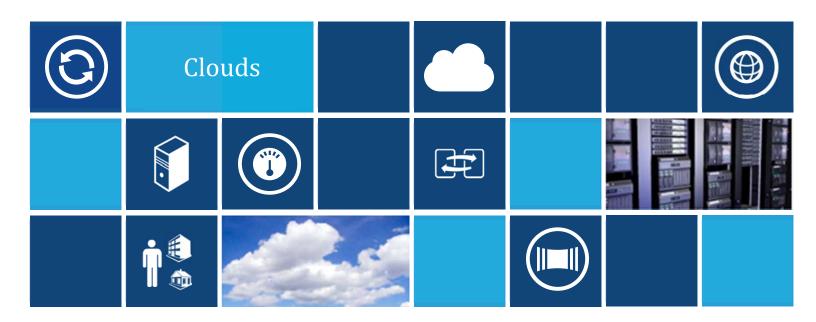
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Microsoft Private Cloud: Evaluation Guide

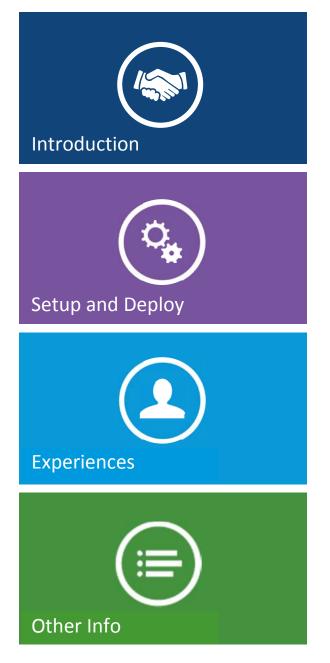




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Introduction

Using the Evaluation Guide

This Private Cloud Evaluation Guide is built to give you the necessary information to experience the Microsoft Private Cloud built on System Center 2012 SP1 and powered by Windows Server 2012 where you will go through detailed scenarios in a proof of concept environment. This guide is designed to be consumed as you wish and each of the hands-on portions of the guide are designed as "Experiences." Each of the Experiences are independent so that you may build and test each of them in any order you wish.

This guide is intentionally built so that you can run it on -lower-level hardware for the purpose of evaluation. It is also possible to follow this guide and change the scenario to your own environment and parameters.

Navigating the document on your terms

This document is designed for you to navigate much easier and locate the information that is most relevant to you. Each of the **4 major chapters – Introduction, Setup and deploy, Experiences and Other info – are collapsible and expandable**.

OIntroduction OUsing the Evaluation Guide

You will also find that you may jump to any of the other chapters or experiences from the end of any section. The following navigation window allows you to click on the desired tile which links directly to that point in the document. **Simply press** "<u>ctrl+click</u>" the tile to view that section.

Links to other areas of interest	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	
	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

This tile takes you back to the Evaluation Guide Contents page.

What is Microsoft's Private Cloud?

The Microsoft Cloud OS

Cloud computing is happening. It is being driven by the exponential growth in modern applications, data and devices. These trends require organizations to quickly scale and deliver continuous services. Simultaneously, innovation is happening across storage, network and compute technologies. With these new requirements and innovations, IT is under pressure to deliver capacity on demand, whether for short-term projects or longer-term initiatives. At the same time, organizations have higher expectations for service levels – services must be always up, always on, with no planned or unplanned downtime.

To meet these challenges, a new modern platform is required. In the era of cloud computing, Microsoft delivers this with the Cloud OS. The Cloud OS takes on a broader role than just managing a server. Microsoft's vision for the Cloud OS is focused on the transformation of the datacenter, enabling modern applications, unlocking insights on any data and empowering people-centric IT.



transforms the datacenter enables modern apps unlocks insights on any data empowers people-centric IT

Figure 1: The Cloud OS delivers on four fundamental tenets of the next generation of IT

The Cloud OS requires a comprehensive execution of vision crossing a wide range of enterprise technologies, including Windows Azure, SQL Server, System Center and Windows Server. This whitepaper sets out a step on that journey by focusing on the transformation of the datacenter. Fundamental to the modern datacenter, is the ability to build private cloud infrastructures and quickly scale within the datacenter as well as agile and secure consumption of Windows Azure and service provider cloud capacity. This paper explains Windows Server 2012 as the foundation for the Private Cloud and how System Center 2012 SP1, makes the management of private and public clouds consistent and seamless.

The Private Cloud in your datacenter

A private cloud aims to deliver many of the characteristics of public cloud computing such as scalability and elasticity, the pooling of shared infrastructure, user self-service, and higher levels of overall application availability and reliability. However, by taking a private cloud approach, organizations can deliver on these goals while still using their own physical resources allowing them to maintain complete control over their data and processes.



Figure 2: The private cloud delivers the broad benefits of cloud computing with added levels of control and customization

With shared infrastructure, compute, storage and even networking assets are virtualized and pooled together. This approach is a shift from today's model in which an application owner will likely know (and probably fund) the exact hardware on which their application is physically deployed. In a private cloud environment, application owners will only care that adequate capacity to run the application has been provided from the shared pool. Once deployed, services can scale up and down based on demand. IT no longer needs to over-provision infrastructure capacity to accommodate potential spikes in load.

Datacenter administrators and application owners can view resource utilization as well as the chargeback information related to their allocated capacity. By giving application owners better visibility over their resource usage organizations are able to more easily drive and deliver the right behavior to conserve capacity where possible. A self-service interface to which standardized services are published from central IT, empowers application owners and other internal customers to be able to easily provision resources when needed. Automation helps to drive efficiency in service delivery thereby freeing up IT Pros to focus on other tasks. Self-service also frees up application owners as well. They are empowered to directly access resources; no complicated approval process; no need to wait for the overworked IT team to eventually get to the request.

A private cloud deployment captures all of these characteristics, most of which are also in common with public and partner hosted clouds, but, the private cloud also allows organizations to maintain total control over their applications and data. These are common blockers for businesses looking at public cloud solutions. Ultimately, most customers will find portions of their organization that live best in a private deployment, portions that live best in a public deployment and in some cases portions that are best served by partner delivered clouds. The world will exist in a hybrid state for the foreseeable future and it is important for companies to evaluate their particular needs to determine the best combination for them.

Why System Center 2012 SP1 for your Private Cloud

Over the last twenty years, Microsoft has built some of the world's largest datacenters running many of the world's largest cloud hosted services. The expertise that has been built up in efficiently running these massive data centers forms the foundation for the Microsoft private cloud offering. Built on System Center 2012 SP1 and Windows Server 2012, a Microsoft private cloud allows datacenter administrators to deploy a flexible and responsive infrastructure that is designed to simplify day-to-day tasks and to enable management of applications at the service level, rather than the level of individual servers.

System Center 2012 SP1 makes it easy for customers to build private clouds while taking advantage of currently deployed IT hardware and building an infrastructure for the future. This comprehensive offering was designed around the following principles.

These principles are surfaced through a core set of capabilities in Windows Server 2012 and System Center 2012 SP1, allowing datacenter administrators and application owners to access and consume IT services from these private clouds.

The rest of this paper will describe the private cloud capabilities provided by System Center 2012 SP1. For the datacenter administrator, this includes infrastructure management, service delivery and automation. For the application owner or business unit IT professional, this includes self-service application management, monitoring and reporting.

The table in Figure 3 highlights these capabilities, how they align to industry concepts and System Center 2012 SP1 components.

Customer Scenario	Industry Capability	System Center 2012 Component	
Application	Application Self-Service	App Controller, Service Manager	
Management	Application Performance Management	Operations Manager	
	Application Management Across Clouds	Virtual Machine Manager	
Service Delivery &	IT Service Management & Reporting	Service Manager	
Automation	Process Automation & Orchestration	Orchestrator	
Infrastructure	Cloud Creation & Delegation	Virtual Machine Manager	
Management	Data Protection & Disaster Recovery	Data Protection Manager, Orchestrator	
	Monitoring	Operations Manager	
	Configuration & Compliance	Configuration Manager	

Figure 3: Mapping of industry cloud computing concepts to System Center 2012 SP1 products and features.

Components of the Private Cloud

Overview

Highly virtualized computing gives you the benefits of increased utilization of your servers, power savings, and reduced server footprint. We are familiar with these as they are in datacenters today. However, this does not equal the private cloud.

A private cloud provides all of those benefits plus highly integrated and automated management, scalable and elastic platforms, and self-service IT infrastructure.

Through a highly automated infrastructure, an organization can reduce operational costs by automating many tasks that previously required manual intervention. Through the service catalog an organization can provide a self-service IT infrastructure to business units and departments with an SLA. This forces service-level discussion and removes the burden to procure, provision, and manage infrastructure on a per-application, ad-hoc basis. With a scalable and elastic infrastructure, an organization can enable faster delivery of capacity as resource needs change. By utilizing a Windows Server 2012 infrastructure along with System Center 2012 SP1, the Microsoft private cloud allows you to deploy a flexible and responsive infrastructure, designed to simplify day-to-day tasks and enable management of applications at the service level, rather than that of individual servers.

With the release of Service Pack 1, many new features have been made available to increase scalability, elasticity and automation of the Private Cloud. Wider integration with many other products including Windows Azure means more options for IT professionals wishing to take advantage of the Public and Private cloud to future proof their business.

Reference Links

- Download Microsoft Windows Server 2012
- Download Microsoft System Center 2012 SP1
- Download SC2012 Configuration Manager and Endpoint Protection SP1
- What's new in System Center 2012 SP1
- <u>What's new for Orchestrator in System Center 2012 SP1</u>
- <u>What's new for App Controller in System Center 2012 SP1</u>
- <u>What's new for Virtual Machine Manager in System Center 2012 SP1</u>
- What's new for Operations Manager in System Center 2012 SP1
- What's new for Service Manager in System Center 2012 SP1
- <u>What's new for Data Protection Manager in System Center 2012 SP1</u>

Microsoft Windows Server 2012

Microsoft Windows Server 2012 is the operating system that runs your private cloud. In this evaluation guide it will run as the host hypervisor, the OS for the different infrastructure components, and for the application that we will deploy, manage, and monitor.

Hyper-V

Hyper-V is the server virtualization technology within Windows Server 2012. It allows you to run virtual machines on top of the host Operating System when your hardware is capable of running virtualized loads.

System Center Orchestrator

System Center Orchestrator is a workflow engine that allows you to automate the creation, deployment and monitoring of resources in your private cloud. Better said, Orchestrator provides you with orchestration, integration and automation of IT processes. Orchestrator works in conjunction with all the System Center components and can also be used to automate components from 3rd party applications like HP ILO and OA, VMware vSphere and many others (for a full list of Orchestrator 2012 SP1 integration packs see http://technet.microsoft.com/en-us/library/hh295851.aspx).

Included as part of Orchestrator 2012 SP1 is the Service Provider Framework which enables service providers to offer Infrastructure as a Service (IaaS). The provider may have already provided a front-end portal for clients to interact with, and Service Provider Foundation allows those clients access to their resources on the hosting provider's system without any change to the portal.

Components	Description
Management Server	The management server is the communication layer between the Runbook Designer and the orchestration database
Runbook Server	A runbook server is where an instance of a runbook runs. A runbook is a collection of actions bundled together that Orchestrator will run performing various automated actions. Runbook servers communicate directly with the orchestration database. You can deploy multiple runbook servers per Orchestrator installation to increase capacity and redundancy.
Orchestration Database	The database is a Microsoft SQL Server database that contains all of the deployed runbooks, the status of running runbooks, log files, and configuration data for Orchestrator.
Runbook Designer	The Runbook Designer is the tool used to build, edit, and manage Orchestrator runbooks. One runbook or different runbooks together form your workflow(s).
Runbook Tester	Runbook Tester is a run-time tool used to test runbooks developed in the Runbook Designer. This tool allows you to test your runbooks before taking them into production.
Orchestration Console	The Orchestration console lets you start or stop runbooks and view real-time status on a web browser. This is a Silverlight-based web console.

Orchestrator Web Service	The Orchestrator web service is a Representational State Transfer (REST)-based service that enables custom applications to connect to Orchestrator to start and stop runbooks, and retrieve information about operations by using custor applications or scripts. The Orchestration console uses this web service to interact with Orchestrator.	
Deployment Manager	Deployment Manager is a tool used to deploy integration packs (IPs), runbook servers, and Runbook Designers	
Integration pack (IP)	An integration pack is a collection of custom activities specific to a product or technology. Microsoft and other companies provide integration packs with activities to interact with their product from an Orchestrator runbook.	
Orchestrator Integration Toolkit	The Orchestrator Integration Toolkit lets you extend your library of activities beyond the collection of standard activities and integration packs. The Integration Toolkit has wizard-based tools to create new activities and integration packs for Orchestrator. Developers can also use the Integration Toolkit to create integration packs from custom activities that they build by using the Orchestrator SDK.	

- Exchange Administrator Integration Pack for Orchestrator in System Center 2012 SP1
- Exchange Users Integration Pack for Orchestrator in System Center 2012 SP1
- Representational State Transfer (REST) Integration Pack Guide for Orchestrator in System Center 2012 SP1

System Center App Controller

System Center App Controller is a Silverlight web-based interface that allows you to manage, build, configure and deploy services both on the private and the public cloud. With this interface, you will have a common self-service experience through your different clouds. This interface is mainly used to provide self-service capabilities for your application owners.

The ability to control and manage applications and services within the private cloud is critical. A key requirement, as organizations begin using hybrid apps, will be the ability to connect with services in other clouds and to manage them through a single management experience.

Components	Description
App Controller Server	The App Controller Server runs the web-based Silverlight application to manage, build, configure and deploy services both on your private cloud and the public cloud.
Database	The database that contains the necessary information for the connection to your Azure subscriptions and your Virtual Machine Manager service(s).
PowerShell Module	The App Controller PowerShell Module provides administrators with the ability to automate App Controller administration.

- Upload a virtual hard disk or image to Windows Azure from a VMM library or network share
- Migrate a virtual machine from VMM to Windows Azure
- Add a Service Provider Framework (SPF) hosting provider connection. SPF enables service providers to offer Infrastructure as a Service (IaaS) to their clients.

System Center Virtual Machine Manager

System Center Virtual Machine Manager is the component that provides you with virtual machine management AND service deployment. This component comes with support for multi-hypervisor environments and is the system that allows you to define, create and manage your private cloud environment(s).

Components	Description
VMM Management Server	The computer on which the Virtual Machine Manager service runs and which processes commands and controls communications with the VMM database, the library server, and virtual machine hosts.
VMM Console	The Virtual Machine Manager Console is the graphical user interface to your VMM environment.
VMM Self-Service Portal	A website used to deploy and request virtual machines.
VMM Database	The VMM database stores all the Virtual Machine Manager configuration and information regarding the hosts and virtual guests.
VMM Library Server	The VMM Library Server is a catalog of resources containing all the ISO files, virtual hard disks, templates and profiles used to deploy virtual machines and services.

New Capabilities

- Support for Network Virtualization with the support for using DHCP to assign customer IP addresses
- Support for VHDX format with functionality to convert from VHD to VHDX
- Support for file shares using SMB 3.0

System Center Operations Manager

System Center Operations Manager provides you with deep application diagnostics and infrastructure monitoring of your private cloud components. It can offer you a thorough overview of the performance and availability of applications deployed in your datacenter, private or public cloud.

Components	Description			
Management Server	The Operations Manager Management Server is the focal point for			
	administering the management group and communicating with the database.			
	When you open the Operations console and connect to a management group,			

	you connect to a management server for that management group. Depending on the size of your computing environment, a management group can contain a single management server or multiple management servers.
Operations Console	The Operations Manager is the graphical user interface that will give you the single pane of glass monitoring of your private cloud.
Operations Manager Database	The OpsMgr database is where all the collected data like performance & event data, alerts etc. are stored.
Operations Manager Data Warehouse	The OpsMgr data warehouse is used for long term reporting.
Operations Manager Web Console	The OpsMgr web console provides a browser-based alternative to the OpsMgr console.
Operations Manager Advisor	Browser-based console to provide deep insight in your .Net applications
Gateway Server	A gateway server is used to monitor untrusted environments like a DMZ Audit Collection Server ACS is used for collecting and auditing security events.

The diagnostic and monitoring capabilities have been expanded in System Center 2012 Operations Manager SP1. New features include:

- Monitoring Windows Services built on the .NET Framework
- Automatic discovery of ASP.NET MVC3 and MVC Applications
- Enabled APM of SharePoint 2010
- Integration with Team Foundation Server 2010 and 2012

System Center Service Manager

Service Manager provides an integrated platform for automating and adapting your organization's IT service management best practices, such as those found in Microsoft Operations Framework (MOF) and Information Technology Infrastructure Library (ITIL). It provides built-in processes for incident and problem resolution, change-control, and release management.

Components	Description
Management Server	Contains the main software part of a Service Manager installation. You can use the Service Manager management server to manage incidents, changes, users, and tasks.
Database	The database that contains Service Manager configuration items (CI) from the IT Enterprise; work items, such as incidents, change requests, and the configuration for the product itself. This is the Service Manager implementation of a Configuration Management Database (CMDB).
Data warehouse management server	The computer that hosts the server piece of the data warehouse.

Data warehouse databases	Databases that provide long-term storage of the business data that Service Manager generates. These databases are also used for reporting.		
Service Manager console	The user interface (UI) piece that is used by both the help desk analyst and the help desk administrator to perform Service Manager functions, such as incidents, changes, and tasks. This part is installed automatically when you deploy a Service Manager management server. In addition, you can manually install the Service Manager console as a stand-alone part on a computer.		
Self-Service Portal	A web-based interface into Service Manager.		

- Chargeback helps you can apply cloud-based pricing to your Virtual Machine Manager fabric
- Improved Operations Manager Integration
- SQL Server 2012 Support
- Windows Server 2012 and Windows 8 Support

System Center Data Protection Manager

Data Protection Manager (DPM) enables disk-based and tape-based data protection and recovery for servers such as SQL Server, Exchange Server, SharePoint, virtual servers, file servers, and support for Windows desktops and laptops. DPM can also centrally manage system state and Bare Metal Recovery (BMR) which will allow us to protect the servers that contain our virtualized infrastructure.

Components	Description
DPM server	The DPM server contains the program files of the Data Protection Manager installation. This server will be responsible for all the protection and recovery jobs
Database	The DPM database will contain all the information of your Data Protection Manager environment. All protection group information, agent information, recovery points and so on are stored here.
Central Console	Operations Management is used as the platform for the central console and is used to manage your SCDPM server (or multiple DPM servers)
Storage Pool	The Storage Pool contains your storage that will be used to take disk-to-disk backups

- Cluster Shared Volume (CSV) 2.0 Support for improved performance on backing up virtual machines on CSVs.
- Hyper-V protection over remote SMB Shares.
- Scale Out support for Hyper-V machines.
- Protection of Windows 8 de-duplicated volumes.
- Support for Live Migration.
- Integration with Windows Azure Online Backup.
- Support for SQL 2012 Always-On feature.
- Support for Resilient File System (ReFS).

Summary

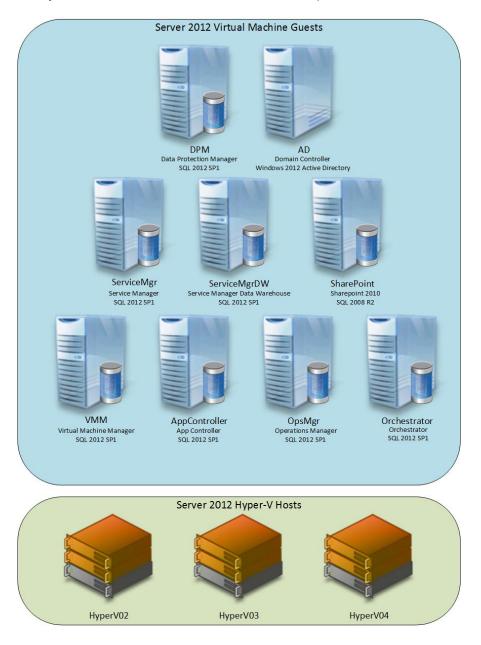
In this first chapter, you reviewed the components that are needed to deploy a private cloud. Now you know all the building blocks to start with your evaluation of the Private Cloud.

Links to other areas of interest	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	Щ.
	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Setup and deploy your Private Cloud

Architecture

Here is the overview of what hardware we are going to use for our private cloud evaluation. This can be different from your environment but this is the minimum required to evaluate the Private Cloud.



Installing the Private Cloud

Implementing or upgrading your Private Cloud

This document covers two situations where you may be deploying System Center 2012 SP1 into a Lab or sandbox environment for evaluation of the Private Cloud. This may be your first time evaluating System Center 2012 and Windows Server 2012, so you have an environment that is empty. Or this may be a follow up from a previous evaluation using the Private Cloud Evaluation guide that was released with the System Center 2012 RTM package.

In future there will also be an option to install the full System Center 2012 Suite using the Microsoft Cloud Accelerator Toolkit.

Both of these situations can be covered in the Install and Upgrade sections below. If you wish to install a Private Cloud environment from a blank environment, follow the steps outlined below in the Installing the Private Cloud section. If you wish to upgrade an existing Private Cloud evaluation environment delivered via the Unified Installer or the previous Private Cloud Evaluation guide, then follow the steps outlined in the section Upgrading the Private Cloud.

If you have previously deployed the Private Cloud either using the previous Evaluation Guide or using the Unified Installer that was released with System Center 2012 RTM, you may have less hardware than the diagram above. To upgrade an RTM environment to SP1 and implement the scenarios in later sections of the document you will need 2 additional hosts, and 2 network cards per host. Each server must have Windows Server 2012 installed, and the Hyper-V role enabled.

More detail on setting up the hardware can be found in the section labeled Upgrading the Private Cloud.

Prerequisites

Physical servers

The following minimum physical servers are required:

Name	CPU	Memory	Disk	NIC's	Main IP	Cluster IP
HyperV02	4	16 GB	1TB	2 Physical NICs	192.168.1.2	172.24.100.2
HyperV03	4	16 GB	1TB	2 Physical NICs	192.168.1.21	172.24.100.21
HyperV04	4	16 GB	1TB	2 Physical NICs	192.168.1.22	172.24.100.22

All servers have a subnet mask of 255.255.255.0 on both network adapters.

Virtual servers

Name	Function	CPU	Memory	Disk	IP
Orchestrator	Orchestrator server	2 vCPU	4 GB	60GB	192.168.1.3
VMM	Virtual Machine Manager server	2 vCPU	4 GB	90GB	192.168.1.4
AppController	App Controller server	2 vCPU	4 GB	60GB	192.168.1.5
OpsMgr	Operations Manager server	2 vCPU	4 GB	60GB	192.168.1.6
ServiceMgr	Service Manager server	2 vCPU	4 GB	60GB	192.168.1.7
ServiceMgrDW	Service Manager Data Warehouse	2 vCPU	4 GB	60GB	192.168.1.8
	server				
DPM	Data Protection Manager server	2 vCPU	4 GB	60GB	192.168.1.9
AD	Domain Controller	2 vCPU	2 GB	60GB	192.168.1.10
SharePoint	SharePoint 2010 Server	2 vCPU	4 GB	60GB	192.168.1.11

The following virtual servers are required:

When you are going to deploy the infrastructure and work through the different exercises, you can use your own IP addresses and better hardware. If you work with different IP ranges, you need to take into account that for some of the exercises, you will also need to change the ranges.

Installing the Private Cloud – fresh install

Requirements

If you are installing the Private Cloud with Server 2012 and System Center 2012 SP1 with a blank environment you will require the following prerequisites:

ltem	Detail
Hardware	3 Hosts meeting the minimum specification as detailed in the Architecture section
Operating	Windows Server 2012
Systems	<u>http://www.microsoft.com/en-us/server-cloud/windows-server/trial.aspx</u> Windows Server 2008 R2 SP1 <u>http://www.microsoft.com/en-us/download/details.aspx?id=11093</u>
Software	System Center 2012 SP1 <u>http://www.microsoft.com/en-us/download/details.aspx?id=34607</u> (BETA) SQL 2012 SP1 <u>http://www.microsoft.com/betaexperience/pd/SQL2012EvalCTA/enus/default.aspx</u> SQL 2008 R2 SP2 <u>http://www.microsoft.com/en-us/download/details.aspx?id=6362</u>

Each product within the System Center suite and SQL also have their own prerequisites. Please refer to the documentation for each product for guidance on installation.

Reference Links

- Windows Server
 - o Download Windows Server 2012
 - Installing Windows Server 2012
 - How to Install Active Directory Domain Services
- SQL Server
 - o Download Microsoft SQL Server 2012 SP1
 - o How to install SQL Server 2008 R2
 - o Quick Start Installation of SQL Server 2012 SP1
- System Center
 - o Download System Center 2012 SP1
 - Install System Center 2012 SP1
 - o How to Install Virtual Machine Manager Management Server
 - o Single-Server Deployment of Operations Manager
 - o Installing Service Manager on Two Computers
 - o Self-Service Portal Deployment for System Center 2012 Service Manager
 - How to Install Orchestrator on a Single Computer
 - o Installing App Controller
 - o Installing Data Protection Manager

Installation process

Once you have the prerequisites downloaded the installation process can commence. Follow each of the steps as detailed in the sequence below.

Install Windows Server 2012 hosts

Install Windows Server 2012 on the two physical hosts.

Once the hosts are built complete the following actions on each host:

- Assign the IPv4 addresses as per the table in the Private Cloud Architecture section in this document
- Rename the hosts to match the naming convention in the Private Cloud Architecture section in this document
- Add the Hyper-V Role (see appendices for detailed instructions)

Once these steps are complete, configure the Virtual Network on each host. It is important that each host has identical Virtual Network settings. To configure the Virtual Network, follow the instructions below on each host:

- 1. Open the Hyper-V Manager console
- 2. Click on Connect to Server in the right hand pane
- 3. Type localhost and click OK
- 4. Right click on the Host name and select Virtual Switch Manager
- 5. Select New Virtual Network Switch, click on External and click Create Virtual Switch
- 6. Set the Name to "External Virtual Network"
- 7. Ensure the physical network adapter is selected and the tick box *allow management operating system to share this network adapter* is ticked.
- 8. Click OK.

Once the Hosts are configured, complete these steps:

- Create a virtual machine for each of the servers as detailed in the Private Cloud Architecture section, ensuring the settings match the table. (See Appendices for instructions on creating a virtual machine). Ensure when you create these virtual machines that you distribute the machines across the 3 physical hosts HyperV02, HyperV03 and HyperV04.
- 2. Install Windows Server 2012 on every virtual machine, except the SharePoint server
- 3. Install Windows Server 2008 R2 on the SharePoint server
- 4. Configure each virtual machine as per the table in the Private Cloud Architecture section in this document.

- 5. Configure the network settings on each virtual machine as per the table in the Private Cloud Architecture section. See the appendices for steps on setting the IPv4 address on a Windows 2012 server.
- 6. Prepare Active Directory on the server "AD".
- 7. Add all servers to the new domain. See the appendices for steps on how to add a Windows 2012 server to the domain.

Once these steps are complete, the lab you have constructed will be ready for deploying System Center 2012.

Group policies

To make the evaluation easier, we've created a Group Policy on domain level to enable and disable a few settings. By default we disabled all Windows Firewalls on the server machines and enabled remote desktop for easy access. It is not necessary to disable Windows Firewall and you can review the requirements for Windows Firewall on the different TechNet pages for the components.

Passwords

All passwords in this evaluation guide are the same. For every account, we are using the password: "pass@word1"

Installing System Center 2012 SP1

Now that the lab is ready for System Center 2012, you can start deploying the different products in the suite on each of the virtual machines in the lab. Install each product in the following order:

- Virtual Machine Manager
- Operations Manager
- Service Manager
- Orchestrator
- App Controller
- Data Protection Manager

You'll notice below that all items that should be installed on the virtual machine with that product have been included. If you've already installed that product on the virtual machine, you may skip installing it again.

Virtual Machine Installation Guidance				
Virtual Machine Manager	1.	Install SQL 2012 SP1 on the virtual machine designated for Virtual Machine Manager as per the installation instructions found here <u>http://technet.microsoft.com/en-us/sqlserver/ff898410.aspx</u> Install System Center 2012 Virtual Machine Manager SP1 as per the installation instructions found here <u>http://technet.microsoft.com/en-us/library/gg610669.aspx</u> .		

	1	Install SQL 2012 SP1 on the virtual machine designated for Operations
Operations Manager		Manager as per the installation instructions found here
		http://technet.microsoft.com/en-us/sqlserver/ff898410.aspx
	2.	Install System Center 2012 Operations Manager SP1 as per the
		installation instructions found here <u>http://technet.microsoft.com/en-</u>
		us/library/hh298609.aspx.
	1.	Install SQL 2012 SP1 on the virtual machine designated for Service
Service Manager	1.	Manager as per the installation instructions found here
Service Manager		http://technet.microsoft.com/en-us/sqlserver/ff898410.aspx.
	2.	Install SQL 2012 SP1 on the virtual machine designated for Service
	۷.	Manager Data Warehouse using the same instructions. Ensure that as
		well as the Database engine, that the Reporting Services and Analysis
		Service are also installed with SQL 2012.
	3.	Install SQL 2008 R2 on the virtual machine designated for SharePoint
	5.	as per the installation instructions found here
		http://technet.microsoft.com/en-us/sqlserver/ff398089.aspx
	4.	Install System Center 2012 Service Manager SP1 as per the installation
	4.	install system center 2012 service manager 3F has per the installation
		us/library/hh305220.aspx. Use the two-computer scenario.
	5.	Install the Self Service Portal for System Center 2012 Service Manager
	5.	SP1 using the instructions found here
		-
	1	http://technet.microsoft.com/en-us/library/hh495575.aspx.
Orchastrator	1.	Install SQL 2012 SP1 on the virtual machine designated for
Orchestrator		Orchestrator as per the installation instructions found here
	2	http://technet.microsoft.com/en-us/sqlserver/ff898410.aspx.
	2.	Install System Center 2012 Orchestrator SP1 as per the installation
		instructions found here <u>http://technet.microsoft.com/en-</u>
	1	us/library/hh420337.aspx.
App Controller	1.	Install SQL 2012 SP1 on the virtual machine designated for App
App Controller		Controller as per the installation instructions found here
	C	http://technet.microsoft.com/en-us/sqlserver/ff898410.aspx.
	2.	Install System Center 2012 App Controller SP1 as per the installation
		instructions found here <u>http://technet.microsoft.com/en-</u>
	4	us/library/jj871059.aspx.
	1.	Install System Center 2012 Data Protection Manager SP1 as per the
Data Protection Manager		installation instructions found here <u>http://technet.microsoft.com/en-</u>
	~	us/library/hh758153.aspx.
	2.	DPM has SQL 2008 R2 as part of the product download and this will
		be installed during the install phase.

Summary

Once you have completed each of the installations as documented above you will have a Private Cloud environment ready to perform the scenarios available in this document. Once you are ready to start these scenarios, please continue to the Scenario Prerequisite section.

Links to other	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info)
areas of interest	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Upgrade your existing Private Cloud to SP1

If you have previously deployed System Center 2012, and wish to reuse that environment to re-evaluate the Private Cloud with System Center 2012 SP1, this is entirely possible. To accomplish this you will need to complete several tasks to take the environment to a state where the scenario information in the subsequent sections is possible to complete.

This upgrade process presumes that the environment you are currently running is built using the previous version of the Private Cloud Evaluation Guide that was released with the RTM of System Center 2012. Before starting this process, ensure that all of the latest Windows Updates and Service Packs are applied to the environment. Specifically ensure that all System Center 2012 installations are updated to Update Rollup 2.

Upgrade the hardware

In the previous Evaluation Guide there was a requirement for a single physical host. This is now increased to three physical hosts with the following minimum specification:

Name	CPU	Memory	Disk	Network Cards	Main IP
HyperV02	4	16 GB	1TB	1 Physical NIC	192.168.1.2
HyperV03	4	16 GB	1TB	1 Physical NIC	192.168.1.21
HyperV04	4	16 GB	1TB	1 Physical NIC	192.168.1.22

To upgrade the hardware, add the two new physical hosts into your Evaluation Lab environment, and build them using Windows Server 2012. Install Windows Server 2012 on the two physical hosts.

Important Note

Note that each server requires two physical network cards to complete the scenarios detailed in the later sections of this document.

Once they have been built, set the IP addresses as

per the above table and add them to the domain you have currently in your lab environment. See the Appendices for details on how to edit a Windows Server 2012 server IP settings and add it to a domain.

Once they are built, add the Hyper-V role to each of the Windows Server 2012 hosts and set the Virtual Network settings. It is important that each host has identical Virtual Network settings. To configure the Virtual Network, follow the instructions below on each host:

- 1. Open the Hyper-V Manager console
- 2. Click on Connect to Server in the right hand pane
- 3. Type localhost and click OK
- 4. Right click on the Host name and select Virtual Switch Manager
- 5. Select New Virtual Network Switch, click on External and click Create Virtual Switch
- 6. Set the Name to External Virtual Network

....

- 7. Ensure the physical network adapter is selected and the tick box *allow management operating system to share this network adapter* is ticked.
- 8. Click OK.

Reference Links

- Description of Update Rollup 2 for System Center 2012
- Installing Microsoft Windows Server 2012
- Evaluating Microsoft Windows Server 2012

Upgrade System Center 2012 to SP1

Once the new Windows 2012 Hosts are in place, it's time to start upgrading the Private Cloud to System Center 2012 SP1. This must be completed in a particular sequence and this sequence is documented in the "Upgrade Sequencing for System Center 2012 Service Pack 1" found <u>http://technet.microsoft.com/en-us/library/jj628191.aspx</u>. The Installation Guidance below follows this sequence.

Installation Guidance	
Orchestrator	To upgrade Orchestrator to SP1 follow the document "Upgrading
	System Center 2012 - Orchestrator to System Center 2012 SP1" which
	can be found http://technet.microsoft.com/en-
	US/library/jj900231.aspx.
Service Manager	To upgrade Service Manager to SP1 follow the document "Upgrading
	to System Center 2012 - Service Manager" which can be found
	http://technet.microsoft.com/en-us/library/hh519584.aspx.
Data Protection Manager	To upgrade Data Protection Manager to SP1 follow the document
	"Upgrading from System Center 2012 - Data Protection Manager"
	which can be found http://technet.microsoft.com/en-
	us/library/jj650934.aspx.
Operations Manager	To upgrade Operations Manager to SP1 follow the document
	"Upgrading System Center 2012 - Operations Manager to Operations
	Manager in System Center 2012 Service Pack 1" which can be found
	http://technet.microsoft.com/en-us/library/jj899854.aspx.
Virtual Machine Manager	To upgrade Virtual Machine Manager to SP1 follow the document
	"Upgrading to VMM in System Center 2012 SP1" which can be found
	http://technet.microsoft.com/en-us/library/jj870890.aspx.
App Controller	To upgrade App Controller to SP1 follow the document "Deploying
	App Controller in System Center 2012 Service Pack 1 (SP1)" which can
	be found <u>http://technet.microsoft.com/en-us/library/jj871059.aspx</u> .

Physical hosts

Once the System Center 2012 suite has been upgraded to SP1, migrate each of the virtual machines currently running on HyperV02 to HyperV03 and HyperV04. Once these virtual machines have been removed from HyperV02, rebuild the HyperV02 host to Windows Server 2012.

Summary

Once these upgrades have been completed you should have the following:

- 3 physical hosts with Windows Server 2012
- 7 Virtual Machines with System Center 2012 SP1

Links to other	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	띑
areas of interest	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Configuring the Private Cloud experiences

This document follows a series of scenarios that a typical business would perform to implement and take advantage of a Server 2012 and System Center 2012 SP1-based private cloud. In these scenarios we will use the personas of Jeff and Debbie.

Jeff is the Data Center admin for Contoso Electronics, a small firm that is growing rapidly beyond its current infrastructure. Increased sales and market share means the current IT infrastructure cannot cope with the requirements for the business, and Jeff needs to take advantage of many of the features of the private cloud to increase the ability of the companies' infrastructure to respond to growing demand.

Debbie is a Business Unit owner and leads a team of developers responsible for delivering new retail applications to the business. She maintains several environments for developing the new applications and requires the infrastructure to be made available at short notice when new projects are provisioned. She also needs to keep an eye on the cost of these environments as each project must be charged on the resources they consume.

During these scenarios, these people will be involved in decision making and taking advantage of the new capabilities of System Center 2012 SP1, and Server 2012.

Prerequisites

The following prerequisites are required to be in place before you can start the evaluation of the Microsoft private cloud solution. All of these steps will take place on **HyperV02**, **HyperV03** or **Hyperv04**. It is assumed that the **Hyper-V** role has already been added to these hosts, that they have been added to the **Contoso.com**, and they have the same **IP address** as outlined in the hardware recommendations in the previous chapter.

Required software for scenarios

The following software will be required for to complete the following stories. The software can be obtained from the Microsoft website and links are provided.

• Windows Server 2012

Microsoft Windows Server 2012 Evaluation **VHD**. This is required for the build of **Guest01** and should be downloaded and extracted to the folder **C:\VirtualMachines** on **HyperV02**.

http://technet.microsoft.com/en-nz/evalcenter/hh670538.aspx

• SQL Server 2012 SP1

R

Microsoft SQL Server 2012 with SP1 Evaluation. This is require for the build of **Guest01** and should be downloaded and extracted to the folder **C:\VirtualMachines** on **HyperV02**.

http://technet.microsoft.com/en-us/evalcenter/hh225126.aspx

• SysInternals Tools

Microsoft Sys Internals VHDTool. This is required for the generation of a large VHD on **Guest01**. To make the file easily accessible to **Guest01**, the file should be stored on the SMB 3.0 share **\\HyperV02\SMB3Share** on **HyperV02**

http://archive.msdn.microsoft.com/vhdtool

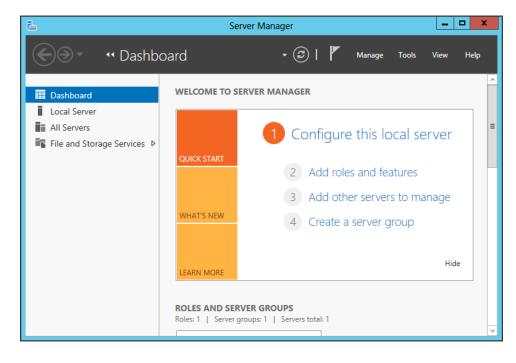
Configuring a SMB 3.0 share

Before **Jeff** can implement a highly available private cloud solution he is going to need a commonly accessible storage platform that can host his highly available services. There are numerous ways that this can be achieved but for the purposes of his evaluation Jeff would like to use a new feature in **Microsoft Windows Server 2012.** That feature is **SMB 3.0** and is available as an installable feature.

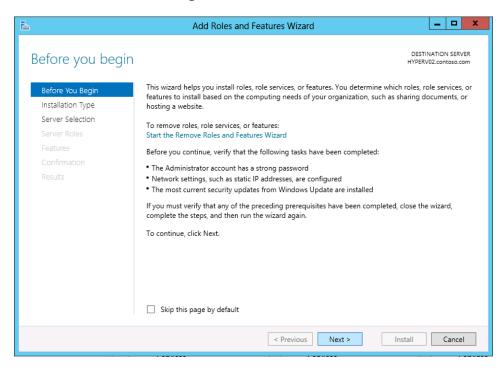
The following steps should be completed on the server HyperV02

Create a SMB 3.0 share

1. Open Server Manager, confirm that the Dashboard is open and select Add Roles and Features



1. In the Before You Begin screen, select Next



2. In the Installation Type screen, tick Role-based or feature-based installation. Then select Next

b	Add Roles and Features Wizard	_		x
Select installatio	n type	NATION /02.cont		
Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	 Select the installation type. You can install roles and features on a running physical comp machine, or on an offline virtual hard disk (VHD). Role-based or feature-based installation Configure a single server by adding roles, role services, and features. Remote Desktop Services installation Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual or session-based desktop deployment. 			
	< Previous Next > Install	C	ance	1

3. In the Server Selection screen select HyperV02 from the Server Pool, select Next

P	Add Roles	s and Features	Wizard	_ 🗆 X		
Select destination	on server			NATION SERVER /02.contoso.com		
Before You Begin Installation Type Server Selection Server Roles	Select a server or a virtual hard disk on which to install roles and features. Select a server from the server pool Select a virtual hard disk					
Features Confirmation	Server Pool					
Results	Name HYPERV02.contoso.com	IP Address 192.168.1.2	Operating System Microsoft Windows Server 2012 Standar	d		
		Server Manager. O	dows Server 2012, and that have been add fline servers and newly-added servers from			
		< Pr	evious Next > Install	Cancel		

4. In the Server Roles screen, expand File and Storage Services, tick File and iSCSI Services, select Next

a	Add Roles and Features Wizard	_ D ×
Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Select one or more roles to install on the selected server. Roles Active Directory Certificate Services Active Directory Domain Services Active Directory Federation Services Active Directory Lightweight Directory Services Active Directory Rights Management Services Active Directory Rights Management Services Application Server DHCP Server DNS Server	DESTINATION SERVER HYPERV02.contoso.com Description File and iSCSI Services provides technologies that help you manage file servers and storage, reduce disk space utilization, replicate and cache files to branch offices, move or fail over a file share to another cluster node, and share files by using the NFS protocol.
	Fax Server File And Storage Services (Installed) V File and iSCSI Services Storage Services (Installed) Hyper-V (Installed) Network Policy and Access Services Print and Document Services V	t > Install Cancel

5. In the **Features** screen select **Next**

	Add Roles and Features Wizard	
Select features	Select one or more features to install on the selected server.	DESTINATION SERVER HYPERV02.contoso.com
Before You Begin	Select one or more features to install on the selected server.	
Installation Type	Features	Description
Server Selection Server Roles Features Confirmation Results	NET Framework 3.5 Features Image: NET Framework 4.5 Features (Installed) Background Intelligent Transfer Service (BITS) BitLocker Drive Encryption BitLocker Network Unlock BranchCache Client for NFS Data Center Bridging Enhanced Storage Failover Clustering Group Policy Management Ink and Handwriting Services Internet Printing Client IP Address Management (IPAM) Server W Image: Management (IPAM) Server	.NET Framework 3.5 combines the power of the .NET Framework 2.0 APIs with new technologies for building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of business processes.

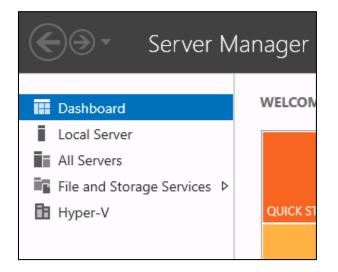
6. In the **Confirmation** screen click on **Install**

A	Add Roles and Features Wizard	_ □ ×
Confirm installati	on selections	DESTINATION SERVER HYPERV02.contoso.com
Before You Begin	To install the following roles, role services, or features on se	ected server, click Install.
Installation Type	Restart the destination server automatically if required	
Server Selection	Optional features (such as administration tools) might be di	
Server Roles	been selected automatically. If you do not want to install the their check boxes.	ese optional features, click Previous to clear
Features		
Confirmation Results	File And Storage Services File and iSCSI Services File Server	
	Specify an alternate source path < Previous	ext > Install Cancel

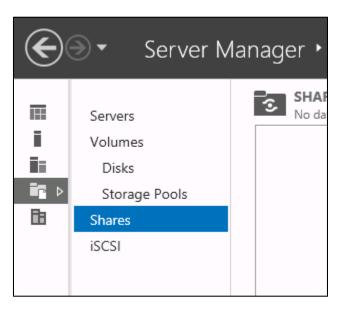
7. On the **Results** screen confirm that the installation was successful. Then select **Close**

a	Add Roles and Features Wizard	_ 🗆 X
Installation prog	ess	DESTINATION SERVER HYPERV02.contoso.com
Before You Begin	View installation progress	
Installation Type	i Feature installation	
Server Selection	Installation succeeded on HYPERV02.contoso.com.	-
Features	File And Storage Services	
Confirmation	File and iSCSI Services File Server	
Results	You can close this wizard without interrupting running tasks. View task	
	Export configuration settings	in o'cluită
	< Previous Next >	Close

8. In Server Manager select File and Storage Services



9. Click **Shares**



10. Select Tasks and then New Share...

SHARES No data available.		TASKS 🔻
	There are no shares.	New Share
	inere are no snares.	Refresh
	To create a file share, start the New Share Wizard.	

11. On the Select Profile screen, select SMB Share – Applications

a	New Share Wi	izard 📃 🗖 🗙
ESELECT THE profile T Select Profile Share Location Share Name Other Settings Permissions Confirmation Results		Description: This profile creates an SMB file share with settings appropriate for Hyper-V, certain databases, and other server applications.
	<	Previous Next > Create Cancel

12. In the **Share Location** screen select **HyperV02**, then select the drive that you would like to host your share on (ensure the drive has 100GB of free space). Then select **Next**

	Ne	w Share Wizard			-		
Select the serve	er and path for th	is share					
Select Profile	Server:						
Share Location	Server Name	Status	Cluster Role	Owner No	ode		
	HYPERV02	Online	Not Clustered	d			
Share Name							
	Share location:						
	Select by volume:						
	Volume	Free Space	Capacity File	System			
	C:	70.5 GB	238 GB NTF	S			
	l:	339 GB	466 GB NTF	S			
	J:	257 GB	466 GB NTF	S			
	The location of the fi volume.	ile share will be a new fold	der in the \Share	s directory on th	he selecte	ed	
	 Type a custom path: 						
					Br	owse.	
		< Previous	Next >	Create	(Cancel	
				<u></u>		_	

13. In the **Share Name** screen, input the share name **SMB3Share**. Then select **Next**

E		New Share Wizard	_		x
Specify share nar	ne				
Select Profile	Share name:	SMB3Share			
Share Location	Chara description.				
Share Name	Share description:				
Other Settings					
Permissions					
Confirmation	Local path to share				
Results	J:\Shares\SMB3Sha	re			
	🕕 lf the folder doe	s not exist, the folder is created.			
	Remote path to sha	are:			
	\\HYPERV02\SMB3	Share			
		< Previous Next > Create	Ca	ancel	

14. On the **Other Settings** screen select **Next** without changing any settings

B	New Share Wizard					
Configure share	settings					
Select Profile Share Location	Enable access-based enumeration Access-based enumeration displays only the files and folders that a user has permissions to access. If a user does not have Read (or equivalent) permissions for a folder, Windows hides the					
Share Name	folder from the user's view.					
Other Settings	Allow caching of share					
Permissions	Caching makes the contents of the share available to offline users. If the BranchCache for Network Files role service is installed, you can enable BranchCache on the share.					
Confirmation	Enable BranchCache on the file share					
Results	BranchCache enables computers in a branch office to cache files downloaded from this share, and then allows the files to be securely available to other computers in the branch.					
	Encrypt data access					
	When enabled, remote file access to this share will be encrypted. This secures the data against unauthorized access while the data is transferred to and from the share. If this box is checked and grayed out, an administrator has turned on encryption for the entire server.					
	< Previous Next > Create Cancel					

15. On the Permissions screen page select Customize Permissions

È.		New Share Wiz	ard		x	
Specify permission Select Profile Share Location	lf this shar remote ma		ost.	nable constrained delegation to enab	ole	
Share Name Other Settings Permissions Confirmation Results	Permissions to access the files on a share are set using a combination of folder permissions, share permissions, and, optionally, a central access policy. Share permissions: Everyone Full Control Folder permissions:					
RESURS	Type Allow Allow Allow Allow Allow Allow Custom	Principal BUILTIN\Users BUILTIN\Users CREATOR OWNER NT AUTHORITY\SYSTEM BUILTIN\Administrators BUILTIN\Administrators	Full Control	Applies To This folder and subfolders This folder, subfolders, and files Subfolders and files only This folder, subfolders, and files This folder, subfolders, and files This folder only		
< Previous Next > Create Cancel						

16. In the Advanced Security Settings for SMB3Share window, select Add

Name: J:\Shares\SMB3Share						
Owner:	Administrators (HYPERV02\Ad	Iministrators) Change				
Permission	s Share Auditing	g Effective Access				
or addition permission Type		nission entry. To modif	y a permission entry, select	the entry and click Edit (if available).		
Allow	Administrators (HYPERV02\A	Full control	None	This folder only		
Allow	Administrators (HYPERV02\A	Full control	J:\	This folder, subfolders and files		
Allow	SYSTEM	Full control	μ	This folder, subfolders and files		
Allow	CREATOR OWNER	Full control	J:\	Subfolders and files only		
Allow	Users (HYPERV02\Users)	Read & execute	J:\	This folder, subfolders and files		
& Allow	Users (HYPERV02\Users)	Special	/:/	This folder and subfolders		
Add Remove View Disable inheritance Replace all child object permission entries with inheritable permission entries from this object						

17. Click on Select a Principal

1			Permissio	on I
ſ	Principal:	Select a principal		
	' Туре:	Allow	~	
	Applies to:	This folder, subfolders and files	~	

18. Select Object Types

Select User, Computer, Service Account, or Group	? X
Select this object type: User, Group, or Built-in security principal	Object Types
From this location:	
contoso.com	Locations
Enter the object name to select (<u>examples</u>):	
	Check Names
Advanced OK	Cancel

19. Tick **Computers** select **OK**

Object Types	? X
Select the types of objects you want to find.	
Object types: Built-in security principals Service Accounts Computers Groups Users Users	
ОК	Cancel

20. Fill in the name of your first Hyper-V host (in this example HyperV03), then select Check Names

Select User, Computer, Service Account, or Gro	up ? X
Select this object type: User, Computer, Group, or Built-in security principal	Object Types
From this location:	
contoso.com	Locations
Enter the object name to select (<u>examples</u>): [Hyper/V03]	Check Names
Advanced OK	Cancel

21. Confirm the servers name has been found correctly then click on **OK**

Select User, Computer, Service Account, or Group) ? X
Select this object type: User, Computer, Group, or Built-in security principal	Object Types
From this location:	
contoso.com	Locations
Enter the object name to select (<u>examples</u>): HYPERV03	Check Names
Advanced OK	Cancel

22. This will return you to the permissions for **SMB3Share**, tick **Full Control**, select **OK**

	Permission Entry for SMB3Share	_ _ ×
Principal:	HYPERV03 (CONTOSO\HYPERV03\$) Select a principal	
Type:	Allow	
Applies to:	This folder, subfolders and files	
Basic permi	ssions:	Show advanced permissions
	✓ Full control	
	✓ Modify	
	✓ Read & execute	
	✓ List folder contents	
	✓ Read	
	✓ Write	
	Special permissions	
🗌 Only app	ly these permissions to objects and/or containers within this container	Clear all
Add a cond Add a cond	ition to limit access. The principal will be granted the specified permissions only if conditions are met. ition	
		OK Cancel

23. Repeat above steps **18-22** for **HyperV04**

	Advanced Sec	curity Settings fo	r SMB3Share	
Name:	J:\Shares\SMB3Share			
Owner:	Administrators (HYPERV02\Administrators) Change		
Permission	s Share Auditing Effect	ive Access		
For addition:	al information, double-click a permission entry	. To modify a permi	ssion entry, select t	he entry and click Edit (if available).
Permission e	ntries:		•	
Туре	Principal	Access	Inherited from	Applies to
& Allow	Administrators (HYPERV02\Administrators)	Full control	None	This folder only
Allow	HYPERV03 (CONTOSO\HYPERV03\$)	Full control	None	This folder, subfolders and files
Allow	HYPERV04 (CONTOSO\HYPERV04\$)	Full control	None	This folder, subfolders and files
& Allow	Administrators (HYPERV02\Administrators)	Full control	J:\	This folder, subfolders and files
& Allow	SYSTEM	Full control	J:\	This folder, subfolders and files
& Allow	CREATOR OWNER	Full control	J:\	Subfolders and files only
& Allow	Users (HYPERV02\Users)	Read & execute	J:\	This folder, subfolders and files
<		III		>
Add	Remove Edit			
Disable in	heritance			
Replace a	II child object permission entries with inheritab	le permission entrie:	from this object	
				OK Cancel Apply

24. Confirm that HyperV03 and HyperV04 are listed in the permissions, select OK

25. On the **Permissions** screen click on **Next**

2		New Share Wiz	ard	
Specify permission	ons to co	ontrol access		
Select Profile Share Location	remote ma	nagement of the Hyper-V h	ost.	nable constrained delegation to enable
Share Name		nformation refer to the cons		
Other Settings		s to access the files on a sha s, and, optionally, a central :		combination of folder permissions, share
Permissions Confirmation		nissions: Everyone Full Conti	rol	
	Folder per	nissions: Principal	Access	Applies To
	Allow	BUILTIN\Users	Special	This folder and subfolders
	Allow	BUILTIN\Users CREATOR OWNER	Read & execute Full Control	This folder, subfolders, and files Subfolders and files only
	Allow	NT AUTHORITY\SYSTEM		This folder, subfolders, and files
	Allow	BUILTIN\Administrators CONTOSO\HYPERV03\$	Full Control Full Control	This folder, subfolders, and files This folder, subfolders, and files
	Allow	CONTOSO\HYPERV04\$ BUILTIN\Administrators	Full Control Full Control	This folder, subfolders, and files This folder only
	Custom	ize permissions		
		< F	Previous Ne:	xt > Create Cancel

26. On the **Confirmation** screen click on **Create**

a	New Share	Wizard	_ D X
Confirm selection Select Profile Share Location Share Name Other Settings Permissions Confirmation Results	S	wizard are the correct settings, and then HYPERV02 Not Clustered J:\Shares\SMB3Share SMB Disabled Disabled Disabled Disabled Disabled	
		< Previous Next > Cr	eate Cancel

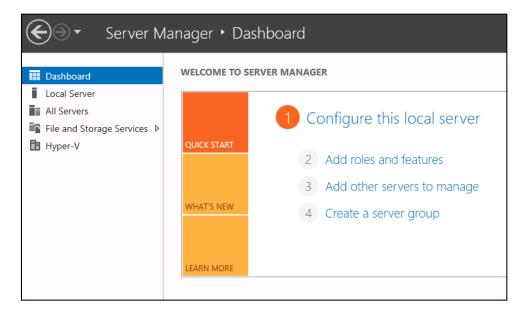
27. Confirm that the action has been completed successfully. Select **Close**

<u></u>	New S	hare Wizard		- - X
View results				
Select Profile	The share was success	fully created.		
Share Location	Task	Progress	Status	
Share Name	Create SMB share		Completed	
Other Settings	Set SMB permissions		Completed	
Permissions				
Confirmation				
Results				
		< Previous Next	Close	Cancel

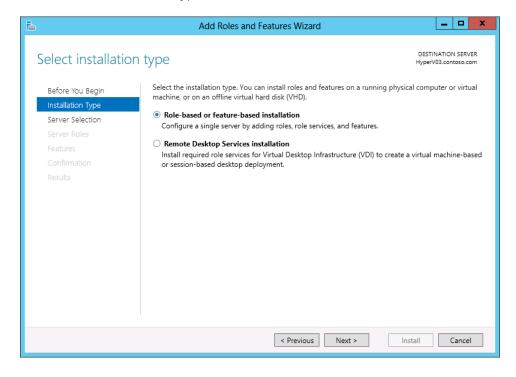
This now completes the creation of an SMB 3.0 share. This will be used as the storage target for the cluster which will be configured in the next step.

Install the Microsoft Failover Cluster

1. Load Server Manager, confirm that the Dashboard is open and then select Add roles and features



- 2. On the Before You Begin window click Next
- 3. In the Installation Type screen, tick Role-based or feature-based installation. Then select Next



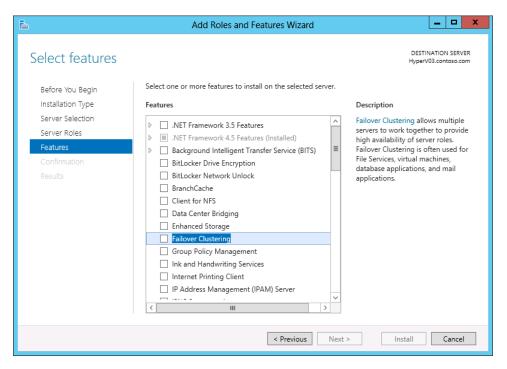
4. On the Server Selection screen select HyperV03 from the Server Pool, then select Next

b	Add Roles	s and Features V	Vizard	_ D X
Select destination	n server			DESTINATION SERVER HyperV03.contoso.com
Before You Begin Installation Type Server Selection Server Roles	Select a server or a virtual Select a server from the Select a virtual hard dis Server Pool	e server pool	to install roles and features.	
Features Confirmation	Filter:			
Results	Name HyperV03.contoso.com	IP Address 192.168.1.21	Operating System Microsoft Windows Server 201	2 Standard
		erver Manager. Off	dows Server 2012, and that have line servers and newly-added ser	
		< Pre	vious Next >	Install Cancel

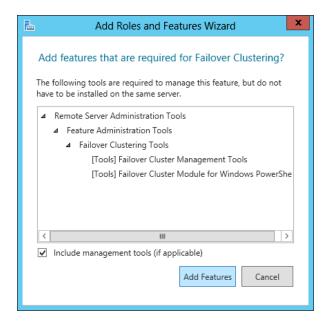
5. On the **Server Roles** screen, click on **Next**

B	Add Roles and Features Wizard	_ D X
Select server roles Before You Begin	Select one or more roles to install on the selected server.	DESTINATION SERVER HyperV03.contoso.com
Installation Type Server Selection Server Roles Features Confirmation Results	Active Directory Certificate Services ^ Active Directory Domain Services Active Directory Federation Services Active Directory Lightweight Directory Services Active Directory Rights Management Services Application Server DHCP Server DNS Server Fak Server Vertice File And Storage Services (Installed) Hyper-V Network Policy and Access Services Print and Document Services Remote Access Remote Desktop Services	Description Active Directory Certificate Services (AD CS) is used to create certification authonities and related role services that allow you to issue and manage certificates used in a variety of applications.
	< Previous Nex	t > Install Cancel

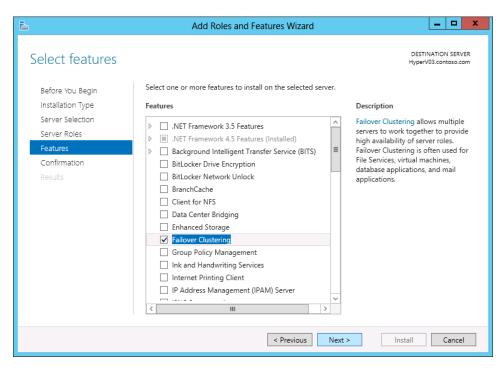
6. In the Features screen tick Failover Clustering



7. The Add features that are required for Failover Clustering window will open, click on Add Features



8. On the **Features** screen select **Next**



9. In the Confirmation screen click Install

Add Roles and Features Wizard				
Confirm installat	ion selections	DESTINATION SERVER HyperV03.contoso.com		
Before You Begin	To install the following roles, role services, or features on selected server, click Inst	all.		
Installation Type	Restart the destination server automatically if required			
Server Selection	Optional features (such as administration tools) might be displayed on this page b			
Server Roles	been selected automatically. If you do not want to install these optional features, o their check boxes.	lick Previous to clear		
Features				
Confirmation	Failover Clustering			
Results	Remote Server Administration Tools Feature Administration Tools Failover Clustering Tools Failover Cluster Management Tools Failover Cluster Module for Windows PowerShell			
	Specify an alternate source path			
	< Previous Next > Inst	all Cancel		

10. Review the **Results** to confirm that the installation was successful. Click on **Close** then reboot **HyperV03**

B	Add Roles and Features Wizard	_ □ ×
Installation progres	S	DESTINATION SERVER HyperV03.contoso.com
Before You Begin	View installation progress	
Installation Type	i Feature installation	
Server Selection		•
Server Roles	Installation succeeded on HyperV03.contoso.com.	
Features	Failover Clustering	
Confirmation	Remote Server Administration Tools	
Results	Feature Administration Tools Failover Clustering Tools Failover Cluster Management Tools Failover Cluster Module for Windows PowerShell	
	You can close this wizard without interrupting running tasks. View task p page again by clicking Notifications in the command bar, and then Task Export configuration settings	
	< Previous Next >	Close Cancel

- 11. Once HyperV03 has finished its reboot, log in as administrator to finalize the install
- 12. Repeat steps 1-10 on HyperV04

Configuring the Microsoft **Failover Cluster** on HyperV03 and HyperV04

1. From **HyperV03** open **Server Manager** and confirm that the **Dashboard** is open. From the **Tools** menu items, select **Failover Cluster Manager**

ا (2)	Manage Tools View Help
	Cluster-Aware Updating
	Component Services
	Computer Management
	Defragment and Optimize Drives
	Event Viewer
	Failover Cluster Manager
	iSCSI Initiator
	Local Security Policy
	ODBC Data Sources (32-bit)
	ODBC Data Sources (64-bit)
	Performance Monitor
	Resource Monitor
	Security Configuration Wizard
	Services
	System Configuration
	System Information
	Task Scheduler
	Windows Firewall with Advanced Security
	Windows Memory Diagnostic
	Windows PowerShell
	Windows PowerShell (x86)
	Windows PowerShell ISE
	Windows PowerShell ISE (x86)
	Windows Server Backup

2. Once the Failover Cluster Manager loads, Click on Create Cluster and click Next

3. In the **Create Cluster Wizard**, Type **HyperV03**; **HyperV04** and click **Add**. The server names will verify and then press **Next**

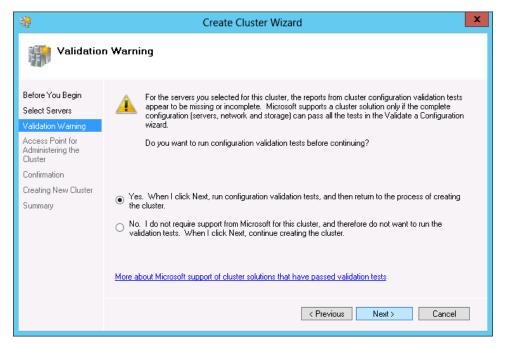
		Create Cluster Wizard	x
Select Se	ervers		
Before You Begin Select Servers Validation Warning Access Point for	Add the names of all the Enter server name:	servers that you want to have in the cluster. You must add a	t least one server. Browse
Administering the Cluster	Selected servers:	u HyperV03.contoso.com HyperV04.contoso.com	Add
Confirmation Creating New Cluster Summary			Remove
		< Previous Next >	Cancel

4. On the **Create Cluster Wizard** click **Next** to run cluster validation checks against **HyperV03** and **HyperV04**

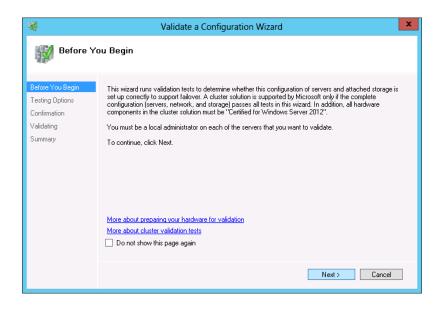
Important Note

You now have the option to validate the cluster. Microsoft Support will depend on the outcome of this validation test. It is recommended to familiarize yourself with the process during this evaluation guide.

