Microsoft Azure: Infrastructure as a Service (IaaS)

Module 2 - Azure Resource Manager (ARM)

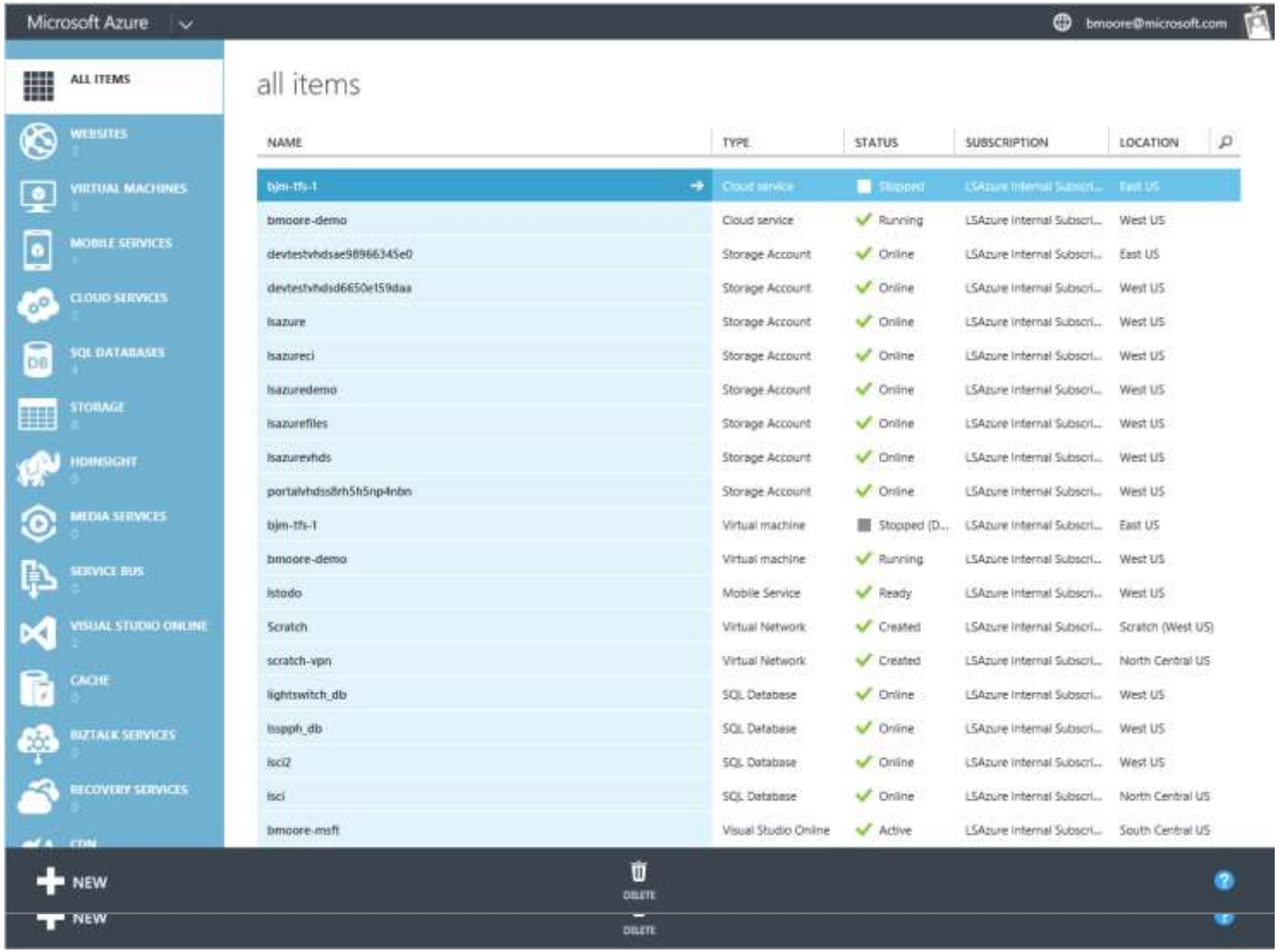
Overview

Why Azure Resource Manager?

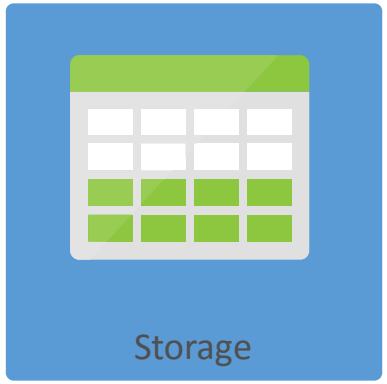
Today's challenge – it's difficult to…

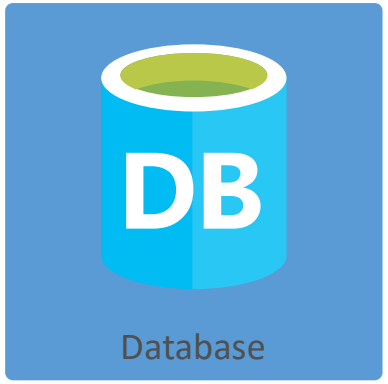
- Set and manage permissions – only co-admin and service admin
- Monitor and have alerting rules – limited to Management Services and basic KPI in portal
- Billing – through the billing portal
- Deployment – complex PowerShell to gather all components for an application
- Visualize a group of resources in a logical view, including monitoring/billing

