



CLOUD PRO PT

Meeting #2 | 06.03.2017

New Azure SQL DB with blades or scripts? Humm what should I use?

by Ricardo Cabral

Speaker Presentation

- IT Manager at Globaltemp
- Degree in Computer Engineering
- Actively participating, volunteering and/or speaking Portuguese community meetings (Azure PT, Arduino Day, Cloud Pro PT, IT Pro Portugal, Netponto, O365PT, PowerShell Portugal, PTJUG, SQLPort, SQLSaturday Lisboa & Porto, Tuga IT, etc.)
- Passionate and self-taught in information technology with over 13 years' of experience in IT management, development and projects.
- Loves sharing, living and learning.

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Microsoft
CERTIFIED

Solutions Associate

Cloud Platform



Agenda



IaaS vs PaaS vs SaaS



Azure SQL Database



Azure Resource Manager



Azure PowerShell



Azure RM Templates

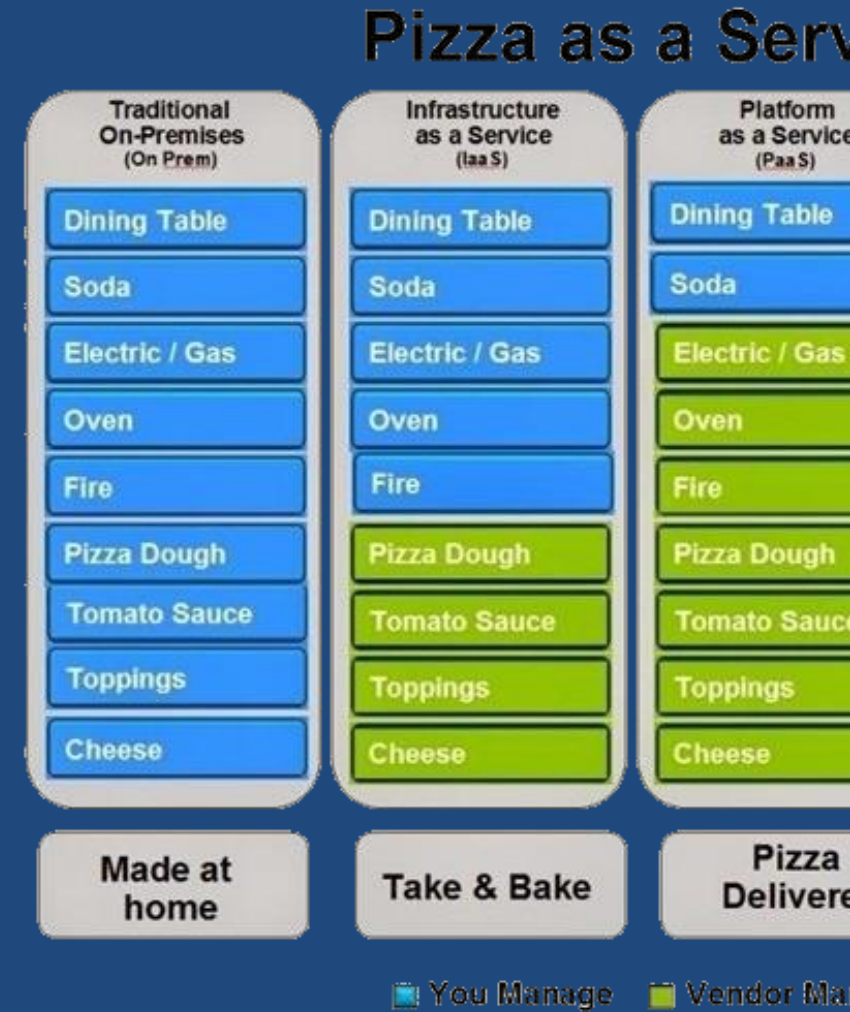


Q & A



Image source: <http://dilbert.com/strip/1995-11-17>

IaaS vs PaaS vs SaaS



IAAS vs PAAS vs SAAS

On-premises



IaaS

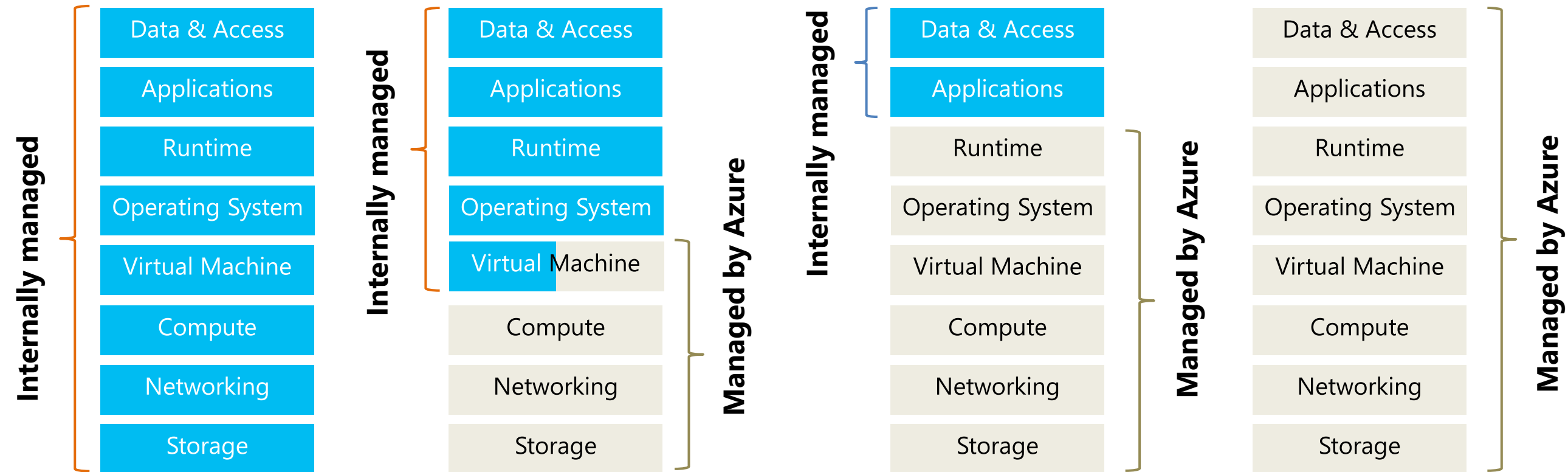


PaaS (DBaaS)

