# DataKeeper Cluster Edition Oracle Cloud Infrastructure Guide

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## 1. DataKeeper Cluster Edition Oracle Cloud Infrastructure Guide

This guide walks you through creating the following configurations as examples of using a cluster environment.

- DataKeeper cluster nodes (two nodes cluster join in a domain node)
- Failover Cluster
- SQL Server Cluster

# **1.1. Oracle Cloud Infrastructure Overview**

Oracle Cloud Infrastructure (OCI) is a set of complementary cloud services that enable you to build and run a wide range of applications and services in a highly available hosted environment provided by Oracle. OCI provides high-performance computing capabilities (such as physical hardware instances) and storage capacity in a flexible overlay virtual network that can be securely accessed from an on-premises network.

For more information, please visit <u>https://www.oracle.com/cloud/</u>.

# **1.2. Configuration Information**

In this verification, we used two cluster nodes joined in a domain node with the following configuration with DataKeeper for Windows installed.

#### Domain node

Region	US East
Availability Domain	AD-1
Fault Domain	FD1
Virtual Cloud Network	10.0.0/16
Subnet	10.0.1.0/24 (public) 10.0.2.0/24 (private)
Instance	Compute shape: VM.Standard.E4.Flex OS: Windows Server 2019 Standard Additional disks: N/A Network: Global IP address for connection 10.0.1.0/24 (public)
OS	Windows Server 2019 Standard

Cluster nodes (x2)

Region	US East
Availability Domain	AD-1
Fault Domain	FD2, FD3
Virtual Cloud Network	10.0.0/16
Subnet	10.0.1.0/24 (public), 10.0.2.0/24 (private)
Instances	Compute shape: VM.Standard.E4.Flex OS: Windows Server 2019 Standard Additional disks: For Volume D: 50GB (For SQL Server cluster data, replicated by DataKeeper) Network: Global public IP address for remote connection 10.0.1.0/24 (public) 10.0.2.0/24 (private)
OS	Windows Server 2019 Standard

#### Verification Environment System Diagram

- Two cluster nodes and a domain node are in different fault domains.
- DataKeeper is used to replicate data between nodes.



# **1.2.1. OCI Instance Configuration**

#### Domain node

Server name	NODE-AD
Public IP address 1	10.0.1.14/24
CPU	2vCPU 4 processors
Memory	8GB
Disk	System driver 200GB

#### Create compute instance

Name		
nev-dkce-node01-trang		
Create in compartment		
siostechnology (root)		0
Placement		Collapse
The availability domain helps determine which shapes are available.		
Availability domain		
AD 1	AD 2	AD 3
NqZi:US-ASHBURN-AD-1	NqZI:US-ASHBURN-AD-2	NqZi:US-ASHBURN-AD-3
Se Hide advanced options		
Capacity type On-demand capacity Flace the instance on a shared host using on-demand capacity.		
Preemptible capacity Place the instance on a shared host using preemptible capacity. This instance can be reclaimed	at any time.	
Capacity reservation Place the instance on a shared host, and have it count against a <u>capacity reservation</u> .		
O Dedicated host Place the instance on a <u>dedicated virtual machine host</u> .		
Fault domain		
FAULT-DOMAIN-2		\$
When should I specify a fault domain?		