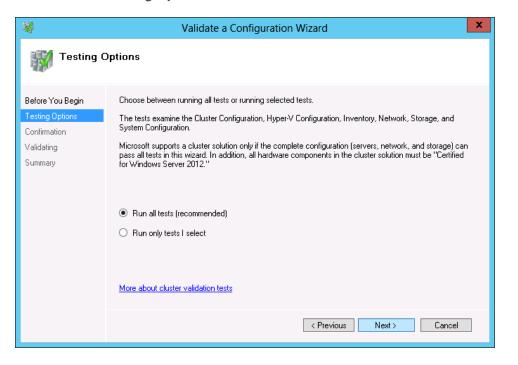
1



5. On the Before You Begin screen of the Validate a Configuration Wizard, click Next



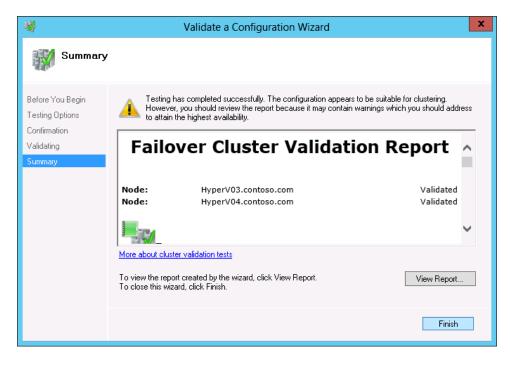
6. On the **Testing Options** screen click **Next** to run all tests



7. On the Confirmation screen click Next

N	Validate a Configuratio	n Wizard	x
Confirma	tion		
Before You Begin Testing Options	You are ready to start validation. Please confirm that the following settings are correct	t	
Confirmation	Servers to Test		
Validating	HyperV03.contoso.com		\sim
Summary	HyperV04.contoso.com		
	Tests Selected by the User	Category	
	List Fibre Channel Host Bus Adapters	Inventory	
	List iSCSI Host Bus Adapters	Inventory	
	List SAS Host Bus Adapters	Inventory	
	List BIOS Information	Inventory	~
	List Environment Variables	Inventory	
	To continue, click Next.		
	More about cluster validation tests		
		< Previous Next > Car	icel

8. On the **Summary** screen make sure both nodes are validated and click **Finish**. (In this example warnings are expected due to hardware limitations of the environment)



9. On the Access Point for Administering the Cluster screen of the Create Cluster Wizard, enter the cluster name EvalCluster, enter the IP address 192.168.1.30 and click Next

ii		Create Cluster Wiza	rd 🛛 🗙	
Access Point for Administering the Cluster				
Before You Begin	Type the name you	u want to use when administering th	ne cluster.	
Select Servers Access Point for Administering the Cluster Confirmation			ne or more IPv4 addresses could not be configured we sure the network is selected, and then type an	
Creating New Cluster		Networks	Address	
Summary		192.168.1.0/24	192 . 168 . 1 . 30	
			< Previous Next > Cancel	

10. On the **Confirmation** screen, review the entries are correct and click **Next**

a		Create Cluster Wizard	x
Confirma	tion		
Before You Begin Select Servers	You are ready to crea The wizard will create	te a cluster. your cluster with the following settings:	
Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	Cluster: Node: Node: IP Address:	EvalCluster HyperV04.contoso.com HyperV03.contoso.com 192.168.1.30	
	I ☑ Add all eligible stor To continue, click Nex		
		< Previous Next > C	ancel

11. On the **Summary** screen click **Finish**

i		Create Cluster Wizard	×
Summary			
Before You Begin Select Servers Access Point for	You have such	cessfully completed the Create Cluster Wizard.	
Administering the Cluster		Create Cluster	^
Confirmation			
Creating New Cluster			
Summary	Cluster:	EvalCluster	
	Node: Node:	HyperV04.contoso.com HyperV03.contoso.com	
	Quorum:	Node Majority	
	IP Address:	192.168.1.30	
			\sim
	To view the report crea To close this wizard, cl	ated by the wizard, click View Report. lick Finish.	View Report
			Finish

12. The cluster is now created, from the Failover Cluster Manager you should see the resources online

▲ Cluster Core Resources		
Name	Status	
Cluster Name		
🖃 🏪 Name: EvalCluster	🕤 Online	
IP Address: 192.168.1.30	🕤 Online	
	~	

At the end of this exercise we have created a Microsoft Failover Cluster. This technology will allow you to build resilient and fault redundant applications in your private cloud.

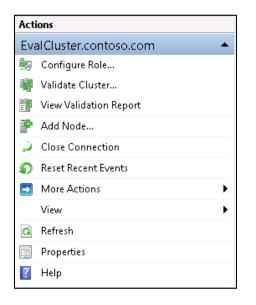
Configure Microsoft Hyper-V Replication

As **HyperV03** and **HyperV04** are already part of a **Failover Cluster**, the standard Hyper-V replication between two hosts cannot be used. Instead a Hyper-V **Replica Broker** will need to be used. The Hyper-V **Replica Broker** is an additional role that needs to be added to the **Failover Cluster**:

1. From HyperV03 open Server Manager and confirm that the Dashboard is open. From the Tools menu items, select Failover Cluster Manager

- (B)	Manage Tools View Help					
	Cluster-Aware Updating					
	Component Services					
	Computer Management					
	Defragment and Optimize Drives					
	Event Viewer					
	Failover Cluster Manager					
	Hyper-V Manager					
	iSCSI Initiator					
	Local Security Policy					
	ODBC Data Sources (32-bit)					
	ODBC Data Sources (64-bit)					
	Performance Monitor					
	Resource Monitor					
	Security Configuration Wizard					
	Services					
	System Configuration					
	System Information					
	Task Scheduler					
	Windows Firewall with Advanced Security					
	Windows Memory Diagnostic					
All Servers	Windows PowerShell					
	Windows PowerShell (x86)					
Manageability	Windows PowerShell ISE					
Events	Windows PowerShell ISE (x86)					
Services	Windows Server Backup					
26141062						

2. In the Failover Cluster Console click on EvalCluster, then in the Actions column select Configure Role



3. In the High Availability Wizard, on the Before You Begin window, click on Next

80	High Availability Wizard			
to Before You Begin				
Before You Begin Select Role	This wizard configures high availability for a role. After you successfully complete this wizard, if a clustered server fails while running the role, another clustered server automatically restarted, either on the same server on another server in the cluster, depending on options that you specify. If you want to cluster a complex application such as a mail server or database application, see that application's documentation for information about the correct way to install it. More about roles that you can configure for high availability Do not show this page again			
	Next > Cancel			

4. Select Hyper-V Replica Broker, then select Next

剱	High Availability Wizard
Select Ro	ble
Before You Begin Select Role	Select the role that you want to configure for high availability:
Client Access Point Confirmation Configure High Availability Summary	DFS Namespace Server Description: Distributed Transaction Coordinator (DTC) File Server Generic Application Boker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. For more information, see Configuring Hyper-V Replica Broker can be configured on each failover cluster. Image: Server Image: Server More about roles that you can configure for high availability Image: Next > Cancel

5. In the **Client Access Point** screen, type in the name **EvalBroker**, and for the IP address input **192.168.1.31**. Then select **Next**

8 7	High Availability Wizard	x
Client Ac	ccess Point	
Before You Begin	Type the name that clients will use when accessing this clustered role:	
Select Role	Name: EvalBroker	
Client Access Point		
Confirmation	The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not b automatically. For each network to be used, make sure the network is selected, and th	
Configure High Availability	address.	
Summary	Networks Address	
	I 192.168.1.0/24	. 31
	< Previous Next >	Cancel

6. On the **Confirmation** screen click **Next**

刻	Hi	igh Availability Wizard	x
tonfirma 🗞	tion		
Before You Begin Select Role Client Access Point Confirmation Configure High Availability Summary	You are ready to configure I Network Name: OU: IP Address:	nigh availability for a Hyper-V Replica Broker. EvalBroker CN=Computers,DC=contoso,DC=com 192.168.1.31	^
	To continue, click Next.	< Previous Next >	Cancel

7. On the **Summary** screen click on **Finish**

80	Hi	igh Availability Wizard	×	
to Summary				
Before You Begin Select Role Client Access Point	High availability wa:	s successfully configured for the role.		
Client Access Point Configure High Availability Summary	To allow replica nodes from oth settings for the select the 'Repl Network Name: OU: TP Address:	ber-V Replica Broker etion of virtual machines to the of er servers, you must configure n e Hyper-V Replica Broker role. To lication Settings' action for the r EvalBroker CN=Computers,DC=contoso,DC=com 102168131 by the wizard, click View Report.	cluster eplication o do this, ole.	
			Finish	

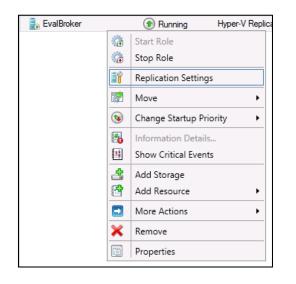
8. From HyperV03 open Server Manager and confirm that the Dashboard is open. From the Tools menu items, select Failover Cluster Manager

• ©	Manage Tools View Help					
Ŭ	Cluster-Aware Updating					
	Component Services					
	Computer Management					
	Defragment and Optimize Drives					
	Event Viewer					
	Failover Cluster Manager					
	Hyper-V Manager					
	iSCSI Initiator					
	Local Security Policy					
	ODBC Data Sources (32-bit)					
	ODBC Data Sources (64-bit)					
	Performance Monitor					
	Resource Monitor					
	Security Configuration Wizard					
	Services					
	System Configuration					
	System Information					
	Task Scheduler					
	Windows Firewall with Advanced Security					
	Windows Memory Diagnostic					
All Servers	Windows PowerShell					
	Windows PowerShell (x86)					
Manageability	Windows PowerShell ISE					
Events	Windows PowerShell ISE (x86)					
Services	Windows Server Backup					
Services						

9. Expand EvalCluster, then click on Roles



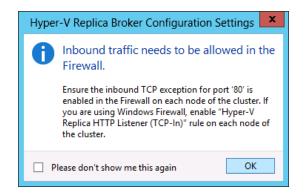
10. Right click on EvalBroker then select Replication Settings



11. Tick the Enable this cluster as a Replica server, the Use Kerberos (HTTP), and the Allow replication from any authenticated server boxes. In the Specify the default location to store Replica files box input \\HyperV02\SMB3Share then select OK

٥ť			Hyper-V Replica Broker Configuration		• >	¢
Γ	背 Re	plication Configural	ion		- ^	
	🖌 Ena	able this cluster as a	Replica server.			
		entication and ports				
		cify the authenticat wall.	ion types to allow for incoming replication traffic. Ensure that the ports you specify are open in	the		
	✓	Use Kerberos (HTTF);			
		Data sent over the	network will not be encrypted.			
		Specify the port:	80			
		Use certificate-base	d Authentication (HTTPS):			
		Data sent over the	network will be encrypted.			
		Specify the port:	443			
		Specify the certifica	ite:		=	1
		Issued To: Issued By: Expiration Date: Intended Purpose	:			
			Select Cer	tificate		
	Auth	orization and storag	e		Ξ.	
	Spe	cify the servers tha	t are allowed to replicate virtual machines to this cluster.			
	۲	Allow replication fro	m any authenticated server			
		Specify the default	location to store Replica files:			
		\\HyperV02\SMB33	hare\			
			В	rowse	1	-
	0	Allow replication fro	m the specified servers:		- III	
		Primary Server	Storage Location Trust Group		1	
						-
			OK Cancel	Ap	iply]

12. Take note of the **Inbound traffic needs to be allowed in the Firewall** information box. As **Windows Firewall** has been disabled on all hosts this information can be disregarded. Select **OK**



The next step is to configure the other end of the replication partnership. This is to be completed on **HyperV02**.

13. Open **Hyper-V Manager** on **HyperV02**, right click on **HyperV02** in the left hand column, and then select **Hyper-V Settings...**

Hyper-V Mana	ger					
HYPERV02	New	Virtual Machines				
	Import Virtual Machine					
	Hyper-	V Settings				
	Virtual Switch Manager					
	Virtual SAN Manager					
	Edit Disk					
	Inspect Disk					
	Stop Se	ervice				
	Remov	ve Server				
	Refresh	1				
	View	•				
	Help					

14. On the Hyper-V Settings for HyperV02 window, select Replication Configuration. Tick the boxes Enable this computer as a Replica server, then Use Kerberos (HTTP), and Allow replication from any authenticated server. In the Specify the default location to store Replica files: box input C:\VirtualMachines (create the C:\VirtualMachines folder if it does not already exist). Select OK

£	Hyper-V Settings for HYPERV02
Server Server Vitual Hard Disks C:\Users\Public\Documents\Hyper Physical GPUs Manage RemoteFX GPUs Physical GPUs Monage RemoteFX GPUs Sorage Migrations Storage Allower Storage A	Pyper-V Settings for HTPERVU2 Provide the settings for HTPERVU2 Provide the setting of the setting o
	OK Cancel Apply

Take note of the Inbound traffic needs to be allowed in the Firewall information box. As Windows
 Firewall has been disabled on all hosts this information can be disregarded. Select OK

This concludes the configuration of the replication partnership between **EvalCluster** and **HyperV02**. No Hyper-V guests will be replicated until it has been configured accordingly. The configuration of the guests will be covered in **Story 1 Scenario 4**.

Add EvalCluster and HyperV02 to System Center 2012 VMM SP1

 Login to the VMM server using the Contoso\Jeff account that was previously created and start Virtual Machine Manager

E	Connect to Server	_ 🗆 X
	vstem Center 2012	
Vir	tual Machine Manager	
Server name:	localhost:8100 Example: vmmserver.contoso.com:8100	
Ose current	Microsoft Windows session identity	
O Specify created	dentials	
User name: Password:	Example: contoso\domainuser	
Automatically	connect with these settings	Cancel

2. In the Virtual Machine Manager console click on **Settings** in the left hand column

*	VMs and	Services	
1	Fabric		
5	Library		
Ē	Jobs	Settings Ctrl+S	
-	Settings		1

3. Click on **Create Run As Account** in the top ribbon (if not there, expand **Security**, Click on **Run As Accounts**, click on **Create Run As Account**)

🖪 Admin	istrator - \	/MM.contoso.co	om - \	'irtual Mac	hine Man	ager (Evaluatio	n Version	- 178 (days rem	aining)
∎▼	Home									
**	1			ŧĘ	P	🔰 PowerShell			X	
43						Jobs				
Create User Role	Create Run As Account	Create Servicing Window		mport ole Add-in	Backup	RO PRO	Enable D	Disable	Delete	Properties
	Create	2		Import	Backup	Window	Run As ac	ccount	Delete	Properties
Settings	Settings Create Run As Account			n As Account	is (3)					
🔙 Gene	eral									
> 🎥 Secu	rity			Name Description						
			- 🖪	NT AUTHORITY\LocalService						
Servi Servi	icing Window	/S		NT AUTHORITY\NetworkService						
🟴 Cont	iguration Pro	viders		NT AUTHORITY\System						
i System Center Settings										
	🕮 Console Add-ins									
real Cons	sole Add-ins									

4. For this Create Run As Account we will be using the previously created Domain Admin contoso\VMM_Runas. For the Name and Description type VMM_RunAs_Contoso. The User name will be contoso\VMM_Runas with the password set to pass@word1, click on OK and the account is now created

•	Create Run As Account	x								
Provide t	Provide the details for this Run As account									
Name:	VMM_RunAs_Contoso									
Description:	VMM_RunAs_Contoso									
User name:	CONTOSO\VMM_RunAs									
	Example: contoso\domainuser or localuser									
Password:	•••••									
Confirm pass	sword:									
Validate	domain credentials									
View Script	OK Cancel									

5. From the VMM server log in using the **contoso\Jeff** account and start the **Virtual Machine Manager** console. Click on **VMs and Services** in the left column



6. Right click on All Hosts and choose the add Hyper-V Hosts and Clusters option

Home Fol	lder							
Service Machine • O	Create Create Host Cloud Group Create	Network	Assign Cloud Cloud	Overview	VMs Services	VM Networks	2 PowerShe Jobs PRO Window	ell
VMs and Services	< (VMs (0)						
Clouds		Name	Sta	tus			▼ Virtual ▼	Availabilit.
All Hosts	Create Virtual Ma Add Hyper-V Hos Add Citrix XenSer Add VMware ESX Create Host Grou Move View Networking Delete	ts and Clusters ver Hosts and C Hosts and Clust						

7. On the **Add Resource Wizard** ensure the Windows Server computers in a trusted Active Directory domain is chosen and click Next

*	Add Resource Wizard	X
😭 Resource l	ocation	
Resource location Credentials	Indicate the Windows computer location Windows Server computers in a trusted Active Directory domain Windows Server computer in an untrusted Active Directory domain	
Discovery scope Target resources Host settings Summary	 Windows Server computer in an untrusted Active Directory domain Windows Server computers in a perimeter network If you select this option, before you continue, use VMM Setup to install the VMM agent locally on targeted computers. Ensure that you configure the perimeter network settings during the agent se Physical computers to be provisioned as virtual machine hosts Select this option to add bare-metal computers with baseboard management controllers. 	
	Previous Next Cance	۱ i

8. On the Credentials screen ensure Use an existing Run As Account is checked and click on Browse

*	Add Resource Wizard
📬 Credential	ls
Resource location	Specify the credentials to use for discovery
Credentials	The Run As account or credentials will be used to discover computers and to install the Hyper-V role and
Discovery scope	the Virtual Machine Manager agent if necessary.
Target resources	Use an existing Run As account
Host settings	Run As account: Browse
Ĩ	O Manually enter the credentials
Summary	User name: Example: contoso\domainuser
	Password:
	The above provided credentials or Run As account should be a local administrator on the host machines. If a Run As account is provided, then it will be used while adding the host as well as for providing future access to the host during its lifetime. If credentials are entered manually, then they will only be used while adding the host. Once the host has been successfully added, the VMM service account will be added as local administrator on the host and used to provide any future access to it.
	Previous Next Cancel

9. On the Select a Run As account options choose the user VMM_RunAs_Contoso and hit OK

• =		Add Resource Wizar	d	x
👇 Credenti		Select a Run As Accou	ınt X	
Resource location	Select a Run As ad	count		
Credentials			٩	II the Hyper-V role and
Discovery scope	Name	Description	User Role	
Target resources	NT AUTHORITY\Syster			Browse
Host settings	NT AUTHORITY\Netwo	o		browse
Summary	VMM_RunAs_Contoso	VMM_RunAs_Contoso	Administrator Create Run As Account OK Cancel	ator on the host e host as well as for d manually, then they dded, the VMM service any future access to it.
			Previous	Next Cancel

10. Choose **Next** to ok the Run As account

*	Add Resource Wizard
省 Credenti	als
Resource location	Specify the credentials to use for discovery
Credentials	The Run As account or credentials will be used to discover computers and to install the Hyper-V role and
Discovery scope	the Virtual Machine Manager agent if necessary.
Target resources	Use an existing Run As account
Host settings	Run As account: VMM_RunAs_Contoso Browse
Summary	O Manually enter the credentials
Summary	User name: Example: contoso\domainuser
	Password:
	The above provided credentials or Run As account should be a local administrator on the host machines. If a Run As account is provided, then it will be used while adding the host as well as for providing future access to the host during its lifetime. If credentials are entered manually, then they will only be used while adding the host. Once the host has been successfully added, the VMM service account will be added as local administrator on the host and used to provide any future access to it.
	Previous Next Cancel

11. In the **Discovery scope** screen add the servers **HyperV02** and **HyperV03** and click **Next**

*	Add Resource Wizard	
👌 Discovery	scope	
Resource location Credentials Discovery scope	Specify the search scope for virtual machine host candidates Search for computers by whole or partial names, FQDNs, and IP addresses. Alternatively, you may generate an Active Directory query to discover the desired computers.	
Target resources Host settings Summary	Specify Windows Server computers by names Specify an Active Directory query to search for Windows Server computers Enter the computer names of the hosts or host candidates that you want VMM to manage. Each computer name must be on a separate line. Computer names:	
	HyperV02 HyperV03	
	2a01:110:1e:3:f8ffcfe44:23 Previous Next Cancel	

12. The Virtual Machine Manager will now confirm the computer names entered. Notice in this example that although HyperV03 was selected as a single host, Virtual Machine Manager detects it as a Cluster and allows you to select it as a whole entity. Tick the boxes for both HyperV02 and EvalCluster and click Next

*	Add Resource	ce Wizard	×
音 Target reso	ources		
Resource location	Select the computers that you	u want to add as hosts	
Credentials	Discovered computers:		
Discovery scope	Computer Name	Operating System	Hypervisor
Target resources	🗹 📗 hyperv02.contoso.com	Windows Server 2012 Standard	Hyper-V
Host settings	✓ ¹ / ₄ EvalCluster.contoso.com	Windows Server 2012 Standard	Hyper-V
Summary	HyperV04.contoso.com	Windows Server 2012 Standard	Hyper-V
Summary	HyperV03.contoso.com	Windows Server 2012 Standard	Hyper-V
	Select all Refresh Sto	p	
		Previous	Next Cancel

13. On the Host Settings options just click Next

*]	Add Resource Wizard	x
省 Host settin	ngs	
Resource location	Specify a host group and virtual machine placement path settings for hos	ts
Credentials	Assign the selected computers to the following host group:	
Discovery scope	Host group: 📑 All Hosts	-
Target resources		
Host settings	If any of the selected hosts are currently managed by another Virtual Machine Manager (VMM) environment, select this option to reassociate the hosts with this VMM management server.	
Migration Settings	Reassociate this host with this VMM environment	
Summary	VMM uses virtual machine placement paths as default locations to store virtual machines placed or host. To add a new virtual machine placement path, specify a path and click Add. Add the following path:	on a
	A	Add
	Selected virtual machine placement paths:	
	Rer	move
	Previous Next Ca	ancelii

14. On Migration Settings tick the Turn on incoming and outgoing live migrations. Tick Use Kerberos and click Next

1	Add Resource Wizard	x
脊 Migration	Settings	<u>A</u>
Resource location Credentials Discovery scope Target resources Host settings Migration Settings Summary	Specify the live storage and migration settings Live storage migration Maximum number of simultaneous live storage migrations: 2 • Live migration settings Image:	Add Remove Move up Move down
	Previous Next	Cancel

15. Review the **Summary** page and click **Finish**

*	Add Reso	purce Wizard	x
省 Summary		AA.	
Resource location Credentials	Confirm the settings		View Script
Discovery scope Target resources Host settings Migration Settings Summary	Resource location: Trusted W Discovery credentials: VMM_Rur Discovery scope: Computer	name based discovery uters and 1 clusters are selected to manage ip:	
		Previous Finish	Canceli

16. You will now see the jobs running and complete. In this example you will receive warnings around Multipath IO not being enabled; this is to be expected and can be ignored. Close this window

Name	Status	 Start Time 	 Result Name 	Owner	-
Oreate new host cluster	Completed	19/12/2012 9:38:30 a.m.	EvalCluster.contoso.com	CONTOSO\Jeff	
Ø Discover clusters and their nodes	Completed	19/12/2012 9:38:29 a.m.	EvalCluster.contoso.com	CONTOSO\Jeff	
🔮 Create new RunAs Account	Completed	19/12/2012 9:35:41 a.m.	VMM_RunAs_Contoso	CONTOSO\Jeff	
🔮 Remove a RunAs Account	Completed	19/12/2012 9:34:43 a.m.	VMM_RunAs_Contoso	CONTOSO\Jeff	
🔮 Create new RunAs Account	Completed	19/12/2012 9:29:54 a.m.	VMM_RunAs_Contoso	CONTOSO\Jeff	
🔮 Remove a RunAs Account	Completed	19/12/2012 9:27:43 a.m.	VMM_RunAs_Contoso	CONTOSO\Jeff	
👠 Add virtual machine host	Completed w/ Info	19/12/2012 9:38:33 a.m.	HyperV03.contoso.com	CONTOSO\Jeff	
👠 Add virtual machine host	Completed w/ Info	19/12/2012 9:38:32 a.m.	HyperV04.contoso.com	CONTOSO\Jeff	
👠 Add virtual machine host	Completed w/ Info	19/12/2012 9:38:27 a.m.	hyperv02.contoso.com	CONTOSO\Jeff	
🔇 Create new host cluster					

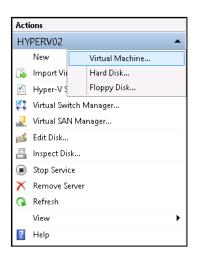
Create a Virtual Guest on HyperV02

Log onto **HyperV02** as an **administrator**, copy the previously downloaded Server 2012 Evaluation VHD from Microsoft website (<u>http://technet.microsoft.com/en-nz/evalcenter/hh670538.aspx</u>) to an easily accessible location. In this example we are using the folder **C:\VirtualMachines**

1. On HyperV02, open the Hyper-V Manager console from Server Manager

- 3)	Manage Tools View Help				
		Component Services				
		Computer Management				
		Defragment and Optimize Drives				
		Event Viewer				
		Hyper-V Manager				
		iSCSI Initiator				
		Local Security Policy				
		ODBC Data Sources (32-bit)				
		ODBC Data Sources (64-bit)				
		Performance Monitor				
		Resource Monitor				
	Security Configuration Wizard					
		Services				
		System Configuration				
		System Information				
		Task Scheduler				
		Windows Firewall with Advanced Security				
		Windows Memory Diagnostic				
		Windows PowerShell				
		Windows PowerShell (x86)				
rvers		Windows PowerShell ISE				
		Windows PowerShell ISE (x86)				
geability		Windows Server Backup				

2. On the Actions column (right hand side), click on New, then select Virtual Machine...



3. In the Before You Begin screen, select Next

8 .	New Virtual Machine Wizard
Before You E	Begin
Before You Begin Specify Name and Location Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	This wizard helps you create a virtual machine. You can use virtual machines in place of physical computers for a variety of uses. You can use this wizard to configure the virtual machine now, and you can change the configuration later using Hyper-V Manager. To create a virtual machine, do one of the following: • Click Finish to create a virtual machine that is configured with default values. • Click Next to create a virtual machine with a custom configuration.
	Do not show this page again
	< Previous Next > Finish Cancel

4. On the Specify Name and Location window, in the Name: box input Guest01. Tick Store Virtual Machine in a different location, and in the Location: box, input C:\VirtualMachines. Select Next

30	New Virtual Machine Wizard	X
Specify Name	e and Location	
Before You Begin Specify Name and Location Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	Choose a name and location for this virtual machine. The name is displayed in Hyper-V Manager. We recommend that you use a name that helps you earlientify this virtual machine, such as the name of the guest operating system or workload. Name: Guest01 You can create a folder or use an existing folder to store the virtual machine. If you don't select a folder, the virtual machine is stored in the default folder configured for this server. ✓ Store the virtual machine in a different location Location: CytricualMachines: Browse If you plan to take snapshots of this virtual machine, select a location that has enough free space. Snapshots include virtual machine data and may require a large amount of space.	
	< Previous Next > Finish Cance	;

5. On the **Assign Memory** window leave all settings at **default** (do not change default of **512MB** or tick the box **Use Dynamic Memory for this Virtual Machine**). Select **Next**

8e	New Virtual Machine Wizard
Assign Memo	ory
Before You Begin Specify Name and Location Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	Specify the amount of memory to allocate to this virtual machine. You can specify an amount from 8 MB through 14030 MB. To improve performance, specify more than the minimum amount recommended for the operating system. Startup memory: Image: MB Use Dynamic Memory for this virtual machine. Image: MB When you decide how much memory to assign to a virtual machine, consider how you intend to use the virtual machine and the operating system that it will run.
	< Previous Next > Finish Cancel

6. On the **Configure Networking** window, select the network **External Virtual Network** from the drop down box. Select **Next**

8	New Virtual Machine Wizard	x
Configure Ne	etworking	
Before You Begin Specify Name and Location Assign Memory Configure Networking Connect Virtual Hard Disk Installation Options Summary	Each new virtual machine includes a network adapter. You can configure the network adapter to use virtual switch, or it can remain disconnected. Connection: Not Connected Not Connected External Virtual Network	3a
	< Previous Next > Finish Cancel	

7. Tick the Use an existing virtual hard disk, then select Browse...

8c	New Virtual Machine Wizard
Connect Vir	tual Hard Disk
Before You Begin Specify Name and Location Assign Memory Configure Networking	A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties. O Create a virtual hard disk Use this option to create a dynamically expanding virtual hard disk with the default format (VHDX).
Connect Virtual Hard Disk Summary	Name: Guest01.vhdx Location: C:\UrtualMachines\Guest01\\Urtual Hard Disks\ Browse Size: 127 GB (Maximum: 64 TB) Image: Size: Size: 127 Image: Size: Size: Size: 128 Image: Size: Size: Size: Browse Image: Size: Size: Browse Browse
	< Previous Next > Finish Cancel

8. Browse to **C:\VirtualMachines**, select the Microsoft Windows server 2012 Evaluation VHD file, then select **Open**

ð.	Open			X
⊕ ⊜ - ↑ 🌗	Computer 🔸 Local Disk (C:) 🔸 VirtualMachines 🔺	✓ C Se	arch VirtualMachines	,ο
Organize 👻 New fol	r		8== 👻 🔲	
👼 Microsoft Manage	Name	Date modified	Туре	Size
	\mu OpsMgr	12/5/2012 1:48 PM	1 File folder	
🔆 Favorites	🔑 Orchestrator	12/9/2012 10:33 Pi	M File folder	
💻 Desktop	🕌 ServiceMgr	12/5/2012 1:48 PM	1 File folder	
📜 Downloads	🐌 ServiceMgrDW	12/5/2012 1:48 PM	1 File folder	
📜 Recent places	👝 9200.16384.amd64fre.win8_rtm.120725-1247_server_serverdatacentereval_e	en-us.vhd 7/26/2012 8:05 PM	1 Hard Disk Image F	8,729,7
Libraries Libraries Documents Music Fictures Videos Computer Local Disk (C:) Data (i;)	SP1 VHD.vhdx	12/19/2012 10:06 .	Hərd Disk Image F	14,258,
	K			>
Fi	name: 9200.16384.amd64fre.win8_rtm.120725-1247_server_serverdatacentereval_e	n-us.vhd Vi	irtual hard disk files (*.vhd; Open Cance	_
				_

9. Select Finish

8	New Virtual Machine Wizard
Connect Vir	tual Hard Disk
Before You Begin Specify Name and Location Assign Memory Configure Networking	A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties. O Create a virtual hard disk Use this option to create a dynamically expanding virtual hard disk with the default format (VHDX).
Connect Virtual Hard Disk Summary	Name: Guest01.vhdx Location: C:\VirtualMachines\Guest01\Virtual Hard Disks\ Size: 127 GB (Maximum: 64 TB) Image: Size: 127 GB (Maximum: 64 TB) Browse Image: Size: 127 GB (Maximum: 64 TB) Browse Location: Size: Siz
	< Previous Next > Finish Cancel

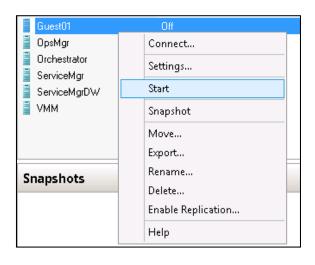
10. Within Hyper-V Manager on HyperV02 right click Guest01 and then click on Settings...

Virtual Machines				
Name 📩	Sta	ite	CPU Usage	Assig
📕 AD	Ru	nning	0%	852 M
AppController	Ru	nning	0%	2048
📱 DPM	Ru	nning	0%	1125
Guest01	Ru	nning	0%	512 N
OpsMgr		Connect		183
Orchestrator ServiceMgr		Settings		57 M 754
ServiceMgrDW		Turn Off		128
VMM		Shut Down		402
		Save		
		Pause		
Snapshots		Reset		
		Snapshot		
		Move		
		Rename		
		Enable Rep	lication	
		Help		
		-		

11. Within the Window Settings for Guest01 on HYPERV02, under the Hardware column expand Processor, select Compatibility, and tick the box Migrate to a physical computer with a different processor version. Click on OK

	S	Settir	ngs	s f	fo	fo	or (Gu	ues	stO	01	o	n ł	ΗY	ΡE	R١	V0	2									_	•			x	
Guest01	¥	4			0	G	3																									
★ Hardware ▲ Add Hardware ■ BIOS Boot from CD ■ Memory \$12 MB ■ Processor 1 Virtual processor ■ MMA ■ IDE Controller 0 ■ Hard Drive 9200.16384.amd64fre.win ■ IDE Controller 1 ● DVD Drive None SCSI Controller ■ Vetwork Adapter External Virtual Network ♥ OCM 1 None ♥ COM 1 None ♥ Cod 2 None ♥ Cod 2 None ♥ Cod 2 None ♥ Cod 2 None ♥ Statett Drive None ♥ Cod 2 None ♥ Cod 2 Name Guest01 ● Snapshot File Location C:VirtualMachines/Guest01		t t	roce You the v	cess Li ca e vir	issi cai virt	:soi an irtu	or c n lin tual	mit I al ma	npal the ach	atibi e pr nine	ility roce e's d	/ :ess com	sor npa	fea	atur ility	wi	ith (diff	ere	nt	pro	ces	sor	ver		s.	ais imp	pro	ves			
																	0	К					Ca	nce	1			A	pply	•		

12. Within Hyper-V Manager on HyperV02 right click Guest01 and then click on Start



 Connect to Guest01 by double clicking its name in Hyper-V Manager. Wait for OS to load and the License Agreement to be displayed, tick I accept the license terms for using Windows. Then click on Accept



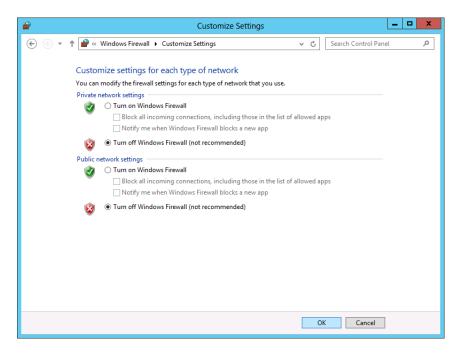
14. Select the correct **Regional and Language** settings, select **Next**

Region and Langua	age	
Country/region	United States	~
Language	English (United States)	~
Keyboard layout	US	~
		Next

15. Input the password **pass@word1** twice, then click on **Finish**

Setting	S
Type a password for the	built-in administrator account that you can use to sign in to this computer.
User name	Administrator
Password	•••••
Reenter password	••••••
	Finish

16. Log into the **Guest01**, open **Windows Firewall** and disable the firewall for **Private** and **Public**. Click on **OK**



17. Log off of Guest01

Install SQL 2012 SP1

All the experiences in this guide will use SQL Server 2012 SP1 in their scenarios. To install SQL Server 2012 complete the following instructions:

- 1. Log onto Guest01 as GUEST01\ADMINISTRATOR and the password pass@word1
- 2. Install **SQL 2012 SP1** on the **Guest01** virtual machine from the media downloaded previously. For further information on the prerequisites and installing **SQL Server 2012** refer to the following articles on MSDN:

Reference Links	
SQL Server prerequisites	http://msdn.microsoft.com/en-us/library/ms143506(SQL.110).aspx
SQL Server installation	http://msdn.microsoft.com/en-us/library/bb500395.aspx

- 3. Ensure the following roles and features are installed during the SQL Server installation
 - a. Database services
 - b. Management Tools Complete

Synopsis

Jeff has now configured his infrastructure to take advantage of many of the new and exciting features of Server 2012 and System Center 2102 SP1. So far he has accomplished the following:

- Set up a new failover cluster which will give him the ability to create Highly Available virtual infrastructure
- Configured a connection broker which will allow him to configure Hyper-V Replicas of his virtual machines
- Configured a SMB 3.0 share for storing virtual machine operating files
- Configured Virtual Machine Manager to manage his virtual infrastructure
- Built a virtual guest to host new applications and services

These roles and features that Jeff has configured will allow him to start taking advantage of many of the new capabilities available when Windows Server 2012 and System Center 2012 SP1 come together. The following scenarios will walk Jeff through step by step guides of how to configure and utilize features such as:

- Shared Nothing Live Migration
- Storage Pooling using Just a Bunch Of Disks (JBOD)
- Business Continuity through High Availability and Hyper-V Replica
- Network Traffic management through Quality of Service in Hyper-V

Links to other	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	#
areas of interest	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Experiences

The following experiences are designed to help you experience the key features of System Center 2012 SP1 and Windows Server 2012. They highlight the most important new functionality of System Center and take you through how you might use these features in your own network.

The experiences are designed to be consumed as you wish- you can go through them systematically or start with the one that intrigues you the most and try out others as you wish. They can be done in any order, at any time. You will want to ensure that you've installed and configured your network as described in "Setup and Deploy your Private Cloud." The steps included in "Configuring the Private Cloud Experiences" are important to be able to successfully follow the step-by-step instructions.

The five experiences are:

- 1. Manage Private Cloud resources
- 2. Manage Private Cloud capacity
- 3. Private Cloud automation
- 4. Manage Apps in the Private Cloud
- 5. <u>Reporting insights of the Private Cloud</u>

Inside each Experience are scenarios. Each of the scenarios will allow you to evaluate and identify how the System Center Private Cloud can assist in alleviating problems in the current environment, or provide you with the basis for a plan to take advantage of Windows Server 2012 and System Center 2012.

Experience 1: Manage Private Cloud resources

This experience will take you through some of the features that are provided by the Microsoft Private Cloud. These features will be invaluable in creating a robust, low cost and resilient infrastructure, while also delivering on the core tenets of the Private Cloud:



Scalable and Elastic

Shared Resources

Always Up, Always On

Prerequisites

To evaluate this experience you will require the following resources in place in your Eval Guide lab. Refer to the Scenario Prerequisites for additional information on how to configure these items:

- The HyperV role installed on HyperV02, HyperV03, and HyperV04
- An SMB3.0 share on HyperV02
- A Failover Cluster installed and configured on HyperV03 and HyperV04
- The Hyper-V Cluster Broker installed and configured on the Failover Cluster
- Guest01 prebuilt and running on HyperV02

Scenario: Verifying VM storage infrastructure

Jeff has identified that his virtual infrastructure appears to require alteration to take advantage of the new features of the private cloud he is implementing. He investigates the current configuration of his virtual infrastructure to see where he can best implement these features.

In this scenario Jeff will take a look at the resources of **Guest01** which is currently hosted on **HyperV02**. This is typical non-highly available Hyper-V installation running local, non-shared direct attached storage. In this scenario Jeff will confirm the location of the storage for **Guest01**

1. From **HyperV02** open **Server Manager** and confirm that the **Dashboard** is open. From the **Tools** menu items, select **Hyper-V Manager**

• 🕑		Manage	Tools	View	Help
	Compo	onent Servic	es		
	Compu	uter Manage	ement		
	Defrag	ment and C	ptimize Dri	ves	
	Event \	/iewer			
	Hyper-	V Manager			
	iSCSI Ir	nitiator			
	Local S	ecurity Poli	сy		
	ODBC	Data Source	es (32-bit)		
	ODBC	Data Source	es (64-bit)		
	Perforr	mance Moni	tor		
	Resour	rce Monitor			
	Securit	y Configura	tion Wizard		
	Service	25			
	System	n Configurat	ion		
	System	n Informatio	n		
	Task So	cheduler			
	Windo	ws Firewall v	with Advan	ed Secur	ity
	Windo	ws Memory	Diagnostic		
	Windo	ws PowerSh	ell		
	Windo	ws PowerSh	ell (x86)		
vers	Windo	ws PowerSh	ell ISE		
	Windo	ws PowerSh	ell ISE (x86)		
eability	Windo	ws Server Ba	ackup		

2. If HyperV02 is not listed under Hyper-V Manager, right click Hyper-V Manager, then select Connect to Server...

File Action View	/ Help
	▶ E
📑 Hyper-V Manager	r
	Connect to Server
	View 🕨
	Help

3. Tick Local computer, select OK

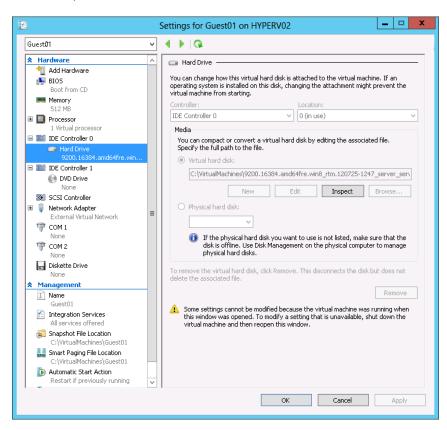
Select Computer
Connect to virtualization server Local computer
Another computer: Browse
OK Cancel

4. This will return you to the **Hyper-V Manager.** Select the Virtual Machine **Guest01**, and in the right hand column click on **Settings...**

Guest01	Running	0%
🧧 OpsMgr	Running	0%
Orchestrator	Running	0%
📱 ServiceMgr	Running	0%
📱 ServiceMgrDW	Running	0%
📱 VMM	Running	2%

Gu	est01 🔺
1	Connect
	Settings
	Turn Off
0	Shut Down
0	Save
	Pause
	Reset
۲	Snapshot
٩	Move
ī	Rename
t	Enable Replication
?	Help

5. Expand IDE Controller 0 in the Hardware column and select Hard Drive



6. Take note of the path under Virtual hard disk.

As Jeff can see the storage for this particular virtual machine is located on the local C: drive of the server **HyperV02**. In the event of an interruption to service, this virtual machine would not be available, and in the case of a hardware failure, the data may well be lost. Through the following steps Jeff will migrate the storage of **Guest01** to a shared storage platform and host the virtual machine on a Microsoft Failover Cluster to take advantage of the Availability and Resiliency that clustering gives.

Scenario: Migrating VM storage with SMB 3.0

Debbie has discussed with Jeff the importance of a particular server in the Contoso environment that houses much of the code and development work her project team are preparing for release. Debbie needs to ensure that the data is always available to her project teams who work in several locations and in different time zones, so high availability is very important. She also needs to ensure that in the event of hardware fault, the server will continue operating.

Jeff decides to migrate the server Guest01 to the cluster to ensure that the server is always on, even if one physical server fails, and also if he needs to shut down hosts for maintenance. He also decides to take advantage of the SMB 3.0 storage for the virtual machines, reducing the cost of implementing the highly available solution.

In this scenario Jeff will migrate the server **Guest01** from **HyperV02**, to the cluster **EvalCluster**. The purpose for this is to provide a stable, highly available platform that is resilient to hardware failure and loss of service. Prior to configuring this, some specific changes have to be made to the SMB 3.0 share. These changes will allow live migration to take place to and from the SMB 3.0 Share

Storage of Virtual Machines on remote SMB 3.0 shares is a new feature in Hyper-V 3.0 and provides the following features:

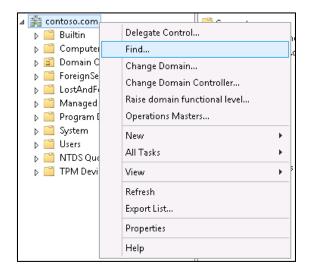
- Ease of provisioning and management. You can manage file shares instead of storage fabric and logical unit numbers (LUNs).
- Increased flexibility. You can dynamically migrate virtual machines or databases in the data center.
- Ability to take advantage of existing investment in a converged network. You can use your existing converged network with no specialized storage networking hardware.
- Reduced capital expenditures. Capital expenses (acquisition costs) are reduced.
- Reduced operating expenditures. You can reduce operating costs because there is no need for specialized storage expertise.
- Connect to the Active Directory server AD as an administrator and load Active Directory Users and Computers

3		Active Directory
File Action View Help		
🗢 🔶 📶 📋 🗎 🖓 🚱 🖬	7 🔁 🐍	
 Active Directory Users and Computers [AD.contoso.com] Saved Queries contoso.com Builtin Computers Domain Controllers ForeignSecurityPrincipals LostAndFound Managed Service Accounts Program Data System 	Name APPCONTROLLER DPM ValBroker VALCLUSTER HYPERV02 HYPERV03 HYPERV04 OPSMGR ORCHESTRATOR	Type Computer Computer Computer Computer Computer Computer Computer Computer
 p → system b → Users b → MTDS Quotas b → TPM Devices 	N SERVICEMGR	Computer Computer Computer

2. Click on View and tick Advanced Features

Viev	v Help
	Add/Remove Columns
	Large Icons
	Small Icons
	List
۲	Detail
	Users, Contacts, Groups, and Computers as containers
\checkmark	Advanced Features
	Filter Options
	Customize

3. Next, right click the Contoso.com domain and select Find



4. Change the Find: box from Users, Contacts and Groups to Computers

	Find Users, Contacts, and Groups	_ D X
File	Edit View	
	Users, Contacts, and Groups V In: 🛱 contoso.com V	Browse
Use Na De	Printers Shared Folders Umanizational Units	Find Now Stop Clear All

5. Type in **HyperV02**, then click on **Find Now**

3	Find Computers	- 🗆 X
File Edit View		
Find: Computers	V In: 🚔 contoso.com V	Browse
Computer name: Owner: Role:	HyperV02	Find Now Stop Clear All

6. Right click on HyperV02 then select Properties

Name	Machine Role	Owner
🜉 HYPERV02	Workstation or Server	
	Delete	
	Add to a group	
	Name Mappings	
	Disable Account	
	Reset Account	
<	Move	>
Displays the properti	Manage	-
	Properties	

7. Click on the Delegation tab, tick Trust this computer for delegation to specified services only, and tick Use Kerberos only. Click Add...

HYPERV02 Properties								
Password Replica	Password Replication Location Managed By Object Security							
General	Operating System Member Of D				Delegation			
behalf of another O Do not trust the O Trust this con	Delegation is a security-sensitive operation, which allows services to act on behalf of another user. O Do not trust this computer for delegation O Trust this computer for delegation to any service (Kerberos only) © Trust this computer for delegation to specified services only							
	eros only authentication p	rotocol						
Services to v	which this acco	unt can preser	nt delegate	ed credentia	ls:			
Service Ty	pe UserorC	omputer	Port	Se	rvice N			
III Expanded Add								
		IK	Cancel	Арр	ly Help			

8. Click Users or Computers...

	Add Sen	vices	? X			
To allow services to be delegated for a user or computer, select the appropriate users or computers, and then click the services.						
	To select one or more user or computer names, click Users or Computers					
Available service	IS:					
Service Type	User or Computer	Port	Service Name D			
			Chinten			
		ОК	Select All			

9. In the object name box, type in HyperV03; HyperV04, click OK

Select Users or Computers	? X
Select this object type:]
Users, Computers, Built-in security principals, or Other objects From this location:	Object Types
contoso.com	Locations
Enter the object names to select (<u>examples</u>):	
HyperV03; HyperV04	Check Names
1	
Advanced OK	Cancel

10. Scroll down and select **Microsoft Virtual System Migration Service** for **HyperV03** and **HyperV04** (hold the ctrl key to select multiple items), click **OK**

Add Service	es ? X					
To allow services to be delegated for a user or computer, select the appropriate users or computers, and then click the services.						
To select one or more user or computer names Users or Computers.	, click Users or Computers					
Available services:						
Service Type	User or Computer F A					
messenger	HYPERV03					
Microsoft Virtual Console Service	HYPERV04					
Microsoft Virtual Console Service	HYPERV03					
Microsoft Virtual System Migration Service	HYPERV04					
Microsoft Virtual System Migration Service	HYPERV03					
msdtc	HYPERV04					
msdtc	HYPERV03					
msiserver	HYPERV04					
< 111	>					
	Select All					
	OK Cancel					

11. Click **OK** to close the **HyperV02** properties

HYPERV02 Properties								
Password Replica	Password Replication Location Managed By Object Security							
General	Öpe	erating Syste	em	Me	mber Of	Dele	gation	
Delegation is a security-sensitive operation, which allows services to act on behalf of another user. Do not trust this computer for delegation Trust this computer for delegation to any service (Kerberos only) Trust this computer for delegation to specified services only ① Use Kerberos only								
⊖ Use any a Services to v		•		t delegati	ed credentia	als:		
Service Type User or Computer Port Service N Microsoft Virt HYPERV03 Microsoft Virt HYPERV04								
<		Ш				>		
Expanded	J			Add	Rer	nove		
		OK		Cancel	Ар	oly	Help	

12. Repeat the above steps **5** – **11** for **HyperV03** and **HyperV04**. The following delegation roles will need to be added to each server:

13. HyperV03

a.	CIFS	HyperV02	
b.	Microsoft Virtual System	m Migration Service	HyperV02

c. Microsoft Virtual System Migration Service HyperV04

14. HyperV04

a.	CIFS	HyperV02	
b.	Microsoft Virtual System	n Migration Service	HyperV02
C.	Microsoft Virtual System	n Migration Service	HyperV03

Next Jeff will need confirmation that **Guest01** experiences no loss of service during the migration. A simple way to check this is to set up a persistent ping to **Guest01** and confirm that no pings are dropped during the transfer.

1. From **HyperV02** open **Server Manager** and confirm that the **Dashboard** is open. From the **Tools** menu items, select **Hyper-V Manager**

• 🕲	Manage Tools View Help				
	Component Services				
	Computer Management				
Defragment and Optimize Drives					
	Event Viewer				
	Hyper-V Manager				
	iSCSI Initiator				
	Local Security Policy				
	ODBC Data Sources (32-bit)				
	ODBC Data Sources (64-bit)				
	Performance Monitor				
Resource Monitor Security Configuration Wizard					
					Services
	System Configuration				
	System Information				
	Task Scheduler				
	Windows Firewall with Advanced Security				
	Windows Memory Diagnostic				
	Windows PowerShell				
	Windows PowerShell (x86)				
vers	Windows PowerShell ISE				
	Windows PowerShell ISE (x86)				
eability	Windows Server Backup				

2. Click on Guest01 in the Virtual Machines pane

Virtual Machines		
Name 📩	State	CPU Usage
📕 AD	Running	0%
AppController	Running	0%
📕 DPM	Running	0%
Guest01	Running	0%
🗧 OpsMgr	Running	0%
Orchestrator	Running	0%
ServiceMgr	Running	0%
🚪 ServiceMgrDW	Running	0%
VMM	Running	2%

3. In the **Guest01** box at the bottom of the console, click on the **Networking** tab, and take a note of the IP address. This IP address is the network address for **Guest01** and will be used in the next step. In this example the IP address is **192.168.1.109**

Guest01				
Adapter:	Network Adapter (Dynamic MAC: 00:15:5D:8E:F8:0F)			
Connection:	External Virtual Network			
IP Addresses:	192.168.1.109, fe80::f959:1ac6:e823:e255			
Status:	ОК			
Summary Memory	Networking Replication			

- On HyperV02, load the Command Prompt, and type in the command ping <Guest01 IP> -t then press return. This will now set up a persistent ping to the Guest01. In the previous step the IP address was 192.168.1.109, so in this example the command used would be ping 192.168.1.109 -t
- 5. Leave the **Command Prompt** box open so you can review the results of the ping

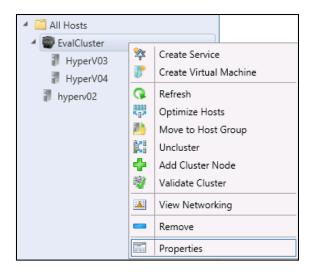
C31.	Administrator: Command Prompt - ping 192.168.1.109 -t
Microsoft Wind (c) 2012 Micros C:\Users\admin Pinging 192.164 Reply from 192 Reply from 192	Administrator: Command Prompt - ping 192.168.1.109 -t Ows [Version 6.2.9200] soft Corporation. All rights reserved. istrator.CONTOSO>ping 192.168.1.109 -t 8.1.109 with 32 bytes of data: .168.1.109: bytes=32 time<1ns TTL=128 .168.1.109: bytes=32 time<1ns TTL=12
	~

The next steps will make the SMB 3.0 share available to the HyperV cluster. This will be used for the shared storage of **Guest01**

1. Load the Virtual Machine Management Console and log in as Jeff. Click on VMs and Services

-	VMs and Services
1 0	Fabric
=	Library
=	Jobs
~	Settings
	•

2. Expand All Hosts, right click on EvalCluster, then select Properties



3. Click on File Share Storage, click on Add

1	EvalCluster.con	toso.com Properties		x
General	File Share Storage			
Status	The following file shares will be av	ailable as storage locations fo	or VMs deployed to r	odes in this cluster:
Available Storage	File Share Path	Access Status	Free Space	Total Capacity
File Share Storage				
Shared Volumes				
Virtual Switches				
Migration Settings				
Custom Properties				
			Repair Add	d Remove
	Use an existing Run As account to	access file shares for ongoin	g operations.	
ALL MARK	Run As account:			Browse
View Script			O	K Cancel

4. On the Add file share window in the File share path, type \\Hyperv02\SMB3Share click OK

Add File Share				
Specify a valid SMB share path to use for VM deployment				
File share path: \\HyperV02\SMB3Share				
To register a file share to this cluster, select a managed file share from the list or enter the UNC path for an unmanaged file share.				
For managed shares, VMM grants file share access to the Active Directory computer account for the virtualization cluster and the VMM cluster management account. For unmanaged file shares, ensure that the Active Directory computer account for the virtualization cluster and the VMM cluster management account have access to the file share.				
To bring a file share into management: in the VMM console, open the Fabric workspace, click the Providers node, and then click "Add Storage Device."				
OK Cancel				

5. Click on the **Browse** button next to the **Run As account** box, select **VMM_RunAs_Contoso** Click on **OK**

Β) s	elect a Run As Accou	nt ×			
	Select a Run As account					
			٩			
	Name	Description	User Role			
	NT AUTHORITY\System					
	NT AUTHORITY\LocalS					
	NT AUTHORITY\Netwo					
	VMM_RunAs_Contoso	VMM_RunAs_Contoso	Administrator			
			Create Run As Account			
_						
		[OK Cancel			

6. Confirm your settings then click on **OK**

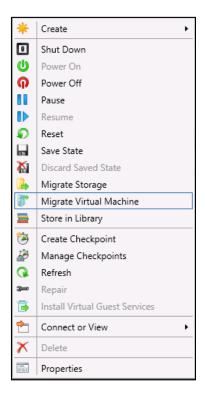
EvalCluster.contoso.com Properties					x	
General	File Share Stor	rage				
Status	Status The following file shares will be available as storage locations for VMs deployed to nodes in this cluster:					
Available Storage	File Share Path	Shara	Access Status	Free Space	Total Capacity	
File Share Storage	(injpervoz (sivis	Share				
Shared Volumes						
Virtual Switches						
Migration Settings						
Custom Properties						
				Repair Ad	ld Remove	2
Use an existing Run As account to access file shares for ongoing operations.						
	Run As account:	VMM_RunAs_Contos	þ		Browse.	
View Script				C	Cancel	

This final step will start the migration of **Guest01** from **HyperV02** to **EvalCluster**.

1. Load the Virtual Machine Management Console and log in as Jeff. Expand All Hosts, click on HyperV02



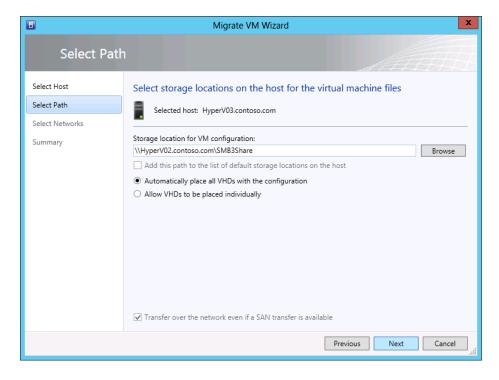
2. In the VMs pane right click on Guest01 then select Migrate Virtual Machine



3. Wait for Virtual Machine Manager to assess your servers and provide the scores for each of your hosts. Tick the box Make this VM Highly available, and Virtual Machine Manager will now reassess the servers and score their suitability from a high availability perspective. Select HyperV03 then click on Next

Migrate VM Wizard					
Select Hos	:	A A A A A A A A A A A A A A A A A A A			
Select Host	Select a destination for the virtual machine				
Select Path	Destinations are rated based on the virtual machine requirements	and on the default placement options.			
Select Networks	Expected Utilization 🗹 Make this VM highly available				
Summary	Search 🔎 🗸 in	All Hosts 🗸 🗸			
	Rating Destination	Narni Transfer Type Netwo 🔨			
	🚖 🚖 🚖 🚖 🚦 HyperV03.contoso.com	📸 Live (VSM) 😑			
	☆ ☆ ☆ ☆ ☆	📸 Live (VSM)			
	👉 👉 🍲 🍲 🔳 (current host) - hvnen/02 contoso	🖹 Live Stora			
	Placement has finished calculating ratings for each potential des	stination of this virtual machine.			
	⊗ Details				
	Details 🕕 Rating Explanation 🕕 Storage Area Network (SA	N) Explanation			
	Description	^			
	Status OK				
	Operating system Microsoft Windows Server 20	12 Standard			
	Pr	evious Next Cancel			

4. Confirm that the SMB 3.0 share on HyperV02 is being used, don't change any other settings, click Next



5. On the **Select Networks** window, leave the settings are default then click **Next**

8		Migrate VM Wiza	rd		x
Select Net	works			AA	
Select Host	Specify which virte	ual switches to us	e for the virtual m	achine.	
Select Path	Selected host: H	yperV03.contoso.com			
	Virtual Network Ad	VM Network	Virtual Switch	Port Classification	VLAN
Summary	Network Adapter 1	Virtual - Virtual Swi 📖	External Virtual Ne 🔻	No Port Classifica: 🔻	VLAN - 🔻
	The Virtual Switch c adapter on the host		ual switches that are co		ore defaults cal network
			Previou	JS Next	Cancel

6. Review your settings, then finally click **Move**

	Migrate VM Wizard	x
Summary		
Select Host Select Path Select Networks Summary	Before you migrate the virtual machine to the new host, review the settings that you chose View S Virtual machine: Guest01 Source host: hyperv02.contoso.com Destination host: HyperV03.contoso.com Path: \\HyperV02.contoso.com\SMB3Share\Guest01	cript
	Start the virtual machine after deploying it To migrate the virtual machine, click Move. You can track the progress of this job in the Jobs workspace.	
	Previous Move Can	celi

While migration is taking place, look at the ping results in the command prompt on **HyperV02**. You should find that there are very little, if any dropped network packets during the migration. Small fluctuations in ping times and a small number of dropped packets are expected during the final handover of the migration.

