

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



## New-SQLSaturday –Event 583 –Location Lisbon



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# Tuga IT 2017 (18-20 May, 2017)

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- Because they want **YOU**  
to learn from the BEST IN THE WORLD.

# André Batista (The Guilty One):

---



# Paulo Matos (Finances):

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# Pedro Simões (Sponsors):

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# Claudio Silva (Special Projects):

---



# Paulo Borges (Operations):

---



# Who is Ricardo Cabral



- 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.

## Contacts:

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- <http://blog.rramoscabral.com>
- Follow me @rramoscabral



**Microsoft**  
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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>



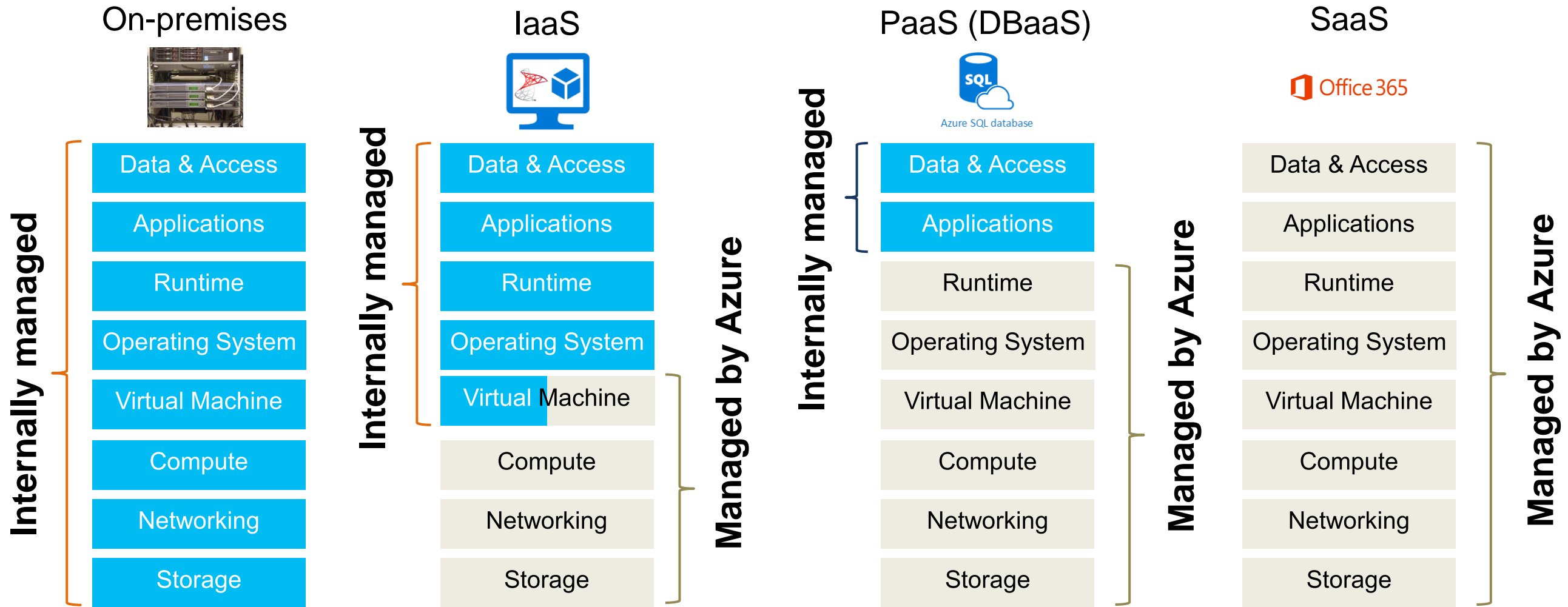
## Pizza as a Service



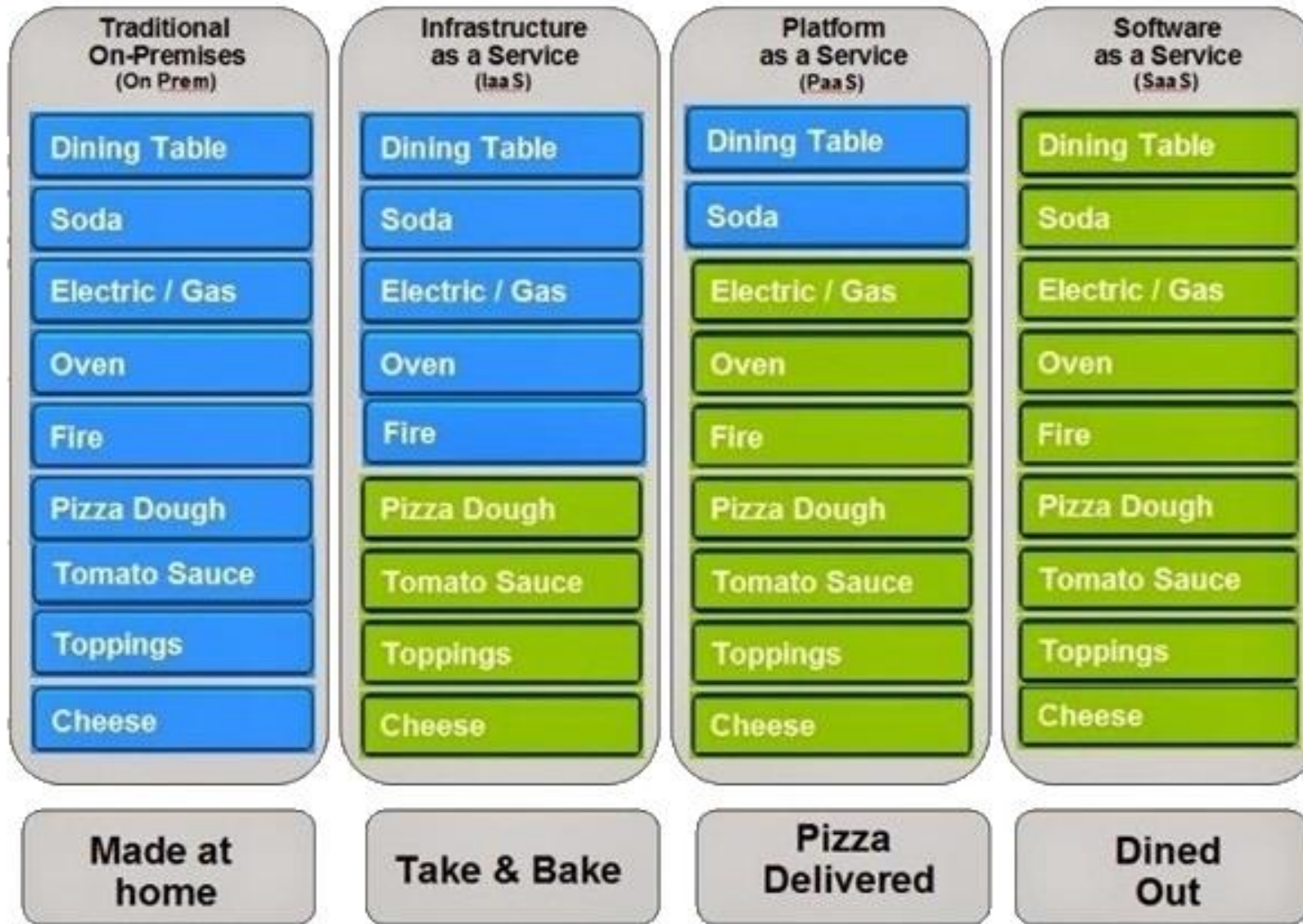
■ You Manage ■ Vendor Manages

# IAAS VS PAAS VS SAAS

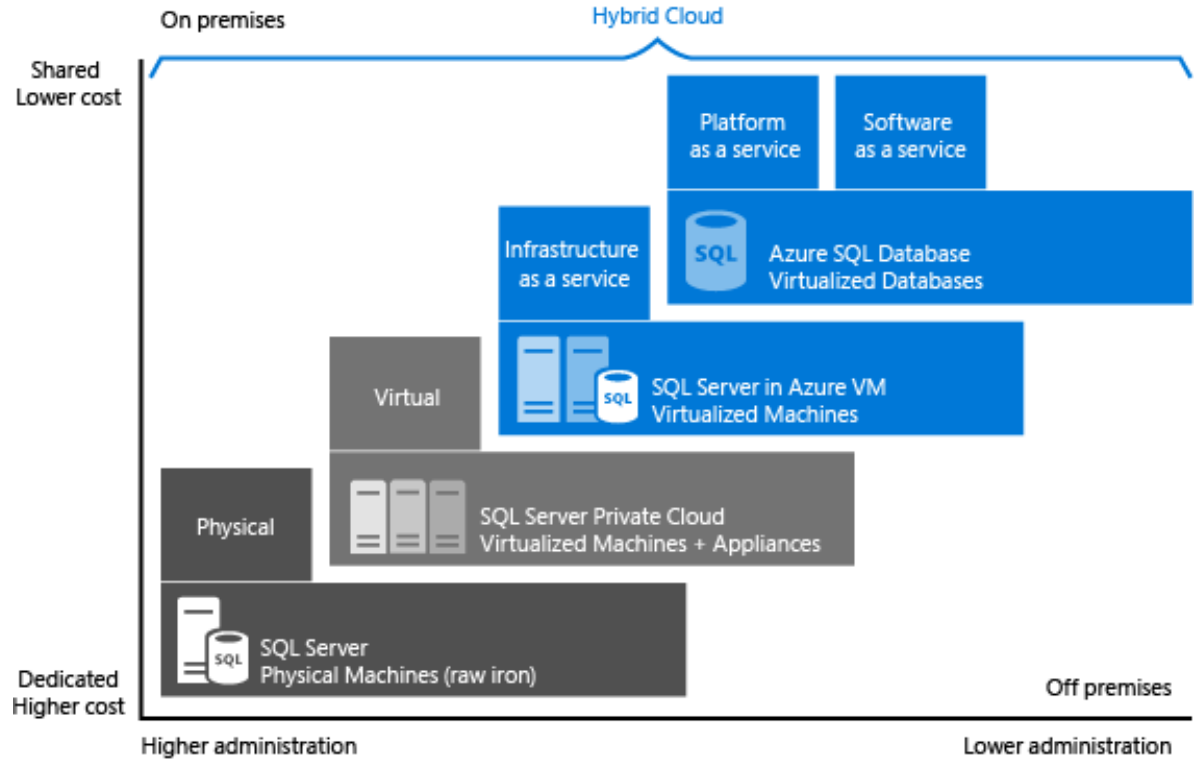
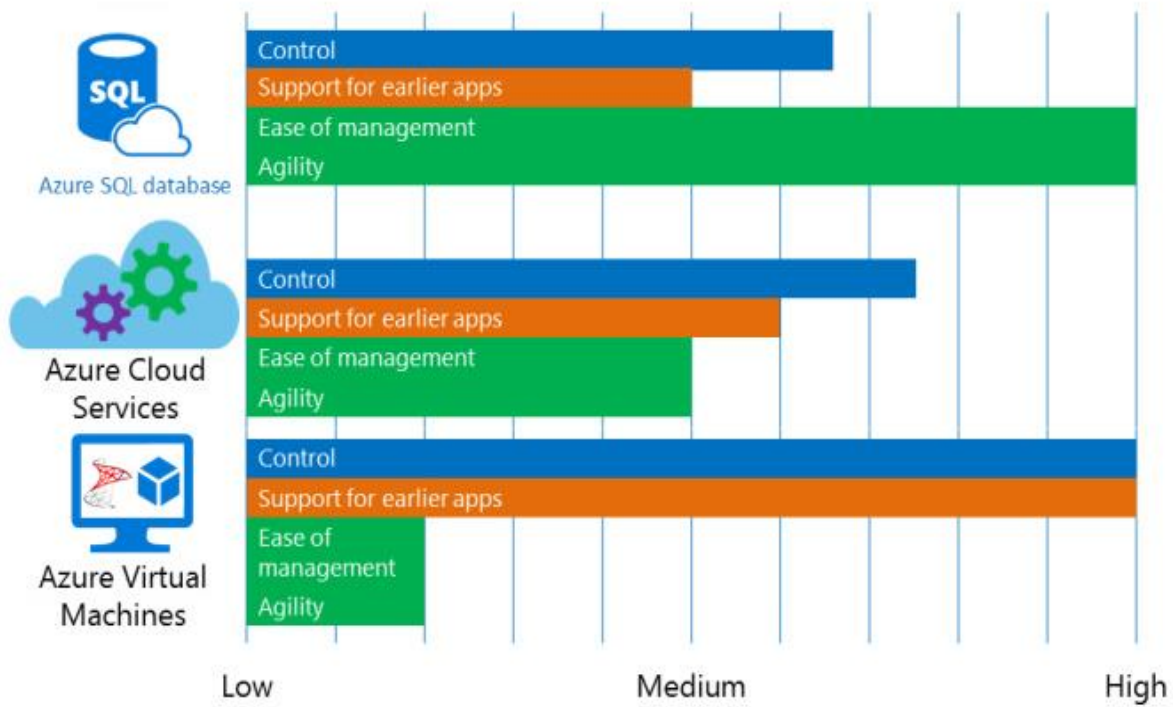
# IAAS vs PAAS vs SAAS



# Pizza as a Service



- You Manage
- Vendor Manages





# \$25 for 1 Year no creditcard needed



Visual Studio | My Benefits Ricardo Cabral Sign out

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Get started
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**Activate**
- Xamarin University Training**  
Free on-demand access  
Build native iOS and Android apps in C# with expert getting-started videos (subset of class)  
Activate

