

Microsoft®

tech·days

15 From the Desktop to the Cloud
Years of Turning Vision into Value

Hong Kong|2012



Windows Azure: an overview

Abhishek Lal
Senior Program Manager,
Windows Azure Application Platform



What is Cloud Computing?

What is Cloud Computing?



Physical

What is Cloud Computing?



Physical

Virtual

What is Cloud Computing?



Physical

Virtual

IaaS

What is Cloud Computing?



Physical

Virtual

IaaS

PaaS

What is Cloud Computing?



Physical

Virtual

IaaS

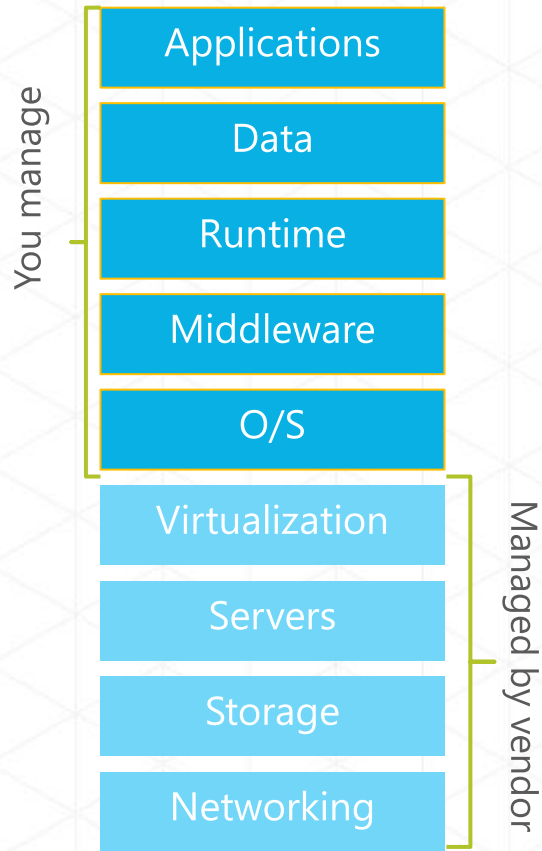
PaaS

SaaS

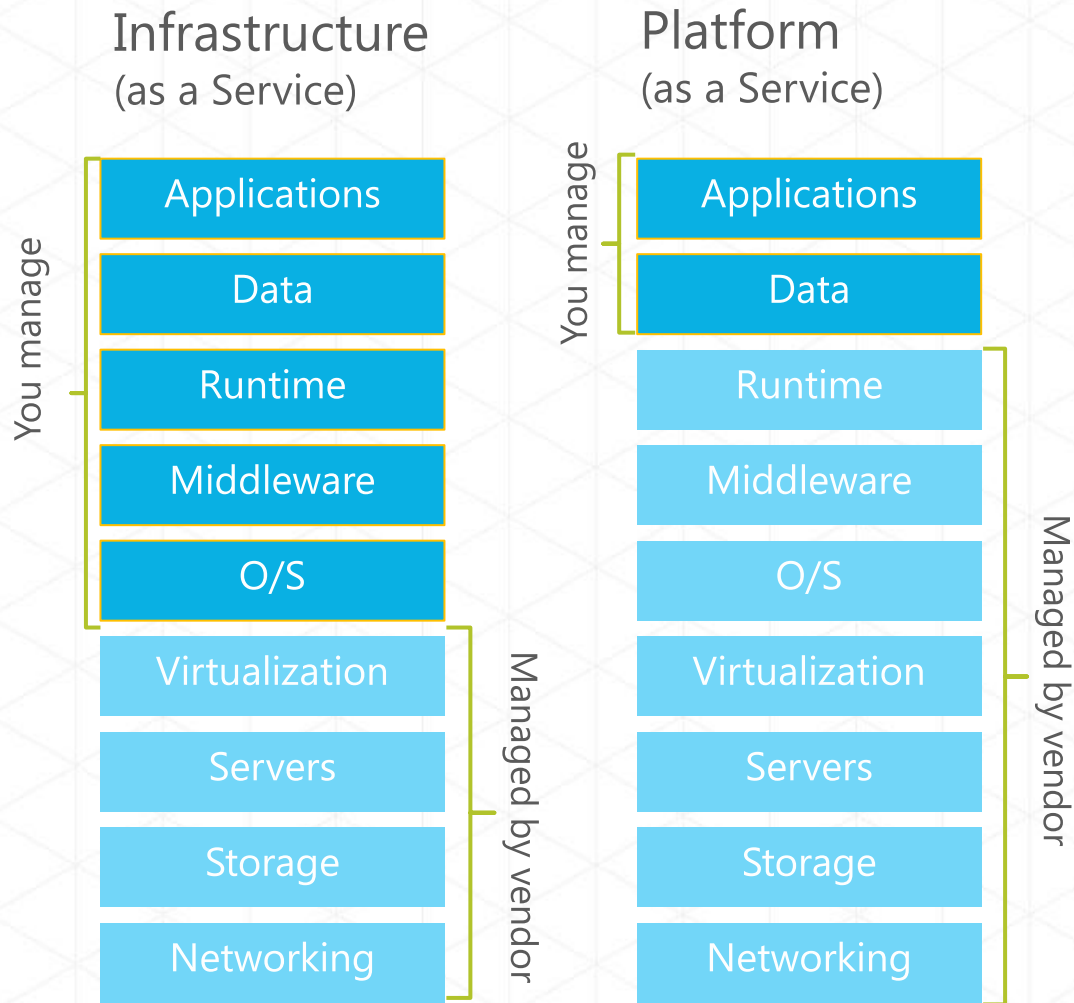
Why Cloud?

Why Cloud?

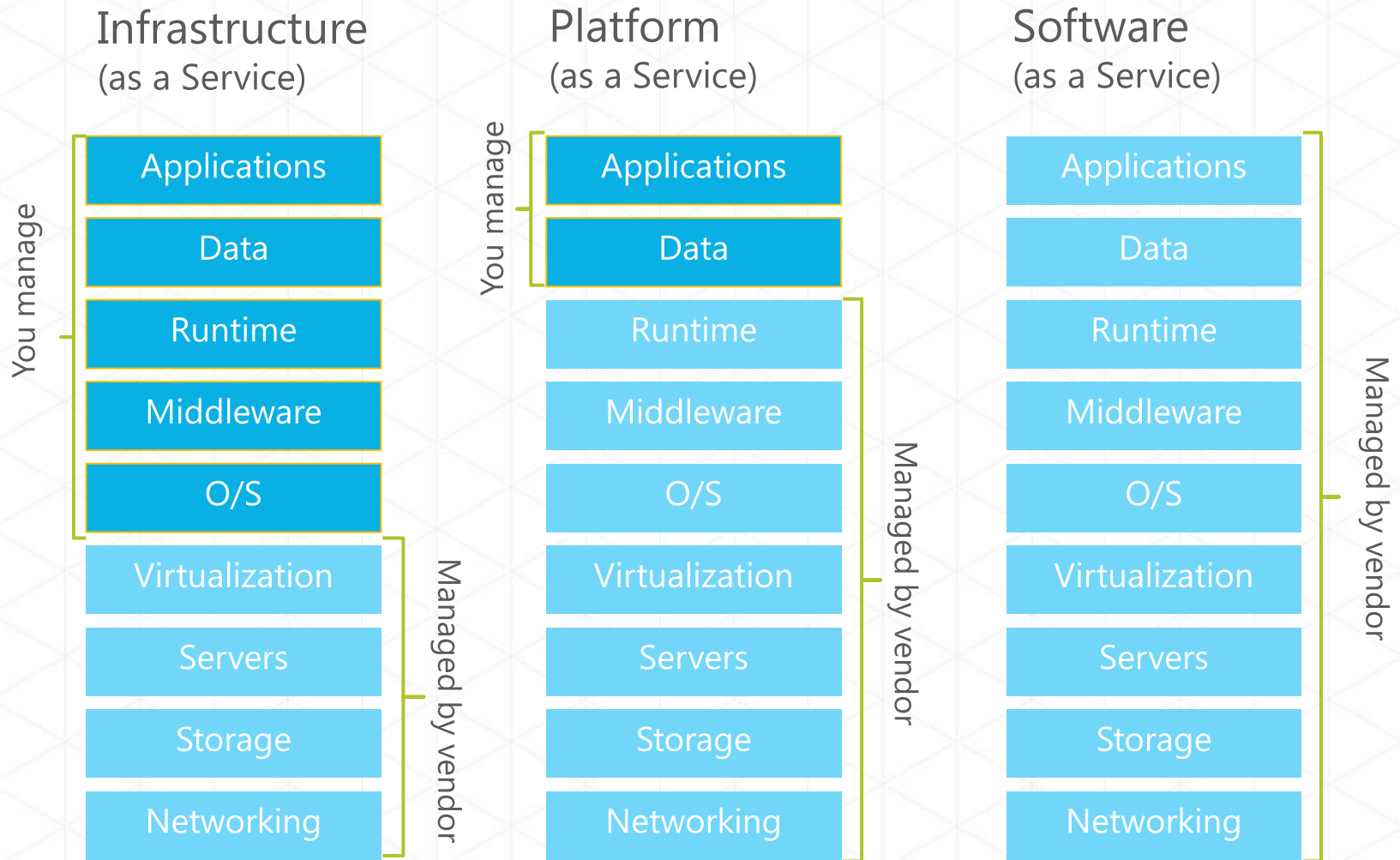
Infrastructure (as a Service)



Why Cloud?



Why Cloud?