With the completion of this step Jeff has successfully migrated the non-highly available Guest01 to the newly created highly available failover cluster. Not only is Guest01 now highly available, but it was migrated with no downtime or loss of service. The virtual machine was also migrated with no shared storage between the two nodes – an excellent example of Shared Nothing Live Migration. Virtual machines can be migrated between different Hyper-V 3.0 hosts that share no commonly accessible storage with no downtime.

Scenario: Using remote SMB storage shares on a VHD

Now that Jeff has performed the migration, he investigates the virtual machine settings in his recently implemented Virtual Machine Manager environment. Jeff will confirm that the storage of **Guest01** is now located on the SMB 3.0 share located on **HyperV02**, and that the VM is running on the cluster **EvalCluster**.

 Load the Virtual Machine Management console and enter the username contoso\Jeff and the password pass@word1. Click on Connect



2. Click on VMs and Services

	5 ServiceMpr	Running
	👗 VMM	Running
	S Orchestrator	Running
	👗 DPM	Running
	👗 Guest01	Running
VMs and Services		
🔮 Fabric		
🧮 Library		
Jobs		
Settings		

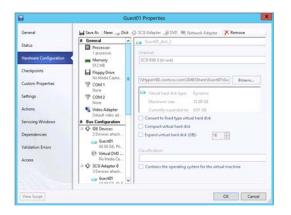
3. Expand All Hosts and click on EvalCluster

VMs and Services	< V	M,	(1)			
Tenants	I		Name	5	tatus	Vin
A M Methods A M Methods Starge A M Methods Starge A M Methods A Mont A SubClate A MyserV03 B MyserV03 B MyserV02		5	Guest01	2	hinning .	Run
Pr VMs and Services Paleric Ultrary Jobs Settings						

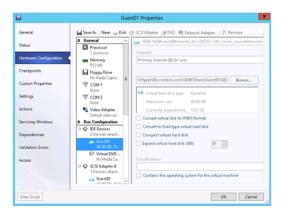
4. Right click on **Guest01**

٠	Create	
	Shut Down	
0	Power On	
Q	Power Off	
11	Pause	
Ð	Besume	
Ð	Reset	
ы	Save State	
4	Discard Saved State	
2	Migrate Storage	
8	Migrate Virtual Machine	
=	Store in Library	
3	Create Checkpoint	
3	Manage Checkpoints	
G	Refresh	
*	Repair	
	Install Virtual Guest Services	
*	Connect or View	
×	Delete	
87	Properties	

5. Left click on Guest01 and select Properties then click on Hardware Configuration



6. Click on the Hard Drive 0 under IDE Controller



- 7. Confirm that the location of the drive is now \\HyperV02\SMB3Share
- 8. Click on **OK**

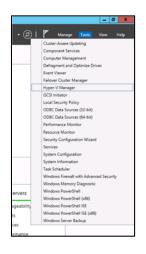
At the end of this scenario Jeff has confirmed that **Guest01** has been migrated from **HyperV02** to **EvalCluster** and is utilizing a remote SMB Share for storage of the virtual hard disk.

Scenario: Using replication for shared nothing failovers

Now that the Guest01 server hosting the critical data is highly available, Jeff decides to implement another feature of Hyper-V in Server 2012 to ensure business continuity in event of a total site failure. Setting up a replica allows for a shared nothing failover to another Hyper-V host using Windows Server 2012. This means a quick and simple way of ensuring continuity with the virtual infrastructure, especially if the hosts are in different geographic locations.

Jeff also notes that one of the features of Hyper-V Replica is the ability to change the IP address of the virtual machine when the failover occurs. This ensures the server can communicate on a different subnet with no intervention from the administrators during failover.

In this scenario we will replicate Guest01 from EvalCluster back to HyperV02.



1. Load the Hyper-V console on HyperV03

2. Right click Guest01 and select Enable Replication

4				Hyper-V	Manager	
File Action View Help						
* * 2 🗊 🖬 🗊						
Hyper-V Manager	Virtual Machines					
	Name *	State Plunning	0 %	Assigned Memory 512 MB	Uptime 00.0717	Status

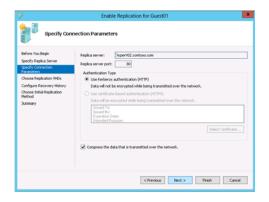
3. Click on Next

3 9	Enable Replication for Guest01						
Before You Begin							
Before You Begin	This wizard helps you to configure replication for a virtual machine.						
Specify Repica Server Specify Connection Parameters Choose Repication WHOs Configure Recovery History Choose Initial Repication Method Summary	hefter programs, manze tak ury ou here configured a server to alleva rediction here the compare- tion why this, was the helps close of an entropy of the here of the length of the specific distribution of the specific and the here of t						
	Do not show this page again. Hore about enabling resilution for a virtual mechane						
	< Previous Next > Printh Cancel						

4. Type in the name **HyperV02**

	Enable Replication for Guest01
Specify Repli	ca Server
Index two legits Specify if and a drive Parameters Parameters Drose Registation VHos Configues Recovery VHosty Objects behall Reploation Hethod Summary	Sperfy në kaleka server name tu va ka vajekat Plu v shuk andran. Ji the Rapka server i or a Raphore Guller, gold v innan et lë nërga kaleka tolëre se të kaleka serve, tu ka Plabore Culler Minanger et the Rapka server to frd the name d the Rapka boler. Rapka server: <u>Ingent02</u>
	<previous next=""> Pinish Cancel</previous>

5. Click on **Next**



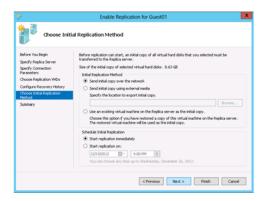
6. Click on Next

\$0	Enable Replication for Guest01
Choose Repl	ication VHDs
Before You Begin Specify Replica Server Specify Concertion Farantiers Concern Replication MCN Configue Recovery History Okoosa behail Replication Hethod Summary	Case the deck Source of any related here/date (NPCs) that you do not want to replicate (for example, a ND-used for a deck-dated pages (R). The replicating centre (NCs, such as the operating system WHC, could result in the Replica virtual such results of sample or property. What Here Chase (MrsperVID2 contross cost)(2481)Shere(Guerd101(5200: 16304.amd64fee.werd_rtm.120225-1247_serv)
	C III >

7. Click on Next

	Enable Replication for Guest01
Configure F	tecovery History
Before You Begin Specify Replica Server Specify Connection Parameters	You can choose to store only the latest recovery point of the primary virtual machine on the Replica server or to add additional recovery points, advoing you to recover to an earlier point in time. Additional recovery points require more storage and processing resources. Specify the number of recovery points to save.
Choose Replication VHDs	Only the latest recovery point
Configure Recovery History	 Additional recovery points
Choose Initial Replication Method	Number of additional recovery points to be stored: $4\frac{n}{v}$
Summary	Additional recovery inequalities are created every host. Climited additional space regards on the Replical server to strong these recovery magnitude: 3.4 G GI To replicate an incremental snapphot using the Values 9 Androw Capy Service (VSS), which the following shock Suc, and then use the label to specify the Integrands there impediates are taken. Use the strong shock Suc, and then exception to the single strong structure of the prices which incremental values in the label to specify the Integrands them integration to the prices which incremental values integrates are taken.
	1 hour 12 hours 4 hour(s)
	< Previous Next > Finish Cancel

8. Leave these settings default, click on **Next**. (For the purposes of the evaluation guide these settings can be kept at default, although it would be good to familiarize yourself with the delivery options for your initial replication.)



9. Click on Finish

Specify Replica Server Description: Specify Connection ServerS	Completing	the Enable Replication wiza	rd
Onces Replays Very Apple are rem Model*20 endsets can baption are ports No Condrigue Replays The State Model Congress data: Yes No Model Replays The State Stremary Congress data: Yes No Stremary Stremary Stremary No Stremary	Before You Begin Specify Replica Server Specify Connection	"Guest01" with the following setting	
To enable replication and close the vecand, click Finish.	Parameters Choose Replication VHDs Configure Recovery History Choose Initial Replication Method	Replica server port: Compress data: Authentication type: VHDs not selected for replication: Store additional recovery points:	60 Yes Kerberos authentication None No
		To enable replication and close the	vizaré, ckól Tivish.

At the end of this scenario we have successfully replicated **Guest01** from **EvalCluster** to **HyperV02**. Hyper-V replication is not a point-in-time snapshot and the data will be constantly replicated from **EvalCluster** to **HyperV02**.

Now that the replica has been configured, Jeff has successfully implemented a robust business continuity solution without having to purchase additional hardware of software. This will ensure the cost of business continuity for Contoso Electronics is kept low.

Synopsis

Jeff has successfully implemented several features that will allow the Contoso Electronics company to continue to work in the event of hardware failure, or if maintenance is required. Previously, work would stop for several hours when Jeff needed to patch his servers or upgrade hardware. Now he can implement improvements and configuration changes to his infrastructure without interrupting the business. This is critical as it allows Jeff to ensure the infrastructure continues to supply the business with always on and efficient supply of computing power to continue to grow and operate.

Links to other	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info) (
areas of interest	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Experience 2: Manage Private Cloud capacity

Once **Jeff** has a **Private Cloud** in place it's time to take advantage of the features of **Windows Server 2012** and **System Center 2012 SP1** to increase your capacity or manage your workloads dynamically without downtime.

In this Experience we'll step through three scenarios:

- Dynamically expand storage for workloads
- Modifying network resources of VM's
- Using dynamic memory to improve workloads

Scenario: Dynamically expand storage for workloads

In this scenario we can see how the Jeff can dynamically expand the storage capacity of a server utilizing the Storage Spaces features in Windows Server 2012 without interrupting service.

Debbie has informed Jeff of upcoming projects that will require large amounts of disk capacity for storing SQL databases for a new Sales application that is being developed. Jeff assesses the current capacity and identifies that it will not meet the needs of the business. Jeff also realizes that he does not have enough budget this month to purchase new disk for his storage server.

Jeff identifies that he has a pool of different size disks left over from previous projects and hardware upgrades that is still functional, but because they are all different sizes they cannot be included in a typical RAID volume. Jeff decides to take advantage of the Just a Bunch Of Disks (JBOD) features of Server 2012 and present these disks in a pool to the project team for storage. He will also allow for growth on the volume in case the project overruns.

1. Load the Virtual Machine Manager console, select Use current Microsoft Windows session identity and click Connect



2. Click on VMs and Services and click on All Hosts



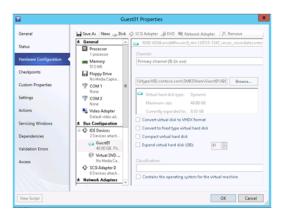
3. Click on **Guest01**

🗇 Tenants	1			
40 Clouds	Name	Status	 Virtual Machine State 	
VM Networks	AppController	Running	Running	
	🐉 ServiceMgrDW	Running	Running	
3 Storage	💑 AD	Running	Running	
r 🛄 All Hoth	🛃 OpsMgr	Running	Running	
	ServiceMgr	Running	Running	
	J. VMM	Running	Running	
	Crchestrator	Running	Running	
	S, DPM	Running	Running	
	No Guest01	Running	Running	

4. Right click **Guest01** and click on **Properties**

		Guest01 Properties		
General Status	Name: Description:	Guest01		
Hardware Configuration				
Checkpoints	Computer name: Cost center:	WIN-UGEAD1698T4		
Custom Properties	Tag:	(none)		
Settings	Cloud:		w	
Actions	Туре:	🛃 Virtual Machine		
	Operating system:	64-bit edition of Windows Server 2012 Datacenter	-	
Servicing Windows	Virtual machine guest se	nvices: 6.2.9200.16384		
Dependencies Validation Errors Access	Added: Modified:	Wednesday, 19 December 2012 11.01 a.m. Wednesday, 19 December 2012 12:31 p.m.		
View Script		OK	scel	

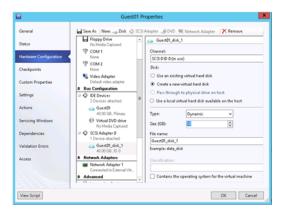
5. Click on Hardware Configuration



- 6. We will be adding 3 SCSI disks to **Guest01** as it will allow us to **hot-add storage** without rebooting the guest OS.
- 7. Scroll down until you can see **SCSI Adapter** under the **Bus Configuration** and select **SCSI** Adapter

General	Save As New: _ Disk	503	Adapter
Status	No Media Capitred	-	SCS Adaptar 0
Handware Configuration	TOM 1 None		
Checkpoints	TOM 2 None		
Custom Properties	Video Adapter Detault video adapter		
	# Bus Configuration	13	
Settings	O O		
Actions	Guest01 40.00 GB, Prenary		
Servicing Windows	Writual DVD drive No Media Coptured		
Dependencies	SCS Adapter 0 0 Devicer attached	1	
Validation Errors	R Network Adapters		
Access	Network Adapter 1 Connected to External Virt. Advanced		
	Al services		

8. At the top, click on **New: Disk**, change the size of the disk to **10 GB** and click on **OK**



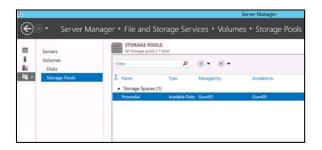
9. Wait for the VM to finish updating, then repeat the above steps to add an additional **2 disks**. These disks will need to be **12GB** and **15GB** in size.

General	Nord	7 0.0	Adapter @DVD N Network Adapter X Remove
Status	TOM 2 None	^	◆ SCSI Adapter 0
Hardware Configuration	Video Adapter Default video adapter		
Checkpoints	A Bus Configuration	-11	
Custom Properties	Contract Provides 2 Devices attached		
Settings	Guest01 40.00 GB, Primary		
Actions	Virtual DVD drive No Media Captured	=	
Servicing Windows	SCSI Adapter 0 3 Devices attached		
	Guest01 10.00 GB.ID 0		
Dependencies	Guest01 12.00 GR. ID 1		
Validation Errors	Guest01 15.00 GB, ID 2		
Access	A Network Adapters		
	Network Adapter 1 Connected to External Virt		
	Advanced	¥	

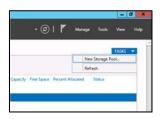
- At the end of this you will have three additional disks assigned to Guest01, these will be 10GB,
 12GB, and 15GB in size. When we created the disks, VMM will automatically place the created disks in the same location as the current Guest01 VHDX files. If you look at the SMB3Share on HyperV02 you will notice the newly created VHDX files.
- 11. Connect to **Guest01** and within Server Manager, click on **File and Storage Services**.



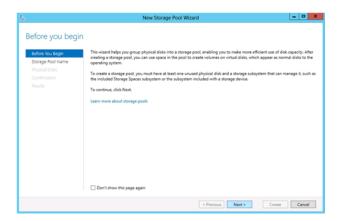
12. Click on Storage Pools



13. In the **Physical Disks** section click on **Tasks** and click **New Storage Pool**



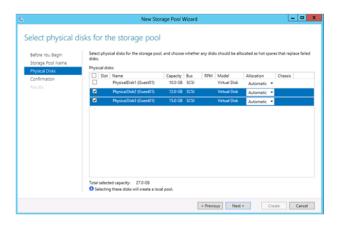
14. In the Before you begin screen click Next



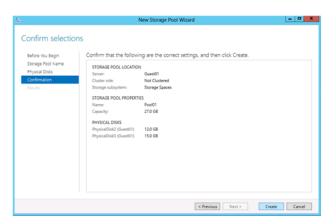
15. In the Storage Pool Name screen, type Pool01 into the Name field, click on Next

		New Storage Pool Wiza	ird		
Specify a storage Before too Begin Storage Foot Name Physical Disks Confermation Results	Description:	d subsystem			
	Managed by	able disks (also known as a primo Available to	Subsystem	Primordial Pool	
	Guest01	Guest01	Storage Spaces		
			< Previous Next	> Create	Cancel

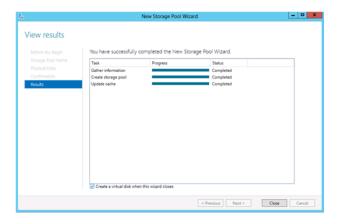
16. In the **Physical Disks** screen tick the **12 GB** and **15GB** disk. Do **NOT** select the **10GB** disk. Click **Next**



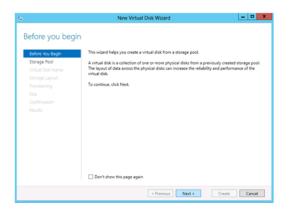
17. Click Create



18. Once completed, tick the box that says **Create a virtual disk when this wizard closes** and then click on **Close**



19. The New Virtual Disk Wizard will now open. Click on Next



20. Select **Pool01** and click **Next**

ty Free Space Subsystem 38 25:0 GB Storage Space	Capa 25.1	vailable t uest01		Mana Guest	ool Name ool01		itorage Pool
GB 25.0 GB Storage Space	25.	uest01	01	Guest	lool01		
						ame	/irtual Disk N

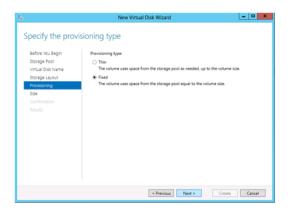
21. Name the virtual disk VirtualDisk01 and click Next

Storage Rod Vehall Dick Name Storage Layout Providing Stee Confirmation	

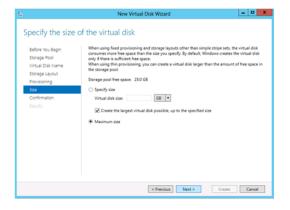
22. Select **Simple** and click **Next**

Before You Begin	Layout:	Description
Storage Pool	Simple	Data is striped across physical disks, maximizing capacity and
Virtual Disk Name	Mirror	increasing throughput, but decreasing reliability. This storage layout requires at least one disk and does not protect you from
Storage Layout	Parity	a disk failure.
Provisioning		

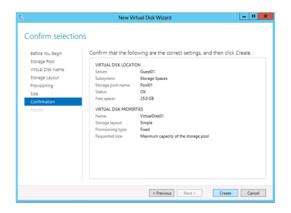
23. Ensure that **Fixed** is selected and click **Next**



24. Tick the box Maximum size and click Next



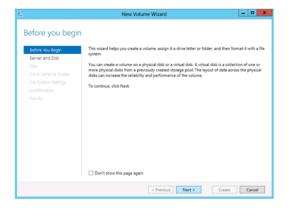
25. Click Create



26. Ensure that the Create a Volume when this wizard closes box is ticked, click on Close

2	New Virt	ual Disk Wizard	_ D X
View results Before You Begin	The New Virtual Disk	Wizard successfully con	npleted.
Stronge Pool Virtuel Dak Name Stronge Lagout Provisioning See Conformation Results	Task Gather information Create virtual disk Rescan disk Initialize disk Update cashe	Progress	Status Completed Completed Completed Completed Completed
	Create a volume when	this wizard closes	
		< Previous Ne	t> Close Cancel

27. The New Volume Wizard will now open. Click Next



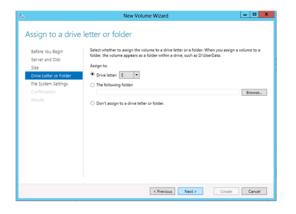
28. Review the settings and click Next

efore You Begin	Serven					
erver and Disk	Provision to	Stat		Cluster Role		
ize	Guest01	Onli	ne	Not Cluster	red Local	
					Refresh	Resc
	Disk				Nerresn	Mesca
	Disk	Virtual Disk	Capacity	Free Space	Subsystem	
	Disk 4	VirtualDisk01			Storage Spaces	

29. Confirm the size of the disk as **21.9GB** and click **Next**

2		New Volume Wizard
Specify the size c	of the volume	
Before You Begin Server and Disk	Available Capacity:	
Size	Minimum size: Volume size:	8.00 MB 21.9 GB •
Drive Letter or Folder File System Settings		
		< Previous Next > Create Cancel

30. Select the drive letter E: and click Next



31. Change the **Volume Label** to **Data** and click **Next**

6	Nev	w Volume Wizard	_ _ X
Select file system Before too Begin Server and Dirk Server and Dirk Dirk Lytem of Rolder Dirk Lytem Settings Confirmation Results	Settings File system: Allocation unit size: Volume label Generate short file Short file names (8	NTF5	
		< Previous Next >	Create

32. Click on Create

Before You Begin	Confirm that the following	ng are the correct settings, and	then click Create.
Server and Disk	VOLUME LOCATION		
	Server:	Guest01	
Drive Letter or Folder	Subsystem:	Storage Spaces	
File System Settings	Virtual disk:	VirtualDisk01	
Confirmation	Disk	Disk 4	
Results	Free space:	21.9 G8	
	VOLUME PROPERTIES		
	Volume size:	21.9·G8	
	Drive letter or folder:	EΛ	
	Volume label:	Data	
	FILE SYSTEM SETTINGS		
	File system:	NTFS	
	Short file name creation:	Disabled	
	Allocation unit size:	Default	

33. This will now create you a new Volume. Click Close

6	New Vo	lume Wizard	_ 0 X
Completion Before You Begin	You have successfully o	completed the New Vo	lume Wizard.
Server and Dark Soar Drive Letter or Folder File System Settings Confernation Results	Tark Gathe information Create new partition Format: volume Andrat: volume Andrat: volume Update cache	Progress	Sota Completed Completed Completed Completed Completed
		< Previous Net	xt > Close Cancel

34. Within Server Manager, click on File and Storage Services and click on Volumes



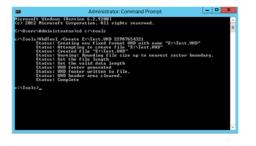
Confirm that your new volume is listed there and the free space is correctly reported. If you did not give your newly created drive the drive letter of E: then take note of the Volume letter here. This information is required for the next step.

35. Copy the VHDtool.exe Application from **\\HyperV02\SMB3Share** to the folder **C:\Tools** on **Guest01**

36. Open a command prompt by moving to the bottom left hand corner of the screen, opening the Start screen and typing CMD. Click on the Command Prompt icon. Browse to the folder that VHDtool was downloaded to by typing cd c:\tools.

			Tools	
File Home Share View	ŵ.			
🕣 🔹 🕈 📕 🕈 Computer	Local Disk (C.) Tools			
* Favorites	Name	Data modified	Туре	Size
Desktop Downloads Recent places	K VhdTool	12/14/2012 12:39	Application	5783
Libraries Cocuments Music				
Pictures Videos				
Computer				

37. Type in the following: **VHDTOOL /Create E:\Test.VHD 22987654321** and press enter. If you created your new drive with a different drive letter then change the above command accordingly.



- 38. You will now have 21.4GB VHD file on your volume. Close the command prompt.
- 39. Load Server Manager, click on File and Storage Services then Volumes

E	. Server Manag	er • File and !	Storage S	ervices • Volu	ımes 🕨					ا چ
	Servers	All volumes 2 t	otal							
ii -	Volumes Disks	Filter	د	0 0 • A •						
iing ⊳	Storage Pools	 Volume Guest01 (2) 	Status File Syste	em Label Provisionin	Gapacity	Free Space	Deduplication Rate	Deduplication Savings	Percent Used	
		E	Data	Fixed	21.9 GB	376 MB				
		C:		Fixed	40.0 GB	31.0 GB			-	

- 40. Take note of the free space on the **E:** drive and the fact that the **Percent Used** is now in a red **emergency** state
- 41. Click on Storage Pools

\mathbf{E}	. Server Manag	er • File and Stor	age Serv	ices • Volumes	 Storage Pools 			• ©	🏲 Manage	e Tools
	Servers Volumes Disks	All storage pools 2 tot		· · ·						
iig ⊳	Storage Pools	â Name	Type	Managed by	Available to	Read-Write Server	Capacity	Free Space	Percent Allocated	Status
		 Storage Spaces (2) Primordial 	Available Disks	Guest01	Guest01	Guest01				
		Pool01	Storage Pool	Guest01	Guest01	Guest01	25.5 GB	3.00 GB		

42. Right click on **Pool01** under **Storage Spaces**



43. Select Add Physical Disk

īω.					Ad	d Physical Di	sk		_ D X
Sele disk		cal disks for the sto	orage pool,	and ch	ioose w	hether any disk	s should be alloca	ted as hot :	spares that replace failed
	Slot	Name	Capacity	Bus	RPM	Model	Allocation	Chassis	
		PhysicalDisk1 (10.0 G8	SCSI		Virtual Disk	Automatic *		
Tota	i select	ed capacity: 0.0	00 B						
									OK Cancel

44. Tick the box next to the **10GB** disk and click on **OK**



45. Right click on VirtualDisk01 under the Virtual Disks panel

col	01 on Guest01							TASKS		Pool01 o
R	ller			P (8)• (e) •			۲	Filter
à	Name	Status	Leyout	Provisioning	Capacity	Allocated	Volume	Oustered	At	▲ Sic
	VirtualDisk01	5 .		Fixed	22.0 GB	22.0 GB	E		G	
			New	lohane						0
				Virtual Disk						
				h Virtual Disk						
				or Unmask Vir		_				
				d Virtual Disk.						
			Delete	e Virtual Disk						
			Prope	ties						

46. Left click on Extend Virtual Disk



47. Input a new value of **28GB** and click on **OK**



48. Click on **Volumes** in the left hand pane

\bigcirc	∋ - Server Manag	er • File and St	orage Services	s • Volun	nes •				•	()
	Servers Volumes Disks Storage Pools	VOLUMES All volumes 2 tota Filter Volume St Guest01 (2)	atus File System Label		Capacity	Free Space	Deduplication Rate	Deduplication Savings	Percent Used	
		E C	Data		21.9 GB 40.0 GB				-	

49. Right click the **E:** drive and select **Extend Volume**

Filter	P	•			
 Volume Guest01 (2) 	Status File System Lal	bel i	Provisioning	Capacity	Free Space
e	Data		fixed	21.9 GB	376 MB
0	Scan File System for Em Repair File System Liver			D GB	31.0 GB
	Manage Drive Letter an Format	d Access	Paths		
	Extend Volume				
	Delete Volume				
Last refreshed.	Configure Data Deduple Properties	cation			

50. Input the number listed under **Maximum size** (i.e. **27.9GB**) and click on **OK**



51. Once completed, confirm that the **E**: drive has now additional free space.

iter		ب (i) م	(H) •					
Volume Guest01 (2)	Status	File System Label	Provisioning	Capacity	Free Space	Deduplication Rate	Deduplication Savings	Percent Used
E		Data	Fired	27.9 GB	6.37 G8			
C			Fixed	40.0 GB	31.0 G8			-

At the end of this scenario Jeff has created a single virtual volume that spans multiple physical drives of varying sizes. This allowed him to utilize the disparate disks and combine them into a single pool of storage for the developers to utilize.

Important Note

Do not delete the created VHD file as this will be used in the following scenario.

1

He then added additional storage to the pool and extended out logical volume when they over-utilized their assigned capacity.

This highlights the ability of administrators to take advantage of disparate disks they may have in different locations to create large pools of storage. JBOD can become an inexpensive way to ensure that environments can extend their disk resource with little new investment in infrastructure.

Scenario: Modifying network resources of VM's

Jeff has noticed that a new server that has been implemented into Production that hosts the new sales application is performing at capacity. In fact it appears to be utilizing much of the network resources of the underlying physical infrastructure to the detriment of other virtual servers hosted on the same server.

Jeff needs to alter the configuration of the virtual machine without interrupting the service to reduce the network throughput to allow other servers equal access to network resources.

In this example, the network load is generated using a large file copy.

- 1. Connect to Guest01
- Using File Explorer browser to the virtual volume file created in the previous scenario in the E:\ drive labelled Test

	Disc image 1	fosis				Data (E.
File: Home Share	View Mariage	ŧ				
🖻 🔹 🕈 🝙 🛛 Comp	puter + Data (E)					
* Favorites	1	Name	Date modified	Type	See	
E Desktop	5	Test	12/19/2012 1:32 PM	Hard Dok Image File		22,448,982 X3
📕 Download:						
Secent places						
The Libraries						
Documents						
Music						
WILLING .						
Pictures						
Pictures						
Pictures						
Pictures						

3. Right click on the file and select **Copy**

2 D B	Disc image Tools			Data (E:
File: Home Share Vi	lew Mariage			
🕣 🕘 + 🕇 🚘 🕇 Computs	er 🔹 Data (E.)			
* Favorites	Name		Date modified Type	Sze
E Desktop	Ca Test		12/19/2012 1:32 PM Hard Disk Image File	11,440,887 KB
Downloads Recent places		8	Mount Open with Restore previous versions	
Documents			Send to + Cut	
Music Pictures			Сору	
Videos			Create shortcut Delete	
r Computer			Bename	
Local Disk (C) Ca Data (E)			Properties	

4. Browse to \\HyperV02\SMB3Share, right click and select paste

🕹 l ⊋ 🚯 👳 l				smb3share		
File Home Share View						
🛞 💿 = 🕆 🎍 > Network >	hyperv02 + smb3share +					
🔶 Favorites	Name	•	Date modified	Type	Size	
Desktop Dowmloads	🎍 Guest01		12/19/2012 3:00 Ph	f File folder		
🔀 Libraries 💽 Documents 🎝 Music						
Videos		View Sort by	*			
🚝 Computer 🎩 Local Disk (Ci)		Group by Refresh	,			
👝 Data (Ei)		Customize this folde Paste	r			
🗣 Network		Paste shortcut				
		New	•			
		Properties				

The Windows Copy dialogue box will now open and show you the speed at which you are transferring your file. Click on **More Details** as this will show you a graph that displays the current speed of the transfer.

On a 100MB network this should be around 11.4MB/s on a 1000MB network this should be around 110MB/s. Confirm the current speed that the file is copying at and take a note of it.

Copying 1 it	tern from Data (E) to smb3share				
0% comp	lete		н х			
	_		Spe	ed: 10.	7 MB/s	
Name: Test	ning: About 3 h					

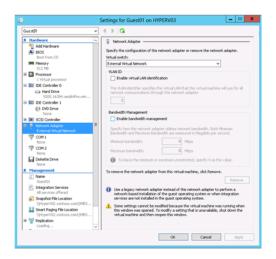
5. With this window still open, open the HyperV Manager console on HyperV03

				Hype	r-V Manage	-	
File Action View Help							
• • 2 🖬 📖							
Hyper-V Manager	Virtual Machine	5					
	Name *	State	CPU Usage	Assigned Memory	Uptime	Status	
	Guestit	Running	11.5	512 M8	0045:27		

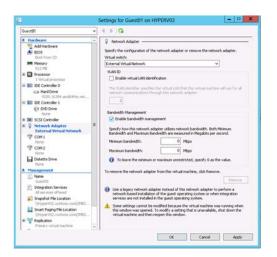
6. Select then **Guest01** virtual machine and right click it then select **Settings**

20 A				Hype	r-V Manage	4	
File Action View Help							
💠 🌩 🙎 📰 📓 📰							
Hyper-V Manager	Virtual Machin	6					
	Name	State	CPU Usage	Assigned Memory	Uptime	Status	
	Guest01	Running			00.43.33		
		Connect					
		Settings					
		Turn Off					
		Shut Down					
		Save					
		Pause					
		Reset					
		Snapshot					
		Move					
	Snapshots	Rename					
		Replication +					
		Help		The selected virtual mach	ine has no snaps	inors.	

7. Click on Network Adapter



8. Under Bandwidth Management, tick the box Enable bandwidth management



9. In the **Maximum Bandwidth** box type **10**. This will reduce the network to a **1MB/s** network. Click on **Apply**

Guest\$7	۷	4 1 0	
E theorement Markene	*	Hatmork Adgeter Seed's the configuration of the network adgeter or removes the network Markal and ob. External Water Methods External Water Methods External Water Methods Configuration Markal Description Markal Methods Markal Methods	nd use for all frimum cond.
Name Gunt01 Gunt01 Stepgaton Services Al services offseed Snapoto File Location UhyperViD_controls.com(DH0). Mark Paging Pile Location UhyperViD_controls.com(DH0). Snapoto Services.com(DH0). Snapototo Preservid_controls.com(DH0). Snapototo Preservid_controls.com(DH0).	•	Control of the reserves adaption of soft ones in the strain matching, color announces of the strain of the spart operating system. The strain of the spart operating system. The strain of the stra	erform a integration

10. Go back to **Guest01** and confirm that the speed of your transfer has been reduced. It should be approximately **1MB/s**

11. Once you have confirmed this, go back to the **Hyper-V Manager** console and remove the tick from the **Enable Bandwidth Management** tick box and click **OK**

2	Settings for Guest01 on HYPERV03
Guest01	✓ 4 ≥ Q
Hardware Add Hardware	Vietwork Adapter
BIOS	Specify the configuration of the network adapter or remove the network adapter.
Boot from CD	Virtual switch:
Memory 512 MB	External Virtual Network.
Processor Wrbuel processor	VLAN ID Enable virtual LAN identification
E 10 IDE Controller 0	
9200, 16304, and 64fre, win	The VLAN identifier specifies the virtual LAN that this virtual machine will use for all network communications through this network adapter.
B 10E Controller 1	2
DVD Drive None	Bandwidth Management
8 SCSI Controller	Enable bandwidth management
Network Adapter External Virtual Network	Specify how this network adapter utilizes network bandwidth. Both Minimum Bandwidth and Maximum Bandwidth are measured in Megabits per second.
TOM 1 None	Minimum bandwidth: 0 Mbps
Tone COM 2	Maximum bandwidth: 10 Mbps
Diskette Drive	To leave the minimum or maximum unrestricted, specify 0 as the value.
* Management	To remove the network adapter from this virtual machine, click Remove.
I Name Guest01	Remove
Integration Services All services offered Snapshot File Location	(i) Use a legacy network adapter instead of this network adapter to perform a network-based installation of the quest operating system or when integration services are not installed in the quest operating system.
U/HyperV02.contoso.com/SMB3	Some settings cannot be modified because the virtual machine was running when
Smart Paging File Location WhyperV02.contoso.com/;5H03	this window was opened. To modify a setting that is unavailable, shut down the virtual machine and then reopen this window.
Replication Primary virtual machine	v
	OK Cancel Apply

12. Once **Bandwidth Management** has been **disabled**, if you monitor the file transfer of **Guest01** you will notice that it will have returned to its original speed.



At the end of this scenario Jeff has successfully throttled the network bandwidth of **Guest01**. This will ensure that one virtual machine in the infrastructure will can be prevented from impacting other virtual machines hosted on the same physical host.

1



The minimum setting is another important feature as it can ensure that an important server can continue to receive a minimum amount of bandwidth in times when all servers hosted on the same infrastructure are under load. This can be utilized to ensure that business critical applications continue to operate at critical times of business flux.

Scenario: Using dynamic memory to improve workloads

Jeff has noticed that at times of load the Sales application in production becomes non-responsive. During one of these periods he investigates the SQL Server and finds that it has consumed all of the available memory. Jeff decides to utilize the Dynamic Memory features of Hyper-V and SQL Server 2012 to allow the server to consume more memory resources as it requires.

- 1. Log onto the Hyper-V server HyperV03, open the Hyper-V Manager and Select Guest01
- 2. Right click and select **Shutdown**

🔶 🤿 🙇 📰 👔										
Hyper-V Manager	Virtual Ma	Virtual Machines								
	Name 🔶		State	CPU Usage	Assigned Memory					
	Guest01		Running	0%	512 MB					
			Connect							
			Settings							
			Turn Off							
			Shut Down							
			Save							
			Pause							
			Reset							
			Snapshot							
			Revert							
			Move							
			Rename							
			Enable Replic	ation						
			Help							

3. Once the server has shutdown, right click and select **Settings** and select **Memory** from the hardware section

	:	Settings for Guest01 on HYPERV03
Guest01	~	4 ▶ Q.
Hardware Add Hardware	^	Memory
BIOS		You can configure options for assigning and managing memory for this virtual machine.
Boot from CD		Specify the amount of memory that this virtual machine will be started with.
Memory 512 MB		Startup RAM: 512 MB
🗉 🛄 Processor		Dynamic Memory
1 Virtual processor		You can manage the amount of memory assigned to this virtual machine dynamically within the specified range.
9200.16384.amd64fre.win		Enable Dynamic Memory
🖃 🔝 IDE Controller 1		Minimum RAM: 512 MB
None		Maximum RAM: 512 MB
SCSI Controller Guest01_disk_1_B2CF48F2	-	Specify the percentage of memory that Hyper-V should try to reserve as a buffer. Hyper-V uses the percentage and the current demand for memory to determine an amount of memory for the buffer.
Guest01_disk_2_F0FC5F79		Memory buffer: 20 🔆 %
Guest01_disk_3_FFDFE652		Memory weight
Vetwork Adapter External Virtual Network		Specify how to prioritize the availability of memory for this virtual machine compared to other virtual machines on this computer.
COM 1 None		Low High
COM 2		Specifying a lower setting for this virtual machine might prevent it from
		starting when other virtual machines are running and available memory is low.
None		
* Management		
I Name Guest01		
Integration Services All services offered	~	
		OK Cancel Apply

4. Set the following memory configuration and press **OK**

Dynamic Memory	Enabled
Minimum RAM	512MB
Maximum RAM	1024MB
Memory Buffer	20%

12	Settings for Guest01 on HYPERV03
Guest01	
Guest01	▲ Imm Memory You can configure options for assigning and managing memory for this virtual machine. Specify the amount of memory that this virtual machine will be started with. Startup RAM: 512 MB Dynamic Memory You can manage the amount of memory assigned to this virtual machine dynamically within the specified range. ✓ Enable Dynamic Memory Minimum RAM: 512 MB ■ Maximum RAM: 512 MB Specify the percentage of memory that Hyper-V should try to reserve as a buffer. Hyper-V uses the percentage and the current demand for memory to determine an
COM 2 None Diskette Drive None Management Name Guest01 Mare Guest01 Mare	Specifying a lower setting for this virtual machine might prevent it from starting when other virtual machines are running and available memory is low.
All services offered	QK Cancel Apply

5. Select **Guest01**, right click and select **Start**

Virtual N	lach	nines					
Name	•		State	CPU Usage	Assigned Memory	Uptime	Status
Guest01			Off				
		Connect					
		Settings					
		Start					
		Snapshot					
		Revert					
		Move					
		Export					
		Rename					
		Delete					
		Enable Re	plication				
		Help					

6. Select **Guest01**, right click and select **Connect**

Virtual Ma	achines							
Name	•	State	CP	U Usage	Assig	ned Memory	Uptime	Status
Guest01		Running	6 %	6	512 M	В	00:00:42	
	Connec	:t						
	Setting	5						
	Turn O	ff						
	Shut Do	own						
	Save							
	Pause							
	Reset Snapshot							
	Revert							
	Move							
	Renam	e						
	Enable	Replication						
	Help							

7. Logon as **administrator** with the password **pass@word1**

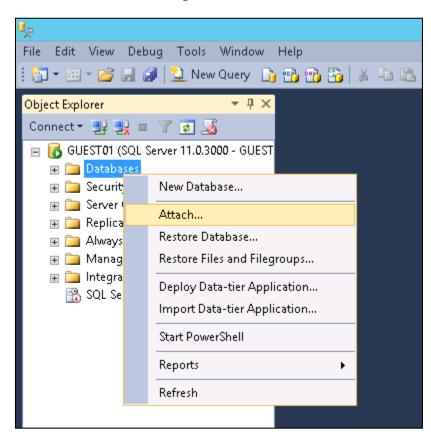
- 8. Download and extract, the Adventure Works 2012 sample database from codeplex website: http://msftdbprodsamples.codeplex.com/releases/view/93587
- 9. Copy the downloaded database files to C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA

👪 l 💽 🚯 = l	DATA			
File Home Share View				
📀 🐵 🔻 🏦 🚺 C:\Program Files\Microsoft	SQL_Server\MSSQL11.MSSQLSERVER\MSSQL\DATA			Search DATA
☆ Favorites	Name	Date modified	Туре	Size
🛄 Desktop	AdventureWorks2012_Database	12/21/2012 11:46	File folder	
〕 Downloads	📴 master	12/21/2012 11:40	SQL Server Databa	4,096 KB
💯 Recent places	📴 mastlog	12/21/2012 11:40	SQL Server Databa	768 KB
	📴 model	12/21/2012 11:40	SQL Server Databa	3,136 KB
🥽 Libraries	📴 modellog	12/21/2012 11:40	SQL Server Databa	512 KB
Documents	🔄 MS_AgentSigningCertificate	12/21/2012 11:40	Security Certificate	1 KB
🎝 Music	📴 MSDBData	12/21/2012 11:40	SQL Server Databa	17,088 KB
🔄 Pictures	📴 MSDBLog	12/21/2012 11:40	SQL Server Databa	2 0,0 96 KB
🛃 Videos	📴 tempdb	12/21/2012 11:40	SQL Server Databa	8,192 KB
	📴 templog	12/21/2012 11:40	SQL Server Databa	512 KB
🌉 Computer				
🚢 Local Disk (C:)				
🞑 DVD Drive (D:) SQLServer				
👝 Data (E:)				
🙀 Network				

10. Start SQL Server Management Studio and click Connect

eji	Connect to Server	x
SQL Serv	/er ⁻ 2012	
Server type:	Database Engine	~
Server name:	GUEST01	¥
Authentication:	Windows Authentication	¥
User name:	GUEST01\Administrator	×
Password:		
	Remember password	
Connect	Cancel Help Options	>>

11. Select **Databases**, Right click and select **Attach**



12. Click **Add**

0	At	tach Databa	ises				x
Select a page Page General	🔄 Script 🔻 🚺 Help						
	Databases to attach:						
	MDF File Location	I		Database Name	Attach	n As	(
	<	ш					>
				Add		Remov	e
	Database details:						
Connection	Original File Name	File Type	Current F	File Path	Messa	age	
Server: GUEST01							
Connection: GUEST01\Administrator							
View connection properties							
Progress				Add Catalog]	Remov	e
C Ready							
					OK	Car	icel

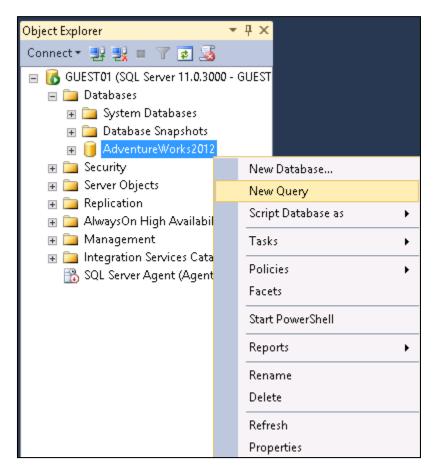
13. Browse to C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA and click OK

Ū Lo	cate Database Files - GUEST01 📃 🗖 🗙
Database Data File location: C:\Program	Files\Microsoft SQL Server\MSSQ
Boot Documents and Settings PerfLogs Program Files Files Internet Explorer Microsoft Analysis Services Microsoft SQL Server Microsoft	AdventureWorks2012_Data.mdf master.mdf model.mdf MSDBData.mdf tempdb.mdf
File name: AdventureWorks	2012_Data.mdf Database Data Files(*.mdf) V

0	Att	ach Datab	ases		_ □	x
Select a page Page General	<u> S</u> cript 🔻 [] Help					
	Databases to attach: MDF File Location C:\Program Files\	Microsoft SQL	Ser	Database Name AdventureWorks2012	Attach As AdventureWorks2	012
	''AdventureWorks2012''	III database det		Add	Remove	>
0	Original File Name	File Type		File Path	Message	
Connection	AdventureWorks20	Data		gram Files\Microso	-	
Server: GUEST01	AdventureWorks20	Log	C:\Prog	gram Files\Microso		
Connection: GUEST01\Administrator						
-						
Progress				Add Catalog	Remove	
Ready						
					OK Cano	el

14. Click **OK** to attach the **AdventureWorks2012** database

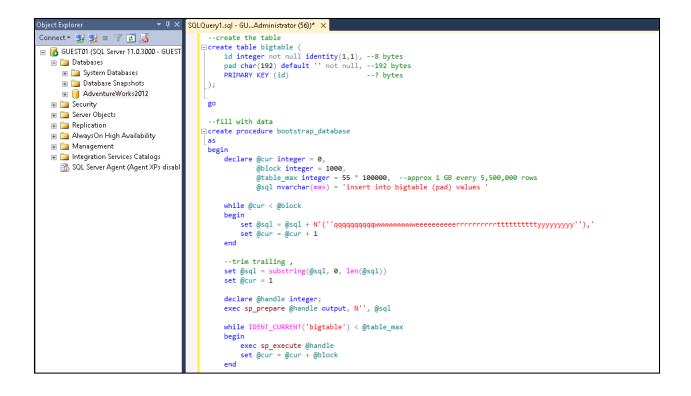
15. Select the **AdventureWorks2012** database by expanding the **Databases** section in **Object Explorer**, right click and choose **New Query**



16. Copy and paste the following commands into the query window:

```
--create the table
create table bigtable (
id integer not null identity(1,1), --8 bytes
pad char(192) default " not null, --192 bytes
PRIMARY KEY (id) --? bytes
);
go
--fill with data
create procedure bootstrap_database
as
```

```
begin
declare @cur integer = 0,
@block integer = 1000,
@table_max integer = 55 * 100000, --approx 1 GB every 5,500,000 rows
@sql nvarchar(max) = 'insert into bigtable (pad) values '
while @cur < @block
begin
set @cur = @cur + 1
end
--trim trailing,
set @sql = substring(@sql, 0, len(@sql))
set @cur = 1
declare @handle integer;
exec sp_prepare @handle output, N", @sql
while IDENT_CURRENT('bigtable') < @table_max
begin
exec sp_execute @handle
set @cur = @cur + @block
end
exec sp_unprepare @handle
end
go
exec bootstrap_database
```



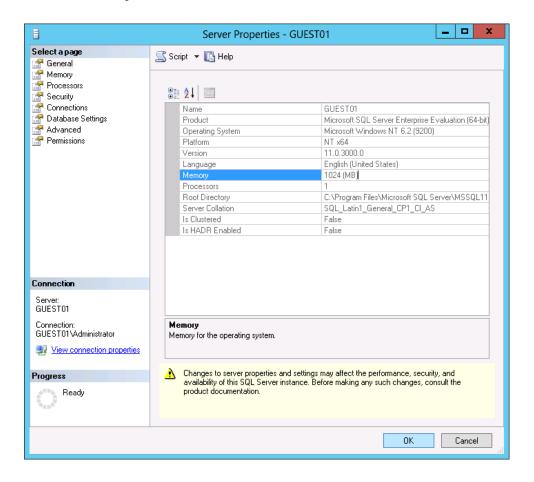
17. Click **Execute** – this will take a few minutes to complete

File Edit View Query Project Debug Tools	; Window Help
🗄 🛅 🕶 📨 📂 🛃 🦪 🔔 New Query - 🛅 📸	📸 💑 💺 🛍 🕵 🤊 - (* - 🚚 - 🖳 🌉 🕨 🚽 - (* - 💋
🗄 💷 🙀 AdventureWorks2012 🔹 🥊 Exect	ute 🕨 Debug 🔲 🧹 📅 🖷 🔚 🎇 🍓 🎆 🏠 🗔 🖄 🌲 👫 🖕
Object Explorer · 무 × SQ	Execute (F5) BUAdministrator (56))* ×
Connect * 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	<pre>create the table Create table bigtable (id integer not null identity(1,1),8 bytes pad char(192) default '' not null,192 bytes PRIMARY KEY (id)? bytes); (); gofill with data Create procedure bootstrap_database as begin declare @cur integer = 0, @block integer = 1000, @table_max integer = 55 * 100000,approx 1 GB every 5,500,000 rows @sql nvarchar(max) = 'insert into bigtable (pad) values ' while @cur < @block</pre>

18. Once the script has completed, right click on **Guest01 (SQL SERVER)** from within **Object Explorer** and select **Properties**

Object Explorer	▼ 🕂 🗙 SQLQuery1.sql	l - GUAdministrator (56))* 🗙
Connect ▼ 🛃 🛃 = 🍸 🕏 🖃 🐻 GUEST01 (SQL Server 11.		te the table table bigtable (integer not null identity(1,1),8 by
 Databases System Database Database Snapsh AdventureWorks Security Server Objects Replication AlwaysOn High Avai Management SQL Server Agent (Agent (Agen	Connect Disconnect Register New Query Activity Monitor Start Stop Pause Resume Restart Policies	<pre>char(192) default '' not null,192 i MARY KEY (id)? by with data procedure bootstrap_database lare @cur integer = 0, @block integer = 1000, @table_max integer = 55 * 100000, @sql nvarchar(max) = 'insert into .le @cur < @block</pre>
	Facets Start PowerShell Reports Refresh Properties	<pre>;in set @sql = @sql + N'(''qqqqqqqqqqwwww (s) affected) ((s) affected) ((s) affected)</pre>

19. Note the **Memory** allocated to the SQL Server instance



20. Click **OK**

21. Select the AdventureWorks2012 database again, right click and choose New Query

Object Explorer	▼ ₽ ×
Connect 🕶 🛃 🜉 💷 🍸 🛃 🍒	
 ■ GUEST01 (SQL Server 11.0.30 ■ □ Databases ■ □ System Databases ■ □ Database Snapshots ■ □ AdventureWorks2012 	
😠 🧰 Security 😠 🚞 Server Objects	New Database
 	Tasks
	Rename Delete Refresh Properties

22. Enter the text in the box below into the new Query window, then Execute Query

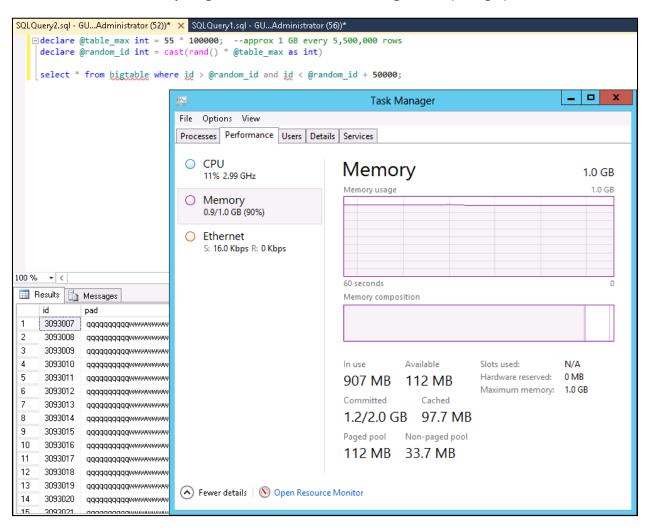
```
declare @table_max int = 55 * 100000; --approx 1 GB every 5,500,000 rows
declare @random_id int = cast(rand() * @table_max as int)
```

select * from bigtable where id > @random_id and id < @random_id + 50000;

```
SQLQuery2.sql - GU...Administrator (52))* × SQLQuery1.sql - GU...Administrator (56))*

□ declare @table_max int = 55 * 100000; --approx 1 GB every 5,500,000 rows
declare @random_id int = cast(rand() * @table_max as int)
select * from bigtable where id > @random_id and id < @random_id + 50000;
```

23. Monitor the memory usage on Guest01 with Task Manager and opening up the Performance tab



24. Notice that the memory on the server is now consumed by the SQL Server

25. Change to the Hyper-V Manager console on HyperV03

26. Right click on **Guest01**, click **Settings** and change the memory values as defined below

Minimum RAM	512MB
Maximum RAM	4096MB

14	Settings for Guest01 on HYPERV03
Guest01	
Add Hardware Add Hardware BIOS Boot from CD Memory 512 MB Image: Processor 1 Virtual processor IDE Controller 0 Hard Drive 9200.16384.amd64fre.win IDE Controller 1 DVD Drive SQLServer2012SP1-FullSlip Image: Processor Hard Drive Guest01_disk_1_B2CF48F2 Hard Drive Guest01_disk_2_F0FC5F79 Hard Drive Guest01_disk_3_FFDFE652 Image: Processor COM 1 None COM 2 None Image: Diskette Drive None Image: Name Guest01 Image: Integration Services All services offered	 Memory You can configure options for assigning and managing memory for this virtual machine. Specify the amount of memory that this virtual machine will be started with. Startup RAM: 512 MB Dynamic Memory You can manage the amount of memory assigned to this virtual machine dynamically within the specified range. Image: The spe
	OK Cancel Apply

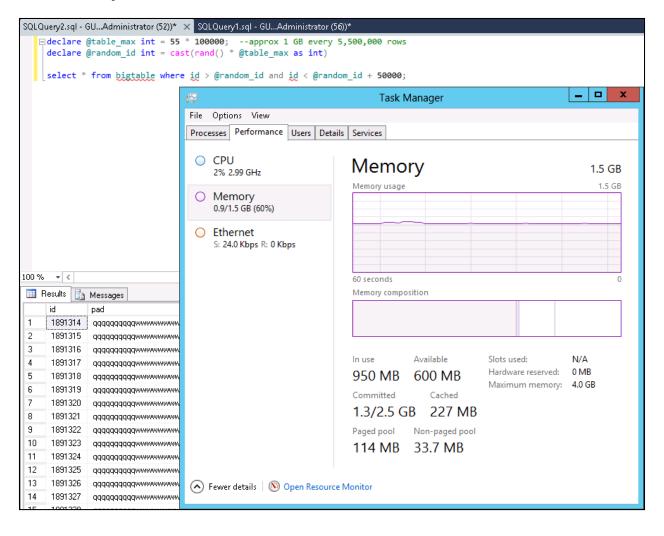
27. Click **OK**

28. Change back to the guest virtual machine Guest01

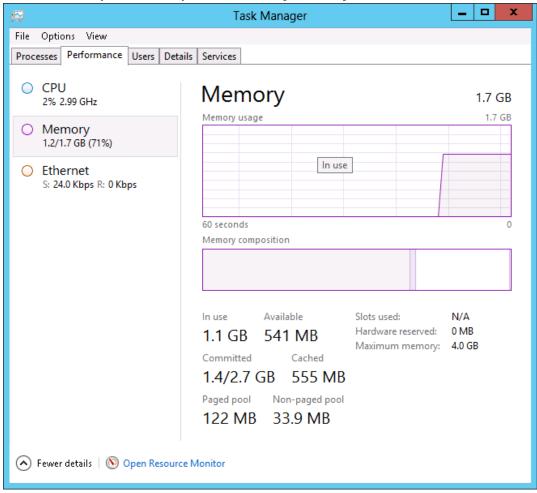
29. Execute the previous SQL Query again still in the SQL Server Management Studio



30. Using **Task Manager**, check the servers memory by selecting the **Performance** tab, and selecting **Memory**



31. Notice that the system memory has increased **dynamically**



8	Server Properties	- GUEST01
Select a page	🔄 Script 👻 🛐 Help	
🚰 General		
🚰 Memory		
Processors	₿∰ 2 ↓ 🔤	
Security	•== Z + ===	
Connections	Name	GUEST01
🚰 Database Settings	Product	Microsoft SQL Server Enterprise Evaluation (64-bit)
🚰 Advanced	Operating System	Microsoft Windows NT 6.2 (9200)
🔗 Permissions	Platform	NT x64
	Version	11.0.3000.0
	Language	English (United States)
	Memory	1724 (MB)
	Processors	1
	Root Directory	C:\Program Files\Microsoft SQL Server\MSSQL11
	Server Collation	SQL_Latin1_General_CP1_CI_AS
	Is Clustered	False
	Is HADR Enabled	False
Connection Server: GUEST01 Connection: GUEST01 \Administrator View connection properties	Name Name of the server and instance.	
Progress	Changes to server properties a availability of this SQL Server	nd settings may affect the performance, security, and nstance. Before making any such changes, consult the
	product documentation.	nstance, perere making any such changes, consult the
Ready	product accumentation.	

32. Using the SQL Server Management Studio, right click on Guest01 (SQL SERVER) and select Properties

Jeff has successfully implemented Dynamic Memory and as it was seen in the scenario, SQL 2012 automatically consumed the memory hotadded to it without stopping the background processing of transactions. This is a major advantage in the ability to respond quickly to performance problems within Server

Important Note

Note the **Memory** allocated to the SQL Server instance has also increased dynamically, allowing the SQL Server instance to consume the additional memory allocated to the operating system, without taking the server offline.

environments where resources are required to be added without interrupting an application. SQL 2012 combined with Server 2012 and Hyper-V Dynamic Memory allows administrators to rectify issues of resource constraint immediately.

....

Links to other areas of interest	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info))
	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Experience 3: Private Cloud automation

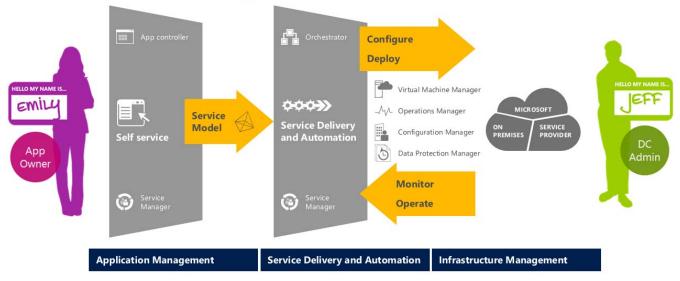
This experience focuses on how to gain operation efficiencies through automation, control through self-service and delegation and delivers a consistent management experience of the infrastructure. Organizations will have a perspective of both the business unit owner to make requests for cloud resources as well as the datacenter admin perspective of building extreme automation to control the environment effectively with little overhead. The key components that are leveraged in this experience will be Service Manager, Orchestrator, App Controller and Virtual Machine Manager.

One of the biggest strengths of System Center 2012 is its integrated approach to workflow, knowledge and data management. System Center 2012 has connectors and integration packs that simplify communication between the components that help to provide full life-cycle management of your applications and infrastructure. In this chapter we will start with the overview of how to connect the components together.

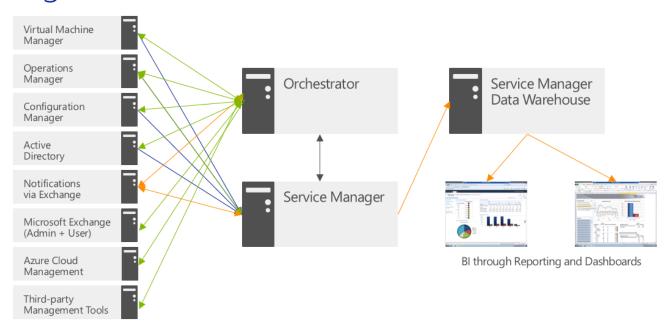
Now that Jeff has installed Microsoft System Center 2012 SP1, he is going to set up the connections between the components. Because Jeff's goal is to make sure that Emily's application is monitored, deployed, and upgradable, he needs to ensure that all of the components are working and communicating together. In this chapter, we are going to create all these connections.

Bringing the System Center 2012 Components Together

Unified management for the Cloud OS



When we look back at the model of interaction between Emily and Jeff, we see that the Orchestrator and Service Manager components are located in the middle of the model. This is not a coincidence. Service Manager and Orchestrator automate the workflows, the data management required to deliver self-service and efficiently deliver the private cloud SLAs.



Integration across the infrastructure

In this figure we see how the components work together. We will now describe the different connections and then Jeff will configure them in his environment.

Orchestrator and the Integration Packs

Jeff knows that Orchestrator comes with an entire set of automation activities out of the box. But Orchestrator can easily be extended by using integration packs. An integration pack is a combination of activities that can extend the functionality of Orchestrator to provide more automation capabilities and integration into other third party applications. In this evaluation, Jeff is going to use the Integration Packs for System Center 2012 SP1.

Downloading Integration Packs

The integration packs can be downloaded from the following location:

http://www.microsoft.com/en-us/download/details.aspx?id=34611

Registering Integration Packs

Before we can use an integration pack in Orchestrator, we need to register it. **Jeff** is going to register the **Microsoft Virtual Machine Manager** integration pack.

