Oracle RAC on Microsoft Azure

*Deployment Process Demonstration*

*rev. 2021-02-15*
About FlashGrid for Oracle RAC on Azure

Ensuring high availability of backend relational databases is a critical part of the cloud strategy - whether it is a lift-and-shift migration or a green-field deployment of mission critical applications. FlashGrid is an engineered cloud system designed for database high availability. FlashGrid is delivered as a fully integrated Infrastructure-as-Code template that can be customized and deployed to Azure account with a few mouse clicks. Key components of FlashGrid for Oracle RAC on Azure include:

- Azure Virtual Machines
- Azure Managed Premium SSD block storage
- FlashGrid Storage Fabric software
- FlashGrid Cloud Area Network software
- Oracle Grid Infrastructure software
- Oracle RAC database engine

By leveraging the proven Oracle RAC database engine FlashGrid enables the following use-cases:

- Lift-and-shift migration of existing Oracle RAC databases to Azure.
- Migration of existing Oracle databases from high-end on-premises servers to Azure without reducing availability SLAs.
- Design of new mission critical applications for the cloud based on the industry proven and widely supported database engine.

About This Demo

This brief demo the main steps of deploying FlashGrid for Oracle RAC on Azure. The target audience is Azure cloud architects and engineers and database architects and administrators.

More detailed information is available in the following documents:

- White paper: Oracle RAC on Microsoft Azure enabled by FlashGrid engineered cloud system.
- Deployment Guide
Step 0: Select one of standard configuration templates

Since majority of deployments have 2 or 3 RAC nodes, these two standard configuration are readily available when you click Launch at https://www.flashgrid.io/products/flashgrid-for-oracle-rac-on-azure/

Click on a button that corresponds to either 2, or 3 RAC nodes. It will open FlashGrid Launcher tool. (For configurations other than 2 or 3 RAC nodes contact FlashGrid support.)
Step 1: Enter basic information about the cluster

At this step you need to enter information such as Azure Cloud type, operating system, and the SSH key that you will use for accessing the VMs.
Step 2: Select database version

Select which version of the database you are planning to use, along with Patch Set Update / Release Update version for it.
Step 3: Provide location of Oracle installation files

You need to upload the listed Oracle installation files to a Blob Storage Container and provide URL of the container. Cluster initialization script will download and install the files.
Step 4: Configure cluster nodes

Provide hostnames, Availability Zone placement (for regions where AZs are supported), and sizes of the cluster nodes.
Step 5: Configure storage

Specify ASM disk groups that will be created. The corresponding disks will be automatically attached to the nodes.
Step 6: Specify memory allocation

If needed, customize database memory allocation percentages. These percentages are used for automatic configuration of HugePages when database node boots up based on the total memory.
Step 7: Specify listener ports

If needed, customize SCAN and Local listener port numbers.
Step 8: Provide information about target VNet

In most cases the cluster must be deployed in an existing VNet. Provide information about the VNet and other network resources. Alternatively, you can choose to create a new VNet.
Step 9: Configure DNS

Specify domain name that will be assigned to cluster nodes. You can also replace the default Azure DNS server with your own list of DNS servers.

<table>
<thead>
<tr>
<th>Clusters Info</th>
<th>DNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cluster Info</td>
<td>DNS</td>
</tr>
<tr>
<td>2. DB Version</td>
<td>Within the cluster host name resolution is performed by DNSMASQ service configured locally. For resolving cluster node names on clients or app servers need to add corresponding records to your DNS servers. For resolving host names that are outside of the cluster (e.g. storage service endpoint) on the cluster nodes, you can use Azure-provided DNS server (default) or custom DNS servers.</td>
</tr>
<tr>
<td>3. Oracle Files</td>
<td>Domain Name</td>
</tr>
<tr>
<td>4. Nodes</td>
<td>example.com</td>
</tr>
<tr>
<td>5. Storage</td>
<td>The domain name will be configured in the OS. The domain must be in a zone hosted on your DNS servers.</td>
</tr>
<tr>
<td>6. Memory</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>7. Listener Ports</td>
<td>168.63.129.16</td>
</tr>
<tr>
<td>8. Network</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>9. DNS</td>
<td>168.63.129.16</td>
</tr>
<tr>
<td>10. Time Zone, NTP</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>11. Alerts</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>12. Tags</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>13. Registration</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>14. Validate</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>15. Launch</td>
<td>DNS Servers</td>
</tr>
</tbody>
</table>
Step 10: Select time zone and time servers

You can provide your own list of time servers or keep the default list of Google time servers.
Step 11: Configure email alerts

Specify list of emails where alerts will be sent for errors that may happen during operation of the cluster.
Step 12: Specify tags

Optionally, specify the list of tags that will be assigned to VMs and disks.
Step 13: Provide registration information

Registration
Please enter your contact information. This will allow us to provide you with better support for this system.