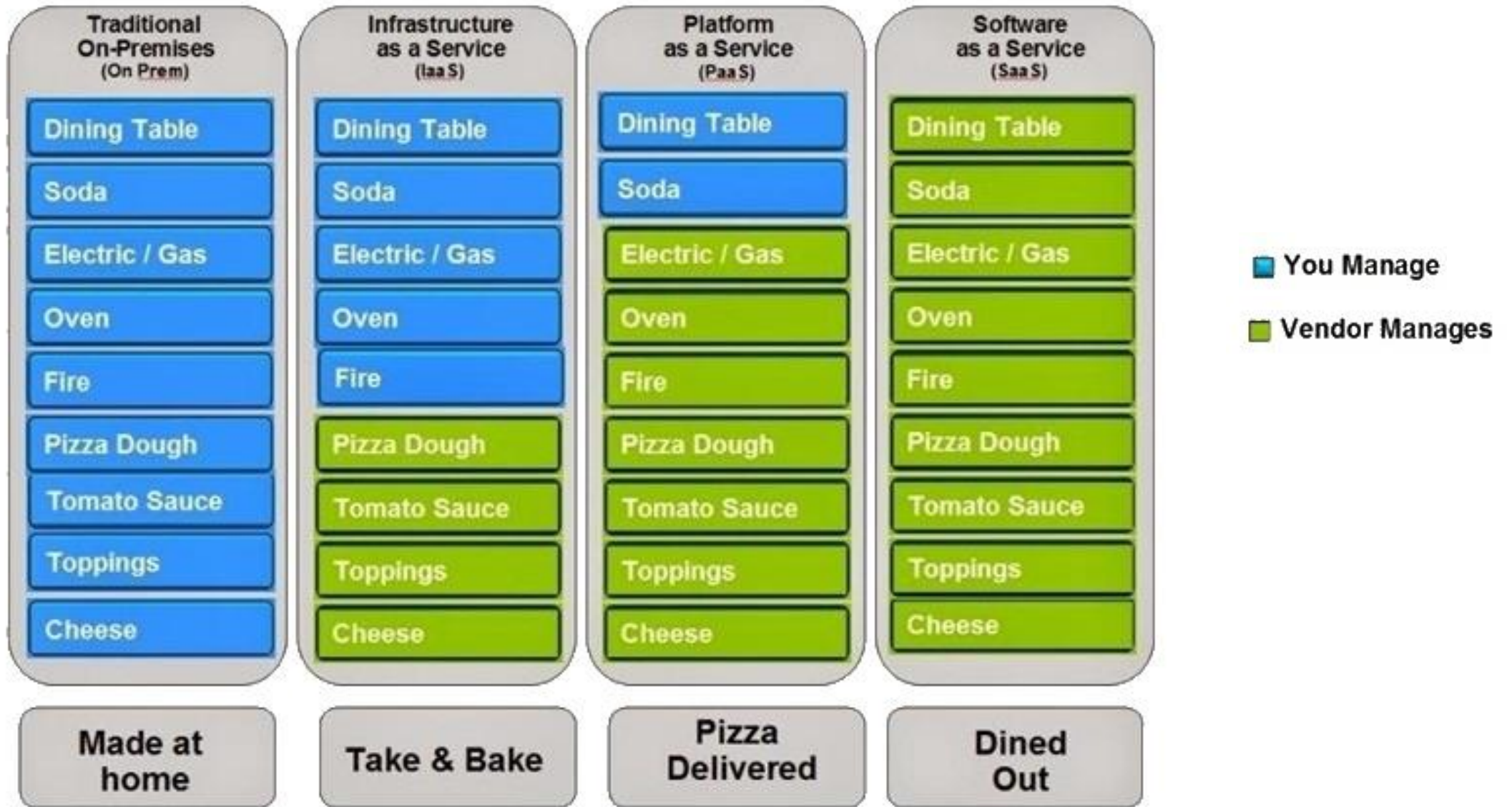


Azure SQL database

SaaS



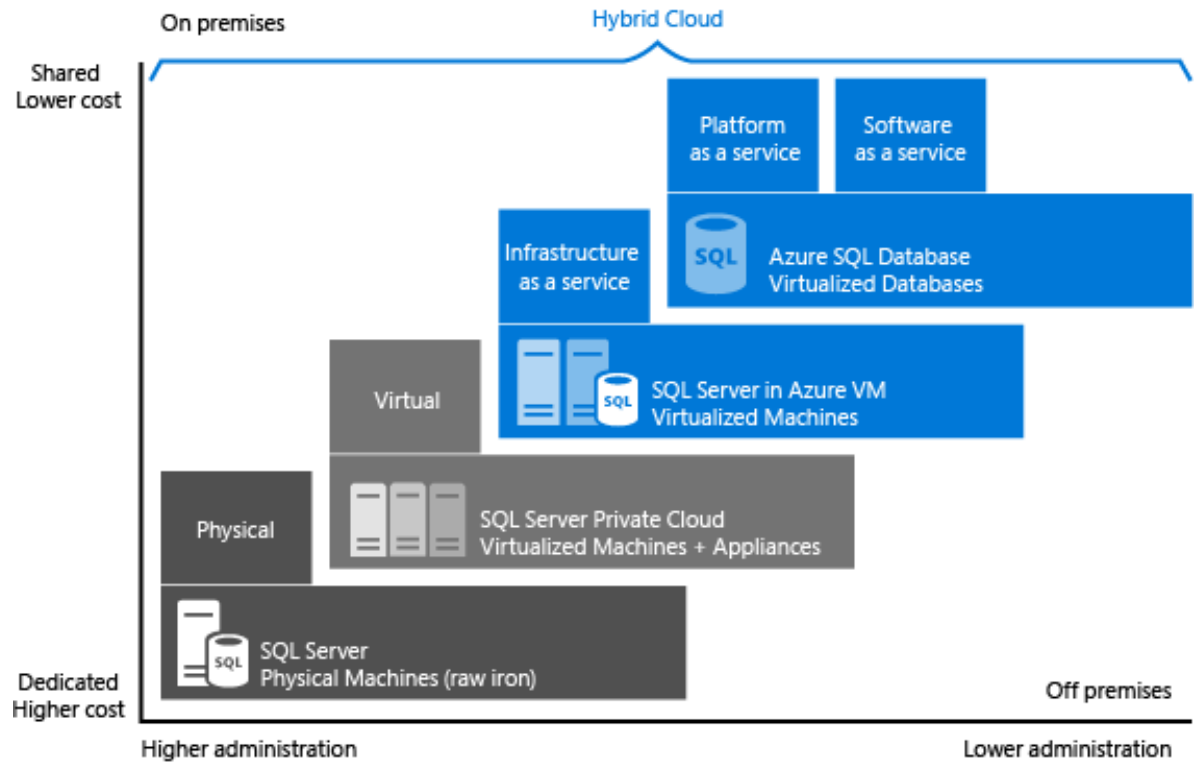
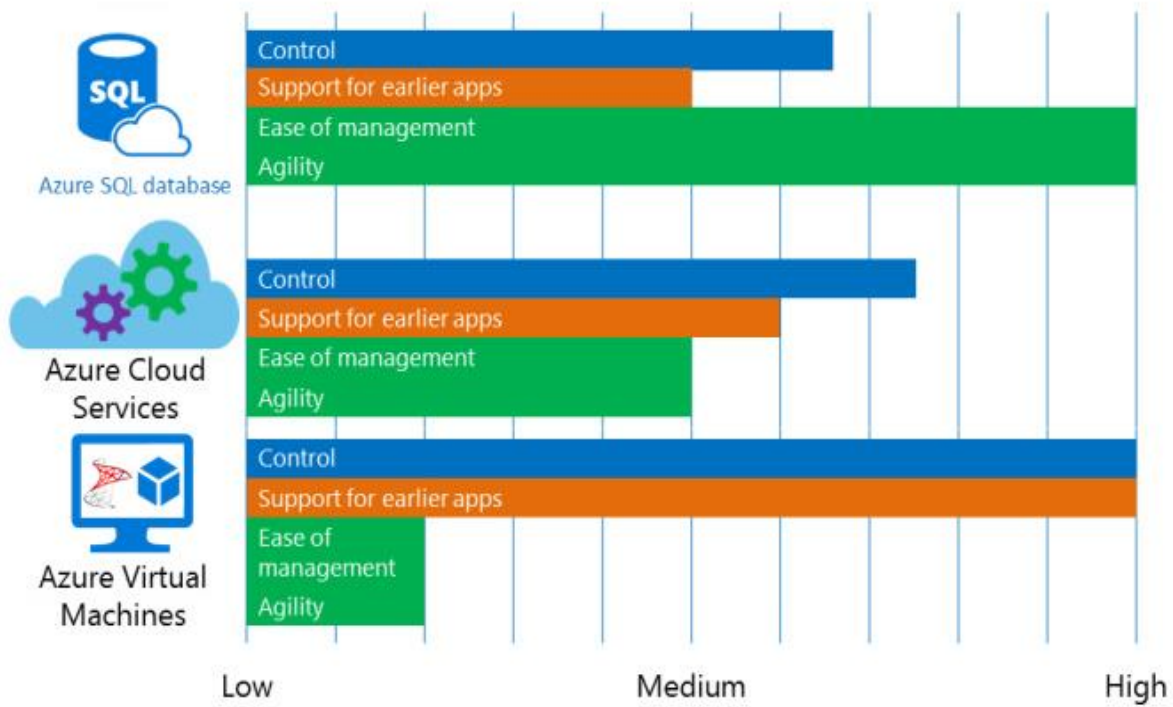
Pizza as a Service



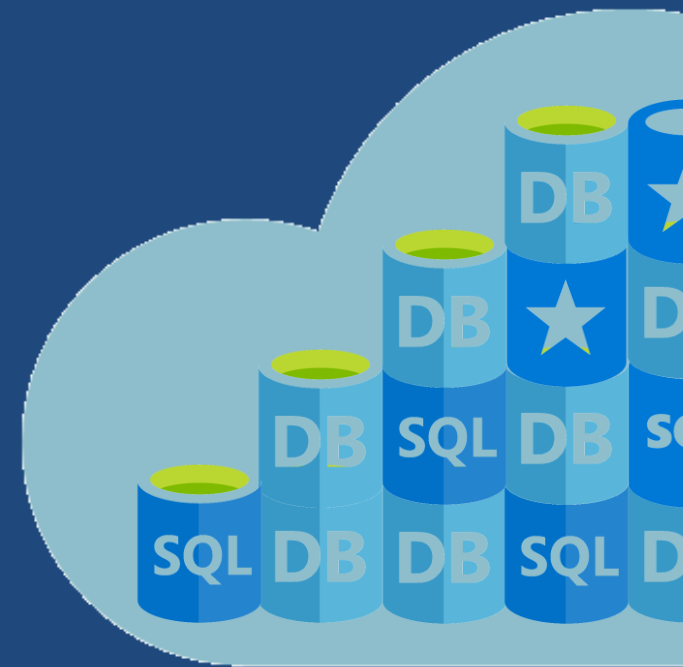
DaaS, CaaS MaaS, and XaaS

- Desktop-as-Service (DaaS)
 - Virtual desktop infrastructure (VDI)
- Communications-as-a-Service (CaaS)
 - Voice over IP (VoIP), instant messaging (IM), PBX, VPNs and Unified Communication
- Metal-as-a-Service (MaaS)
 - Physical servers to the cloud, example hyperscale computing environments for big data.
- Monitoring-as-a-Service (MaaS)
 - Login, monitoring and status regardless of location
- X-as-Service (XaaS) or anything as service or everything as a service
 - Hybrid Cloud computing, combination of services and increasing number of services





Azure sql database



Azure SQL Database

	Microsoft SQL Server	Microsoft Azure SQL Database
Database size	Up to 524,272 TB	Up to 1 TB
Authentication	SQL Login, Internal AD Users	SQL Login, Azure AD User
Upgrades	Manual	Automatic
Backups & Restore	MSSQL, BACPAC, Third-party Soft.	BACPAC, SQL Data Sync, Azure Storage, Point-In-Time Restore (PITR)
Statistics	Must configure	Automatic
Monitoring	Performance Monitoring Tools	Customized on the Azure portal
SLA	Have at least 2 Machines/VM	99,99%
Compatibility Level	100: in SQL Server 2008 and Azure SQL Database V11. 110: in SQL Server 2012 and Azure SQL Database V11. 120: in SQL Server 2014 and Azure SQL Database V12. 130: in SQL Server 2016 and Azure SQL Database V12.	