Basic	DTUs	MAX STORAGE PER DB	PRICE <sup>1</sup>
<b>B</b>	5	2 GB	~\$4.9848/mo

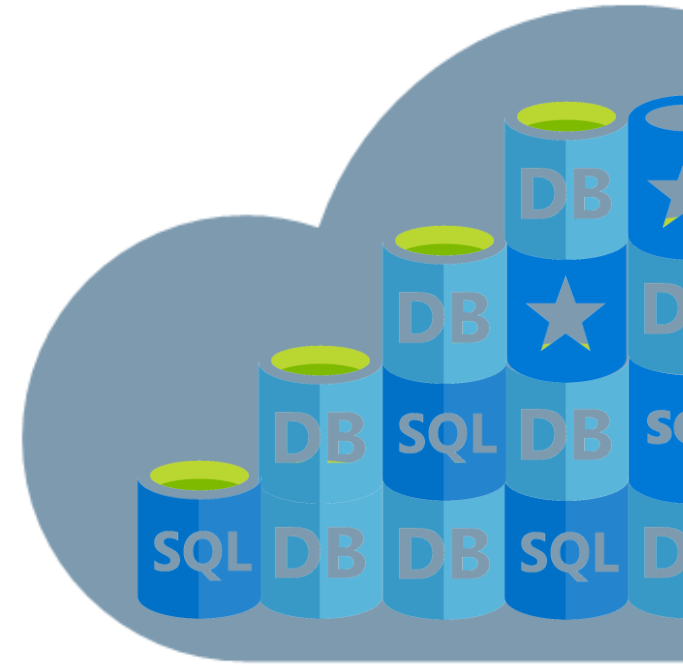
Standard	DTUs	MAX STORAGE PER DB	PRICE <sup>1</sup>
<b>S0</b>	10	250 GB	~\$15.03/mo

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

<https://my.visualstudio.com>



# 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	<p>Message</p> <p>Location 'East Asia' is not accepting creation of new Azure SQL Database Servers of version '11.0' at this time. This location only supports the following server versions: '2.0,12.0'. Please retry using a supported server version.</p> <p>120: in SQL Server 2014 and Azure SQL Database V12. 130: in SQL Server 2016 and Azure SQL Database V12.</p>	

# Azure SQL Database



Azure SQL is great but some features is not supported.

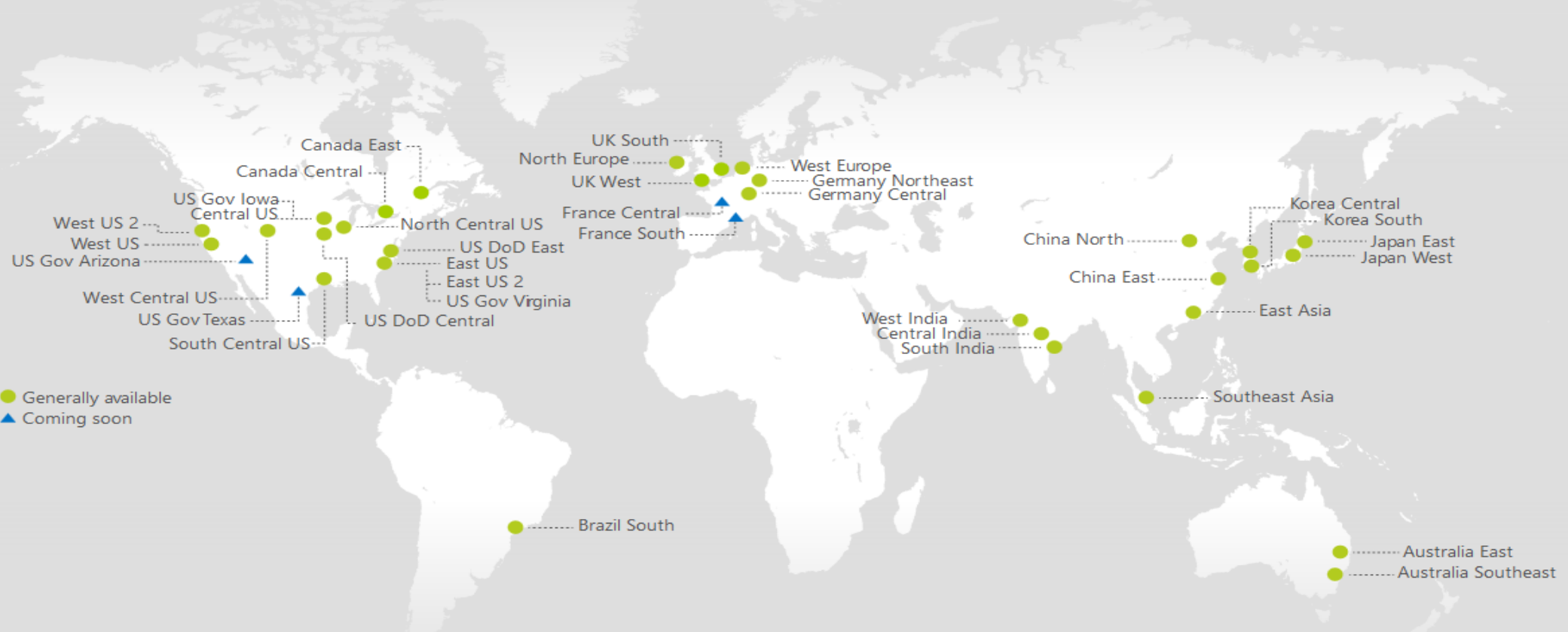
- Attach a database
  - BACKUP and RESTORE statements
  - Change data capture
  - Common language runtime (CLR)
  - Database mail
  - Database mirroring
  - Data Quality Services (DQS)
  - Extended stored procedures
  - Filestream
  - Management commands
- Master Data Services (MDS)
  - Minimal logging 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/>

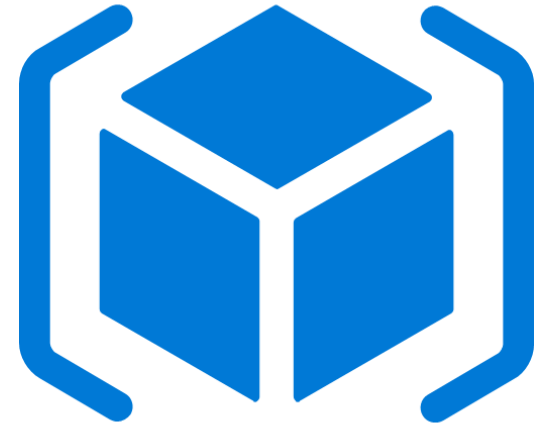
# Azure SQL Database



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?