- 1. Connect to the **Orchestrator** server as **contoso\administrator** and open **Local Users and Groups**
- 2. Open the Group **OrchestratorUsersGroup** and add **contoso\Domain Admins** to allow Jeff to manage Runbooks

OrchestratorUsersGroup Properties ? ×						
General	General					
OrchestratorUsersGroup						
Description:	Description: Group used to manage permissions for Orchestator					
Members: CONTOSO\administrator CONTOSO\Domain Admins						
Add Remove Changes to a user's group membership are not effective until the next time the user logs on.						
OK Cancel Apply Help						

3. Open the System Center 2012 Orchestrator Deployment Manager

8	System Center 2	2012 Orchestrator Deployment Manager	_ D ×
File View Help			
🔉 Refresh			
Server Name 📱 ORCHESTRATOR			🗸 🤿 G
×	Name	Description	
🖃 – 📱 Orchestrator Management Server	Integration Packs	Integration Packs registered with this Orchestrator Management Server	
🛅 Integration Packs	🔍 Runbook Designers	Runbook Designers registered with this Orchestrator Management Server	
🖶 🚅 Runbook Designers	Runbook Servers	Runbook Servers registered with this Orchestrator Management Server	
		Details r Management Server ORCHESTRATOR Management Server ORCHESTRATOR.	
eady			

4. Right-click on Integration Packs and choose Register IP with the Orchestrator Management Server...

Orchestrator Management Server Orchestrator Management Server Register IP with the Orchestrator Management Server Runbook Servers Dealer: IP to Runbook Servers		×	Name	Description
Register IP with the Orchestrator Management Server				
Runhook Servers Danlay ID to Bunhook Server or Bunhook Designer			th the Orchestrator Mar	nagement Server
🐨 🔤 Runbook Servers 🛛 Deploy IP to Runbook Server or Runbook Designer	🗄 급 Runbook Servers	Deploy IP to F	Runbook Server or Runb	ook Designer

5. On the Welcome to the Integration Pack Registration Wizard select Next

Integration Pack Registration Wizard
Welcome to the Integration Pack Registration Wizard
This wizard will walk you through the steps of registering Integration Packs or Hotfixes with the local Orchestrator Management Server:
Selecting the Integration Packs or Hotfixes to register
Accepting the license agreement for each item
Integration Packs perform critical functions in your environment. Microsoft strongly recommends that you verify the integrity of any Integration Pack before registering and deploying it.
Refer to the Orchestrator Security Guide for details on how to perform this verification.
To continue, click Next.
< Back Next > Cancel Help

6. Select the **Add** button and browse to the location where you stored your Integration Packs

	Inte	egration Pack or Hotfix Selection	? X
	ation Packs or Hotf Integration Packs or Ho	ixes otfixes to register with the Orchestrator Management Server	Les la
Product	Version	File Path	
Add	Remove		
		< Back Next > Cancel	Help

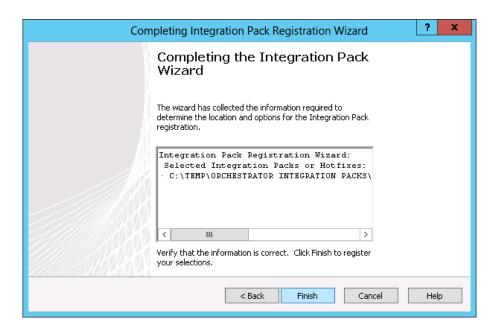
7. Select the System Center 2012 Virtual Machine Manager Integration Pack and the select Open

*	Open	x
Look in:	📔 Orchestrator Integration Packs 🗸 🎯 🍺 📂 🖽 🗸	
Recent places Desktop	Name SC2012SP1_Integration_Pack_for_Azure.oip SC2012SP1_Integration_Pack_for_Configuration_Manager.oip SC2012SP1_Integration_Pack_for_Data_Protection_Manager.oip SC2012SP1_Integration_Pack_for_Operations_Manager.oip SC2012SP1_Integration_Pack_for_REST.oip SC2012SP1_Integration_Pack_for_Service_Manager.oip SC2012SP1_Integration_Pack_for_Service_Manager.oip SC2012SP1_Integration_Pack_for_Virtual_Machine_Manager.oip SC2012SP1_Integration_Pack_for_Virtual_Machine_Manager.oip System_Center_2012_SP1_Integration_Pack_for_ActiveDirectory.oip System_Center_2012_SP1_Integration_Pack_for_ExchangeAdmin.oip	Date 11/1: 11/1: 11/1: 11/1: 11/1: 11/1: 11/1: 31/1: 30/1: 20/1:
Computer Computer Network	System_Center_2012_SP1_Integration_Pack_for_ExchangeUser.oip System_Center_2012_SP1_Integration_Pack_for_FTP.oip Image: File name: SC2012SP1_Integration_Pack_for_Virtual_Max Files of type: Open as read-only	30/1 30/1 > Open Cancel

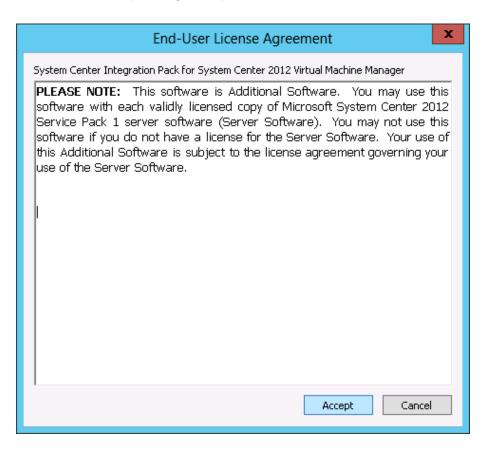
8. Select **Next** when you have added the management pack

	Int	egration Pack or Hotfix Selection	? X
	tion Packs or Hol Itegration Packs or I	fixes Hotfixes to register with the Orchestrator Management Server	
Product	Version	File Path	
System Center	I 7.1	C:\Temp\Orchestrator Integration Packs	
Add	Remove		
		< Back Next > Cancel	Help

9. On the **Completing the Integration Pack** page, select **Finish**



10. Accept the **End-User License Agreement** by selecting **Accept.** You will have to do this multiple times (one EULA per integration pack)



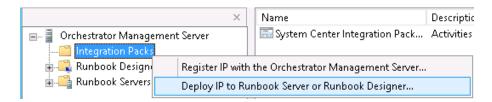
Deploying Integration Packs

Now that Jeff has registered the Integration Packs, he also needs to deploy them to each Runbook server and to each server / workstation with a Runbook designer that will use the integration packs. In our evaluation, Jeff is going to deploy them on the Orchestrator server as this is the server that he is going to use for the evaluation.

1. Open the System Center 2012 Orchestrator Deployment Manager

8	System Center 2012 Orchestrator Deployment Manager		- • ×
File View Help			
😱 Refresh			
Server Name			🗸 🔶 G
Crchestrator Management Server Crchestrator Management Server Crchestrator Management Server Annbook Designers Comparison Runbook Servers	Name Description System Center Integration Pack Activities for System Center 2012 Virtual Machine I	Version 18 7.1	
	Log Entries Dechestrator Management Server ORCHESTRATOR Connected to Orchestrator Management Server ORCHESTRATOR. Connected to Orchestrator Management Server ORCHESTRATOR. Finished enumerating Integration Packs	ails	

2. Right-click on Integration Packs and choose Deploy IP to Runbook Server or Runbook Designer...



3. On the Welcome to the Integration Deployment Wizard select Next

Integration Pack Deployment Wizard ? 🗙
Welcome to the Integration Pack Deployment Wizard
This wizard will walk you through the steps of deploying an Integration Pack or Hotfix to single or multiple computers.
Selecting the Integration Pack or Hotfix to deploy
Selecting the computers to deploy on
To continue, click Next.
Skip this welcome page in the future.
< Back Next > Cancel Help

- 4. On the **Deploy Integration Packs or Hotfixes** page select the integration pack that Jeff registered and then select **Next**
 - System Center Integration Pack for System Center 2012 Virtual Machine Manager

Integration Pack or Hotfix Deployment ? ×	
Deploy Integration Packs or Hotfixes Select the Integration Packs or Hotfixes that you want to deploy	
Name System Center Integration Pack for System Center 2012 Virtual Machine Manager	
< Back Next > Cancel Help]

5. On the **Computer Selection Details** page, type in the name of the runbook server (in our case this is **Orchestrator**) and select the **Add** button. Then select **Next**

	Computer Selection	? X
Computer Sele Select the co	ection Details omputers that you want to deploy the Integration Pack or Hotfix or	n. (1 1)
Computer:	Orchestrator	Add
Orchestrator		
Remove		
	< Back Next > Cancel	Help

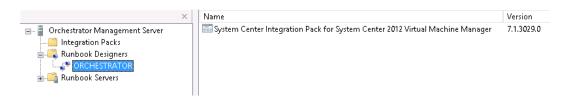
6. On the Installation Configuration page, Jeff is going to choose to deploy the Integration Packs now. This will stop all the running runbooks on that server. If that would be a problem, then Jeff could have chosen to schedule the installation or to install the Integration Packs without stopping the runbooks and restart the server afterwards.

Installation Options ? X
Installation Configuration Configure the installation options for the Integration Packs or Hotfixes
You can Install the Integration Packs or Hotfixes now, or at a time that you specify.
Schedule installation
Perform installation at: 12:47:15 p.m. 💭 15/01/2013
Advanced Options Stop all running Runbooks before installing the Integration Packs or Hotfixes Install the Integration Packs or Hotfixes without stopping the running Runbooks. You may need to restart the computer to complete the installation.
< Back Next > Cancel Help

7. On the **Completing the Integration Pack Deployment** page, select **Finish**

Completing	g Integration Pack Deployment Wizard 🛛 📪 🗙
	Completing the Integration Pack Deployment Wizard
	The wizard has collected the information required to determine the location and options for the Integration Pack or Hotfix deployment.
	Integration Pack Deployment Wizard: Target Servers: ORCHESTRATOR
	Integration Packs • System Center Integration Pack for Sy
	Install on schedule: N/A V
	Verify that the information iis correct. Click Finish to deploy your selections.
	< Back Finish Cancel Help

8. You can verify that the deployment is successful by looking at the **Runbook Designers** folder within the Orchestrator Deployment Manager to see that the **Integration Packs** are there. You can do the same by looking at the **Runbook Servers** and selecting **Orchestrator** to see if the **Integration Packs** are shown.



Configuring the System Center 2012 Virtual Machine Manager Integration Pack

Before Jeff can actually use the Integration Packs, he needs to configure them so that they have a connection to the correct server(s) and that they have a username and password to connect to these servers. In the next steps, Jeff is going to configure the four integration packs that he just registered and deployed.

Before Jeff can configure an integration pack, he needs to make sure that the prerequisites are OK. In the documentation on TechNet, he finds all the information that he needs:

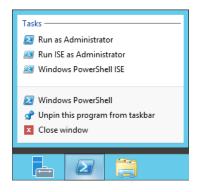
http://technet.microsoft.com/en-us/library/hh295851.aspx

To configure the **System Center 2012 Virtual Machine Manager Integration Pack**, Jeff needs to have the following prerequisites:

- System Center 2012 Orchestrator
- System Center 2012 Virtual Machine Manager (VMM)
- Windows Management Framework (Windows PowerShell 2.0 and WinRM 2.0)

Jeff has deployed the **Orchestrator** server and the **VMM** server in Chapter 3. The **Orchestrator** server is configured on **Windows Server 2008 R2 SP1** so the Windows Management Framework is also covered. Last but not least, **Jeff** needs to change the execution policy of PowerShell. The execution policy in Windows PowerShell determines which scripts must be digitally signed before they will run. By default, the execution policy is set to **Restricted** which prohibits loading any configuration files or running any scripts.

1. Right Click on the **PowerShell** icon and choose **Run As Administrator**



2. In the PowerShell window, type set-executionpolicy remotesigned and select Enter



3. Type **Y** when asked



- 4. Complete steps **1-3** on the server **VMM**
- 5. Jeff is now ready to connect the Integration Pack to the **Virtual Machine Manager** server. Open **System Center 2012 Orchestrator Runbook Designer**

a a Computer Groups a Computer Groups a Restart System	8	System Center 2012 Orchestrator Runbook Designer	_ D X
Connections Activities Image: Computer Groups Image: Computer Groups Image: Computer Groups Image	Actions Edit Options View H	lelp	
Image: System Image: System Image: System	🔉 Refresh 🐌 Run 🔳 Stop 日	Check In 📝 Check Out Y Undo Check Out 🛛 Runbook Tester 🛛 Orchestration Console 🙆 I	Evaluation version: 180 day(s) left
End Process End Process End Process South State	Connections		Activities
B - GRUNDOWS B	je 🝌 💼 🔥		
wontoring wontoring File Management □ mail Montication withitati	 Runbooks Computer Groups Runbook Servers 		Get SNMP Variable Run SSH Command Monitor SNMP Trap Save Event Log Query WMI Send SNMP Trap Reset System Status
File Management □ Email ▲ Notification ↓ Utilities ⇒ Text File Management ↓ SC 2012 Virtual Machine Manager ▲ Runbook Control Log			III Scheduling
Enail ▲ Notification ▲ Utilities ■ Text File Management ■ S 2012 Virtual Machine Manager ▲ Runbook Control Log			Search Monitoring
▲ Notification ▲ Utilizes ▲ Text File Management ■ Sc 2012 Virtual Machine Manager ▲ Runbook Control			
Log			💷 Email
Log			A Notification
Log			🔐 Utilities
Log			Text File Management
Log			SC 2012 Virtual Machine Manager
			Runbook Control
Øx	4	Log	
		ØX	
Log Log History Audit History Events		Log History Audit History Events	

6. On the menu bar, select **Options** and select **SC 2012 Virtual Machine Manager**

0	ptions	View	Help
	SC 2	2 01 2 Virt	tual Machine Manager
	Invo	oke Web) Services
	Orchestration Console		
	Con	ifigure	

7. On the **Prerequisite Configuration** page, select **Add...**

	SC 2012 V	/irtual Machine Manager	x
Prerequisite Confi Prerequisite configurations		ity.	
Configurations	Name Add	Type Edit	
		Finish Cancel	Help

- On the Add Configuration page, type in the Name (VMM Connection) and click on the ... button to add the Type (System Center Virtual Machine Manager). Then fill in the following properties and then select OK
 - VMM Administrator Console: vmm.contoso.com
 - VMM Server: vmm.contoso.com
 - **User**: administrator
 - **Domain**: contoso
 - **Password**: *********
 - Authentication Type (Remote only): Default
 - Port (Remote only): 5985
 - Use SSL (Remote only): False
 - Cache Session Timeout (Min.): 10

lame:	VMM Connection		
ype:	System Center Virtual Machine M	lanager	
ropert	ies		
VMM A	Administrator Console	vmm.contoso.com	^
VMM S	Server	vmm.contoso.com	
User		administrator	=
Domai	n	contoso	-
Passw	ord	****	
Authe	ntication Type (Remote only)	Default	
Port (I	Remote only)	5985	~

9. Select Finish

	SC 2012 Virtual M	1achine Manager X
Prerequisite Confiq Prerequisite configurations s		
Configurations	Name VMM Connection	Type System Center Virtual Mac
		Finish Cancel Help

Jeff has now configured the Integration Pack to connect to Virtual Machine Manager in his environment.

Service Manager and the Connectors

Jeff has created the connections in **System Center 2012 Orchestrator** using the **Administrator** account. Now he needs to configure the **Connectors** in **System Center 2012 Service Manager**. Connectors in **Service Manager** are used to build the configuration management database, CMDB. The CMDB is created and maintained by importing configuration items (CI's) from Active Directory Domain Services, Operations Manager, Virtual Machine manager, and Configuration Manage. There is also a connector that allows you to automatically import alerts from Operations Manager and you can import data manually as well from a **CSV** file. By having an accurate and easily maintained CMDB, Jeff can accurately create the organizational processes and automated responses required to maintain his private cloud SLAs.

For creating the connectors in Service Manager, Jeff logs on to the Service Manager server as a Domain Administrator

The Active Directory Connector

The Active Directory Connector will import users, groups, printers and computers as configuration items into the Service Manager CMDB database. Those objects then can be used as objects in incidents, requests and so on.

Jeff is going to configure this connector.

1. In the Service Manager console, under Administration, click on Connectors

Administration	<
Administration	
O Announcements	
🖵 Connectors	
🔀 Deleted Items	
🚟 Management Packs	
🕨 🔀 Notifications	
Security	
🕨 📄 Service Level Management	
✓ Settings	
Workflows	
Administration	
🔋 Work Items	

2. In the **Tasks** pane, on the right, select the **Create connector** button

Co	-	-	~	_	-	-
CO	П	п	в		10	rs

^

Create connector Import from CSV file...

짂 Refresh

3. Choose Active Directory connector

rt Tim	e Finish Time	Status	Con	nectors	^
	Active Directory connector			Create connector ▶	
-19	Configuration Manager con	nector		Import from CSV file	
-19	Operations Manager Alert c	onnector		Refresh	
77	Operations Manager CI con	nector		ninistration	^
-19	Orchestrator connector			Start PowerShell Session	
77	Virtual Machine Manager co	onnector			

4. On the **Before you begin** page, select **Next**

8	Active Directory connector wizard
🚽 Before You Be	egin
Before You Begin General Domain/OU Select objects Summary Completion	Create an Active Directory connector This wizard helps you create an Active Directory connector which imports data about users, user groups, computers and printers.
	Do not show this page again To continue, click Next.
	Cancel < Previous Next > Create

- 5. On the **General** page, type in the following parameters and select **Next**
 - Name: Active Directory Connector
 - **Description:** Connector for Active Directory
 - Enable this connector: checked

1	Active Directory connector wizard
📕 General	
Before You Begin	Enter a name and description for the connector
General	
Domain/OU	Name:
Select objects	Active Directory Connector
Summary	Description:
Completion	Connector for Active Directory
	Cancel < Previous Next > Create

6. On the **Domain or organizational unit** page, select the domain then select **New...** to create a specific account for this connection or choose an already created account. In this case, we are going to create a new one.

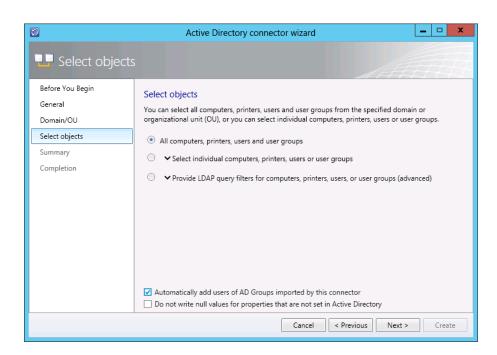
3	Active Directory connector wizard
🖵 Domain or o	rganizational unit
Before You Begin General	Select a domain or organizational unit
Domain/OU	Server Information
Select objects Summary Completion	Specify which Active Directory domain or organizational unit (OU) to connect to.
	Cancel < Previous Next > Create

- 7. On the Run As Account page, fill in the following parameters; after that, when back on the **Domain/OU** page **test the connection** and select **Next**
 - Name: Active Directory Account
 - **Description:** Account to connect to Active Directory
 - Account: Windows Account
 - User name: administrator
 - **Password:** *****
 - **Domain:** contoso

Run As Account	_ 🗆 X
😤 Run As Account	
Display name:	
Active Directory Account	
Description:	
Account to connect to Active Directory	
Management pack	
Service Manager Linking Framework Configuration Last modified: 14/01/2013 2:20:10 p.m.	v New
Account:	
Windows Account	•
User name:	
administrator	
Password:	

Domain:	
CONTOSO	•
	OK Cancel

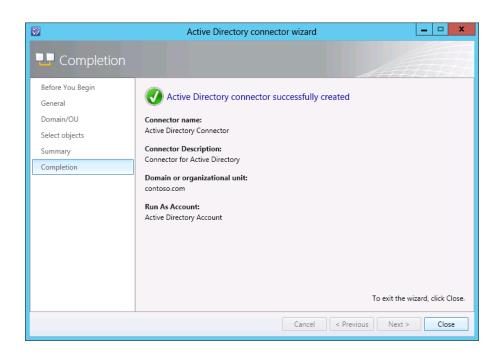
8. On the Select objects screen, select All computers, printers, users and user groups, tick Automatically add users of AD Groups imported by this connector, and select Next



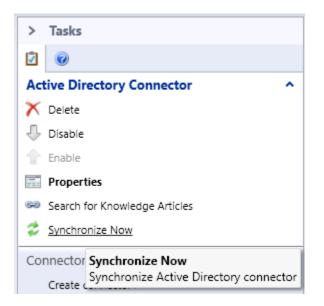
9. On the **Confirm connector settings** screen, review your settings and select **Create** to create the connector

	Active Directory connector wizard
🕹 Summary	
Before You Begin General Domain/OU Select objects	Confirm connector settings Connector name: Active Directory Connector Connector Description:
Summary Completion	Connector for Active Directory Domain or organizational unit: contoso.com Run As Account: Active Directory Account To change settings, click Previous. To create the connector, click Create.
	Cancel < Previous Next > Create

10. On the Completion screen, select Close



11. From the Tasks column, click on Synchronize now



12. Click on **OK** to confirm the synchronization request

Synchronize Now	x
The synchronization request has been submitted.	
ОК	

The Orchestrator Connector

The System Center Orchestrator Connector provides the capability to synchronously invoke runbooks from within Service Manager through the use of workflows.

1. In the Service Manager console, under Administration, click on Connectors

Administration	<
Administration	
O Announcements	
🔀 Deleted Items	
🚟 Management Packs	
Notifications	
Security	
🕨 🧮 Service Level Management	
Settings	
Workflows	
Z Administration	
둘 Library	
🔋 Work Items	

2. In the **Tasks** pane, select the **Create connector** button

^

Connectors

Create connector 🕨

Import from CSV file...

짂 Refresh

3. Select the **Orchestrator connector** button

rt Tim	e Finish Time Status Co	nnectors ^
	Active Directory connector	Create connector >
	Configuration Manager connector	
22	Operations Manager Alert connector	Refresh
	Operations Manager CI connector	ninistration ^
22	Orchestrator connector	Start PowerShell Session
-17	Virtual Machine Manager connector	

4. On the **Before you Begin** page, select **Next**

8	Orchestrator connector wizard		
📕 Before You Be	🖳 Before You Begin		
Before You Begin General	Create a System Center Orchestrator connector		
Connection Sync folder	This wizard helps you create a System Center Orchestrator connector that imports runbooks.		
Web Console URL			
Summary Completion			
	To continue, click Next.		
	Do not show this page again		
	Cancel < Previous Next > Create		

- 5. In the **General** screen, enter the following parameters and select **Next**
 - Name: Orchestrator Connector
 - **Description:** Connector used for Orchestrator
 - Enable the connector: checked

1	Orchestrator connector wizard
📕 General	
Before You Begin	Enter a name and description for the connector
General	
Connection	Name:
Sync folder	Orchestrator Connector
Web Console URL	Description:
Summary	Connector used for Orchestrator
Completion	
	✓ Enable this connector
	Cancel < Previous Next > Create

On the Connection page, fill in the URL for the Orchestrator Web Service URL. This is http://servername:port/Orchestrator2012/Orchestrator.svc so in our environment this is http://orchestrator2012/Orchestrator.svc so in our environment this is http://orchestrator2012/Orchestrator.svc so in our environment this is http://orchestrator:81/Orchestrator2012/Orchestrator.svc For the Run As Account select Active Directory Account

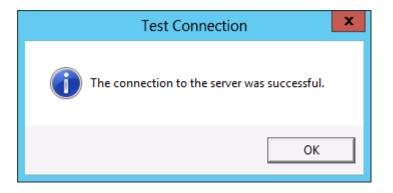
Orchestrator connector wizard		
Before You Begin General	Provide the URL and credentials for the Orchestrator web service	
Connection	Server Information	
Sync folder	Orchestrator Web Service URL:	
Web Console URL Summary Completion	http://orchestrator.81/Orchestrator2012/Orchestrator.svc	
	Credentials Run As account: Active Directory Account Test Connection	
	Cancel < Previous Next > Create	

7. For the credentials use the **contoso\administrator** account, then click on **OK**

	Credentials	– – ×
User name:		
administrator		
Password:		

Domain:		
LCONTORO		-
		OK Cancel

8. Click on **Test Connection** to confirm the credentials, then click **OK**



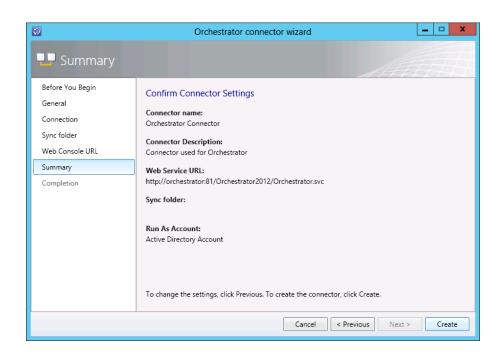
On the Sync folder page, you can select which folders in Orchestrator that you want to import. If you choose the \ folder as Jeff is going to do, then you will import all the runbooks from Orchestrator. Select Next

9	Orchestrator connector wizard
🖵 Folder	
Before You Begin General Connection	Select sync folder Sync folder
Sync folder	
Web Console URL Summary Completion	
	Y
	Cancel < Previous Next > Create

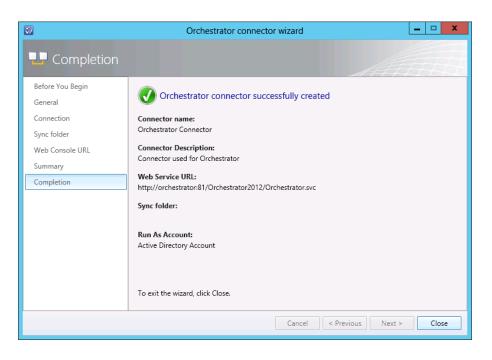
10. On the **Web Console URL** page, enter the URL for the **Web Console** of Orchestrator. This is <u>http://orchestrator:82/(or http://orchestratormanagementserver:port</u>). Select **Next**

3	Orchestrator connector wizard
🖵 Web Console	e URL
Before You Begin General	Provide an Orchestrator Web Console URL
Connection Sync folder	If you would like to enable hyperlinks to runbook information and job details, enter the URL of the Orchestrator Web Console server (e.g.: http://webconsole:82/)
Web Console URL	http://orchestrator:82/
Summary	
Completion	
	Cancel < Previous Next > Create

11. On the **Summary** page, review your settings and select **Create**



12. On the Completion page, select Close



Service Manager and the Data Warehouse

After you have deployed the service manager management servers and data warehouse management servers, you need to set up reporting. To do this, you run the Data Warehouse Registration Wizard. This wizard registers the service manager management group with the data warehouse management group. It also deploys management packs from the service manager management server to the data warehouse management server.



This process can take several hours to complete. It is advised that you don't turn off any services during this period. You can work with Service Manager during this time without any problems.

1

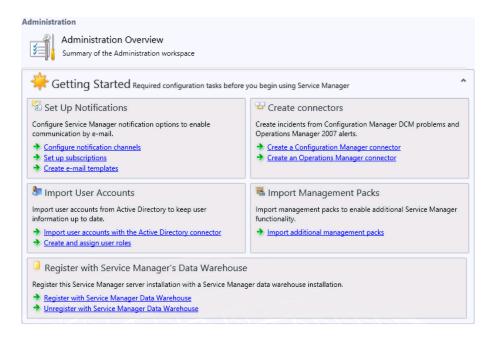
Registering with the Data Warehouse

Jeff is not going to evaluate the reporting now but he sure will want to look into this in a later phase of the evaluation. For now, he is going to register the Service Manager installation with the **Data Warehouse**

1. In the System Center 2012 Service Manager console, go to Administration

Administration	<	
Administration		
Announcements		
Connectors		
🔀 Deleted Items		
🚟 Management Packs		
Notifications		
Security		
Einstein Service Level Management		
Settings		
Vorkflows		
Administration		
Library		
Work Items		
Configuration Items		

2. On the Administration Overview page, click on Register with Service Manager Data Warehouse



3. On the **Before You Begin** page, select **Next**

8	Data Warehouse Registration Wizard			
💶 Before You Begin				
Before You Begin	Register with the Service Manager Data Warehouse			
Data Warehouse				
Credentials	This wizard will walk you through the process of registering this Service Manager management group			
Summary	with the Service Manager data warehouse.			
Completion	This will provide you with the ability to run reports and use other data warehouse functionality.			
	To continue, click Next.			
Cancel < Previous Next > Create				

4. On the **Data Warehouse** page, type in the **Server name ServiceMgrDW** and select the **Test Connection** button.

9	Data Warehouse Registration Wizard
🚽 Data Wareho	use
Before You Begin	Specify the data warehouse management server name
Data Warehouse	Server name:
Credentials	ServiceMgrDW T
Summary	
Completion	Test Connection
	The current console user must have administrative privileges on the data warehouse management server.
	Cancel < Previous Next > Create

5. If the connection test succeeds, select **Next**

8	Data Warehouse Registration Wizard
🖵 Data Wareho	use
Before You Begin	Specify the data warehouse management server name
Data Warehouse	Server name:
Credentials	ServiceMgrDW
Summary	
Completion	Test Connection
	Cancel < Previous Next > Create

6. On the **Credentials** page, select the **DW_ServiceManagerMG SecureReference Run As Account** and select **Next**

9	Data Warehouse Registration Wizard
🖵 Credentials	
Before You Begin Data Warehouse	Provide credentials for the data warehouse
Credentials Summary Completion	Create or select the Run As account that the data warehouse will use to connect to this Service Manager installation. The account must have administrator privileges on this server. Run As account: DW_ServiceManagerMG SecureReference New If the selected user is not currently a Service Manager administrator, the selected user will be added to this user role.
	Cancel < Previous Next > Create

7. The system will request you to enter the **Password** for these credentials. Enter the password and select **OK**

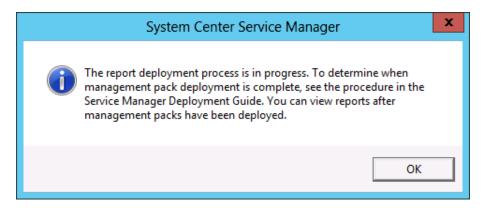
3	Credentials		_ □	x
User name: administrator				
Password:				

Domain:				
CONTOSO				-
		ОК	Car	ncel

8. On the **Summary** page, review your selections and select **Create**

8	Data Warehouse Registration Wizard 📃 🗖 🗙
🖵 Summary	ATTA
Before You Begin Data Warehouse	Confirm Connection Settings
Credentials	Data warehouse management server:
Summary	ServiceMgrDW
Completion	Run As account:
	DW_ServiceManagerMG SecureReference
	To change the settings, click Previous. To complete the registration, click Create.
	Cancel < Previous Next > Create

9. When the Report Deployment process popup appears, select OK



10. On the **Completion** page, select **Close**

	Data Warehouse Registration Wizard
L Completion	ATTER A
Before You Begin Data Warehouse	The data warehouse registration succeeded
Credentials	Data warehouse management server:
Summary	ServiceMgrDW
Completion	Run As account:
	DW_ServiceManagerMG SecureReference
	To exit the wizard, click Close.
	Cancel < Previous Next > Close

How to determine when the Data Warehouse registration is complete

Jeff knows that the synchronization process can take up to a few hours. In the meantime, he will continue with his evaluation. During this time, he also would like to check on the status of the registration process.

Jeff can see if the initial synchronization process is finished by following this procedure:

1. In the System Center 2012 Service Manager console, go to Data Warehouse > Data Warehouse Jobs

Data Warehouse	<
🔺 길 Data Warehouse	
🗈 Analysis Libraries	
Cubes	
🧕 Data Sources	
🖆 Data Warehouse Jobs	
😽 Management Pack Lists all data warehouse jobs	
Security	
	-
Administration	
Work Items	
Configuration Items	
🤰 Data Warehouse	

2. In the **Data Warehouse Jobs** pane, double click **MPSyncJob**

Data Warehouse Jobs 6				
Filter				🔎 Edit Criteria 🗸
Name	Category	Enabled	Status	
Extract_DW_ServiceManagerMG	Extract	Yes	Not Started	
Load.Common	Load	Yes	Not Started	
Load.OMDWDataMart	Load	Yes	Not Started	
Load.CMDWDataMart	Load	Yes	Not Started	
Transform.Common	Transform	Yes	Not Started	
MPSyncJob	Synchronization	Yes	Not Started	

3. On the **MPSyncJob details** page, go to **Status** and review the **Job details** list. The management pack deployment process is complete when the status for all of the management packs is **Associated** or **Imported**

			1PSyncJob	
eneral	▲ Status			
hedule	Job details:			
atus	Batch ID	Data Source	Management Pack	Status
	574	ServiceManagerMG	System.WorkItem.ChangeRequest.Library	Pending Associatior
	574	ServiceManagerMG	Microsoft.EnterpriseManagement.Servic	Pending Associatior
	574	ServiceManagerMG	System.WorkItem.ChangeRequest.Library	Imported
	77	DW_ServiceManagerMG	ServiceManager.LinkingFramework.Library	Associated
	77	DW_ServiceManagerMG	Microsoft.SystemCenter.Warehouse.Syst	Associated
	77	DW_ServiceManagerMG	System.Snmp.Library	Associated
	574	ServiceManagerMG	Microsoft.SystemCenter.Datawarehouse	Pending Associatior
	574	ServiceManagerMG	System.Knowledge.Library	Pending Associatior
	574	ServiceManagerMG	System.AdminItem.Library	Pending Associatior
	574	ServiceManagerMG	ServiceManager.RunbookActivity.Library	Pending Associatior
	77	DW_ServiceManagerMG	Microsoft.SystemCenter.Grooming.Library	Associated
	574	ServiceManagerMG	System.Snmp.Library	Pending Associatior
	77	DW_ServiceManagerMG	System.Software.Library	Associated
	574	ServiceManagerMG	ServiceManager.IncidentManagement.Li	Imported
	77	DW_ServiceManagerMG	System.WorkItem.Library	Associated
	574	ServiceManagerMG	ServiceManager.WorkItem.Library	Pending Associatior
	574	ServiceManagerMG	System.WorkItem.Activity.Library	Pending Associatior
	•		<u> </u>	
				OK Cance

- 4. After the management packs have been deployed (as determined in step 3), make sure that the following five data warehouse jobs appear in the **Data Warehouse Jobs** pane:
 - Extract_<Service Manager management group name>
 - Extract_<data warehouse management group name>
 - Load.Common
 - Transform.Common
 - MPSyncJob

Filter 🔎 Edit Criteria 🗸					
Name	Category	Enabled	Status		
Load.CMDWDataMart	Load	Yes	Not Started		
Load.OMDWDataMart	Load	Yes	Not Started		
Process.SystemCenterChangeAndActivityMana	Cube Processing	Yes	Running		
Process.SystemCenterPowerManagementCube	Cube Processing	Yes	Running		
Process.SystemCenterSoftwareUpdateCube	Cube Processing	Yes	Running		
Transform.Common	Transform	Yes	Not Started		
Process.SystemCenterWorkItemsCube	Cube Processing	Yes	Running		
Process.SystemCenterServiceCatalogCube	Cube Processing	Yes	Running		
Process.SystemCenterConfigItemCube	Cube Processing	Yes	Running		
MPSyncJob	Synchronization	Yes	Not Started		
Load.Common	Load	Yes	Not Started		
Extract_ServiceManagerMG	Extract	Yes	Not Started		
Extract DW ServiceManagerMG	Extract	Yes	Not Started		

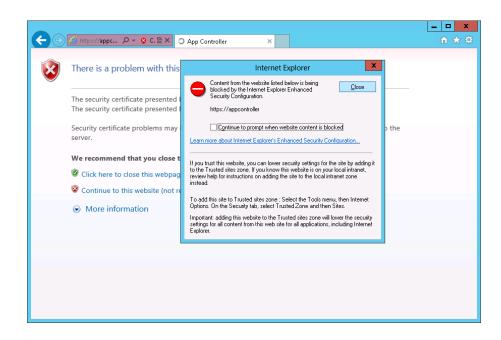
Adding Virtual Machine manager to App Controller

Important Note

Viewing the App Controller portal with Internet Explorer requires the **Silverlight plugin**. In this example, Jeff is running it on the App Controller server itself but you could use another Server / Workstation to connect to the portal without needing to install Silverlight on the App Controller server.

IJ

1. Open the App Controller portal by browsing to <u>https://appcontroller/</u>. When prompted with the certificate warning, click **Continue to this website** and add the site to the trusted site list.



2. At the login screen enter the user name contoso\Administrator and relevant password and click Sign In

System Center 2012	App Controller
Enter your credentials to sign in	
User name:	
Contoso\Administrator	
Password:	
•••••	
	Sign In

3. On the Overview page, under the Private Clouds heading click **Connect a Virtual Machine Manager server and clouds**

+ ttps://appcontrolle	r/ 🔎 👻 🖻 App Controller	×		• □ × ît ★ \$
System Center 2	012			App Controller Hi, Sign out Help
< Overview	Overview			
Clouds 🕸 Services			🕥 Las	t refresh: 4:10:47 p.m. 🔀
 Virtual Machines Library Jobs Z Settings 		Public Clouds		• ouds external service
	Next Steps <u>Common Tasks</u> Connect a Virtual Machine Mana. Connect a Windows Azure subsci Add a network file share hts reserved. Privacy Send feedback to Micro	ger server	w To Obtain a Windows Azure su Use network file shares for 1 Manage private cloud quot Manage services Create service template Add a service template to a Moving from virtual machin	templates and a cloud

- 4. On the **Add a new VMM connection** window enter the following information and click **OK**
 - Connection name: VMM
 - Description: Production VMM server
 - Server name: vmm.contoso.com
 - Port: 8100

	_	
		_
1-	<u> </u>	P

Add a new VMM connection

You can add a connection from only a Virtual Machine Manager for System Center 2012 management server. х

Connection name:			*
VMM			
Description:			
Production VMM Server			
Server name:	*	Port:	*
vmm.contoso.com		8100	

Automatically import SSL certificates To copy files and templates to and from a VMM management server, App Controller must import SSL certificates from the management server.

More about importing certificates

c] [)K Cancel	

To confirm the VMM server connection has been created, on the **Overview** page under the **Private Clouds** heading you should now see **1 Virtual Machine Manager server**.

Experience 3: Private Cloud automation

← → ■ https://appcontroller	/ ・ D マ 🗟 C 🔲 App Controller	×		× ↑★ ©
System Center 20	012			App Controller Hi, Sign out Help
< Overview	Overview			
Clouds				🔇 Last refresh: 4:13:46 p.m. 🗹
 Virtual Machines Library 	Status Private Clouds	Public Clouds		Hosted Clouds
 Jobs Settings 	1 Virtual Machine Manager server	Connect a Windo	ows Azure	Add an external service provider
	Next Steps Common Tasks Connect a Virtual Machine Manage Connect a Windows Azure subscrip Add a network file share	r server and clouds	How To To Obtain a Windows Solution a Windows Solution a Windows Solution a Windows Manage services Solution a Windows Add a service temp & Moving from virtuu	ares for templates and resources oud quota plates plate to a cloud
	Community			
	System Center Blogs		Recent Forum Pos	····
	RSS feed is empty		RSS feed is em	pty
			Import certifica	tes completed for "vmm.contoso.com" ×
Service Pack 1 © 2012 Microsoft. All righ	ts reserved. Privacy Send feedback to Microsof	t		

Summary

In this chapter, **Jeff** configured some of the connectors between the System Center 2012 components. He configured the Integration Packs between Orchestrator and Virtual Machine Manager, and linked Operations Manager and Virtual Machine Manager through their connector. He then created the connector between Service Manager and Active Directory, then created this Service Manager Data Warehouse association. Jeff is now ready to start configuring his Self Service Portal.

Scenario: Build extreme automation

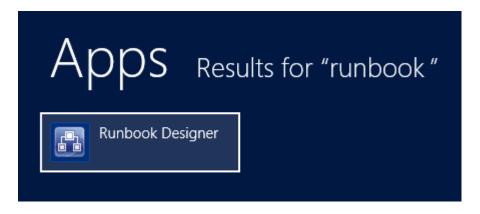
In this scenario we are going to explore the automation possibilities of the Microsoft Private Cloud. The primary component of System Center 2012 we will be focusing on will be System Center 2012 Orchestrator.

Jeff wants to build some automation into his environment. Initially, Jeff would like to explore some of the automation capabilities available, and may later decide to re-use his new runbooks in his production environment.

Creating the Create Private Cloud runbook

Jeff manages a large number of private clouds that are manually created by him through requests from Emily. Because automation is a key component of the private cloud, Jeff wonders if he can automate this simple task. If he succeeds, Emily's requests will be fulfilled faster, and Jeff can continue to focus on his existing work instead of repeating this simple task. Jeff decides to try to achieve this objective utilizing System Center 2012 Orchestrator.

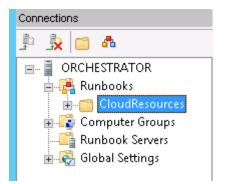
- 1. Log on to the Orchestrator server **Orchestrator**
- 2. Open the **Runbook Designer**



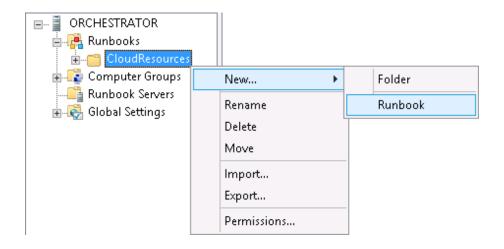
3. On the left, under connections, right-click on Runbooks and select New... > Folder

Connections			
🏝 💼 🎉 🖷			
ORCHESTRAT	OR		
🗄 📑 Computer	New	×	Folder
	Rename		Runbook
	Delete		
	Move		
	Import		
	Export		
	Permissions		

4. Give the new folder a name, for example **CloudResources**



5. On the newly created **CloudResources** folder, right-click and choose **New... > Runbook**



6. On the newly created **Runbook**, right-click and choose **Rename** from the context menu.

Connections	뤕 New Runb	ook	
ji ji 📩 💼 🗛			Check Out
ORCHESTRATOR			Runbook Tester
🖶 📑 Runbooks			Run
CloudResources			Rename
■ Tomputer Groups ■ Tomputer Groups			Delete
🖅 🔞 Global Settings			Move
			Export
			Permissions
			Properties

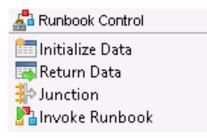
7. When you receive the Confirm Check out, select Yes



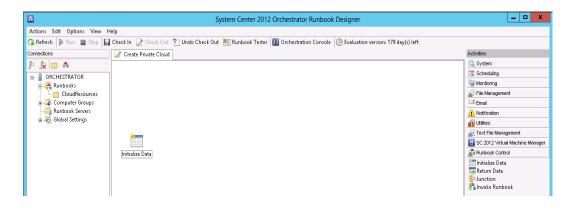
8. To assist in identifying the purpose of the new runbook, change its name to Create Private Cloud



9. From the **activities** pane (right side of the console), select the **Runbook Control** folder, to expose the contained activities.



10. Drag the Initialize Data activity object to the runbook canvas (as illustrated below)



11. Next, select the SC 2012 Virtual Machine Manager folder to present its activities

🔲 SC 2012 Virtual Machine Manager		
🔹 Apply Pending Service Update	懂 Get VM	🖑 Update User Role Property
\mu Configure Service Deployment	📹 Get VM Host	😂 Update User Role Quota
🚱 Create Checkpoint	🔨 Get VM Network	🚰 Update VM
📩 Create New Disk	🔽 Get VM Subnet	
🔚 Create New Disk From VHD	🔊 Manage Checkpoint	
🚋 Create Network Adapter	酔 Move VM	
😻 Create User Role	🔆 Remove User Role	
🍣 Create VM From Template	🐴 Remove VM	
😋 Create VM from VHD	🔤 Repair VM	
🚰 Create VM from VM	Na Resume VM	
摔 Deploy Service	🛃 Run VMM PowerShell Script	
🍽 Get Checkpoint	字 Scale Tier In	
🆾 Get Cloud	字 Scale Tier Out	
🔚 Get Disk	🍄 Set Pending Service Update	
ز Get Network Adapter	🖳 Shut Down VM	
摔 Get Service	🎽 Start VM	
🖏 Get Service Configuration	록 Stop Service	
🗺 Get Service Template	📲 Stop VM	
🚰 Get Tier	📲 Suspend VM	
🕵 Get User Role	💪 Update Disk	
🤔 Get User Role Quota	설 Update Network Adapter	

- 12. Drag the following activities to the runbook canvas as illustrated below:
 - Run VMM PowerShell Script
 - Create User Role
 - Update User Role Property
 - Update User Role Quota
 - Update User Role Property Becomes Update User Role Property (2)

8			System Cente	er 2012 Orchestrator Ru	inbook Designer		_ 0 X
Actions Edit Options View H	lelp						
🞧 Refresh 🐌 Run 🔳 Stop 🔛	Check In 📝 Check Out	🎦 Undo Check Out 📗	Runbook Tester 🚺 Orche	stration Console 🕗 Evalua	tion version: 179 day(s) left		
Connections	📝 Create Private Cloud						Activities
l 🗼 💼 🗛							😘 System
- ORCHESTRATOR							Scheduling
Runbooks							🙀 Monitoring
CloudResources							See Management
🕫 😱 Computer Groups							Enol
							A Notification
🗄 🐼 Global Settings							di Utities
		b	<u>+ 3</u>	-13	4.0	13	Text File Management
	4	2	8	8	۲.	K	SC 2012 Virtual Machine Manager
	Initialize Data	Run VMM PowerSh	Create User Rale	Update User Role Property	Update User Role Quota	Update User Role Proper	Update User Role Property Update User Role Quota
							🐴 Update VM

13. Next, we will create three connections in the runbook to wire up the workflow, these connections are commonly referred to as the "pipeline" or "databus", because this is the mechanism utilized to pass information between each activity. On the runbook canvas, move your mouse to the right of the **Initialize Data** activity until your pointer changes to a crosshair. Then, holding down the left mouse button, draw a connection between the **Initialize Data** and the **VMM PowerShell Script** activity.



Repeat the process, this time from:

VMM PowerShell Script activity to the Create User Role activity
Create User Role activity to the Update User Role Property activity
Update User Role Property activity to the Update User Role Quota activity.
Update User Role Quota activity to the Update User Role Property (2).

Jeff now has created his first, simple runbook. It will start with the first activity "**Initialize Data**," then proceed to the **VMM PowerShell Script**, then **Create User Role**, then **Update User Role Property**, **Update User Role Quota**, then and finally perform the **Update User Role Property** activity, passing the results of the previous activity over the pipeline, and available for the following activity to utilize.



14. Jeff must now configure the activities in the runbook, as currently it has no configured task to perform. To begin, double-click on the **Initialize Data** activity to open the properties dialog box.

1	Initialize Data Properties	x
Details Informatic Define the parameters for t		
General Details Run Behavior	Add Remove	
	Finish Cancel Help]

15. On the dialog **Details** page, select the **Add** button five times to add five parameters.

	Initialize Data Properties	x
Details Informatic Define the parameters for t		
General Details Run Behavior	Parameter 1 (data type: String) Parameter 2 (data type: String) Parameter 3 (data type: String) Parameter 4 (data type: String) Parameter 5 (data type: String) Parameter 5 (data type: String) Parameter 5 (data type: String)	
	Finish Cancel Help)

16. Next, select Parameter 1 and change that name to MemoryGB, and then repeat for Parameter 2, Parameter 3, Parameter 4 and Parameter 5, changing their respective names to StorageGB, CloudName, NoOfVMs and Username. Once complete select Finish to close the dialog

1	Initialize Data Properties	x
Details Information		
General Details Run Behavior	MemoryGB (data type: String) StorageGB (data type: String) CloudName (data type: String) NoOfVMs (data type: String) Username (data type: String) Username (data type: String) Add	
	Finish Cancel Help	

17. Back on the canvas, double-click the **Run VMM PowerShell Script** activity.

	Run VMM PowerShell Script Properties
Properties Define the properties use	d by the activity.
General	Configuration
Properties Run Behavior	Properties
	Finish Cancel Help

 Select the "..." button on the right of the Configuration Name: and then select the connection (VMM Connection) that Jeff created previously

	Run VMM Por	werShell Script Properties	x
Properties Define the properties used by General	y the activity. Configuration Name:	Item Selection ×	
Properties Run Behavior	Properties	OK Cancel	
		Finish Cancel Help	

19. In the text field next to **PowerShell Script**, right-click and choose **Expand...** Copy and paste the following PowerShell script.

```
$CloudName = ""
$MemoryGB =
$StorageGB =
$NoOfVMs =
If ((Get-SCCloud -Name "$CloudName") -eq $null) {
$GUID = [System.Guid]::NewGuid().ToString()
Set-SCCloudCapacity -JobGroup "$GUID" -UseCustomQuotaCountMaximum $true -
UseMemoryMBMaximum $false -UseCPUCountMaximum $true -UseStorageGBMaximum
$false -UseVMCountMaximum $false -MemoryMB ($MemoryGB * 1024) -StorageGB
$StorageGB -VMCount $NoOfVMs
$addCapabilityProfiles = @()
```

```
$addCapabilityProfiles += Get-SCCapabilityProfile -Name "Hyper-V"
Set-SCCloud -JobGroup "$GUID" -RunAsynchronously -AddCapabilityProfile
$addCapabilityProfiles
$hostGroup = (Get-SCVMHostGroup | where {$_.ParentHostGroup -eq $null})
$hostGroups = @()
$hostGroups += $hostGroup
$Cloud = New-SCCloud -JobGroup "$GUID" -VMHostGroup $hostGroups -Name
$CloudName -Description ""
}
```

20. On the first line of the PowerShell script (**\$CloudName = ""**) between the quote marks (**""**) right click and select **Subscribe > Published Data** from the context menu.

			×
\$CloudName = " \$MemoryGB =	Subscribe 🕨	Published Data	^
\$StorageGB = \$NoOfVMs =	Cut	Variable	
	Сору		_
If ((Get-SCCloud	Paste	eq \$null) {	=
sGUID =	Delete	d().ToString()	
Set-SCC	Select All		
UseCustomQuota	aCountMaximum \$true -l	JseMemoryMBMaximum \$false -	
	ximum \$true -UseStorag imum \$false -MemoryMi	jeGBMaximum \$talse - 3 (\$MemoryGB * 1024) -StorageGB	
\$StorageGB -VM0	Count \$NoOfVMs	. , , , ,	
)abilityProfiles = @())abilityProfiles += Get-S(CCapabilityProfile -Name "Hyper-V"	
	-		
		OK Cancel	

21. In the Activity drop-down, the "Initialize Data" activity should be presented. The "pipeline" or "databus" attributes of "MemoryGB", "StorageDB", "CloudName" and "NoOfVMs" which we created earlier are now available to select.

Select the **CloudName** property and click **OK**

: İ	Published Data	x
Activity:	🛅 Initialize Data	*
Name CloudName NoOfVMs NemoryGB Username StorageGB	Description	
Show common Pu	blished Data	
	ОК Са	incel

- 22. For the following PowerShell script lines, repeat the previous steps however right click after the equals sign (=) and select **Subscribe > Published Data** from the context menu and select the associated properties (MemoryGB, StorageGB and NoOfVMs).
 - \$MemoryGB =
 - \$StorageGB =
 - \$NoOfVMs =

Run VMM	PowerShell Script Propertie	es	X
Activity: Name CloudName NoOFVMs MemoryGB Username StorageGB	Published Data Initialize Data Description		
		OK Cancel	
	Activity: Activity: Name CloudName NoOfVMs MemoryGB StorageGB	Activity: CloudName CloudName Name Description MemoryGB Username	Activity: Initialize Data Activity: Initialize Data Activity: Initialize Data Name Description CloudName NoOfVMs MemoryGB Username StorageGB StorageGB

23. Confirm that the first four lines of the PowerShell script are as below and click **OK** and then click **Finish**.

	x
\$CloudName = "{ <u>CloudName from "Initialize Data"</u> }" \$MemoryGB = { <u>MemoryGB from "Initialize Data"</u> } \$StorageGB = { <u>StorageGB from "Initialize Data"</u> } \$NoOfVMs = { <u>NoOfVMs from "Initialize Data"</u> }	^
I∲ ((Get-SCCloud -Name "\$CloudName") -eq \$null) { \$GUID = [System.Guid]∷NewGuid().ToString()	=
Set-SCCloudCapacity -JobGroup "\$GUID" - UseCustomQuotaCountMaximum \$true -UseMemoryMBMaximum \$false - UseCPUCountMaximum \$true -UseStorageGBMaximum \$false - UseVMCountMaximum \$false -MemoryMB (\$MemoryGB * 1024) -StorageGB \$StorageGB -VMCount \$NoOfVMs \$addCapabilityProfiles = @() \$addCapabilityProfiles += Get-SCCapabilityProfile -Name "Hyper-V"	~
OK Cancel	

24. In the text field next to **Output Variable 01** click in the text field and type "Cloud". Click Finish.

Run VMM PowerShell Script Properties				
Properties Define the properties used	by the activity.			
General	Configuration Name: VMM Connection			
Properties	Properties			
Run Behavior	PowerShell Script	\$CloudName = "{CloudName from "Ir		
	Output Variable 01	Cloud Optional Properties		
		Finish Cancel Help		

25. Back on the canvas double-click the **Create User Role** activity to open the properties dialog box.

	Create User Role Properties	x
Properties Define the properties used	by the activity.	
General	Configuration Name:	
Properties Run Behavior	Properties	
	Finish Cancel Help	

26. Select the "..." button on the right of the **Configuration Name:** and then select the connection (**VMM Connection**) that Jeff created earlier.

	Ci	reate User Role Pr	operties		x
Properties Define the properties used	by the activity		antian an		
General	Configur Name:	Item Sel	ection ×		
Properties Run Behavior	Propertie	ОК	Cancel		
			Finish	Cancel	Help

27. In the text field next to **User Role Name**, right click and select **Subscribe > Published Data** from the context menu.

operties Define the properties u	Create User Role Properties
General	Configuration Name: VMM Connection
Run Behavior	Properties User Role Name Profile Type Cut Copy Paste Delete Select All Expand
	Finish Cancel Help

28. In the Activity drop-down, select **"Initialize Data"**. The "pipeline" or "databus" attributes of "MemoryGB", "StorageDB", "CloudName" and "NoOfVMs" which we created earlier are now available to select. Select **CloudName** and click **OK**

	:i	Croate Licer Pole Properties Published Data	x	x
Proper Define t	Activity:	🛅 Initialize Data	~	
Gener Prope Run B	Name	n Published Data	ncel	ies
				Help

29. At the end of the text box add the text: **_SelfServiceUser**

	Create User Ro	le Properties X
Properties Define the properties us	ed by the activity.	
General	Configuration Name: VMM Connection	
Properties Run Behavior	Properties User Role Name Profile Type	'Initialize Data"} _SelfServiceUser Self Service User Optional Properties
		Finish Cancel Help

30. In the text field next to **Profile Type** click in the text field and select the "..." and select **Self Service User** from the Profile Type window. Click **OK**. Click **Finish**.

Create User Role Properties			
Properties Define the properties used by	v the activity.		
General	Configuration Name: VMM Connection		
Properties Run Behavior	Properties User Role Name Profile Type	{CloudName from "Initialize Data"} "Se Self Service User Optional Properties	
		Finish Cancel Help	

31. Back on the canvas double-click the **Update User Role Property** activity to open the properties dialog box.

	Update User Role Property Properties	x
Properties Define the properties used	by the activity.	
General	Configuration Name:	
Properties Run Behavior	Properties	
	Finish Cancel Help	

32. Select the "..." button on the right of the **Configuration Name:** and then select the connection (**VMM Connection**) that you created earlier in Chapter 4.

	Update	User Role Property Prope	erties 🛛 🗙	:
Properties Define the properties used t	by the activity	Item Selection	x	
General	-Configur Name:	VMM Connection		
Properties Run Behavior	Propertie	OK Canc	el	
		Fini	sh Cancel Help	

33. In the text field next to **User Role Name**, right click and select **Subscribe > Published Data** from the context menu.

Configuration Jame: VMM Connection				
Properties User Role Name	1			
Action Type		Subscribe	•	Published Data
Property Value		Cut Copy Paste Delete Select All Expand		Variable

34. In the Activity drop-down, the "Create User Role" activity should be presented. From the list of "databus" attributes select **User Role Name** and click **OK**

:1	Published	l Data	x		
Activity:	😻 Create User Role		*		
Name		Description	^		
🐴 Member Names	;				
🐴 Profile Type					
Run as Accoun					
SQL Profile Res					
	Service Instance Resource Names				
	te Resource Names				
🐴 User Role Data	Path				
🐴 User Role ID					
User Role Nam					
M Instance R			~		
K VM Template R	esource Names		×		
Show common P	ublished Data				
		ОК	Cancel		
		0	Cancor		

35. In the text field next to **Action Type** click in the text field and select the "..." and select **Add** from the Action Type window. Click **OK**.

	Update User	Role Property	Properties		x
Properties Define the properties used	·	Action Ty	rpe x		
General Properties Run Behavior	Configur Name: Configur Propertie User Ro Action Propert Value	e		from "Create User R	
		ОК	Cancel	Cancel Help]

36. In the text field next to **Property** click in the text field and select the "..." and select **Clouds** from the Property window. Click **OK**.

	Update User Role Property Properties				
Properties Define the properties used	by the activit	Property			
General	Configur Name:	Clouds User Role Data Path Actions Run as Accounts Library Servers			
Properties Run Behavior	Propertie User Ro Action Propert Value	Service Templates Service Instances VM Templates VM Templates	from "Create User R		
		Finish	Cancel Help		

37. In the text field next to **Value**, right click and select **Subscribe > Published Data** from the context menu. In the Activity drop-down, select "**Initialize Data**". From the list of "databus" attributes select

CloudName and click **OK**.

	Update User Role Property Properties				
Properti	: ப்	Published Data	×		
Define the General Properti Run Beha	Activity: Name CloudName NoOfVMs MemoryGB Username StorageGB	-	er R		

38. Click Finish.

	Update User Role Pro	perty Properties
Properties Define the properties used b	by the activity.	
General	Configuration Name: VMM Connection	
Properties	Properties	
Run Behavior	User Role Name	{User Role Name from "Create User R
	Action Type	Add
	Property	Clouds
	Value	{CloudName from "Initialize Data"}
		Finish Cancel Help

39. Back on the canvas double-click the **Update User Role Quota** activity to open the properties dialog box.

	Update User Role Quota Properties
Properties Define the properties used	by the activity.
General	Configuration Name:
Properties Run Behavior	Properties
	Finish Cancel Help

40. Select the "..." button on the right of the **Configuration Name:** and then select the connection (**VMM Connection**) that Jeff had created earlier and then click **OK**.

	Upda	ate User Role Quota Properties	x
Properties Define the properties used b	by the activity	Item Selection	
General Properties Run Behavior	Configur Name: [Propertie	WMM Connection	
		OK Cancel Finish Cancel Help	

41. In the text field next to **User Role Name**, right click and select **Subscribe > Published Data** from the context menu. In the Activity drop-down, select **"Create User Role"**. From the list of "databus" attributes select **User Role Name** and click **OK**

	Update User Role Quota Properties				
Propert	<u>с</u> і	Published Da	ta	x	
Define th	Activity:	💖 Create User Role		~	
Genera Proper Run Be	Service In: Service Te User Role I User Role I User Role I Se VM Instance VM Templa	ie count Names 9 Resource N stance Resou mplate Reso Data Path ID			5
			ОК	Cancel	Help

42. In the text field next to **Cloud Name**, right click and select **Subscribe > Published Data** from the context menu. In the Activity drop-down, select **"Initialize Data"**. From the list of "databus" attributes select **Cloud Name** and click **OK**

_		Update User Role Q	uota Properties		x
Propert	<u>د ا</u>	Published D	ata	×	
Define th	Activity:	🛅 Initialize Data		¥	
Genera Proper Run Be	Name	Description	OK	Cancel	User R

43. In the text field next to **Level** click in the text field and select the "..." and select **Member** from the Level window. Click **OK**.