Windows Azure

Windows Azure



 **Application**

 **Virtual Machine**

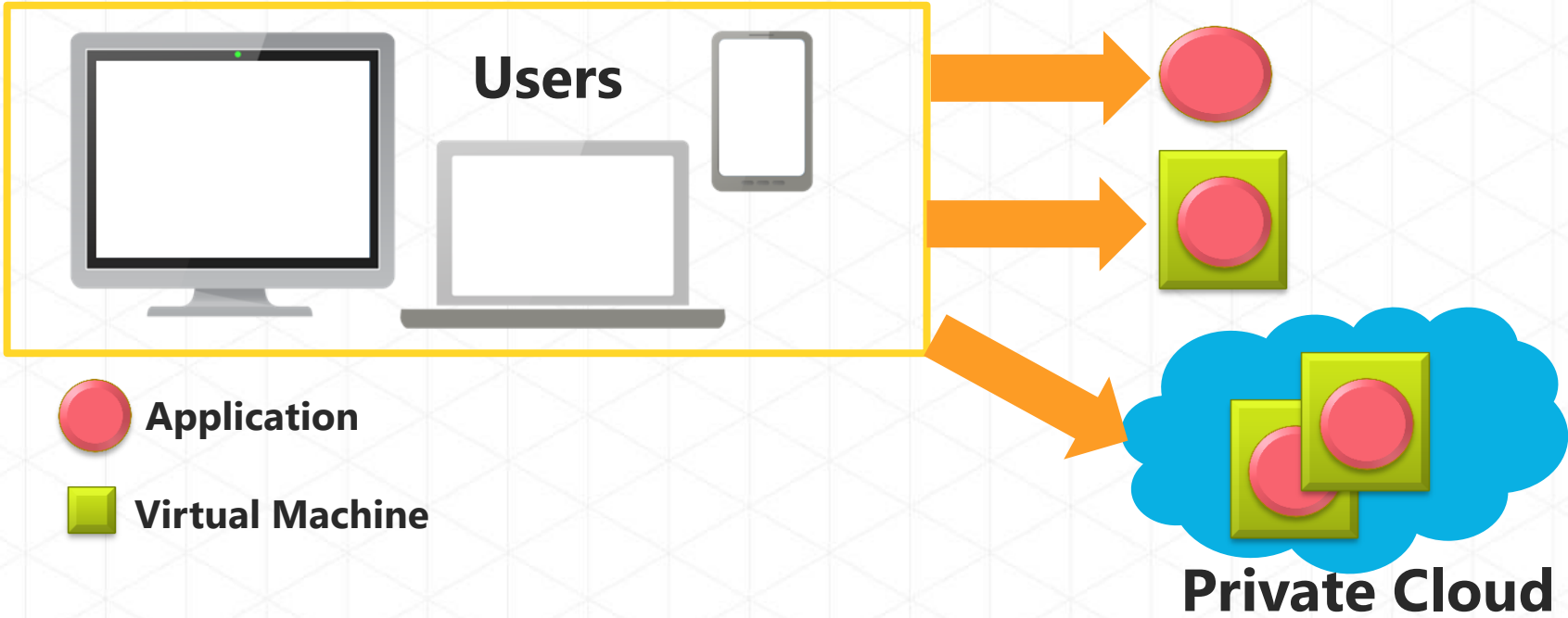
Windows Azure



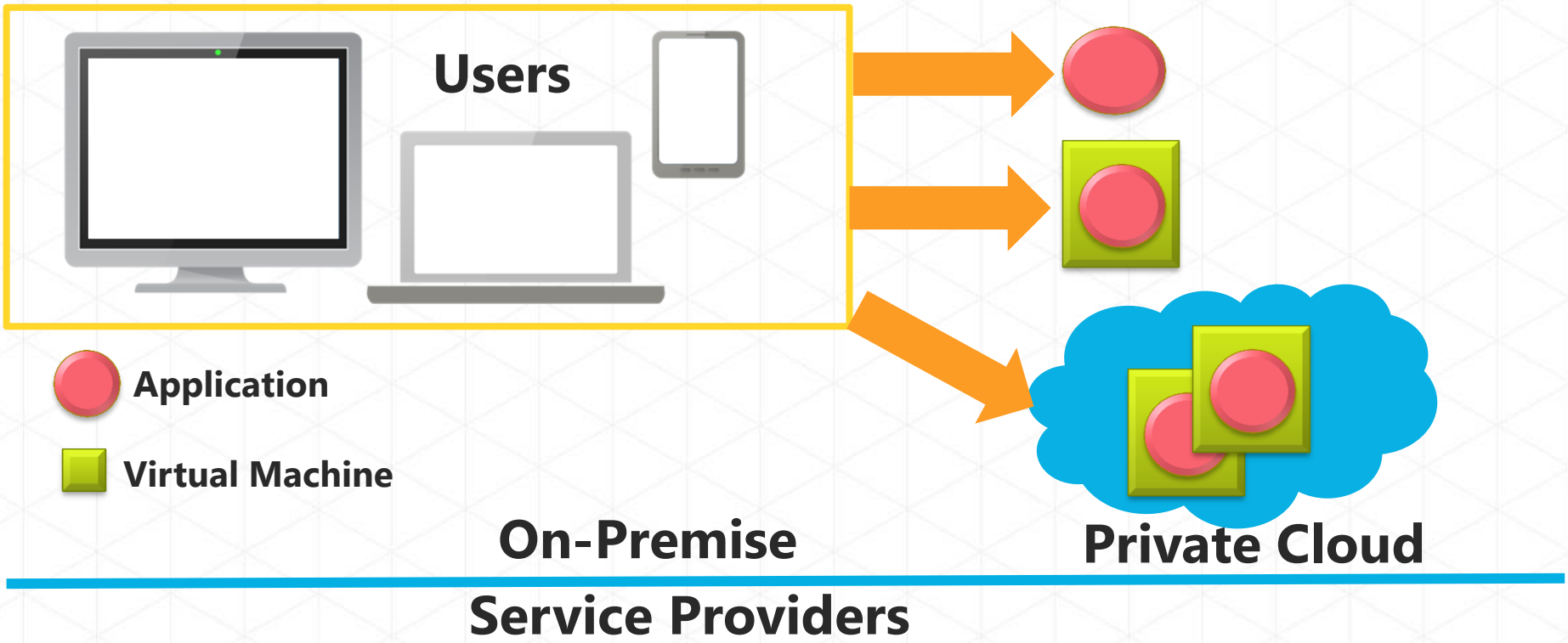
 **Application**

 **Virtual Machine**

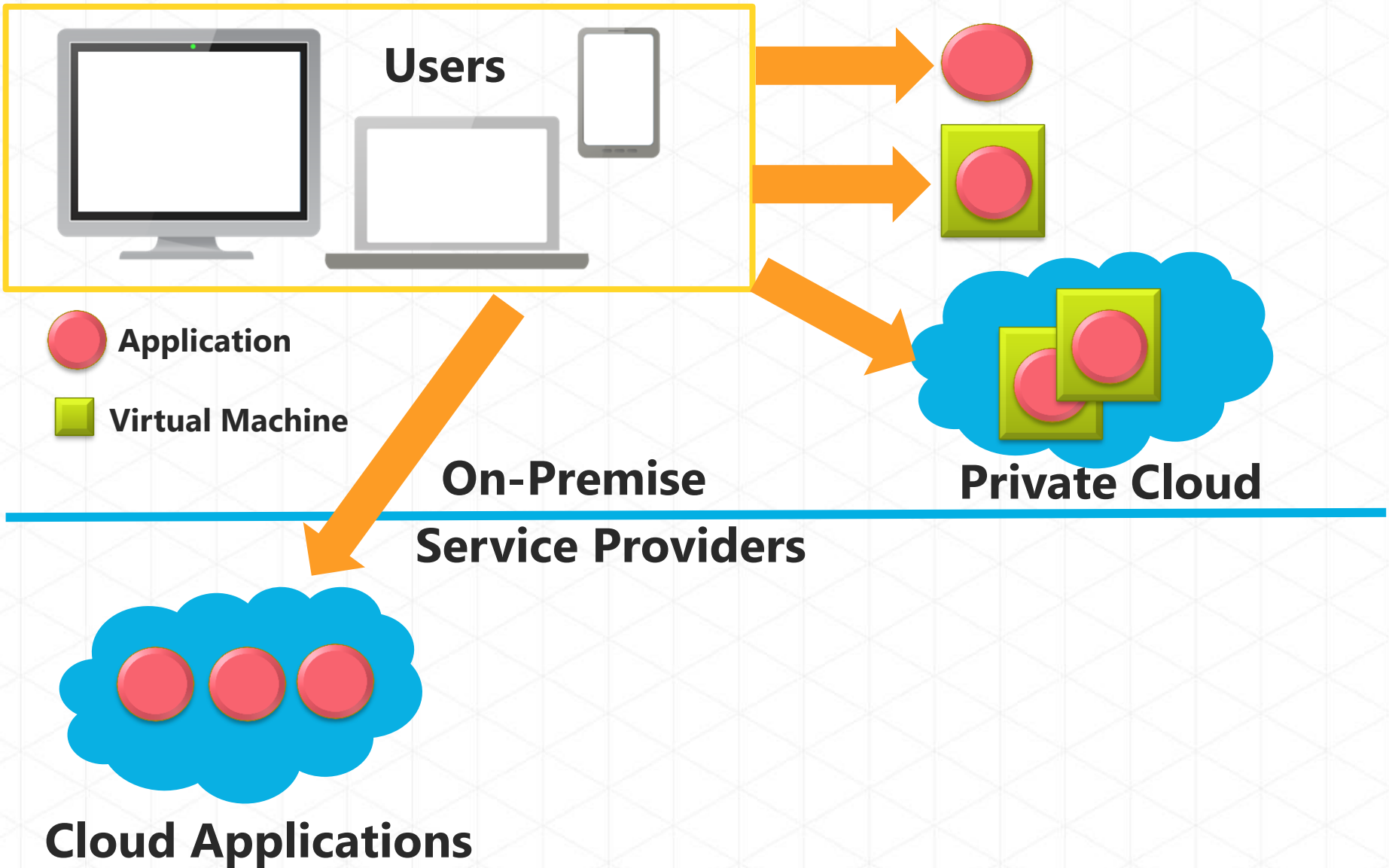
Windows Azure



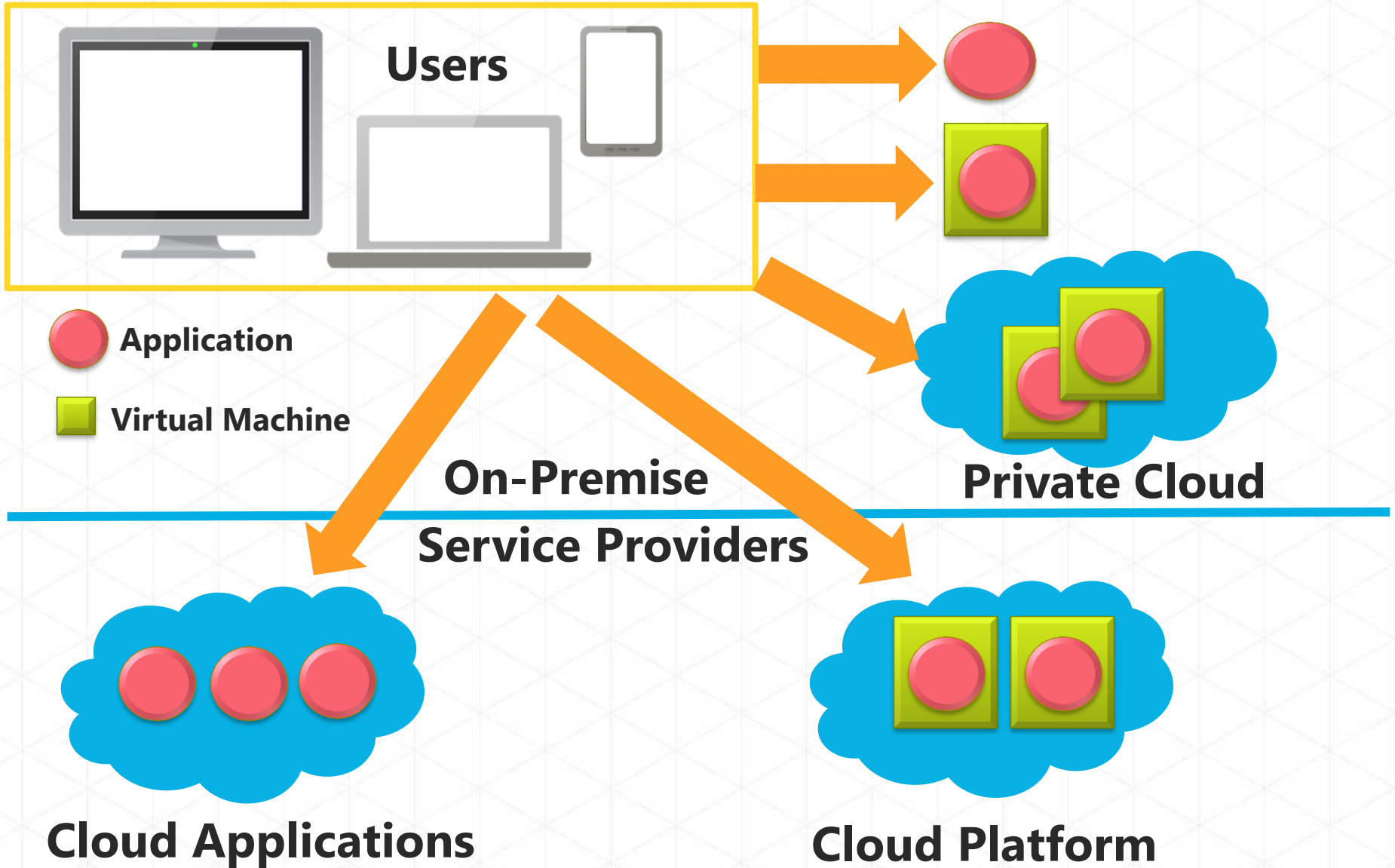
Windows Azure



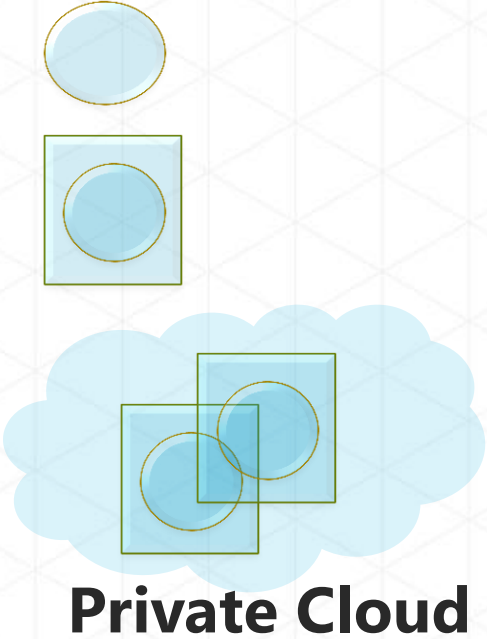
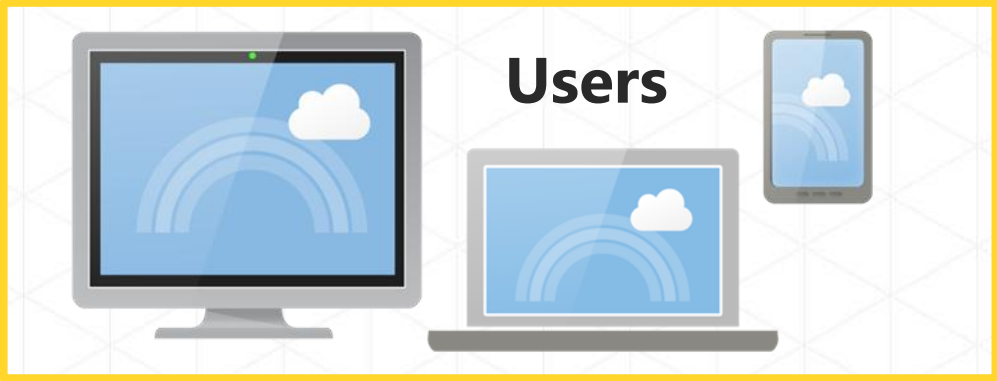
Windows Azure




Windows Azure

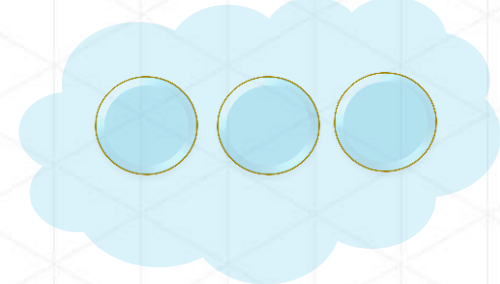
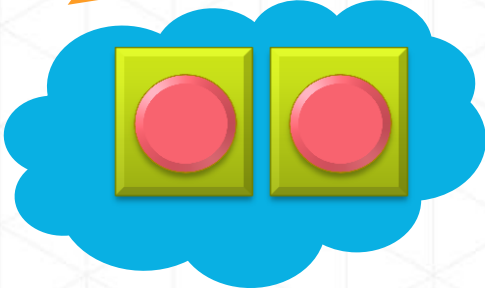


Focus for today's session



-  **Application**
-  **Virtual Machine**

**On-Premise
Service Providers**



Cloud Applications

Cloud Platform

Windows Azure

Windows Azure



Windows Azure



usage based



automated

Windows Azure



usage based



automated



managed
resources

Windows Azure



usage based



automated



managed
resources



always up.
always on.

Windows Azure



usage based



automated



managed
resources



always up.
always on.



elastic

Windows Azure



usage based



automated



managed
resources



always up.
always on.



elastic



economics

Windows Azure



usage based



automated



managed
resources



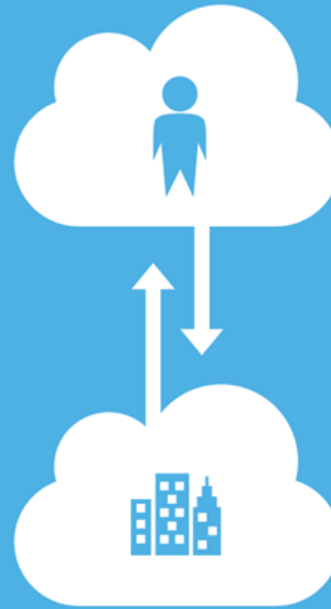
always up.
always on.



elastic



economics



PUBLIC

PRIVATE

global datacenter footprint



Video

Inside a datacenter



The image features the Microsoft logo in a bold, italicized, white font with a registered trademark symbol, set against a background of a bright blue sky filled with fluffy white clouds. The entire scene is framed by a thick black border.

