

Configure Your Heterogenous Environment with PowerShell and DSC

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Code
Build
Forge your future.
Explore
Secure

Windows Server 2016



Built-in layers
of security



Software-defined
datacenter



Cloud-ready
application platform

Windows Server + System Center

Eras of Windows Server and PowerShell

Server for the masses era

Windows NT

Simple GUI to setup and run server workloads

No PowerShell

Rare automation with only VBS and DOS/.bat

Enterprise server era

Windows 2000 Server, Windows Server 2003

Active Directory/Group Policy eases management across the enterprise

PowerShell Begins!

New shell and scripting language built around structured data

Enables automation across many servers to reduce errors, cost, and downtime

Datacenter server era

Windows Server 2008, Windows Server 2012

Added virtualization, network and storage management

Enabled management of interconnected servers hosted in remote datacenters

Full PowerShell—age of automation on Windows

Broad cmdlet coverage, full featured remoting, modules, and the Integrated Scripting Editor

Enables a large and powerful community to completely automate Windows management across the datacenter

Eras of Windows Server and PowerShell

Cloud server era

Windows Server 2016 and Nano Server

Cloud-ready with DevOps workflow that enables transition to public or private clouds

Containers, Docker, Remote Server Management Tools (RSMT), and software-defined networking

Nano Server deployment option provides a minimal footprint and attack surface, fewer reboots

PowerShell and the cloud era

DevOps tooling: Desired State Configuration (DSC), Pester testing framework, PackageManagement (PowerShellGet), code analysis (ScriptAnalyzer), Visual Studio Code support, and remote debugging

PowerShell classes: enables system programming

Security: JEA (Just Enough Administration) and improved audit logs

PowerShell Gallery: leverages the strength of the community to provide 100s of modules and resources to support automation and DevOps on Windows Servers

Heterogenous: built on .NET Core to support Nano Server, macOS, and Linux

Heterogeneous — Powershell as glue

DISCOVER[^]ABLE

Across data, text, APIs

COM, WMI, .NET, XML, CSV, JSON, Text, Registry, native PInvokes

Across versions of Windows

Windows Server 2008 R2, 2012, 2012 R2, 2016

Windows 7, 8.1, 10, Anniversary

Across .NET Framework and .NET Core

Nano Server

...now... across Windows, macOS, and Linux

Cloud era—management landscape



Power

(Scale * complexity) exceeds skill
Cloud scale demands power



Velocity

Ever-faster solution delivery needed
Pace of change is increasing



Ubiquity

Heterogeneous environments are norm
IT spans on-prem, hybrid, and cloud

PowerShell 5.0

Improvements in Desired State Configuration

Configurations

- Specifying Cross Node Dependencies
- Encrypted MOFs
- Help support for DSC Configuration
- Authoring Improvements using PowerShell ISE
- Allowance for Identical Duplicate Resources in a Configuration
- Import-DscResource keyword -moduleversion parameter
- WOW64 support for Configuration Keyword

Resources

- Class-based DSC Resources
- DSC Resource Script Debugging
- Automatic RunAs support for DSC Resources
- Side-By-Side Versioning Support for DSC Resources
- New in-box Resources

Local Configuration Manager

- Configure Node with Multiple Config Fragments
- Support for Mixed RefreshModes
- Configure DSC Engine with New Attribute

Detailed information about LCM State

Frequencies fix for RefreshMode and ConfigurationMode

Additional Value for RefreshMode Property

Cmdlets

Details about Configuration Status

Test-DscConfiguration cmdlet supports Reference Configurations

Direct Access to DSC Resource Methods

Deliver Configuration Document without Applying

Remove DSC Documents

Unified and Consistent State and Status Representation

Set-DscLocalConfigurationManager cmdlet supports -force parameter

Pull Mode

On-demand PULL of DSC Configurations

Separation of Node and Configuration Ids

Separation of Config, Resource, and Report Repositories

Report Configuration Status to Central Location

Just Enough Administration (JEA)

Creating and Connecting to JEA Endpoint

Reporting on JEA

PowerShell 5.0

PowerShell Classes

- Define Custom Types
- Declare Base Class
- Declare Implemented Interface
- Call Base Class Constructor
- Call Base Class Method

PowerShell Script Debugging++

Audit PowerShell Usage using Transcript and Logging

- Enhanced Transcription Options
- Script Tracing and Logging
- Cryptographic Message Syntax

PackageManagement and PowerShellGet

- PackageManagement cmdlets
- PowerShell Module with PowerShellGet
- Register a PowerShell Repository
- Side-by-Side Support on PowerShell 5.0 or newer
- Installation of Module Dependencies
- PowerShellGet Cmdlets for Module Management