	Upo	ate User Role Quota Properties	x
Properties Define the properties used I	by the activ	ty	
		Level ×	
General	-Config Name:	Member User Role	
Properties Run Behavior	Proper User Cloud Leve	OK Cancel	}
		Finish Cancel	Help

44. Click Optional Properties...

{User Role Name from "Create User R
{CloudName from "Initialize Data"}
Member
Optional Properties

45. From add/remove property add **Max VMs**, **Max Storage in GBs** and **Max Memory in MBs** and click **OK**

	Add/Remove Property	x
Available	Selected	
Max Custom Quota (<0 for unlimited) Max Virtual CPUs (<0 for unlimited)	>> Max VMs (<0 for unlimited) Max Storage in GBs (<0 for unlimited) Max Memory in MBs (<0 for unlimited)	
	OK	:el

46. In the text field next to Max VMs (<0 for unlimited), right click and select Subscribe > Published Data from the context menu. In the Activity drop-down, select "Initialize Data". From the list of "databus" attributes select NoOfVMs and click OK

	Update User Role Quota Properties	x
Propertion Define the	Activity:	
General Properti Run Beha	StorageGB	ser f ")"
	OK Cancel	Help

47. In the text field next to Max Storage in GBs (<0 for unlimited), right click and select Subscribe > Published Data from the context menu. In the Activity drop-down, select "Initialize Data". From the list of "databus" attributes select StorageGB and click OK

		odate User Role Ouota Pro		X
Properti	வ்	Published Data	X	
Define the	Activity:	🛅 Initialize Data	~	
General Properti Run Beha	StorageGB	Description	OK Cancel	ser F "}
l				

48. In the text field next to Max Memory in MBs (<0 for unlimited) type [Mult(, 1024)]

User Role Name	{User Role Name from "Create User
Cloud Name	{CloudName from "Initialize Data"}
Level	Member
Max VMs (<0 for unlimited)	{NoOfVMs from "Initialize Data"}
Max Storage in GBs (<0 for unlimited)	{StorageGB from "Initialize Data"}
Max Memory in MBs (<0 for unlimited)	[Mult(, 1024)]

49. Right click between the left parenthesis (() and comma (,)and select **Subscribe > Published Data** from the context menu.

Properties							
User Role Name	{User	Role M	Name from "Crea	te Use	er F		
Cloud Name	{Cloud	iName	from "Initialize [Data"}			
Level	Memb	er					
Max VMs (<0 for unlimited)	{NoOf	VMs fi	rom "Initialize Da	ta"}			
Max Storage in GBs (<0 for unlimited)	{Stora	igeGB	from "Initialize D	ata"}			
Max Memory in MBs (<0 for unlimited)	[Mult(1024	31				
			Subscribe	•	F	Publishe	ed Data
			Cut		١	Variable	
			Сору		F		
	Finis		Paste		Help		
			Delete				
			Select All				1
			Expand				

50. In the Activity drop-down, select **"Initialize Data"**. From the list of "databus" attributes select **MemoryGB** and click **OK.** Then click **Finish**

		date User Role Ouota Proper Published Data	ties 🛛	×
Properti		Initialize Data		
General Properti Run Beha	Activity: Name CoudName CoudName MemoryGB Username StorageGB	Description		 ser f '}

51. Back on the canvas double-click the **Update User Role Property (2)** activity to open the properties dialog box.

	Update User Role Property (2) Properties
Properties Define the properties used	by the activity.
General	Configuration Name:
Properties Run Behavior	Properties
	Finish Cancel Help

52. Select the "..." button on the right of the **Configuration Name:** and then select the connection (**VMM Connection**) that you created earlier in Chapter 4.

	Update (User Role Property (2) Properties	x
Properties Define the properties used	by the activitu		
General Properties Run Behavior	Configur Name: [Propertie	Item Selection ×	
		OK Cancel	
		Finish	Cancel Help

53. In the text field next to User Role Name, right click and select Subscribe > Published Data from the context menu. In the Activity drop-down, select "Create User Role". From the list of "databus" attributes select User Role Name and click OK

_		Undate User Role Property (2) Pro	onerties	-	x
	: ப்	Published Data	x		
Propert	Activity:	🎊 Create User Role			
Define th	Activity:	Create User Role	¥		
	Name	Description	<u>^</u>		
Genera Prope Run Be	Service Ins Service Ter Service Ter User Role I Service Role I Service Role I Service Role I Service Role I	e :ount Names Resource N itance Resou palate Reso Data Path ID	=		
	Show commo	on Published Data	Cancel	Help	

54. In the text field next to **Action Type** click in the text field and select the "..." and select **Add** from the Action Type window. Click **OK**.

	Update User Role Property (2) Properties	x
Properties Define the properties used	Config Remove	
General Properties Run Behavior	Name: Proper User Actic Prop Value	
	OK Cancel He	lp

55. In the text field next to **Property** click in the text field and select the "..." and select **Members** from the Property window. Click **OK**.

Update User Role Property (2) Properties						
Properties Define the properties used to General Properties Run Behavior		Clouds User Role Data Path Actions Run as Accounts Library Servers	me from "Create User R	×		
		OK Cancel Finish	Cancel Help			

56. In the text field next to **Value**, right click and select **Subscribe** > **Published Data** from the context menu. In the Activity drop-down, select **"Initialize Data"**. From the list of "databus" attributes select **Username** and click **OK**. Click **Finish**

	1	Indate Liser Role Property (2) P	ronerties		x
	: ப்	Published Data	×		
Proper Define th	Activity:	🛅 Initialize Data	¥		
Genera Prope Run Be	Name CloudName MooFVMs MemoryGB	Description Published Data		User R	
_		0	K Cancel	Help	1
l					1

Testing the Runbook

Jeff has now created his first runbook. The only thing he now has to do is start the runbook, provide the four parameters and his job should be automated, saving him time in the future. But before he relaxes, he must now check to see if the runbook actually works. For that, he is going to use the **Runbook Tester** which is integrated into the **Orchestrator Runbook Designer** we have already been utilizing. For his test, Jeff wants to create a new cloud called "XYZ" and assign the following resources:

16GB of Memory

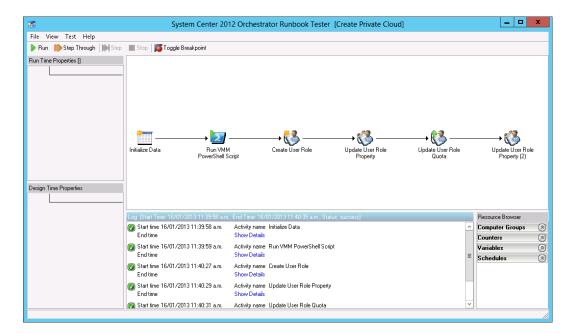
200GB of Storage

Allow a maximum of 8 virtual machines to be created in the cloud.

1. Select the Runbook Tester in the menu bar

🕜 Refresh	🕨 Run	📕 Stop	📙 Check In	Check Out	🎦 Undo Check Out	🕅 Runbook Tester	🚺 Orchestration Console
-----------	-------	--------	------------	-----------	------------------	------------------	-------------------------

2. The **System Center 2012 Orchestrator Runbook Tester** window will now be presented, select the **Run** button to test the runbook.



 The Initialize Data Parameters dialog will be presented; here we will assign the MemoryGB as 16, StorageGB of 200, CloudName as XYZ, NoOfVMs as 8 and Username of contoso\Emily. Then select OK

Initia	lize Data Parameters
MemoryGB	16
StorageGB CloudName	200 XYZ
NoOfVMs	8
Username	Contoso\Emily
	OK Cancel

4. Using the **Log** pane, Jeff can observe the runbook activities which are currently active, or have completed. By selecting the **Show Details** link, or expanding the **+** icon, Jeff can view the results of each activity as it processes within the workflow.

Log	g (Start Time: 1/22/2013 2:46:06 PM)	
0	Start time 1/22/2013 2:46:07 PM End time	Activity name Initialize Data Show Details
Þ	Activity name = Run VMM PowerShell Sc ⊞	ipt ; Activity ID = {8376A1CD-4CFD-4A36-8F2E-DEA966A48037}

5. When all activities are complete, Jeff will see that the job status now reads, "success"

Log	(Start Time: 1/22/2013 2:46:06 PM,	End Time: 1/22/2013 2:46:50 PM, Status: success)	
	Start time 1/22/2013 2:46:07 PM End time	Activity name Initialize Data Show Details	^
	Start time 1/22/2013 2:46:07 PM End time	Activity name Run VMM PowerShell Script Show Details	=
	Start time 1/22/2013 2:46:42 PM End time	Activity name Create User Role Show Details	
	Start time 1/22/2013 2:46:43 PM End time	Activity name Update User Role Property Show Details	
	Start time 1/22/2013 2:46:46 PM	Activity name Update User Role Quota	~

6. Back in the **Virtual Machine Manager Console**, Jeff should now also see that the Cloud called **XYZ** cloud has been created.

VI	As and Services	<
4	💖 Tenants 💖 XYZ _SelfServiceUser	
4	Clouds	
	🚢 VM Networks	
	결 Storage	
Þ	All Hosts	

Check In the Runbook

Prior to utilizing our completed runbook, it must be "checked in" again, using the Orchestrator Runbook Designer. If the runbook has not been checked in, it will not be replicated to Service Manager in the next chapter.

- 1. Open the **Runbook Designer**
- 2. Locate our **Runbook** which we named **Create Private Cloud**
- 3. Select the **Check In** button from the menu bar



Scenario: Simplified Self Service

Overview

In the previous scenario, Jeff created a runbook with the objective of optimizing his time not addressing repetitive tasks. Jeff read about the Self-Service potential of the private cloud and plans to embrace automation even further. Currently, Jeff must still start his new runbook and provide the private cloud details each time he receives a request ticket. Unfortunately, many times he simply only receives an email request, eager to automate the complete process, Jeff plans to present Emily and her team a simple web page to request the change, letting Service Manager and Orchestrator do the rest.

Prerequisites

Before Jeff begins to create the Self-Service portal, he will need to first source all the required components for the project. For his evaluation implementation, Jeff is going to use the **SharePoint** server to install all the required components. As SharePoint Foundation does not support Windows Server 2012, the **SharePoint** server will be installed with the **Windows Server 2008R2** operating system. In production, Jeff will follow the recommend guidelines, utilizing additional virtual machines to distribute the roles and service loads. The **Windows Server 2008 R2** evaluation can be downloaded from

http://www.microsoft.com/en-us/download/details.aspx?id=11093

The initial installation that Jeff needs is **SharePoint Foundation 2010**. The Self-Service portal is a collection of components that live on top of SharePoint. In production, he will embed those components on his production SharePoint farm, while for the evaluation; he is going to utilize the free SharePoint Foundation sever that he downloads from http://www.microsoft.com/download/en/details.aspx?id=5970

Prior to beginning the installation of **SharePoint Foundation 2010**, Jeff must download and install the following prerequisites specifically for **SharePoint**

SharePoint Foundation 2010 prerequisites:

Prerequisite	URL
Windows Identity Foundation:	http://www.microsoft.com/download/en/details.aspx?id=17331
Microsoft Sync Framework Runtime v1.0 (x64):	http://www.microsoft.com/download/en/details.aspx?id=15391
Microsoft Chart Controls for Microsoft .NET Framework 3.5:	http://www.microsoft.com/download/en/details.aspx?id=14422
Microsoft Filter Pack 2.0:	http://www.microsoft.com/download/en/details.aspx?id=17062
Microsoft Server Speech Platform Runtime (x64):	http://www.microsoft.com/download/en/details.aspx?id=16789

Microsoft Server Speech Recognition Language - TELE(en-US):	http://go.microsoft.com/fwlink/?LinkID=166371
SQL 2008 R2 Reporting Services SharePoint 2010 Add-in:	http://www.microsoft.com/download/en/details.aspx?id=622
Microsoft Sync Framework Runtime v1.0 (x64):	http://go.microsoft.com/fwlink/?LinkID=160382
Microsoft [®] SQL Server [®] 2008 R2 Native Client	http://www.microsoft.com/en-us/download/details.aspx?id=16978
Microsoft SQL Server 2008 Analysis Services ADOMMD.NET	http://go.microsoft.com/fwlink/?LinkID=160390
Microsoft .Net Framework 4.0	http://go.microsoft.com/fwlink/p/?LinkID=232304

Next, Jeff proceeds with the installation of **SharePoint Foundation 2010** as a **Standalone server** with the default settings

After the installation, he then runs the SharePoint Configuration Wizard (default settings)

Once Jeff has installed SharePoint Foundation 2010 he will need to download and install SP1 from the Microsoft website. This is to add compatibility for SQL 2012. It can be downloaded from the following location http://www.microsoft.com/en-us/download/details.aspx?id=26640

Installing the Self-Service Portal

Now that all the prerequisites have installed, Jeff can start installing the **System Center 2012 Service Manager web portal.**

- 1. Still working on the **SharePoint** computer, Run **setup.exe** from the **System Center Service Manager** installation media
- 2. On the Service Manager splash screen, select Service Manager web portal



3. On the **Portal Parts** screen, select both the **Web Content Server** and **SharePoint Web Parts** and select **Next**

🗭 Service Manager Setup Wizard	×
Getting started	
Portal Parts	
We recommend that you only install both parts of the Service Manager web portal on separate computers unless you are working in a lab environment. You must install the web content server before you install the SharePoint Web Parts. If you select both parts, the web content server will be installed first.	
Web Content Server: Provides a connection to the Service Manager database, contains the Silverlight code for the Web Parts, and caches data for better performance.	
SharePoint Web Parts: Installs a site, applies a SharePoint template, deploys the web parts and configures them with the web content server.	
< Previous Next > Can	cel

4. On the **Product registration** page, fill in a **Name** and **Organization**, select **I have read, understood, and agree with the terms of the license terms** and select **Next**

Product regist	ration	
Name:	Administrator	
Organization:	Contoso	
-	Lonioso	
Privacy statement		
License terms:		
		_
MICROSOFT	SOFTWARE LICENSE TERMS	-
	SOFTWARE LICENSE TERMS	-
	SOFTWARE LICENSE TERMS	•
MICROSOFT SYST		•
MICROSOFT SYST MICROSOFT SYST	TEM CENTER 2012 CONFIGURATION MANAGER SERVICE PACK 1	
MICROSOFT SYST MICROSOFT SYST MICROSOFT SYST	TEM CENTER 2012 CONFIGURATION MANAGER SERVICE PACK 1 TEM CENTER 2012 CLIENT MANAGEMENT SUITE SERVICE PACK 1 TEM CENTER 2012 STANDARD SERVICE PACK 1	4
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5. On the **Installation location** page, change the installation location or leave it default and select **Next**

💮 Service Manager Setup V	Yizard		×
Getting started			
Installation	n location		
The recommend	led default location for the virtual website is displayed.		
Location:	C:\inetpub\wwwroot\System Center Service Manager Portal		Browse
	Disk space required: 1 GB		
	Free space: 111.5 GB		
	The disk space is verified.		
		< Previous Nex	kt > Cancel

System check res	sults		
Setup can continue but this	s computer does not meet optimum system requirements, which	n may affect performance.	
Service Manager Self-S	ervice Portal	Expand All	-
1 Memory check	There is not enough memory in this computer	· ·	
	The suggested memory requirement is 8192 MB. 4095 MB.	This computer has only	
Processor speed check	k The CPU processor check passed		
⊘ IIS check	IIS 7.0 is installed		
ASP.NET check	ASP.NET is installed		
⊘ Basic Authentication of	check Basic Authentication is enabled		
⊘ Windows Authenticat	ion check Windows Authentication is enabled		
Ø Microsoft .NET Frame check	work 4 Microsoft .NET Framework 4 is installed		
Windows Service Pack	k check Windows Service Pack is installed		•
Review full system requirer	ments		

6. On the **System check results**, when you have passed the system requirements, select **Next**

 On the Configure the Service Manager Self-Service Portal name and port, uncheck the Enable SSL encryption and make sure that the Port is 81. Select Next to continue

	Service Manager Self-Servi		and port	
Specify a name for you	Ir Self-Service Portal and the port that this	s website will use.		
Website name:	SCSMWebContentServer	Port:	81	
	ransfer data between the browser and the se Secure Sockets Layer (SSL) encryption.			-
SSL certificate:				

8. On the **Select the Service Manager database** page, in the **Database server** text field enter **servicemgr**, and set the **SQL Server instance** dropdown to **Default.** Finally, in the **Database** dropdown select **ServiceManager**. Then select **Next**

ice Manager Setup Wiz	ard		Cherry A Contraction and and	
nfiguration				
Select the Se	ervice Manager database			
	f the server that hosts the instance of S Service Manager database.	QL Server 2008 that conta	ins the Service Manager database,	
	2			
🌒 Service Manage	er Self-Service Portal will use the existin	g 'ServiceManager' databa	ise	
Database server:	servicemgr	SQL Server instance:	Default 🔹	
Database:	ServiceManager	data mer on S	connect to the existing configuration abase, you must be logged on as a mber of the Administrators user role Service Manager management server, erwise setup will fail.	

9. On the **Configure the account for the Self-Service Portal** page, select the **Domain account** option; provide the **User name** as **administrator**, provide the relevant **password**, and then set the **domain** to **contoso**. Select **Test the credentials**. When the test succeeds, select **Next**

Service Manager Setup Wizard	×
Configuration	
Configure the account for the Self-Service Portal The Self-Service Portal can access the Service Manager database under the Local System account, if installed on the same computer, or under a domain user or service account. Setup will add the domain account to the Service Manager	
Administrators user role.	
C Local System account	
User name: administrator	
Password:	
••••••	
, Domain:	
CONTOSO 🔹	
Test Credentials O The credentials were accepted.	
< Previous Next > Can	cel
///////////////////////////////////////	THE YOL

10. On the **Configure the Service Manager SharePoint Web site**, uncheck the **Enable SSL encryption** and set the port to **82**. Set the **Database server** as **ServiceMgr**, the **SQL Server instance** drop down to **Default**, and the **Database name** to read **SharePoint_SMPortalContent**. Then select **Next**

Configure the	Convice Manager ChareDo	int Mah sita	
	Service Manager SharePo		
	oort number for the SharePoint Web site oint Web site, and then specify the URL		
SharePoint site:			
Website name:	Service Manager Portal	Port: 82	
Enable SSL encrypt	ion (recommended)		
SSL certificate:			
SharePoint database:			
Database server:	SERVICEMGR	SQL Server instance:	Default
Database name:	Sharepoint_SMPortalContent		
Web content server:			
URL:	http://SHAREPOINT:81		

11. On the **Configure the account for Service Manager SharePoint application pool**, provide the **User name** as **administrator**, provide the relevant **password**, and then set the **domain** to **contoso**. Select **Test the** credentials and when the test succeeds, select **Next**

	ager Setup Wizard
onfigura	tion
-	
Co	onfigure the account for Service Manager SharePoint application pool
The	e Service Manager SharePoint application pool can run under a domain user or service account.
	User name:
	administrator
	Password:
	•••••
	Domain:
	CONTOSO
	Test Credentials I The credentials were accepted.

12. On the **Help improve Microsoft System Center 2012 – Service Manager** choose if you want to participate anonymously in the **Customer Experience Improvement Program** or not, then select **Next**



13. On the **Use Microsoft Update to help keep your computer secure and up-to-date** page, select if you want to use **Microsoft Update**, and select **Next**

onfig	guration
	Use Microsoft Update to help keep your computer secure and up-to-date
	Microsoft Update offers security and important updates for Windows and other Microsoft products, including Microsoft System Center 2012 - Service Manager. Updates are delivered using your Automatic Updates setting, or you can visit the Microsoft Upd Web site.
	♥ C Use Microsoft Update when I check for updates (recommended).
	I do not want to use Microsoft Update.
	☐ Initiate machine wide Automatic Update.
See	the Microsoft Update FAQ
Priva	acy Statement
	< Previous Next > Can

14. On the **Installation summary**, review your settings and select **Install**

Manager Setup Wizard guration	
Installation summary	
Review the selections for the parts you are installing. To continue, click Install. To change these selections, click Prev	ious.
Self-Service Portal virtual directory: C:\inetpub\wwwroot\System Center Service Manager Portal	-
Web content server website name: SCSMWebContentServer	
Web content server website port: 81	
Use Service Manager database on: servicemgr	
Database name: ServiceManager	
Application Pool account for web content server website: CONTOSO\Administrator	
SharePoint Web site name: Service Manager Portal	
SharePoint Web site port:	•
< Previous Install	Cancel

15. On the Setup completed successfully page, write down the URL (<u>http://sharepoint:82/SMPortal</u>) of your newly created portal as presented in the results text. Finally you may select Close to complete the exercise.

🗑 Service Manage	r Setup Wizard	X
Finished		
Setup has ins <u>DataAccessS</u> 'SCSMWebCo Setup has ins	Dempleted successfully. talled the Web Content Server which may be accessed at <u>http://SHAREPOINT:81/ServiceHos</u> <u>envice.svc</u> . You can access the configuration via the Internet Information Services (IIS) Manag ontentServer'. talled the SharePoint site 'Service Manager Portal'. This site may be accessed at <u>http://SHAR</u> te may be configured using the SharePoint 2010 Central Administration tool for site 'Service	er via site name EPOINT:82/SMPortal/. The
0 0 0 0 0 0	Initialize Install files Configure registry settings Configure portal Web site Configure portal SharePoint Web site Finalize	Deployment Guide Release Notes Search Support Articles View System Requirements Cloud Service Pack Guide Open the Setup Log
		Close

Creating a Runbook

Jeff now considers the steps which he needs to repeat in order to deliver a service to his end-users, some of these will not require to be repeated each time, so the list will act as a guide for him as he proceeds to publishing his new service offerings on the portal.

- Pre-Work
- Create a Runbook in Orchestrator (already covered in this chapter)
- Create the Orchestrator Connector in Service Manager (already covered in this chapter)
- Synchronize Orchestrator with Service Manager
- Create a Runbook Automation Activity template
- Create a Service Request template
- Create a Service Offering
- Create a Request Offering
- Add the Request Offering to the Service Offering

As this is the first time Jeff has encountered this new process, he decides that he will attempt to complete each of these steps now so he understands the process, and later when he is ready to offer additional services he can opt to exclude the optional steps if he so wishes.

Pre-Work

Prior to Jeff beginning the work of offering new services, he first will create a Management Pack. This management pack will be used to store all the customizations which he will create as he implements his offerings. An advantage of this approach is that he can undo his changes by deleting the management pack, but also he can export the management pack from his evaluation environment, and simply import it onto another environment, for example Production at any time in the future. This enables Jeff to have a good test first approach for delivering new services.

1. In the **System Center 2012 Service Manager console**, with the **Administration** workspace selected, expand the navigation tree to select **Administration** > **Management Packs**



2. The context of the Tasks Pane will update, and now we can choose Create Management Pack

> Tasks	
2	
Reporting Infra MP	^
🗡 Delete	
Export	
Properties	
Management Packs	^
Create Management Pack	
📸 Import	
😯 Refresh	
Administration	^
Start PowerShell Session	

3. On the **Create Management Pack** dialog, in the **Name** text box enter **CONTOSO Service Requests Management Pack**, and in the **Description** text box enter: **This is a Management Pack that contains all customization Service Request offerings**. Then select **OK**

Create Management Pack – 🗆 🗙
Management pack general properties
Name:
Contoso Service Requests Management Pack
Description:
This is a Management Pack that contains all customization Service Request offerings.
OK Cancel

Synchronize Orchestrator with Service Manager

As we created a runbook in the previous chapter he must now synchronize this new information with Service Manager, otherwise the new runbook will be unavailable for us to utilize in Service Manager.

1. In the **System Center 2012 Service Manager** console, with the **Administration** workspace selected, expand the navigation tree to select **Administration** > **Connectors**.

Administration	<
Administration	
Announcements	
PP Connectors	
🔀 Deleted Items	
🚟 Management Packs	
Notifications	
Security	
🕨 📄 Service Level Management	
Settings	
Vorkflows	
Administration	
둘 Library	
Work Items	
Configuration Items	
길 Data Warehouse	
Reporting	
	•

2. Select the previously created **Orchestrator Connector** connection

Connectors 2

Filter		٩	Edit Criteria 🛩
Name	Enabled	Data Provider Name	
Orchestrator Connector	Yes	System Center Orchestrator Runbook Connector	

3. The context of the **Tasks** pane will update, and now we can choose **Synchronize Now**

>	Tasks	
2	0	
Or	chestrator Connector	^
X	Delete	
Ŷ	Disable	
	Enable	
1 00 173.1	Properties	
69	Search for Knowledge Articles	
2	Synchronize Now	

4. Select **OK** on the **Synchronize Now** page and then refresh the page until the synchronization has finished.

Synchronize Now	x
The synchronization request has been submitted.	
ОК	

Create Runbook Automation Activity Template

Next, Jeff needs to prepare **Service Manager** to offer the runbook that he created in Chapter 9 as available for use in his templates. Once this is complete Jeff can then utilize the runbook in any of his service templates, including requests and incidents. Jeff also has the option to take advantage of the template to define some parameters now, so they do not need to be redefined every time the runbook is required.

1. In the **System Center 2012 Service Manager** console, with the **Library** workspace selected, expand the navigation tree to select **Runbooks**.

Library	<
 Library Groups Knowledge Lists Queues Runbooks Service Catalog Tasks Templates 	
Administration	
Work Items	
Configuration Items	
ј Data Warehouse	
Reporting	
	•

- 2. Select the Runbook from the **Runbooks** pane that you created in Chapter 9 called **Create Private Cloud**
 - If you don't see the **Create Private Cloud** runbook in the **Runbooks** pane, then run the following SQL statement on the Orchestrator server:

USE Orchestrator
TRUNCATE TABLE
[Microsoft.SystemCenter.Orchestrator.Internal].AuthorizationCache

Filter		٩	Edit Criteria 🛩
Name	Description	Folder Path	
Create Private Cloud		\CloudResources\Create Private Clo	oud

3. The context of the **Tasks** pane will update, and now we can choose **Create Runbook Automation Activity Template**.



- 4. Fill in the following data on the **Create Template** page. When done, select **OK** to open the template editor
 - Name: Create Private Cloud Runbook Activity Template
 - **Description**: This is the template used for the Runbook Create Private Cloud
 - **Class**: Runbook Automation Activity
 - Management Pack: CONTOSO Service Requests Management Pack

Create Template	– 🗆 X
Create Template	
Enter a name and description for the template	
Name:	
Create Private Cloud Runbook Activity Template	
Description:	
This is the template used for the Runbook Create Private Cloud	
Class: Runbook Automation Activity	Browse
For example, to create an incident template, select the Incident class.	DIOWSE
Select an unsealed management pack where the template will be saved. Management pack	
Contoso Service Requests Management Pack Last modified: 17/01/2013 12:08:23 p.m.	New
When I click OK, open the template form.	
ОК	Cancel

- 5. Now you can change the parameters for the runbook activity. Those parameters will be automatically filled in when a new activity is created in **Service Manager.**
 - **Title**: Create Private Cloud
 - **Description**: Create Private Cloud
 - Area: Hardware\Server

3	Runbook Activity Template: Create Private Cloud Run	book Activity Template 📃 🗖 🗙
Ē	Status: Created On: 1/1	17/2013 4:51:02 PM > Tasks
	Parent Work Item: Created By:	Ū @
	rate Cloud	Runbook Automation A ^ * Create Change Request * Create Release Record Print Search for Knowledge Articles View Associated Runbook View Most Recent Job General Refresh
Area: Hardware Assigned To		
Comment:	OK	Private

6. Ensure the option **Is Ready for Automation** box is checked; otherwise you cannot use this runbook as an automated activity. Finally close and save the dialog changes, click **Apply**

Runbook Activity	✓ Is Ready For Automation
Title:	
Create Private Cloud	
Description:	
Create Private Cloud	
L	
Area:	Stage:
Hardware\Server	•

 Click the **Runbook** tab, here we define the Runbook that is associated with this Activity Template. Select SELECT, make sure Create Private Cloud is highlighted then click on OK. Click on OK when returned to the **Runbook Activity Template** form.

8		Run	book Activit	y Template:	Create Private	Cloud Runbo	ook Activit	ty Ten	nplate 🗕 🗖 🗙
Ē			Sta	us:	Cr	eated On: 1/17/	/2013 5:05:1	9 PM	> Tasks
		F	arent Work It	em:	C	reated By:			2
General	Runbook	Configu	uration Items	Scheduling	Related Items	History			Runbook Automation A A K Create Change Request
Runbo	ook Inforr	mation	Last Statu Active	5:	<u> </u>	ated On: 7/2013 4:31:20 P	М	-	★ Create Release Record ➡ Print
Name:									Search for Knowledge Articles View Associated Runbook
Create	Private Cloud	ł					Select		🕘 View Most Recent Job
Paramet	er Mapping:								General
Name		Туре	Value						
Usernar Mapped to	property Text1	(In) String				Edit Ma	apping		
Memory Mapped to	yGB property Text2	(In) String				Edit Ma	apping	=	
Storage Mapped to	GB property Text3	(In) String				Edit Ma	apping		
€ InvedM			[) [•		
Docume	ntation:								
								Ŧ	
					ОК	Cancel	Арр	ly	

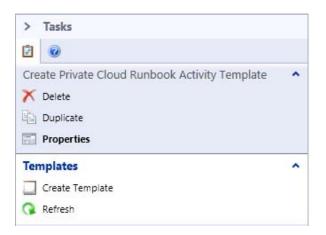
Create Service Request Template

When the end user connects to the Self Service portal to submit a new request, Service Manager is presenting a Service Request offering; these offering are based on the Service Request Template, and can be customized to auto-populate some of the fields in the request. Additionally, the Service Request Template allows Jeff to define which workflow will be carried out when this request offering is implemented. In this example the main activity Jeff is concerned with is his recently created runbook activity.

1. In the **System Center 2012 Service Manager** console, with the **Library** workspace selected, expand the navigation tree to select **Templates**

Library <
🔺 🚍 Library
🔯 Groups
Knowledge
🐴 Lists
🔞 Queues
🚰 Runbooks
Service Catalog
Tasks
Templates
Administration
🔋 Work Items
Configuration Items
📁 Data Warehouse
Reporting

2. The context of the **Tasks** pane will update, and now we can choose **Create Template**.



- 3. On the **Create Template** page fill in the following data:
 - Name: Create Private Cloud Request Template

- **Description**: This template will serve as the template for the Service Request
- **Class**: Service Request

Our management pack called **CONTOSO Service Requests** should still be selected, and we can Select **OK** to open the Template Editor

🗟 Create Template 💶 💌 🗙
Create Template
Enter a name and description for the template
Name:
Create Private Cloud Request Template
Description:
This template will serve as the template for the Service Request
Class:
Service Request Browse
For example, to create an incident template, select the Incident class.
Select an unsealed management pack where the template will be saved. Management pack
Contoso Service Requests Management Pack Last modified: 1/17/2013 5:58:47 PM
☑ When I click OK, open the template form.
OK Cancel

- Once the form is presented, we will be placed on the **General** tab, where we can customize the parameters which we would like to be automatically filled for each new service request created in **Service Manager** based on this template
 - Title: Automated Service Request Create Private Cloud
 - **Description**: Through the Self-Service Portal, users will be able to request a new Private Cloud Environment.
 - **Urgency**: Medium
 - **Priority**: Low
 - **Area**: Hardware\Server

	Service Request Template:						
10		Activit Request C	ty stage: Offering:			Created On Created by	
General Activitie	s Results	Related Items	History				
Service Requ	est Informa	ation				^	*
Affected User	Ş	Alternate conta	ct method				
Title							
Automated Servic	:e Request – Cre	ate Private Cloud					=
D							
Description Through the Self-	Service Portal, u	isers will be able t	o request a new	Private Cloud Er	vironment.		
	Service Portal, u	isers will be able t	o request a new	Private Cloud Er	wironment.		
Through the Self-	Service Portal, u		o request a new	Private Cloud Er	wironment.		
	Service Portal, u	Priority Low	o request a new	Source	wironment.	•	_
Through the Self- Urgency <u>Medium</u> Area		Priority		Source		•	
Through the Self- Urgency <u>Medium</u>		Priority Low		Source Assigned to		¥ 	
Through the Self- Urgency <u>Medium</u> Area	•	Priority Low	•	Source Assigned to			
Through the Self- Urgency <u>Medium</u> Area	•	Priority Low	•	Source Assigned to			

5. We can then proceed on to the **Activities** tab. Here we can define the workflow of activities which should be executed for this service request. Examples here may be a Review Activity when we would first prefer a manager to approve the request prior to moving on with the next step in the workflow. Jeff has decided that, for his initial validation, to add the Runbook Activity he created earlier so as to understand how this

really works. He proceeds by selecting the button.

3			Service R	equest Template:	
20		Activi	ty stage:	Created	i On:
		Request Offering:		Create	d by:
General	Activities	Results Related Items	History		
Activit	ies				I
Activit	163			Activities Zoom Add	Views
			START		
			J		$\sim $
					/
			END		
∧ Details					
		Select an activ	ity to view its det	tails	
				OK Cancel Ap	ply

6. In the **Select Template** dialog, choose the **Runbook Automation Activity** that we created a little earlier and called **Create Private Cloud Runbook Activity**. Then select **OK**

Select Template	_ _ ×
Select Template	
Type to filter	٩
Templates:	
Name 👚	Class
Create Private Cloud Runbook Activity Template	Runbook Automation Activity
Default Dependent Activity	Dependent Activity =
Default Manual Activity	Manual Activity
Default Parallel Activity	Parallel Activity
•	
Description:	
Default Sequential Activity	
	OK Cancel

7. As Jeff does not plan to add any additional activities for now, just select **Apply** and **OK** to complete creating the Service Request template

Service Request Template:				
20		Activity stage:		Created On:
		Request Offering:	Created by:	
General	Activities	Results Related Items History		
Activit	ies		🕂 🔶	
, retrities			Activities	Zoom Views
START				
		80		
		₩ SA21: (0) ^		
		ŧ		
		Drag existing activities here or: Add Activity		
		•		
				,
		END		
∧ Details		END		
o cluis		Select an activity to view its details		
		Select an activity to view its details		
		ОК	Cancel	Apply

Create a Service Offering category

Now that Jeff has created both his templates, he can finally proceed to create the offerings that will appear on the Self-Service portal. Jeff has browsed through some information about this process and learned that there are two types of offerings.

- A) Service Offering, these are really nothing more than a collection of different Request Offerings.
- B) **Request Offerings** are the actual offering which end-users are presented, and are normally customized with specific questions relevant to the request.

Create a Service Offering

In this example Jeff will be creating the offerings called **Emily's Cloud Offerings**. Since a **Service Offering** is a collection of different **Request Offerings**, Jeff will add all offerings specific for Emily's Cloud under this Service Offering.

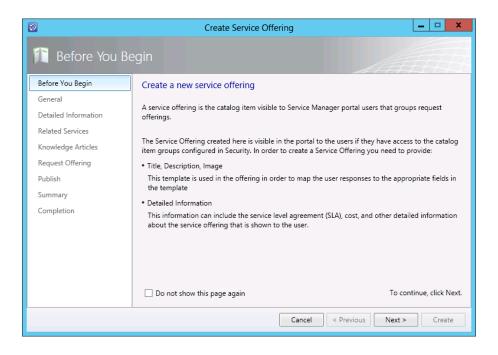
1. In the **System Center 2012 Service Manager** console, with the **Library** workspace selected, expand the navigation tree to select **Service Catalog** > **Service Offerings**.

Library	<
 Library Groups Knowledge Lists Queues Runbooks Service Catalog Request Offerings Service Offerings Tasks Templates 	
Administration	
🔋 Work Items	
Configuration Items	
📔 Data Warehouse	
Reporting	
	•

2. The context of the Tasks pane will update, and now we can choose Create Service Offering



3. The Create a new service offering wizard will be presented, select Next to begin



- 4. On the **Specify the information for this offering** page fill in or select the following information:
 - **Title:** Infrastructure Services
 - **Category:** General
 - Language: Leave empty!
 - Overview: Here are all the Offerings specific for Infrastructure Services
 - Description: On this page, you will find all the offerings for Infrastructure Services
 - Management Pack: CONTOSO Service Requests Management Pack

Select Next

8	Create Service Offering
🚺 General	
Before You Begin	Specify the information for this offering
General	Title: Image (32 x 32):
Detailed Information	Infrastructure Services Browse
Related Services	
Knowledge Articles	Category: Language:
Request Offering	General 🔹
Publish	Overview, shown on the portal home page:
Summary	Here are all the Offerings specific for Infrastructure Services
Completion	Description, shown on the service offering page:
	On this page, you will find all the offerings for Infrastructure Services
	Management pack
	Contoso Service Requests Management Pack Last modified: 1/17/2013 5:58:47 PM
	Cancel < Previous Next > Create

5. The Detailed Information page enables Jeff to provide both Service level agreement (and a related URL), as well as Cost information (and a related URL), which are associated with the service offering. Currently Jeff has not figured out what these might be in his evaluation, but will review these before going into production, for now, just select Next

8	Create Service Offering
1 Detailed Info	rmation
Before You Begin	Specify the information for this offering
General Detailed Information Related Services Knowledge Articles	Service level agreement information:
Request Offering Publish Summary	Link for additional information:
Completion	Cost information:
	Link for additional information:
	Cancel < Previous Next > Create

6. Click **Next**

8		Create Service Offering		_ 🗆 X
👔 Related Servi	ces			
Before You Begin General Detailed Information	Select the services:	ces that are related to this	offering	
Related Services	Title	Fully Qualified Name	Last Modified	Add
Knowledge Articles Request Offering Publish Summary Completion				Open
		Cano	cel < Previous Ne	xt > Create

7. Click Next

1		Create Service Offering		- 🗆 X		
Before You Begin	Select the kn	owledge articles that are related to	this offering			
General						
Detailed Information	Related knowled	-				
Related Services	Identifier 👻	Title	Last Modified	Add		
Knowledge Articles				Remove		
Request Offering				Open		
Publish						
Summary						
Completion						
		Cancel	< Previous Next >	Create		

8. On the **Request Offering** page, we have the ability to add the request offerings that users will see grouped under this service offering. Because we have not yet created a request offering, we will leave this empty for now and select **Next**

	Create Service Offering	• D X
🎦 Request Offe	ering	
Before You Begin	Select the request offerings that users will see grouped under this servic	e offering
General Detailed Information	Request offerings:	
Related Services	Title Status Last Modified	Add
Knowledge Articles Request Offering		Open
Publish		
Summary		
Completion		
	Cancel < Previous Next >	Create

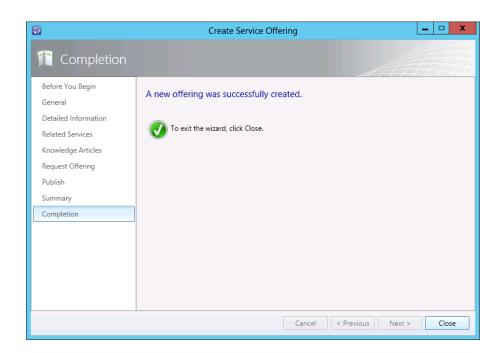
9. On the **Specify publishing information** page, we will set the **Offering status** to **Published** and set the **Offering owner** to **Jeff.** And again we can select **Next**

D	Create Service Offering) <u> </u>
👔 Publish		A TELL
Before You Begin General Detailed Information Related Services Knowledge Articles Request Offering Publish Summary Completion	Specify publishing information. Offerin them to appear on the portal. Offering status: Published Published date: 1/17/2013 5:57:17 PM Internal notes:	ngs must be set to Published in order for Offering owner:
		Cancel < Previous Next > Create

10. Finally, we can review the choices from the **Summary** page, before we select **Create**

3	Create Service Offering	D X
👔 Summary		
Before You Begin General	Please confirm the settings of this offering	A
Detailed Information	Title:	
Related Services	Infrastructure Services	
Knowledge Articles	Category:	
Request Offering	General	
Publish	Language:	=
Summary	Displayed to all users	
Completion	Offering status:	
	Published	
	Overview, shown on the portal home page:	
	Here are all the Offerings specific for Infrastructure Services	
	Description, shown on the service offering page:	
	On this page, you will find all the offerings for Infrastructure Services	-
	Cancel < Previous Next >	Create

11. When the offering has been created, select **Close**. Please note that we will not see this service offering presented in the portal until we associate at least one request offering to the service



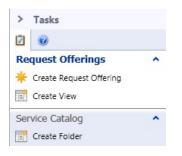
Create Request Offering

Jeff just finalized his **Service Offering** and is now eager to publish his first **Request Offering**. As Jeff required just some specific information for this runbook, instead of manually extracting the information from a generic request, and transposing this into his runbook, he is instead going to customize the offering specifically prompting the user for the information which is relevant to this specific request.

1. In the System Center 2012 Service Manager console, with the **Library** workspace selected, expand the navigation tree to select **Service Catalog** > **Request Offerings**

Library	<
4 🧱 Library	
Croups	
🕨 📑 Knowledge	
📥 Lists	
😥 Queues	
🚰 Runbooks	
🔺 📗 Service Catalog	
Request Offerings	
Service Offerings	
🛃 Tasks	
C Templates	
Administration	
📳 Work Items	
Configuration Items	
📋 Data Warehouse	
Reporting	

2. The context of the Tasks Pane will update, and now we can choose Create Request Offering



3. The Create Request Offering wizard will be presented, select Next to begin

	Create Request Offering			
Before You	Begin			
Before You Begin	Create a new request offering			
General				
User Prompts	A request offering is the catalog item visible to Service Mana assistance, or action that is available to end users.	ager portal users that describes the item,		
Configure Prompts				
Map Prompts	You can bundle one or more request offerings in a service offering. Once you create an individual request offering, you can optionally include it in a service offering. However, a request offering can			
Knowledge Articles	exist stand-alone without being grouped within a service offering. Before you begin please ensure you have:			
Publish	Created a service or incident request template			
Summary	This template is used in the offering in order to map the user responses to the appropriate fields in			
Completion	the template			
	User prompts and responses			
	You will be entering the user prompts in this wizard for the template fields. Please ensure that you have them written			
	Do not show this page again	To continue, click Next		
	Cancel	< Previous Next > Create		

- 4. On the **Specify the information** page, fill in the following information:
 - **Title:** Create Private Cloud
 - Description: This request will allow you to create a private cloud
 - **Template name:** Create Private Cloud Request Template

Jeff now understands why he created the template earlier, as every request that will be made through the portal will be created in Service Manager utilizing this template.

Contoso Service Request Management Pack Select Next

8	Create Request Offering
📄 General	
Before You Begin	Specify the information for this offering
General	
User Prompts	Title:
Configure Prompts	Create Private Cloud
Map Prompts	Image (32 x 32):
Knowledge Articles	Browse
Publish	
Summary	Description, shown on the request offering page:
Completion	This request will allow you to create a private cloud
	Template name: Create Private Cloud Request Template
	Management pack Contoso Service Requests Management Pack Last modified: 1/17/2013 5:58:47 PM
	Cancel < Previous Next > Create

The **User Prompts** page enables Jeff to define what questions should be presented to his end users when they select this request offering, these can be marked as mandatory or optional for the user to provide.

(For more information about the different prompt types: http://blogs.technet.com/b/servicemanager/archive/2011/11/08/reguest-offering-wizard-overview.aspx)

For Jeff's example there are four questions which he requires to be answered, so appends these to the form

- Private Cloud Name > Required > Text
- How much Memory (GB) > Required > Simple List
- How much Storage (GB) > Required > Simple List
- How many VMs > Required > Simple List

Select Next

1			Create Request Offering		- 🗆 X
User Prompts					
Before You Begin	Er	nter	the prompts or information text		
General	Fo	rm i	instructions:		
User Prompts					
Configure Prompts					
Map Prompts					
Knowledge Articles	En	teri	prompts or information text		💠 🗙 🎓 🖊
Publish			User Prompts or Information	Response Type	Prompt Type
Summary	4	1	Private Cloud Name	Required	Text
Completion	Þ	2	How much Memory (GB)	Required	Simple List
	Þ	3	How much Storage (GB)	Required	Simple List
	Þ	4	How many VMs	Required	Simple List
	Þ				-
	0	Ye	ou can configure the prompts above on the next wizard	pages.	
			Cancel	< Previous N	ext > Create

5. On the **Configure Prompts** page, we will need to configure the **List** user prompts Select the **How much Memory (GB)** prompt and click the Configure button.

Create Request Offering					
Configure Pr	ompts				
Before You Begin	Configure user prompts				
General	Select a prompt and click Configure below to constrain valid input for the promp	nt.			
User Prompts	select a prompt and check compare below to constrain value impaction are promp				
* Configure Prompts		Configure			
Map Prompts	User Prompts or Information Prompt Output				
Knowledge Articles	1 Private Cloud Name 1: String (string)	<u>^</u>			
Publish	2 How much Memory (GB)				
Summary	3 How much Storage (GB)				
Completion	4 How many VMs				
Completion					
		-			
	▲ 3 prompts require configuration				
	Cancel < Previous N	ext > Create			

6. On the Configure prompt, add the following items, these will represent the predefined units of memory (in GB) that can be configured for a new Private Cloud.

- 8
- 16
- 32
- 64

Click **OK**

- 7. Repeat the previous step for the **How much Storage (GB)** and **How many VMs** prompts populating the lists with the following values:
 - How much Storage (GB)
 - 64
 - 128
 - 256
 - 512

How many VMs

- 4
- 8
- 16
- 32

Click Next

8. On the Map prompts page, we are going to map the user's responses to fields so that we can process them in Service Manager. Jeff plans to use all of the prompts to be passed as parameters to his runbook activity so that Orchestrator knows what we would like to take action on. To do this, we simply select the Runbook Automation Activity we created earlier called Create Private Cloud Now, we can map all of the prompt fields to the parameters of the activity by widening the Property field to see the full entry, and then mapping the matching option in the Prompt Output field. For example, for the Property that is mapped to Runbook parameter StorageGB, select the Prompt Output option How much Storage (GB).

Additionally we need to pass the user name of the person creating the service request to the runbook as a parameter, to do this map the **Token: Portal User Name** to the **Text** property that is **mapped to Runbook parameter Username**.

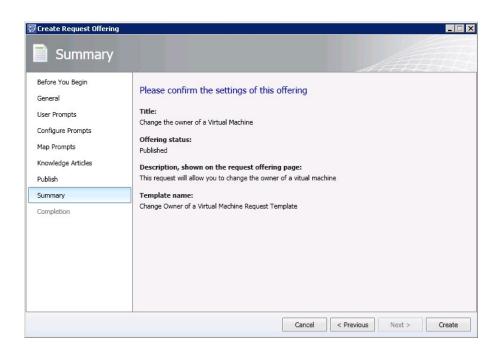
Proceed by selecting **Next**

8	Create Request Offering		_ □ X
Map Prompts			A A A A A A A A A A A A A A A A A A A
Before You Begin General User Prompts Configure Prompts	Map prompts to properties Select an object and map its properties: Automated Service Request – Create Private Cloud Create Private Cloud - (Runbook Automation Activ		· · · · ·
Map Prompts Knowledge Articles			
Publish	Property		Prompt Output
Summary	> Text1 (mapped to Runbook parameter Userna		Token: Portal User Name 🔻 🏛
Completion	Text2 (mapped to Runbook parameter Memor		2. How much Memory (GB) : L 🔻
	Text3 (mapped to Runbook parameter Storag		
	> Text4 (mapped to Runbook parameter Cloud		
	Text5 (mapped to Runbook parameter NoOfV		1. Private Cloud Name : String ✓ 2. How much Memory (GB) : ListValue
	Display common properties Display all pro	oper	
			4. How many VMs : ListValue ✓ Token: Portal User Name
	Cance	2	<pre></pre>

- 9. Click **Next** on the **Knowledge Articles**
- 10. On the **Publish page**, change the **Offering** status to **Published** and change the **Offering** owner to **Jeff**. Select **Next**

efore You Begin eneral	Specify publishing information. Offering them to appear on the portal.	gs must be set to Published in order fo
iser Prompts configure Prompts lap Prompts nowledge Articles	Offering status: Published Published date:	Offering owner: <u>Jeff (Jeff)</u> Published by: Administrator
ublish ummary iompletion	Internal notes:	

11. On the **Summary** page, review your settings and then select **Create**



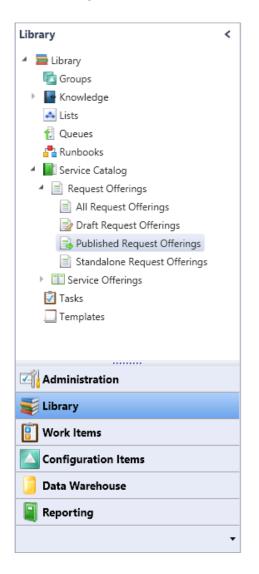
12. Once the **Completion** page is presented we can select **Close**

🗑 Create Request Offering	
Completion	
Before You Begin General User Prompts Configure Prompts Map Prompts Knowledge Articles Publish Summary Completion	A new offering was successfully created.
	Cancel < Previous Next > Close

Add the Request Offering to the Service Offering

Jeff now has to add this **Request Offering** to the **Service Offering** that we created earlier. Then we will be able to see the offering on the **Self-Service** portal.

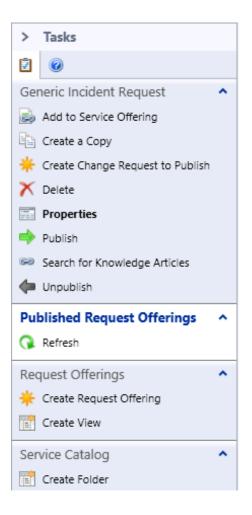
1. In the **System Center 2012 Service Manager** console, with the **Library** workspace selected, expand the navigation tree to select **Service Catalog** > **Request offerings** > **Published Request Offerings**



2. Select the Create Private Cloud offering from the presented list

Published Request Offerings 3	
Filter	🔎 Edit Criteria 🗸
Title	Brief Description
Generic Incident Request	This request allows you to submit the incident
Generic Incident Request (EN)	This request allows you to submit the incident
Create Private Cloud	This request will allow you to create a private cloud

3. The context of the Tasks pane will update, and now we can choose Add to Service Offering



4. Choose Infrastructure Services and select Add. Then select OK

		Select objects	
Select objects			
		bjects and click Add. You can use Search and Filter to better	dafina tha
list.	, select the o	bjects and click Add. You can use Search and Filter to better	benne the
Type to filter		Service Offering	•
Available objects: 1 of 1	1. Enter more	e details in the search criteria to narrow the result list.	
Title	Status	Brief Description	Notes
Infrastructure Services	Published	Here are all the Offerings specific for Infrastructure Services	
		11	
4		II Add Remove	4
✓ Selected objects: Title Status Brief Determinant	escription 1	······································	4
	escription N	Add Remove	4
	escription N	Add Remove	¢
	escription N	Add Remove	Þ

Create Service Catalog Groups

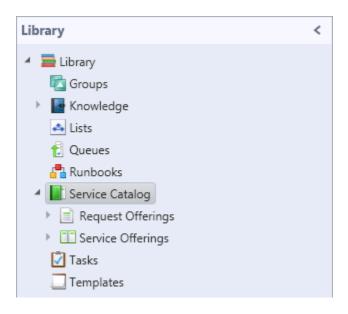
Jeff creates a **Service Catalog Group** that be will used for defining role based access to specific Service Request Offerings from the Self-Service Portal. For example Jeff may wish to only show HR related Service Request Offerings to a specific HR AD group - he does this by created **Service Catalog Group** and selecting only those specific **Service Request Offerings** and create a **User Role** which is assigned to the **Service Group Catalog** and an associated AD group. This section will be broken down into two sections

FYI: User Roles in Service Manager are cumulative.

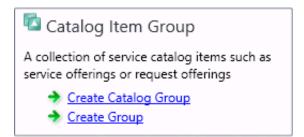
1. From the System Center Service Manager console click Library



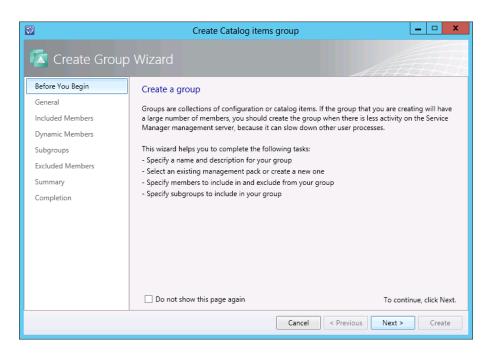
2. Then select Service Catalog



3. And in the right-hand side column, click Create Catalog Group



4. From the **Create Group Wizard** click **Next**



- 5. Next Jeff creates a Catalog Group called **Contoso Service Catalog Group** and adds all Service Offerings & Request Offerings to this group
 - Group name Contoso Service Catalog Group
 - Group description Provides access to the following Service Offerings: Create Private Cloud
 - Management pack Contoso Service & Request Offerings

1	Create Catalog items group
🚺 General	
Before You Begin	Group name:
General	Contoso Service Catalog Group
Included Members Dynamic Members	Group description:
Subgroups	Provides access to the following Service Offerings : Create Private Cloud
Excluded Members	
Summary	
Completion	
	Select an existing management pack where this group will be stored. Management pack
	Contoso Service Requests Management Pack Last modified: 1/25/2013 4:20:21 PM
	Cancel < Previous Next > Create

6. From the **Included Members** screen click on **Add...**

3	Cre	eate Catalog items group		– – ×
🖾 Included Mer	mbers			ALL I
Before You Begin	Included Memb	ers		
General	Choose the items th	nat will be included as members o	of this group.	
Included Members	Name	Path		Add
Dynamic Members	Name	Faul		Remove
Subgroups				
Excluded Members				
Summary				
Completion				
		Cance	el < Previous Ne	ext > Create

7. Select Create Private Cloud and Infrastructure Services, click OK

8	Select obje	cts	_ D X			
Select objects						
, ,						
To add objects to the list, select the obj list.	ects and click Add. Y	ou can use Search and Filter to I	better define the			
Type to filter	🔎 Cat	alog Item	•			
Available objects: 25 of 27. Enter more	e details in the search	n criteria to narrow the result list	t.			
Name	Class	Path				
📄 Allmän incidentbegäran	Request Offering	ServiceManager.ServiceCatalo	g.GenericInci			
Általános eseménykérés	Request Offering	ServiceManager.ServiceCatalo	og.GenericInci			
Anmodning om generisk hændels	e Request Offering	ServiceManager.ServiceCatalo	g.GenericInci			
Demande générique d'incident	Request Offering	ServiceManager.ServiceCatalo	og.GenericInci			
📄 Genel Olay İsteği	Request Offering	2	2			
Generic Incident Request	Request Offering	ServiceManager.ServiceCatalo	2 1			
Generic Incident Request (EN)	Request Offering	ServiceManager.ServiceCatalo	2			
Generieke incidentaanvraag	Request Offering	ServiceManager.ServiceCatalo	g.GenericInci 🚽			
			r			
	Add	emove				
Selected objects:						
Name Class	Path					
Create Private Cloud Request Offe	ring Offeringb5e	c04751d654b87ace2e9f38051f3	3			
Infrastructure Services Service Offer	Infrastructure Services Service Offering Offering3b19dd91aa6f43e3885a63f10b8f441a					
		OK	Cancel			

8. Confirm Create Private Cloud and Infrastructure Services are shown then click Next

1	Create Catalog i	tems group	- 🗆 X
🖾 Included M	embers		<i>illh</i>
Before You Begin General	Included Members Choose the items that will be include	ad as members of this group	
Included Members Dynamic Members Subgroups Excluded Members Summary Completion	Name Pa Infrastructure Services Of		Add Remove
	4	I Cancel < Previous Next >	Create

9. For Dynamic Members leave all as default and select Next

8	Create Catalog items group
🖾 Dynamic Mer	mbers
Before You Begin General	Dynamic Members Specify the class and add criteria to build your query.
Included Members Dynamic Members	Related classes:
Subgroups Excluded Members Summary Completion	<search></search>
	Criteria:
	Cancel < Previous Next > Create

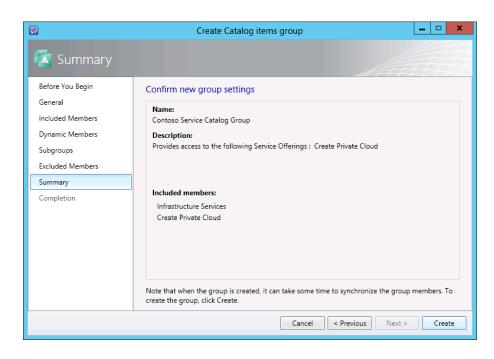
10. For **Subgroups** leave all as default and select **Next**

8	Cre	ate Catalog items group		_ 🗆 X
🖾 Subgroups				
Before You Begin General Included Members Dynamic Members		that you want to include in this f the wizard, you must add at le	group. If you have not entered a ast one group in this page.	any members in
Subgroups Excluded Members Summary Completion	Name	Path		Add Remove
	1	Canc	el < Previous Next >	Create

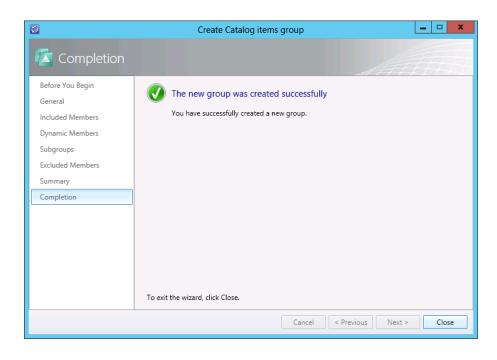
11. For **Excluded Members** leave all as default and select **Next**

8	Create Catalog items group	– – X
🔽 Excluded Mer	mbers	<i>anh</i>
Before You Begin	Excluded Members (Optional)	
General	Choose the items that will be excluded from this group.	
Included Members Dynamic Members	Name Path	Add Remove
Subgroups		Kemove
Excluded Members		
Summary		
Completion		
	Cancel < Previous New	create

12. On the **Summary** Screen click **Create**



13. Click **Close** after the group is created

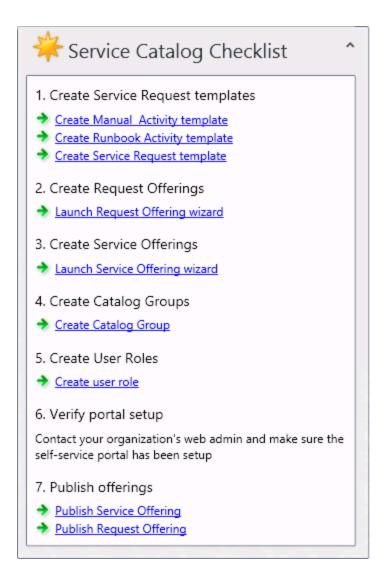


Create User Role

In System Center 2012 – Service Manager SP1, the security rights that allow users to access or update information are defined in a user role profile. A user role profile is a named collection of access rights, and it usually corresponds to an employee's business responsibilities. Each user role profile controls access to such artifacts as knowledge articles, work items (incidents, change requests), authoring, administration, and other credentials. Think of user role profiles as defining what you are allowed to do.

Jeff will now grant Emily access to the relevant parts of Self-Service Portal so she can submit a new service request.