First Name
Bob

Last Name
Smith

Company
ACME Corp.

The company name will be used to generate a FlashGrid product license file.

Email
bob@acme.corp
Step 14: Validate configuration

Click Validate to confirm that the provided configuration is consistent.
Step 15: Generate Azure Resource Manager (ARM) template

When you click Launch FlashGrid Cloud Cluster, ARM template will be generated and Azure Portal will open.

Launch

Click Launch FlashGrid Cloud Cluster to generate an Azure Resource Manager (ARM) template and open it in ARM for deploying.

- Creating a new resource group for the cluster is highly recommended. This will make it easier to delete the entire cluster if needed.
- After the ARM template is successfully deployed, cluster initialization process starts and takes about 90 minutes.
- Connect to the first database node via SSH as user az-admin.
- See FlashGrid knowledge base for troubleshooting ARM errors or errors during cluster initialization.

To generate and download the ARM template without opening ARM click here.

By clicking Launch FlashGrid Cloud Cluster or downloading ARM template you explicitly indicate your acceptance of the FlashGrid End User License Agreement.
Step 16: Deploy the ARM template

On Azure Portal select target subscription, create new resource group for the cluster, select the target region, and click Purchase.
Step 17: SSH in to the first node

After the deployment of the ARM template is complete, use SSH to connect to the first node of the cluster as user *az-admin*. If the cluster init already finished (takes 60-90 minutes) then you will see the following message.
Step 18: Check status of the cluster
#

```
# sudo flashgrid-cluster
```

```
[az-admin]racl:~$ sudo flashgrid-cluster
FlashGrid 19.6.1.3ame ap24af708d491dd8e2b33bdes1e380f2109ddf46
License: via Marketplace Subscription
Support plan: 24x7

Support plan expiration: 07/13/2021

FlashGrid running: OK
Clocks check: OK
Configuration check: OK
Network check: OK

Querying modes: rac1, rac2, racq ...

Cluster Name: myrac
Cluster status: Good

+-----------------+----------+----------+----------+----------+----------+
<table>
<thead>
<tr>
<th>Node Name</th>
<th>Status</th>
<th>ASH_Name</th>
<th>Storage_Name</th>
<th>Quorum_Name</th>
<th>Failgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>rac1</td>
<td>Good</td>
<td></td>
<td></td>
<td></td>
<td>RAC1</td>
</tr>
<tr>
<td>rac2</td>
<td>Good</td>
<td></td>
<td></td>
<td></td>
<td>RAC2</td>
</tr>
<tr>
<td>racq</td>
<td>Good</td>
<td></td>
<td></td>
<td></td>
<td>RACQ</td>
</tr>
</tbody>
</table>
+-----------------+----------+----------+--------------|-------------|-----------|

Cluster Group Name: Status | Mounted | Type | TotalMiB | FreeMiB | OfflineDisks | LostDisks | Resync | ReadLocal | Vote |
DATA | Good | AllNodes | NORMAL | 3145728 | 3145336 | 0 | 0 | No | Enabled | None |
FRA | Good | AllNodes | NORMAL | 3145728 | 3145336 | 0 | 0 | No | Enabled | None |
GRID | Good | AllNodes | NORMAL | 10240 | 9056 | 0 | 0 | No | Enabled | 3/3 |

The cluster is ready. You can now create your database using DBCA.
Additional Information

For more information see https://www.flashgrid.io/products/flashgrid-for-oracle-rac-on-azure/ or email info@flashgrid.io

Copyright © 2021 FlashGrid Inc. All rights reserved.

This document is provided for information purposes only, and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document.

FlashGrid is a registered trademark of FlashGrid Inc. Oracle and Java are registered trademarks of Oracle and/or its affiliates. Red Hat is a registered trademark of Red Hat Inc. Microsoft and Azure are registered trademarks of Microsoft Corporation. Other names may be trademarks of their respective owners.