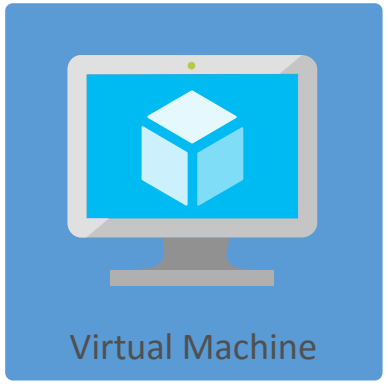
Current Portal - Resource Centric Views



Current Portal - Individual Resources







- Provision resources in isolation
- Deployment becomes more complex
- Management of app is challenging
- Proper use of resources becomes more abstract
- Isolation makes communications a challenge

Benefits of ARM

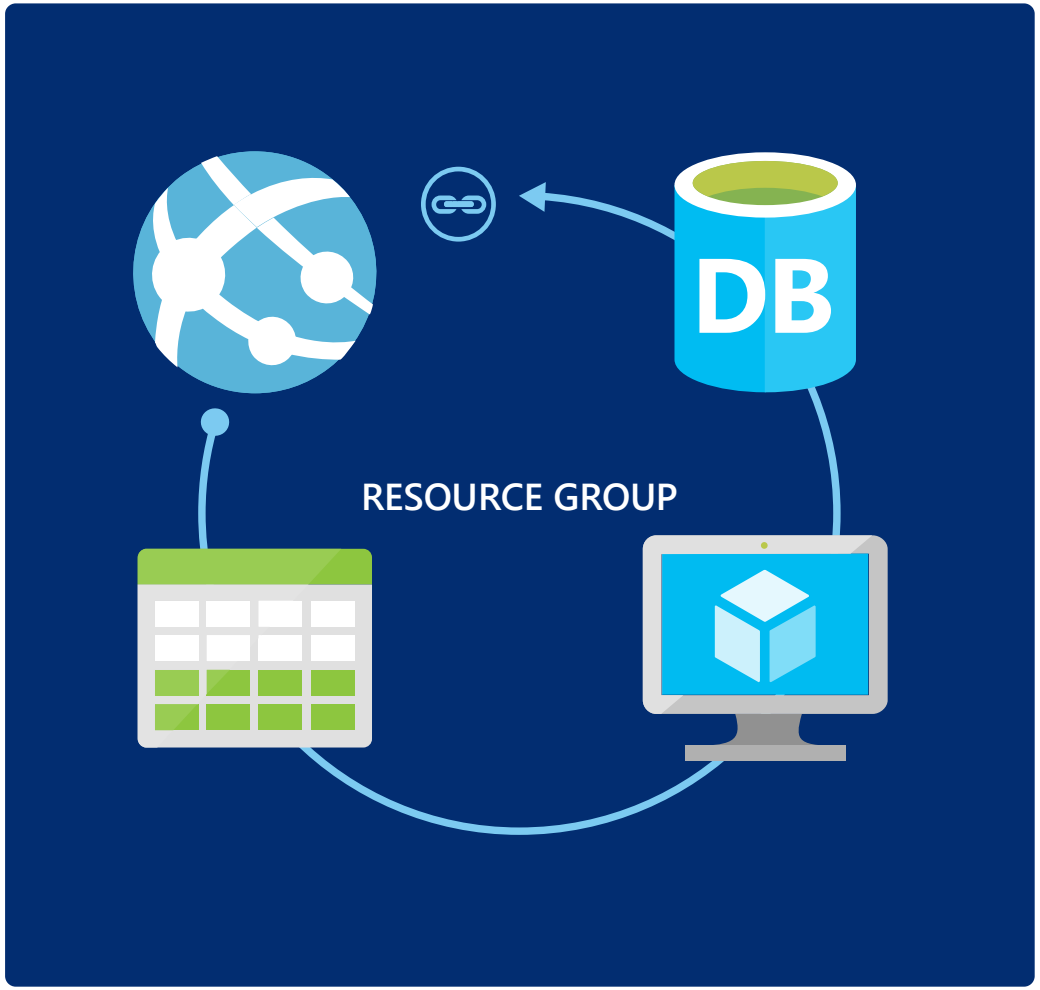
- Desired-state deployment
- Faster deployments
- Role-based access control (RBAC)
- Resource-provider model
- Common interface for Azure and Azure Stack