Microsoft®

**IT Pre-Assembled-Components
(ITPAC)**

Focus on Applications



Compute



Storage



Messaging



Security/Identity



Caching



CDN



Marketplace



Connectivity

Compute



Compute

Compute

Web / Worker Role



Compute

Compute

Web / Worker Role

Environment for your application code



Compute

Web / Worker Role

Environment for your application code

Includes local storage



Compute

Compute

Web / Worker Role

Environment for your application code

Includes local storage

Automated deployment and configuration



Compute



Web / Worker Role

Environment for your application code

Includes local storage

Automated deployment and configuration

Isolation, redundancy and load-balancing

Compute



Web / Worker Role

Environment for your application code

Includes local storage

Automated deployment and configuration

Isolation, redundancy and load-balancing

Abstraction and Flexibility

Compute



Windows Azure has SDKs for:

.NET languages

Java

PHP

Node.js

Developers can use:

Visual Studio

Eclipse

Other tools



 Windows Azure





 Windows Azure





→ Provision Virtual Servers

→ Deploy App Code

→ Configure Network

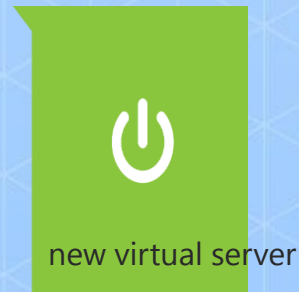
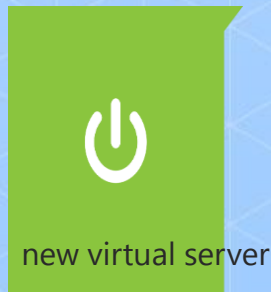


Server Rack 1 Server Rack 2

→ Provision Virtual Servers

→ Deploy App Code

→ Configure Network



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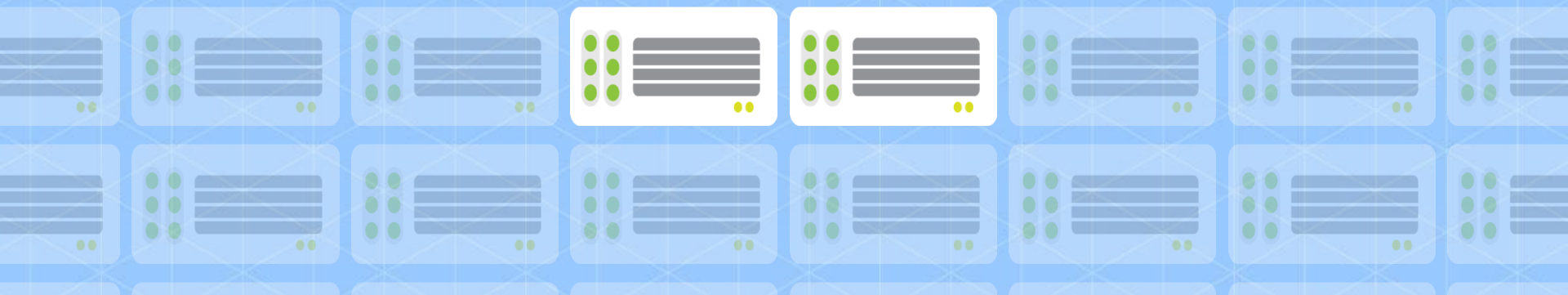
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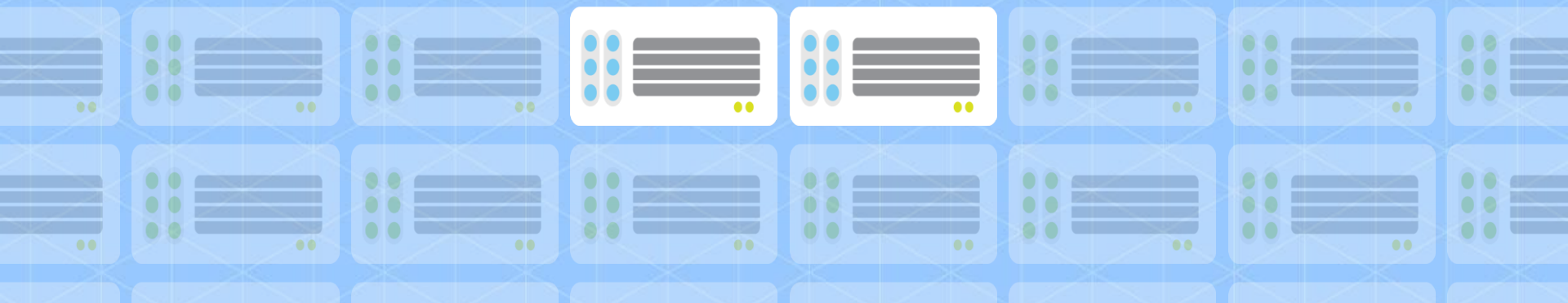
Windows Azure Datacenter



- Provision Virtual Servers
- Deploy App Code
- Configure Network



Windows Azure Datacenter



- Provision Virtual Servers
- Deploy App Code
- Configure Network

Windows Azure Datacenter



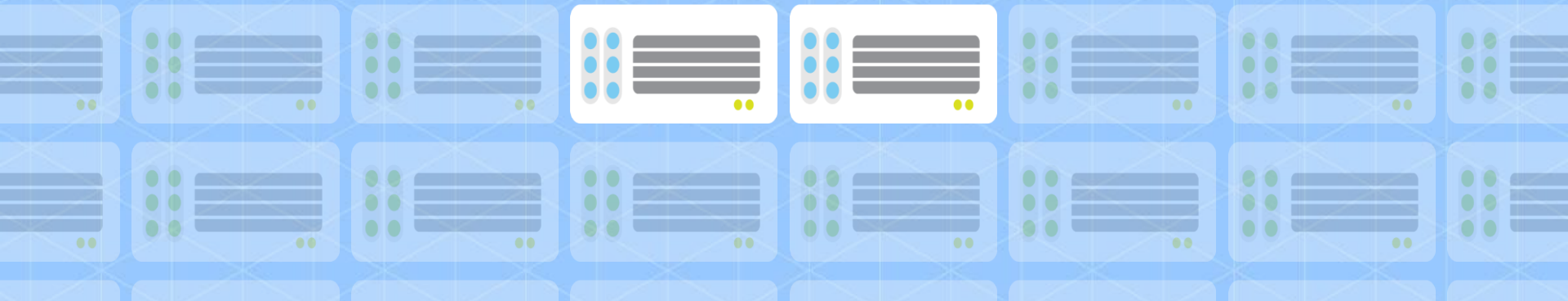
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Network Load Balancer

← Network load-balancer configured for traffic

Windows Azure Datacenter

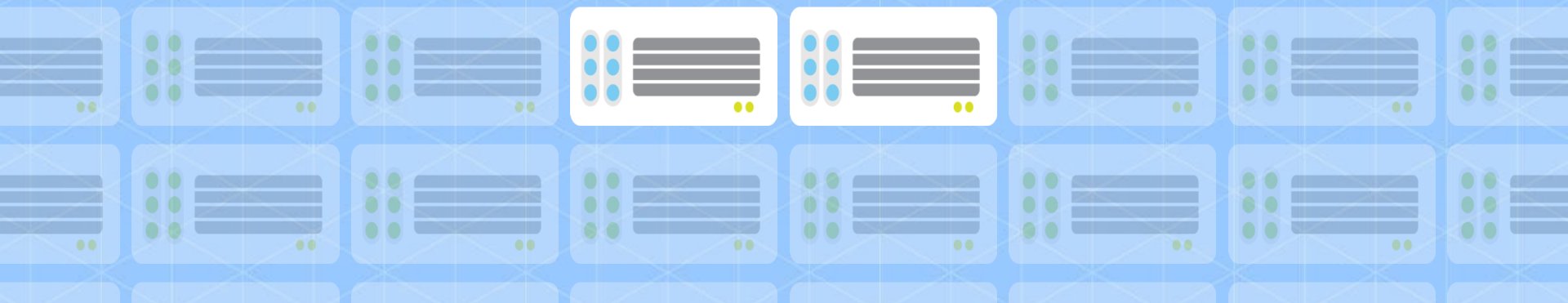


- Provision Virtual Servers
- Deploy App Code
- Configure Network



Network Load Balancer

Windows Azure Datacenter



Storage

Windows Azure Storage



Storage

Storage

Windows Azure Storage

Scalable, durable, available storage (100tb per account)



Storage

Storage



Storage

Windows Azure Storage

Scalable, durable, available storage (100tb per account)

Accessible via REST services, can be secured

Storage



Storage

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Accessible via REST services, can be secured

Drives – NTFS VHD mounted on compute instance

Storage



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Drives – NTFS VHD mounted on compute instance

Blob – Large binary storage

Storage



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Blob – Large binary storage

can access over http

Storage



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can access over http

Max size of 1 terabyte

Storage



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Drives – NTFS VHD mounted on compute instance

Blob – Large binary storage

- can access over http

- Max size of 1 terabyte

Table – name/value pairs

Storage



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Table – name/value pairs

- Provides a key/value store

Storage



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- Max size of 1 terabyte

Table – name/value pairs

- Provides a key/value store

- Simple and fast

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Drives – NTFS VHD mounted on compute instance

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Table – name/value pairs

- Provides a key/value store

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- Accessed via OData

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Scalable, durable, available storage (100tb per account)