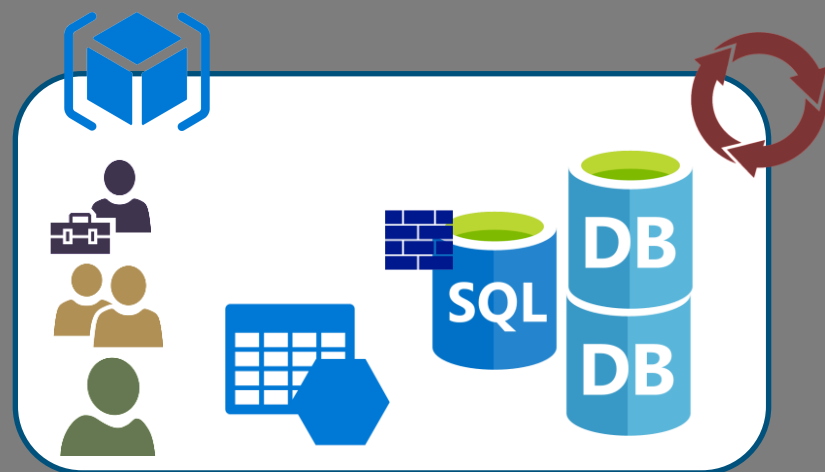
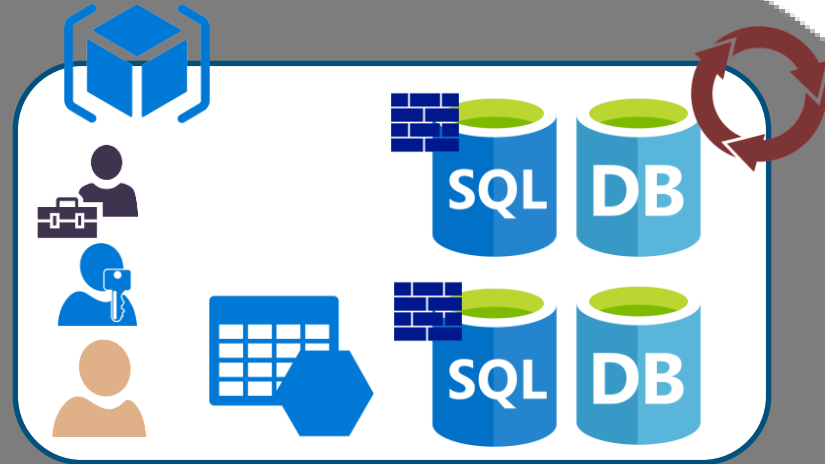
# AZURE RESOURCE MANAGER

# 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





**Legend**

Roles:

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



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

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

# AUTOMATION AZURE SQL DATABASE



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

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

# AZURE POWERSHELL

# PowerShell



## Windows Management Framework (WMF) 5.0

- Windows PowerShell
- Windows PowerShell Desired State Configuration (DSC)
- Windows PowerShell Integrated Script Environment (ISE)
- Windows Remote Management (WinRM)
- Windows Management Instrumentation (WMI)
- Windows PowerShell Web Services (Management OData IIS Extension)
- Software Inventory Logging (SIL)
- Server Manager CIM Provider

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

## Windows Management Framework (WMF) 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:\>
```

```
PS C:\> $psversiontable
```

Name	Value
PSVersion	5.1.14393.693
PSEdition	Desktop
PSCompatibleVersions	{1.0, 2.0, 3.0, 4.0...}
BuildVersion	10.0.14393.693
CLRVersion	4.0.30319.42000
WSManStackVersion	3.0
PSRemotingProtocolVersion	2.3
SerializationVersion	1.1.0.1

```
PS C:\>
```

# Install Azure PowerShell



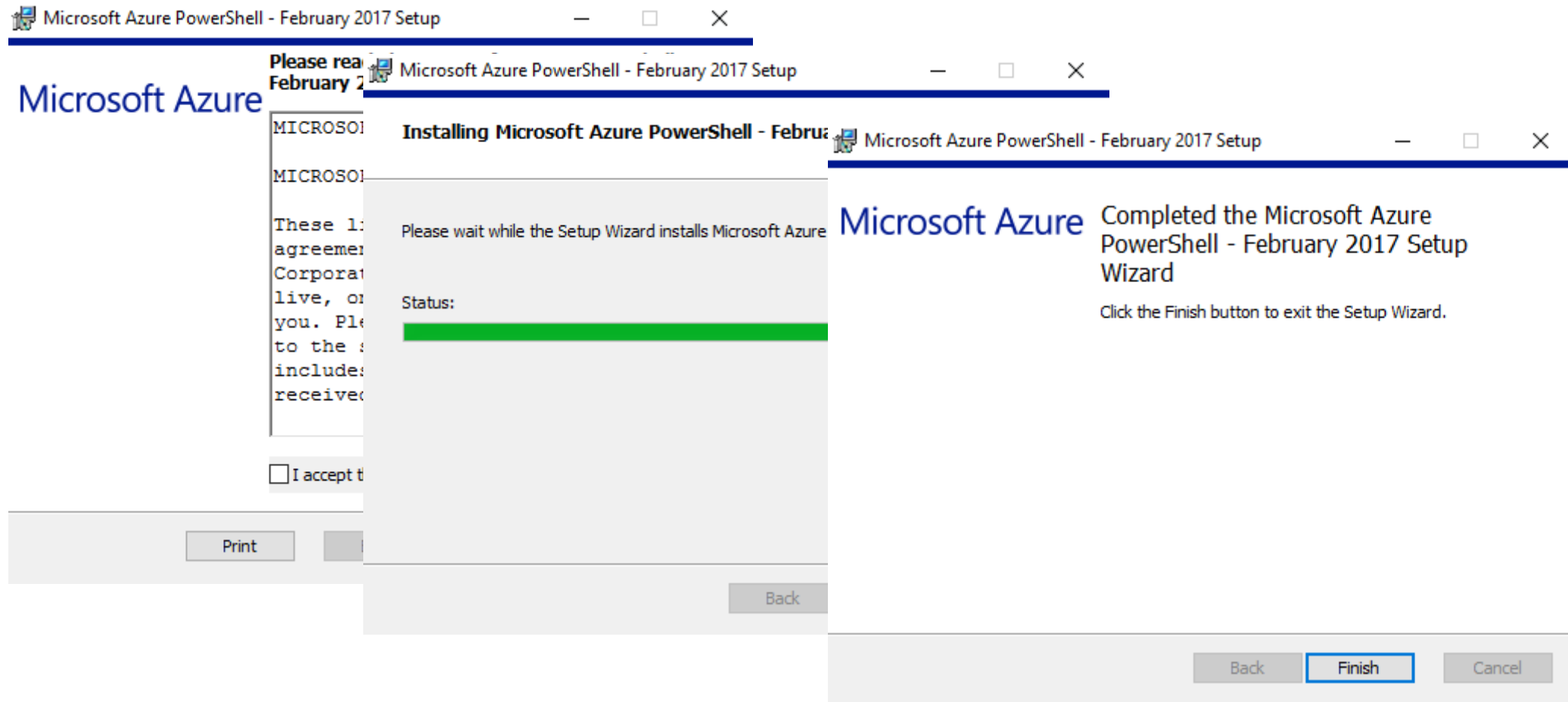
Graphic Interface install using Web Platform Installer at <https://azure.microsoft.com/en-us/>

The screenshot shows the Microsoft Azure website on the left and the Web Platform Installer 5.0 application on the right. The website's 'Command-line tools' section is visible, with 'Windows install' highlighted under the PowerShell category. The Web Platform Installer application displays a list of available tools for installation.

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 a 'Tags' tab is also visible. The main content area displays the 'Latest release' as '3.6.0', which was released 8 days ago by 'cormacpayne' with 30 commits. Below the release information, 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 features 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.
    [oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo]
  ]

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 "\*azurermsql\*" | Get-Help | Format-Table Name, Synopsis -AutoSize

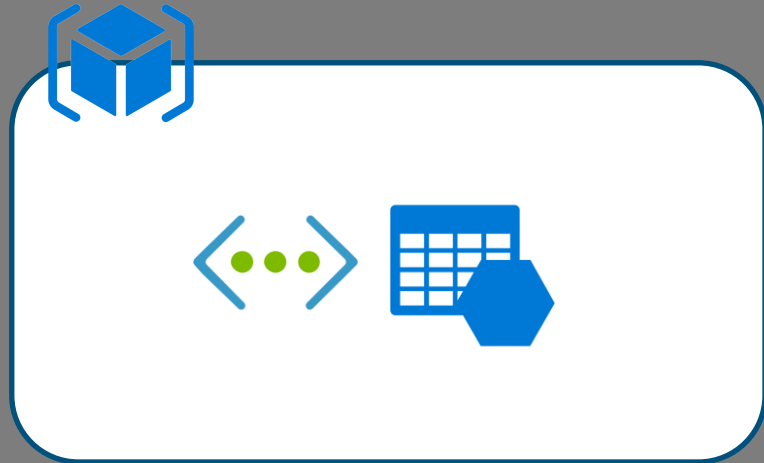
```
PS C:\Users\tigru> Get-command | where name -Like "*azurermsql*" | Get-Help | Format-Table Name, Synopsis -AutoSize