Azure SQL Database

Azure SQL is great but some features is not supported.

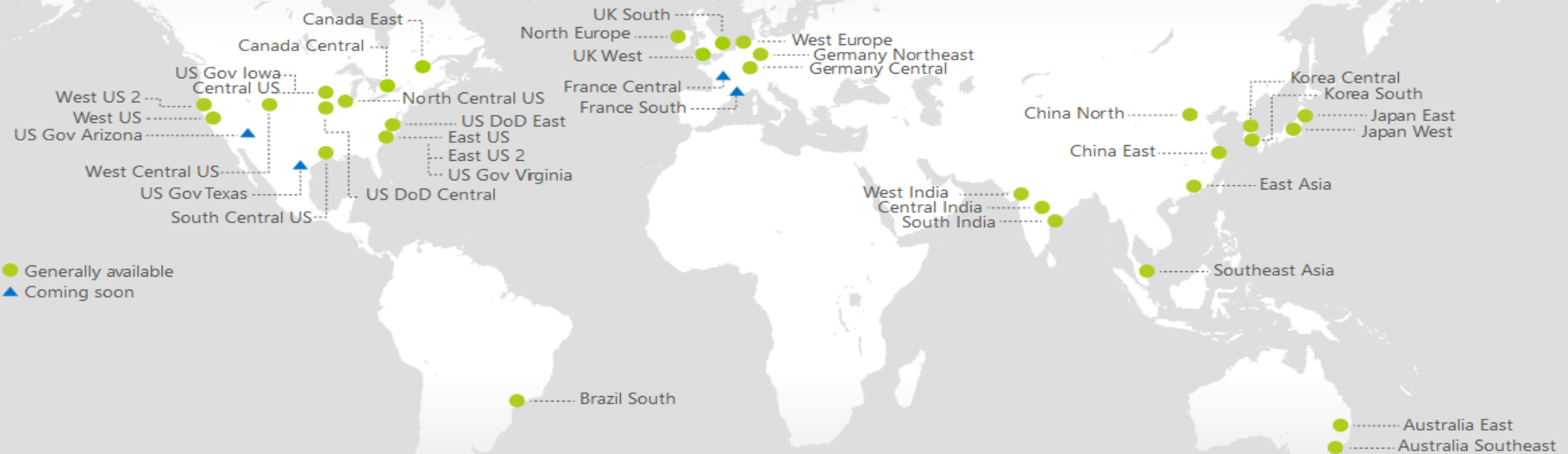
- Attach a database
 - BACKUP and RESTORE statements
 - Change data capture
 - Common language runtime (CLR)
 - Database mail
 - Database mirroring
 - Data Quality Services (DQS)
 - Extended stored procedures
 - Filestream
 - Management commands
- Master Data Services (MDS)
 - Minimal logging in bulk import
 - Modifying system data
 - Polybase
 - Policy-based management
 - Semantic search
 - Service Broker
 - SQL Server Agent
 - SQL Server Analysis Services (SSAS)
 - SQL Server Reporting Services (SSRS)

Azure SQL Roadmap: <https://azure.microsoft.com/en-us/updates/?product=sql-database>



Azure SQL Database Available

Azure is generally available in 34 regions + 5 regions. <https://azure.microsoft.com/en-us/regions/>



Products available by region <https://azure.microsoft.com/en-us/regions/services/>



Azure SQL Database

Some of important questions to ask before start the project

What ? How ? When ? Who?

- Is there going to be a development environment?
- Is there going to be a production environment?
- Is there a server for each environment or is it a single (cost reduction)?
- Amount of users?
- Amount of database?
- Who is or are responsible for the Azure?
- Who is or are the administrators of databases?
- Who is or are departmental officials?
- Types of access?





Azure Resource Manager

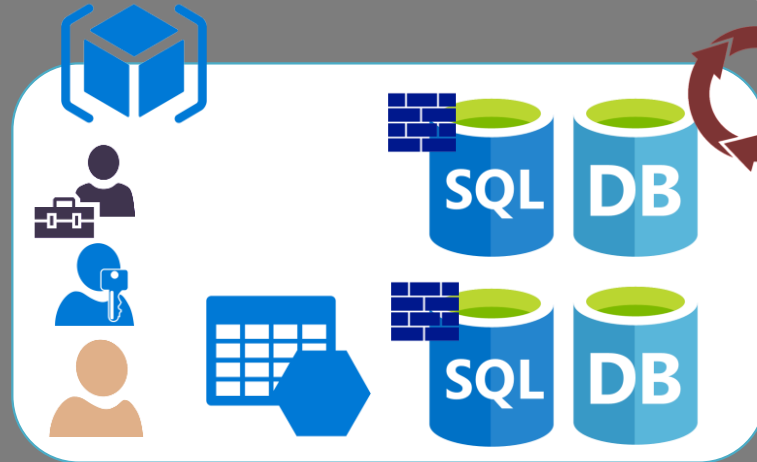
Azure Resource Manager

- Resource Group
 - Is a container that holds all resources for a solution or related resources.
- Access control using Role-Based Access Control (RBAC):
 - Owner - can manage everything, including access
 - Contributor - can manage everything except access
 - Reader - can view everything, but can't make changes
 - User Access Administrator - can manage user access to Azure resources
 - SQL Server Contributor - Can manage SQL servers and databases, but not their security-related policies
- TAGS
 - Categorize resources.
- Templates

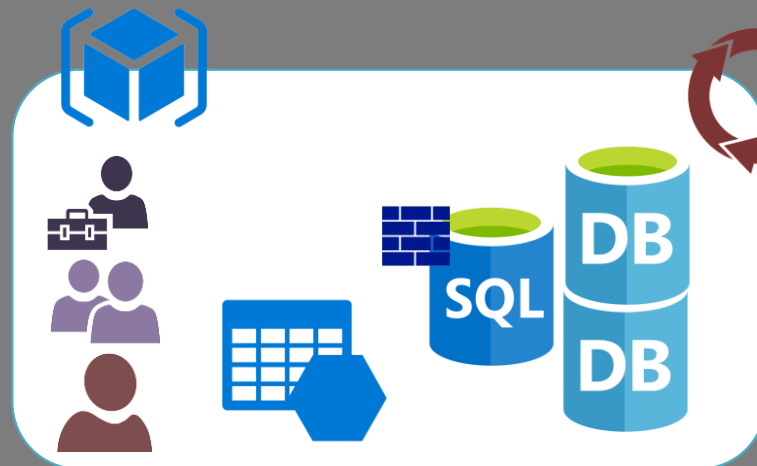




Shared Infrastructure Environment







Development Environment



Production Environment

Legend

Roles:

-  Owner
-  Contributor
-  SQL Server Cont.
-  Prod. Team
-  Dev. Team



Title of Demo

Demo

Link to Demo (source code, etc...)