PowerShell Script with PowerShellGet

PowerShellGet Cmdlets for Script Management

New and updated cmdlets based on community feedback

- Symbolic links using Item cmdlets
- Archive cmdlets
- Clipboard cmdlets
- Convert-String
- Extract and Parse Structured Objects out of String
- Format-Hex
- NoNewLine parameter
- New-TemporaryFile
- New-Guid
- Get-ChildItem has -Depth parameter
- Updates to FileInfo object
- Modules support for declaring version ranges

Information Stream

- Generate PowerShell Cmdlets based on OData Endpoint
- Network Switch Management with PowerShell
- Software Inventory Logging

PowerShell 5.1

PowerShell Editions

Improvements in Desired State Configuration

- DSC class-based resource improvements
- DSC resource debugging improvements
- DSC pull client supports TLS 1.1 and TLS 1.2
- Improved pull server registration
- Pull partial configuration naming convention
- PsDscRunAsCredential with DSC composite resources
- DSC module and configuration signing validations

Improvements in the PowerShell Console

- VT100 Support
- Vi mode support in PSReadline
- Redirected stdin with interactive input

Performance Improvements

- Startup time: ~4x faster
- First command run: 2.5x faster
- First command (w/ caching): 13x faster
- ForEach-Object: ~2x faster

Improvements in PackageManagement

Removed -Version alias to -MinimumVersion

Fixed prompts for bootstrapping the NuGet provider

Support for PackageManagement on intranet-only nodes

Event logging improvements

Support for basic authentication

Support for using PackageManagement behind a proxy

New Cmdlets and Bug Fixes

Catalog Cmdlets

Pester updated from 3.3.5 to 3.4.0

Specify module version with 'using module'

Module auto-discovery fully honors PSModulePath

File redirection no longer hard-codes -Encoding Unicode

Fixed a regression in accessing members of

System.Reflection.TypeInfo

Fixed some issues with COM objects

Now allow [ordered] inside classes

About topics with multiple versions returns the latest one

Power

Desired State Configuration (DSC)

- Cross-Node Dependencies
- Test-DscConfiguration cmdlet supports Reference Configurations
- Direct Access to DSC Resource Methods
- Reporting

PowerShell Classes

- System programming and frameworks
- Ability to create new types in pure PowerShell
- Writing DSC resources is even easier with classes

New debugging/editing features

- Remote psedit/editing
- BreakAll for DSC debugging

DSC resources

- DSC enables simpler configuration and deployment

Power—Security

Transcription logging/auditing

Just Enough Administration (JEA)

- Protect against rogue admins with too much privilege
- Only give server administrations exactly the permissions that they need to do their job
- Allows you to define contexts in which admins can execute PowerShell

Desired State Configuration (DSC)

- Now encrypting DSC MOFs by default
- Pull server supports TLS 1.1/1.2

PowerShellGet and PowerShell Gallery now supports validating catalog signatures

Velocity/Power—PowerShellGet

Makes downloading, sharing PS modules easier

PowerShell Gallery

- ``Find-Module *azure*`` to look for Azure related modules
- ``Install-Module AzureRM`` gets you all modules for managing Azure