1. On the System Center Service Manager console, click Library then click Create User Role



2. On the **Before You Begin** screen click on **Next**

1	Create User Role
寝 Before You Be	gin
Before You Begin	Create a new user role
General	
Management Packs	This wizard creates a new user role according to the selected user role profile. Service Manager user roles provide credentials for console tasks.
Classes	Use this wizard to perform the following tasks:
Queues	- Add users to the user role
Configuration item Groups	- Select the permissions that you want them to have
Catalog item Groups	The user role profile defines the objects that are available for users in this role to act upon.
Tasks	
Views	
Form Templates	
Users	
Summary	
Completion	
	Do not show this page again To continue, click Next.
	Cancel < Previous Next > Create

3. Input the name Contoso Service Catalog Users, click Next

5	Create User Role
🚪 General	
Before You Begin	Enter a name and description for the user role
General	Author
Management Packs	Authors can create or edit any work items that are in their queue scope and any configuration items
Classes	that are in their group scope. They may also create, edit, and delete announcements that are displayed on the Service Manager Self-Service portal. Authors can also make limited customizations
Queues	that are stored in management packs. Such customizations can include creating, editing, and
Configuration item Groups	deleting list items, tasks, templates, views, and view folders.
Catalog item Groups	Name:
Tasks	Contoso Service Catalog Users
Views	Description (optional):
Form Templates	
Users	
Summary	
Completion	
	Cancel < Previous Next > Create

4. In the Management Packs screen check the Select All box and click Next

3	Create User Role
糏 Management	: Packs
Before You Begin	Define the objects to show in the wizard
General	The selection of management packs on this page is used only as a filter for the subsequent wizard
Management Packs	pages and is not saved as part of the user role definition.
Classes	Management Packs 🗖
Queues	Activity Management Report Library
Configuration item Groups	Change Management Report Library
Catalog item Groups	Configuration Management Report Library
Tasks	Configuration Manager Report Library Contoso Service Reguests Management Pack
Views	Contoso service requests management Pack V Data Warehouse Library
Form Templates	✓ Default Management Pack
Users	Distributed Application Designer Library
Summary	V Health Library
· · · · ·	 ✓ Help for Activity Management ✓ Help for Change Management
Completion	· · · · · · · · · · · · · · · · · · ·
	☑ Select All
	Cancel < Previous Next > Create

5. Leave the **Classes** as default and click **Next**

8	Create User F	Role	- 🗆 X
🔭 Classes			AND
Before You Begin General Management Packs	Select the classes to which the u For management pack authoring only. V target only the selected classes. Select th	when an author creates views, tasks,	
Classes	user role.		
Queues	 All classes can be accessed Provide access to only the selected c 	asses	
Configuration item Groups	Name	Management Packs	
Catalog item Groups	Object	System Library	
Tasks	Collection	System Library	=
Views	Logical Entity	System Library	
Form Templates	ManagementPack subelement b Mobile device	System Library System Library	
Users	Network Adapter	System Library	
Summary	Operating system (mobile)	System Library	
Completion	Perspective	System Library	+
	Select All		
		Cancel < Previous	Next > Create

6. Tick **All** for the **Queues** followed by **Next**

9	Create User R	ole	- 🗆 X
🚛 Queues			and the
Before You Begin General Management Packs Classes	Select the queues to which the u Selecting queues limits access to work it users in this user role. Work items in que role.	ems. Select the queues that you wa	
Queues	Provide access to only the selected quarter of the	ueues	
Configuration item Groups Catalog item Groups	Name Work Item Group	Management Packs System Work Item Library	
Tasks		-,,	
Views			
Form Templates			
Users			
Summary			
Completion			
	Select All		
		Cancel < Previous	Next > Create

7. Tick All for the Configuration item Groups followed by Next

Create User Role					
Configuration item Groups					
Before You Begin General Management Packs Classes Queues	Select the configuration item of Selecting groups limits access to confi to the users in this user role. Configur- users in this role. All configuration items can be accessed Provide access to only the selected 	iguration items. Select the groups that ation items in groups that are not sele essed	you want to be available		
Configuration item Groups	Name	Management Packs			
Catalog item Groups	Global users instance group	Service Manager Console Man			
Tasks	Global Operators Group	Service Catalog Generic Incide			
Views	All Groups	Instance Group Library			
Form Templates					
Users					
Summary					
Completion					
	Select All				
	·	Cancel < Previous	Next > Create		

8. On the Catalog item Groups check, Provide access to only the selected group: Contoso Service Catalog Group and click Next

8	Create User I	Role 📃 🗖 🗙
糏 Catalog item	Groups	
Before You Begin General Management Packs Classes Queues Configuration item Groups Catalog item Groups Tasks Views Form Templates		o Catalog Items. Select the catalog groups that you want to be atalog items in groups that are not selected will not be visible
Users Summary Completion	Select All	Cancel < Previous Next > Create

9. Tick **All** for the **Tasks** followed by **Next**

Before You Begin General Management Packs Classes		n this role.	CESS le to this user role. Tasks that are not	selecte
Queues	 Provide access to only the Name 	ne selected tasks Description	Management Packs	
Configuration item Groups Catalog item Groups	Add Request Offerir	Add request offering	Service Manager Service Catal	-
Tasks	Create Managemen Properties	2	Service Manager Data Wareho Service Manager Change Man	
Views	Delete	Delete Price Sheet	Service Manager Chargeback P	
Form Templates Users	Delete	Delete Link to existing Parent R Start or Resume release	Service Manager Runbook Libr Service Manager Release Man Service Manager Release Man	
Summary	Create a Copy	Creates a copy of the re	Service Manager Service Catal	
Completion	Restart Deployment	Restart Deployment	Service Manager Data Wareho	

10. Tick **All** for the **Views** followed by **Next**

Before You Begin	Select the views to which the us		
	select the views to which the us	er role has access	
General Management Packs	Select the views that you want to be ava visible to users in this role.	ilable to this user role. Views that a	re not selected will not b
Classes	 All views can be accessed 		
Queues	Provide access to only the selected v	iews	
Configuration item Groups	Name	Management Packs	
Catalog item Groups	Performance	System Center Internal Library	
5	Medium severity alerts in the las	System Center Internal Library	
Tasks	All distributed applications in a s	System Center Internal Library	
Views	 Object Discoveries 	System Center Internal Library	
Form Templates	Diagram View	System Center Internal Library	
Users	All alerts in the last 24 hours	System Center Internal Library	
05015	 High severity computer alerts in 	System Center Internal Library	
Summary	Events	System Center Internal Library	
Completion	High severity service alerts in the	System Center Internal Library	

11. Tick **All** for the **Form Templates** followed by **Next**

Before You Begin	Select the forms to which the us	er role has access	
General			rms that are not colocted
Management Packs	Select the form templates that you want to be available for this user role. Forms that are not selected will not be visible to users in this role.		
Classes	 All forms can be accessed 		
Queues	Provide access to only the selected feed of the	orms	
Configuration item Groups	Name	Management Packs	
Catalog item Groups	Assigned To User Notification Te	Service Manager Incident Man	4
Tasks	Standard Change Request	Service Manager Change Man	=
	Default Sequential Activity	Service Manager Activity Mana	
Views	Incident portal template	Microsoft System Center Servi	
Form Templates	Linking Framework Active Direct	Service Manager Active Direct	
Users	Linking Framework Configuratio	System Center Configuration	
	End User Notification Template	Service Manager Incident Man	
Summary	Networking Issue Incident Temp	Service Manager Incident Man	
Completion	Assigned To User Notification Te	Service Manager Change Man	

12. For **Users** click **Add**

8	Create User Role	• 🗆 X
🎦 Users		
Before You Begin	Selected users:	
General	Member name *	Add
Management Packs		Remove
Classes		
Queues		
Configuration item Groups		
Catalog item Groups		
Tasks		
Views		
Form Templates		
Users		
Summary		
Completion		
	Cancel < Previous Next >	Create

13. Type **contoso\domain users** followed by **OK**

Select Users or Groups	? X
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
contoso.com	Locations
Enter the object names to select (<u>examples</u>):	
CONTOSO\Domain Users	Check Names
Advanced OK	Cancel

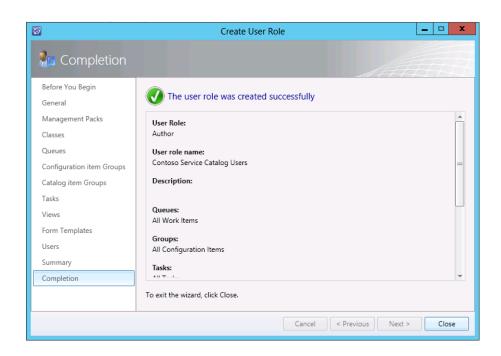
14. Confirm **CONTOSO\Domain Users** is displayed then click **Next**

1	Create User Role	- 🗆 X
🚪 Users		
Before You Begin	Selected users:	
General	Member name	Add
Management Packs	🍇 CONTOSO\Domain Users	Remove
Classes		
Queues		
Configuration item Groups		
Catalog item Groups		
Tasks		
Views		
Form Templates		
Users		
Summary		
Completion		
	Cancel < Previous Next >	Create

15. On the **Summary** screen click on **Create**

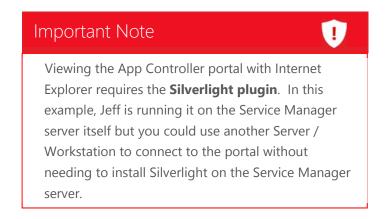
8	Create User Role
📲 Summary	
Before You Begin General	Review the user role selections
Management Packs	User Role:
Classes	User role name:
Queues Configuration item Groups	Contoso Service Catalog Users =
Catalog item Groups	
Tasks	Queues: All Work Items
Views Form Templates	Groups:
Users	All Configuration Items
Summary	Tasks: All Tasks
Completion	To change the settings, click Previous. To create the user role, click Create.
	Cancel < Previous Next > Create

16. Once this has been completed click on **Close**



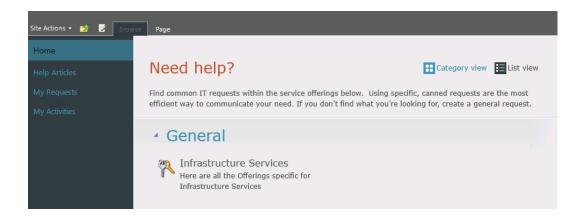
Running through the Service Request

Prior to Jeff releasing this new Service Offering to Emily, he first plans to verify the experience which will be presented to the users and that the interactions with Orchestrator and Virtual Machine Manager do indeed work as planned. For his test scenario, Jeff will create a test Private Cloud.

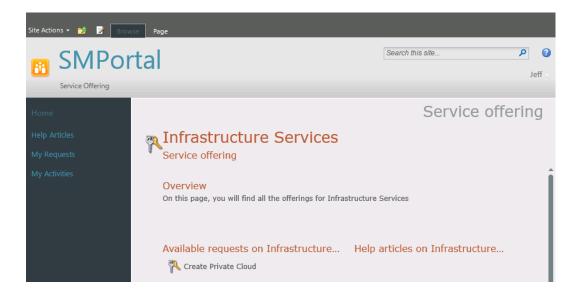


Jeff decides to test this with his own account. He logs onto the Service Manager server as himself (contoso\jeff).

 Opens the Service Manager portal by browsing to <u>http://Sharepoint:82/SMPortal</u> After a few moments the portal will be presented, select **Infrastructure Services** from the category **General**



2. As Jeff only has a single Request offering created and published, this will be presented on the **Infrastructure Services** page. Here Jeff will select this offering **Create Private Cloud**



3. On the Request offering page, select Go to request form

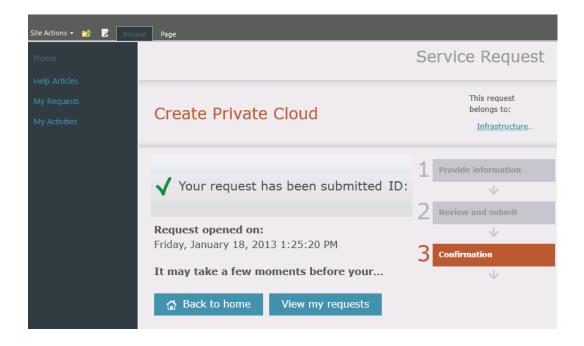
Site Actions + 彭 📝 Browse Page						
Request Offering	tal		Search this site	ک Jeff		
Home Help Articles My Requests My Activities	Create Private C This request will allow you to create		Service Re Go to	equest →		
	Related help articles:	Related service of Infrastructure Services Here are all the Offering	2			

Our four user prompts which we created on the request form are now presented, and we can proceed to fill these out as follows. In the Private Cloud Name text box enter MyCloud, from the How much Memory (GB) list select 16, from the How much Storage (GB) list select 128, and from the How many VMs list select 8. Then we can select Next

Site Actions 👻 📝 Brow	Page		
Home		Service Request	
Help Articles			
My Requests		This request	
My Activities	Create Private Cloud	belongs to: Infrastructure	
		<u>innastructure</u>	
		Provide information	
		÷	
	Private Cloud Name	↓	
	MyCloud	2 Review and submit	
		\checkmark	
	How much Memory (GB)	3 Confirmation	
	16 💌	\checkmark	
	How much Storage (GB)		
	128 💌		
	How many VMs		
	8 🔻		
	← Back Next → Cancel ×		

- Site Actions 👻 📝 🛛 Browse Page Service Request This request belongs to: **Create Private Cloud** Infrastructure.. 1 **Provide information** Review your information. When satisfied, submit your request, or... \mathbf{v} Private Cloud Name MyCloud **Review and submit** \checkmark How much Memory (GB) 16 Confirmation \mathbf{v} How much Storage (GB) 128 How many VMs 8 ← Back Submit → Cancel ×
- 5. On the **Review and Submit** page, we can double check our information prior to selecting **Submit**

6. The **Confirmation** page will then be presented where we now have the option to select **View my requests**



7. After Selecting the **View My Requests** button, we can observe that our request is currently in progress.

Site Actions 👻 📝 🛛 Brows	Page	
	tal	Search this site 🔎 😮
Home Help Articles	Requests Type Service Requests	My Requests
My Requests Service Requests My Activities Automated Service SR54 In Progress	ID: SR54 Last updated: 1/18/2013 1:26:26 PM Status: In Progress Description Through the Self-Service Portal, users will be able to request a new Private Cloud Environment. Request activities 1. RB55 : Create Private Cloud In Progress Request action log	
		New activity was added 1/18/2013 1:26:24 PM There was a status change for Service Request 1/18/2013 1:26:12 PM User Input Browse Update request

 Switching back to the Service Manager Console, Jeff can see the newly created service request by ensuring the Work Item workspace selected, and expanding the navigation tree to select Service Request Fulfillment > All Open Service Requests

Work Items <
 Work Items
E Activity Management
🕨 ಶ Change Management
Incident Management
Problem Management
🕨 🔽 Release Management
🔺 🔗 Service Request Fulfillment
All Open Service Requests
🗟 Assigned To Me
🕰 Cancelled Service Requests
🚱 Closed Service Requests
🊱 Completed Service Requests
🍫 Failed Service Requests
🍫 Service Requests with Service Level Breached
🧭 Service Requests with Service Level Warning
Administration
Work Items
Configuration Items
ј Data Warehouse
📔 Reporting
•

9. In the **All Open Service Requests**, the ticket created is now presented, matching the ID which was reported on the **My Requests** page in the portal. We can now double-click this request to **open** it

All Open Service Requests 1								
Filter	Filter P							
ID	Title	Owner	Status	Priority				
SR54	Automated Service Request – Create Private Cloud		In Progress	Low				

10. On the **general** page we can see that all the fields which we defined in the template are now completed as we provided

SR93 : Automated Service Request – Create Private Cloud	_ 🗆 X
SR93 Activity stage: Create Private Cloud Created On: 1/28/2013 2:01:23 PM	> Tasks
In Progress Request Offering: Create Private Cloud Created by: Jeff	
General Activities Results Related Items Service Level History	SR93 - Automated Service 🔺
Service Request Information	Assign To Me
	🔍 Cancel
Affected User Alternate contact method	🐼 Close
Jeff (jeff)	Complete
Title Alternate contact method =	🔆 Create Change Request
Ittle Automated Service Request – Create Private Cloud	✤ Create Incident
	🔆 Create Release Record
Description	🖶 Print
Through the Self-Service Portal, users will be able to request a new Private Cloud Environment.	Put On Hold
	Resume
	Search for Knowledge Articles
	Set First Response or Comment
Urgency Priority Source	General ^
Medium	2 Refresh
Area Support Group Assigned to	
Hardware\Server 🔹 🔍 🤍	
OK Cancel Apply	

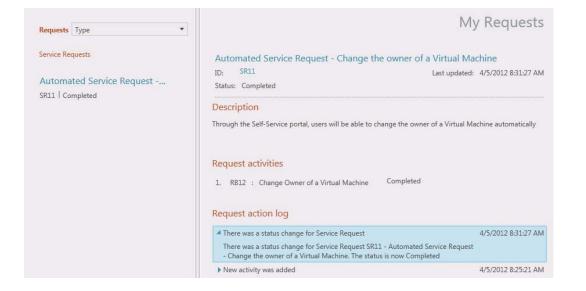
11. When **Jeff** selects the **Activities** tab we can see that the Runbook activity is already in progress.

SR93 : Automated Service Request – Create Private Cloud	_ 🗆 X
SR93 Activity stage: Create Private Cloud Created On: 1/28/2013 2:01:23 PM	> Tasks
In Progress Request Offering: Create Private Cloud Created by: Jeff	
General Activities Results Related Items Service Level History	SR93 - Automated Servi Assign To Analyst
Activities	Assign To Me
Activities Zoom Views	Cancel
START	Close
	Complete
	* Create Incident
Z RB94: Create Privat	🔆 Create Release Record
	🖶 Print
	Put On Hold
	Resume
	Search for Knowledge Articles Set First Response or Comment
	-
	General Refresh
	Nellesii
END	
▲ Details	
Select an activity to view its details	
OK Cancel Apply	

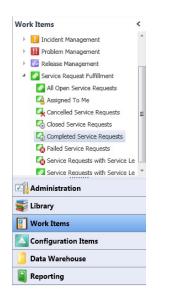
12. Switching over to the **Virtual Machine Manager console**, Jeff can see a new cloud called **MyCloud** has been created, exploring the properties of the new cloud will show the allocated resources requested.

8		I	MyCloud Pro	perties	
General	^	Set the capacity fo	r this cloud		
Resources		Cloud capacity:			
Logical Networks		Dimension	Total Capacity	Use Maximum	Assigned Capacity
Logical Networks		Virtual CPUs:	Unlimited	\checkmark	Unlimited
Load Balancers		Memory (GB):	16		8 🌩
		Storage (GB):	1219		128 🌩
VIP Templates		Custom quota (points):	Unlimited	\checkmark	Unlimited
Port Classifications		Virtual machines:	Unlimited		8 🜩
Library Capacity					
Capability Profiles					
PRO Configuration					
PRO State					
Custom Properties	-				

13. Switching back again to the Self-Service Portal, Jeff refreshes the request to see that its status is now also updated, and marked as complete.



14. In the Service Manager console, ensuring the **Work Item** workspace is selected, and expanding the navigation tree to this time select **Service Request Fulfilment** > **Completed Service Requests**



15. Jeff can now see his **Service Request** is indeed presented and its status updated to read **Completed**.

Completed Service Requests 1					
Filter P					
ID	Title	Owner	Status		
SR11	Automated Service Re	equest - Chang	Completed		

Using the Service Request in Production

Now that Jeff has verified that the automated service request process for creating a private cloud is working as expected he notifies Emily so that she can now create a new development environment using the Self Service Portal.

Before **Emily** can access the Self-Service Portal **Jeff** will need to add the **Create Private Cloud** request offering, and the **Infrastructure Services** service offering to the **Generic Incident Request Catalog Items Group**.

1. On the Service manager console on **ServiceMgr**, **Choose Library** and click on **Groups**, select **Generic Incident Request Catalog Items Group**, then in the **Tasks** pane, click on **Properties**

File Language View Go Tools Tasks Help		
🗲 🔶 👻 🔽 🔪 🕨 Library 🕨 Library 🕨 Groups		
Library <	Groups 2	
 Library Groups Knowledge Lists Queues Runbooks Service Catalog Tasks Templates 	Filter Name Generic Incident Request Catalog Items Group Global Operators Group	Sealed No No
Administration		
🐳 Library		
Configuration Items		
길 Data Warehouse		
📔 Reporting		

2. Click Included Members, followed by Add

8	Generic Incident Request Ca	atalog Items Group Propert	ies	_ □	x
General					-
Included Members	Included Members				
Dynamic Members	Choose the items that will be inc	cluded as members of this group.			_
Subgroups	Name 👚	Path		Add	
Excluded Members	Allmän incidentbegäran Általános eseménykérés	ServiceManager.ServiceCata ServiceManager.ServiceCata		Remove	=
	Anmodning om generisk h	ServiceManager.ServiceCata			
	Demande générique d'incid Genel Olay İsteği	ServiceManager.ServiceCata ServiceManager.ServiceCata			
	Generic Incident Request	ServiceManager.ServiceCata			
	Generic Incident Request (EN) Generieke incidentaanvraag	ServiceManager.ServiceCata ServiceManager.ServiceCata			
	Generische Vorfallsanforder	ServiceManager.ServiceCata			
	Generisk hendelsesforespør	ServiceManager.ServiceCata			
	Obecná žádost týkající se in	ServiceManager.ServiceCata			
	Pedido de Incidente Genérico	ServiceManager.ServiceCata			
	Richiesta generica eventi im	ServiceManager.ServiceCata			
	Rodzajowe żądanie zdarzenia	ServiceManager.ServiceCata			
	Solicitação de incidente Ge	ServiceManager.ServiceCata			
	Solicitud de incidente genér	ServiceManager.ServiceCata			
	Yleisen tapauksen pyyntö	ServiceManager.ServiceCata			
			OK	Cance	el i

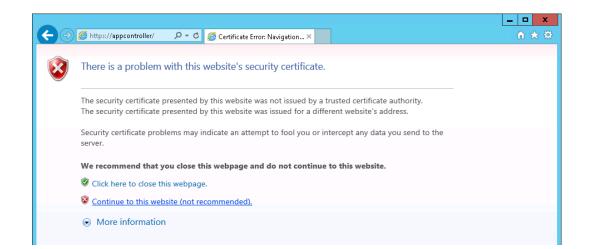
3. Add Create Private Cloud, and Infrastructure Services, then click OK, followed by OK on the Generic Incident Request Catalog Items Group properties screen.

	Select o	bjects	- ×
Select objects			
To add objects to the list, sele list.	ect the objects and click Ac	dd. You can use Search and Filter to better def	fine the
Type to filter	٩	Catalog Item	•
Available objects: 2 of 26. Er	nter more details in the sea	arch criteria to narrow the result list.	
Name	Class	Path	
Create Private Cloud	Request Offering	Offeringb5ec04751d654b87ace2e9f38051	f3da
Infrastructure Services	Service Offering	Offering3b19dd91aa6f43e3885a63f10b8f4	441a
	Add	Remove	
Selected objects:	Add	Remove	
Selected objects:	Add	Remove	
		Path	iden 📥
Name	Class	Path ServiceManager.ServiceCatalog.GenericInci	
Name Allmän incidentbegäran	Class Request Offering Request Offering	Path ServiceManager.ServiceCatalog.GenericInci ServiceManager.ServiceCatalog.GenericInci	iden [.]
Name Allmän incidentbegäran Általános eseménykérés	Class Request Offering Request Offering endelse Request Offering	Path ServiceManager.ServiceCatalog.GenericInci ServiceManager.ServiceCatalog.GenericInci ServiceManager.ServiceCatalog.GenericInci	iden [:] iden [:]

Testing the Self-Service Portal with a user

Jeff is now ready for Emily to connect to the Self-Service Portal and create her own private cloud.

1. Open the App Controller portal by browsing to <u>https://appcontroller</u>. When prompted with the certificate warning, click **Continue to this website** and add the site to the trusted site list.



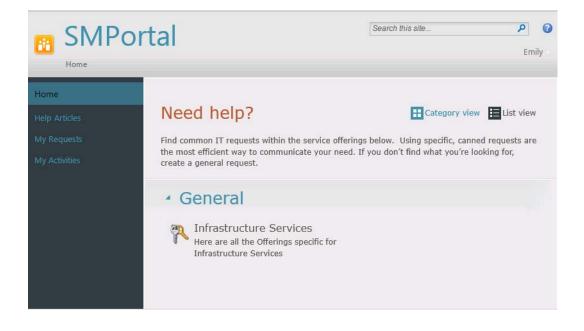
2. At the login screen enter the user name **contoso\emily** and relevant password and click **Sign In**

System Center 2012	App Controlle
Enter your credentials to sign in	
User name:	
Contoso\Emily	
Password:	
••••••	
	Sign In
Service Pack 1	
© 2012 Microsoft. All rights reserved.	

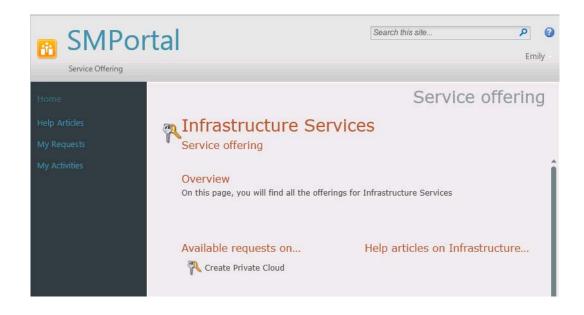
3. Click **Clouds** from the navigation pane, Emily will see that there are no Clouds available for her.

System Cente	er 2012				Hi, Emily Sign	ontroller out Help
Overview	< Clouds (0)			Enter keyword	Q
Clouds Services				== G	Last refresh:	4:40:53 PM
 Virtual Machines Library Jobs 	Name		Connection Name	Description	Subscription ID	Virtua

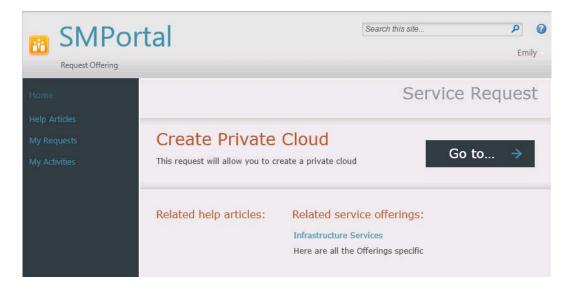
4. Open <u>http://Sharepoint:82/SMPortal</u> and login as Emily. After a few moments the portal will be presented, and Emily can select **Infrastructure Services** from the category **General**



5. Select the Create Private Cloud offering



6. On the Request offering page, Create Private Cloud select to Go to request form



 Our four user prompts which we created on the request form are now presented, and we can proceed to fill these out as follows. In the Private Cloud Name text box enter BusinessApp2, from the How much Memory (GB) list select 32, from the How much Storage (GB) list select 256, and from the How many VMs list select 16. Then we can select Next

	Service Request
Create Private Cloud	This request belongs to: Infrastructure Services
Privata Cloud Name BusinessApp2	1 Provide information 4 2 Review and salumit
How much Memory (GB) 32	• 3 Continuation
How much Storage (GB) 256	
How many VMs 16	8
	← Back Next → Cancel ×

8. On the **Review and Submit** page, we can double check our information prior to selecting **Submit**

			S	ervice Request
Create Private Cloud				quest belongs to: rructure Services
Review your information. When satisfied, submit your request, or go back to make changes.			1	Provide information
Private Cloud Name BusinessApp2			2	Review and submit
How much Memory (GB) 32			-	↓
How much Storage (GB) 256			3	Confirmation
4.50 How many VMs				
16				
	🗲 Back	Submit >	Cancel 🗙	

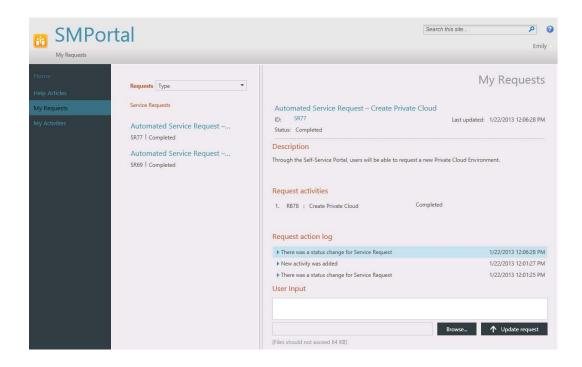
9. The **Confirmation** page will then be presented where we now have the option to select **View my** requests

	Service Reques
Create Private Cloud	This request belongs to: Infrastructure Services
✓ Your request has been submitted ID: <u>SR77</u>	1 Provide information ↓ 2 Review and submit
Request opened on: Tuesday, January 22, 2013 12:01:03 PM It may take a few moments before your request is available for viewing.	3 confirmation

10. Selecting the **View My Requests** button, we can observe that our request is currently in progress.

SMPortal My Requests		Search this site
Home Help Articles My Requests My Activities Service Requests Automated Service SR77 In Progress Automated Service SR69 Completed	Description	Last updated: 1/22/2013 12:01:27 PM
	New activity was added There was a status change for Service Request User Input (Files should not exceed 64 KB)	1/22/2013 12:01:25 PM 1/22/2013 12:01:25 PM Browse

11. After a few minutes Emily refreshes the request to see that its status is now also updated, and marked as complete.



12. Emily returns to the App Controller portal and clicks the **Refresh** button from the toolbar in the Clouds pane. Emily sees the **BusinessApp2** cloud, and clicking the **Show items as cards** from the toolbar displays the available resources for the private cloud.

() Overview	Clouds (1)						Enter keyword	
Clouds Services	Deploy Manage Run As	accounts			88	II Q	👔 😡 Last re	efresh: 12:11:06
Virtual Machines	Name	Connection Name	Description	Subscription ID	Virtual Machines	CPU	Memory	Storage
🔤 Library								
🚺 Jobs	BusinessApp2	VMM			0/16	0 / Unlimi	ted 0 MB / 32768 M	MB 0 GB / 256 0

Scenario: Provision storage to increase cloud capacity

Jeff decides that he would like to implement a flexible and vendor neutral storage solution that he can use for future provisioning of private clouds. Using the SMI-S provider that is included Virtual Machine Manager, Jeff is able to connect to an iSCSI target and provision his storage as and when the need arises.

Install SMI-S target Server on HyperV02

Prerequisites

• Install the update described in Microsoft KB article 27558246:

http://www.microsoft.com/en-us/download/details.aspx?id=34851 This update contains WMI-related changes to iSCSI Target Server that improve VMM discovery performance.

• Install the SMI-S provider, using the iSCSI Target SMI-S Provider Setup wizard.

The SMI-S provider is included with the System Center 2012 Virtual Machine Manager SP1 installation. You can find the setup file on the installation CD under the path:**\amd64\Setup\msi\iSCSITargetSMISProvider.msi**, or alternatively on the VMM server under **\Program Files\Microsoft System Center 2012\Virtual Machine Manager\setup\msi\iSCSITargetProv\iSCSITargetSMISProvider.msi**. Complete the wizard to install the SMI-S provider on the iSCSI Target Server computer.

1. Load the PowerShell console on HyperV02 and run the following command:

Add-WindowsFeature FS-IscsiTarget-Server

This will install the **iSCSI Target feature** to HyperV02. A reboot will not be required.

1

PS C:\Us	sers\Administra	tor> Add-Window	sFeature	fs-iscsitarget-server
Success	Restart Needed	Exit Code	Feature	Result
True	No	NoChangeNeeded	0	
PS C:\Us	sers\Administra	tor> _		

Add a storage provider on HyperV02

Jeff has just configured HyperV02 as an iSCSI target, he will use this target as the storage destination for his private cloud solution. Once the iSCSI target has been configured, Virtual Machine Manager can be connected to this target via SMI-S. In this scenario the iSCSI target is HyperV02, alternatively this could be any other SMI-S compatible storage solution.

1. From the server VMM, open the VMM Management Console as an administrator, and then run **PowerShell** from the console.

Home				
Create Create Create File Create Classification Logical Unit		Allocate Overview	Fabric Resources	PowerShell
Create	Add (Capacity	Show	Window

2. Type the following command into the console:

\$cred = Get-Credential
contoso\administrator

*Note that any account that is part of the Local Administrators group is sufficient.

		Windows PowerShe	ll - Virtual I	Machine Manager				
	PS C:\Users\administrator.CONTOSO> \$cred = Get-Credential cmdlet Get-Credential at command pipeline position 1							
Supply values for Credential	the following	y parameters:						
	Windows Power	Shell Credential Re	? X					
		G	P					
	Enter your credentia	als.						
	<u>U</u> ser name:	🕵 contoso\administrator	×					
	Password:	•••••						
		OK	Cancel					

3. Create a RunAs account in VMM as follows:

\$runas = New-SCRunAsAccount -Name "iSCSIRunas" -Credential \$cred

\$runas = New-SCRunAsAccount -Name "iSCSIRunas" -Credential \$cred

4. Add the storage provider as follows:

Add-SCStorageProvider -Name "Microsoft iSCSI Target Provider" -RunAsAccount \$Runas -ComputerName "HyperV02" -AddSmisWmiProvider

Add-SCStorageProvider -Name "Microsoft iSCSI Target Provider" -RunAsAccount \$Runas -ComputerName "HyperV02" -AddSmisWmiProvider

View storage properties

1. Review the storage array attributes as follows:

```
$array = Get-SCStorageArray -Name "HyperV02"
$array.StoragePools
```

This final command will display the list of iSCSI Targets configured on HyperV02. Jeff notices that the results correlate with the logical drives on HyperV02, he takes note of an iSCSI target name that maps to a logical drive with at least 50GB of space free. In this example Jeff will use the iSCSI target: "iSCSITarget: HyperV02: D:"

PS C:\Users\administrator.CONTOSO> \$array = Get-SCStorageArray -Name "HyperV02" PS C:\Users\administrator.CONTOSO> \$array.StoragePools

Add pools from iSCSI Target Server for VMM Management

1. Jeff will populate the following PowerShell command with the iSCSI Target that he determined in the previous step:

\$pool = Get-SCStoragePool -Name "iSCSITarget: HyperV02: D:"

\$pool = Get-SCStoragePool -Name "iSCSITarget: HyperV02: D:

2. Jeff then creates a new storage classification called "Gold":

```
$class = New-SCStorageClassification -Name "Gold"
```

\$class = New-SCStorageClassification -Name "Gold"

3. He then adds the Storage Pool to VMM:

```
Set-SCStorageArray -AddStoragePoolToManagement $pool -StorageArray
$pool.StorageArray -StorageClassification $class
```

Set-SCStorageArray -AddStoragePoolToManagement \$pool -StorageArray \$pool.StorageArray -StorageClassification \$class

4. Finally he allocates the newly created storage pool to the "All Hosts" host group

```
Set-SCStoragePool -StoragePool $pool -AddVMHostGroup (Get-
SCVMHostGroup -Name "All Hosts")
```

Set-SCStoragePool -StoragePool \$pool -AddVMHostGroup (Get-SCVMHostGroup -Name "All Hosts")

Install Multipath-IO on HyperV03 and HyperV04

Before Jeff can connect to the iSCSI target on **HyperV02** he will need to install the **Multipath-IO** feature on **HyperV03** and **HyperV04**:

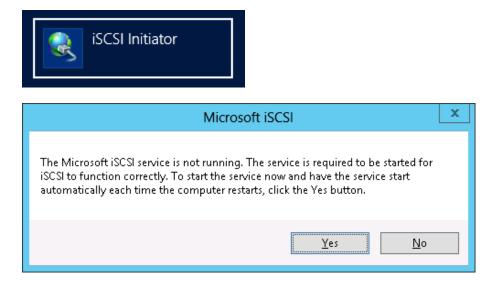
1. From HyperV03, he opens PowerShell with elevated privileges and runs the command:

	Add-Windo	owsFeature	e multipath-io	
		Kon CONTOPOL (1dd-WindowsFeature multipath-io	
	Restart Needed		Feature Result	
True WARNING is autor	No : Windows automa natically update	Success atic updating ed, turn on Wi	(Multipath 1/0) is not enabled. To ensure that your newly-installed role or feature indows Update.	

2. Jeff repeats the above step on HyperV04

```
PS C:\Users\administrator.CONTOSO> Add-WindowsFeature multipath-io
Success Restart Needed Exit Code Feature Result
_______
True No Success (Multipath I/O)
WARNING: Windows automatic updating is not enabled. To ensure that your newly-installed role or feature
is automatically updated, turn on Windows Update.
```

3. Jeff also needs to run the **iSCSI initiator** on both **HyperV03** and **HyperV04** for discovery of the iSCSI target. Jeff is prompted that the service is currently not running by default and click **Yes** to start the required service.



Create a LUN

Jeff now needs to create a LUN which will be presented via the iSCSI Target.

1. Run the following command from Powershell on the server **VMM**:

```
$LUN = New-SCStorageLogicalUnit -Name "iSCSI1" -StoragePool $pool -
DiskSizeMB 50000
```

\$LUN = New-SCStorageLogicalUnit -Name "iSCSI1" -StoragePool \$pool -DiskSizeMB 50000

2. He then allocates the LUN to the **All Hosts** host group as follows:

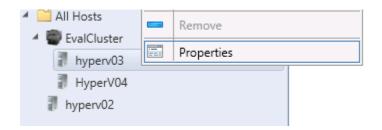
Set-SCStorageLogicalUnit -StorageLogicalUnit \$LUN -VMHostGroup (Get-SCVMHostGroup -Name "All Hosts")

Set-SCStorageLogicalUnit -StorageLogicalUnit \$LUN -UMHostGroup (Get-SCUMHostGroup -Name "All Hosts")

3. Jeff then goes into the Virtual Machine Manager console on **VMM** and clicks on the **VMs and Services** button and expands **All Hosts** and then **Evalcluster**.

VMs and Services <
🔺 🕵 Tenants
😻 BusinessApp2 _SelfServiceUser
🤯 MyCloud _SelfServiceUser
🔺 🧀 Clouds
lesinessApp2
a MyCloud
🚢 VM Networks
🧐 Storage
All Hosts
Æ 👹 EvalCluster
hyperv03
HyperV04
hyperv02
🗽 VMs and Services
E Fabric
🧮 Library
🗄 Jobs
✓ Settings
•

4. Jeff then Right clicks on the HyperV03 server and clicks on Properties



5. Choose the **Storage tab**, click **Add** at the top and choose **Add iSCSI Array**.

•	hyperv03.cont	oso.com Properties	x
General	Storage		
Status	👍 Add 🗙 Remove]
Hardware	Add Disk Add iSCSI Array	File share path: //hyperv02.contoso.com/smb3share Access to file share:	
Host Access	Add File Share		
Virtual Machine Paths	□ iSCSI Arrays		
Reserves	Fibre Channel Arrays		
	SAS Arrays		
Storage	□ File Shares		
Virtual Switches	\\hyperv02.contoso.co 465.76 GB (210.94 GB		
Migration Settings			
Placement			
Servicing Windows			
Custom Properties			
PRO State 🗸			-
View Script		OK	

6. On the **Create New iSCSI Session** page, Jeff clicks on the drop down on the array and chooses **HyperV02** from the selection, and then clicks **Create**

	Create New iSCSI Session	x
Array:	hyperv02	•
SM name:	hyperv02.contoso.com	
Total capacity:	1,169.65 GB	
Storage pools:	3 (1 managed)	
Use advance	d settings	
Target portal		Ŧ
Target name:		Ŧ
Initiator IP:		*
View Script	Create Cance	:I

7. Jeff now sees that **HyperV03** now has an iSCSI session against the configured HyperV02 iSCSI Array. Click **OK**.

Storage	
🛖 Add 🗙 Remove	
□ Disk	Array name: hyperv02 SM name: hyperv02.contoso.com Total capacity: 1,169.65 GB
□ iSCSI Arrays	Storage pools: 3 (1 managed)
hyperv02 1,169.65 GB (3 pools)	The target supports multiple sessions, you can create additional session by clicking Create Session.
□ Fibre Channel Arrays	Create session
SAS Arrays	
□ File Shares	
\\hyperv02.contoso.co 465.76 GB (210.94 GB	

8. Jeff then Right clicks on the HyperV04 server and clicks on Properties

All Hosts	ă.	View Networking
 EvalCluster hyperv03 		Remove
HyperV04		Properties
hyperv02		

9. Choose the **Storage** tab, click **Add** at the top and choose **Add iSCSI Array**.

	HyperV04.cont	toso.com Properties	x
General	Storage		
Status	👍 Add 🗙 Remove		
Hardware	Add Disk Add iSCSI Array	File share path: \\hyperv02.contoso.com\smb3share Access to file share: Ø	
Host Access	Add File Share	Access to the short of	
Virtual Machine Paths	□ iSCSI Arrays		
Reserves	□ Fibre Channel Arrays		
=	□ SAS Arrays		
Storage	□ File Shares		
Virtual Switches	\\hyperv02.contoso.co 465.76 GB (210.94 GB		
Migration Settings			
Placement			
Servicing Windows			
Custom Properties			
PRO State 👻			
View Script		OK Cancel	

10. On the **Create New iSCSI Session** page, Jeff clicks on the drop down on the array and chooses **HyperV02** from the selection, and then clicks **Create**

	Create New iSCSI Session	x
Array:	hyperv02	•
SM name:	hyperv02.contoso.com	
Total capacity:	1,169.65 GB	
Storage pools:	3 (1 managed)	
Use advance	d settings	
Target portal		-
Target name:		-
Initiator IP:		Ŧ
View Script	Create Cance	:I

11. Jeff sees that HyperV04 now has an iSCSI session against the configured HyperV02 iSCSI Target.

•	HyperV04.cont	oso.com Properties	x
General	Storage		
Status	👍 Add 🗙 Remove		
Hardware Host Access	□ Disk	Array name: hyperv02 SM name: hyperv02.contoso.com Total capacity: 1,169.65 GB	
Virtual Machine Paths	□ iSCSI Arrays	Storage pools: 3 (1 managed)	
Reserves	hyperv02 1,169.65 GB (3 pools)	The target supports multiple sessions, you can create additional session by clicking Create Session.	
Storage	Fibre Channel Arrays	Create session	
	□ SAS Arrays		
Virtual Switches	□ File Shares		
Migration Settings Placement	\\hyperv02.contoso.co 465.76 GB (210.94 GB		
Servicing Windows			
Custom Properties			
PRO State 👻			
View Script		OK Cancel]

12. Next Jeff needs to create a LUN for the Cluster "EvalCluster"

```
$host01 = Get-SCVMHostCluster -Name EvalCluster
Register-SCStorageLogicalUnit -StorageLogicalUnit $LUN -
VMHostCluster $host01
```



13. Jeff now runs **Virtual Machine Manager console** and from **VMs and Services** expands the **All Hosts**. He then right clicks on **EvalCluster** and chooses properties.

All Hosts		
EvalCluster # hyperv02	* *	Create Service Create Virtual Machine
	C () () () () () () () () () ()	Refresh Optimize Hosts Move to Host Group Uncluster Add Cluster Node Validate Cluster
		View Networking Remove
		Properties

14. From the **EvalCluster** properties, click on **Shared Volumes** and then click **Add**

	EvalCluster.co	ontoso.com Pro	operties				x
General	Cluster Shared Volumes	(0)					
Status	CSV Path	Current Owner	Capacity	Free Space	Total Space	Cluster Resour	ce
Available Storage							
File Share Storage							
Shared Volumes							
Virtual Switches							
Migration Settings							
PRO Configuration							
PRO State							
Custom Properties							
		4	Add	Remove	Convert to	Available Stora	ge
View Script					OK	Cancel	

15. Tick on the **iSCSI1** target we created earlier to add the cluster shared volume and click **OK**.

B	Add Cluster Shared Volume X									
	Select the disks you want to add as Cluster Shared Volume									
	Name	Classification	Size	Partition St	yle	Volume Label	Quick Format	Force Format		
	✓ iSCSI1	Gold	48.83 GB	MBR	•					
	Any data that exists on the disks will be over	erwritten.					Creat	e Logical Unit		
							ОК	Cancel		

16. We now see that the iSCSI target has been added as a shared volume to the cluster, press **OK** now to exit.

Ð	EvalCluster.co	ontoso.com Pro	operties				x
General	Cluster Shared Volumes	(1)					
Status	CSV Path	Current Owner	Capacity	Free Space	Total Space	Cluster	Resource
Available Storage				48.83 GB	48.83 GB		
File Share Storage							
Shared Volumes							
Virtual Switches							
Migration Settings							
PRO Configuration							
PRO State							
Custom Properties							
all have		A	\dd	Remove	Convert to	Available	e Storage
View Script					OK	(Cancel .:

17. Jeff now checks Server Manager on HyperV02. He opens File and Storage Services and checks the iSCSI status. We can see the iSCSI VHD we created and also the EvalCluster servers attached to the storage currently.

ers	All ISCSI virtual disks 1 total						TASKS
imes sks	Filter	• (1) • (1)					
orage Pools	Path	Virtual Disk_	Target Name	Target Status	Initiator ID	Size	
es	 hyperv02 (1) 						
1	DA(04044DEB-9D53-4981-907F-EB402	E180245].vhd Connected	SPC:15538, SPC:15551	Multiple targets	IQN:qn.1991-05.com.microsoft:hyperv03	.contoso.com, 48.8 GB	
	Last refreshed on 1/24/2013 5:53:50 P	4					
							C-0010
	D/(040440E8-9D53-4981-907F-E8402E	180245) which on hyperv02					TAS
	DA/04044DEB-9D53-4981-907F-EB402E	180245).vhd on hyperv02					TAS
	DA/04044DEB-9D53-4981-907F-EB402E	₽ ₩ • ₩ •	Target Statu	s Initiator ID		Last Logon	TAS
	DAU04044DEB-9053-4981-907F-E84026 Filter Name Server Name Target IQN	₽ ₩ • ₩ •		See Through Sector	-05.com microsoft/sperv64.contoso.com	- and the second	TAS
	DAJD40440E8-9053-4981-907F-E84025 Filter Name Server Name Target IQN SPC15538 hyperv02 ign:1991-0	Α (i) ★ (i) ★	538-target Connected	KQN:iqn.1991	HÖSzom microsoftáypervÖ4 contoro com	1/24/2013 5:41:15 PM	TA
	DAJD40440E8-9053-4981-907F-E84025 Filter Name Server Name Target IQN SPC15538 hyperv02 ign:1991-0	P (ii) • (ii) •	538-target Connected	KQN:iqn.1991		1/24/2013 5:41:15 PM	TAS
	DAJD40440E8-9053-4981-907F-E84025 Filter Name Server Name Target IQN SPC15538 hyperv02 ign:1991-0	P (ii) • (ii) •	538-target Connected	KQN:iqn.1991		1/24/2013 5:41:15 PM	TAS
	DAJD40440E8-9053-4981-907F-E84025 Filter Name Server Name Target IQN SPC15538 hyperv02 ign:1991-0	P (ii) • (ii) •	538-target Connected	KQN:iqn.1991		1/24/2013 5:41:15 PM	TAS
	DAJD40440E8-9053-4981-907F-E84025 Filter Name Server Name Target IQN SPC15538 hyperv02 ign:1991-0	P (ii) • (ii) •	538-target Connected	KQN:iqn.1991		1/24/2013 5:41:15 PM	TAS

18. Jeff now navigates to either **HyperV03** or **HyperV04** and opens up **Failover Cluster Manager**. We can see that the Clustered Shared Volume is now available to all servers in the cluster. The change may not be reflected immediately and the disk may take 5 minutes to appear in Failover Cluster Manager.

Disks (1)							Actions
Search				Q,	Queries 🔻		Disks
Name	Status	Assigned To	Owner Node	Disk Number	Capacity	Information	😫 Add Disk
🕂 Cluster Disk 1	Online	Cluster Shared Volume	HyperV04	1	49 G	В	📑 Move Available Storage
							View
							Refresh
<		ш				>	👔 Help
👻 🦉 Cluster	Disk 1						Cluster Disk 1
							💀 Bring Online
Volumes (1)							- 🙀 Take Offline
Clustered	Disk (C:\ClusterSt	rage\Volume1)					🚯 Information Details
	GB free of 49 GB						B Show Critical Events
							🗟 Move
							More Actions
							Remove from Cluster Shared Volumes
							Properties
							👔 Help

19. If we navigate to C:\ClusterStorage we can access and use the iSCSI shared disk created on the HyperV02 server.

Summary

At the end of this scenario Jeff has implemented a storage solution that he knows will grow with the business's storage requirements.

Links to other	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	∭
areas of interest	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Experience 4: Manage apps in the Private Cloud

This experience will show how System Center 2012 SP1 improves datacenter service levels with dynamic reporting and monitoring to provide deep application insight. Ultimately, organizations will be able to improve root-cause analysis processes while reducing the mean time to service restoration. You can now leverage Operations Manager and Global Service Monitoring to deliver better application support. The scenarios to follow will visualize how Operations Manager, Visual Studio and Virtual Machine Manager provides seamless integration and simplifies IT oversight of the infrastructure and applications.

Scenario: Deep application performance insight

Jeff has a customer facing .Net web application used for Sales called Contoso Electronics. This application has been developed internally and the development team have asked for feedback on how the application has been performing. Jeff wishes to leverage the features of System Center to closely monitor the website and associated systems, and provide detailed feedback to the developers.

Jeff also notes that along with many of his other applications he spends a large amount of time delving into logs, server management consoles and performance monitor logs to try and find the reason an application is performing poorly. Most of the evidence provided by the end user is anecdotal and non-specific as they have no personal insight into the different layers of an application. Jeff decides to implement System Center 2012 Operations Manager with Application Performance Monitoring (APM) and begin collecting precise data on the activity of the application.

The business has also dictated to Jeff that the Sales Application is extremely important and must be available 99% of the time. Within the terms of this Service Level Agreement it is defined that poor performance is also considered to be not meeting the terms of the SLA.

Prerequisites:

These prerequisite steps will deploy the Sales Application to the GUEST01 server already present in the lab environment. This will give a target for the Operations Manager agent to discover, inventory and monitor.

- Guest01 added to the Contoso domain. Refer to the appendix information on how to achieve this
- Microsoft SQL 2012 installed on Guest01 in mixed mode, with the sa account enabled and a password of pass@word1
- IIS installed on Guest01
- Enable the following features under .NETFramework 4.5 Features > WCF Services
 - o HTTP Activation
 - o TCP Activation
- Memory on Guest01 will need to be configured accordingly
 - o Startup RAM **1024**
 - o Dynamic RAM Enabled
 - o Minimum RAM **1024**
 - o Maximum RAM 2048

• Guest01 will require 2 vCPU's

Download the **Contoso Electronics Web App** source and extract to <u>\\HyperV02\SMB3Share\SalesApp</u>. The source is located here <u>http://go.microsoft.com/?linkid=9825975</u>

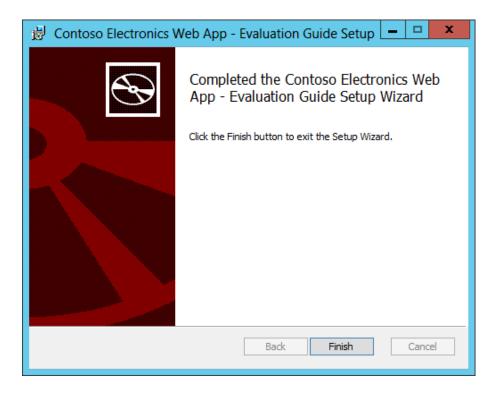
Disable IE Enhanced Security Configuration via the Server Manager Console

Install the Contoso Electronics Web App sales application

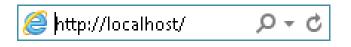
1. After downloading the Contoso Electronics Web App from <u>http://go.microsoft.com/?linkid=9825975</u>, you now install it. Run the file, check **I accept the terms in the License Agreement**, then click **Install**



2. Click **Finish** to complete the install



3. Open Internet Explorer and browse to http://localhost



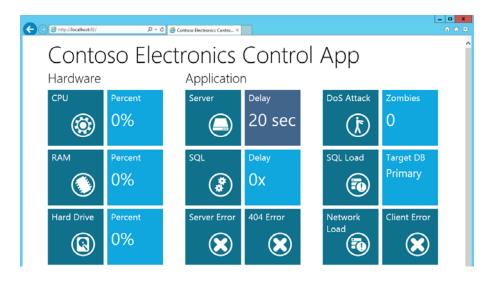
4. The website will now create the database, this can take approximately 2 minutes to complete. When you get an error page with the title "The Operation has timed out", refresh the page.



5. Open <u>http://localhost:81</u> and click on **ContosoService.svc** and confirm that the website displays as below

X
ContosoService Service
You have created a service. To test this service, you will need to create a client and use it to call the service. You can do this using the svcutil.exe tool from the command line with the following syntax:
<pre>svcutil.exe http://localhost:81/ContosoService.svc?wsdl</pre>
You can also access the service description as a single file:
http://localhost:81/ContosoService.svc?singleWsdl
This will generate a configuration file and a code file that contains the client class. Add the two files to your client application and use the generated client class to call the Service. For example:

6. Open <u>http://localhost:82</u> and confirm that you receive the service console as displayed below



Install the Operations Manager Agent to Guest01

Now that the application exists in the domain, Jeff must deploy an Operations Manager agent to the server.

Log onto the server **OpsMgr** as contoso\administrator and load the **Operations** Manager console

1. Click on Administration

Important Note



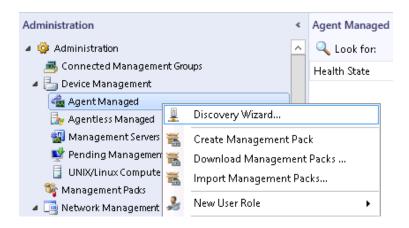
To monitor a website using APM the server does not need to be a member of the domain. It must have the Operations Manager agent, but it may exist in a DMZ or in an untrusted domain. This is especially important when dealing with customer facing websites. For more information refer to TechNet <u>http://technet.microsoft.com/en-</u> us/library/hh212856.aspx



2. Click on Agent Managed



3. Right click Agent Managed and select Discovery Wizard...



4. In Computer and Device Management Wizard select Windows Computers and click Next

Choose the type of computers or devices to discover and manage.



Windows computers

Discover Windows computers in your Active Directory environment and install agents on the ones you want to manage.



UNIX/Linux computers

This enables you to discover UNIX and Linux computers in your environment and install agents on the ones you want to manage.

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Network devices

Discover and monitor network devices using Simple Network Management Protocol (SNMP).

Select a discovery type and click Next to continue.

< Previous	Next >	Discover

5. Tick Automatic Computer Discovery then click Next

Automatic computer discovery	
Scans the "CONTOSO" domain for a	
) Advanced discovery	
Allows you to specify advanced disc	covery options and settings.
Computer and Device Classes:	
Servers and Clients	v
Management Server OpsMgr.contoso.com	
Verify discovered computers ca	n be contacted

6. Tick **Use Select Management Server Action Account** and click **Discover.** Discovery can take up to 2 minutes to complete.

Administrator Account

Select a user account with Administrator rights on the computers you will scan. These credentials will also be used when installing the agents on managed computers.

¥				
ł	account, not a do	account, not a domain account he local account option, the ager	account, not a domain account he local account option, the agent installation t	

7. Tick the computer **Guest01.contoso.com** then click **Next**

Discovery Results		
The discovery process found the following un-managed devices.		
Select the devices you want to manage:	Select All	Deselect All
 AD.contoso.com APPCONTROLLER.contoso.com GUEST01.contoso.com HYPERV02.contoso.com HYPERV03.contoso.com HYPERV04.contoso.com ORCHESTRATOR.contoso.com SERVICEMGR.contoso.com SERVICEMGRDW.contoso.com VMM.contoso.com 		
Note: If you do not see all of the computers you expect to see, you information on troubleshooting discovery issues at http://go.micrubinkID=128940 . Management Server		
OpsMgr.contoso.com		
Management Mode:		
Agent		
< Previous Ne	ext > Finis	h Cancel

8. On the **Summary Page** leave the defaults and click **Finish**

ummary
Agents to be installed: 1
Agent installation directory:
%ProgramFiles%\System Center Operations Manager
Agent Action Account
Specify credentials for the agent to use when performing actions.
Local System
🔿 Other
User name:
Password:
Domain:
CONTOSO
o close the wizard and deploy the agents, click Finish.
< Previous Next > Finish Cancel

Import the Management Packs to Operations Manager

Operations Manager uses specific management packs for information on how to monitor everything in the enterprise from Network Devices to specific software such as SQL 2012 or an operating system like Windows. These management packs are maintained and updated in an online repository accessible via the Operation Manager console. Many other vendors also release their own management packs to allow the Operations Manager agent to get more granular understanding of devices and applications in the enterprise.

To allow Jeff to monitor the Sales Application from front end to back end database he must import specific management packs for each of the technologies involved in the process such as SQL 2012, IIS 8 and Windows Server 2012.

Important Note A minimum of management packs are installed by default to allow Operations Manager administrators to only monitor and receive alerts from a small base number of services. This alerting and monitoring can be further fine-tuned through the use of Overrides to ensure only the services and applications that require monitoring are targeted, rather than receiving a storm of alerts from every device on the network. See TechNet for further information http://technet.microsoft.com/enus/library/hh230704.aspx

- 1. Log onto the server **OpsMgr** as **contoso\administrator** and load the **Operations Manager console**
- 2. Click on **Administration**



3. Right click Management Packs select Import Management Packs

Administration		*
4 🌼 Administration		^
遇 Connected Management	Groups	
🔺 迼 Device Management		
📹 Agent Managed		
🍌 Agentless Managed		
🏭 Management Servers		
丈 Pending Management		
🚦 UNIX/Linux Computers		
🎬 Management Packs		
🔺 📑 Network Manageme 👱	Discovery Wizard	
📋 Discovery Rules 🛛 🗮	Create Management Pack	
🛒 Network Devices 🧧	- Download Management Packs	
Metwork Devices P	Import Management Packs	
🔺 🖂 Notifications		
📑 Channels 🏼 🍰	New User Role	•
Subscribers 👔	Create Run As Account	
Subscriptions	Create Run As Profile	
Product Connectors	New channel	
		•
🟥 Resource Pools 🐉	New subscriber	
🔺 🍀 Run As Configuration 📆	New subscription	
🛀 Accounts 🔤	Add Management Group	
Sector Profiles	Refresh	F5
🕺 UNIX/Linux Accour	nencon	
a 🔒 Security		~

4. Click Add, then select Add from disk ...

G	Import Manag	ement Packs		x
Select Managemer	nt Packs		A	<u>A</u> A
Select Management Packs				🕢 Help
	Import list :		+ Add • Properties	× Remove
	Name	Version Rele	Add from catalog Add from disk	
	Status details :			
			Install	Cancel

5. When prompted to check the online catalog for further dependencies choose **No**

	Online Catalog Connection
?	Some of the management packs you select may have dependencies that cannot be located locally. Would you like to search the online catalog for these dependencies?
	Yes No

- Browse to the System Center Service Manager installation media. In this example we are using C:\Sources\Management Packs. Select the following packs and then click Open
 - Microsoft.System.Center.Apm.Web.IIS7.mp
 - Microsoft.System.Center.Apm.Web.IIS8.mp

	Select Management Packs to import		×
🔄 🕘 🔻 🕇 🚺 🕨 C	Computer 🔸 Local Disk (C:) 🔸 Sources 🔸 ManagementPacks 🗸 🗸 🖉	Search ManagementPack	ks 🔎
Organize 👻 New folde	r	8== ▼	· 🔲 🕜
 ★ Favorites ■ Desktop ▶ Downloads ™ Recent places ₩ Libraries ▶ Documents ▶ Music ₩ Futures 	Name Microsoft.SystemCenter.AlertAttachment.mpb Microsoft.SystemCenter.AlertAttachment.mpb Microsoft.SystemCenter.Apm.Infrastructure.Monitoring.mp Microsoft.SystemCenter.Apm.Library.mpb Microsoft.SystemCenter.Apm.NtServices.mpb Microsoft.SystemCenter.Apm.Wcb.IIS7.mp Microsoft.SystemCenter.Apm.Web.IIS7.mp	Date modified 10/30/2012 1:23 PM 10/30/2012 3:50 PM 10/30/2012 1:34 PM 10/30/2012 3:50 PM 10/30/2012 3:50 PM 10/30/2012 3:50 PM 10/30/2012 1:34 PM 10/30/2012 1:34 PM	Type MP File MPB File MPB File MPB File MPB File MPB File MP File MP File
Videos Computer Local Disk (C:)	Microsoft.SystemCenter.Apm.Web.mpb Microsoft.SystemCenter.ApplicationMonitoring.360.SLA Microsoft.SystemCenter.ApplicationMonitoring.360.Template.Dashboards.mp Microsoft.SystemCenter.ApplicationMonitoring.360.Template.Dashboards.mpb	10/30/2012 3:50 PM 10/30/2012 12:54 10/30/2012 1:34 PM 10/30/2012 3:50 PM	MPB File XML Doc MP File MPB File
🗣 Network	Microsoft.SystemCenter.ApplicationMonitoring.360.Template.Library.mp Microsoft.SystemCenter.ApplicationMonitoring.Library.mpb Microsoft.SystemCenter.ClientMonitoring.Internal.mp	10/30/2012 1:34 PM 10/30/2012 3:50 PM 10/30/2012 1:23 PM	MP File MPB File MP File
File r	name: "Microsoft.SystemCenter.Apm.Web.IIS8.mp" "Microsoft.SystemCenter.Apm.Wet 👻	All Management Packs (Open C	(*.mp; * 👻 Cancel

- 7. The following management packs will also need to be installed. These are not located on the System Center Service Manager installation media, these have to be downloaded from the **online catalog.** An internet connection will be required for these packs to be downloaded:
 - SQL Server 2008 (Discovery)
 - SQL Server 2008 (Monitoring)
 - SQL Server 2012 (Discovery)
 - SQL Server 2012 (Monitoring)
 - Windows Server 2008 Internet Information Services 7
 - Windows Server 2012 Internet Information Services 8
 - Windows Server 2008 Operating System (Discovery)
 - Windows Server 2008 Operating System (Monitoring)
 - Windows Server 2012 Operating System (Discovery)
 - Windows Server 2012 Operating System (Monitoring)
- 8. Click on Add followed by Add from Catalog

G	Import Manag	gement Packs		x
Select Manageme	nt Packs		MA	
Select Management Packs				🕜 Help
	Import list :	Version Rele	Add Properties X R Add from catalog Add from disk	
	Status details :			
			Install	Cancel

9. Wait for the following dialogue box to disappear:

	Connecting
0	Connecting to Management Pack Catalog Web Service Operations Manager is attempting to connect to the Microsoft Management Pack Catalog Web Service. If you do not wish to connect to the Web service, click Cancel to return to the beginning of the wizard.
	Cancel

10. Type **SQL** into the **Find** query and hit search. You can now expand the results in the management packs in the catalog and find the required **SQL Server 2012 (Discovery)** and click on **Add**.