Automation

Azure sql database

```
New-AzureVM -VM $myVM  
New-AzureStorageAccount -  
Set-AzureVNetConfig -Conf
```

```
{  
  "$schema": "https://../de  
  "contentVersion": "1.0.0  
  "parameters": {},  
  "variables": {},  
  "resources": [],  
  "outputs": {}  
}
```


Azure Powershell

```
New-AzureRmSqlServer -ServerName "SqlSrv-" + $RGDevel
```

```
New-AzureRmSqlServer -ServerName "SqlSrv-" + $RGProdu
```

```
New-AzureRmSqlServerFirewallRule -FirewallRuleName ""
```

```
New-AzureRmSqlServerFirewallRule -FirewallRuleName ""
```

Azure PowerShell

Windows Management Framework 5.0

- Windows PowerShell
- Windows PowerShell Desired State Configuration (DSC)
- Windows Remote Management (WinRM)
- Windows Management Instrumentation (WMI)

Windows Server 2012 and R2, Windows Server 2008 SP1 and R2, Windows 8 and 8.1, Windows 7 SP1

Windows Management Framework 5.1

- Require the .Net Framework 4.5.2
- New cmdlets example local users and groups (Get-ComputerInfo)
- PackageManagement added support for Containers, CBS Setup, EXE-based setup, CAB packages
- Security enhancements including enforcement

Windows Server 2016, Windows Server 2012 and R2, Windows Server 2008 R2, Windows 10, Windows 8 and 8.1, Windows 7 SP1



View PowerShell Version
\$PSVersionTable.PSVersion

Windows 10 version 1607 (Compilacion 14393.693)

```
C:\>powershell
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\> $PSVersionTable.PSVersion

Major  Minor  Build  Revision
-----
5      1      14393  693

PS C:\>
```



Install Azure PowerShell

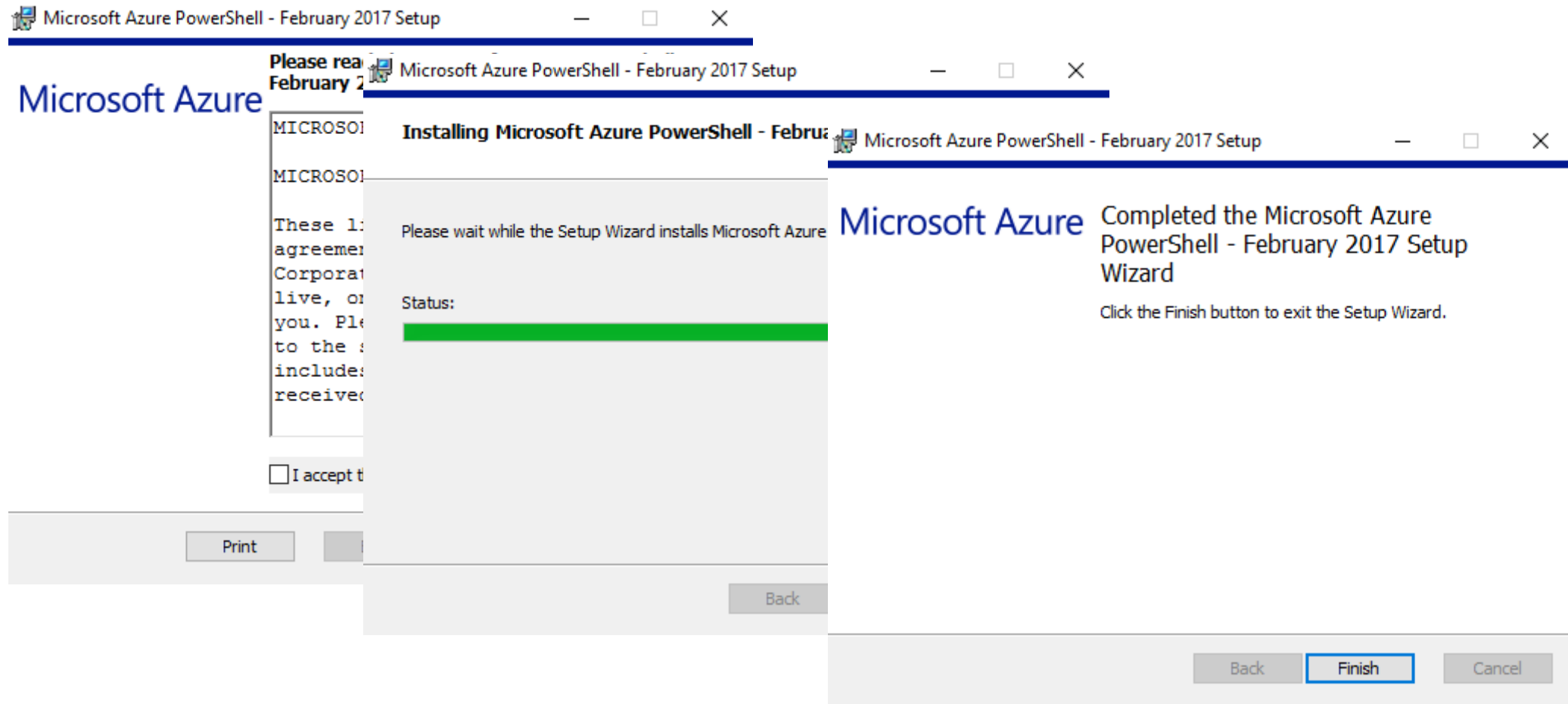
Graphic Interface install using Web Platform Installer at <https://azure.microsoft.com/en-us/>

The image shows a composite screenshot. On the left is the Microsoft Azure website, with the 'Command-line tools' section highlighted. The 'Windows install' link under PowerShell is circled in red. On the right is the Web Platform Installer 5.0 application window, which displays a list of available tools. The first item, 'Windows Cache Extension 2.0 (x86) for PHP 7.1 (English)', is selected.

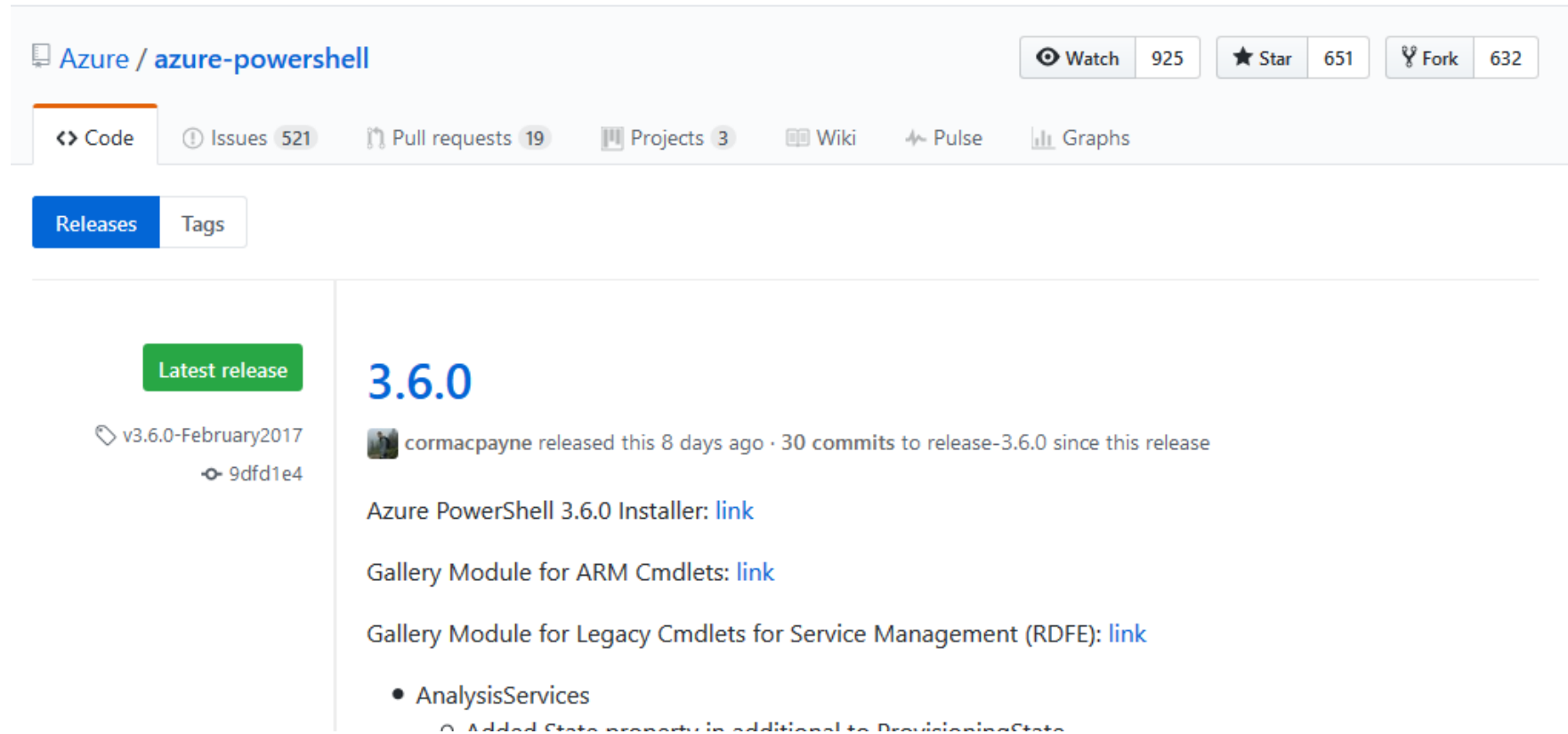
Name	Released	Install
Windows Cache Extension 2.0 (x86) for PHP 7.1 (English)	07/02/2017	Add
Windows Cache Extension 2.0 (x86) for PHP 7.1 in IIS Express (English)	07/02/2017	Add
Windows Cache Extension 2.0 (x64) for PHP 7.1 (English)	07/02/2017	Add
Windows Cache Extension 2.0 (x64) for PHP 7.1 in IIS Express (English)	07/02/2017	Add
Microsoft Azure PowerShell (English)	22/02/2017	Add
Microsoft Azure Cross-platform Command Line Tools (English)	08/02/2017	Add
Microsoft Azure Service Fabric SDK and Tools - 2.4.164 (VS2015)	01/02/2017	Add



Graphic Interface install direct download at <http://aka.ms/azure-powershellget2>



Graphic Interface at GitHub <https://github.com/Azure/azure-powershell/releases>



The screenshot shows the GitHub interface for the repository `Azure / azure-powershell`. At the top, there are buttons for `Watch` (925), `Star` (651), and `Fork` (632). Below these are navigation tabs for `Code`, `Issues` (521), `Pull requests` (19), `Projects` (3), `Wiki`, `Pulse`, and `Graphs`. The `Releases` tab is selected, and the `Tags` tab is also visible. The main content area displays the latest release, `3.6.0`, which was released 8 days ago by `cormacpayne`. It includes 30 commits since the previous release. Below the version number, there are three links: `Azure PowerShell 3.6.0 Installer: link`, `Gallery Module for ARM Cmdlets: link`, and `Gallery Module for Legacy Cmdlets for Service Management (RDFE): link`. A list of changes is partially visible, starting with `• AnalysisServices` and `• Added State property in addition to ProvisioningState`.