Accessible via REST services, can be secured

Drives – NTFS VHD mounted on compute instance

Blob – Large binary storage

- can access over http

- Max size of 1 terabyte

Table – name/value pairs

- Provides a key/value store

- Simple and fast

- Accessed via OData

- Max table size: 100 terabytes

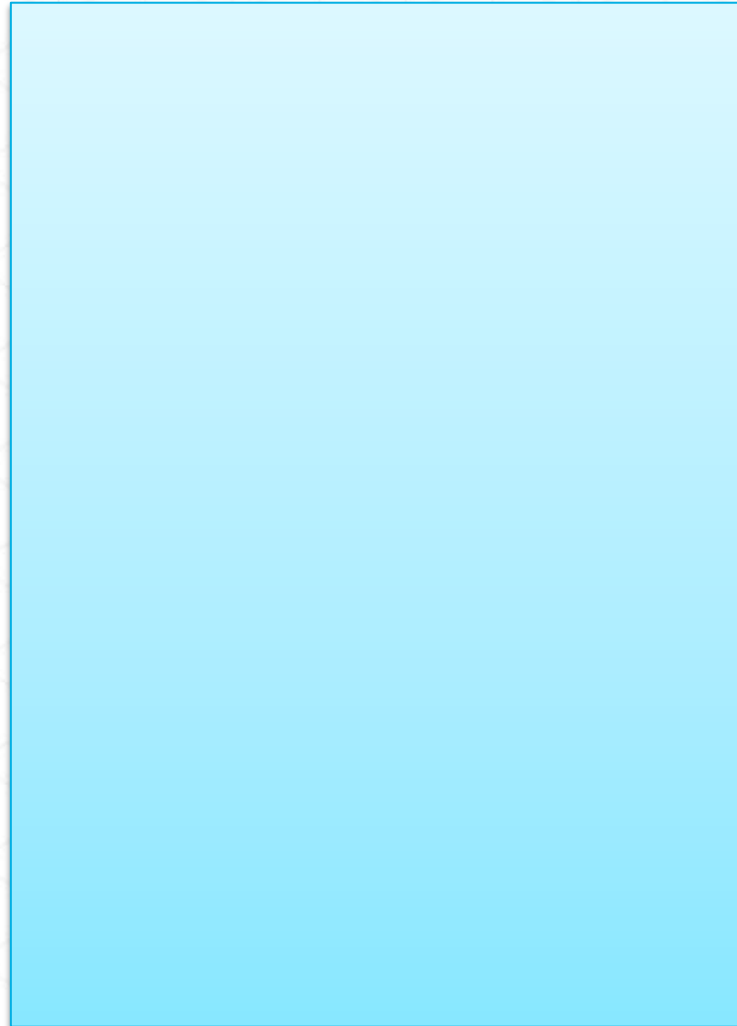
Azure Storage – Tables



Storage

Azure Storage – Tables

Table



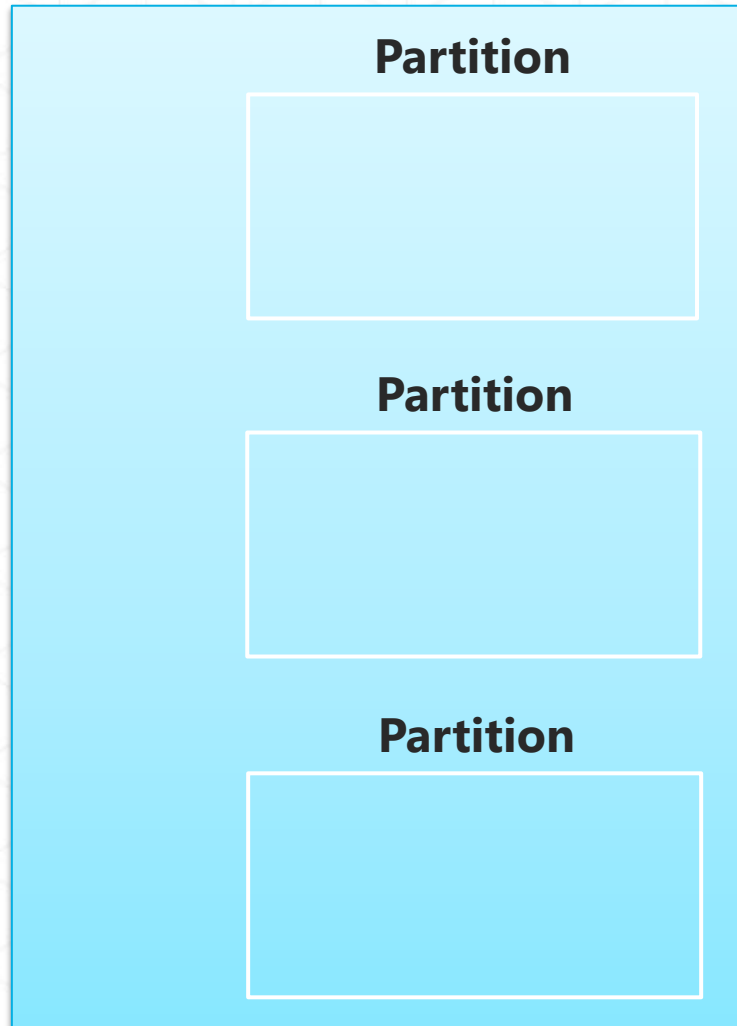
Storage

Azure Storage – Tables



Storage

Table

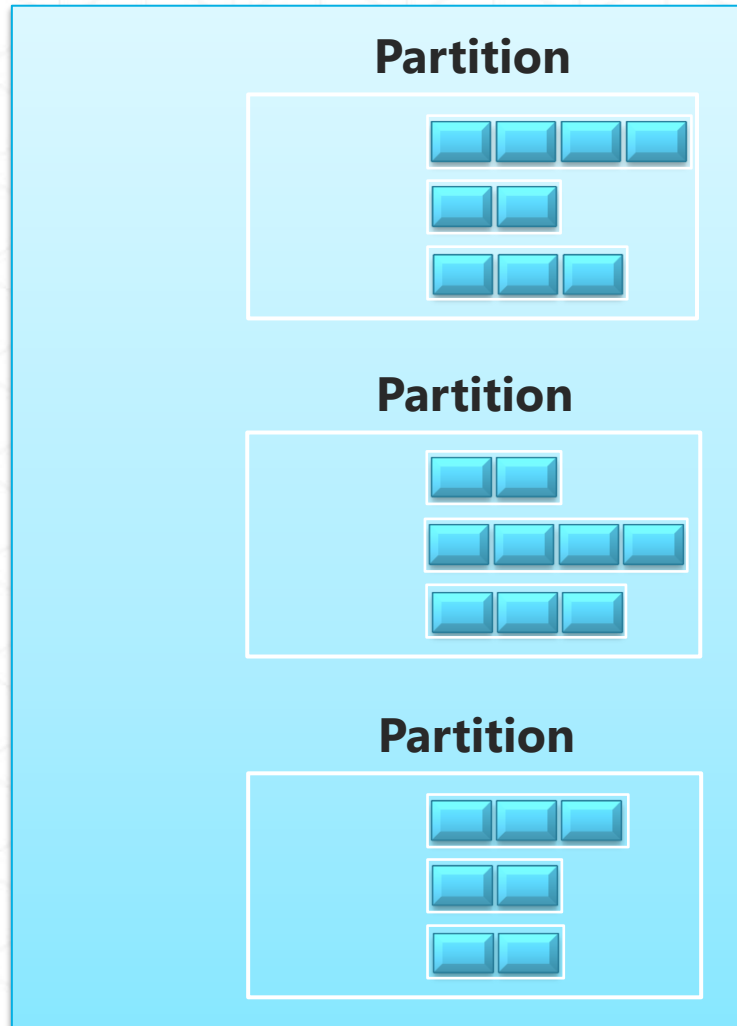


Azure Storage – Tables



Storage

Table



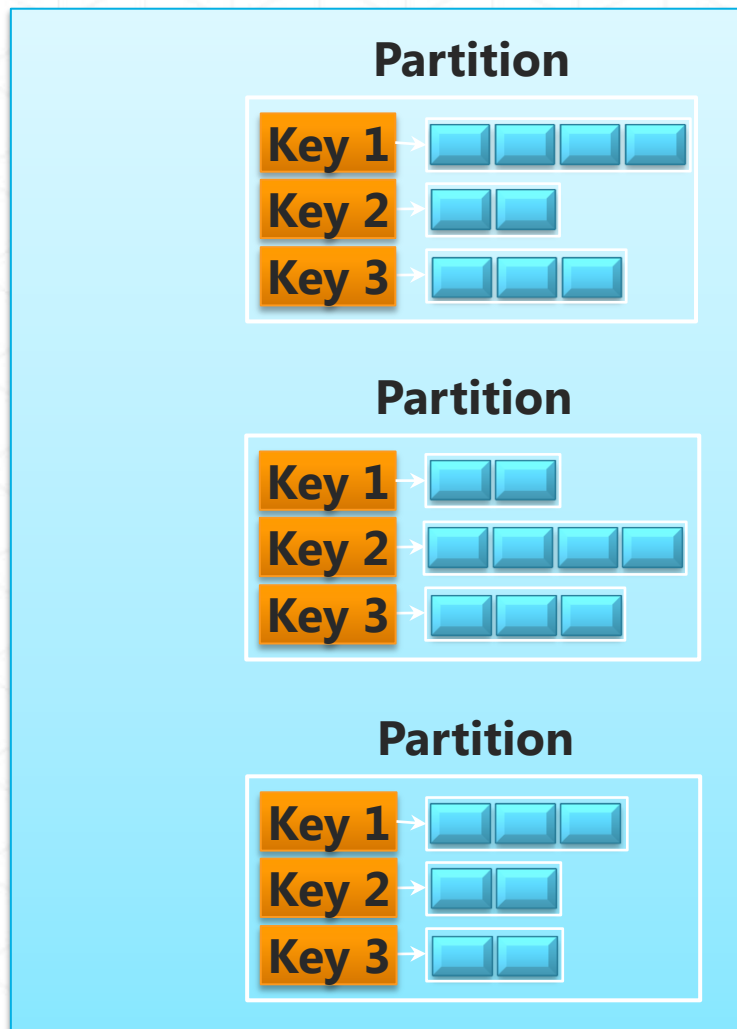
Property

Azure Storage – Tables



Storage

Table



 *Row key*

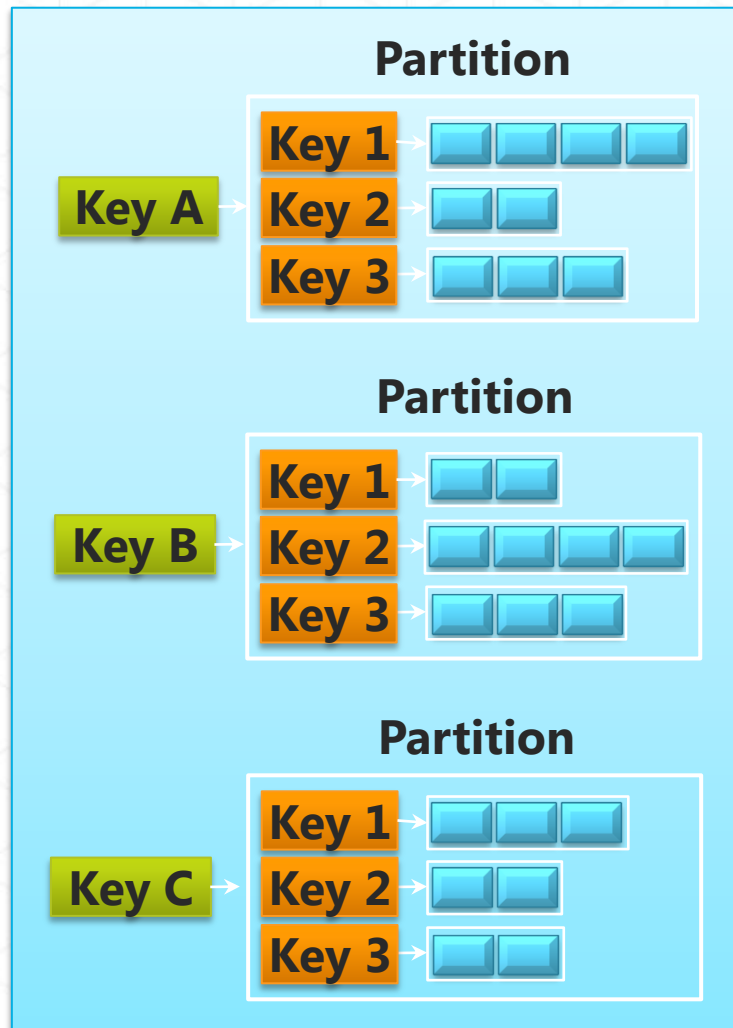
 *Property*

Azure Storage – Tables



Storage

Table



-  **Partition key**
-  **Row key**
-  **Property**

Storage



Storage

Storage

SQL Azure Database



Storage

Storage

SQL Azure Database
SQL Server relational database



Storage

Storage



Storage

SQL Azure Database

SQL Server relational database

Support for existing APIs and Tools (TDS protocol)

Storage



Storage

SQL Azure Database

SQL Server relational database

Support for existing APIs and Tools (TDS protocol)

Max database size: 150 gigabytes

Storage



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PAAS Service based on SQL Server

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PAAS Service based on SQL Server

Easy to provision and manage

Storage



Storage

SQL Azure Database

SQL Server relational database

Support for existing APIs and Tools (TDS protocol)

Max database size: 150 gigabytes

PAAS Service based on SQL Server

Easy to provision and manage

Data stored on multiple backend data nodes

Messaging



Messaging

Messaging

Queue Service



Messaging

Messaging

Queue Service
Durable messaging



Messaging

Messaging

Queue Service

Durable messaging

Load balancing and Load leveling



Messaging

Messaging

Queue Service

Durable messaging

Load balancing and Load leveling

Service Bus



Messaging

Messaging

Queue Service

Durable messaging

Load balancing and Load leveling

Service Bus

Connects applications



Messaging

Messaging



Messaging

Queue Service

- Durable messaging

- Load balancing and Load leveling

Service Bus

- Connects applications

- Asynchronous and Synchronous (with Relay)

Messaging



Messaging

Queue Service

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Service Bus

- Connects applications

- Asynchronous and Synchronous (with Relay)

- Rich Publish / Subscribe platform

Messaging



Messaging

Queue Service

- Durable messaging

- Load balancing and Load leveling

Service Bus

- Connects applications

- Asynchronous and Synchronous (with Relay)

- Rich Publish / Subscribe platform

- Supports REST, WCF and .NET programming

Messaging



Messaging

Queue Service

- Durable messaging

- Load balancing and Load leveling

Service Bus

- Connects applications

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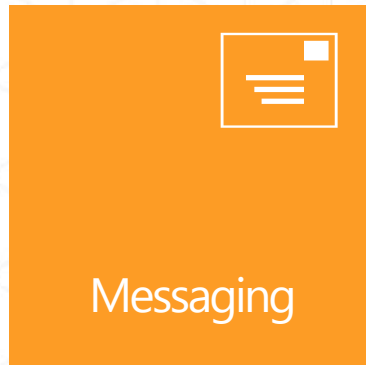
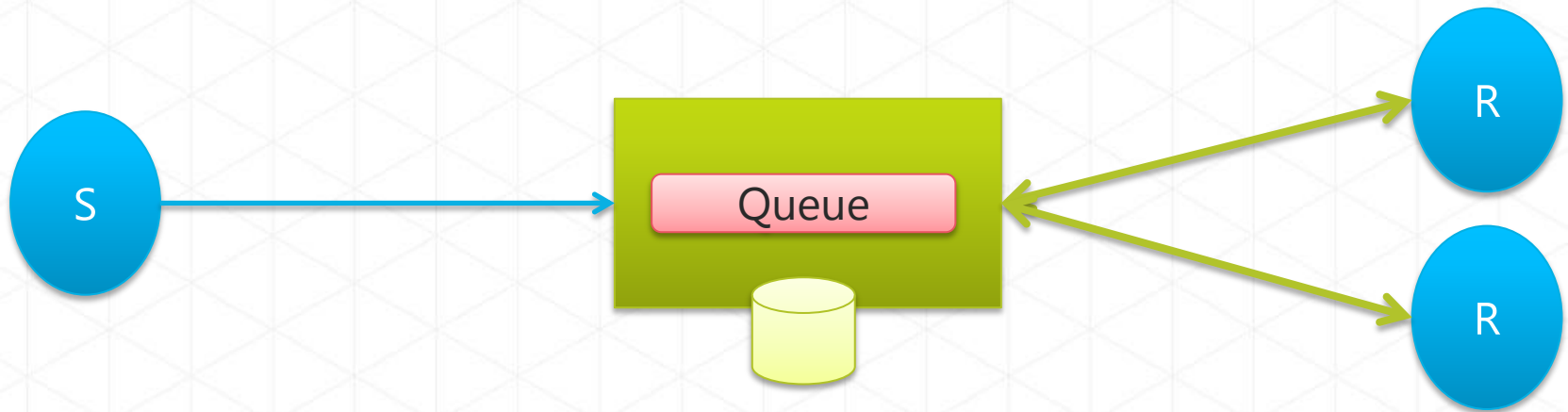
- Rich Publish / Subscribe platform