Image and shape	Collapse
A shape is a template that determines the number of CPUs, amount of memory, and other resources allocated to an instance. The image is the operating system that in shape.	uns on top of the
Image	
Windows Server 2019 Standard	Change image
IIIiage Duliu. 2022.03.08-0	
Shape	
MDJ VM.Standard.E4.Flex	Change shape
Virtual machine, 2 core OCPU, 8 GB memory, 2 Gbps network bandwidth	Change shape
Show advanced options	
Networking	Collapse
Networking is how your instance connects to the internet and other resources in the Console. To make sure you can connect to your instance, assign a public IP address to the instance.	
Primary network Select existing virtual cloud network Create new virtual cloud network Enter subnet OCID	
Virtual cloud network in sigstechnology (root) (Change Compartment)	
NEV_VCN	٥
Subnet	
Public Subnet-NEV_VCN (regional)	\$
	•
Public IP address	
Assign a public IPV4 address Do not assign a public IPV4 address	
I Assigning a public IP address makes this instance accessible from the internet. If you're not sure whether you need a public IP address, you can always assign one later.	
Sa Hide advanced options	
Use network security groups to control traffic (1)	
Private IP address Optional	
10.0.1.14	
DNS record Assign a private DNS record D not assign a private DNS record	
roongn a prima prim	
NODE-AD	
No spaces. Only letters, numbers, and hyphens. 83 characters max.	
Fully qualified domain name: NODE-AD.sub04080341510.nevvcn.oraclevcn.com	
Launch options	
S Let Oracle Cloud Infrastructure choose the best networking type Allow Oracle Cloud Infrastructure to choose the <u>networking type</u> , depending on the instance shape and operating system image.	
O Paravirtualized networking	
For general purpose workloads such as enterprise applications, microservices, and small databases.	
For low-latency workloads such as wide streaming, real-time applications, and large or clustered databases.	

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#### Boot volume

A boot volume is a detachable device that contains the image used to boot the compute instance.

$\checkmark$	Specify a custom boot volume size Volume performance varies with volume size. Default boot volume size: 47.0 GB. When you specify a custom boot volume size, service limits apply.
Во	of volume size (GB)
2	00
Inte	ger between 50 GB and 32,788 GB (32 TB). Must be larger than the default boot volume size for the selected image.
$\checkmark$	Use in-transit encryption Encrypts data in transit between the instance, the boot volume, and the block volumes.
	Encrypt this volume with a key that you manage By default, Oracle manages the keys that encrypt this volume, but you can choose a key from a vault that you have access to if you want greater control over the key's lifecycle and how it's used. How do I manage my own encryption keys?

#### Cluster Node 1

Server name	DKCE-NODE01
Public IP address	Static IP address issued by OCI for connections over the internet.
IP address (public)	10.0.1.15/24
IP address (private)	10.0.2.15/24
CPU	2vCPU 4 processors
Memory	8GB
Disks	System disk 50GB Disk 1 (Volume D) 50GB (used to hold SQL data and replicated by DataKeeper*)

\*The server name is registered as the hostname in the OS. Please do not use "\_" in the hostname.

Create compute instance		
Create an instance to deploy and run applications, or save as a reusable Terraform Name	stack for creating an instance with Resource Manager.	
nev-dkce-node01-trang		
Create in compartment		
siostechnology (root)		\$
Placement The <u>availability domain</u> helps determine which shapes are available.		Collapse
Availability domain		
AD 1	AD 2	AD 3
NqZi:US-ASHBURN-AD-1	NqZi:US-ASHBURN-AD-2	NqZi:US-ASHBURN-AD-3
en Hide advanced options		
Capacity type On-demand capacity Place the instance on a shared host using on-demand capacity.		
Preemptible capacity Place the instance on a shared host using preemptible capacity. This instance can be reclaimed a	t any time.	
Capacity reservation Place the instance on a shared host, and have it count against a <u>capacity reservation</u> .		
<ul> <li>Dedicated host</li> <li>Place the instance on a <u>dedicated virtual machine host</u>.</li> </ul>		
Fault domain		
FAULT-DOMAIN-2		\$
vinen snould i specify a fault domain 2		