Install the Azure modules from the PowerShell Gallery

#Install Modules for Azure Resource Manager (ARM)

Install-Module AzureRM

Install Modules for Azure Service Management (ASM)

Install-Module Azure

```
C:\>powershell Set-ExecutionPolicy RemoteSigned

Installing package 'AzureRM'
  Installing dependent package 'Azure.Storage'
  [
    Installing package 'Azure.Storage'
    Downloaded 3.72 MB out of 5.30 MB.
    [ooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo]
  ]

You are installing the modules from an untrusted repository. If you trust this repository, change its InstallationPolicy value by running the Set-PSRepository cmdlet.
Are you sure you want to install the modules from 'PSGallery'?
[Y] Yes [A] Yes to All [N] No [L] No to All [S] Suspend [?] Help (default is "N"): A
```



Azure PowerShell ARM SQL cmdlets

Get-command | where name -Like "*azurerm*sql*" | Get-Help | Format-Table Name, Synopsis -AutoSize

```
PS C:\Users\tigru> Get-command | where name -Like "*azurerm*sql*" | Get-Help | Format-Table Name, Synopsis -AutoSize
```

Name	Synopsis
Get-AzureRmSqlServerAuditingPolicy	Gets the auditing policy of a SQL server.
New-AzureVMSqlServerAutoBackupConfig	Creates a configuration object for SQL Server automatic backup.
New-AzureVMSqlServerAutoPatchingConfig	Creates a configuration object for automatic patching on a virtual machine.
New-AzureVMSqlServerKeyVaultCredentialConfig	Creates a configuration object for SQL server key vault credential on a virtual machine.
Remove-AzureRmSqlServerAuditing	Removes the auditing of a SQL server.
Set-AzureRmSqlServerAuditingPolicy	Changes the auditing policy of a SQL Database server.
Use-AzureRmSqlServerAuditingPolicy	Specifies that a database uses the auditing policy of its host server.
Add-AzureRmSqlDatabaseToFailoverGroup	{{Fill in the Synopsis}}
Add-AzureRmSqlServerKeyVaultKey	Adds a Key Vault key to a SQL server.
Get-AzureRmSqlCapability	Gets SQL Database capabilities for the current subscription.
Get-AzureRmSqlDatabase	Gets one or more databases.
Get-AzureRmSqlDatabaseActivity	Gets the status of moving elastic databases.
Get-AzureRmSqlDatabaseAdvisor	Gets one or more Advisors for an Azure SQL Database.
Get-AzureRmSqlDatabaseAuditingPolicy	Gets the auditing policy of a database.
Get-AzureRmSqlDatabaseBackupLongTermRetentionPolicy	Gets a database long term retention policy.
Get-AzureRmSqlDatabaseDataMaskingPolicy	Gets the data masking policy for a database.
Get-AzureRmSqlDatabaseDataMaskingRule	Gets the data masking rules from a database.
Get-AzureRmSqlDatabaseExpanded	Gets a database and its expanded property values.
Get-AzureRmSqlDatabaseFailoverGroup	{{Fill in the Synopsis}}
Get-AzureRmSqlDatabaseGeoBackup	Gets a geo-redundant backup of a database.
Get-AzureRmSqlDatabaseGeoBackupPolicy	Gets a database geo backup policy.
Get-AzureRmSqlDatabaseImportExportStatus	Gets the details of an import or export of an Azure SQL Database.
Get-AzureRmSqlDatabaseIndexRecommendations	Gets the recommended index operations for a server or database.
Get-AzureRmSqlDatabaseRecommendedAction	Gets one or more recommended actions for an Azure SQL Database Advisor.
Get-AzureRmSqlDatabaseReplicationLink	Gets the geo-replication links between an Azure SQL Database and a resource group or SQL Server.

Documentation <https://docs.microsoft.com/en-us/powershell/resourcemanager/azurerm.sql/v2.5.0/azurerm.sql>



Demo

Azure PowerShell





Shared Infrastructure Environment



Only Free DB in all regions

Development Environment



Bacpac

Production Environment



Azure Resource Manager Templates

```
{  
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",  
  "contentVersion": "1.0.0.0",  
  "parameters": {  
    "Development" : {  
      "type" : "string",  
      "defaultValue": "ARMDev",  
      "metadata": {  
        "description" : "Development environment name"  
      }  
    },  
  },  
}
```

Resource Manager template

- Is a file written in JavaScript Object Notation (JSON).
- JSON is built on two structures:
 - A collection of name/value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.
 - An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence

Source: <http://www.json.org>

- The file defines one or more resources to deploy to a resource group.
- Can be used to deploy consistently and repeatedly.



Template Format

```
{  
  "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",  
  "contentVersion": "1.0.0.0",  
  "parameters": { },  
  "variables": { },  
  "resources": [ ],  
  "outputs": { }  
}
```

Template language:

schemas/2014-04-01-preview/deploymentTemplate.json
schemas/2015-01-01/deploymentTemplate.json



Template Format : Variables

```
"variables": {  
  "<variable-name>": "<variable-value>",  
  "<variable-name>": {  
    <variable-complex-type-value>  
  }  
}
```

Template example

```
{  
  "parameters": {  
    "Production": {"type": "string"}  
  }  
  "variables": {  
    "RGProd": "parameters('Production')"  
  }  
}
```

PowerShell Example

```
Param(  
  [string]$Production  
)  
$RGProd = $Production
```



Template Format : Resources

```
"resources": [  
  {  
    "apiVersion": "<api-version-of-resource>",  
    "type": "<resource-provider-namespace/resource-type-name>",  
    "name": "<name-of-the-resource>",  
    "location": "<location-of-resource>",  
    "tags": "<name-value-pairs-for-resource-tagging>",  
    "comments": "<your-reference-notes>",  
    "dependsOn": [  
      "<array-of-related-resource-names>"  
    ],  
    "properties": "<settings-for-the-resource>",  
    "copy": {  
      "name": "<name-of-copy-loop>",  
      "count": "<number-of-iterations>"  
    },  
    "resources": [  
      "<array-of-child-resources>"  
    ]  
  }  
]
```

Template example

```
"resources": [  
  {  
    "name": "[parameters('SQLServerName')]",  
    "type": "Microsoft.Sql/servers",  
    "location": "Nort Europe",  
    "apiVersion": "2014-04-01-preview",  
    "dependsOn": [],  
    "tags": {  
      "displayName": "Production"  
    },  
    "properties": {  
      "administratorLogin": "[parameters('AdminLogin')]",  
      "administratorLoginPassword": "[parameters('Password')]",  
      "version": "12.0"  
    }  
  }  
]
```



Templates : Outputs

```
"outputs": {  
  "<outputName>": {  
    "type": "<type-of-output-value>",  
    "value": "<output-value-expression>"  
  }  
}
```

Template example

```
"outputs": {  
  "ServerResourceID": {  
    "type": "string",  
    "value": "[resourceId('Microsoft.Sql/servers', parameters('SQLServerName'))]"  
  }  
}
```