- Supports REST, WCF and .NET programming

- Queues and Topics-Subscriptions

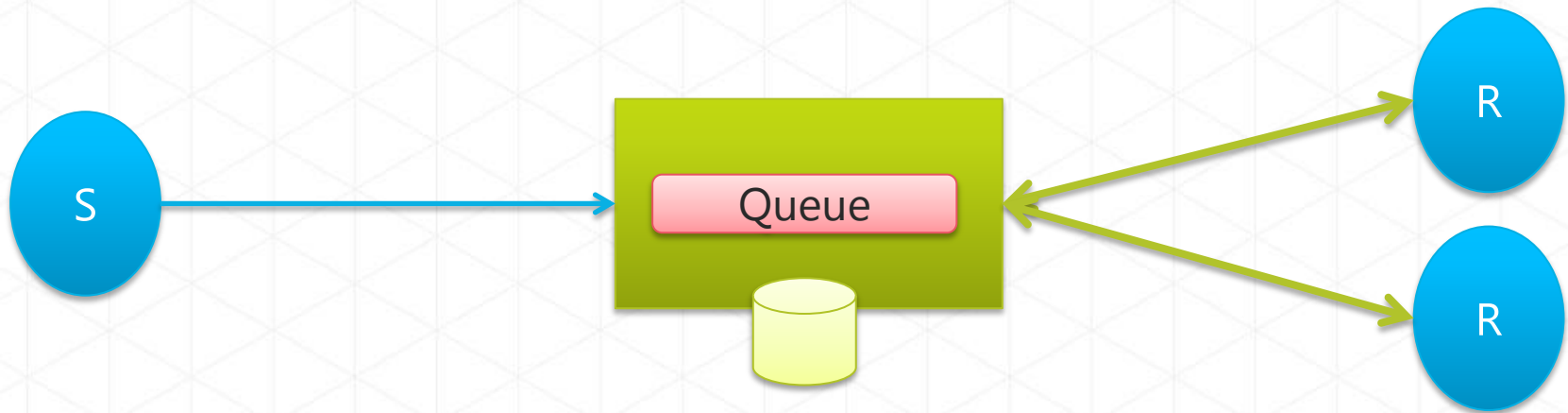
Messaging

Queues



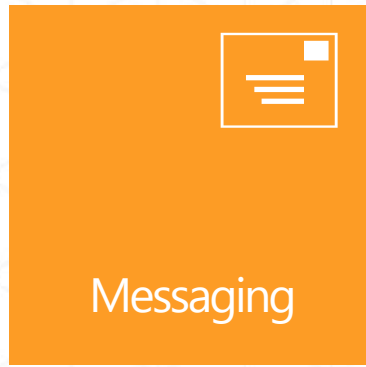
Messaging

Queues



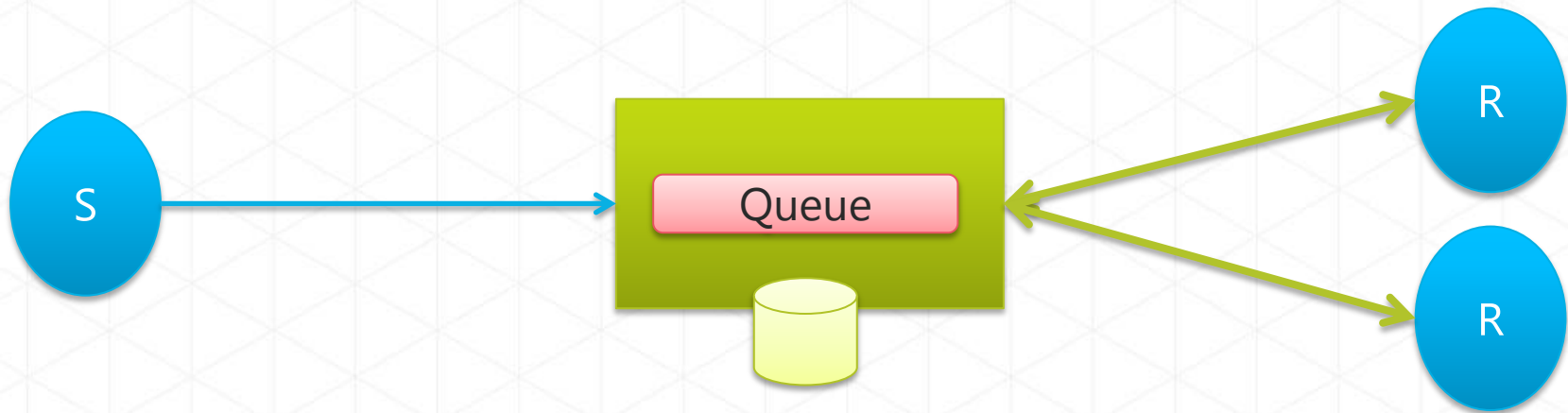
Load Leveling

Receiver receives and processes at its own pace



Messaging

Queues



Load Leveling

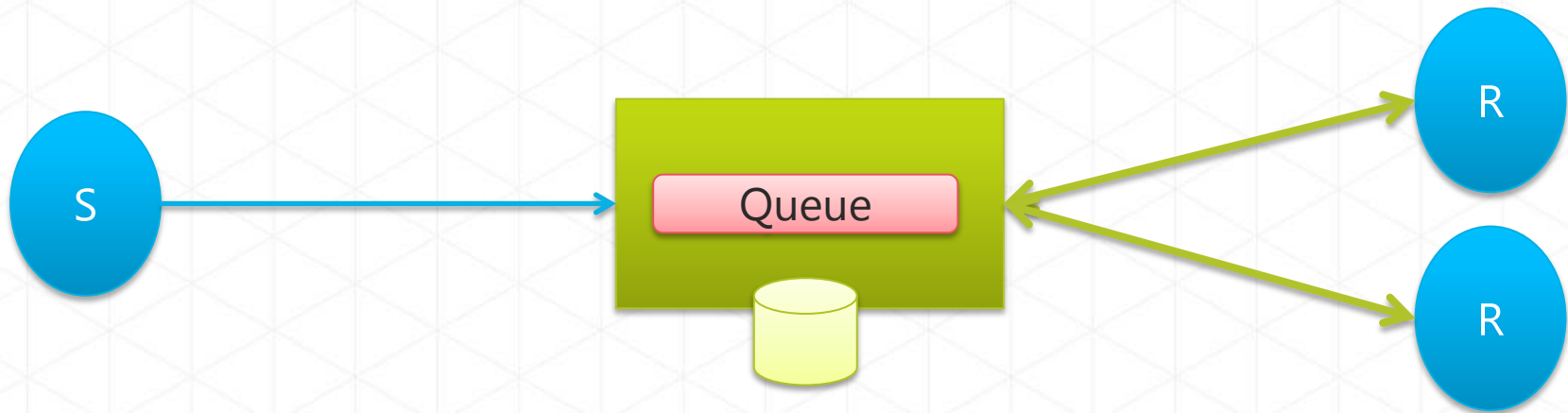
Receiver receives and processes at its own pace

Temporal Decoupling

Allows taking the receiver offline for servicing or other reasons

Messaging

Queues



Load Leveling

Receiver receives and processes at its own pace

Temporal Decoupling

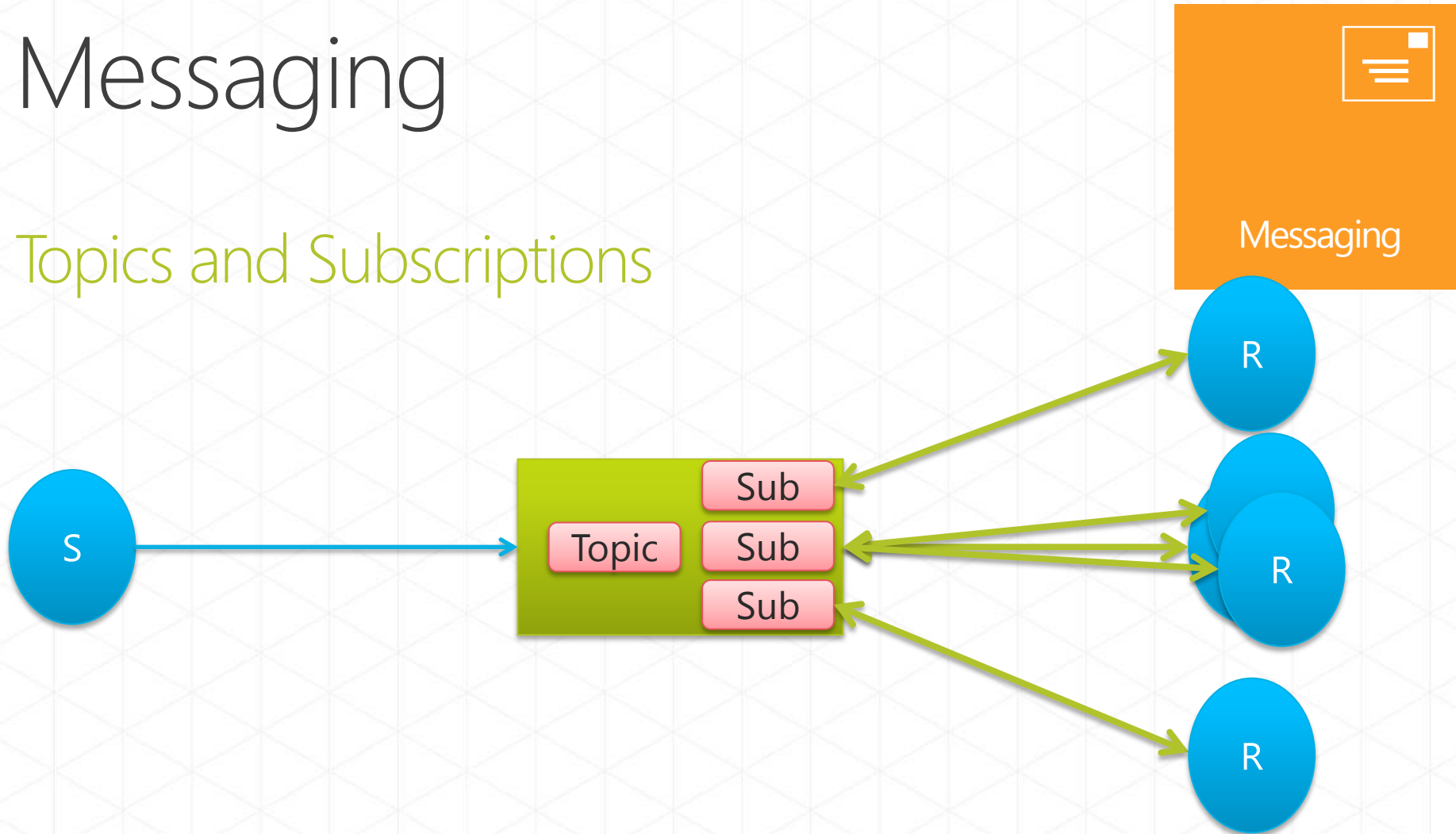
Allows taking the receiver offline for servicing or other reasons