Image and shape Collapse		
A shape is a template that determines the number of CPUs, amount of memory, and other resources allocated to an instance. The image is the operating system that runs on top of the shape.		
Imago		
inage		
Windows Server 2019 Standard Image build: 2022.03.08-0	Change image	
Shape		
VM.Standard.E4.Flex         Virtual machine, 2 core OCPU, 8 GB memory, 2 Gbps network bandwidth	Change shape	
Se Show advanced options		
Networking Networking is how your instance connects to the internet and other resources in the Console. To make sure you can <u>connect to your instance</u> , assign a public IP address to the instance.	<u>Collapse</u>	
Primary network Select existing virtual cloud network Create new virtual cloud network Enter subnet OCID		
Virtual cloud network in siostechnology (root) (Change Compartment)		
NEV_VCN	\$	
Subnet Create new public subnet		
Subnet in siostechnology (root) ① (Change Compartment)		
Public Subnet-NEV_VCN (regional)	\$	
Public IP address           Assign a public IPv4 address         O Do not assign a public IPv4 address		
Assigning a public IP address makes this instance accessible from the internet. If you're not sure whether you need a public IP address, you can always assign one later.		
Use network security groups to control traffic (		
Private IP address Optional		
10.0.1.15		
DNS record O Do not assign a private DNS record		
Hostname Optional		
DKCE-NODE01		
INO spaces. Unity letters, numbers, and myprens, os characters max.		
runy quarmeu domain name, DRGE-NODEVT.sub04000341510.nevodi.oradievcit.com		
Let Oracle Cloud Infrastructure choose the best networking type     Allow Oracle Cloud Infrastructure to choose the networking type     down on the instance shape and operating system image.		
Paravirtualized networking     Exceeded sub-assetteration profestively and evaluate the second sub-assetteration pro		
<ul> <li>In general purpose monocula source administration, minu oser moles, and similar usiauoses.</li> <li>Hardware-assisted (SR-IOV) networking</li> </ul>		

For low-latency workloads such as video streaming, real-time applications, and large or clustered databases.

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#### Boot volume

A boot volume is a detachable device that contains the image used to boot the compute instance.

Specify a custom boot volume size Volume performance varies with volume size. Default boot volume size: 47.0 GB. When you specify a custom boot volume size, service limits apply.
Boot volume size (GB)
50
Integer between 50 GB and 32,768 GB (32 TB). Must be larger than the default boot volume size for the selected image.
Use in-transit encryption Encrypts data in transit between the instance, the boot volume, and the block volumes.
Encrypt this volume with a key that you manage

By default, Oracle manages the keys that encrypt this volume, but you can choose a key from a vault that you have access to if you want greater control over the key's lifecycle and how it's used. How do I manage my own encryption keys?

#### Cluster Node 2

Server name	DKCE-NODE02
Public IP address	Static IP address issued by OCI for connections over the internet.
Private IP address (public)	10.0.1.16/24
Memory	8GB
Disks	System disk 50GB Disk 1 (Volume D) 50GB (used to hold SQL data and replicated by DataKeeper*)
CPU	2vCPU 4 processors

\*The server name is registered as the hostname in the OS. Please do not use "\_" in the hostname.

# **1.2.2. Software Configuration**

In this document, we tested the cluster nodes with the following software configuration.

OS	Windows Server 2019 Standard
DataKeeper	DataKeeper for Windows 8.9.0
SQL Server	SQL Server 2016

# **1.2.3. OCI Network Configuration**

The following configuration was used for OCI verification. The IP addresses have been granted with public and private subnets assigned to the cluster nodes. With the domain node, the IP address is only associated with a public subnet.

Cluster Nod	es
Virtual Cloud Network	10.0.0/16
Public Subnet	10.0.1.0/24
Private Subnet	10.0.2.0/24
Domain Noo	de
Virtual Cloud Network	10.0.0/16
Public Subnet	10.0.1.0/24

The OCI network subnet has a security policy.

# **1.3. Configuration on OCI**

### **Creating a VCN Network**

Create the VCN using the following two subnets.

VCN Name	NEV-VCN
Configure VCN and Subnets	
VCN CIDR Block	10.0.0/16
Public Subnet CIDR Block	10.0.1.0/24
Private Subnet CIDR Block	10.0.2.0/24
DNS Resolution	Selected

- 1. Log in to the Oracle Cloud Infrastructure.
- 2. From the navigation menu, select **Networking > Virtual Cloud Networks**.



 Click on Start VCN Wizard. Select the Create VCN with Internet Connectivity and Start VCN Wizard.