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.
```

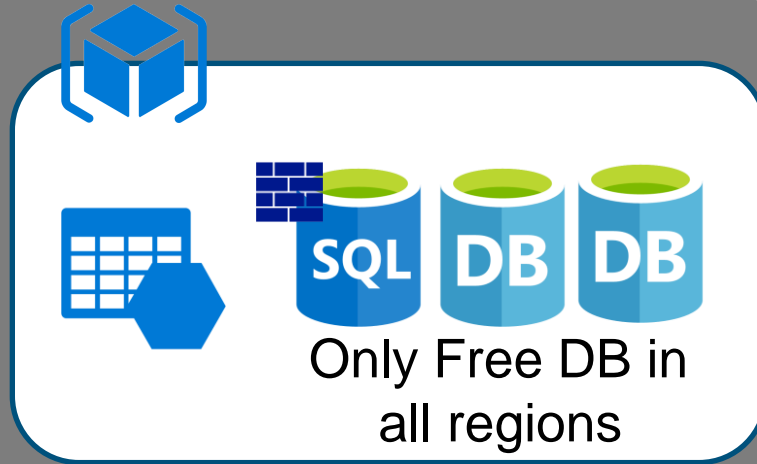
Documentation <https://docs.microsoft.com/en-us/powershell/resourcemanager/azurermsql/v2.5.0/azurermsql>



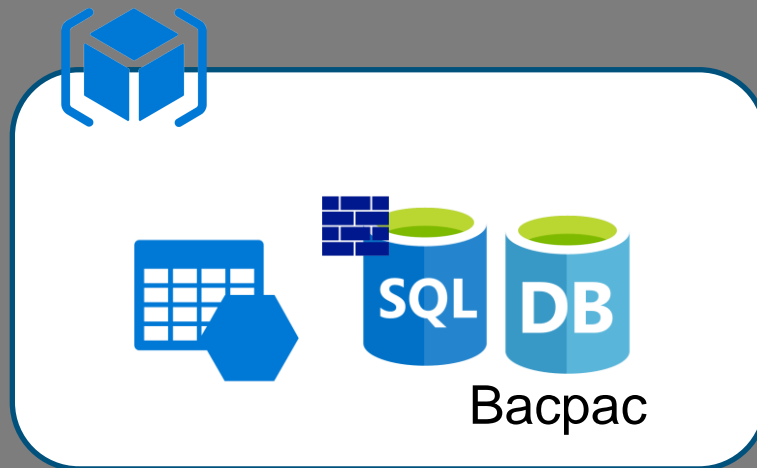
# DEMO AZURE POWER SHELL



Shared Infrastructure Environment



Development Environment



Production Environment



```
{  
  "$schema": "https://schema.management.azure.com/schemas/2015-01-01/  
  "contentVersion": "1.0.0.0",  
  "parameters": {  
    "Development" : {  
      "type" : "string",  
      "defaultValue": "ARMDev",  
      "metadata": {  
        "description" : "Development r  
      }  
    },  
  },  
}
```

# AZURE RESOURCE MANAGER TEMPLATE

# 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 : Parameters



```
"parameters": {
  "<parameter-name>" : {
    "type" : "<type-of-parameter-value>",
    "defaultValue": "<default-value-of-parameter>",
    "allowedValues": [ "<array-of-allowed-values>" ],
    "minValue": <minimum-value-for-int>,
    "maxValue": <maximum-value-for-int>,
    "minLength": <minimum-length-for-string-or-array>,
    "maxLength": <maximum-length-for-string-or-array>,
    "metadata": {
      "description": "<description>"
    }
  }
}
```

- string
- secureString
- int
- bool
- object
- secureObject
- array

## Example

```
"parameters": {
  "Development" :{
    "type" : "string",
    "defaultValue": "ARMDDev",
    "metadata": {
      "description" : "Specifies Development resources nickname"
    }
  },
}
```

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



# Template Format : Variables



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

- string
- secureString
- int
- bool
- object
- 
- 

## 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"  
    }  
  }  
]
```