Load Balancing

Can add receivers as queue length grows

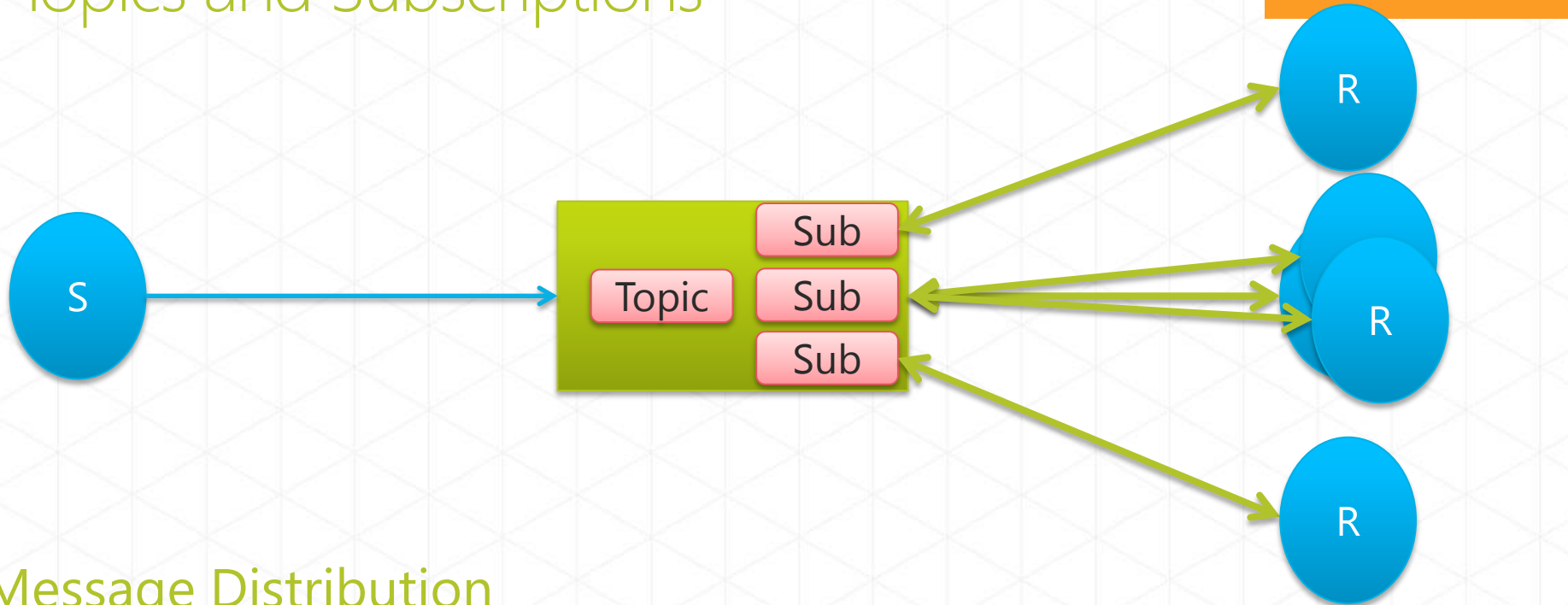
Messaging

Topics and Subscriptions



Messaging

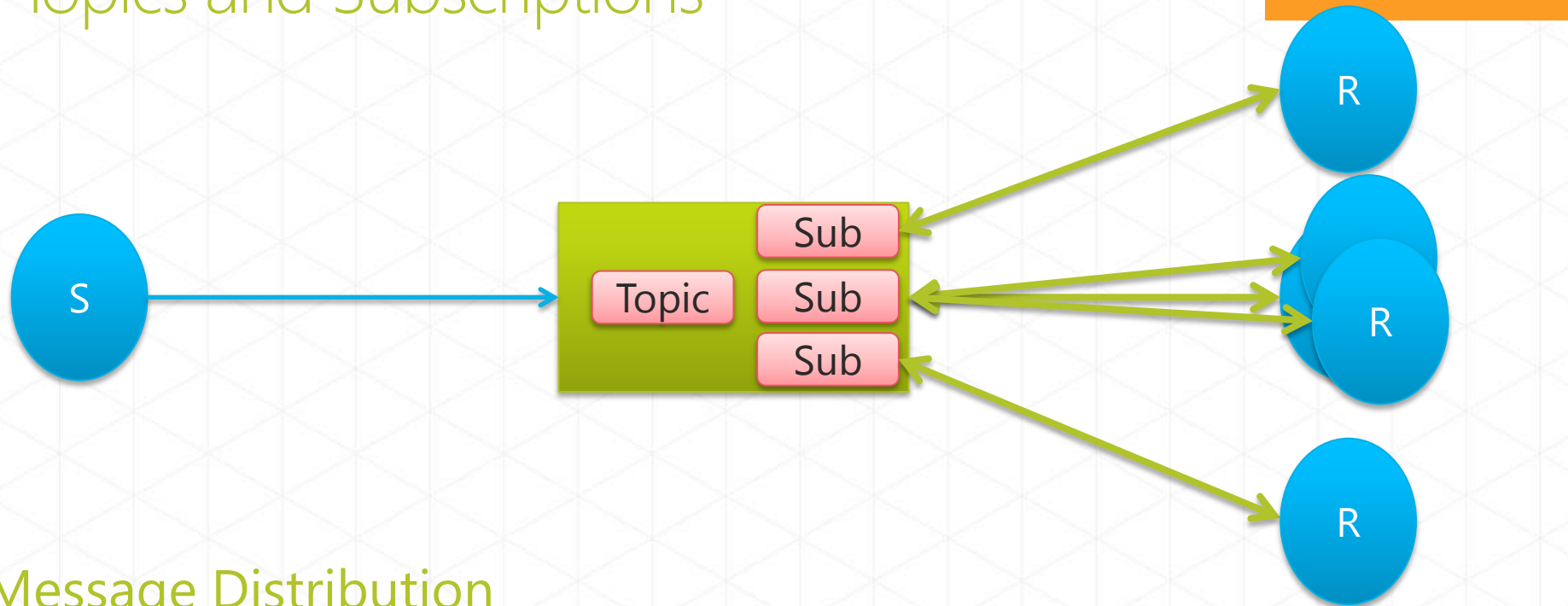
Topics and Subscriptions



Message Distribution

Messaging

Topics and Subscriptions

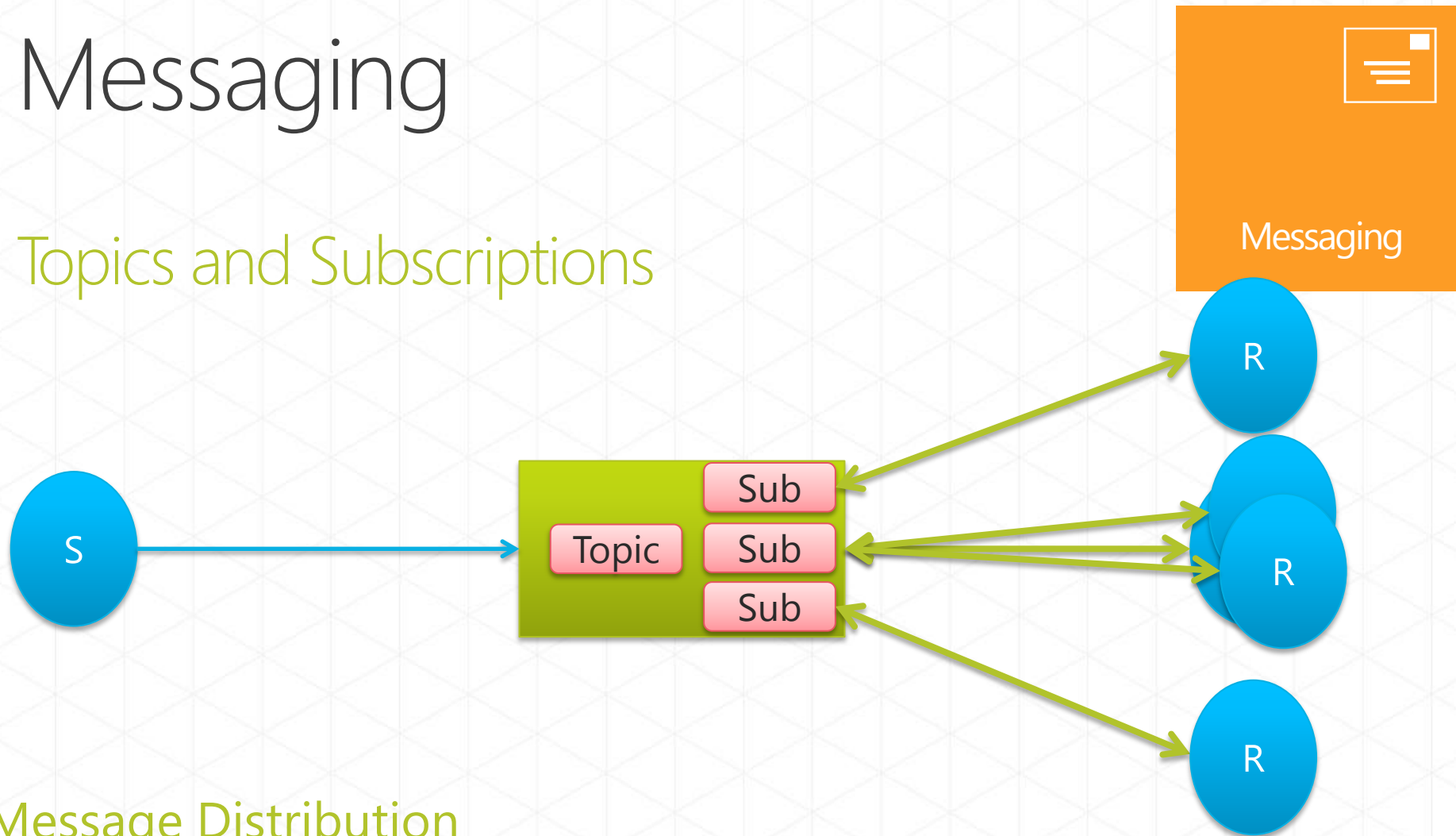


Message Distribution

Each receiver gets its own copy of each message

Messaging

Topics and Subscriptions

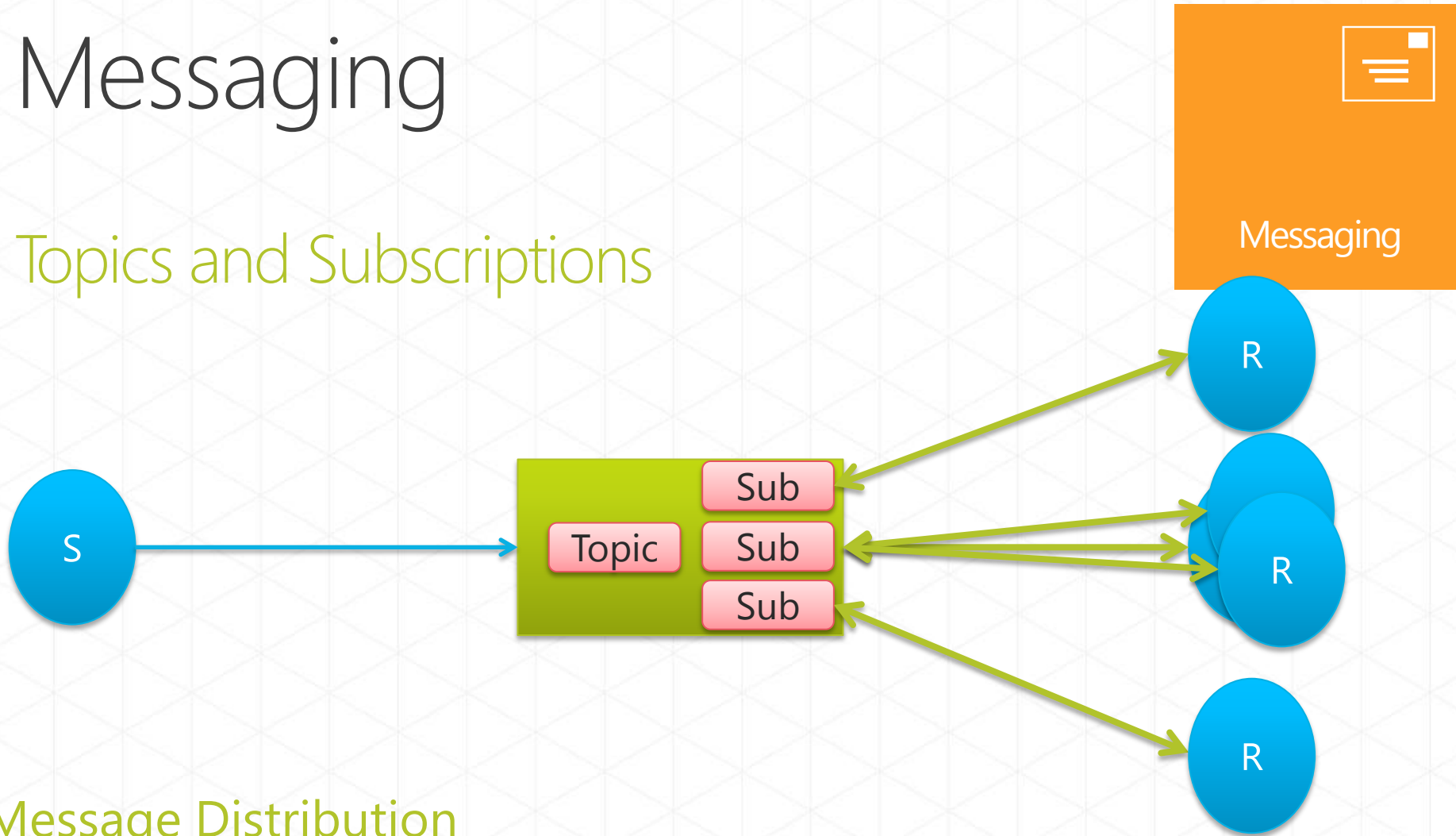


Message Distribution

Each receiver gets its own copy of each message
Subscriptions are independent queues

Messaging

Topics and Subscriptions



Message Distribution

- Each receiver gets its own copy of each message
- Subscriptions are independent queues
- Subscriber can filter down by interest.

Security and Identity



Security/Identity

Security and Identity



Security/Identity

Active Directory Access Control Service

Security and Identity



Security/Identity

Active Directory Access Control Service
Used to authenticate and authorize users

Security and Identity



Security/Identity

Active Directory Access Control Service

Used to authenticate and authorize users

Integration Single Sign On and centralized authorization into your web applications

Security and Identity



Security/Identity

Active Directory Access Control Service

Used to authenticate and authorize users

Integration Single Sign On and centralized authorization into your web applications

Standards-based identity providers

Security and Identity



Security/Identity

Active Directory Access Control Service

Used to authenticate and authorize users

Integration Single Sign On and centralized authorization into your web applications

Standards-based identity providers

Enterprise directories (e.g. Active Directory Federation Server v2.0)

Security and Identity



Security/Identity

Active Directory Access Control Service

Used to authenticate and authorize users

Integration Single Sign On and centralized authorization into your web applications

Standards-based identity providers

Enterprise directories (e.g. Active Directory Federation Server v2.0)

Web identities (e.g. Windows Live ID, Google, Yahoo!, and Facebook)

Security and Identity



Security/Identity



Security and Identity



Security/Identity



***Application
(On-premises
or cloud)***

Security and Identity



Security/Identity



Browser

***Application
(On-premises
or cloud)***

Security and Identity



Security/Identity

Identity Providers (IdPs)



Browser

*Application
(On-premises
or cloud)*

Security and Identity



Security/Identity

Identity Providers (IdPs)



1) Access application and get redirected to IdP

Security and Identity



Security/Identity

Identity Providers (IdPs)



IdP Token

2) Authenticate user, then return IdP token



Browser

**Application
(On-premises
or cloud)**

1) Access application and get redirected to IdP

Security and Identity

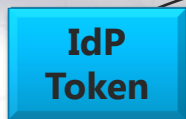


Security/Identity

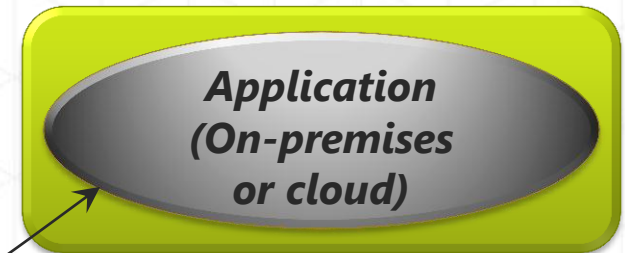
Identity Providers (IdPs)



Access Control



2) Authenticate user, then return IdP token



1) Access application and get redirected to IdP

Security and Identity

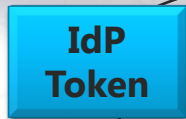
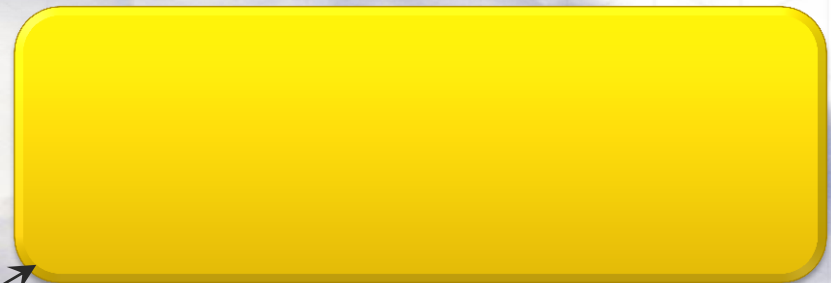


Security/Identity

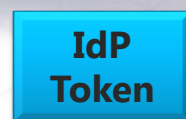
Identity Providers (IdPs)



Access Control



3) Send IdP token to Access Control



2) Authenticate user, then return IdP token



1) Access application and get redirected to IdP

Security and Identity



Security/Identity

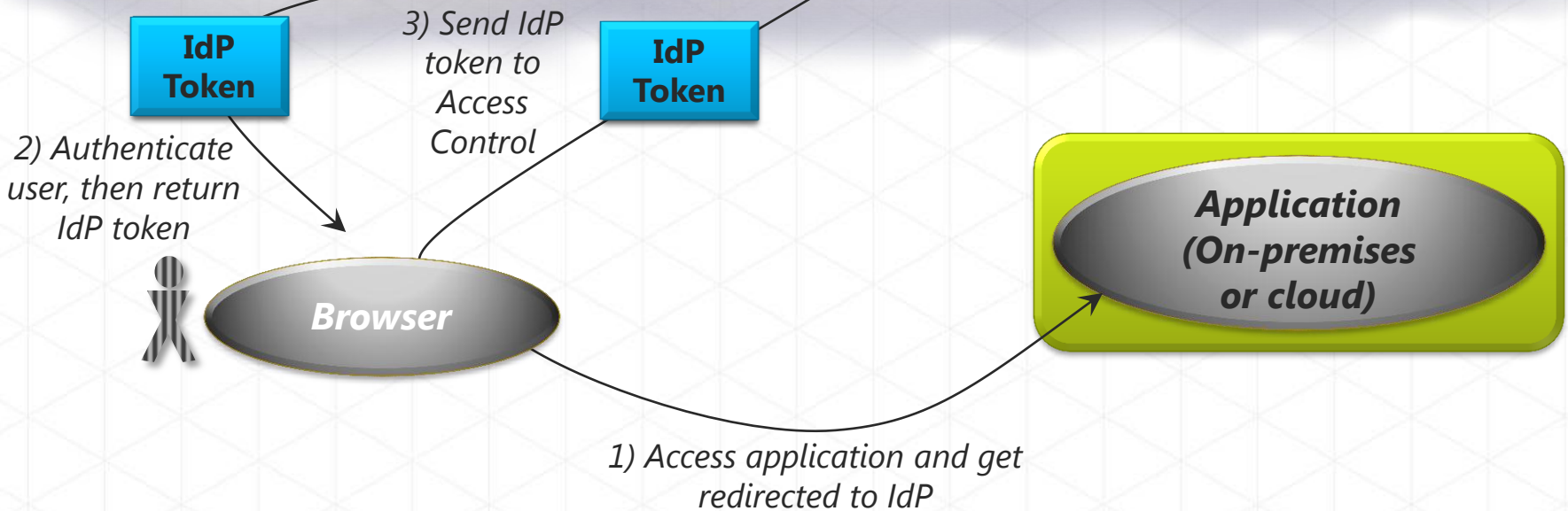
Identity Providers (IdPs)



