SQLskills Immersion Event

IEAzure: Azure VMs and Azure SQL Database

Module 8: Azure Administration and Scheduling

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Overview

- Azure Automation
- Elastic Agent Jobs
- PowerShell
- SQL Server Agent
- Administration Tasks

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Azure Automation

- Cloud-based automation and configuration service
- Provides consistent management across your Azure and non-Azure environments
- Provides complete control during deployment, operations, and decommissioning of workloads and resources
- Consists of process automation, update management, and configuration features

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Azure Automation Capabilities

- **Process Automation**
  - Orchestrate processes using graphical, PowerShell, and Python runbooks
- **Configuration Management**
  - Collect inventory, track changes, and configure desired state
- **Update Management**
  - Assess compliance, schedule update installation
- **Shared capabilities**
  - Role based access control
  - Secure, global store for variables, credentials, certificates, and connections
  - Flexible scheduling, shared modules, source control support, auditing, and tags
- **Heterogenous**
  - Windows & Linux, Azure and on-premises

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Process Automation

- Provides the ability to automate frequent, time-consuming, and error-prone cloud management task
- Helps lower operational cost by boosting efficiency
- Integrate Azure services and other public systems that you need when deploying, configuring, and managing your processes
- Author runbooks graphically, in PowerShell, or Python
  - A library of existing runbooks already exist so you can modify for your specific needs
- A hybrid Runbook worker allows you to unify management across on-premises environments
- Integrate Webhooks to trigger automation from ITSM, DevOps, and monitoring systems

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Configuration Management

- Known simply as 'desired state configuration' DSC
- Cloud-based solution for PowerShell DSC for enterprise environments
- You are about to write, manage, and compile PowerShell DSC configurations, import DSC resources, and assign configurations to target nodes
- Target nodes receive notifications, conform to the 'desired state', and then report back on their compliance
- The pull server is built-in to Azure Automation
- Supports Windows 7 up to Windows Server 2019 and all Linux distributions endorsed on Azure
  - Except for Debian and Ubuntu 18.04

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Update Management

- Use to update Windows and Linux systems
- Visibility of update compliance across Azure, on-premises, and other clouds
- Create a schedule of deployments to install updates within a defined maintenance window
- Easily exclude exempt machines/servers from receiving patches during a deployment

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Shared Resources

- Schedules – used in the service to trigger events on predefined times
- Modules – used to manage Azure and other systems
- Modules gallery – integration into the PowerShell gallery to view and import runbooks into the Automation Account
- Python 2 packages – Python 2 packages to use in Python runbooks
- Credentials – securely store information used by runbooks
- Connections – store a name or value pairs of information that contains common information
- Certificates – store and make available at runtime
- Variables – provides a way to store and hold content that can be used across runbooks and configurations

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Common Scenarios

- **Build or deploy resources**
  - Standing up and tearing down development or QA environments
- **Configure Virtual Machines**
  - Assess and configure both Windows and Linux machines with your desired configuration state without manually having to touch each unit
- **Monitor**
  - Identify changes on machines that are causing issues or out of compliance
- **Protection**
  - Quarantine a VM if a security alert is raise
- **Govern**
  - Set up role-based access control
  - Recover unused resources

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Demo

Azure Automation

Elastic Database Jobs

- **Job scheduling service to execute custom jobs on one or many Azure SQL Databases**
- **Target groups can be one or more individual databases or data warehouses, or all databases in a server, or pools**
- **Can run against databases in different subscriptions**
- **Servers and pools are dynamically enumerated at runtime, meaning jobs run against all databases that exist in the target group at the time of execution**
- **Supported APIs and tools include**
  - Azure Portal
  - PowerShell
  - T-SQL
  - Azure Resource Manager

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Elastic Database Jobs

- **Elastic Job components**
  - Elastic Job agent – Azure resource you create to run and manage jobs
  - Job database – Azure SQL database the job agent uses to store job related data, job definitions, and more
  - Target group – set of servers, pools, databases, warehouses, and shard maps to run a job against
  - Job – unit of work that is composed of one or more job steps
    - Steps specify the T-SQL script to run, as well as other details required to execute the script