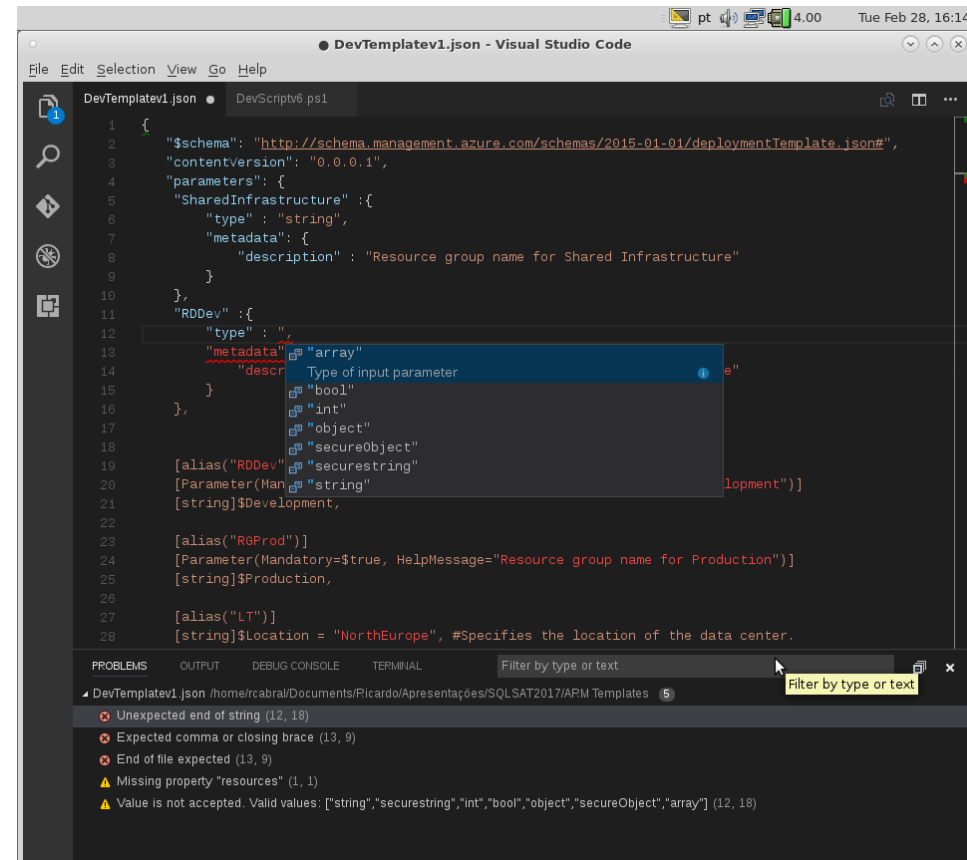
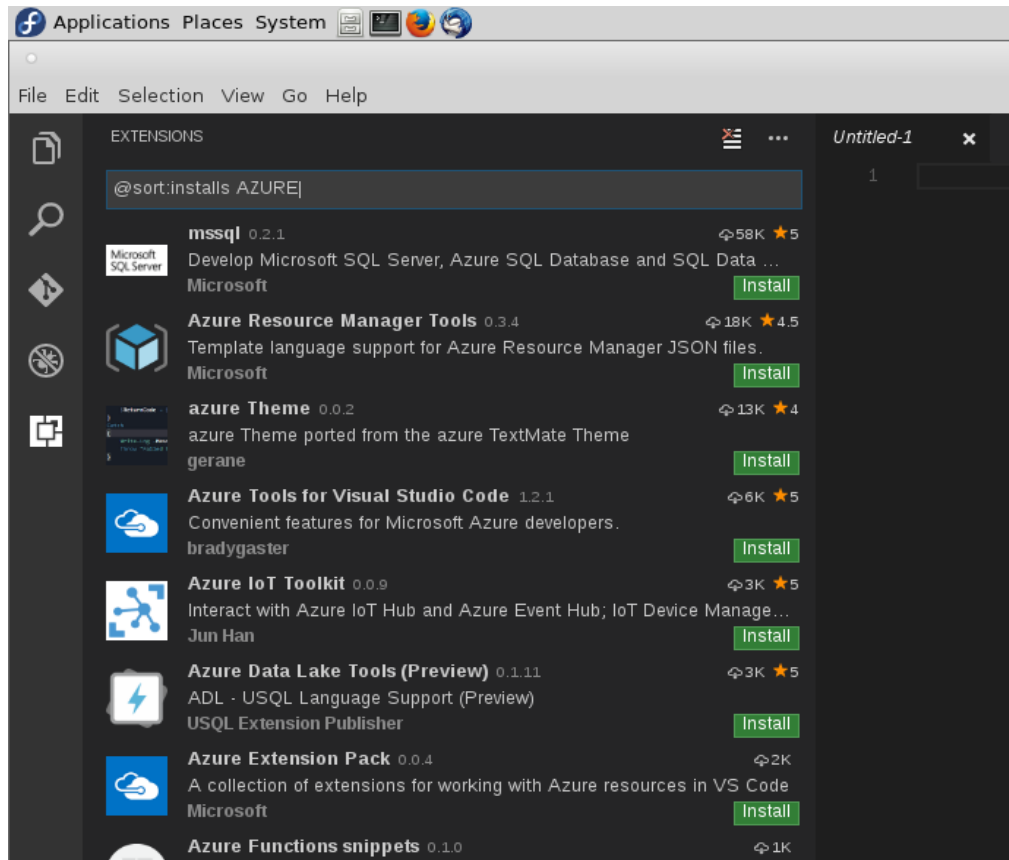
Template Editor : Azure Portal

The screenshot shows the 'Edit template' page in the Azure Portal. The breadcrumb navigation is 'Microsoft Azure > New > Marketplace > Everything > Template deployment > Custom deployment > Edit template'. The page title is 'Edit template' with the subtitle 'Edit your Azure Resource Manager template'. Below the title, there are buttons for '+ Add resource', '↑ Quickstart template', '↶ Load file', and '↓ Download'. On the left, a tree view shows the template structure: Parameters (16), Variables (3) (DevelopmentLC, Development, SqlSrvDevelopment), Resources (3) (DevelopmentStorageAccount, vnet, DevelopmentSQLServer), and sub-resources under DevelopmentSQLServer (DevelopmentFirstSQLDatabase, DevelopmentSecondSQLDatabase, [concat(variables('SqlSrvDevelo...), PublicLocalIP (firewallrules)). The main area displays the JSON template code with line numbers 1 through 19. The code defines a schema, content version, parameters (Development, VirtualNetworkName), and metadata. At the bottom, there are 'Save' and 'Discard' buttons. A footer contains a search bar with 'comment' and a list of search filters: 'Realçar tudo', 'Diferenciar maiúsculas de minúsculas', 'Palavras completas', and '1 de 1 correspondência'. A status message reads 'Atingido o fim da página, continuando do início'.

The screenshot shows the 'Edit template' page in the Azure Portal, but with the 'Add a resource to the template' dialog box open. The breadcrumb navigation is 'Microsoft Azure > New > Marketplace > Everything > Template deployment > Cust...'. The page title is 'Edit template' with the subtitle 'Edit your Azure Resource Manager template'. Below the title, there are buttons for '+ Add resource', '↑ Quickstart template', '↶ Load file', and '↓ Download'. The dialog box is titled 'Add a resource to the template' and contains a search bar with the text '* Select a resource'. Below the search bar, a list of resources is displayed: App Service plan (server farm), Availability set, MySQL database, SQL database, SQL server, Storage account, Ubuntu virtual machine, Virtual network, Web app, and Windows virtual machine. The 'App Service plan (server farm)' item is selected. At the bottom, there are 'Save' and 'Discard' buttons. A footer contains a search bar with 'comment' and a list of search filters: 'Realçar tudo', 'Diferenciar maiúsculas de minúsculas', 'Palavras completas', and '1 de 1 correspondência'. A status message reads 'Atingido o fim da página, continuando do início'.



