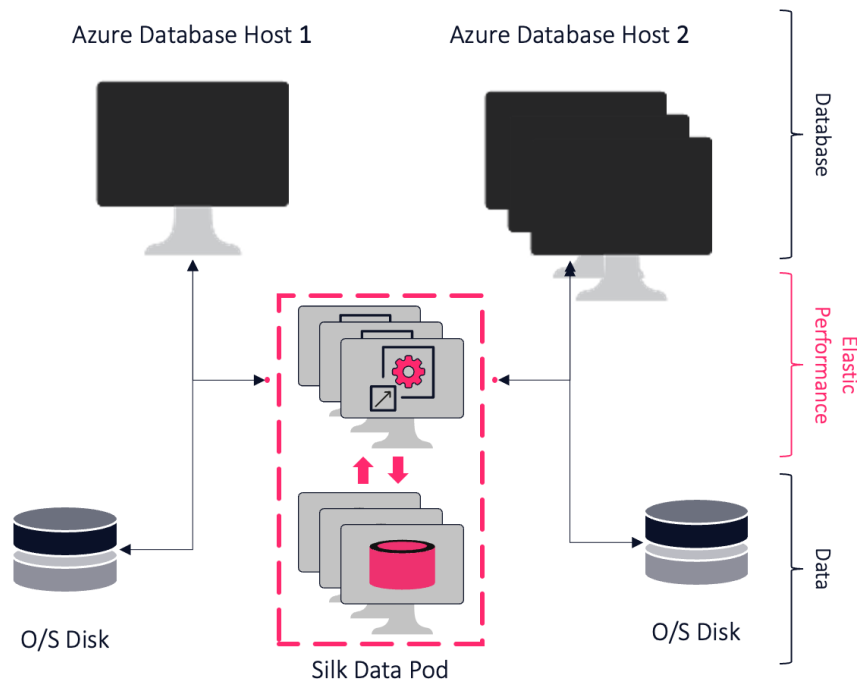


Deploying an Oracle Database on Azure with the Silk Cloud Platform

The Oracle database is one of the highest performing, largest capacity databases both on premises and in the cloud. It requires large amounts of I/O bandwidth, low latency, and high I/O rates for both read and write operations. These demands are where Silk fits in providing an extremely robust performant invisible layer of storage and database services.



This document is for DBAs, architects and database managers deploying Oracle on Azure IaaS solution with the Silk Cloud Platform. This document provides the steps required to build an Oracle on Silk IaaS deployment on Azure for Oracle.

No modification to the Oracle stack is required for successful deployment. The Silk Platform is presented to Oracle via ASM; all tuning, administration and life cycle management are standard Oracle.

Overview of Steps required

1. Choose a VM shape and Image
2. Apply Silk & Oracle Best practices to VM
3. Create and Connect Silk Volumes

Azure Oracle Licensing Considerations

Documentation of Oracle's public policy on licensing Oracle RDMS on Azure is linked [here](#). For Intel and AMD processors the core factor is the same at .5. This means that 2 vCPUs require one Oracle processor license.

Choose a VM shape and Image

Choosing the VM image

Azure Marketplace offers images containing Oracle database software. Alternatively, you can choose a standard Linux image and install Oracle separately. One advantage of running Oracle on Azure on Silk is that you can choose the flavor of Linux and version of Oracle to match your corporation requirements.

Oracle ASM is recommended by Silk, Microsoft, and Oracle (for performance reasons), so the Oracle Grid infrastructure packages is required.

You can find further details about Oracle specific VM images on Azure [here](#).

Here is the latest OS [certification](#) matrix from Oracle Corporation.

Choosing a VM shape

Silk works differently than standard cloud storage and is not limited by I/O restrictions that apply to standard cloud storage options. You should choose a VM shape depending on the required CPU and memory characteristics. The peak write I/O bandwidth just needs to be lower than the network bandwidth limit for the VM shape.

VM shape example

A database requires 3,000 MBPS, but only needs 32 vCPU cores to successfully run its workload. With standard Azure storage I/O capabilities, you would have to use at least a 96 vCPU VM shape to reach that level of I/O capacity, resulting in overprovisioning of both infrastructure and licensing, dramatically increasing Oracle Licensing costs. By using the Silk platform to provide data I/O, you can easily provision enough throughput using only a 32 vCPU VM.

VM-Shape	Memory	Cores	Cloud Native storage limits (uncached)	Network BW limit	Effective max Silk Limit per vm
Standard_E32s_v5	256GB	32	<ul style="list-style-type: none">• 51,200 IOPS• 865 Mbytes/s combined	<ul style="list-style-type: none">• 16,000 Mbits/s• 2,000 Mbytes/s egress	<ul style="list-style-type: none">• 2,000 Mbytes/s write• 5,500 Mbytes/s read• IOPS 400k per c.node
Standard_E64s_v5	512GB	64	<ul style="list-style-type: none">• 80,000 IOPS• 1,735 Mbytes/s combined	<ul style="list-style-type: none">• 30,000 Mbits/s• 3,750 Mbytes/s egress	<ul style="list-style-type: none">• 2,000 Mbytes/s write• 5,500 Mbytes/s read• IOPS 400k per c.node
Standard_E104s_v5	672GB	104	<ul style="list-style-type: none">• 120,000 IOPS• 4,000 Mbytes/s combined	<ul style="list-style-type: none">• 100,000 Mbits/s• 12,500 Mbytes/s egress	<ul style="list-style-type: none">• 12,500 Mbytes/s write• 12,500 Mbytes/s read• IOPS 400k per c.node

You can find full details of some suitable available VM shapes [here](#).