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Elastic Database Jobs

- Job agent executing jobs across different types of target groups

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Demo

Elastic Database Jobs

PowerShell

- **Azure PowerShell Az module**
  - December 2018 – Azure PowerShell A module is the intended PowerShell module for interacting with Azure
  - Az offers shorter commands, improved stability, and cross-platform support
  - Feature parity and an easy migration path from AzureRM
  - Recommend upgrade path is uninstall Azure PowerShell AzureRM module and install the Azure PowerShell Az module
  - Enable combability mode to add aliases for AzureRM 'Enable-AzureRMAlias' – only enable aliases if you DO NOT have AzureRM installed
  - For more details on upgrading to Az - https://docs.microsoft.com/en-us/powershell/azure/new-azureps-module-az?view=azps-1.6.0

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PowerShell

- **Deploy to a resource group or to a subscription**
  - New-AzResourceGroupDeployment -ResourceGroupName <resource-group-name> -TemplateFile <path-to-template>
  - New-AzDeployment -Location <location> -TemplateFile <path-to-template>

- **Deploy a local template**

Azure PowerShell

```
$resourceGroupName = Read-Host -Prompt "Enter the Resource Group name"
$location = Read-Host -Prompt "Enter the location (i.e. centralus)"

New-AzResourceGroup -Name $resourceGroupName -Location $location
New-AzResourceGroupDeployment -ResourceGroupName $resourceGroupName `
  -TemplateFile c:\MyTemplates\azuredeploy.json
```


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PowerShell

- **Deploy a remote template**

Azure PowerShell

```
$resourceGroupName = Read-Host -Prompt "Enter the Resource Group name"
$location = Read-Host -Prompt "Enter the location (i.e. centralus)"

New-AzResourceGroup -Name $resourceGroupName -Location $location
New-AzResourceGroupDeployment -ResourceGroupName $resourceGroupName `
  -TemplateUri https://raw.githubusercontent.com/Azure/azure-quickstart-templates/master/101-storage-account-
```

- **Deploy from Azure Cloud Shell**

Azure PowerShell

```
$resourceGroupName = Read-Host -Prompt "Enter the Resource Group name"
$location = Read-Host -Prompt "Enter the location (i.e. centralus)"

New-AzResourceGroup -Name $resourceGroupName -Location $location
New-AzResourceGroupDeployment -ResourceGroupName $resourceGroupName `
  -TemplateUri https://raw.githubusercontent.com/Azure/azure-quickstart-templates/master/101-storage-account-
```


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PowerShell

- **Redeploy when deployment fails**
  - Feature that lets you 'rollback on error'
  - When a deployment fails, you can automatically redeploy a previous, successful deployment from your deployment history
  - -RollbackToLastDeployment or –RollBackDeploymentName
- **Sample Scripts for Azure SQL**
  - https://docs.microsoft.com/en-us/azure/sql-database/sql-database-powershell-samples

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SQL Server Agent

- **SQL Server Agent is packaged with Azure SQL Managed Instance, SQL Server Standard, Enterprise, and Developer**
- **For SQL Server database related task, most database administrators have expressed that they would like to keep using SQL Server Agent**
  - For Azure SQL Database, this is an issue because SQL Agent is missing
  - SQL Server Agent can be used with an Azure SQL Database as a data source
  - Many customers have leveraged SQL Agent on-premises or an Azure VM with SQL Server to run jobs against their Azure SQL Databases
- **Longer term, its better to consider Elastic Database Jobs**

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Administration Tasks

- **Index Optimizations**
  - Rebuilds and reorganizations
  - Fragmentation does matter
- **Statistics Updates**
  - Query Optimizer still benefits from up to date statistics
- **Database Consistency Checks**
  - Yes, you still need to do these
- **Any number of data manipulations that your organization needs**

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Key Takeaways

- There are administration tasks that you will still need to schedule
- SQL Server on VMs and Azure SQL Managed Instance still have SQL Server Agent to schedule jobs
- Elastic Database Jobs allow for scheduling database task to one or many databases
- Azure Automation allows for full Azure scheduling of any number of tasks
- With PowerShell, you can do everything

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Review

- Azure Automation is your full Azure Scheduler
- Elastic Database Jobs is your cloud SQL Agent replacement
- PowerShell can do it all
- SQL Server Agent can still be your go to in some cases
- There are certain standard administration tasks that DBAs still are required to perform, even in Azure

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