Template Editor : Visual Studio Code

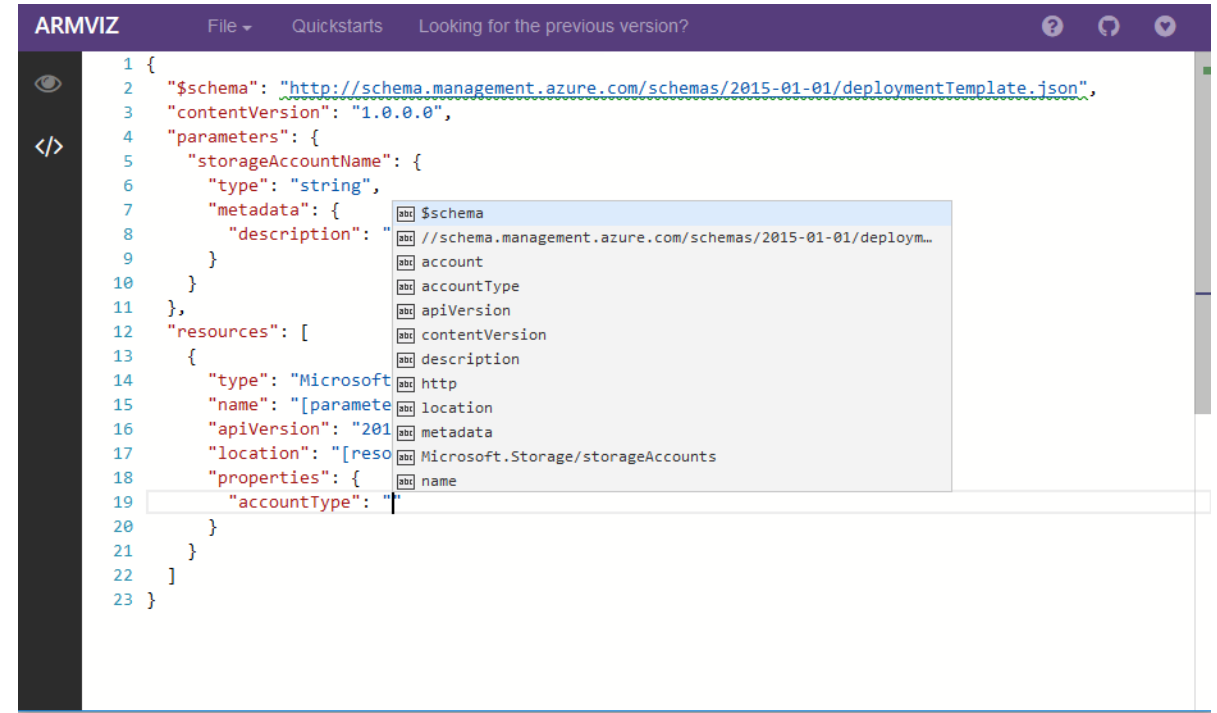
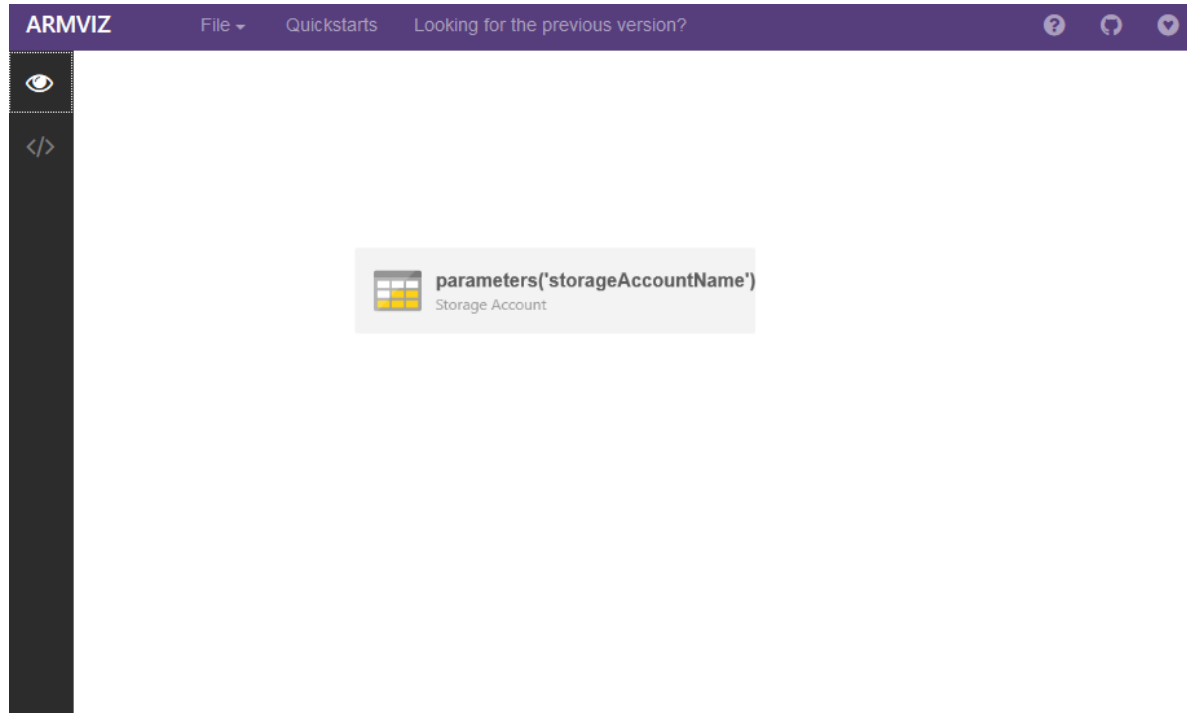


Available at <https://code.visualstudio.com/>



Template Editor & Visualizer : ARMVIZ

ARM Template visualizer <http://armviz.io>



GitHub project at <https://github.com/msshli/arm-visualizer>



Publish ARM Template

The screenshot illustrates the process of publishing an ARM template to Azure. It is divided into three main sections:

- Microsoft Azure Portal (Left):** Shows the 'Template deployment' section for the 'Microsoft Azure' publisher. It includes a sidebar with navigation icons and a main area with a 'Create' button.
- GitHub Repository (Middle):** Displays the repository 'MicrosoftAzure / AzureSQLData' on the 'master' branch. It lists files like 'README.md', 'azuredeploy.json', 'azuredeploy.parameters.json', and 'metadata.json'. A prominent heading reads 'Provision a SQL Database' with 'Deploy to Azure' and 'Visualize' buttons.
- Windows PowerShell ISE (Right):** Shows the execution of PowerShell commands to test and deploy the template. The output indicates a successful deployment.

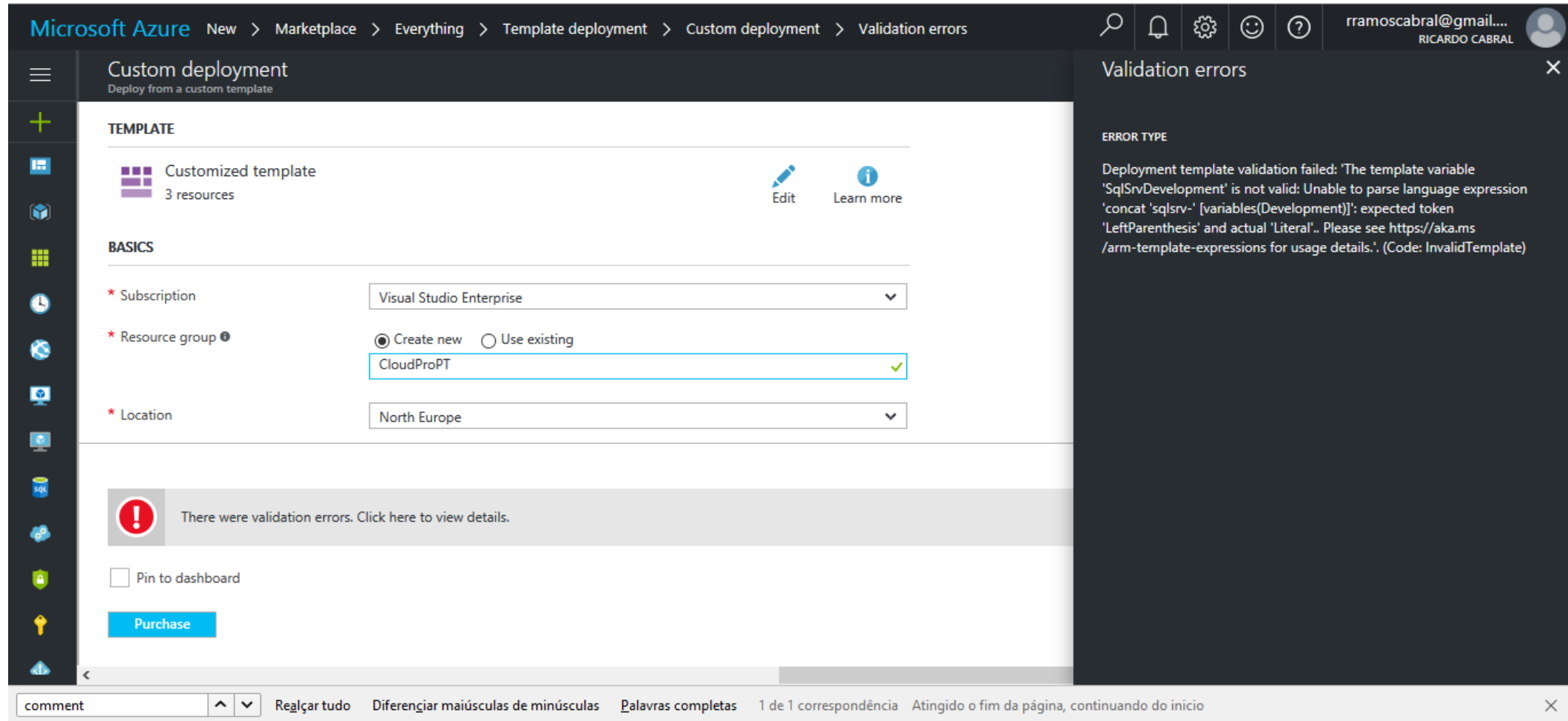
```
PS C:\> Test-AzureRmResourceGroupDeployment -ResourceGroupName "PSDeployTemplateDemo" -TemplateFile "azuredeploy.json"
cmdlet Test-AzureRmResourceGroupDeployment at command pipeline position 1
Supply values for the following parameters:
(Type !? for Help.)
PublicLocalIP: 44.44.44.44

PS C:\> New-AzureRmResourceGroupDeployment -Name "Azure-RM-TemplateDemo" -ResourceGroupName "PSDeployTemplateDemo" -TemplateFile "azuredeploy.json"
cmdlet New-AzureRmResourceGroupDeployment at command pipeline position 1
Supply values for the following parameters:
(Type !? for Help.)
PublicLocalIP: 44.44.44.44

DeploymentName      : Azure-RM-TemplateDemo
ResourceGroupName   : PSDeployTemplateDemo
ProvisioningState   : Succeeded
Timestamp           : 05/03/2017 00:43:52
Mode                : Incremental
TemplateLink        :
Parameters          :
Name                Type                Value
-----
development         String              ARMDev
virtualNetworkName  String              VNET-DEV
vnetPrefix          String              10.0.0.0/16
vnetSubnetName1     String              Subnet-DEV-1
vnetSubnetPrefix1   String              10.0.0.0/24
vnetSubnetName2     String              Subnet-DEV-2
vnetSubnetPrefix2   String              10.0.1.0/24
storageAccountName  String              devstoragegenera
storageSkuName      String              Standard_LRS
sqlServerName       String              DevAdmin
```