	Select Management	Packs from (Catal	og		?	×
Select one (or more management packs in the catalog list and click Add	l.				(9
Find :					<u>View c</u>	onnection cert	ificat
SQL							
View :							
All manage	ment packs in the catalog						~
						Searc	-h
						Searc	on
Managemer	t packs in the catalog					Propert	ies .
Name		st	tatus		Version	Release Dat	e A
	SQL Server 2005						
⊳	SQL Server 2008						
4	SQL Server 2012						
	Microsoft SQL Server 2012 AlwaysOn Discovery Manageme	nt Pack U	pdate	available	6.3.173.1	8/21/2012	=
	Microsoft SQL Server 2012 AlwaysOn Monitoring Manageme	ent Pack U	pdate	available	6.3.173.1	8/21/2012	17
	SQL Server 2012 (Discovery)	U	pdate	available	6.3.173.1	8/21/2012	
	SQL Server 2012 (Monitoring)	U	pdate	available	6.3.173.1	8/21/2012	
	SQL Server Core Library	U	pdate	available	6.3.173.1	8/21/2012	~
<	Ш						>
Add							
Selected ma	anagement packs :						
Name		Status		Version	Release D	ate	
SQL Server	2012 (Discovery)	Update availal	ble	6.3.173.1	8/21/2012		
SQL Server	2012 (Monitoring)	Update availal	ble	6.3.173.1	8/21/2012		
SQL Server	2008 (Monitoring)	Update availat	ble	6.3.173.1	8/21/2012		
SQL Server	2008 (Discovery)	Update availat	ble	6.3.173.1	8/21/2012		
Remove							
					ОК	Canc	el
					OR	Canc	

- 11. Repeat Step 10 and add the other Management packs:
 - SQL Server 2008 (Discovery)
 - SQL Server 2008 (Monitoring)
 - SQL Server 2012 (Discovery)
 - SQL Server 2012 (Monitoring)
 - Windows Server 2008 Internet Information Services 7
 - Windows Server 2012 Internet Information Services 8
 - Windows Server 2008 Operating System (Discovery)
 - Windows Server 2008 Operating System (Monitoring)
 - Windows Server 2012 Operating System (Discovery)
 - Windows Server 2012 Operating System (Monitoring)

Click **OK** once completed

12. Once the Management Packs have been added you will be returned to the Import Wizard.

	Import Managen	nent Packs				
Select Manageme	ent Packs					
elect Management Packs						🕜 Help
	Import list :		🕂 Add 👻	🚰 Properti	es 🗙 R	emove
	Name	Version	Release Date	Status	EULA	
	🛕 SQL Server 2012 (Monitoring)	6.3.173.1	8/21/2012	<u>Resolve</u>		
	🛕 SQL Server 2012 (Discovery)	6.3.173.1	8/21/2012	Resolve		
	🛕 SQL Server 2008 (Monitoring)	6.3.173.1	8/21/2012	Resolve		
	🔔 SQL Server 2008 (Discovery)	6.3.173.1	8/21/2012	Resolve		
	Status details : This management pack depends on ot online catalog. You must resolve these dependencies either injut-click the management pack	to import this mar	Iagement pack. To	resolve thes	e dependen	cies,
	details.			Inst		Cancel

13. A number of the packs will have dependency issues, click on **Resolve** to resolve these issues.

×	Dep	endency War	ning	? X					
1	Warning: Resolve management pack dependencies								
are ava	over 2012 (Discovery) depe lable in the online catalog. (the Import list.	nds on manageme Click Resolve to a	ent packs that are not in dd the dependent man	mported but agement					
Name			Version						
SOL S	erver Core Library		6.3.173.1						
			Resolve	Cancel					

14. Click **Resolve** to fix any dependency errors seen.

×	Dependency V	Varning	? X						
🔔 Wa	Warning: Resolve management pack dependencies								
SQL Server 2012 (Discovery) depends on management packs that are not imported but are available in the online catalog. Click Resolve to add the dependent management packs to the Import list.									
Name		Version							
SQL Server	Core Library	6.3.173.1							
		Resolve	Cancel						

15. Click on Install to complete the installation of the Management Packs

2	Import Manageme	nt Packs			×
Select Manageme	nt Packs				
Select Management Packs					🕜 Help
	Import list :		🕂 Add 🕶	Properties 🕻	K Remove
	Name	Version	Release Date	Status EULA	A A
	Operations Manager APM Web II	7.0.9538.0			
	🖌 SQL Server 2008 (Monitoring)	6.3.173.1	8/21/2012		
	SQL Server 2008 (Discovery)	6.3.173.1	8/21/2012		
	SQL Server 2012 (Discovery)	6.3.173.1	8/21/2012		
	🖌 SQL Server 2012 (Monitoring)	6.3.173.1	8/21/2012		=
	✓ Windows Server 2008 Internet Inf	6.0.7600.0	2/8/2010		
	Microsoft Windows Server 2012 In	7.0.8862.0	10/4/2012		
	✓ Windows Server 2008 Operating	6.0.6989.0	10/3/2012		
	✓ Windows Server 2012 Operating	6.0.6989.0	10/3/2012		
					~
	Status details :				
	Operations Manager APM Web IIS 7 vers	ion 7.0.9538.0	has already been im	ported.	
	1				
				Install	Cancel
				instan	Cancer

16. Once the import has completed, click on **Close**

.	Import Managem	ent Packs			×
Import Managemen	nt Packs				
Select Management Packs				@ H	Help
	Downloading and importing the selecte	d management	packs.		
	Name	Version 7.0.9538.0	Status		7
	 Operations Manager APM Web II Operations Manager APM Web II 		Imported Imported		
	Import Status Details :				_
	1				
				Stop Close	

Create the .Net Application Monitor

Now that Jeff has imported the correct management packs, these will be disseminated to the agents on the monitored servers when they next check in. If the software or application that these management packs apply to exists on the server it will be inventoried and the data returned to the management server. In this case, all IIS websites and SQL Databases will be inventoried.

Once the inventory has been completed and the data returned to the Operations Manager server, Jeff will be able to select specific websites and databases to monitor. In this case he will create a specific .Net application monitor that will invoke APM to delve deep into the .Net code.

During this set up Jeff will configure the APM agent to monitor two things – the web service and the front end web site. For the front end website he will also enable the Client Side monitoring which will allow APM to inject code into the webpage and return error and performance metrics on how the client sees the final webpage.

Important Note

APM can be utilised to monitor Java web applications and .Net based Windows Services as well as .Net based web applications.

1. Once imported, click on Monitoring and browse to Application Monitoring, .Net Monitoring

1

Monitoring	<
4 🧱 Monitoring	^
Active Alerts	
Discovered Inventory	
🔢 Distributed Applications	
💑 Task Status	
📰 UNIX/Linux Computers	
📰 Windows Computers	
Agentless Exception Monitoring	
a 🕝 Application Monitoring	
P Applications	
INET Monitoring]≡
Veb Application Availability Monitoring	
▷ 📴 Data Warehouse	
Microsoft Audit Collection Services	
Microsoft SQL Server	
Microsoft Windows Client	
Microsoft Windows Internet Information Services	
Microsoft Windows Server	
Network Monitoring	
Operations Manager	
D 📴 PRO	
Synthetic Transaction	
INIX/Linux Computers	
Virtual Machine Manager	\checkmark
Show or Hide Views	
New View 🕨	
Monitoring	
Monitoring	

2. Click on **IIS 8.0 ASP.NET Web Application Inventory** and wait for the **Sales Application** to appear in this pane. This can take up to 15 minutes to appear

IIS 8.0 ASP.NET Web Application I	nventory (2)		
🔍 Look for:	Fin	nd Now Clear	,
IIS Application Name	Application Virtual Root		Path
SalesController	/LM/W3SVC/102/ROOT		GUEST01.contoso.com;W3SVC/102
SalesFrontEnd	/LM/W3SVC/100/ROOT		GUEST01.contoso.com;W3SVC/100

3. Once it has appeared, click on **Authoring**

Authoring	<
🔺 📝 Authoring	
👂 🐼 Management Pack Templates	
🕿 Distributed Applications	
🔤 Groups	
🕞 📷 Management Pack Objeds	
Add Monitoring Wizard	
New Distributed Application	
New Group	
Monitoring	
Authoring	

4. Right click Management Pack Templates and select Add Monitoring Wizard

Authoring		<	Management Pa	ick Templat
4 📝 Authoring			🔍 Look for:	
Management Pack Templates				
🖄 Distributed Applications		Add Monitoring	g Wizard	
Groups	Ø	Refresh		F5

5. Select .Net Application Performance Monitoring and click Next

@ Help
Select the monitoring type
NET Application Performance Monitoring OLE DB Data Source Process Monitoring TCP Port UNIX/Linux Log File Monitoring UNIX/Linux Process Monitoring Web Application Availability Monitoring Web Application Transaction Monitoring Windows Service
Description: This template lets you monitor ASP.NET and WCF Applications hosted in IIS 7.0 and IIS 8.0, in addition to Windows Services that use the Microsoft. NET Framework. To monitor ASP.NET applications and web services, you must install and import either the Windows Server 2008 Internet Information Services 7.0 management pack or the Windows Server 2012 Internet Information Services 8.0 management pack. To use this template to monitor a Windows service that is based on the .NET framework with the APM feature, you must install the
< Previous Next > Create Cancel

6. In the Name field type Sales Application Monitor

		🕢 Help
Enter a friendly name and description		
Name:		
Sales Application Monitor		
Description:		
		^
		~
<select management="" pack=""></select>	~	New
To select ASP.NET applications or services hosted on IIS 7.0 / packs: • Operations Manager APM Web IIS 7 management pack	for monitoring, you need to import the following) management
	< Previous Next > Create	Cancel

7. Click on the **New** button next to the **Destination Management Pack** field

Management pack		
Select destination management pack:		
<select management="" pack=""></select>	✓	New

8. Enter **Contoso Management** in the **Name** field, click **Next**

						C) H
nagement Pack Genera	al Prope	erties					
ID :							
Contoso.Management							
Name :							
Contoso Management							
Version :							
1.0.0.0	For	r example, 1	.0.0.0				
Description :							
	<	Previous	Next	>	Create	Car	ice

9. In Knowledge Article window that opens, click Create

< Previous	Next >	Create	Cancel

10. This should now be selected in the destination management pack field. Click **Next**

ntoso.Management		~	New
To select ASP.NET applications or services hosted packs: • Operations Manager APM Web IIS 7 managemen	 need to import the	following ma	nagement

11. Click **Add**

Add application compo	ients to monitor
Application group:	Sales Application Monitor
Application components	

12. Select **Web Applications and Services** and click **Search**

To add objects, search for the objects and then add them to the selected objects list.	
Search for:	
Web Applications and Services	~
Filter by part of name (optional):	
	Search

13. Click and highlight **SalesFrontEnd** and **SalesWebService** and click **Add**

Available items			
Component	Application Path		
🐻 SalesController	SalesController		
🐻 SalesFrontEnd	SalesFrontEnd		
SalesWebService	SalesWebService		
		bbA	Remove
Selected objects			
Component	Application Path		
		ОК	Cancel

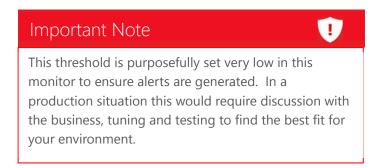
14. Click **OK**

Component	Application Path	
🜍 SalesController	SalesController	
🜍 SalesFrontEnd	SalesFrontEnd	
🛃 SalesWebService	SalesWebService	
elected objects Component	Application Path	Add
SalesFrontEnd	SalesFrontEnd	
SalesWebService	SalesWebService	
-0:		

15. Click Next

Add application compo	ats to monitor	🕢 Help
Application group:	ales Application Monitor	
Application components		💳 Remove
Component	Application Path	
🐻 SalesFrontEnd	SalesFrontEnd	
🛃 SalesWebService	SalesWebService	
Monitoring scope		
Use the environment tag and targeted group define	I targeted group to control where monitoring will be applied. The tag will become part of the ervers where monitoring will occur.	display name
Environment: None		~
Targeted group:	🜟 Create 🔎 Search	📟 Remove
	< Previous Next > Create	Cancel

16. Change the **Performance Event** threshold to **500ms** and ensure the box **Enable Additional Configuration Options** is ticked and then click **Next**



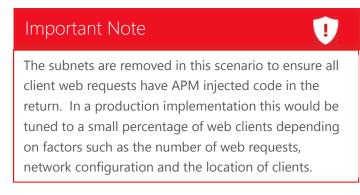
Configure the default monitoring settings Fuent monitoring Image: True on performance event aletts Ture on exception events aletts Performance event threshold (ms): 50 50 Deta advanced settings to further customize the configuration for the application group Advanced Settings Image: True block additional configuration options for server-side and client-side monitoring		🕢 Help
 Turn on performance event alerts Turn on exception events alerts Configure performance event monitoring Performance event threshold (ms): 500 Use advanced settings to further customize the configuration for the application group Advanced Settings	Configure the default monitoring settings	
 Turn on performance event alerts Turn on exception events alerts Configure performance event monitoring Performance event threshold (ms): 500 Use advanced settings to further customize the configuration for the application group Advanced Settings	Event monitoring	
Configure performance event monitoring Performance event threshold (ms): 500 Sourced settings to further customize the configuration for the application group Advanced Settings		
Performance event threshold (ms): 500 Use advanced settings to further customize the configuration for the application group Advanced Settings	✓ Turn on exception events alerts	
500 Strain Strai	Configure performance event monitoring	
Use advanced settings to further customize the configuration for the application group Advanced Settings Advanced Settings	Performance event threshold (ms):	
Advanced Settings	500 🗘	
Advanced Settings	Use advanced settings to further customize the configuration for the application group	
✓ Enable additional configuration options for server-side and client-side monitoring		
	Enable additional configuration options for server-side and client-side monitoring	
< Previous Next > Create Cancel	< Previous Next > Create	Cancel

17. Click Next

Custon	nize monitoring for individu	al application components			🕜 Help
					🥖 Customize
	Component 🔺	Application Path			Configuration
1	SalesFrontEnd	SalesFrontEnd			Default
	SalesWebService	SalesWebService			Default
		1			
			< Previous	Next >	Create Cancel

18. Tick the turn on **Exception Events Alerts** box, change the **Page Load** and **Ajax** thresholds to **500ms** and click **Remove** twice to clear the IP Address filter and click **Next**

				🕢 Help
Configure client-side monitoring				
Event monitoring				
Turn on performance event alerts				
Turn on exception events alerts				
Configure performance event coll	ection			
Page load threshold (ms):		Ajax and WCF threshold (ms)):	
500		500	^	
Configure client IP address filter				
			🛟 Add 🥒 Edit	. 📟 Remove
IP Address	▲ Netmask		Deny Type	
More about client IP address filters				
Use advanced settings to further	customize the configu	uration for the application	group	
Advanced Settings				
		< Previous	Next > Create	Cancel



19. Tick the **Enabled** box next to **SalesFrontEnd** and click **Next**

Enable client-side monitoring for web applications

Client-side monitoring uses JavaScript scripts automatically added to each managed web application that is configured for monitoring. To ensure that these scripts can run, you should run the Check Client-Side Monitoring Compatibility task against any new web applications.

					🥖 Customize
Enabled	Component	IIS Application Pat	h	Excluded Pages	Configuration
✓	SalesFrontEnd	SalesFrontEnd		/	Default
More about	client-side monitoring				
Monitored	l servers				
You can ta	rget a group to limit the scope	of the monitoring to the group of s	ervers.		
Targeted gr	roup:			🌟 Create 🔎 Se	arch 📟 Remove
				T	
		[< Previous	Next > Crea	te Cancel
		L			

20. Click Create

Experience 4: Manage apps in the Private Cloud

🕜 Help

cation Monitor
anagement
equest Time exceeds threshold
n Events/sec exceeds threshold
nce Events/sec exceeds threshold
equest Time exceeds threshold
n Events/sec exceeds threshold
nce Events/sec exceeds threshold

21. Back on **Guest01** wait for **10 minutes** then open an administrative command prompt and type the command

Iisreset _ 🗆 X C:4. Administrator: Command Prompt Nicrosoft Windows [Version 6.2.9200] (c) 2012 Microsoft Corporation. All rights reserved. ≣ C:\Windows\system32>iisreset Attempting stop... Internet services successfully stopped Attempting start... Internet services successfully restarted C:\Windows\system32}_



The IIS reset is required as the APM agent begins in a disabled state before a .Net monitor is configured. When the agent detects that a .Net monitor for a website hosted in the server has been enabled, it starts the APM agent, creates Application Pools and injects itself into IIS and the website. At this point IIS must be restarted to enable the new configuration to be loaded.

Create a Web Application Availability Monitor

Now that Jeff has created a .Net Application monitor, he also needs to monitor the website to ensure it is responding within a specific timeframe. This is accomplished by creating Availability Monitors which use Operations Manager agents to run requests against specific websites. This means that any server with an Operations Manager agent can be used to monitor a website. This can allow Jeff to build up a map of how a website is responding from a perspective of any of his managed sites within the enterprise.

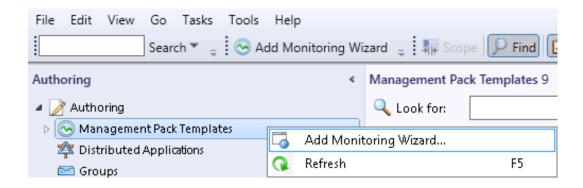
Important Note

This can also be extended to the point of view of an external source also. Using Global Service Monitor (GSM) availability monitors can be created to report on your websites from multiple countries around the globe. This gives a true 360 degree perspective of your web applications and adds even more granularity to the triage process. For more information see http://www.microsoft.com/en-us/server-cloud/system-center/global-service-monitor.aspx

1. In the Operations console on OpsMgr click on Authoring



2. Right click Management Pack Templates and select Add Monitoring Wizard



3. At Select Monitoring Type click on Web Application Availability Monitoring and press Next

	🕜 Help
Select the monitoring type	
NET Application Performance Monitoring OLE DB Data Source Process Monitoring UNK/Linux Log File Monitoring UNK/Linux Process Monitoring UNK/Linux Process Monitoring Web Application Availability Monitoring Web Application Transaction Monitoring Web Application Transaction Monitoring Web Application Transaction Monitoring Windows Service	om
internal or external locations.	
< Previous Next > Create I	Cancel

4. In the Name field type Sales Application Availability

	🕜 Help
Enter a friendly name and description	
Name:	
Sales Application Availability	

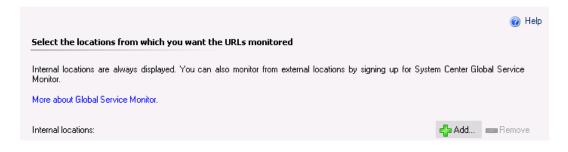
5. Select **Contoso Management** in the **Management Pack** drop down box and click **Next**

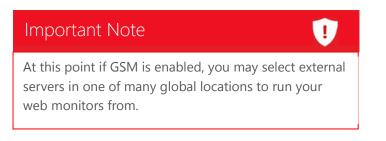
Management pack				
Select destination management pack:				
Contoso Management			¥	New
	< Previous	Next >	Create	Cancel

6. In the Name field type Sales Application and in the URL field type <u>HTTP://Guest01</u> and click Next

				🔞 Help
Enter	URLs to be monitored			
Add Uf paste e	RLs to the list by typing, pasting or importing a file int ntire rows as pairs of comma-separated values (CSV	o the table, including the appropriate protocol (http: /) that is in the format 'Name, URL', or you can pa	// or https:/ iste just the	V). You can list of URLs.
			👍 Add	Remove
	Name	URL		
•	Sales Application	HTTP://Guest01		
*				
		< Previous Next >	Create	Cancel

7. Click Add





8. Type **OpsMgr** in the Filter area and click **Search**

Select the locations that you want to monitor from the list below.	
Search for:	
Internal location - Agent	~
Filter by part of name (optional)	
opsmgr	
	Search

9. Click on **OpsMgr.contoso.com**, click **Add** and then **OK**

Where to monitor:			
Name	Location		
Contoso.com			
<			>
		Add	Remove
Selected locations:			
Name	Location		
G OpsMgr.contoso.com			
<	III		>
		OK	Canad
		OK	Cancel

10. Click Next

				🔞 Help
Select the locations from which you war	nt the URLs monitored			
Internal locations are always displayed. You o Monitor.	can also monitor from external	ocations by signing up for Sys	tem Center Globa	I Service
More about Global Service Monitor.				
Internal locations:			🛟 Add 🗖	Remove
Agent/Pool	Туре	Location		
OpsMgr.contoso.com	Agent			
	Γ	< Previous Next >	Create	Cancel

11. Click Change Configuration from the Test List

Test list			
	sts that will be run. Select a location and click nternal locations only. Select change configura		
Q Look for:	Clear		
Test name	URL	Location	Agent/Pool
Sales Application [OpsM	HTTP://Guest01		OpsMgr.contoso.com
Test frequency: Number of internal Tests:	10 minutes 1		Run Test
Change Configuration			

12. Change the **Test Frequency** to **1 minutes** and click **OK**

Test Frequency / Performance Data Collection Interval				
Performance data collection interval settings are use	d for internal tests only.			
Test frequency:	Performance data collection interval:			
Minutes V	1 10 Minutes			
Test time-out:				
45 Seconds				

13. Click Next

					🔞 Help
	sts that will be run. Select a loc nternal locations only. Select c				
Q Look for:		Clear			
Test name	URL		Location	Agent/Pool	
Sales Application [OpsM	HTTP://Guest01			OpsMgr.contoso.com	
Test frequency: Number of internal Tests:	1 minutes 1				Run Test
Change Configuration]				
			< Previous	Next > Create	Cancel

14. On the **Summary** page click **Create**

Summary		🕢 Help
The following summarizes the configura	tion that is specified to monitor this template.	
Name: Management Pack: Test frequency: Number of tests from internal locations: Internal locations: Test summary: Configuration summary Monitors enabled: Alerting: Performance collection:	Sales Application Availability Contoso Management 1 minutes 1 OpsMgr.contoso.com Sales Application HTTP://Guest01 Status Code Each test generates an alert Total Response Time Time to First Byte Time to Last Byte DNS Resolution Time Content Size Content Time	
<	W	>
	< Previous Next > Create	Cancel

Create a Distributed Application

Now that Jeff has deployed his .Net Application monitor and Availability monitor he can start to draw a picture of the status of the Sales Application from front end to back end. This can be easily compiled using the Distributed Application monitor which can be utilised to create a single point of view of a service comprised of all of the individual components that the service relies upon.

Important Note

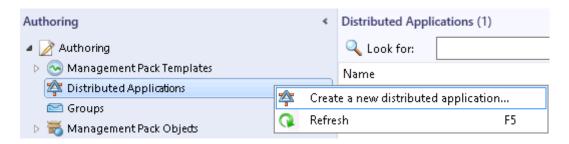
IJ

All devices and software that a specific service relies upon can be collected into a single monitor. For instance, a standard monitor for an Email application may report on database status, connector state and mail flow performance. Using a distributed application we can add in network infrastructure, internet access, other vendors mail filters, inter site connectivity and much more. This gives an overall status of the entire Email Service rather than a specific Mail Server status. This more closely aligns with an end user view of a service. For instance, an end user may be unable to access their email, but it may be a network device preventing them from doing so.

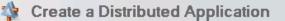
1. In the Operations console click on Authoring



2. Right click **Distributed Applications** and select **Create a New Distributed Application**



3. In the Name field type Sales Application Distributed App



1. Name Your Distributed Application

Choose a name that best matches the distributed application you want to create. You can fill a description for it if you like.

Name:

Description (optional):

Sales Application Distributed App

escription (obtional)	

4. Select the template .Net 3 Tier Application

2. Choose Distributed Application Template

Select a template that most closely matches the distributed application you have deployed. A distributed application object will be created along with a set of monitors, rules, views, and reports.

Template:	Description
NET 3-Tier Application Line of Business Web Application Messaging Blank (Advanced)	This distributed application contains presentation, business and data tiers with availability measured by synthetic transactions.
	View Details

5. Select Contoso Management in the Management Pack drop down list, click Ok

3. Save to a Management Pack

Select a management pack where your distributed application and its components will be saved.

Management Pack:		
Contoso Management	~	New
	ОК	Cancel

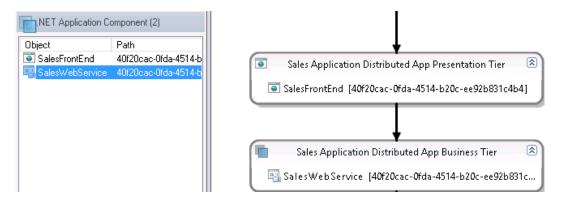
6. In the designer, click on .Net Application Component on the left

NET Application Component (2)
ASP.NET Application
📋 Database
Distributed Application Component
G Perspective
🖄 Service
📷 Web Application Availability Monitorin

7. Drag **SalesFrontEnd** to the object in the diagram labelled **Sales Application Distributed App Presentation Tier**



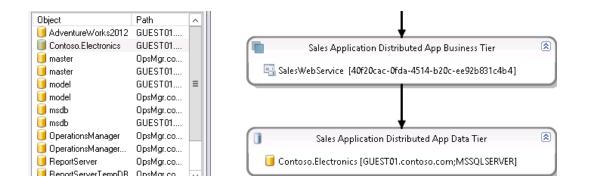
8. Drag SalesWebService to the Sales Application Distributed App Business Tier



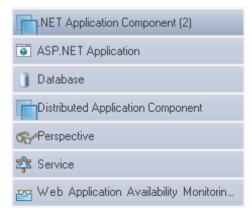
9. Click on **Database** on the left

NET Application Component (2)
ASP.NET Application
📋 Database
Distributed Application Component
G Perspective
🖄 Service
📴 Web Application Availability Monitorin

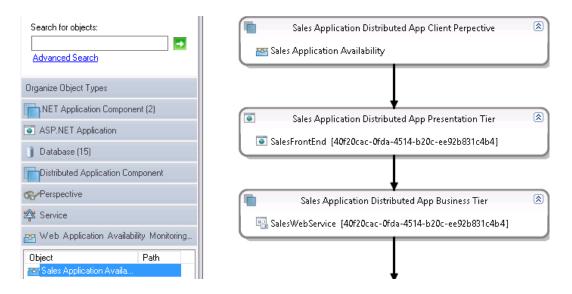
10. Drag the object Contoso.Electronics on GUEST01 to the Sales Application Distributed App Data Tier



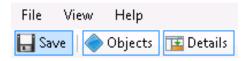
11. Click on Web Application Availability Monitoring



12. Drag the object Sales Application Availability to the Sales Application Distributed App Client Perspective



13. Click the **Save** button in the toolbar and then once saved, close the designer



Create a Service Level Tracking object

Now that Jeff has created an overall picture of the Sales Application service, he can apply an SLA to that service. As decided previously, the business has decreed that the web application must be available 99% of the time so he creates an SLA that matches that requirement.

1. Expand Management Pack Objects and right click Service Level Tracking and select Create

File Edit View Go Tasks Too	ls Help	
Search 👻 📮 📝	Create 🝦 🌆 Sco	pe 👂 Find 🚺 Tasks 🕡
Authoring	<	Service Level Tracking
4 📝 Authoring		🔍 Look for:
Management Pack Templates		Name
🍄 Distributed Applications		
🔤 Groups		
🔺 📷 Management Pack Objects		
E Attributes		
💿 Monitors		
📸 Object Discoveries		
醇 Overrides		
🧾 Rules		
📄 Service Level Tracking 🛛 🥫		
Tasks .	📝 Create	
🖉 Views 🤇	🔉 Refresh	F5

2. In the **Name** field type **Sales Application SLA** and click **Next**

Name:			
Sales Application SLA			
Description (optional):			
			~

3. In the **Select a Class** field, click **Select**

Specify the class of objects for which you want to track service levels. If necessary, specify a group or object to reduce the scope of the tracking request.

largeted class		
Select a class of object to target		
	Select	0

4. Click on the item in the list labelled Sales Application Distributed App and click OK

	Select a Target Cla	
elect the class, group, or object that you ems easier to find.	want to target from the list beli	ow. You can also filter or sort the list to make
ook for:		
		Clear
Search result filter:		
Distributed Application		
Distributed Application		· · · · · · · · · · · · · · · · · · ·
Target 🔻	Management Pack	Description
.NET 3-Tier Application	Microsoft System Center Ap	This distributed application contains presentation
Blank	Distributed Application Desi	This distributed application is used for general p
Business Service	Distributed Application Desi	This class is used to represent Business Service in
Connected Management Group	System Center Core Library	This represents a connected management group
Line of Business Web Application	Distributed Application Desi	This distributed application contains Web Sites a
Management Group	Virtual Machine Manager Lib	
Management Group	System Center 2012 Virtual	This class represents management groups mana
Messaging	Distributed Application Desi	This distributed application contains various con
Network Service	Network Management Librar	This class represents the network service
Operations Manager Management Gro	System Center Core Library	This type represents the Operations Manager M
Sales Application Distributed App	Contoso Management	
Service	Virtual Machine Manager Lib	This abstract type is the base type for all VMM m
Service	System Center 2012 Virtual	This class represents a service that is managed b
Service	System Library	Defines the basic properties of services
User Created Distributed Application	Distributed Application Desi	All distributed applications edited or created wit
<	III	>
5 total Targets, 15 visible, 1 selected		
S total Falgets, 15 Visible, 1 selected		

5. Click **Next**

elect a class of object to target ales Application Distributed App	Select
cope (optional)	
Specify objects within the class:	
All objects of the targeted class	
○ A group or object that contains obje	ects of the targeted class
	Select
Management pack	
Select destination management pack:	
Contoso Management	V New

6. Click Add and select Monitor state SLO

Service level objectives (SLO) defines the performance thresholds or the states that you want to track for the selected targeted class, objects, or group.

Service level objectiv	res:	🕂 Add 🔻 🥒 Edit 🗙 Remove
Name	Targeted class	Monitor state SLO
		Collection rule SLO

7. In the Service level objective name field type Sales Application Monitor and click OK

Service Level Objective (Monitor State)
Enter a name for the SLO and then set the desired thresholds or states to track.
Service level objective name:
Sales Application Monitor
Targeted class
Sales Application Distributed App Select
Monitor:
Availability V
Service level objective goal (%): 99.000 Specify the states you want to be counted as downtime in this objective:
Unplanned maintenance
Monitoring unavailable
Monitor disabled
Planned maintenance
☐ Warning
OK Cancel

8. Click Add and select Collection Rule SLO

Service level objectives (SLO) defines the performance thresholds or the states that you want to track for the selected targeted class, objects, or group.

Service level objectives:			🕂 Add 🔻 🥒 Edit 🗙 Remove
Name	Targeted class		Monitor state SLO
Sales Application Monitor	Sales Application Distributed App	9	Collection rule SLO

9. In the Service Level Objective name field type Sales Application Exception Events

Service Level Objective (Collection Rule)	x
Enter a name for the SLO, select the required collection rule and set the desired thresho	olds
Service level objective name:	
Sales Application Exception Events	
Targeted class	
Sales Application Distributed App	Select
Performance collection rule:	
	Select 이
Aggregation method:	
⊖ Min	
Average	
О Мах	
Service level objective goal:	
Less Than 🗸 50	
ΟΚ	Cancel

10. In the **Performance Collection** rule, click **Select**

Performance collection rule:		
	Select	0

11. Click on Collected Aggregated Average % Exception Events/Sec of Components of 3-Tier Application Instances and click OK

Se	elect a Rule		x
Select the collection rule that you want to use and click O	IK.		
Look for:			
		Clear	
Name	Category	Management Pack	
Collect Aggregated Average % Exception Events/sec	PerformanceCollection	360 Application Monitoring Dash	ibc
Collect Aggregated Average % Performance Events/s	PerformanceCollection	360 Application Monitoring Dash	nbc
Collect Aggregated Average Transaction Response Ti	PerformanceCollection	360 Application Monitoring Dash	nbc
Collect Availability of 3-Tier Application Instances	PerformanceCollection	360 Application Monitoring Dash	nbc
			_
۲ ااا			>
4 total Targets, 4 visible, 1 selected			
			_
	Н	elp OK Cancel	

12. Click **OK**

Service Level Objective (Collection Rule)
Enter a name for the SLO, select the required collection rule and set the desired thresholds
Service level objective name:
Sales Application Exception Events
Targeted class
Sales Application Distributed App Select
Performance collection rule:
Collect Aggregated Average % Exception Events/sec of Components of 3-Tier Applic Select
Aggregation method:
O Min
 Average
⊖ Max
Service level objective goal:
Less Than 🗸 50
OK Cancel

13. Click Add and select Collection Rule SLO

Service level objectives (SLO) defines the performance thresholds or the states that you want to track for the selected targeted class, objects, or group.			s that you want to track for
Service level objectives:		₽	Add 🔽 🥒 Edit 🗙 Remove
Name	Targeted class		Monitor state SLO
Sales Application Monitor	Sales Application Distributed App	9	Collection rule SLO

14. In the Service Level Objective name field type Sales Application Performance Events

Service Level Objective (Collection Rule)	x
Enter a name for the SLO, select the required collection rule and set the desired thresholds	;
Service level objective name:	
Sales Application Performance Events	
Targeted class	
Sales Application Distributed App	Select
Performance collection rule:	
	Select 😣
Aggregation method:	
O Min	
Average	
⊖ Max	
Service level objective goal:	
Less Than 🗸 50	
OK	Cancel

15. In the **Performance Collection** rule, click **Select**

Performance collection rule:		
	Select	0

16. Click on Collected Aggregated Average % Performance Events/sec of Components of 3-Tier Application Instances and click OK

Sele	ect a Rule	2
elect the collection rule that you want to use and click OK.		
.ook for:		
		Clear
Name	Category	Management Pack
Collect Aggregated Average % Exception Events/sec of		360 Application Monitoring Dash
Collect Aggregated Average % Performance Events/sec		360 Application Monitoring Dash
Collect Aggregated Average Transaction Response Tim	PerformanceCollection	360 Application Monitoring Dash
Collect Availability of 3-Tier Application Instances	PerformanceCollection	360 Application Monitoring Dash
<		>
total Targets, 4 visible, 1 selected		
	Help	OK Cancel
	Нер	

17. Click **OK**

Service Level Objective (Collection Rule)	x
Enter a name for the SLO, select the required collection rule and set the desired thresholds	
Service level objective name:	
Sales Application Performance Events	
Targeted class	
Sales Application Distributed App Select	
Performance collection rule:	
Collect Aggregated Average % Performance Events/sec of Components of 3-Tier App Select	
Aggregation method:	
⊖ Min	
 Average 	
⊖ Max	
Service level objective goal:	
Less Than 🗸 50	
OK Cancel	

18. Click Add and select Collection Rule SLO

Service level objectives (SLO) defines the performance thresholds or the states that you want to track for the selected targeted class, objects, or group.

Service level objectives:			🖶 Add 🔽 🥒 Edit 🗙 Remove
Name	Targeted class		Monitor state SLO
Sales Application Monitor	Sales Application Distributed App	S	Collection rule SLO

19. In the Service Level Objective name field type Sales Application Transaction Response

Service Level Objective (Collection Rule)	x
Enter a name for the SLO, select the required collection rule and set the desired thresholds	
Service level objective name:	
Sales Application Transaction Response	
Targeted class	
Sales Application Distributed App Select	
Performance collection rule:	
Select	•
Aggregation method:	
⊖ Min	
Average	
⊖ Max	
Service level objective goal:	
Less Than 🗸 50	
OK Cancel	

20. In the **Performance Collection** rule, click **Select**

Performance collection rule:		
	Select	0
		·

21. Click on **Collected Aggregated Average Transaction Response Time** and click **OK**

	Select a Ru	le	
elect the collection	rule that you want to use and click OK.		
ook for:			
			Clear
Name	•	Category	Managemen
Collect Aggregate	d Average % Exception Events/sec of Compone	nts of 3-T PerformanceCollection	360 Applicati
	d Average % Performance Events/sec of Comp		360 Applicati
	d Average Transaction Response Time of Comp		360 Applicati
Collect Availability	of 3-Tier Application Instances	PerformanceCollection	360 Applicati
<	ш		>
total Targets, 4 visi	ble, 1 selected		
		Help OK	Cancel

22. Click **OK**

Service Level Objective (Collection Rule)	x
Enter a name for the SLO, select the required collection rule and set the desired thresholds	
Service level objective name:	_
Sales Application Transaction Response	
Targeted class	
Sales Application Distributed App Select.	
Performance collection rule:	
Collect Aggregated Average Transaction Response Time of Components of 3-Tier Ap Select	
Aggregation method:	
⊖ Min	
 Average 	
O Max	
Service level objective goal:	
Less Than V 50	
OK Cance	I _

23. Click Add and select Collection Rule

Service level objectives (SLO) defines the performance thresholds or the states that you want to track for the selected targeted class, objects, or group.

Service level objectives:			🖶 Add 🔽 🥒 Edit 🗙 Remove
Name	Targeted class		Monitor state SLO
Sales Application Monitor	Sales Application Distributed App	S	Collection rule SLO

24. In the Service Level Objective name field type Sales Application Availability

Service Level Objective (Collection Rule)		x
Enter a name for the SLO, select the required collection rule and set the desired thresh	nolds	
Service level objective name:		
Sales Application Availability		
Targeted class		
Sales Application Distributed App	Select	
Performance collection rule:		
	Select	•
Aggregation method:		
⊖ Min		
 Average 		
О Мах		
Service level objective goal:		
Less Than 🗸 50		
OK	Cancel	

25. In the **Performance Collection** rule, click **Select**

Performance collection rule:		
	Select 🔒	

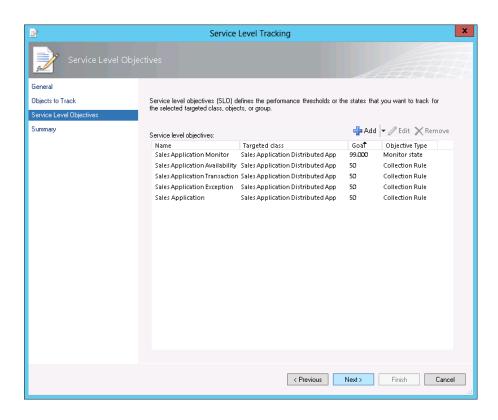
26. Click on Collect Availability of 3 Tier Application Instances and click OK

		Clear
tegory	Managem	ent Pack
formanceCollection	360 Applica	tion Monitorin
formanceCollection	360 Applica	ation Monitoring
formanceCollection	360 Applica	ation Monitoring
formanceCollection	360 Applica	ation Monitorin
		3
Help	OK	Cancel
	Help	Help OK

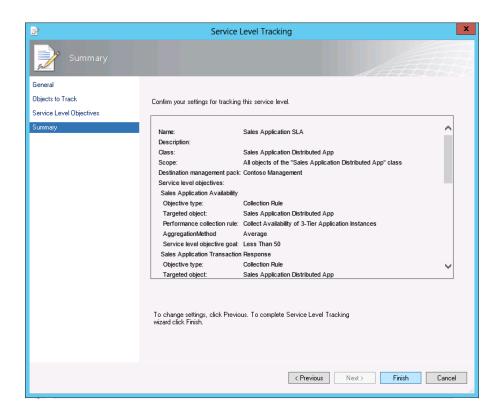
27. Click **OK**

Service Level Objective (Collection Rule)	x
Enter a name for the SLO, select the required collection rule and set the desired thresholds	
Service level objective name:	
Sales Application Availability	
Targeted class	
Sales Application Distributed App Select	
Performance collection rule:	
Collect Availability of 3-Tier Application Instances Select	
Aggregation method:	
⊖ Min	
 Average 	
⊖ Max	
Service level objective goal:	
Less Than v 50	
OK Cancel	

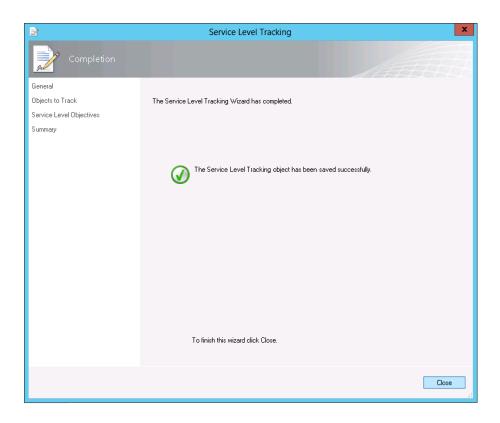
28. Click Next



29. Click Finish

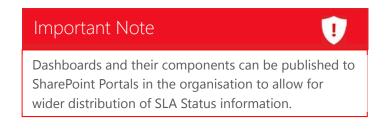


30. Click Close



Create an SLA Dashboard

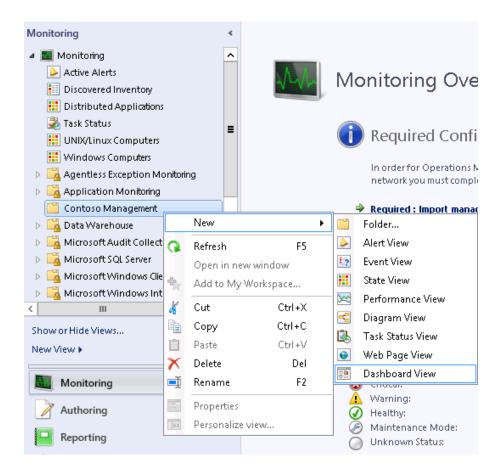
Once the SLA has been created, Jeff can create a dashboard that can show the status of the SLA. This will allow managers and support staff to see at a glance, the status of their Service Level Agreements.



1. In the **Operations Manager** console, click on **Monitoring**

Monitoring	<
4 🔳 Monitoring	~
Active Alerts	
🔝 Discovered Inventory	
📰 Distributed Applications	
🛃 Task Status	
🛄 UNIX/Linux Computers	
👥 Windows Computers	
Agentless Exception Monitoring	
a 🚰 Application Monitoring	
P Applications	
Image: NET Monitoring	≡
Veb Application Availability Monitoring	
🖻 📴 Data Warehouse	
Microsoft Audit Collection Services	
Microsoft SQL Server	
Microsoft Windows Client	
Microsoft Windows Internet Information Services	
Microsoft Windows Server	
Network Monitoring	
Derations Manager	
PRO	
Synthetic Transaction	
D La UNIX/Linux Computers	
👂 🔀 Virtual Machine Manager	~
Show or Hide Views	
New View 🕨	
Monitoring	

2. Right click on **Contoso Management** and select **New** then select **Dashboard View**



3. Select Service Level Dashboard and click Next

	New Dashboard	and Widget Wizard		x
Select a da	shboard layout or wid	dget template	AAA	14
Template	▲ All Templates	Template	Folder	
General Properties	Microsoft	Column Layout	Layouts	
Scope		Grid Layout	Layouts	
Summary		Service Level Dashboard	Layouts	
Completion		Summary Dashboard	Microsoft	
		< Previous Ne	xt > Create	Cancel!

4. In the Name field type Sales Application and click Next

	New Dashboard and Widget Wizard	x
💐 Enter a frier	ndly name and description	
Template	Name:	
General Properties	Sales Application	
Scope	Description:	
Summary		
Completion		
	< Previous Next > Create Cancel	7
	v rievious Next > Create Cancer	

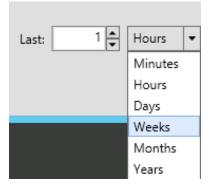
5. Click Add

Select the SLA(s) to display:		
	🕂 Add	X Remove

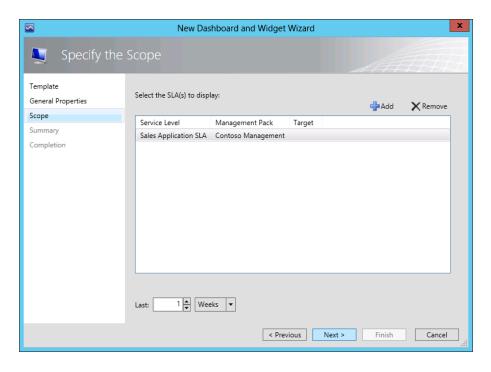
6. In the available items click on **Sales Application SLA** and click **Add** and click **OK**

	Ac	ld SLA		-	x
Search					ρ
					~
^ Available items (1):					
Service Level	Management Pack	Target			
Sales Application SLA	Contoso Management				
	Add	Remove			
Selected items (1):					
Service Level	Management Pack	Target			
Sales Application SLA	Contoso Management				
			OK	Can	cel

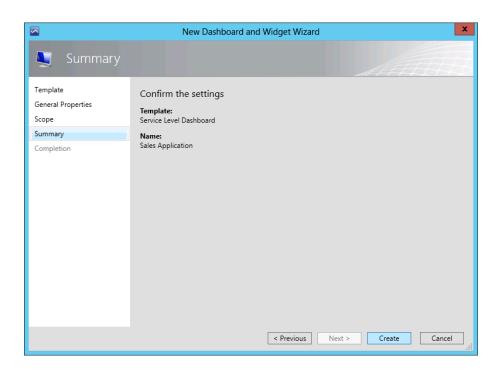
7. Change time period at the bottom to **1 weeks**



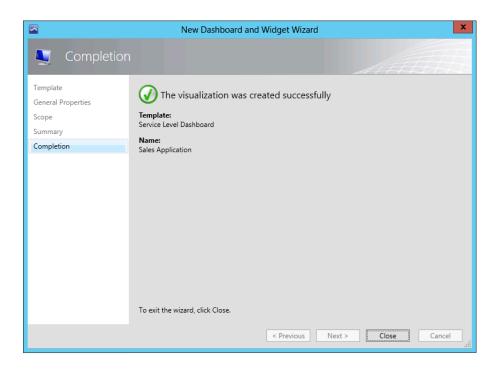
8. Click Next



9. Click Create



10. Click Close

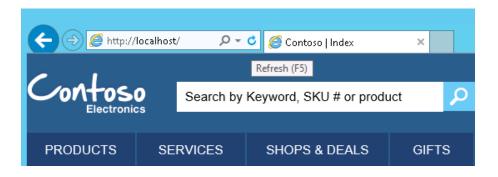


Generating the load and analysing the data

1. On **Guest01** open Internet Explorer and browse to <u>http://localhost</u>

🗲 🕣 🏉 http://localhost/	<mark>ک</mark> + کر	<i> C</i> ontoso Index	×

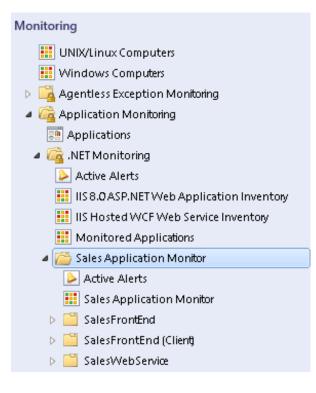
2. Refresh the page several times (press the **F5** key)



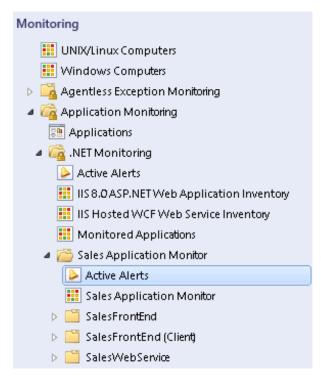
3. In the **Operations Manager** console, click on **Monitoring**



4. Expand Application Monitoring, .Net Monitoring and Sales Application Monitor



5. Click on Active Alerts



6. There should be several alerts available in the console

Active Alerts (4)			
🔍 Look for:	Fi	nd Now Clear	
🚱 Source 🧔	🖻 Name	Description	Resolu
Severity: Warning (4)			
🛕 GUEST01/SalesFrontEnd	Client Performance Except	ion Client MVC Page : Home/Index is sl	New
🛕 GUEST01/SalesFrontEnd	Server Performance Except	ion 'MVC page : Home.GetProject' has	New
🛕 GUEST01/SalesFrontEnd	Server Performance Except	ion 'MVC page : Home.Index' has excee	New
🛕 GUEST01/SalesWebService	Server Performance Except	ion 'Contoso.Electronics.Services.Conto	New

- 7. Click on one that is labelled:
 - Name Server Performance Exception
 - Description Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts

Active Alerts (4)						
🔍 Look for:		Find No	w Clear			
🚱 Source	\gg	Name	Description	Resolu	Created	-
▲ Severity: Warning (4)						
👍 GUEST01/SalesFrontEnd		Client Performance Exception	Client MVC Page : Home/Index is sl	New	1/25/2013 1:41:00 PM	
👍 GUEST01/SalesFrontEnd		Server Performance Exception	'MVC page : Home.GetProject' has	New	1/25/2013 1:40:45 PM	
🛕 GUEST01/SalesFrontEnd		Server Performance Exception	'MVC page : Home.Index' has excee	New	1/25/2013 12:42:50 PM	
🛕 GUEST01/SalesWebService		Server Performance Exception	'Contoso.Electronics.Services.Conto	New	1/25/2013 12:42:48 PM	

8. In the **Alert Details** pane below, in the **Alert Description** click on the URL beginning with <u>http://opsmgr/AppDiagnostics.</u> **IE ESC** may have to be disabled to view the site correctly.

vent properties Similar events	Related events Distributed chains Performance counters	
Event class: .NET Performance Eve Component: System.Web.Mvc.dll Source: SalesFrontEnd Status: New	ent Event Date: 1/25/2013 12:42:20 PM Build: 3.0.0.0 Computer: contoso.com/GUEST01 Aspect: Performance	
	Slowest Node:	E
24,786 / 24,786 ms WCF	$: {\tt Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts~().~Client~side}$	
	Stad	E
Expand All	Execution Tree View Resource Group	
	page : Home.Index	6
	Electronics.Web.BadBehaviourFilter.OnActionExecuting()	
	so. Electronics. Shared. ControlServiceClient. GetControlSettings()	6
	tion Execution: Home.Index	8
	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index()	8
	tion Execution: Home.Index iso.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts()	
	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() WCF: Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts ().	8
	tion Execution: Home.Index iso.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts()	
	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() > WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side /C View rendering: Index	e
	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() > WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side	e
24,848 ms → Act 4,848 ms → Act 4,848 ms ← Act 4,848 ms ← Act 4,789 ms ← Contor 4,789 ms ← Contor 4,789 ms ← Contor 4,786 ms 4,786 ms 4,786 ms 4,786 ms 4,786 ms	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index() thoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts()	e
	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side CV lew rendering: Index Collection Note: Value	e
	tion Execution: Home.Index sos.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side // C View rendering: Index Collection Note: Value SalesFrontEnd	e
	tion Execution: Home.Index sos.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side // C View rendering: Index Collection Note: Value SalesFrontEnd 1980	e
	tion Execution: Home.Index so.Electronics.Web.Controllers.HomeController.Index() thoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() > WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side C View rendering: Index Value SalesFrontEnd 1980 21200642320	e
	tion Execution: Home.Index sos.Electronics.Web.Controllers.HomeController.Index() ntoso.Electronics.Web.ContosoService.ContosoServiceClient.GetWeeklyOfferProducts() WCF : Contoso.Electronics.Web.ContosoService.IContosoService.GetWeeklyOfferProducts (). Client side // C View rendering: Index Collection Note: Value SalesFrontEnd 1980	e

With this information it is easy for Jeff to start dissecting any alerts with the web application and discover the component or components that are causing an issue. Using the alert above as an example, the WCF web service took 24 seconds to respond to the web request that came through from the front end web site. Jeff can pass that information along with all the associated data to the developers to allow them to start looking at the code.

Important Note

1 Another feature of Operations Manager is the ability to integrate with (TFS). This feature allows Operations Manager users to assign incoming alerts to Engineering. Operations Manager then transfers the data into TFS Projects ready for developers to investigate. Intellitrace logs can also be gathered and transferred in this fashion to allow for in-depth logging and investigation.

Links to other areas of interest	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	<u>ن</u>	
	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud	

Experience 5: Reporting insights of the Private Cloud

This experience walks organizations through setting up reporting to delivery virtually no downtime with better business continuity and higher SLA. IT is able to provide deep insight into infrastructure performance and utilization via Chargeback which drives lower operational costs. Operations Manager, Virtual Machine Manager and Service Manager will be used in the scenarios in this experience.

Scenario: Chargeback reporting for visibility into usage

Connecting System Center 2012 Virtual Machine Manager with System Center 2012 Operations Manager allows you to monitor the health and availability of the virtual machines and hosts that VMM manages. You can also monitor the VMM Management server, the VMM database server, library servers, and VMM Self-Service Portal web servers, and see diagram views of the virtualized environment through the Operations console in Operations Manager. As services are deployed in Virtual Machine Manager, a corresponding Distributed Application will be created in Operations Manager. Also, through the connections between Virtual Machine Manager and Operations Manager, you can view reports on the health and utilization of your private cloud infrastructure.

Jeff wants to make sure that he has those views. Because Virtual Machine Manager will be crucial in his private cloud, he needs to make sure that every component is healthy.

Before he can start connecting Virtual Machine Manager and Operations Manager he needs to verify some prerequisites:

Credentials

- An account which is a member of the Operations Manager Administrators user role
- An account which is a member of the VMM Administrator user role

Management Packs

- SQL Server Core Library version 6.0.5000.0 or later (<u>http://www.microsoft.com/download/en/details.aspx?id=10631</u>)
- Windows Server Internet Information Services Library version 6.0.5000.0 or later
- Windows Server Internet Information Services 2003 version 6.0.5000.0 or later
- Windows Server 2008 Internet Information Services 7 version 6.0.6539.0 or later(<u>http://www.microsoft.com/download/en/details.aspx?id=9815</u>)
- Operations Manager console installed on the VMM Server

Since this is an evaluation, he can use the **administrator** role for the credentials.

Jeff performs these procedures first and then starts with the connecting procedure.

1. From the VMM Server open up the System Center Virtual Machine Manager console and click on the Settings workspace. Jeff then clicks on System Center Settings

Settings <
🜆 General
4 🎎 Security
🐼 User Roles
Run As Accounts
Servicing Windows
🚆 Configuration Providers
a System Center Settings
賤 Console Add-ins
w VMs and Services
_
😳 Fabric
🧮 Library
🛅 Jobs
Settings

2. In the **Settings** pane, double click on **Operations Manager Server**

Sett	ings (1)	
		۶
	Name	
	Operations Manager Server	

3. From the **Introduction** page, select **Next**

•	Add Operations Manager
Introductio	on Alle
Introduction Connection to Connection to VMM Summary	Introduction This wizard will guide you through the process of configuring integration with System Center Operations Manager. Please note the following prerequisites: -Credentials An account which is a member of the Operations Manager Administrators user role An account which is a member of the VMM Administrator user role -Management Packs SQL Server Core Library version 6.0.5000.0 or later Windows Server Internet Information Services Library version 6.0.5000.0 or later Windows Server Internet Information Services 2003 version 6.0.5000.0 or later Windows Server 2008 Internet Information Services 7 version 6.0.6539.0 or later -Operations Manager console installed on the VMM Server
	Previous Next Cancel

- 4. On the **Connection to Operations Manager** page, enter the following information and then select **Next**
 - Server name: OpsMgr
 - Use the VMM server service account: Enabled
 - Enable Performance and Resource Optimization (PRO): unchecked
 - Enable maintenance mode integration with Operations Manager: unchecked

Note: If the VMM server service account is LocalSystem, then tick the Use a Run As account instead and select VMM_RunAs_Contoso

E	Add Operations Manager						
Connectio	on to Operations Manager						
Introduction	Configure connection from VMM to Operations Manager Specify the root management server (RMS) to use, and enter the administrative credentials for the						
Connection to							
Connection to VMM	management group to which you want VMM to connect.						
Summary	Server name: OpsMgr						
	● Use the <u>V</u> MM server service account						
	Service account: CONTOSO\administrator						
	O Use a <u>R</u> un As account						
	<u>B</u> rowse						
	Enable Performance and Resource Optimization (PRO) You must separately enable PRO for each host group, host cluster, service, or cloud with which you want to use PRO. Enable maintenance mode integration with Operations Manager When Hosts are put in maintenance mode in VMM, attempt to also set them in maintenance mode in Operations Manager.						
	Previous Next Cancel						

- 5. On the **Connection to VMM** page, fill in the following data and select **Next**
 - **User name:** contoso\administrator
 - Password: *****

	Add Operations Manager					
Connectio	n to VMM					
Introduction Connection to Connection to VMM	Configure connection from Operations Manager to VMM Specify credentials for Operations Manager to use to connect to the VMM server. The account will be assigned Administrator rights on the VMM server.					
Summary	User name: contoso\administrator Example: contoso\domainuser Password: •••••••					
	Previous Next Cancel					

6. On the **Summary** page, review your settings and select **Finish**

8	Add Operations Manager				
Summary					
Introduction Connection to Connection to VMM Summary	Confirm the settings RMS name: OpsMgr Operations Manager credentials: contoso\administrator YMM credentials: contoso\administrator Enable PRO: Yes Maintenance mode integration: Yes	View Script			
	Previous Finish	Cancel!			

7. A job window will open where you can see if the job succeeds or fails

Ē			Job	DS			_ 🗆 X			
Rece	Recent Jobs (8)									
							٩			
	Name	Status ~	Start Time	~	Result Name	Owner	-			
0	New Operations Manager connection	Completed	1/23/2013 9:49:56 AM		OpsMgr	CONTOSO\Administrator				
۷	New Operations Manager connection						~			
	atus: Completed ommand: New-SCOpsMgrConnection	Property		Previous Value		New Value				
Re	sult name: OpsMgr									
Sta	arted: 1/23/2013 9:49:56 AM									
Du	uration: 00:00:24									
01	wner: CONTOSO\Administrator									
	nmary Details Change Tracking									
Sun	many Details Change fracking									
•	Show this window when new objects are cro	eated				F	Restart Cancel			

Install the chargeback report files on the Operations Manager management server

- 1. Log on to the **Operations Manager** management server as **contoso\Administrator**
- In the Chargeback folder (located on the ServiceMgr server <u>\\servicemgr\c\$\program files\Microsoft</u> <u>System Center 2012\Service Manager\Chargeback\</u>) copy the subfolder named **Dependencies** from the Service Manager Management server to the Operations Manager management server. In this example Dependencies has been copied to the desktop.

twork ▶ servicemgr ▶ c\$	▶ Program Files ▶ 1	Microsoft System	n Cente	er 2012 🔸 Service Mar	iager ► Charg
Name		Date modified		Туре	Size
퉬 Dependencies 🛛 👝	1	14/01/2013 2:0	З р	File folder	
Chargeback.mpb	Open		7 p	MPB File	536 KB
📄 ChargebackRepor	Open in new windo	w	80	XLSX File	161 KB
🗟 ImportToSM	Pin to Start		ā a	Windows PowerS	16 KB
🗟 SC2012SP1RCUpg	Restore previous ve	rsions	ā a	Windows PowerS	14 KB
📄 SC2012SP1RCUpg	Send to	•	2 a	Microsoft SQL Ser	4 KB
🗟 SC2012SP1RCUpg	Cut		5 a	Windows PowerS	13 KB
	Сору				

3. On the Operations Manager management server, start Windows PowerShell and then navigate to the **Dependencies** folder. Using the same example as above, the following command will work:

cd c:\users\administrator.contoso\desktop\dependencies

Windows PowerShell Copyright (C) 2012 Microsoft Corporation. All rights reserved. PS C:\Users\administrator.CONTOSO> cd c:\users\administrator.contoso\desktop\dependencies

4. If you have not already set execution policy to **remotesigned**, then type the following command, and then press ENTER:

Set-ExecutionPolicy -force RemoteSigned

Windows PowerShell Copyright (C) 2012 Microsoft Corporation. All rights reserved. PS C:\Users\administrator.CONTOSO> Set-ExecutionPolicy -force RemoteSigned

5. Type the following command, and then press ENTER to run the PowerShell script that imports chargeback management packs and that add chargeback functionality to Operations Manager:

\ImportToOM.ps1

PS_C:\Users\administrator.CONTOSO>_.\ImportToOM.ps1

6. After the script has completed running, type **exit**, and then press ENTER to close the **Administrator: Windows PowerShell** window.