Resource Groups

A Resource Group is a Unit of Management

- Application Lifecycle Containment – Deployment, update, delete and status
- Declarative solution for Deployment – “Config as Code”
- Grouping – Metering, billing, quote: applied and rolled up to the group
- Consistent Management Layer
- Access Control – Scope for RBAC permissions

Azure Resource Groups



- Tightly coupled containers of multiple resources of similar or different types
- Resource groups can span regions
- Every resource *must* exist in one and only one resource group

Resource Group Lifecycle

Question:

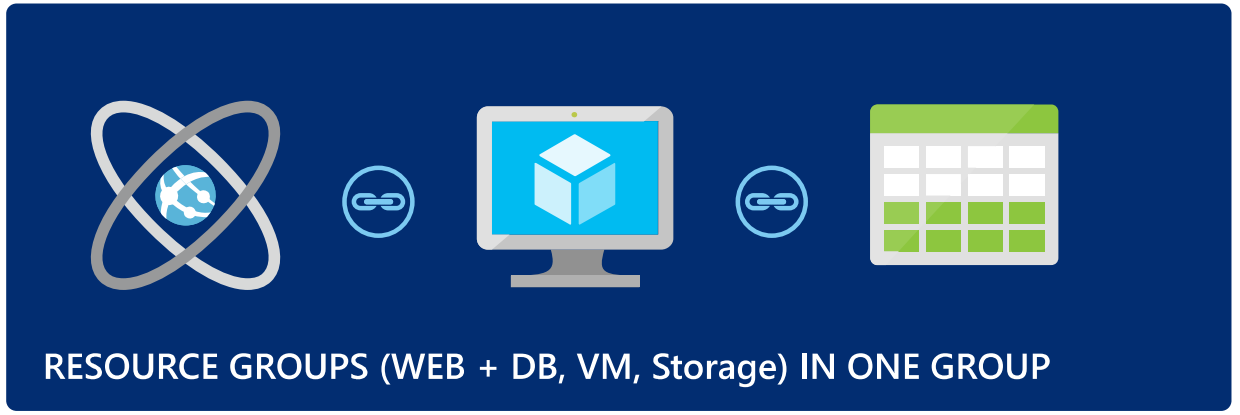
Should these resources be in the same group or a different one?

Hint:

Do they have common lifecycle and management?

Answer:

It's up to you.



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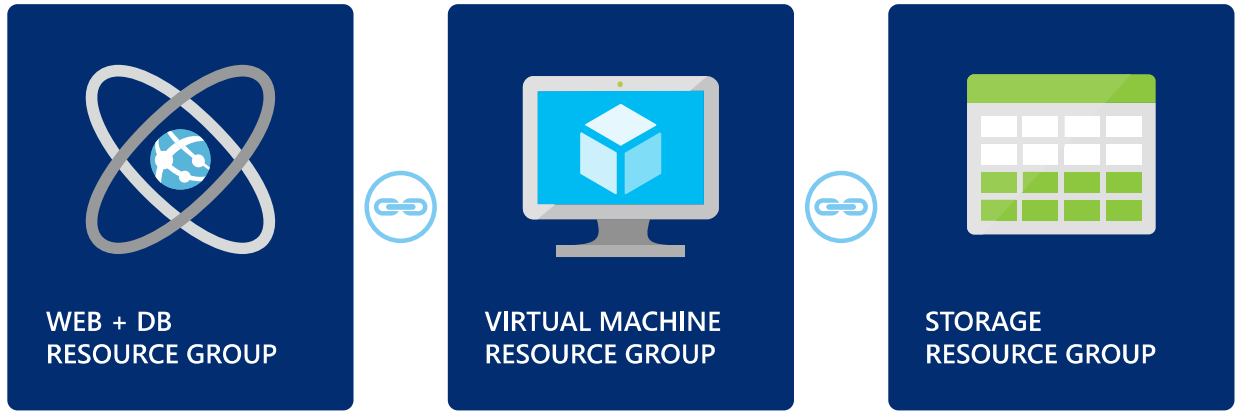


Organizational Concepts

Resource groups

- Tightly coupled to a container of resources
- Follows RBAC rules
- 1 resource group at a time

Tags

- Loosely coupled user or system defined categorization
- Arbitrary boundaries
- 15 tags to use as needed

Resource groups and tags are the building blocks from which users define **applications**.