Publish ARM Template



Microsoft Azure New > Marketplace > Everything > Template deployment > Custom deployment > Validation errors

rramoscabral@gmail... RICARDO CABRAL

Custom deployment

Deploy from a custom template


TEMPLATE

Customized template
3 resources


Edit Learn more

BASICS

* Subscription Visual Studio Enterprise

* Resource group  Create new Use existing
CloudProPT

* Location North Europe

 There were validation errors. Click here to view details.


Pin to dashboard

Purchase

Validation errors

ERROR TYPE

Deployment template validation failed: 'The template variable 'SqlSrvDevelopment' is not valid: Unable to parse language expression 'concat 'sqlsrv-' [variables(Development)]': expected token 'LeftParenthesis' and actual 'Literal'.. Please see <https://aka.ms/arm-template-expressions> for usage details.'. (Code: InvalidTemplate)

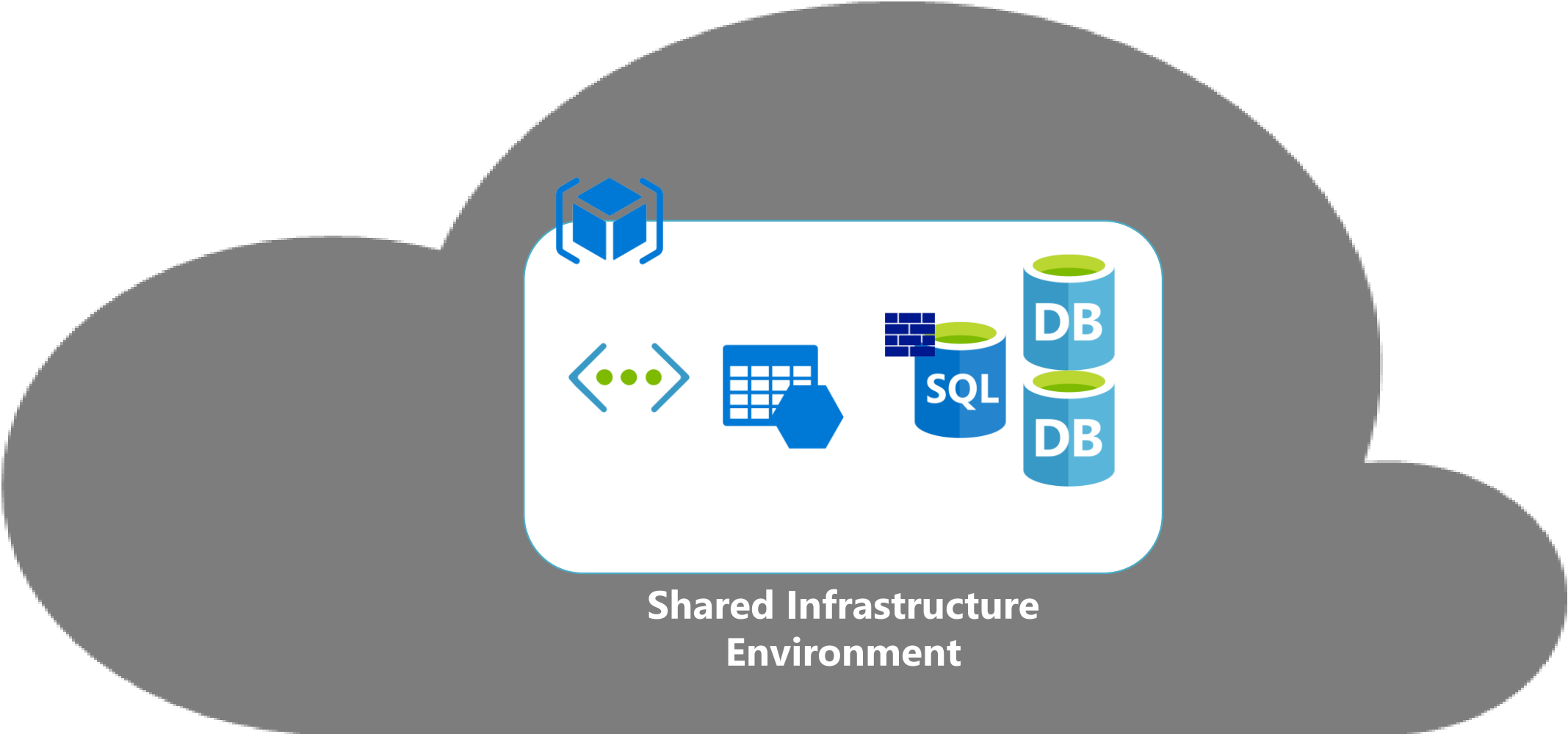
comment  Realçar tudo Diferenciar maiúsculas de minúsculas Palavras completas 1 de 1 correspondência Atingido o fim da página, continuando do início



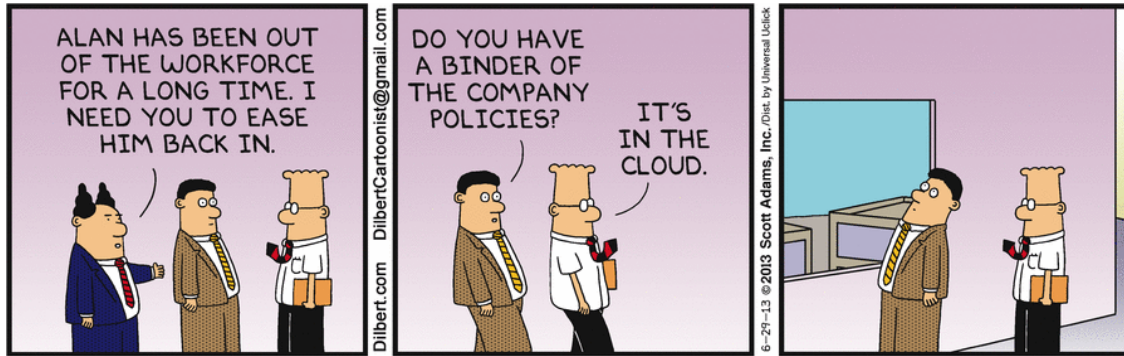
Demo

ARM TEMPLATES

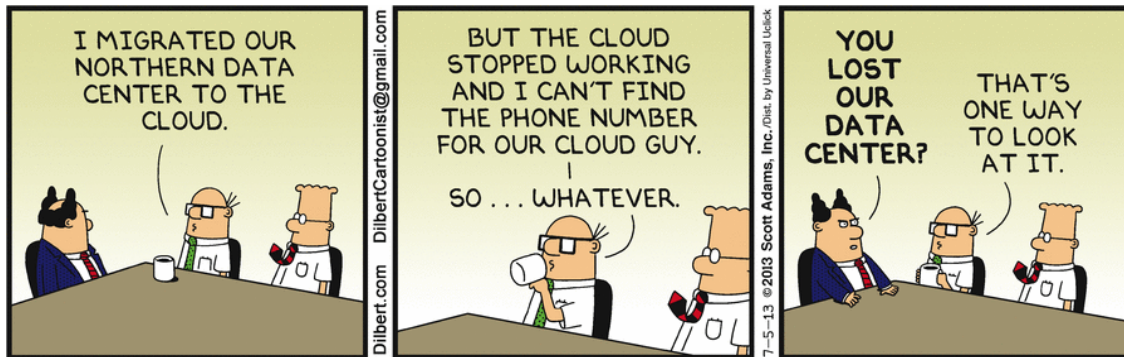




Questions & Answers



Source: <http://dilbert.com/strip/2013-06-29>



<http://dilbert.com/strip/2013-07-05>



THANK YOU!

OBRIGADO!

Дуже дякую!

Go raibh maith agaibh!

Danke!

Diolch!

¡Gracias!

Arigato!

Merci!

Ricardo Cabral

rramoscabral@gmail.com

<https://blog.rramoscabral.com>

@rramoscabral





CLOUD PRO PT



/groups/**cloudpropt**



@**cloudpropt**



<http://cloudpro.org.pt>