Access Control

4) Validate IdP token, then create Access Control (AC) token according to rules for this application

Rules Engine



Security and Identity

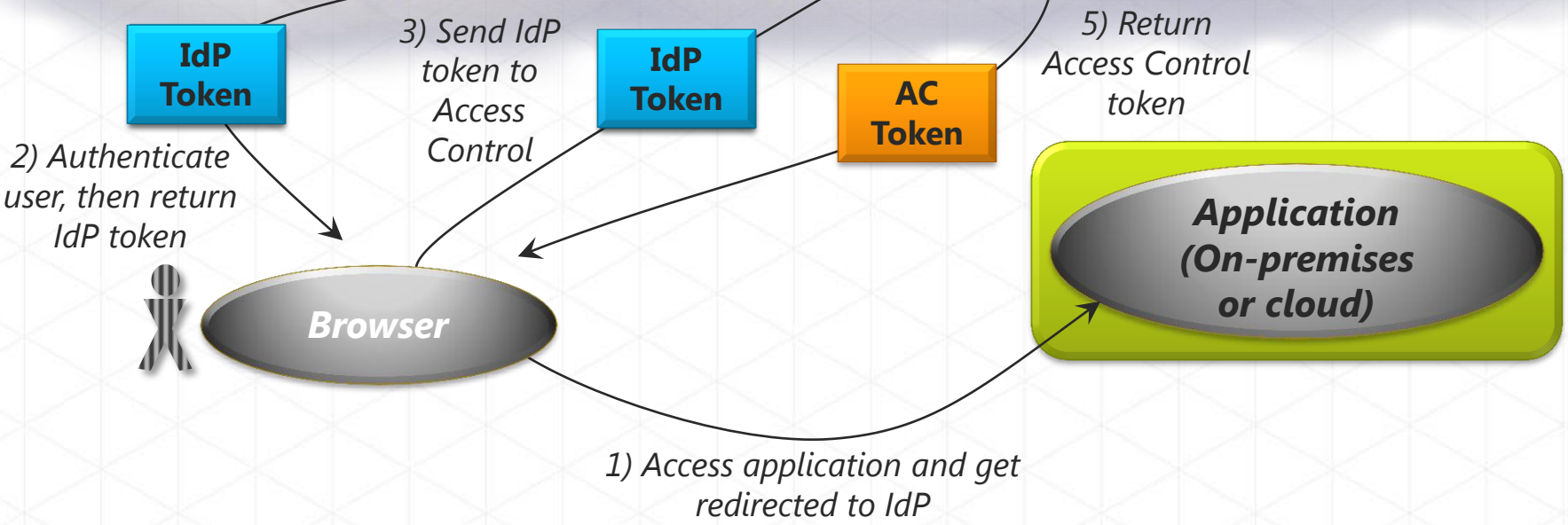
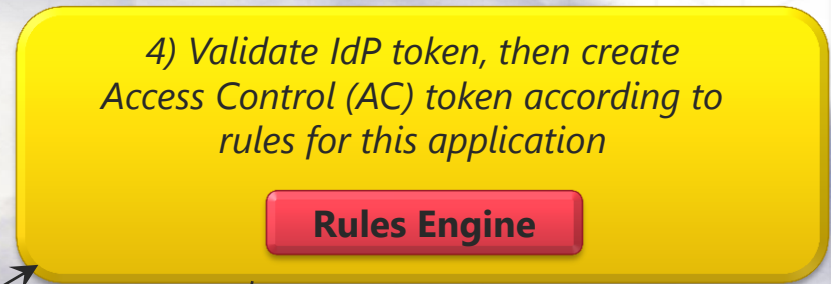


Security/Identity

Identity Providers (IdPs)



Access Control



Security and Identity

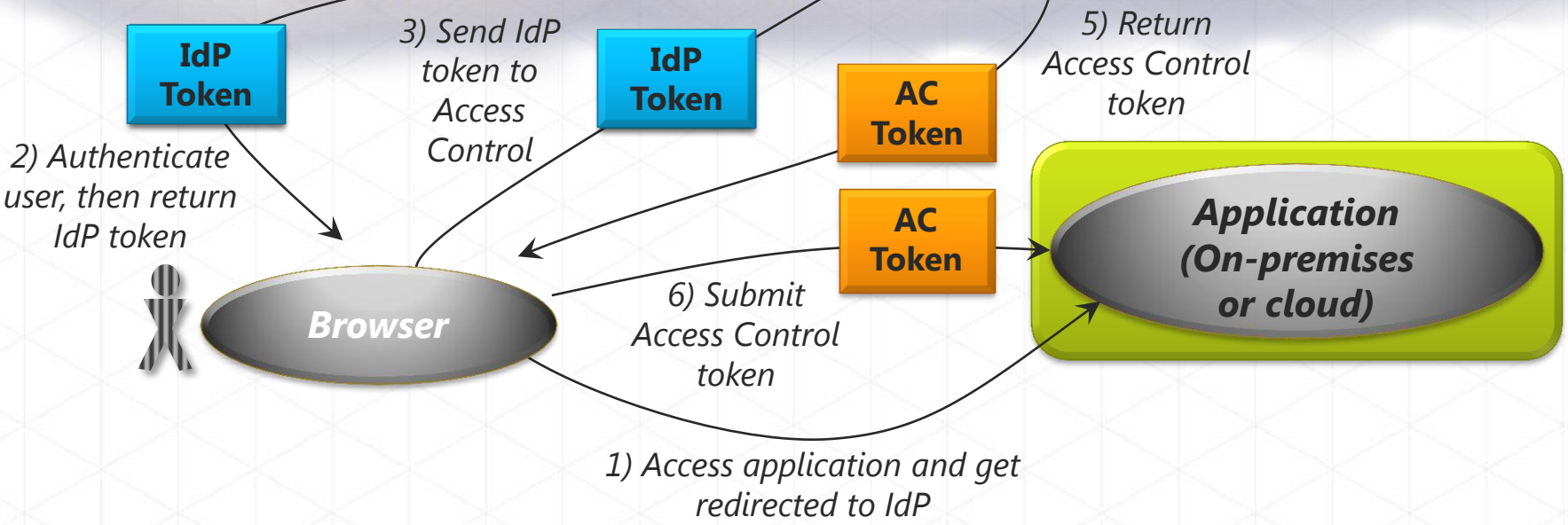
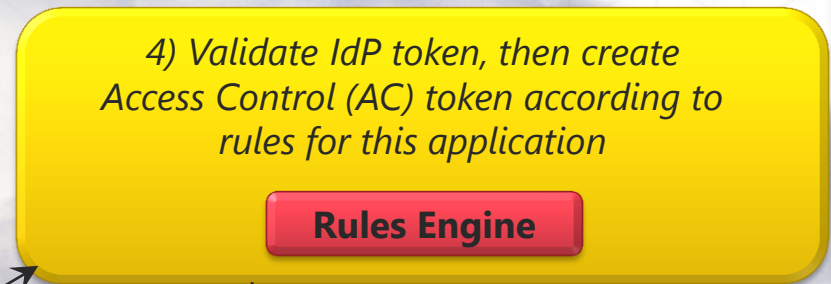


Security/Identity

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Access Control



Security and Identity

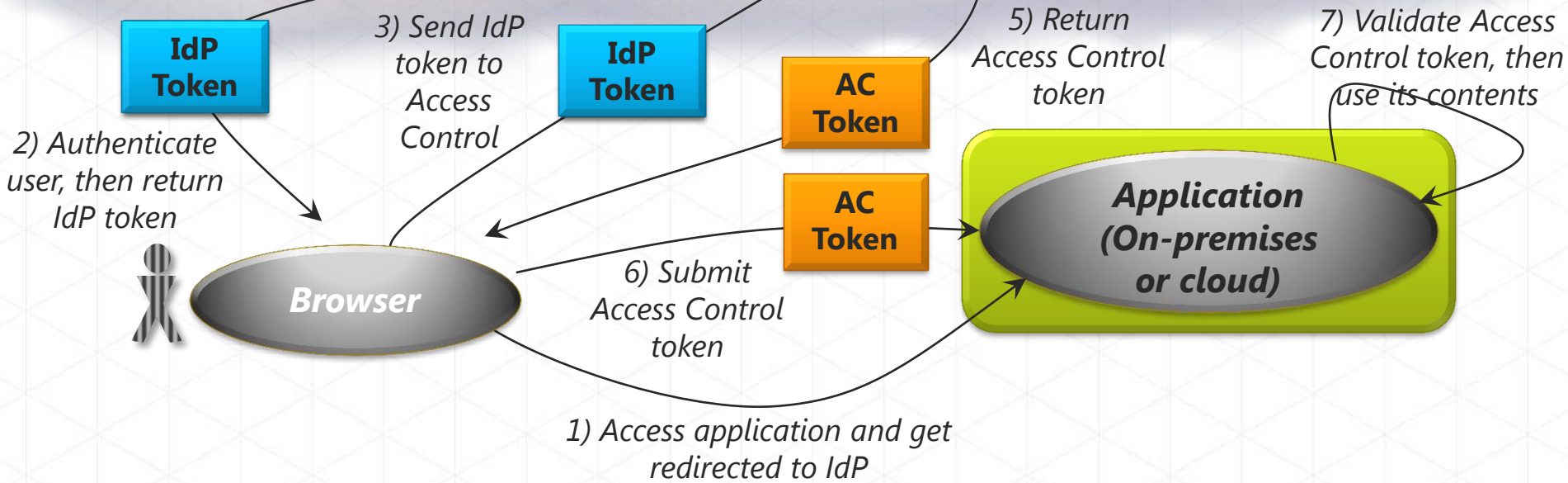
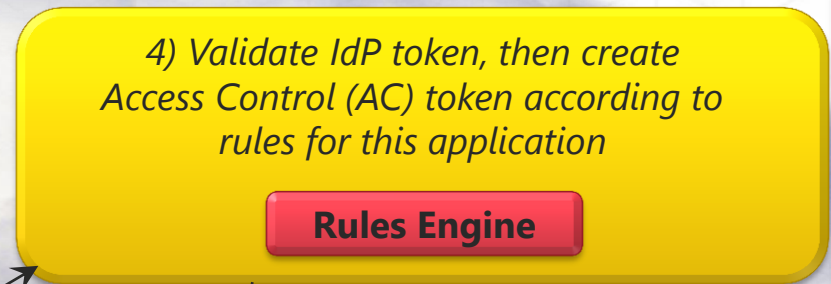


Security/Identity

Identity Providers (IdPs)



Access Control



Caching



Caching

Caching

Distributed, In-memory caching



Caching

Caching

Distributed, In-memory caching

Faster access to repeatedly used data



Caching

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Distributed, In-memory caching

Faster access to repeatedly used data

Data can be



Caching

Caching

Distributed, In-memory caching

Faster access to repeatedly used data

Data can be

Any serializable CLR Object



Caching

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Faster access to repeatedly used data

Data can be

- Any serializable CLR Object

- XML



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Faster access to repeatedly used data

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Used to increase performance

Caching



Distributed, In-memory caching

Faster access to repeatedly used data

Data can be

- Any serializable CLR Object

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Used to increase performance

Session State provider for sharing from Azure to on-premise

CDN



CDN

CDN

Content distribution network



CDN

CDN

Content distribution network
Why?



CDN

CDN

Content distribution network

Why?

Low Cost



CDN

CDN

Content distribution network

Why?

Low Cost

Low Complexity



CDN

Content distribution network

Why?

Low Cost

Low Complexity

High Performance



CDN

Content distribution network

Why?

Low Cost

Low Complexity

High Performance

High Availability



CDN



Content distribution network

Why?

Low Cost

Low Complexity

High Performance

High Availability

Caches blob data locally at global access points

CDN



Content distribution network

Why?

Low Cost

Low Complexity

High Performance

High Availability

Caches blob data locally at global access points

Allows faster global access to repeatedly read data

CDN



Content distribution network

Why?

Low Cost

Low Complexity

High Performance

High Availability

Caches blob data locally at global access points

Allows faster global access to repeatedly read data

Reduce bandwidth usage

CDN



Content distribution network

Why?

Low Cost

Low Complexity

High Performance

High Availability

Caches blob data locally at global access points

Allows faster global access to repeatedly read data

Reduce bandwidth usage

Increase performance

CDN



Content distribution network

Why?