# Template Format : 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'))]"  
  }  
}
```

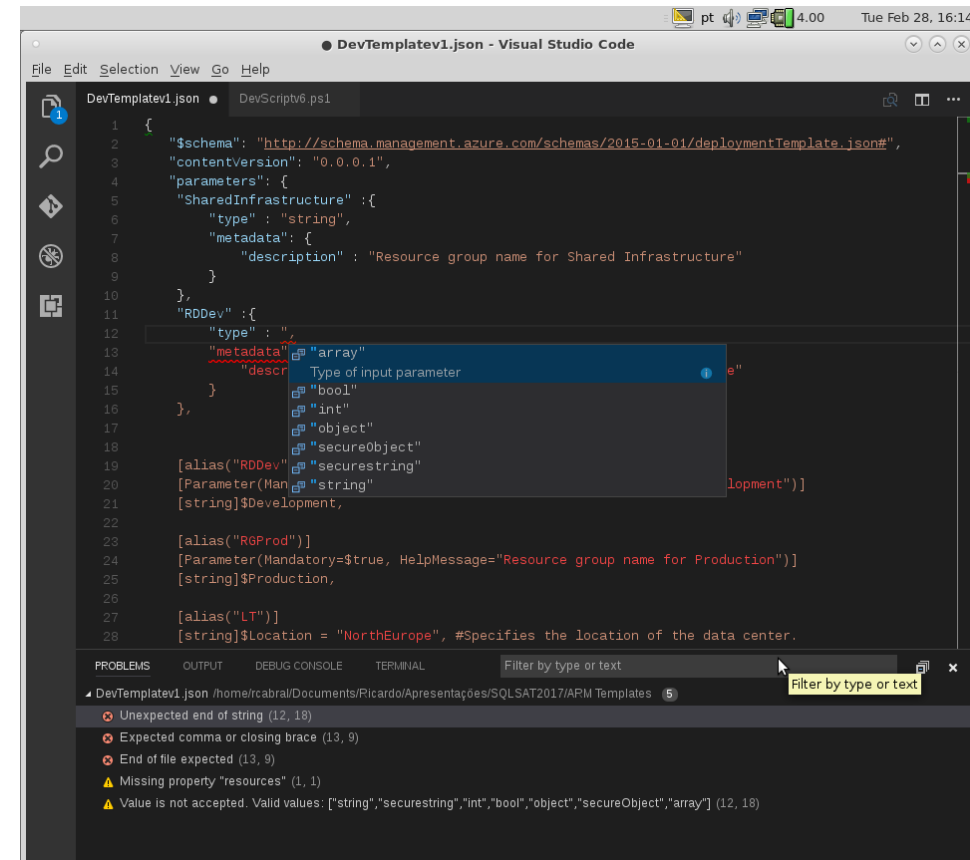
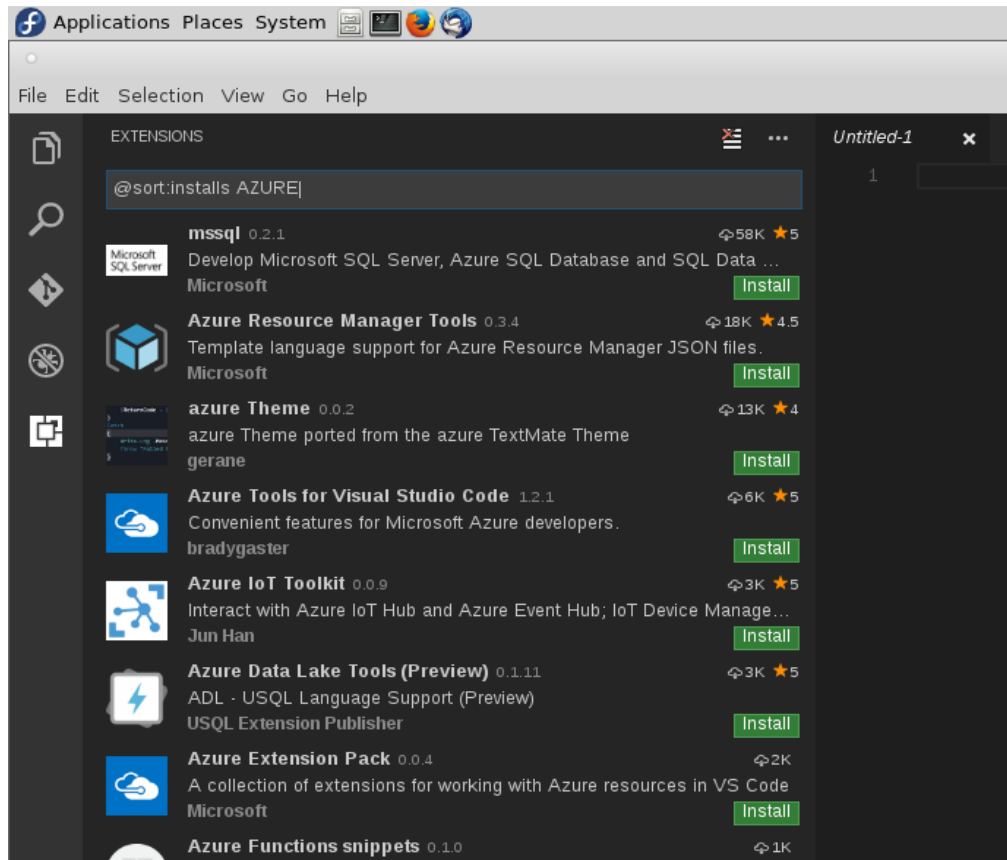
# Template Editor : Azure Portal



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 are buttons for '+ Add resource', '↑ Quickstart template', '↶ Load file', and '↓ Download'. On the left, there is a tree view showing 'Parameters (16)', 'Variables (3)' (with sub-items: DevelopmentLC, Development, SqlSrvDevelopment), and 'Resources (3)' (with sub-items: DevelopmentStorageAccount, vnet, and DevelopmentSQLServer). The main area displays the JSON code for the 'DevelopmentSQLServer' resource, with line numbers 1 through 19. The code includes schema information, content version, parameters for 'Development' and 'VirtualNetworkName', and metadata descriptions. At the bottom, there are 'Save' and 'Discard' buttons. A footer bar contains a search box with 'comment' and a list of search filters: 'Realçar tudo', 'Diferenciar maiúsculas de minúsculas', 'Palavras completas', '1 de 1 correspondência', and 'Atingido o fim da página, continuando do início'.

This screenshot shows the 'Edit template' page with a dropdown menu open for selecting a resource. 