Create VCN with Internet Connectivity	
<ul> <li>Add Internet Connectivity and Site-to- Site VPN to a VCN</li> </ul>	Valid Survey States
	Creates a VCN with a public subnet that can be reached from the internet. Also creates a private subnet that can connect to the internet through a NAT gateway, and also privately connect to the Oracle Services Network.
	Includes: VCN, public subnet, private subnet, internet gateway (IG), NAT gateway (NAT), service gateway (SG)

4. Enter the VCN name in the VCN Name field. In the Configure VCN and Subnets, enter the IP address range for VCN CIDR Block/Public Subnet CIDR Block/Private Subnet CIDR Block.

<ul> <li>Configuration</li> <li>Basine and Costs</li> </ul>	Configuration	
	Resurce availability the keel successfully	Cose VCN with internet Consectivity
	Basic Information	
	Comparison (Co	
	meteoricoup (not)	includer:
	Configure VCN and Subnets	<ul> <li>Public subrat</li> <li>Private subrat</li> <li>Internet patients (CD)</li> </ul>
	VCH CHF Block ()	<ul> <li>N41 private (N41)</li> <li>Surplus adverse (SS)</li> </ul>
	(ii) 9.3.9.16 For the manufactual gala writer (Cu) to (Cu) and writery particular (VPs. ) part way.	<ul> <li>An oral Securit (1.4)</li> </ul>
	Puter Indext OIR Block (D)	
	10.93.024	
	The adapted of state much as model.	
	Private Statest CDR Resci (j)	
	18.9.1.924	
	The submit CDF blacks must be transfer	
	CPEN PERSONANY     CONTRACTOR IN THE VEX     The proof to restrict a statement in the VEX     The proof to restrict a function is magnetically properties for an intel proof (VEX) for a strate second to charged effect the VEX to model <u>Language</u>	
	DE tenne basine durbes	

- 5. Click Next.
- 6. Review and click on **Create**.
- 7. The new VCN has been created successfully.

#### Create a VCN with Internet Connectivity

<ul> <li>Configuration</li> <li>Review and Create</li> </ul>	Created Virtual Cloud Network	
	Creating Resources	
	Witwal Cost Network presiden complete	
	Critical Claud Network (1 reached)	Done 👩
	<ul> <li>Create Subnets (2 resolved)</li> </ul>	Done 🕥
	<ul> <li>Create Informet Gatenay (Treaslend)</li> </ul>	Dona 👩
	<ul> <li>Create INTE Sateway (1 resolució)</li> </ul>	Done 🥑
	<ul> <li>Groats Service Setenay (Transition)</li> </ul>	Done 😋
	<ul> <li>Create Houts Liable to PH-and Subset (Treas/rod)</li> </ul>	Uono 🥝
	<ul> <li>Cristel Security List for Private Submer 11 (cserved)</li> </ul>	Done 🥥
	<ul> <li>Update Maxim Tables (2 read/vod)</li> </ul>	Done 🥥
	» Updato Private Salanet (1 received)	Llona 🌖

View Virtual Cloud Network

# **1.3.1. Creating Security Rules**

1. In the Virtual Cloud Network Details, scroll down to Resources and click on Security Lists.

Networking a Writaal Cloud Networks a Writ	ual Cloud Network Details a Secarity Lists								
	NEV_VCN								
	Nove Researce Add Taps Territols	Moon Ronauxa Add Taya Turributa							
VCN	VCN information Tags								
RARADLE	Comparison Schedulupy (2008) Created F-6, Apr R, 2012, 13: A 45: 20 UTC IP-94 CON Block: 10: 8: 61: 15 IP-95 Profile: No 100 pr	OOD:666244 Stream Conty DMS Reactives (MCL)2020 Default React Failer Default React Table 1 DMS Reactive React Instruction Control Control	n NEX 3000						
Resources	Security Lists in siostechnology (root) Compartm	nent							
Subrets (2)	Cinate Security Ltd								
CIDR Backs/Forlans (1)	Narre	State	Created						
Route Tables (2)	SecallyList In: Physic Subset-NEV_VCN	Avalable	Fri, Apr 8, 2022, 83:64:54 UTC						
Internet Galeways (1)	Defealt Security List for NEV_VON	Analable	Fil. Apr 8, 2022, 03 44 42 UTC						
Altechments (I)			Shaving 2	tens <1x11>					
Network Security Groups (7)									