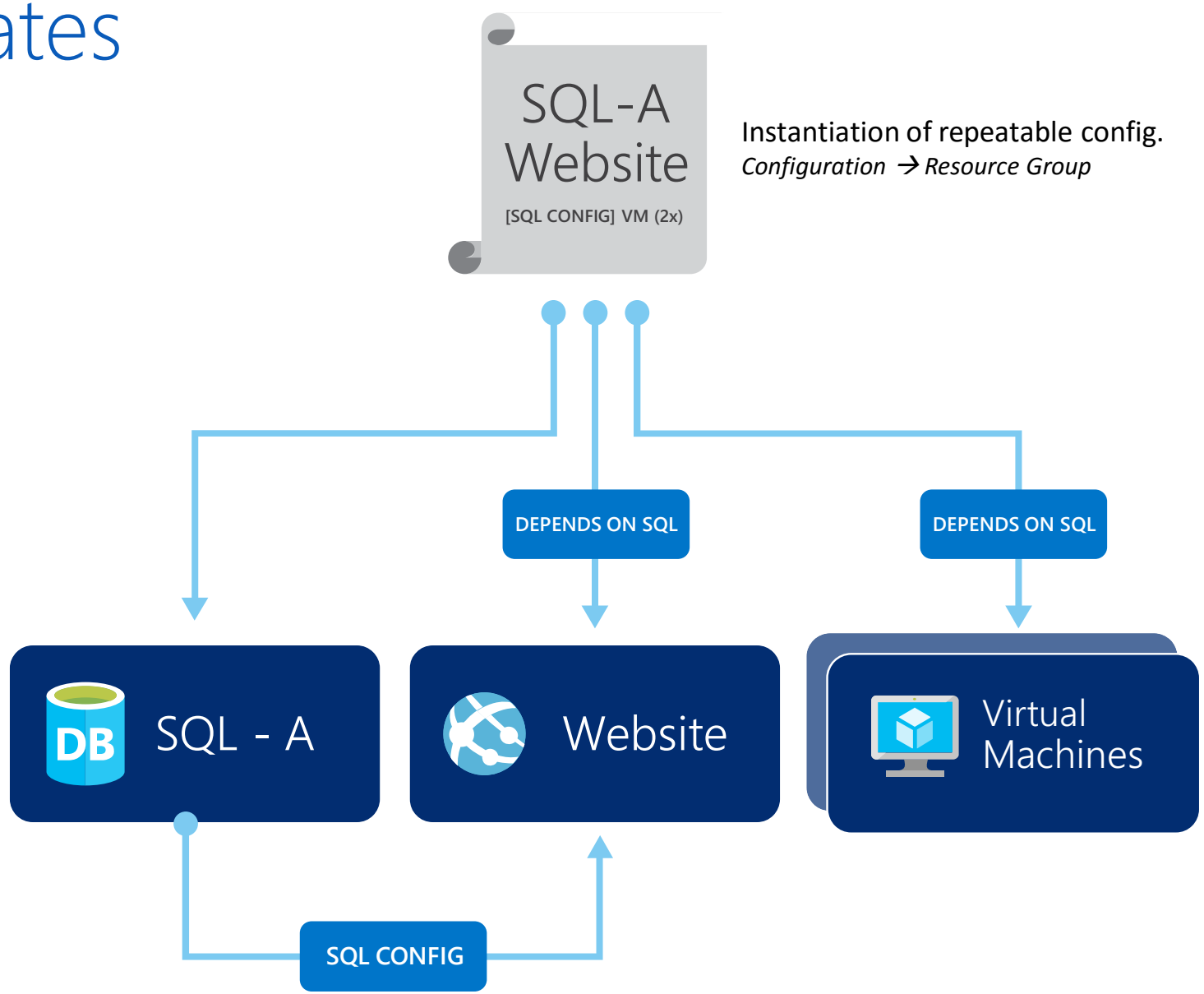
Deployment Templates

What?

- Source file, can be checked-in
- Specifies resources, dependencies and connections
- Parameterized input/output

Why?

- Ensure Idempotency
- Simplify orchestration
- Provide cross-resource configuration and update support



Demo: Resource Groups and Templates

Module 2 - Azure Resource Manager (ARM)

Resource Providers

ARM Definitions

- Resource - Atomic unit of deployment
- Resource group - Collection of resources
- Resource provider - Manages specific kinds of resources
- Resource type - Specifies the type of resource

Resource Providers

- Used to deploy specific types of resources

- Identified by provider namespace
  - e.g., Microsoft.Compute, Microsoft.Storage, Microsoft.Web (~25 Microsoft or Customer namespaces)

- Resource types
  - Each provider namespace manages one or more resource types: e.g., virtualMachines
  - Different regional availability and apiVersions

- PowerShell
  - Get-Azurelocation
  - Get-AzureProvider

Resource Provider Types (examples)

Resource Type	Usage
Microsoft.Compute/virtualMachines	Virtual Machines (VMs) ~ (V2)
Microsoft.Storage/storageAccounts	Storage accounts (V2)
Microsoft.Compute/availabilitySets	
Microsoft.Network/networkInterfaces	Virtual network interface card (NIC)
Microsoft.Network/loadBalancers	Azure Load Balancer or Internal Load Balancer
Microsoft.Network/virtualNetworks	Virtual networks (V2)
Microsoft.ClassicStorage	V1 storage – not managed by ARM
Microsoft.ClassicCompute	V1 VMs – not managed by ARM

Many more!

How do I know what resources providers are available?