Apply Silk & Oracle best practices to VM

VM Configuration for Silk

To connect an IaaS VM to a Silk Pod, you must follow the steps detailed in the Silk Configuration Guide, available [here](#).

Oracle Grid Infrastructure Installation

Silk recommends using the ASM layer in Oracle to store the data, to gain maximum performance. If the image does not contain the grid infrastructure packages, you will need to install these packages as well. You can find steps to install asm on Linux on Azure [here](#).

You can use either ASMLIB or ASMFED. You must set the permissions for Oracle ASM devices to allow Oracle to create ASM disk groups to use the volumes. A Silk walkthrough describing the steps to configure ASMLIB with Silk is available [here](#). Alternatively, Oracle describes the installation and configuration of Oracle ASM Filter Driver [here](#).

Windows configuration

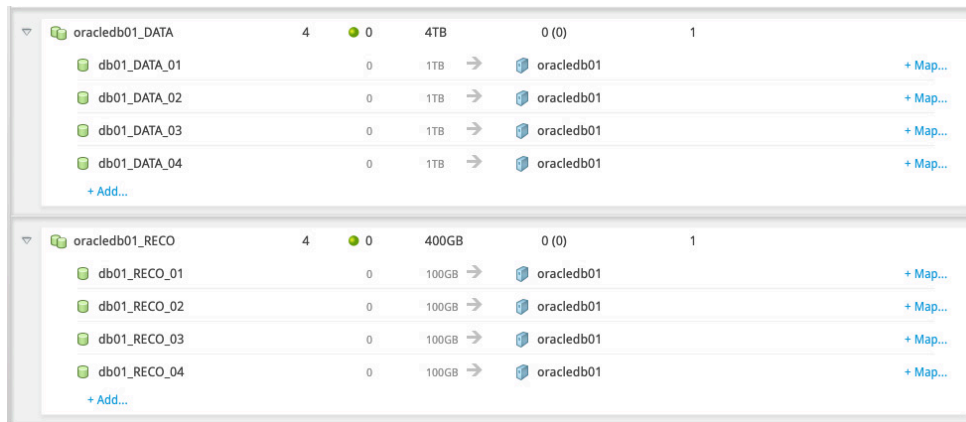
Silk on Azure IaaS supports [Windows/Oracle](#). Oracle describes the steps to configure ASM on Windows [here](#).

Oracle ASM and Silk Volume group recommendation

Silk recommends creating two different ASM diskgroups; a recovery area (+RECO) and a data area (+DATA). You may create other volumes for other functions. Each ASM diskgroup should have a minimum of four volumes (LUNS/ASM) associated with it. This enables the spread of I/O interrupts across multiple internal I/O queues at the iSCSI layer.

You should provision the volumes for the different ASM groups in the corresponding Silk Volume groups, to enable consistent snapshot creation and simplifying performance monitoring.

Sample Silk Volume and Volume Group configuration



Volume Group	Number of Volumes	Free Space	Total Capacity	Used Space	Number of Disks
oracledb01_DATA	4	0	4TB	0 (0)	1
db01_DATA_01	0	0	1TB		oracledb01
db01_DATA_02	0	0	1TB		oracledb01
db01_DATA_03	0	0	1TB		oracledb01
db01_DATA_04	0	0	1TB		oracledb01
oracledb01_RECO	4	0	400GB	0 (0)	1
db01_RECO_01	0	0	100GB		oracledb01
db01_RECO_02	0	0	100GB		oracledb01
db01_RECO_03	0	0	100GB		oracledb01
db01_RECO_04	0	0	100GB		oracledb01

Compression and Data Reduction

The Silk Data Platform always uses thin provisioning and compression to minimize the amount of physical capacity required to store data and, optionally, supports variable block size deduplication. As Oracle places a unique sequence number in two places in each block of data, Silk typically recommends you disable inline deduplication of Oracle volumes in Silk for optimal performance.

You can add additional space to an Oracle db without the need for a lengthy rebalance operation in Oracle. Simply expand the volumes on Silk, ensure the OS can see the space and expand using ASM as below.

```
sqlplus / as sysasm and perform 'alter disk group <dg_name> resize all'
```

Options for replicating and backing up your Oracle environment on Silk.

Silk's patented snapshot technology allows you to create zero-footprint clones without the need to provision another virtual machine. You can use snapshots to accelerate backup methodologies and integrate directly with major backup vendors like CommVault and Netbackup.

You can also asynchronously replicate Silk's snapshots to another Region or zone, providing DR options as alternatives to Oracle Dataguard. Silk-based replication can help reduce Oracle licensing costs and limit the need to keep the DR Oracle instance online.

Additional Resources

For more information on how Silk can optimize your Oracle database experience in the cloud, visit <https://silk.us>.

- [4 Database Performance Tips When Moving Oracle Exadata Workloads to the Public Cloud](#)
- [Silk Platform for any Database](#)
- [Moving from Oracle Exadata to Azure](#)
- [4 Common Database Challenges in the Cloud](#)

About Silk

The Silk Cloud DB Virtualization Platform gives demanding workloads 10x faster performance on the cloud compared to native cloud alone. It is a virtualization layer that sits between the underlying cloud infrastructure and customers' workloads. Without refactoring, workloads such as Oracle, Microsoft SQL Server, and industry-specific applications can move onto the GCP and Azure cloud while massively improving user experience. Industry leaders in e-commerce, software publishing, FinTech, and healthcare trust Silk with their mission-critical workloads to get the ultra-fast speeds their customers demand. Silk is headquartered in Needham, MA.

To learn more, visit silk.us.