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 are buttons for '+ Add resource', '↑ Quickstart template', '↶ Load file', and '↓ Download'. The main heading is 'Add a resource to the template'. Below this is a search box with the text '\* Select a resource'. The dropdown menu lists the following resources: 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. At the bottom, there are 'Save' and 'Discard' buttons. A footer bar is partially visible at the bottom of the page.

# Template Editor : Visual Studio Code

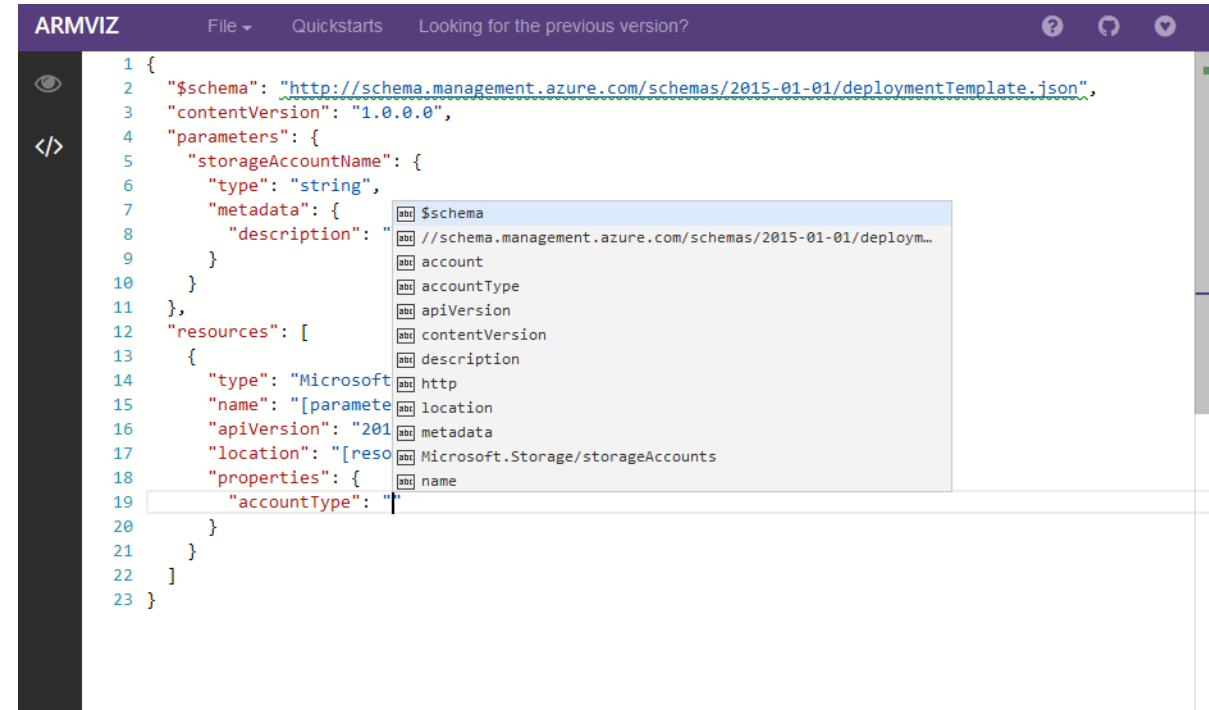
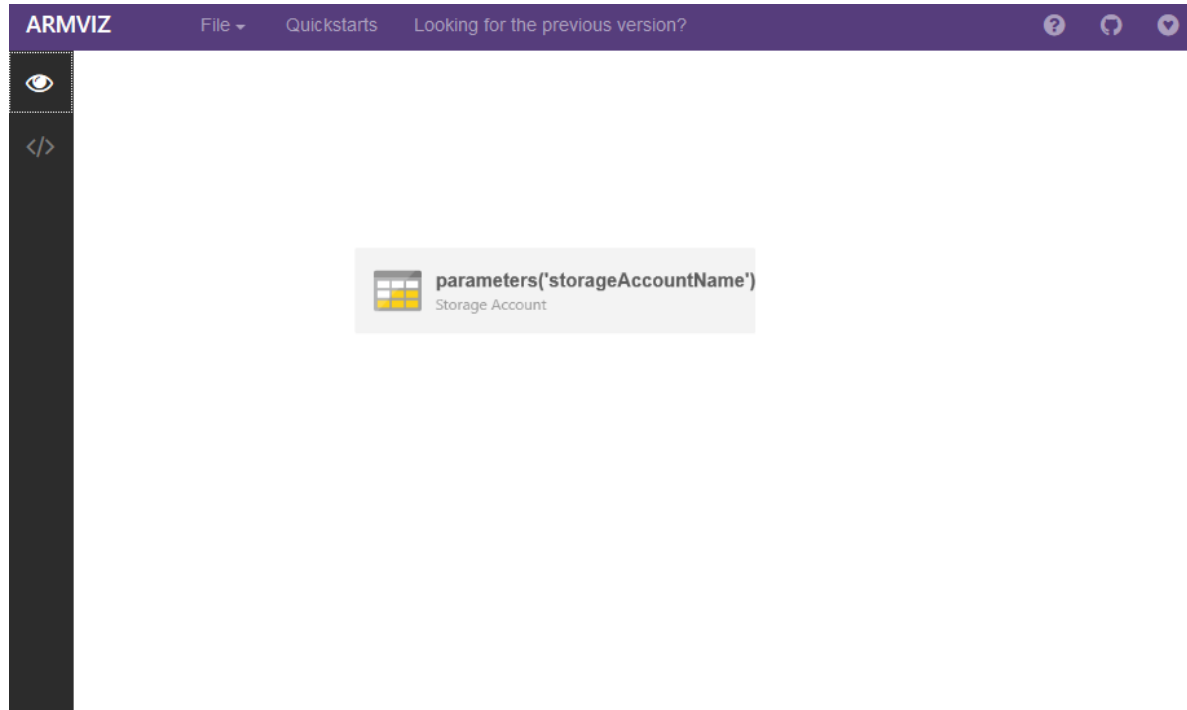


Available at <https://code.visualstudio.com/>

# Template Editor & Visualizer : ARMVIZ



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



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

# Publish ARM Template



The screenshot displays the Microsoft Azure portal interface for publishing an ARM template. On the left, the 'Template deployment' sidebar is visible, showing options like 'PUBLISHER', 'LOGICAPPSUPPORTED', and 'USEFUL LINKS'. The main content area shows the GitHub repository 'rramoscabral / MicrosoftAzure' with a 'Provision a SQL Database' section and buttons for 'Deploy to Azure' and 'Visualize'. On the right, a Windows PowerShell ISE window shows the execution of PowerShell commands and their output, including the deployment name, resource group name, provisioning state, and a list of parameters.