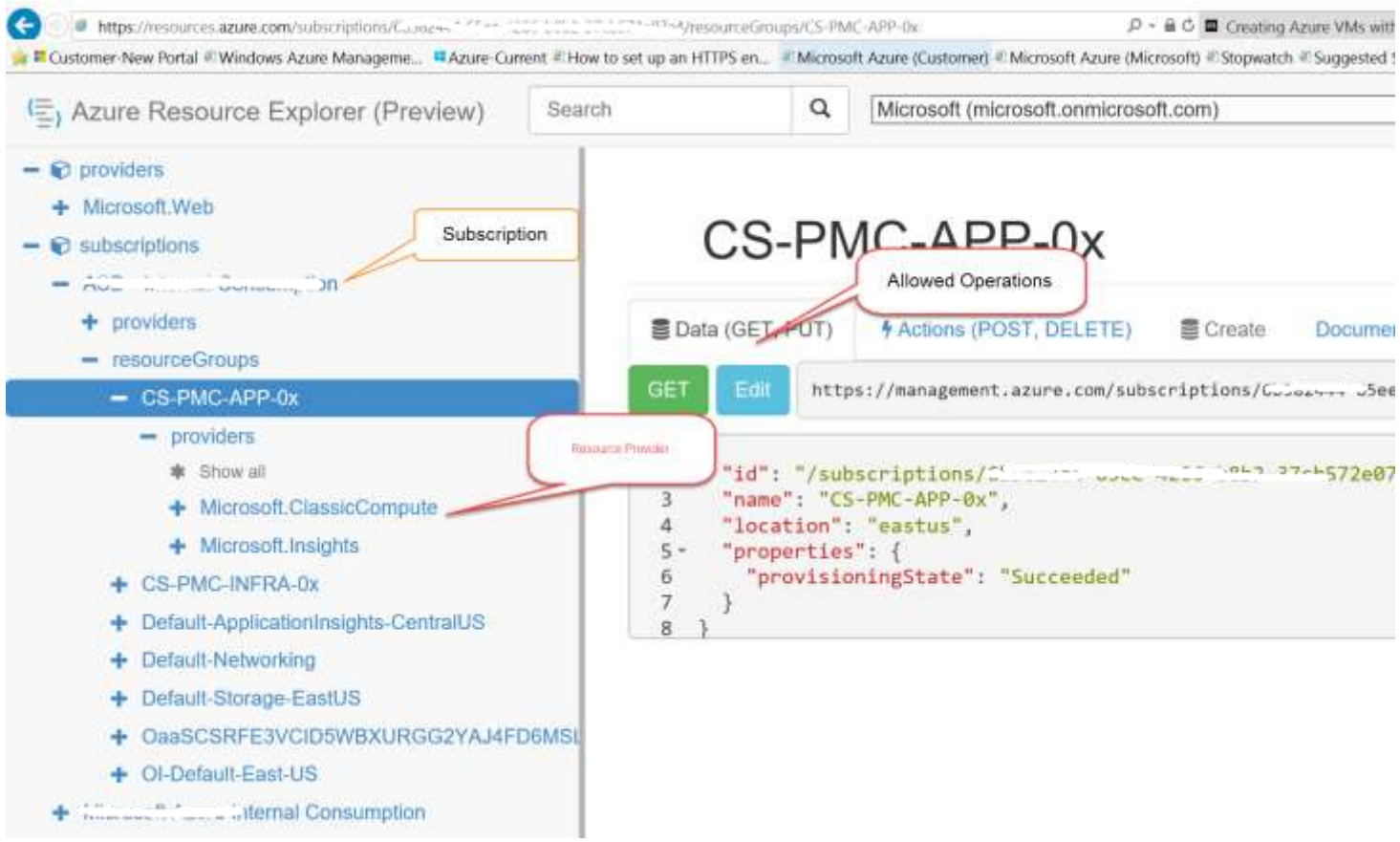
Using PowerShell, log in to your Azure account and then run