Easier to bring up cattle servers

- Enables “getting dependencies” in your CI/CD pipeline

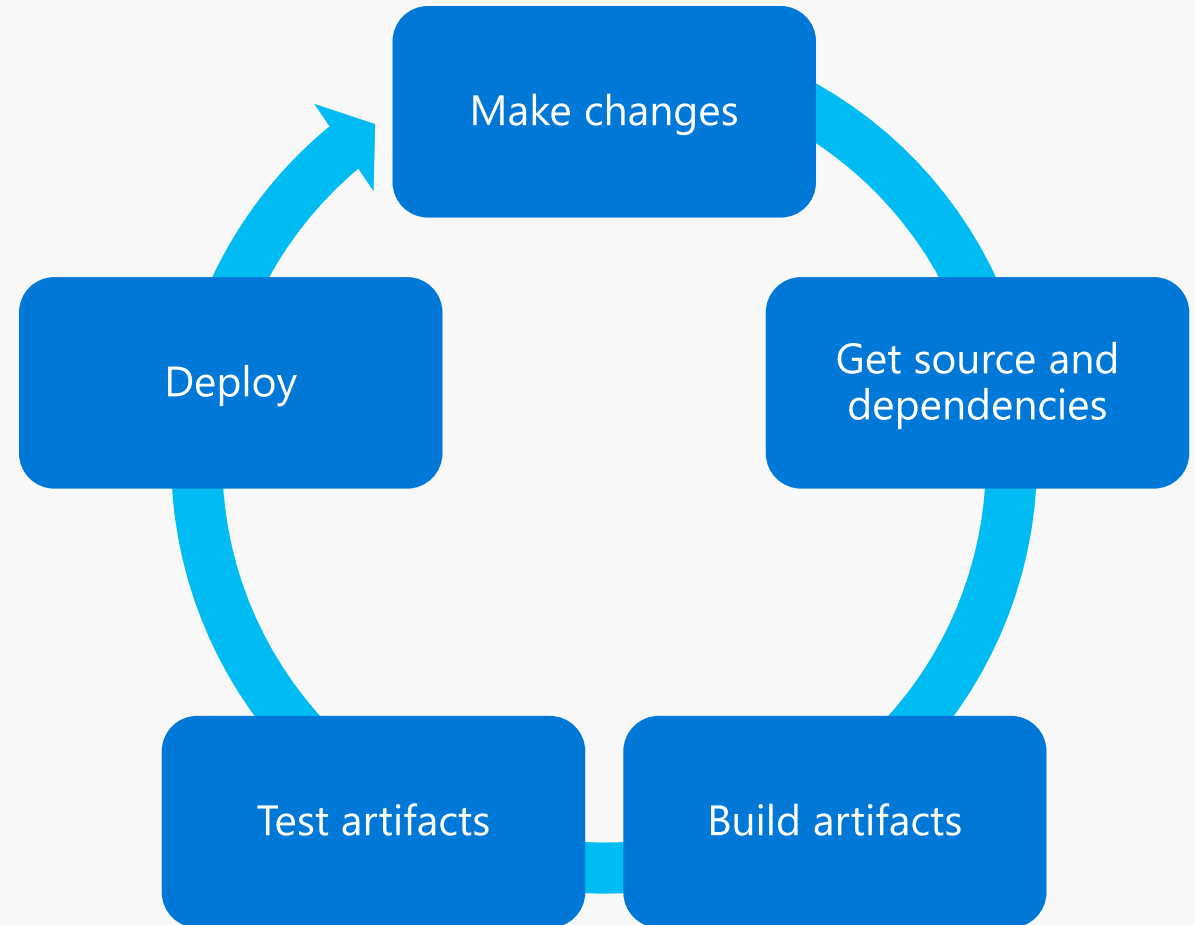
Can also publish your private modules to an [internal Gallery](#)

Over 4 million downloads; 500,000 in just August alone

Velocity—CI/CD Pipeline

Automation
Repeatability
Artifacts are

- Internal PS modules
- Community PS modules
- DSC resources
- DSC configurations
- .NET applications
- WHATEVER YOU WANT



Velocity

Pester

- Check in code faster and be sure nothing breaks
- CI/CD pipeline

Script Analyzer

- Build modules using best practices quicker

PowerShell Core on Nano Server

- Nano allows you to stand up and teardown servers quicker than ever

Remote debugging

- Enables you to understand and remediate problems quicker

PowerShell Gallery

- Leverage the PowerShell community to bootstrap your scripts

Ubiquity—Powershell everywhere

PowerShell and DSC play well with other configuration management solutions like Chef and Puppet

WMF: Windows PowerShell 5.1 downlevel to Server 2008 R2 and Windows 7

Open-source, cross-platform PowerShell Core 6.0 alpha

- Available on Windows, Nano, Mac, and Linux
- Based on the .NET CoreCLR

PowerShell plugin for Visual Studio Code

- Nearly at parity with the ISE
- Integrated terminal
- Debugging

Ubiquity—Windows, Mac, and Linux

Runs natively on Linux and Mac OS X

Open source on GitHub

Preview today → GA in 2017



Existing PS users	Mgmt products	App developers	Linux users
Manage Linux and Windows systems from any computer	Single stack to manage anything from anywhere	Framework transforms a small amount of code into rich automation and configuration	Another tool in your toolbox. Optimized for structured data, REST APIs, and object models

Contribute!



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Resources

- 1 PowerShell Home Page
<https://microsoft.com/PowerShell>
- 2 PowerShell Open Source
<https://github.com/PowerShell>

Free IT Pro resources

To advance your career in cloud technology

Plan your
career path

Microsoft IT Pro Career Center
www.microsoft.com/itprocareercenter

Get started
with Azure

Microsoft IT Pro Cloud Essentials
www.microsoft.com/itprocloudessentials

Demos and
how-to videos

Microsoft Mechanics
www.microsoft.com/mechanics

Connect with peers
and experts

Microsoft Tech Community
<https://techcommunity.microsoft.com>

Join the Microsoft Tech Community
to collaborate, share, and learn
from the experts:

<http://techcommunity.microsoft.com>



Thank You

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