Low Cost

Low Complexity

High Performance

High Availability

Caches blob data locally at global access points

Allows faster global access to repeatedly read data

Reduce bandwidth usage

Increase performance

Streaming capabilities

Existing CDN Customers



Windows Update

Zune Video

Hotmail

Bing Maps

MSN/ MSN Video

MSN Ads

Beijing Olympics

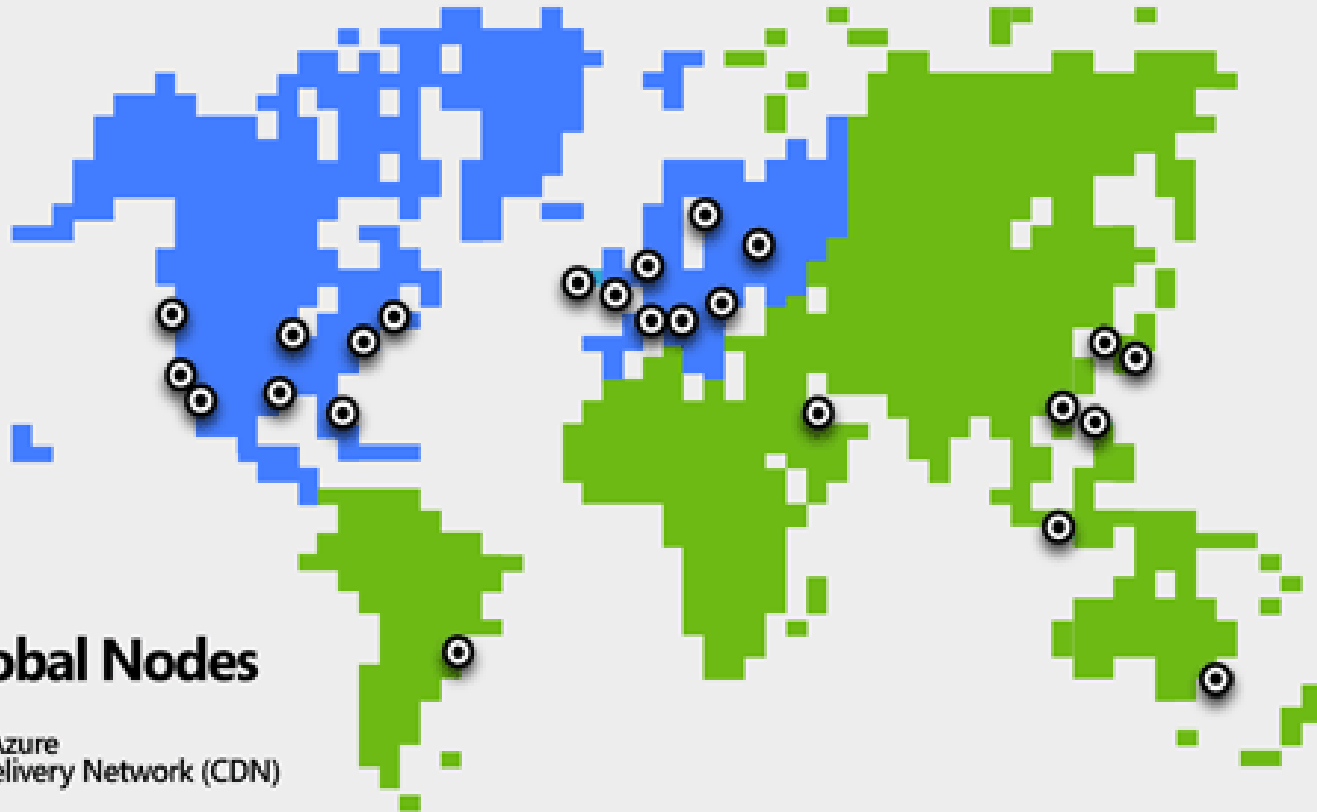
Microsoft AJAX CDN

Microsoft[®]



THE STUDIO
A Microsoft[®] Experience

Reach, Scale and Capability



**MULTIPLE TERABITS PER SECOND OF CAPACITY
24 GLOBAL LOCATIONS WITH 99.95% AVAILABILITY**

Marketplace



Marketplace

Marketplace



Marketplace

Find Windows Azure Applications and Data

Marketplace



Marketplace

Find Windows Azure Applications and Data
For SAAS applications (can be paid/free)

Marketplace



Marketplace

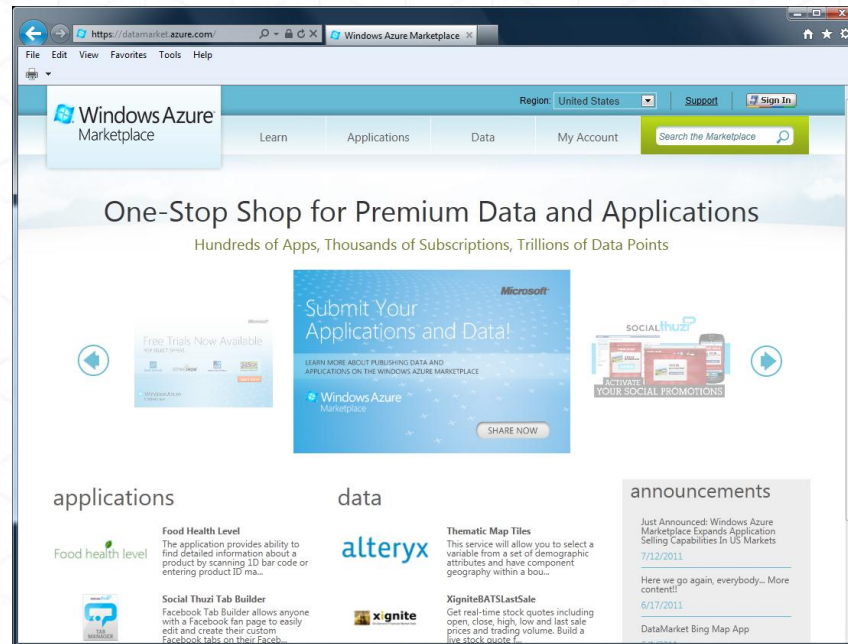
Find Windows Azure Applications and Data
For SAAS applications (can be paid/free)
Allows direct access to data via ODATA

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Find Windows Azure Applications and Data
For SAAS applications (can be paid/free)
Allows direct access to data via ODATA



Connectivity



Connectivity

Connectivity

SQL Azure Data Sync



Connectivity

Connectivity

SQL Azure Data Sync

SQL Azure databases in different datacenters



Connectivity

Connectivity



Connectivity

SQL Azure Data Sync

SQL Azure databases in different datacenters

SQL Azure databases and SQL Server databases

Connectivity



Connectivity

SQL Azure Data Sync

SQL Azure databases in different datacenters

SQL Azure databases and SQL Server databases

Traffic Manager

Connectivity



Connectivity

SQL Azure Data Sync

SQL Azure databases in different datacenters

SQL Azure databases and SQL Server databases

Traffic Manager

Spreads user requests across Windows Azure datacenters

Connectivity



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Connectivity



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SQL Azure Data Sync

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Traffic Manager

Spreads user requests across Windows Azure datacenters

Connect

Connects Windows Azure VMs to on-premise Windows Server computer

Connectivity



Connectivity

SQL Azure Data Sync

- SQL Azure databases in different datacenters

- SQL Azure databases and SQL Server databases

Traffic Manager

- Spreads user requests across Windows Azure datacenters

Connect

- Connects Windows Azure VMs to on-premise Windows Server computer

- Secure machine-to-machine connection

Connectivity



Connectivity

SQL Azure Data Sync

SQL Azure databases in different datacenters

SQL Azure databases and SQL Server databases

Traffic Manager

Spreads user requests across Windows Azure datacenters

Connect

Connects Windows Azure VMs to on-premise Windows Server computer

Secure machine-to-machine connection

No changes to network infrastructure needed

Pricing examples

Pricing examples

- Compute: \$0.04 to \$0.96 per hour per instance

X-Small	Small	Medium	Large	X-Large
1 x 1.0Ghz (low IO)	1 x 1.6Ghz (moderate IO)	2 x 1.6Ghz (high IO)	4 x 1.6Ghz (high IO)	8 x 1.6Ghz (high IO)
768 MB memory 20 GB storage (instance storage)	1.75 GB memory 250 GB storage (instance storage)	3.5 GB memory 500 GB storage (instance storage)	7.0 GB memory 1000 GB storage (instance storage)	14 GB memory 2000 GB (instance storage)

Pricing examples

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- Storage: \$0.14 per GB per month & \$0.01 per 10,000 operations
- Bandwidth: Inbound Free, Outbound \$0.12-\$0.17/GB

MSDN Benefits

- Free Windows Azure for Professional, Premium, and Ultimate subscribers



MSDN subscribers

Get free access each month, including up to \$3,700.00 in annual Windows Azure benefits

[LEARN MORE](#) →



BizSpark members

Get free access each month, including up to \$3,700.00 in annual Windows Azure benefits

[LEARN MORE](#) →



MPN members

Get free access each month, including up to \$1,300.00 in annual Windows Azure benefits

[LEARN MORE](#) →

Multiple Languages

The screenshot shows the Windows Azure website's 'Downloads' page. The browser address bar displays 'http://www.windowsazure.com/en-us/develop...'. The page header includes 'Windows Azure' and a 'SIGN IN' button. A navigation menu contains 'HOME', 'PRICING', 'DEVELOP', 'COMMUNITY', 'SUPPORT', and 'ACCOUNT'. Below the menu, there are links for 'overview', '.net', 'node.js', 'java', 'php', and 'downloads', along with a 'free trial' button. The main heading is 'Downloads' with the subtext 'Get the tools you need. Fast.' and an illustration of a red toolbox with tools and language-specific labels like '.net', 'java', 'node.js', and 'php'. The 'full installs' section is organized into five columns: '.net', 'node.js', 'java', 'php', and 'other'. Each column lists specific tools with green checkmarks and an 'install' button with a download icon. The last updated date for all categories is 'November 2011'.

.net	node.js	java	php	other
<ul style="list-style-type: none">Visual Studio ToolsClient Libraries for .NET	<ul style="list-style-type: none">PowerShell ToolsNode.js for Windows	<ul style="list-style-type: none">Eclipse ToolsClient Libraries for Java	<ul style="list-style-type: none">Command Line ToolsClient Libraries for PHP	<ul style="list-style-type: none">Command Line ToolsEmulators
install	install	install	install	install
Last updated November 2011	Last updated November 2011	Last updated November 2011	Last updated November 2011	Last updated November 2011

Stackoverflow

→ <http://stackoverflow.com/questions/tagged/azure>

The screenshot shows the Stack Overflow website interface. At the top, there's a navigation bar with the Stack Overflow logo, a search bar containing 'azure', and links for 'log in', 'careers', 'chat', 'meta', 'about', and 'faq'. Below the navigation bar, there are tabs for 'Questions', 'Tags', 'Users', 'Badges', and 'Unanswered', along with an 'Ask Question' button. The main content area is titled 'Tagged Questions' and shows a list of questions. The first question is 'When should one use the following: Amazon EC2, Google App Engine, Microsoft Azure and Salesforce.com?' with 29 votes, 6 answers, and 4k views. The second question is 'To Azure or Not to Azure?' with 25 votes, 12 answers, and 5k views. The third question is 'Recommend a C# Task Scheduling Library' with 20 votes, 5 answers, and 14k views. On the right side, there's a summary for '2,224 questions tagged azure' and a 'Bruno knows Cloud' banner featuring a man's portrait. Below that, there's a 'Related Tags' section listing 'c#' (243), 'cloud' (199), '.net' (194), and 'asp.net' (187).

StackExchange v log in | careers | chat | meta | about | faq [azure]

stackoverflow Questions Tags Users Badges Unanswered Ask Question

Tagged Questions newest faq votes active unanswered 2,224 questions tagged azure about »

29 votes
6 answers
4k views

When should one use the following: Amazon EC2, Google App Engine, Microsoft Azure and Salesforce.com?

I am asking this in very general sense. Both from cloud provider and cloud consumer's perspective. Also the question is not for any specific kind of application (in fact the intention is to know which ...

google-app-engine amazon-ec2 azure cloud salesforce

user32262 834 ● 2 ● 14 ● 27

25 votes
12 answers
5k views

To Azure or Not to Azure?

I don't know about you, but i'm rather excited by the newly developing 'Cloud' computing platform. In the past I have been rather hoo hum about it all, thinking it is going to be a passing fad. I'm ...

azure

Andrew Harry 3,012 ● 4 ● 24 ● 58

20 votes
5 answers
14k views

Recommend a C# Task Scheduling Library

I'm looking for a C# library, preferably open source, that will let me schedule tasks with a fair amount of flexibility. Specifically, I should be able to schedule things to run every N units of time ...

c# azure task-scheduler

ssmith 961 ● 1 ● 5 ● 16

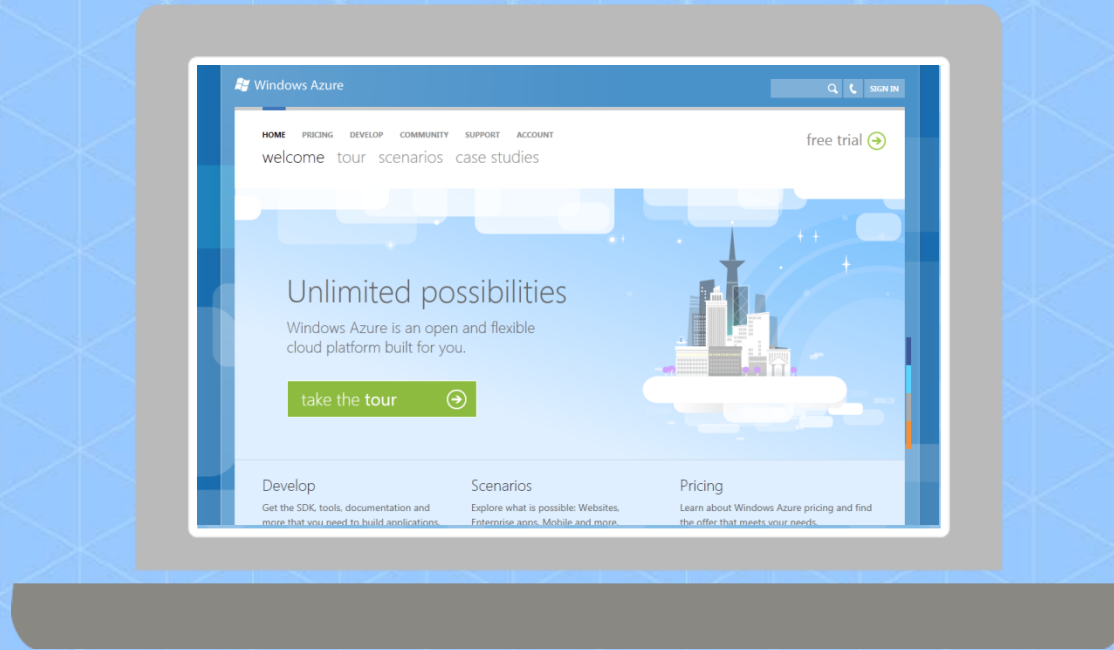
Bruno knows Cloud

Related Tags

c# × 243
cloud × 199
.net × 194
asp.net × 187

Getting started

http://WindowsAzure.com



Related Sessions

PBC353 Scott Golightly 6 th May @ 9:00am	Controlling Application Access with Windows Azure
PBC305 Abhishek Lal 6 th May @ 11:00am	Using Microsoft Visual Studio® to Build Applications that Run on Windows Azure
PBC216 Sam Leung 6 th May @ 1:30pm	Understanding the Application Portfolio Assessment and Migration Strategy to Windows Azure
PBC384 Abhishek Lal 6 th May @ 4:45pm	Windows Azure Service Bus Introduction: Why, What, How
PBC276 Ben Ng 7 th May @ 9:30am	A Lap Around Microsoft Dynamics CRM and Microsoft Dynamics CRM Online
PBC389 Scott Golightly 7 th May @ 11:00am	Windows Azure and Windows Phone - Creating Great Apps
PBC283 Matt Valentine 7 th May @ 1:30pm	Coding 4Fun - Kinect, Microcontrollers and Windows Phone
PBC379 Abhishek Lal 7 th May @ 3:15pm	Windows Azure Service Bus: Advanced Messaging Features

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