Get-AzureRmResourceProvider

```
ProviderNamespace               RegistrationState ResourceTypes
-----------------               ----------------- -------------
Microsoft.AppService            Registered        {apiapps, appIdentities, gateways, deploymenttemplates...}
Microsoft.Automation            Registered        {automationAccounts, automationAccounts/runbooks, operations}
Microsoft.Backup                Registered        {BackupVault}
Microsoft.Batch                 Registered        {batchAccounts}
microsoft.cache                 Registered        {Redis, checkNameAvailability, operations, RedisConfigDefinition...}
Microsoft.ClassicCompute        Registered        {domainNames, checkDomainNameAvailability, domainNames/slots, domainNames/slots/
Microsoft.ClassicNetwork        Registered        {virtualNetworks, reservedIps, quotas, gatewaySupportedDevices...}
Microsoft.ClassicStorage        Registered        {storageAccounts, quotas, checkStorageAccountAvailability, storageAccounts/serv
Microsoft.Compute               Registered        {availabilitySets, virtualMachines, virtualMachines/extensions, virtualMachines/
microsoft.insights              Registered        {components, webtests, queries, alertrules...}
Microsoft.KeyVault              Registered        {vaults, vaults/secrets, operations}
Microsoft.MobileEngagement      Registered        {appcollections, appcollections/apps, checkappcollectionnameavailability, suppo
Microsoft.Network               Registered        {virtualNetworks, publicIPAddresses, networkInterfaces, loadBalancers...}
Microsoft.OperationalInsights   Registered        {workspaces, storageInsightConfigs, linkTargets, operations}
Microsoft.Sql                   Registered        {operations, locations, locations/capabilities, checkNameAvailability...}
Microsoft.Storage               Registered        {storageAccounts, operations, usages, checkNameAvailability...}
microsoft.support               Registered        {operations, supporttickets}
Microsoft.Web                   Registered        {sites/extensions, sites/slots/extensions, sites/instances, sites/slots/instanc
Microsoft.ADHybridHealthService Registered        {services, addsservices, configuration, operations...}
Microsoft.Authorization         Registered        {roleAssignments, roleDefinitions, classicAdministrators, permissions...}
Microsoft.Features              Registered        {features, providers}
Microsoft.Resources             Registered        {subscriptions, subscriptions/providers, subscriptions/operationresults, resour
Microsoft.Scheduler             Registered        {jobcollections, operations}
microsoft.visualstudio          Registered        {account, account/project}
```

How can I see what Resource Providers are in use in my subscription?

Go to https://resources.azure.com and log in using your Azure Credentials



Resource Definition

- Name
  - Unique for resource group and resource type (e.g., Microsoft.Compute/virtualMachines)
- Id
  - Unique across Azure
  - /subscriptions/GUID/resourceGroups/myRG/providers/Microsoft.Compute/virtualMachines/vmName
- Location
- ResourceType
- ResourceGroup
- Properties
  - Additional properties specific to the resource provider

Module 2 - Azure Resource Manager (ARM)