Install the chargeback reports on the Service Manager Management server

- 1. Log on to the **Service Manager** Management server as **contoso\Administrator**.
- 2. If you have not already set execution policy to **remotesigned**, then start Windows Power shell as an administrator, type the following command, and then press ENTER:

Set-ExecutionPolicy -force RemoteSigned

Windows PowerShell Copyright (C) 2012 Microsoft Corporation. All rights reserved. PS C:\Users\administrator.CONTOSO> Set-ExecutionPolicy -force RemoteSigned

3. Type exit and then press ENTER to close the Administrator: Windows PowerShell window.

PS C:\Users\Administrator.CONTOSO> exit

- 4. Still from the **ServiceMGR** server, click **Start**, type in **Service Manager Shell** and then click on the **Service Manager Shell** icon to open the program.
- 5. Navigate to the **Chargeback** folder by typing in the command

cd chargeback

PS C:\Program Files\Microsoft System Center 2012\Service Manager> cd chargeback

6. Type the following command, and then press ENTER to run the PowerShell script that imports chargeback management packs and that add chargeback functionality to Service Manager:

.\ImportToSM.ps1

PS C:\Program Files\Microsoft System Center 2012\Service Manager\chargeback> .\ImportToSM.ps1

After the script has completed running, type **exit**, and then press ENTER to close the **Administrator: Windows PowerShell** window.

7. In the **Service Manager** console, click **Data Warehouse**, expand the **Data Warehouse** node, and then click on **Data Warehouse Jobs**.

Data Warehouse <
🖌 🥛 Data Warehouse
🚯 Analysis Libraries
Cubes
🧕 Data Sources
🖆 Data Warehouse Jobs
式 Management Packs
Security
Z Administration
Work Items
Configuration Items
길 Data Warehouse
📔 Reporting
•

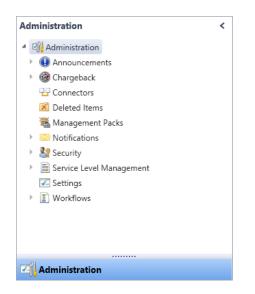
8. In the list of data warehouse jobs, select **MPSyncJob** and then from the Task list, click **Resume**.

Data Warehouse Jobs 13						
Filter					Q	Edit Criteria 🗸
Name	Category	Enabled	Status			A.
Extract_DW_ServiceManagerMG	Extract	Yes	Not Started			
Extract_ServiceManagerMG	Extract	Yes	Not Started			
Load.CMDWDataMart	Load	Yes	Not Started			=
Load.Common	Load	Yes	Not Started			
Load.OMDWDataMart	Load	Yes	Not Started			
MPSyncJob	Synchronization	Yes	Not Started	_		
Process.SystemCenterChangeAndActivityM	Cube Processing	Yes	Failed		perties	
Process.SystemCenterConfigItemCube	Cube Processing	Yes	Failed	Res	ume	
Process.SystemCenterPowerManagementC	Cube Processing	Yes	Failed	Sus	pend	-

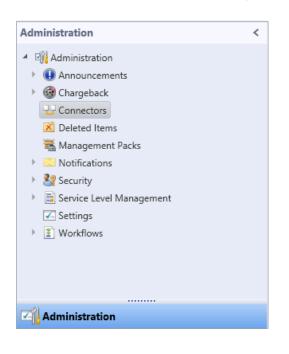
The next step is to configure the **Operations Manager Cl connecter** and ensure that **Service Manager** has discovered the virtual machine information from **Operations Manager**

Create the Operations Manager CI connector

1. From the **ServiceMgr** server open the **Service Manager** console and click on the **Administration** workspace.



2. From the Administration workspace, expand Administration, and then click Connectors.



3. In the Tasks pane, under **Connectors**, click **Create Connector**, and then select **Operations Manager Cl Connector**.

>	Tasks			
7	0			
Cor	nnectors		^	
	Create connector		Active Directory connector	-
_	Import from CSV	22	Configuration Manager con	nector
Q	Refresh	22	Operations Manager Alert c	onnector
Adı	ministration	77	Operations Manager CI con	nector
Σ	Start PowerShell :		Orchestrator connector	
		77	Virtual Machine Manager co	nnector

4. Click **Next** on the **Before you Begin** page.

8	Operations Manager CI conn	ector wizard		L		x
📕 Before You Be	egin					Å
Before You Begin	Create a new connector					
General	This wizard helps you to complete the follow	ing tasks:				
Server Details	Specify what configuration items to bring i	n from Operati	ons Manager.			
Management Packs						
Schedule						
Summary						
Completion						
	Do not show this page again			To continu	ue, click N	ext.
		Cancel	< Previous	Next >	Crea	te

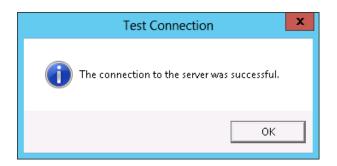
5. On the **General** page, in the **Name** box, type **OpsMgr Cl Connector** for the new connector. Make sure that the **Enable** check box is selected, and then click **Next.**

8	Operations Manager CI connector wizard
🖵 General	A A A A A A A A A A A A A A A A A A A
Before You Begin General	Enter a name and description for the connector
Server Details Management Packs Schedule Summary Completion	OpsMgr CI Connector Description:
	V Enable
	Cancel < Previous Next > Create

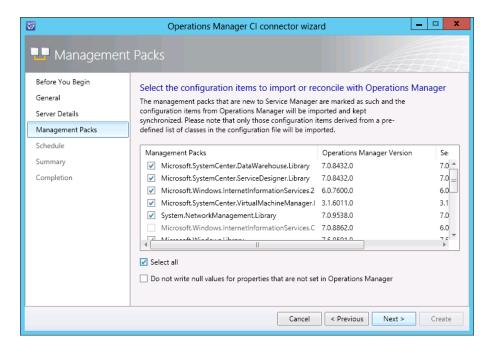
6. On the **Server Details** page, in the **Server name** box, type **OpsMgr** leave the **RunAs** account as **Active Directory Account**. Use the **contoso\administrator** account.

	Operations Manager CI connector wizard	¢
🖵 Server Details		
Before You Begin General Server Details Management Packs Schedule Summary Completion	Enter the server name and credentials for the Operations Manager server Server Information Server name: OpsMgr Credentials Run As account: Active Directory Account New Test Connection	
	Cancel < Previous Next > Create	

7. Test Connection and confirm that the connection confirms correctly, click on OK and then click on Next



8. On the **MP Selection** page, click **Select all**, and then click **Next**



9. On the **Schedule** page, click **Next**, and then click **Next** again.

8	Operations Manager CI connector wizard
L Schedule	
Before You Begin General Server Details Management Packs Schedule Summary Completion	Create a schedule Synchronize Every day • at 10:00 AM •
	Cancel < Previous Next > Create

10. Verify your connector settings are as per the instructions and then click **Create**.

5	Operations Manager CI connector wizard
🖵 Summary	
Before You Begin General	Confirm the connector settings
Server Details Management Packs Schedule	Name: OpsMgr CI Connector Description:
Summary Completion	Server name: OpsMgr = Run As account: Active Directory Account Schedule: Synchronize Every day at 10:00 AM Management pack: Data Warehouse Library, Distributed Application Designer Library, Windows Server 2008 Internet Information Services 7, Surtem Contex Virtual Machine Manager 2008 P3 DPO To change the settings, click Previous. To create the connector, click Create.
	Cancel < Previous Next > Create

The import process can take up to an hour to complete; you can check the status of the import by opening the **Service Manager console** and checking the **status** of the **MPSync** job. Once the import has completed, close the

Service Manager console and then reopen it. Under the **Administration** tab, expand **Administration**, and confirm that **Chargeback** is now listed. Once it is there you can proceed to create your **price sheet**.

Important Note

The Chargeback facility is reliant on the capturing of data over a period of time. Due to time constraints and the minimal pool of resources in this evaluation guide, Microsoft has provided a data generation tool that will pre-populate the Service Manager database with chargeback information. The data generation tool can be downloaded from here: http://go.microsoft.com/?linkid=9825976

!

The installation of this tool is not required for the completion of this scenario, although it will help visualize what real-world results may look like.

To install the Chargeback Data Generation Tool follow these steps:

- Download the data generation tool from <u>http://go.microsoft.com/?linkid=9825976</u> then copy the file to the server **ServiceMgr**
- 2. Extract the file and run the installer **Chargeback Data Generation Tool** on the server **ServiceMgr**
- 3. Click Next

😸 Chargeback Data Generation Tool - Evaluation Guide S 💻 🗖 🗙						
Ð	Welcome to the Chargeback Data Generation Tool - Evaluation Guide Setup Wizard					
	The Setup Wizard allows you to change the way Chargeback Data Generation Tool - Evaluation Guide features are installed on your computer or to remove it from your computer. Click Next to continue or Cancel to exit the Setup Wizard.					
	Back Next Cancel					

4. Check I accept the terms in the License Agreement then click Next

岁 Chargeback Data Generation Tool - Evaluation Guide S 🗕 🗖 🗙					
End-User License Agreement Please read the following license agreement carefully					
MICROSOFT SOFTWARE LICENSE TERMS					
CHARGEBACK DATA GENERATION TOOL - EVALUATION GUIDE					
These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. Please read them. They apply to the software named above, which includes the media on which you received it, if any. The terms also apply to any Microsoft					
updates,					
✓ I accept the terms in the License Agreement					
Print Back Next Cancel					

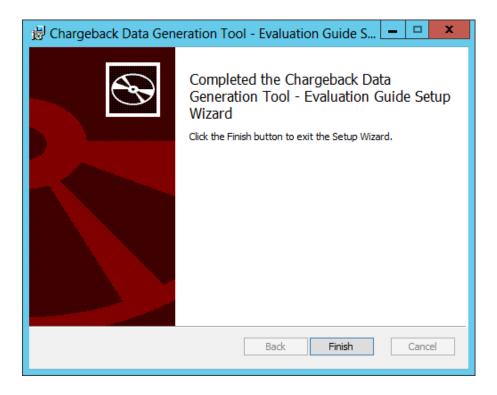
5. Confirm the install directory, then click **Next**

🛱 Chargeback Data Generation Tool - Evaluation Guide S 🗕 🗖 🗙
Destination Folder Click Next to install to the default folder or click Change to choose another.
Install Chargeback Data Generation Tool - Evaluation Guide to:
C:\Program Files (x86)\ChargeBack Data Generation Tool\ Change
Back Next Cancel

6. Click Install

😸 Chargeback Data Generation Tool - Evaluation Guide S 🗕 🗖 🗙
Ready to install Chargeback Data Generation Tool - Evaluation
Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.
Back Install Cancel

7. Click Install



 Browse to the folder that you installed the tool to, in this example it is C:\Program Files(x86)\ChargeBack Data Generation Tool then run the file datagenclient.exe

🖟 l ⊋ 🕼 🖛 l		Application Tools	Char	geBack Data Gene	ration Tool	_ □
File Home Share	View	Manage				~
🔄 💿 🔻 🕇 퉬 « Pro	gram Files (:	<86) 🕨 ChargeBack	Data Generation	「ool √ Ċ	Search ChargeBa	ck Data Gene ,
🛠 Favorites	Name	^		Date modified	Туре	Size
Desktop	🔮 Cloud	Data		2/19/2013 11:21 AM	XML Document	2 KB
🐌 Downloads	🔳 datag	enclient		2/19/2013 11:21 AM	Application	14 KB
🔛 Recent places	📄 datag	enclient.exe.config		2/20/2013 1:07 PM	CONFIG File	1 KB
	📄 datag	enclient.pdb		2/19/2013 11:21 AM	PDB File	26 KB
🥽 Libraries	🔳 datag	enclient.vshost		2/19/2013 11:21 AM	Application	12 KB
Documents	📄 Daten	nove.sql		2/19/2013 11:21 AM	SQL File	2 KB
J Music	🚳 Micro	soft.EnterpriseMana	agement.Core.dll	2/19/2013 11:21 AM	Application extens	3,951 KB
Pictures	🚳 Micro	soft.Mom.BuildCor	stants.dll	2/19/2013 11:21 AM	Application extens	551 KB
📑 Videos	📓 Run_C	CubeProcessJob		2/19/2013 11:21 AM	Windows PowerS	4 KB
	📓 Run-E	т		2/19/2013 11:21 AM	Windows PowerS	5 KB
💻 Computer	📄 RUn-l	.oad		2/19/2013 11:21 AM	Windows PowerS	5 KB
🚢 Local Disk (C:)	🚳 SC.SN	1.TestLibrary.Charge	Back.DataGene	2/19/2013 11:21 AM	Application extens	64 KB
DVD Drive (D:) SQLS	SC.SN	1.TestLibrary.Charge	eBack.DataGene	2/19/2013 11:21 AM	PDB File	136 KB
辑 Network						
*						
13 items 1 item selected 1	13.5 KB					

9. Once the data generation has completed, close the CMD prompt.

Administrator: C:\Windo	ws\system32\cmd.exe - datagenclient.exe	
1 added UMUnplanned 4 added UMUnplanned 3 added UMUnplanned 3 added UMUnplanned 2 added UMUnplanned 2 added UMUnplanned 2 added UMUnplanned 2 added UMUnplanned 3 added UMUnplanned 3 added UMUnplanned 5 added UMUnplanned 5 added UMUnplanned 5 added UMUnplanned 5 added UMUnplanned 5 added UMUnplanned 5 added UMUnplanned	workloads4 to Unplanned workloads workloads5 to Unplanned workloads workloads6 to Unplanned workloads workloads7 to Unplanned workloads workloads8 to Unplanned workloads workloads9 to Unplanned workloads workloads10 to Unplanned workloads workloads11 to Unplanned workloads workloads12 to Unplanned workloads workloads13 to Unplanned workloads workloads14 to Unplanned workloads workloads15 to Unplanned workloads workloads15 to Unplanned workloads workloads14 to Unplanned workloads workloads14 to Unplanned workloads workloads14 to Unplanned workloads workloads15 to Unplanned workloads workloads15 to Unplanned workloads workloads17 to Unplanned workloads workloads19 to Unplanned workloads workloads19 to Unplanned workloads Workloads20 to Unplanned workloads Workloads20 to Unplanned workloads	
comitting the cloud comitting the cloud comitting the cloud	Engg-NewYork Demo UAT Unplanned workloads	•

This completes the installation of the data generation tool. When assigning Clouds to the price sheet created later in this scenario, ensure that you select the additional clouds created by this tool.

Create a Price Sheet

Price sheets in System Center 2012 – Service Manager allow you to define price policies on existing private cloud objects that are discovered from the Operations Manager CI connector. You can associate one or more private clouds to a price sheet. After association, price information contained in the price sheet is shown in OLAP cubes and in a sample Excel report. You can use the OLAP cube data to create your own customized reports using various reporting solutions such as SQL Server Reporting Services, SQL Server Analysis Services tools, and Microsoft Excel. Additionally, you can modify the sample Excel report for your organization's needs.

Although you can create multiple price sheets without publishing them, you must publish a price sheet before you can associate cloud objects to the price sheet.

To create a price sheet

1. In the Service Manager console, select Administration

Administration	<
 Image: Image: Administration 	
Announcements	
🕨 🎯 Chargeback	
🔀 Deleted Items	
🚟 Management Packs	
Notifications	
Security	
Service Level Management	
Z Settings	
Workflows	
	_
Administration	
Work Items	
Configuration Items	
ј Data Warehouse	
Reporting	

2. In the **Administration** pane, expand **Chargeback**, expand **Infrastructure**, expand **Price Sheets** and then select **All Price Sheets**

Administration <
Administration
Announcements
4 🎯 Chargeback
4 🔯 Infrastructure
Clouds
 Price Sheets
All Price Sheets
🖵 Connectors
🔀 Deleted Items
藩 Management Packs
Notifications
Security
🕨 📄 Service Level Management
Settings
Workflows
Administration
🔋 Work Items
Configuration Items
ј Data Warehouse
Reporting

3. In the Tasks pane under All Price Sheets, click Create Price Sheet.



- 4. On the **General** tab, input the following values:
 - Name: Gold Price Sheet.
 - Description: The Gold price sheet is the top tier service for performance and cost

	PS2	Published d Published			1/23/2013 2:56 PM CONTOSO\Administrator
General	Price	Assigned Clouds	History		
Price	Sheet				
Name:				Status:	
Gold P	rice Sheet			<u>Draft</u>	*
Descript					
The Go	na price sr	neet is the top tier ser	vice for per	formance and cost	
				ОК	Cancel Apply

- 5. Click on the **Price** tab and input the following values:
 - VM Base Price per day: 22.55
 - Cloud Membership Price per day: **10.20**
 - VM CPU Price per Core/day: 1.20
 - VM Memory Price per GB/day: .30

- VM Storage Price per GB/day: .10
- Highly Available VM Price per day: 1.10
- Static IP Price per day: .05
- Expanding VHD Price per day: .55

Click on **OK**

PS2		shed date: plished by:			1/23/2013 2:56 PM CONTOSO\Administr	ator
General Price	Assigned Clo	ouds History				
Base Price Base prices are ap Total costs are dis		ïrtual Machine (VM sheet reports.	I) in the assigne	ed usages.		
VM Base Price pe 22.55	r day:	Cloud Membershi 10.20	ip Price p			
Compute Pri Compute prices a Total costs are dis	re applied to th	. 2	irtual Machine	(VM) compu	ite resources in the as	
VM CPU Price per 1.20	r Core/day:	VM Memory Price	e per GB/d	VM Storag 0.10	ge Price per GB/day:	_
Advanced O	ptions Price	e				
Advanced prices a	are applied to th	he corresponding r	esources in the	assigned us	sages.	
Total costs are dis	splayed in price	sheet reports.				
Highly Available \ 1.10	/M Price p	Static IP Price per 0.05	day:	Expanding 0.55	VHD Price per day:	•
			01	<	Cancel Apply	

Publish the Gold Price Sheet

Jeff now needs to publish the price sheet he has created to make it available to assign to new or existing Clouds.

1. In the Service Manager console, select the **Administration** tab

Administration	<
 Administration 	
Announcements	
🕨 🎯 Chargeback	
💾 Connectors	
🔀 Deleted Items	
🚟 Management Packs	
Notifications	
Security	
Service Level Management	
Z Settings	
Workflows	
Administration	
🔋 Work Items	
Configuration Items	
ј Data Warehouse	
Reporting	

2. In the Administration pane, expand Price Sheets, All Price Sheets, then select Gold Price Sheet

Administration <	All Pr	ice Sheets 1			
Administration	Filter	-	٩	Edit Criter	ria 🗸
I Announcements	ID	Name	Description		Stat
4 🎯 Chargeback	PS2	Gold Price Sheet	The Gold price sheet is the top tier service	vice for	Dra
4 🐻 Infrastructure					
Clouds					
 Price Sheets 					
All Price Sheets					
🔀 Deleted Items	٠				- F

3. In the **Tasks** pane click **Publish**.



Assign the Gold Price Sheet to MyCloud

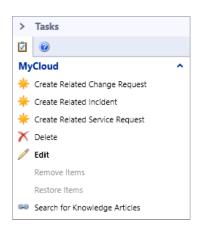
1. In the Service Manager console, select Administration

Administration <
Administration
Announcements
🕨 🎯 Chargeback
🖵 Connectors
🔀 Deleted Items
🚟 Management Packs
Notifications
Security
🕨 📄 Service Level Management
Settings
Workflows
Administration
Work Items
Configuration Items
ј Data Warehouse
📔 Reporting

2. In the Administration pane, expand Chargeback, expand Clouds, and then select All Clouds



3. In the list of clouds, select "MyCloud" and then under Tasks, click Edit



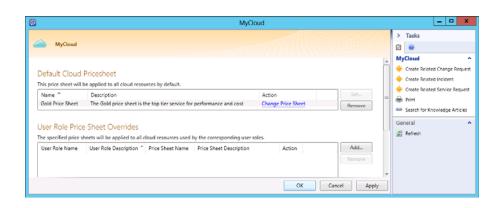
4. In the **MyCloud** form under **Default Cloud Pricesheet**, click **Set**

Default Cloud	Pricesheet		
This price sheet will	be applied to all cloud reso	urces by default.	
-			

5. In the **Select objects** dialog box, select the **Gold Price Sheet** and then click **OK**.

9		Select o	objects		- 🗆 X
	Select objects				
Selec	t an object and then click (OK. You can use Search	and Filter to better define the	e list to se	lect from.
Туре	to filter	Q	VMM Cloud Price Sheet		•
Availa	able objects: 1 of 1. Enter	more details in the sea	rch criteria to narrow the resu	ult list.	
Nar	me	Class 👻	Path		
8	Gold Price Sheet	VMM Cloud Price Shee	et		
				ОК	Cancel

6. Click **OK** to close the **MyCloud** form.



Important Note

If you have used the data generation tool to generate additional chargeback data, repeat steps **2-6** to associate the additional clouds to the **Gold Price Sheet**.

1

Chargeback reporting for visibility into usage

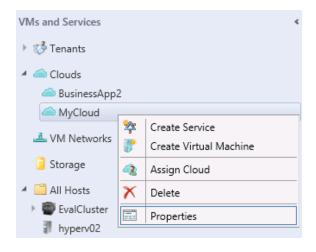
In System Center, chargeback is one of the tools that help you communicate with business units about how they consume capacity. This helps you by utilizing existing investments, proportionate to your customer's requests. System Center components help you manage the following processes:

- Quotas
- Leases
- Approvals
- Chargeback or Showback

The theme of chargeback is cloud based pricing, where each cloud has its own price, based on SLA. Most often, you'll have many clouds with various SLAs for the clouds for different business units or organizations. Chargeback uses a price sheet, or rate card, for each cloud. This means you can have one price represented in a price sheet that contains various clouds addressing one SLA, and you can have another price sheet for a different SLA.

Prerequisites

- Office Professional 2013 demo installed is installed on Guest01 as excel is required to view the Chargeback spread sheet report.
- Download the Microsoft Office Professional Plus 2013 demo from TechNet here http://technet.microsoft.com/en-us/evalcenter/jj192782.aspx
- 1. Firstly Jeff is required to change the properties of the **MyCloud** cloud settings. This is because the virtual machines we are adding to the cloud have a maximum dynamic memory allocation of just over a Terabyte of memory and will conflict with the clouds allowable RAM allocation.
- 2. Jeff opens up the **Virtual Machine Manager console** on the VMM Server. He then clicks on **VMs and Services**, expands **Clouds**, right clicks on the **MyCloud** cloud and clicks **Properties**.



3. When the **MyCloud** properties open, Jeff clicks on the **Capacity** tab and ticks all the **Use Maximum** boxes to allow any Virtual Machine to be added to it and clicks **OK**

General	Catalian ann aite fa	المرتبع المراجع والمراج		
General	Set the capacity fo	r this cloud		
Resources	Cloud capacity:			
Logical Networks	Dimension	Total Capacity	Use Maximum	Assigned Capacity
Logical Networks	Virtual CPUs:	Unlimited	\checkmark	Unlimited
Load Balancers	Memory (GB):	16	\checkmark	Unlimited
	Storage (GB):	1219	\checkmark	Unlimited
VIP Templates	Custom quota (points):	Unlimited	\checkmark	Unlimited
Port Classifications	Virtual machines:	Unlimited	\checkmark	Unlimited
Storage				
Library Capacity				
Storage Library Capacity Capability Profiles				
Library Capacity				
Library Capacity Capability Profiles				

4. From within the **VMM** console, Jeff then navigates to the **VMs and Services** tab and from the available VM list clicks on the **ServiceMgr** server, he then right clicks on it and chooses **Properties**

	VMs (10)		Migrate Virtual Machine
VMs	; (10)		Store in Library
		۲	Create Checkpoint
	Name	2	Manage Checkpoints
	AD	Q	Refresh
	AppController	300	Repair
	DPM	5	Install Virtual Guest Services
	Guest01	1	Connect or View
	OpsMgr	X	Delete
	Orchestrator		Departies
	ServiceMgr	===	Properties

5. In the **General** section of the properties pane Jeff clicks on the drop down box next to **Cloud** and then adds this server to the **MyCloud** cloud.

8	Ser	viceMgr Properties		x
General Status	Name: Description:	ServiceMgr		
Hardware Configuration				
Checkpoints	Computer name:	ServiceMgr.contoso.com		_
Custom Properties	Cost center: Tag:	(none)		
Settings	Cloud:	MyCloud		•
Actions	Type: Operating system:	[None - not associated to a cloud] BusinessApp2 MyCloud		
Servicing Windows	Virtual machine guest servi			_
Dependencies PRO State Validation Errors Access	Added: Modified:	Monday, January 14, 2013 3:33 PM Monday, January 28, 2013 11:57 AM		
View Script			OK Cano	el "ii

6. He then creates a new cost center for this service offering called **ICT100** and clicks **OK**

8	Servic	eMgr Properties	x
General	Name:	ServiceMgr	
Status	Description:		
Hardware Configuration			
Checkpoints	Computer name:	ServiceMgr.contoso.com	
	Cost center:	ICT100	
Custom Properties	Tag:	(none)	
Settings	Cloud:	MyCloud	•
Actions	Туре:	🐍 Virtual Machine	
	Operating system:	64-bit edition of Windows Server 2012 Standard	-
Servicing Windows	Virtual machine guest services:	6.2.9200.16384	
Dependencies	Added:	Monday, January 14, 2013 3:33 PM	
	Modified:	Monday, January 28, 2013 11:57 AM	
PRO State			
Validation Errors			
Access			
ALL Door			
View Script		OK	□

7. Jeff then chooses the ServiceMgrDW virtual machine, right clicks on this and then clicks on Properties

🐌 Orchestrator	×	Delete	
🐌 ServiceMgr			
膭 ServiceMgrDW		Properties	
🐌 SharePoint		Running	Running
🐌 VMM		Running	Running

8. In the **General** section click on the drop down next to clouds and add this server to the **MyCloud** cloud. Jeff also adds the cost center we created earlier **ICT100** and clicks **OK**

8	Service	AgrDW Properties	x
General	Name: Description:	ServiceMgrDW	
Status Hardware Configuration	beachprion		
Checkpoints	Computer name:	ServiceMgrDW.contoso.com	
Custom Properties	Cost center: Tag:	ICT100 (none)	
Settings	Cloud:	MyCloud	•
Actions	Type: Operating system:	 Virtual Machine 64-bit edition of Windows Server 2012 Standard 	•
Servicing Windows Dependencies	Virtual machine guest services: Added:	6.2.9200.16384 Monday, January 14, 2013 3:32 PM	
PRO State	Modified:	Monday, January 28, 2013 11:57 AM	
Validation Errors			
Access			
View Script		OK	□

9. The last server he adds to this Cloud is the **SharePoint** server. Jeff right clicks on the this virtual machine and clicks **Properties**

Output to the second				
🚯 Orchestrator		۵	Connect on View	
	ServiceMgr		Connect or View	•
	ServiceMgrDW	X	Delete	
	SharePoint		Properties	

10. He then adds it to the **MyCloud** cloud but this time adds this machine to the alternative **ICT110** cost center and clicks **OK**

•	Share	Point Properties	x
General	Name: Description:	SharePoint	
Status Hardware Configuration			
Checkpoints	Computer name: Cost center:	SharePoint.contoso.com	
Custom Properties	Tag:	(none)	
Settings	Cloud:	MyCloud [None - not associated to a cloud]	•
Actions	Type: Operating system:	BusinessApp2 MyCloud	
Servicing Windows	Virtual machine guest services	6.2.9200.16384	
Dependencies	Added: Modified:	Wednesday, January 16, 2013 12:46 PM Monday, January 28, 2013 11:57 AM	
PRO State			
Validation Errors			
Access			
Manufacture			
View Script		OK Cancel	

11. Jeff now jumps onto the **ServiceMgr** server and opens the **Service Manager Console**. From the **Administration** tab he now clicks on the **Connectors**

Administration <
 Administration Announcements Chargeback Chargeback Image Chargeback Image Clouds All Clouds All Clouds All Price Sheets All Price Sheets All Price Sheets All Price Sheets Connectors Deleted Items Management Packs Notifications Security Service Level Management Settings Workflows
Administration
🔋 Work Items
Configuration Items
ј Data Warehouse
📔 Reporting
•

12. Jeff chooses the **OpsMgr CI Connector** we created earlier and from the available **Tasks** he forces a **Synchronize Now** from the available task list. Jeff has to wait for this synchronization to complete before carrying on; he hits F5 on the keyboard and watches the **Status** and **Percentage** columns to make sure the process finishes correctly.

Connectors 3			>	Tasks	
Filter		🔎 Edit Criteria 🗸	Ż	0	
Name	Enabled	Data Provider Name	Ор	sMgr CI Connector	^
Active Directory Connector	Yes	ADConnector	X	Delete	
Orchestrator Connector	Yes	System Center Orchestrator Runbook Connector	J.	Disable	
OpsMgr CI Connector	Yes	Operations Manager Configuration Items	Ť	Enable	
			17 16 1	Properties	
			GÐ	Search for Knowledge Articles	
			2	Synchronize Now	

13. From the same Service Manager console, Jeff now clicks on Data Warehouse and clicks on Data Warehouse Jobs. He notes the jobs that are listed are part of the Service Manager Data Warehouse process, and are configured to run at either at specific schedule, i.e. once every 24 hours, where as some are running multiple times per hour. Jeff decides to write a script to have these jobs run now and in the correct sequence

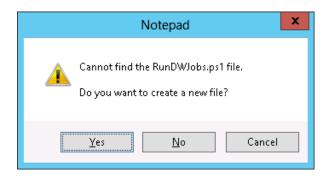
Data Warehouse	<
 Data Warehouse Analysis Libraries Cubes Data Sources Data Warehouse Jobs Management Packs Security 	
Administration	
🔋 Work Items	
Configuration Items	
길 Data Warehouse	
📔 Reporting	
-	•

14. Jeff then clicks on the start button at the bottom left corner of the desktop and opens up the **Service Manager Shell** program



15. He then types in "**notepad RunDWJobs.ps1**" and hits enter, this will now open up notepad and when prompted, he answers **Yes** to create the new file with that associated filename

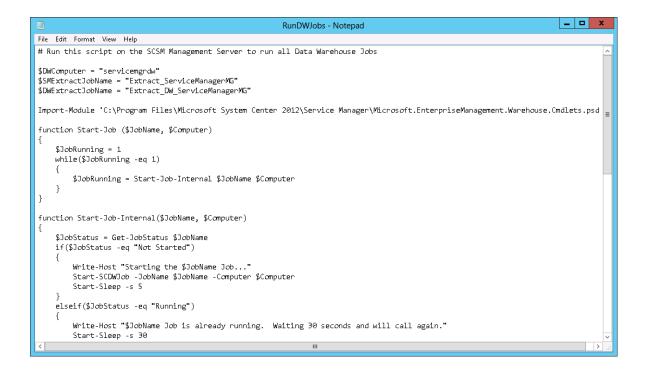
notepad RunDWJobs.ps1



16. Jeff copies the script below into the notepad window, he then saves the file and exits notepad. This script is designed to run all the required data warehouse jobs in the correct order

```
# Run this script on the SCSM Management Server to run all Data Warehouse
Jobs
$DWComputer = "servicemgrdw"
$SMExtractJobName = "Extract_ServiceManagerMG"
$DWExtractJobName = "Extract DW ServiceManagerMG"
Import-Module 'C:\Program Files\Microsoft System Center 2012\Service
Manager\Microsoft.EnterpriseManagement.Warehouse.Cmdlets.psdl'
function Start-Job ($JobName, $Computer)
ł
    JobRunning = 1
   while($JobRunning -eq 1)
        $JobRunning = Start-Job-Internal $JobName $Computer
    }
}
function Start-Job-Internal($JobName, $Computer)
{
    $JobStatus = Get-JobStatus $JobName
    if($JobStatus -eq "Not Started")
    ł
        Write-Host "Starting the $JobName Job ... "
        Start-SCDWJob -JobName $JobName -Computer $Computer
        Start-Sleep -s 5
    }
    elseif($JobStatus -eq "Running")
        Write-Host "$JobName Job is already running. Waiting 30 seconds and
will call again."
        Start-Sleep -s 30
```

```
return 1
    }
    else
    {
       Write-Host "Exiting since the job is in an unexpected status"
       exit
    $JobStatus = "Running"
    while($JobStatus -eq "Running")
    {
        Write-Host "Waiting 30 seconds"
       Start-Sleep -s 30
        $JobStatus = Get-JobStatus $JobName
       Write-Host "$JobName Job Status: $JobStatus"
        if($JobStatus -ne "Running" -and $JobStatus -ne "Not Started")
        {
            Write-Host "Exiting since the job is in an unexpected status"
            exit
        }
    }
   return 0
}
function Get-JobStatus($JobName)
ł
        $Job = Get-SCDWJob -JobName $JobName -Computer $Computer
        $JobStatus = $Job.Status
       return $JobStatus
}
#ETL
Start-Job $SMExtractJobName $DWComputer
Start-Job $DWExtractJobName $DWComputer
Start-Job "Transform.Common" $DWComputer
Start-Job "Load.Common" $DWComputer
#Cube processing
Start-Job "Process.SystemCenterServiceManagerChargebackCube" $DWComputer
```



17. Back in the Service Manager Shell Jeff types in .\RunDWJobs.ps1 and hits enter. This script will then start each of the required Data Warehouse Jobs. This process will take some time to run and by checking on the Data Warehouse Jobs in the Service Manager console you can check they have finished and have all run correctly.

```
PS C:\Program Files\Microsoft System Center 2012\Service Manager> .\RunDWJobs.ps1
Starting the Extract_ServiceManagerMG Job...
Waiting 30 seconds
Extract_ServiceManagerMG Job Status: Running
Waiting 30 seconds
Extract_ServiceManagerMG Job Status: Running
Waiting 30 seconds
Extract_ServiceManagerMG Job Status: Not Started
Starting the Extract_DW_ServiceManagerMG Job...
Waiting 30 seconds
Extract_DW_ServiceManagerMG Job Status: Running
Waiting 30 seconds
Extract_DW_ServiceManagerMG Job Status: Running
Waiting 30 seconds
Extract_DW_ServiceManagerMG Job Status: Not Started
Starting the Tansform.Common Job...
Waiting 30 seconds
```

18. Jeff then connects to the Guest01 server that we have installed the Microsoft Office 2013 Demo so we can view the chargeback reports. From within Explorer, browse to \\servicemgr\c\$\Program Files\Microsoft System Center 2012\Service Manager\Chargeback and open the ChargebackReport.xlsx Excel spread sheet.

🛃 🛄 =	Charg	LOUCK		
File Home S	nare View			\checkmark
🖻 💿 🔻 🚹 🌆	< Service Manager 🕨 Chargeback	Search Chargebac	:k 🌙	
☆ Favorites	Name	Туре	Size	
E Desktop	Dependencies	1/14/2013 2:08 PM	File folder	
鷆 Downloads	Chargeback.mpb	11/21/2012 4:27 PM	MPB File	536 KB
📃 Recent places	🖬 ChargebackReport	10/15/2012 10:08	Microsoft Excel W	161 KB
	📄 ImportToSM	11/21/2012 2:35 AM	Windows PowerS	16 KB
🥽 Libraries	SC2012SP1RCUpgrade_DWCleanup	11/21/2012 2:35 AM	Windows PowerS	14 KB
Documents	SC2012SP1RCUpgrade_DWCleanup	10/30/2012 9:52 AM	Microsoft SQL Ser	4 KB
🎝 Music	SC2012SP1RCUpgrade_RemoveCBMP	s 11/21/2012 2:35 AM	Windows PowerS	13 KB
📔 Pictures				
🚼 Videos				
🖳 Computer				
🊢 Local Disk (C:)				
👝 Data (E:)				
🚺 DVD Drive (F:)				
×	·			
7 items 1 item selec	ted 160 KB			8==

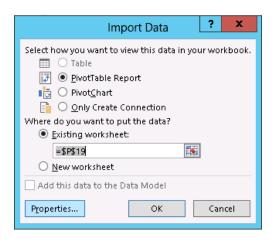
19. Jeff now has the chargeback report open but needs to configure the data source in the spread sheet to connect to the Service Manager Data Warehouse, as by default this report is configured to connect to localhost. From within Excel he clicks on the Data tab and then clicks on Existing Connections.

XI 🗖	5- 0					
FILE	HOME	INSERT	PAGE LA	YOUT	FORMULAS	DATA
Ca From A Ca From W Ca From To	/eb From	o Other urces ∓ C	Existing Connections	Refresh All •	Connections	Ž↓ <mark>Z</mark> Z↓ Sc
	Get Exter	mal Data		C	onnections	
P19	•	\times		2	cisting Connectio nmon sources.	n
	A	В	L	υ	E	F

20. Jeff then clicks on the Connections in this workbook .DWASDatabase SystemCenterServiceManagerChargebackCube and clicks on **Open**.

Existing Connections ?	x
Select a Connection or Table Connections Tables	
Show: All Connections	-
Connections in this Workbook DWASDataBase SystemCenterServiceManagerChargebackCube [Blank]	
Connection files on the Network < No connections found >	
Connection files on this computer	
< III >	
Browse for More Qpen Cancel	

21. From the Import Data dialogue box click on Properties.



22. Then Jeff changes from the default view of the **Usage** tab at the top to the **Definition** tab

	Connection Properties	? X
Connection <u>n</u> ame: Descr <u>i</u> ption:	. DWASDataBase SystemCenterServiceM	lanager Chargeba
Usa <u>q</u> e <u>D</u> efiniti	on	

23. In the available connection string section Jeff changes the **localhost** entry in the **Source** argument to **ServiceMgrDW** and clicks **OK**

	Connection Properties ? X							
Connection <u>n</u> ame: . Descr <u>i</u> ption:	DWASDataBase SystemCenterServiceManagerChargeba							
Usa <u>q</u> e <u>D</u> efinitio	n							
Connection type:	OLAP Query							
Connection <u>f</u> ile:	<u>B</u> rowse							
Connection <u>s</u> tring:	Always use connection file Provider=MSOLAP.4;Integrated Security=SSPI;Persist Security Info=True;Initial Catalog=DWASDataBase;Data Source=ServiceMgrDW;MDX Compatibility=1;Safety Options=2;MDX Missing Member Mode=Error							
	Save pass <u>w</u> ord							
Command type:	Cube							
Co <u>m</u> mand text:	SystemCenterServiceManagerChargebackCube							
Excel Services:	Authentication Settings							
Edit Query	Parameters Export Connection File							
	OK Cancel							

24. He then clicks **OK** when the **Import Data** window appears

Import Data ? 🗙								
Select how you want to view this data in your workbook. Table DivotTable Report OiverChart OiverChart OiverChart Chart C								
=\$P\$19 📧								
Add this data to the Data Model								
Properties OK Cancel								

25. The chargeback report dashboard is now open but there is still no real world data available yet. To get an updated view of the information Jeff clicks on the **Data** tab within Excel and clicks on the **Refresh All** button. The Refresh All button will query Service Managers' Analysis Services Chargeback OLAP cube and imports the information required.



26. Jeff can now see the dashboard(s) in the spread sheet have been updated with all the information updated from Service Manager, Virtual Machine Manager and Operations Manager. The information displayed is derived from the association of the VMM Cloud(s) with the Chargeback Price Sheet assigned.

	Dack	nboard		rearryumper		
	Dasi	ibuaru		2013	<u>^</u>	
				2000		
			2.000	2001		
and the second sec	500	2,500	2,000	2002		
2,000	.000	2,000	1,000	2003		
500	500	1,500	500			
1,000	0	1,000		CalendarMor	nth 🔣	
500	Stood advertiged	500	Gold Silver	February	-	
	Sta Creation and read	0	Price Price Sheet Sheet	January		
				February		
Top 3 Cost Centers	Top 3 Clouds	Top 3 User roles	Top 3 Price sheets	January		
250		7.000		March		
		6,000	•		×	
N00		5,000			P	votTable1
150		4,000				s area to work
		3,000		-	the Pix	otTable repo
100		2,000				
50		1,000			-	
。		0	2018			
Spending Trend (day	to data	Owarall	Spending		MANAG	

27. He then changes to the Chargeable Daily Details within the Spread sheet and notes the charges for each of the clouds deployed and their cost per day as defined by their associated price sheets.

		-		- .		-					YearNumb	21
		L	Daily [Jet	alls	Re	po	ort			2013	
							1				2000	
											2001	
		ory(GB) Days Stor									2002	
8	172	110.00	7,511.18	0	0	0	00	275.64	76.20	351.04	2003	
BusinessApp2	158	105.00	6,907.48	0	0	8	81	0.00	0.00	0.00		
BusinessApp2	2	1.00	535.04	0	0	0	6	206.80	61.20	268.00		
BMYCIOUG	12	12.00	535.04	0	0	0	6	206,80	61.20	268.00	300	
2013-01-28		6.00	267.22	0	0	0	3	103.37	30.60	133.97	250	
	ce Sheet 6	6.00	267.22	0	0	0	3	103.37	30.60	133.97	200	
=2013-01-25		6.00	267.82	0	0	0		103.43	30.60	134.03	100	
	ce Sheet 6	6.00	267.02	0	0	0	3	103.43	30.60	134.03	50	
Grand Total	172	118.00	7,511.18	0	0	8	88	275.64	76.20	351.84	0	10,10
		0.022				11	-				1.1	P2 who and
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	A	0	c	D	1		G	H		1	ĸ	L	M	
												YearNumber	Υ.	CalendarMont
			L	Jaily I	Deta	IIS R	eport					2013		February
				-								2000	*	January
												2001		February
			10010	10010										
		370	253.00	17,160.55	VITAINICAL VHC L				1,495.51	443.40	1,939.91	2002		January
-		204	177.00	17,100.55				144	0.00	0.00	1,9,99,91	2003		March
	nessApp2	204	1.00	11,529.10	8			104	68.83	15.00	83.83		¥	
	elopment Cloud	18	9.00	617.87					299.04	91.80	300.84			
MyC		66	66.00	2,944,91					1,137,64	336.60	1,474,24			
- may -	1000	66	66.00	2.944.91	0				1.137.64	236.60	1,474,24			
	2013-01-28 00:00-00		6.00	267.22	0			1		30.60	1,000,000			
	Gold Price Sheet	6	6.00	267.22		0		1	103.37	30.60	1.600			
	2013-01-29-00-00-00	6	6.00	267.82		0	0	3	103.43	30.60	1,400			-
	Gold Price Sheet	6	6.00	267.82	0	0	0	3	103.45	30.60	1,200			
10	2013-01-30 00:00:00	6	6.00	267.44	0	0	0	3	103.39	30.60				
	Gold Price Sheet	6	6.00	267.44	0	0	0	3	103.39	30.60	1,000			
- 12	2013-01-31 00:00:00	6	6.00	267.80	0	0	0	3	103.43	30.60	800			
	Gold Price Sheet	6	6.00	267.00	0	0	0	1	103.43	30.60	600			
8	2013-02-01 00:00:00	6	6.00	267.80	0	0	0	3	103.43	30.60	400			
	Gold Price Sheet	6	6.00	267.00	0	0	0	3	103.43	30.60	200			
	2013-02-02-00:00:06	6	6.00	267.80	0	0	0	3	103.43	30.60	0	-		
	Gold Price Sheet	6	6.00	267.80	0	0	0	3	103.43	30.60		BusinessApp2 De		MyCloud
Ű.	2013-02-03-00:00:00	6	6.00	267.80	0	0		3	103.43	30.60			Cloud	
	Gold Price Sheet	6	6.00	267.00	0	0		3	103.43	30.60	134.03			
8	2013-02-04 00:00:00	6	6.00	267.00	0			3	103.43	30.60	134.03			
	Gold Price Sheet	6	6.00	267.00	0	0		3	103.43	30.60	134.03			
- 10	2013-02-05 00:00:00	6	6.00	267.80	8	0	0	3	103.43	30.60	134.03			

28. Finally Jeff checks out the Chargeable Monthly Details, he can drill further into the data and see exactly what cloud costs per month and how long each cloud has been deployed for.

					D	1 1	-					YearNumber	1
			MO	nthly	De	etail	S K	ep	ort			2013	
				,	1.000			-1-	1948 B.				a.
			mory(GB) Days Sto			California de la cal	THE PLACE AND A			Cloud Cost	Ward Barris		
	3	1,789	1,226.50	81,141.84	namical St	BOCIP High	83	187	5.028.76	1,493.40	6,522.16	2002	
		1,789	799.50	60,785.03	0	0	83	144	5,028.76	1,493.40	0.00	2003	
0		1,307	799.50	60,785.03	0	0	83	144	0.00	0.00	0.00	TANKS .	÷
1	February	392	224.00	20.601.52	0		28	49	0.00	0.00	0.00		
2	- realizing	392	224.00	20.601.52	0	0	28	49	0.00	0.00	0.00	CalendarMonth	5
	January	915	575.50	40.183.51	0	0	55	95	0.00	0.00	0.00	February	1.
	Construction of the	915	\$75.50	40.183.51	0	0	55	95	0.00	0.00	0.00	recruary	-
5	BusinessApp2	16	8.00	547.31	0	0	0	1	68.83	15.00	83.83	January	
6	Development Cloud	94	47.00	3,222.85	0	0	0	9	1,133.24	346.20	1,479.44	February	
7	= MyCloud	372	372.00	16,586.65	0	0	0	33	3,826.68	1,132.20	4,958.88	January	
в		372	372.00	16,586,65	0	0	0	33	3,826.68	1,132.20	4,958.88	Contract, Product	
9	= February	168	168.00	7,498.50	0	0	0	21	2,896.05	856.80	3,752.85	March	-
0	Gold Price Sheet	168	168.00	7,498.50	0	0	0	21	2,896.05	856.80	3,752.85		
1	= January	204	204.00	9,088.14	0	0	0	12	930.63	275.40	1,206.03		
2		42	42.00	1,870.50	0	0	0	3	0.00	0.00	0.00		
3	Gold Price Sheet	162	162.00	7,217.64	0	0	0	9	930.63	275.40	1,206.03		
5	Grand Total	1,789	1,226.50	81,141.84	0	0	83	187	5,028.76	1,493.40	6,522.16	mydoud	

Summary

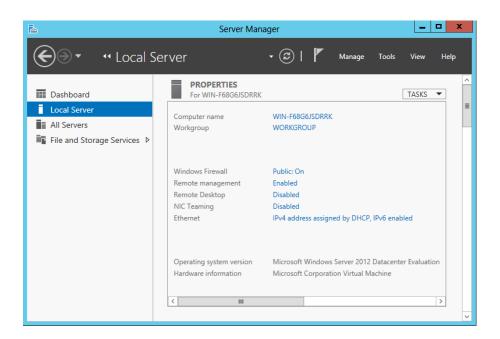
Chargeback allows you to apply real world costs to both physical and virtual compute, storage and memory resources. Through these reports, Jeff is able to bill his external clients for the precise amount of resources they use, while keeping track of internal costs. Due to the granular nature of these reports, they can be applied to multiple levels of service, and across different grades of resources.

Links to other	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	≋
areas of interest	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud

Other Info

How to add a role or feature to Windows 2012

- 1. Open the Server Manager console
- 2. Click on Local Server



3. Click on Manage and select Add Roles and Features

ł	Server Mar	nager	– – X
€ • • Local Se	PROPERTIES	• © 🏲	Manage Tools View Help Add Roles and Features Remove Roles and Features
Local Server All Servers File and Storage Services	For WIN-F68G6JSDRRK Computer name Workgroup	WIN-F68G6JSDRRK WORKGROUP	Add Servers Create Server Group Server Manager Properties
	Windows Firewall Remote management Remote Desktop NIC Teaming Ethernet	Public: On Enabled Disabled Disabled IPv4 address assigne	ed by DHCP, IPv6 enabled
	Operating system version Hardware information	Microsoft Windows Microsoft Corporatio	Server 2012 Datacenter Evaluation on Virtual Machine

4. Click Next

B	Add Roles and Features Wizard					
Before you begin	DESTINATION SERVER WIN-F68G6JSDRK					
Before You Begin Installation Type	This wizard helps you install roles, role services, or features. You determine which roles, role services, or features to install based on the computing needs of your organization, such as sharing documents, or hosting a website.					
Server Selection Server Roles	To remove roles, role services, or features: Start the Remove Roles and Features Wizard					
Features Confirmation Results	Before you continue, verify that the following tasks have been completed: • The Administrator account has a strong password • Network settings, such as static IP addresses, are configured • The most current security updates from Windows Update are installed					
	If you must verify that any of the preceding prerequisites have been completed, close the wizard, complete the steps, and then run the wizard again. To continue, click Next.					
	Skip this page by default					
	< Previous Next > Install Cancel					

5. Select Role-based or feature based installation and click next

à	Add Roles and Features Wizard
Select installation	on type Destination server WIN-F68G6JSDRRK
Before You Begin Installation Type	Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).
Server Selection Server Roles Features	Role-based or feature-based installation Configure a single server by adding roles, role services, and features. Remote Desktop Services installation Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based
	or session-based desktop deployment.
	< Previous Next > Install Cancel

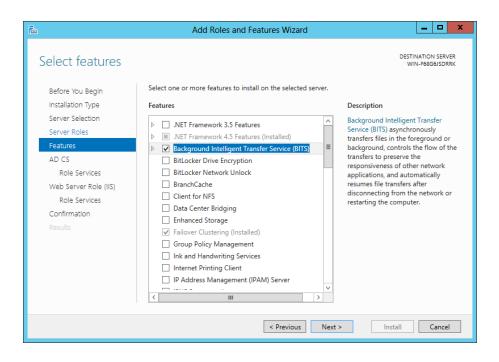
6. On the Server Selection step click **Next**

à	Add Rol	es and Features	Wizard 📃 🗖 🗙
Select destinati	on server		DESTINATION SERVER WIN-F68G6JSDRRK
Before You Begin Installation Type Server Selection	Select a server or a virtua Select a server from t Select a virtual hard of	he server pool	n to install roles and features.
Server Roles Features Confirmation Results	Server Pool Filter:	IP Address	Operating System
- No a di No	WIN-F68G6JSDRRK	10.4.2.167	Microsoft Windows Server 2012 Datacenter Evaluation
		n Server Manager. O	ndows Server 2012, and that have been added by using the ffline servers and newly-added servers from which data
		< Pr	evious Next > Install Cancel

7. Select the **Role** you wish to install and click **Next**

a	Add Roles and Features Wizard	_ D X
Select server roles	Select one or more roles to install on the selected server.	DESTINATION SERVER WIN-FØ8G6JSDRRK
Before You Begin	Select one or more roles to install on the selected server.	
Installation Type	Roles	Description
Server Selection	Active Directory Certificate Services	 Active Directory Certificate Services
Server Roles	Active Directory Domain Services	(AD CS) is used to create certification authorities and related
Features	Active Directory Federation Services	role services that allow you to issue
AD CS	Active Directory Lightweight Directory Services	and manage certificates used in a
Role Services	Active Directory Rights Management Services	variety of applications.
Confirmation	Application Server	
Results	DHCP Server	=
Results	DNS Server	
	Fax Server	
	File And Storage Services (Installed)	
	Hyper-V	
	Network Policy and Access Services	_
	Print and Document Services	
	Remote Access	
	Remote Desktop Services	~
	< Previous N	lext > Install Cancel
(

8. Select any Features you wish to install and click Next

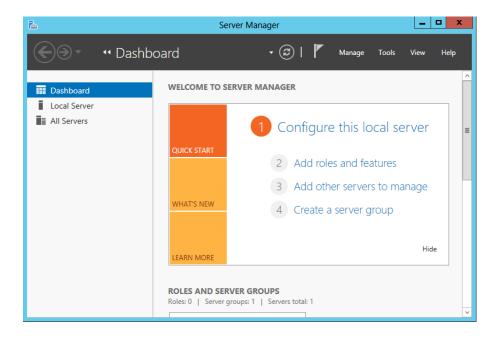


9. Some Roles may require extra configuration at this point. Follow the wizard through, answer all questions and click next until the **Confirm Installation** screen appears and click **Install**

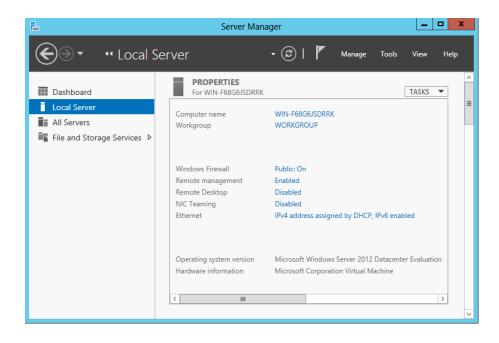
L	Add Roles and Features Wizard	. 🗆 X
Confirm installation		ION SERVER i8G6JSDRRK
Before You Begin	To install the following roles, role services, or features on selected server, click Install.	
Installation Type	Restart the destination server automatically if required	
Server Selection Server Roles Features	Optional features (such as administration tools) might be displayed on this page because the been selected automatically. If you do not want to install these optional features, click Previo their check boxes.	
AD CS Role Services Web Server Role (IIS) Role Services Confirmation Results	Active Directory Certificate Services Certification Authority Background Intelligent Transfer Service (BITS) IIS Server Extension Remote Server Administration Tools Feature Administration Tools BITS Server Extensions Tools Role Administration Tools Active Directory Certificate Services Tools Certification Authority Management Tools	< 11
	Export configuration settings Specify an alternate source path	
	< Previous Next > Install	Cancel

How to set an IPV4 address

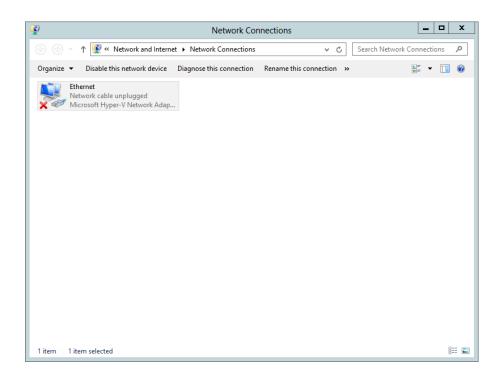
1. Open the Server Manager console



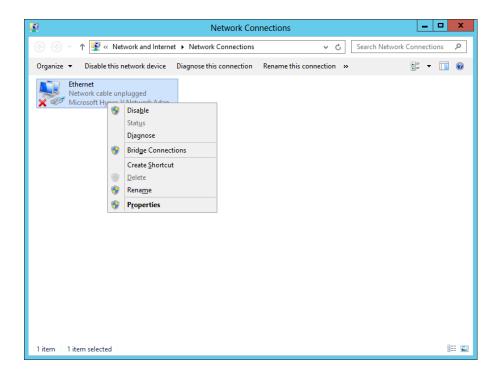
2. Click on Local Server



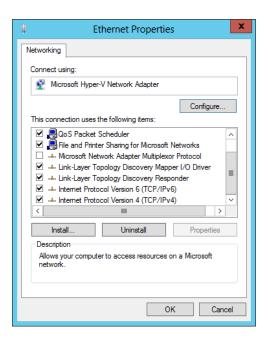
3. Click on the entry next to **Ethernet** (usually *IPv4 Address assigned by DHCP* if there is a DHCP server present). The **Network Connections** window will open



4. Right click the network icon labelled Ethernet and select Properties



5. Click on Internet Protocol Version 4 (TCP/IPv4) and click the Properties button



6. Enter the appropriate network information. Note that this information can be different in your environment. Click on **OK**

Internet Protocol Version 4 (TC	CP/IPv4) Properties ? ×						
General							
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.							
O Obtain an IP address automatica	lly						
• Use the following IP address:							
IP address:	192.168.1.10						
Subnet mask:	255.255.255.0						
Default gateway:	192.168.1.1						
Obtain DNS server address automatically							
• Use the following DNS server add	resses:						
Preferred DNS server:	192.168.1.10						
Alternate DNS server:							
Validate settings upon exit	Ad <u>v</u> anced						
	OK Cancel						

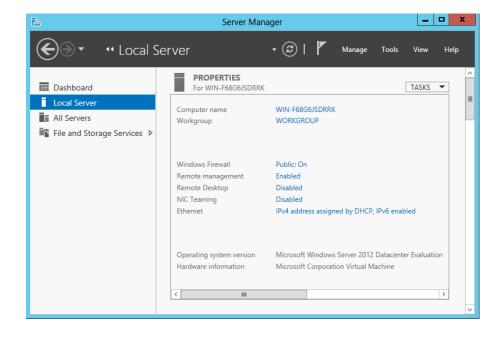
The static IP address has now been set.

How to join the domain

a	Server Manager						
🕞 💿 🔹 애 Dash	board	🕶 🕄 🚩 Manage Tools View Help					
Dashboard	WELCOME TO SE	RVER MANAGER					
Local Server All Servers		1 Configure this local server	=				
	QUICK START	2 Add roles and features					
	WHAT'S NEW	3 Add other servers to manage	1				
	WIRTS NEW	4 Create a server group					
	LEARN MORE	Hide					
	ROLES AND SER						
	Koles: U Server gi	roups: 1 Servers total: 1	~				

1. Open the Server Manager console

2. Click on Local Server, then click on WORKGROUP



3. Click on **Change...**

	S	ystem Pro	perties			x
Computer Name	Hardware	Advanced	Remote]		
	ows uses the e network.	e following inf	omation to	o identify	your compute	r
Computer <u>d</u> escri	ption:					
Full computer na	"/	or example: "I Accounting So /IN-F68G6JS	erver".	tion Serv	er" or	
Workgroup:		ORKGROUF				
To rename this of workgroup, click		change its do	main or		<u>Q</u> hange]
		ОК		Cancel	Apply	

4. Input the name you would like to use, click the **Domain** radio button, then type the name of your domain e.g. **Contoso.com**. Click on **OK**.

Computer Name/Domain Changes					
You can change the name and the membership of this computer. Changes might affect access to network resources.					
<u>C</u> omputer name:					
HyperV02					
Full computer name: HyperV02					
<u>M</u> ore					
Member of					
<u>D</u> omain:					
Contoso.com					
O <u>W</u> orkgroup: WORKGROUP					
OK Cancel					

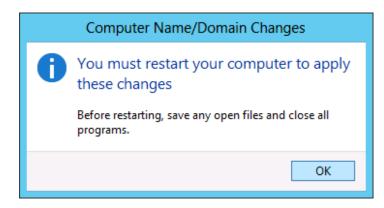
5. When prompted input the domain administrator credentials in the **Windows Security** dialog box. Click on **OK**

Windows Security					
	Name/Domain Changes e and password of an account with permission to join the				
P	contoso\administrator				
	Domain: contoso				
	OK Cancel				

6. Click **OK**

Computer Name/Domain Changes
Welcome to the contoso.com domain.
ОК

7. Click OK



8. Click **Close**

System Properties								
Computer Name Hardware Advanced Remote								
Windows uses the following information to identify your computer on the network.								
Computer description:	Guest01							
	For example: "IIS Production Server" or "Accounting Server".							
Full computer name:	Guest01.contoso.com							
Domain:	contoso.com							
To rename this computer workgroup, click Change								
Changes will take effect after you restart this computer.								
	Close Cancel Apply							

9. Click Restart Now



10. Now the server is a member of the domain and any group policies you have created will be applied.

Links to other areas of interest	Introduction	Setup and deploy your Private Cloud	Experiences	Other Info	
	Manage Private Cloud Resources	Manage Private Cloud Capacity	Private Cloud Automation	Manage Apps in the Private Cloud	Reporting insights of the Private Cloud