```
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

Custom deployment  
Deploy from a custom template

TEMPLATE

Customized template  
3 resources

Basics

- \* Subscription: Visual Studio Enterprise
- \* Resource group: Create new (selected), Use existing. CloudProPT
- \* Location: North Europe

There were validation errors. Click here to view details.

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)

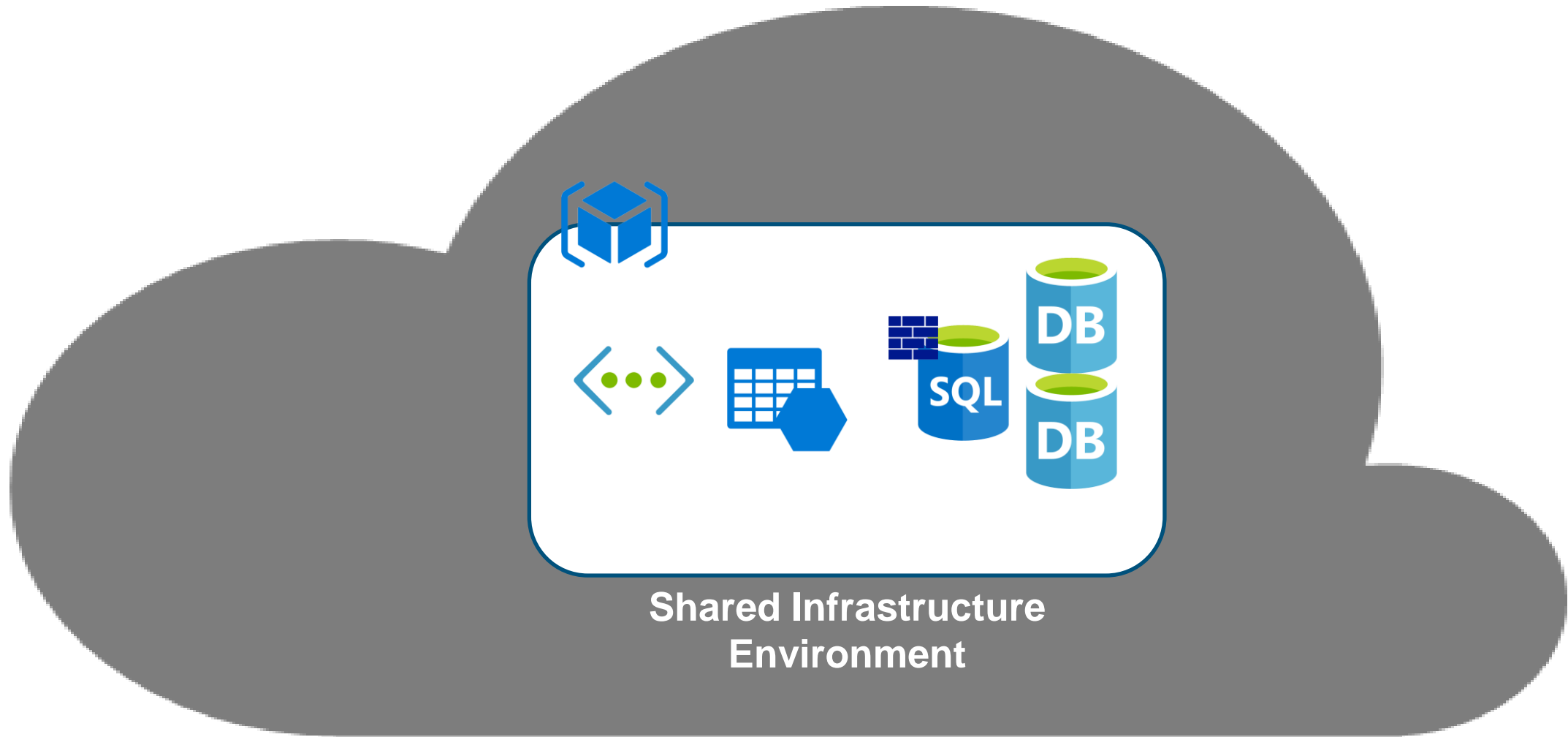
comment

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





# DEMO ARM TEMPLATE



# Azure PowerShell vs Azure Templates

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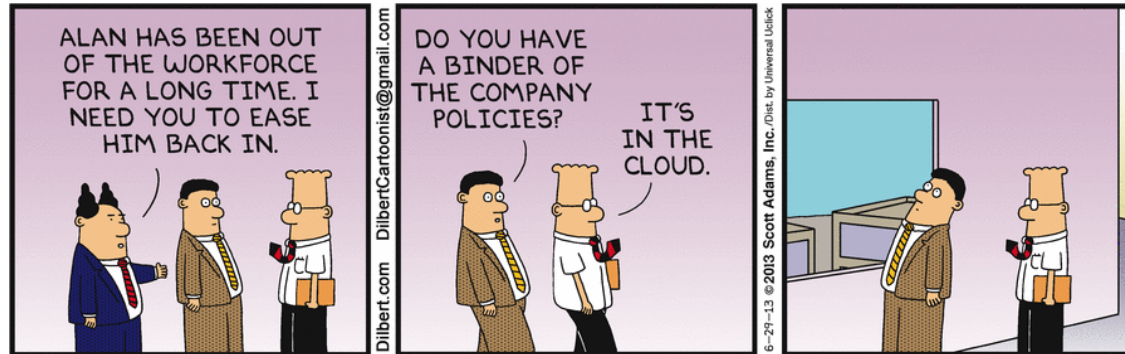
## The best thing I love in Templates

- Azure Templates is more faster because it run inside Azure.

## The best thing I love in PowerShell

- We can create all the resources with PowerShell and use .NET to simplify tasks.

# Questions & Answers



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



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



# Demo Script and Template

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## PowerShell Script

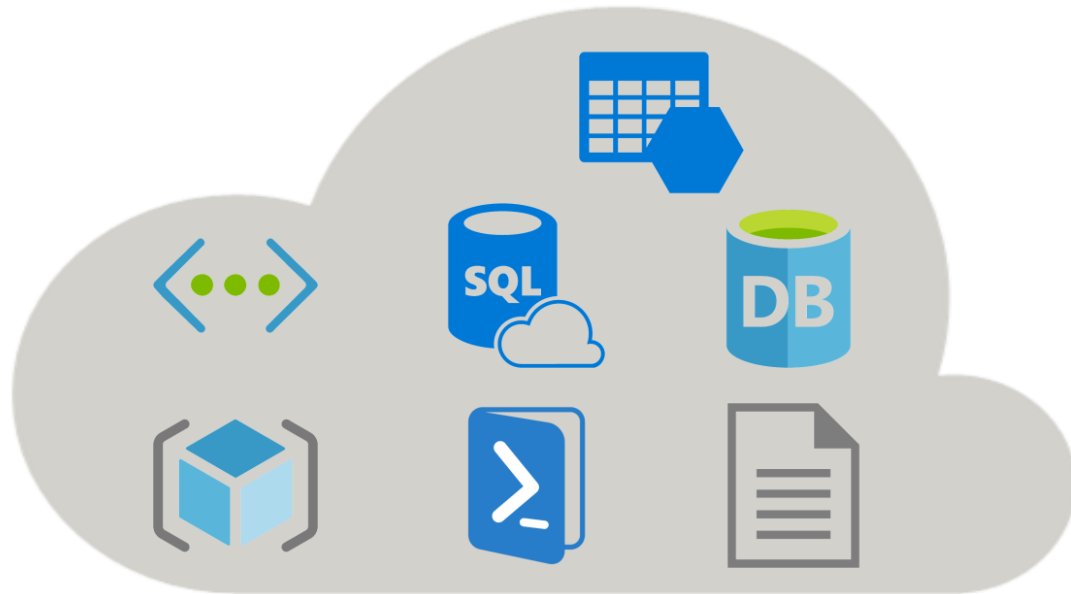
- <https://www.powershellgallery.com/packages/AzureRM-AutomationSQLDatabase>

## Azure Template

- <https://github.com/rramoscabral/MicrosoftAzure/tree/master/templates/AzureSQLDatabase>



# THANK YOU! OBRIGADO!



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