Tools

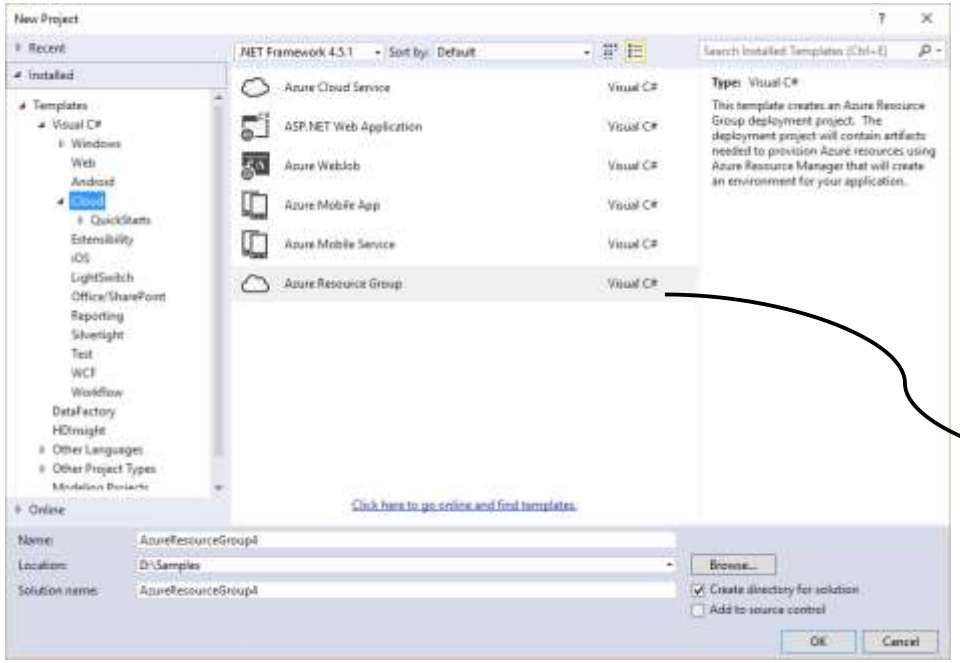
Tools typically used by IT with ARM

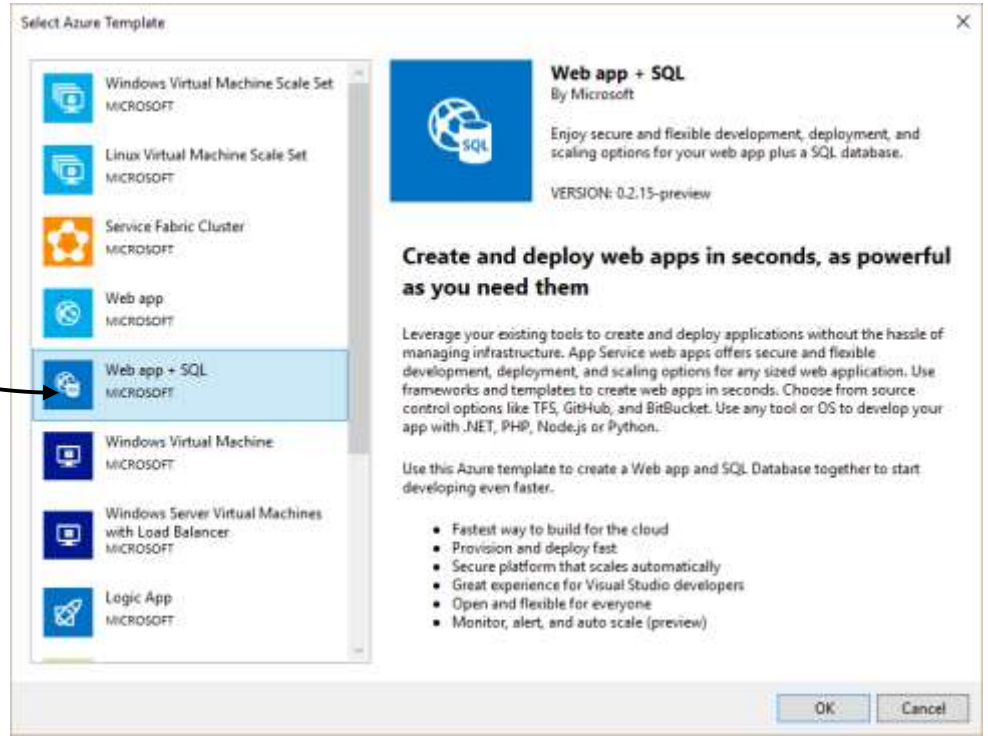
- PowerShell
- Troubleshooting in the portal
- Visual Studio

Visual Studio

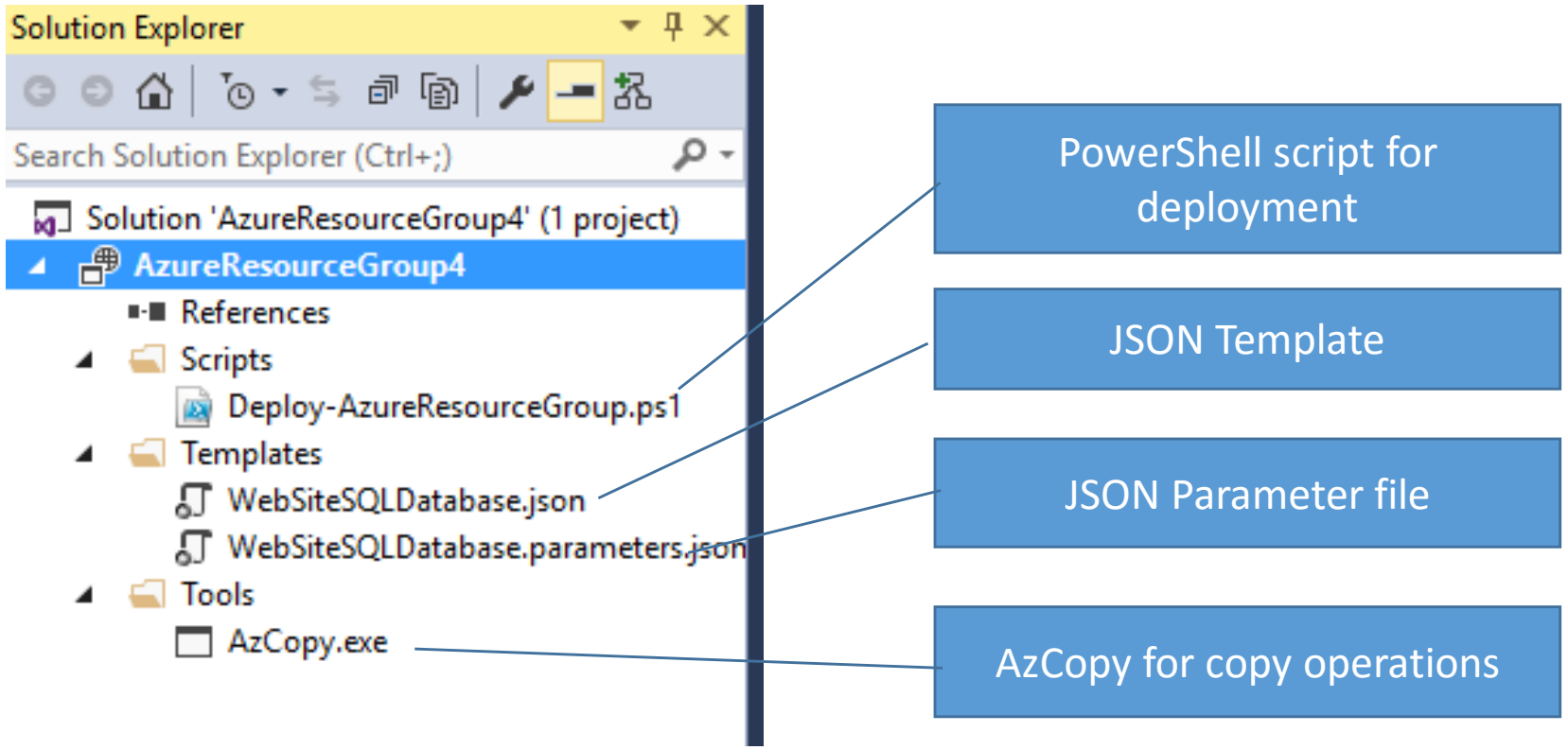
- Provides a new template from the gallery
- Allows the deployment of a resource group
- Generates scripts to deploy application

