

SQLskills Immersion Event

IEAzure: Azure VMs and Azure SQL Database

Module 8: Azure Administration and Scheduling

Tim Radney

Tim@SQLskills.com



Overview

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

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

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

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

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

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

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

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

Demo

Azure Automation

Elastic Database Jobs

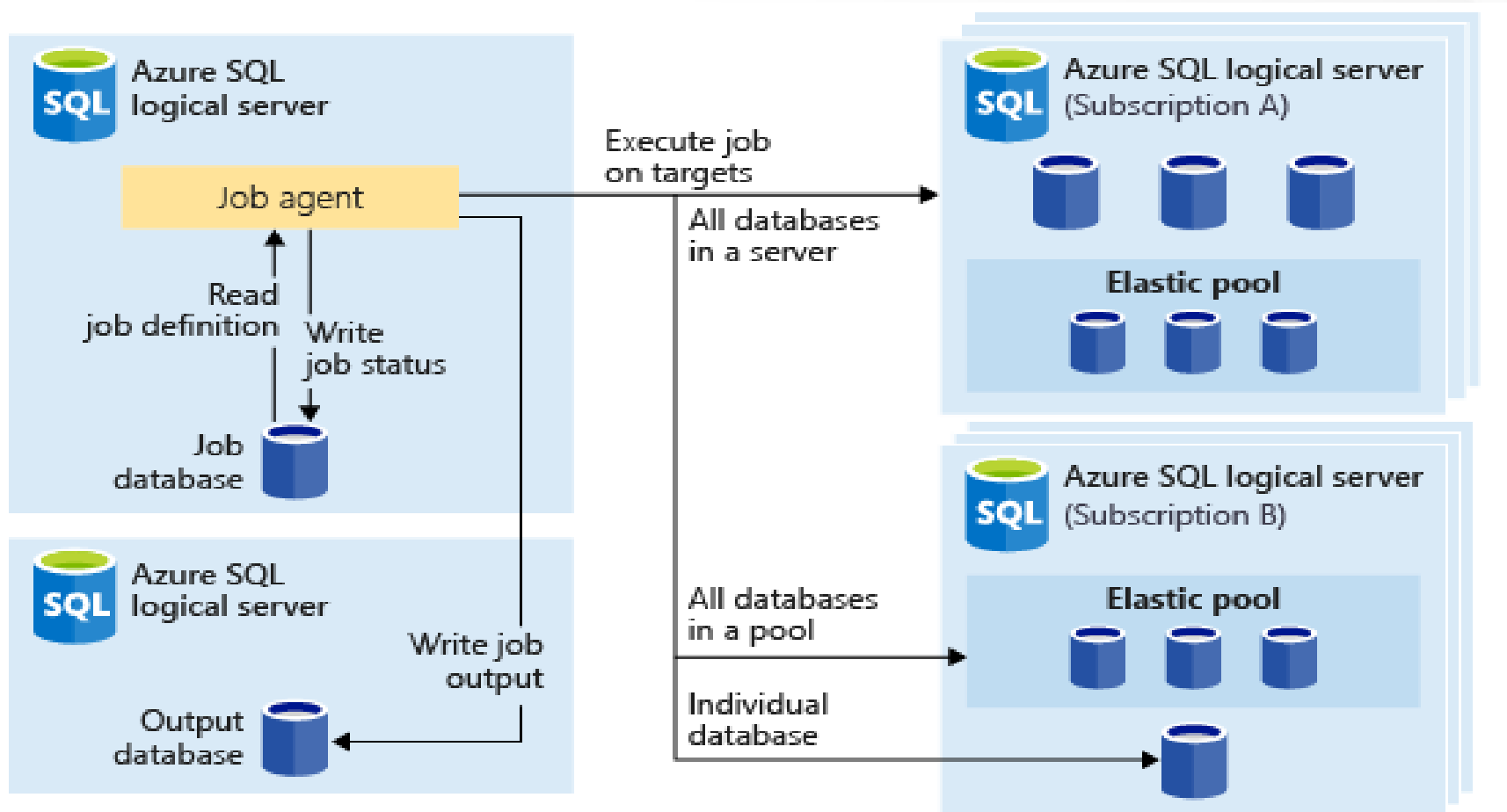
- Job scheduling service to execute custom jobs on one or many Azure SQL Databases
- Target groups can be one or more individual databases or data warehouses, or all databases in a server, or pools
- Can run against databases in different subscriptions
- Servers and pools are dynamically enumerated at 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

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

Elastic Database Jobs



- Job agent executing jobs across different types of target groups

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 compatibility 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>

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
```


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 Copy

$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-
```

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>

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**

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**

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

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