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DB Schenker

Global Infrastructure Services

New code

Concept Template

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# Summary

## Target Group

TSC and cloud ops teams

## Abstract

As part of the Cloud first strategy at GIS, we will be migrating regional workloads to the respective cloud landing zones on Azure. As part of these migrations Microsoft SQL server always on configurations are expected to be migrated via ‘backup and restore’ methodology. This document covers the design aspects around infrastructure (Virtual machines, Load balancer and the Quorum) that are to be used .

## Management Summary

This document covers the Infrastructure design requirements to host a Microsoft SQL ALWAYS ON cluster on Azure

# Topic

Infrastructure considerations:

*Operating systems*: Windows Server 2012 or above

*SQL server*: SQL Server 2012, SQL Server 2014, SQL Server 2016, SQL Server 2017

Note: *For SQL Server 2019 (FCI, AG) VNN along with DNN is recommended for failover purposes. The specific details are not covered in this document and planned to be included in next versions*

Azure platform: The below table captures the availability set details

|  |  |  |
| --- | --- | --- |
| Category | Azure configuration | Notes |
| Subscription Name | Select the appropriate subscription as per the landing zone |  |
| Resource group | Leverage the same resource group for the application (VMs, Storage and Availability set) |  |
| Location | Choose appropriate location as per the Landing zone |  |
| Update domain | 5 |  |
| Fault domain | 3 |  |
| Tags | Appropriate tagging information to be added |  |

Server Operating System:

|  |  |  |
| --- | --- | --- |
| Category | Azure configuration | Notes |
| Resource group | Leverage the same resource group for the application (VMs, Storage and Availability set) |  |
| VM type | A VM type with Premium SSD / ULTRA SSD disks is recommended | The VM-types with alphabet ‘s’ denote the compatibility of the VM category to have premium disks  Ex. D4**s** v3 |
| VM disk layout | C: Drive – OS installation (read Cache)  E: Drive- SQL installation (Read only cache)  F: Drive – Database files (Read only cache)  G: Drive - Log (None cache)  H: Drive- backup (None cache) | All disks are to be appropriately sized to cater to the IOPS requirements as proposed by TSC DBAs |
| VM availability | **Availability set** is required to have the VMs in different Fault domain and update domain |  |
| Tags | Appropriate tagging information to be added |  |
| VM backup | Azure backup is leveraged for VM level backup and for DB level backup TSC team would consider traditional DB backup methods (Inbuilt log backups) or Veeam backup software to be leveraged |  |
| VM Patching (OS level) | OS level patching is recommended for the primary node followed by the secondary node.  Action 1: prior to patching backup the system, user and system databases  Action 2: Maintain the SQL server roles on node A (primary node)  Action 3: Installation of patches on Node B (Secondary node)  Action 4: Restart Node B post patching and perform sanity checks for db health  Action 5: Failover the SQL cluster roles to Node B and perform patching of Node A  Action 6: Post sanity checks on Node A perform the fall back from Node B to Node A | The auto restart post patching is not recommended. An alignment with the TSC and Cloud ops is required for on the restart procedure |
| VM infra monitoring | Azure monitor with Grafana will be leveraged for VM monitoring. The same will be done by the Cloud ops team |  |

Quorum configuration:

There are three configurations available to act as the Quorum witness as below

1. Disk witness
2. **Cloud witness**
3. File share witness

The cloud witness is preferred over a disk and file share witness as its highly available, cost efficient and doesn’t store the data files. But cloud witness can be used only in case of Windows server 2016 and above

For Configurations requiring Windows 2012 a File share witness is to be considered as it doesn’t store the actual data files as in case of disk witness

Below table captures the Cloud witness configuration required

|  |  |  |
| --- | --- | --- |
| Category | Azure configuration | Notes |
| Subscription Name | Select the appropriate subscription as per the landing zone |  |
| Resource group | Leverage the same resource group for the application (VMs, Storage and Availability set) |  |
| Location | Choose appropriate location as per the Landing zone |  |
| Type | General Purpose (storage V2, Storage) | Blob storage cannot be used as witness |
| Replication | LRS |  |
| Connectivity method | Public end point – Selected network and select the appropriate Vnet + Subnet | Subnet will the network wherein the nodes are hosted |
| Advanced | Secure file transfer: Yes  Minimum TLS version 1.2 |  |
| Tags | Appropriate tagging information to be added |  |

Azure load balancer (VNN configuration)

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| --- | --- | --- |
| Category | Azure configuration | Notes |
| Type | ‘Azure standard’ load balancer is recommended with private end point | Public end points are not to be used as it exposes the DB on internet |
| Backend pool | Target network IP configurations of servers in FCI | De |
| Health probe | FCI default TCP port: 59999  Interval: 5 Seconds.  Unhealthy threshold: 2 consecutive failures | A custom port can be used by TSC as required |
| Load balancing rules | Frontend IP address: The IP address for the SQL Server FCIs or the AG listener's clustered network resource.  Port: The SQL Server TCP port. The default instance port is 1433/1434 or custom port.  Backend port: The same port as the Port value when you enable Floating IP (direct server return).  Backend pool: The backend pool name that you configured earlier.  Health probe: The health probe that you configured earlier.  Session persistence: None.  Idle timeout (minutes): 4.  Floating IP (direct server return): Enabled. |  |
| Tags | Appropriate tagging information to be added |  |
| PowerShell script to configure cluster probe | $ClusterNetworkName = "<**Cluster Network Name**>"  $IPResourceName = "<**SQL Server FCI / AG Listener IP Address Resource Name**>"  $ILBIP = "<**n.n.n.n**>"  [int]$ProbePort = <**nnnnn**>  Import-Module FailoverClusters  Get-ClusterResource $IPResourceName | Set-ClusterParameter -Multiple @{"Address"="$ILBIP";"ProbePort"=$ProbePort;"SubnetMask"="255.255.255.255";"Network"="$ClusterNetworkName";"EnableDhcp"=0} | To be run from either of the SQL server nodes |
| Reference Link | [Click here](https://docs.microsoft.com/en-us/azure/azure-sql/virtual-machines/windows/availability-group-vnn-azure-load-balancer-configure) | |

Appendix

Appendix 1

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Appendix 2

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