Template options



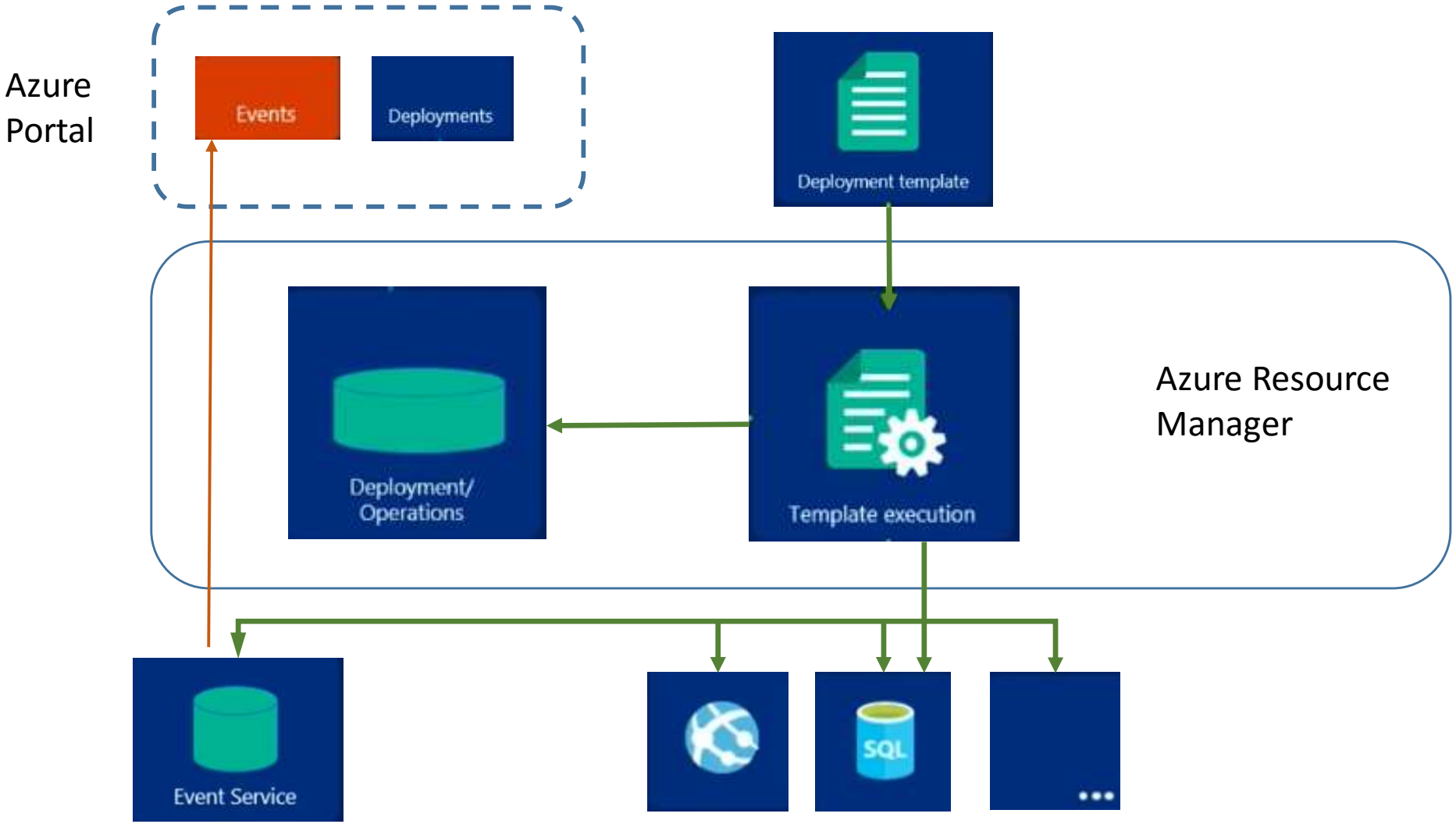


Files Generated by Template



Demo: Visual Studio Deployment

Troubleshooting Deployments



Demo: Troubleshooting

- Event Viewer in the Azure Portal
- Deployment operations in the Azure Portal
- Deployment logs in PowerShell


Microsoft