2. Select the **Default Security Lists for NEV\_VCN > Add Ingress Rules**.

Add rules as shown in the image below:

Default Security List for NEV_VCN									
Instance traffic is centralized by firwall rules on each instance in addition to this Security List									
Move Resource Add Tags Torritotic									
Security List Information Tags									
OCID:37iccq. Sh Created: Pri, Apr.8,	aw Casyy 2022, 83-44 82 UTC			Compartment	skistechnology (mot)				
Ingress Rule	25								
Add Ingress Hales	Ldt Hemove								
Statuloss +	Source	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows	Description		
D Na	00.000	тер	Al	22		1CP traffic for ports: 22 SSH Remote Login Protoc cl	1		
i No	0.0.0.00	ICMP			3, 4	ICMP traffic for: 3.4 Destination Unreachable. Fra- gmentation Needed and Don't Pragment was Set	1		
No No	10.0.0.0/16	ICMP			3	ICMP traffic for: 3 Destination Unreachable	1		
No No	0.0.0.0	TCP	Al	3389		TCP traffic for ports: 3389	1		
No	0.0.0.0	SMP				SMP traffic	1		
No No	10.0.1.0/24	TCP	Al	Al		TCP traffic for ports: All	6		
□ No	10.0.1.0/24	UCP	All	All		UDP traffic for ports: All	Ĕ		
d Selected							Showing 7 Itams 🛛 < 1 of 1 >		

 Back to Security List and select the Security List for Private Subnet-NEV\_VCN > Add Ingress Rules.

Add rules as shown in the image below:

Sec	Security List for Private Subnet-NEV_VCN									
Instance traffic is controlled by frewal rules on each Instance in addition to this Security List										
Mova	More Resource Add Tage Carobada									
Sec	Security List Information Tags									
OCI Cite	Dtxkq5imqS anodt: Pril, Apr 8, 3	1087 C80X 2022, 03:44 54 UTC			Compartment:	sisstechnology (not)				
Ingr	ess Rule	es								
Add	lingress Rules	Edit Remove								
	Stateless +	Source	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows	Description		
	No	10.0.016	TCP	All	22		TCP traffic for ports: 22 SSH Remote Login Protoc of	1		
	No	0.0.0.00	ICMP			3,4	ICMP traffic for: 3, 4 Destination Unreachable. Fra growtation Needed and Don't Fragment was Set	1		
	No	10.0.0.016	ICMP			3	ICMP traffic for: 3 Destination Unreachable	1		
	No	10.0.2.024	TCP	Al	All		TCP traffic for ports: All	1		
	No	10.0.2.0/24	UDP	Al	AI		UDP traffic for ports: All	1		
156	eded							Showing 5 items 🧹 1 a 🔂		

# **1.4. Configuration for an OCI Instance**

### **GUI Startup and VNC Connection**

After creating the instance, run RDP with the public IP using the username and initial password. It will prompt you to change the password.

Instance access
You <u>connect to a running Windows Instance</u> using Remote Desktop. The network that the instance is in must allow Remote Desktop Protocol (RDP) access. Use the instance's initial password to sign in for the first time, and then use the password that you set.
Public IP address: 129.80.80.131 Copy
Username: opc
Initial password: •••••••• Show Copy
Remote Desktop Connection       -       ×         Remote Desktop Connection       -       ×
General Display Local Resources Experience Advanced         Logon settings         Enter the name of the remote computer.         Computer:       129.80.80.131         User name:       opc         You will be asked for credentials when you connect. To use saved credentials, clear the following check box.         Image: Advanced in the remote computer.

Attached VNICs

Connection settings

Hide Options

saved connection Save

Click on **Create VNIC** button, input the second VNIC information.

Save the current connection settings to an RDP file or open a

Save A

Open

Connect Help

Scroll down to the resource, attached to the second VNICs and block volumes.

Belect a virtual cloud network in sigstechnology (root) (Change Compartment)			
NEV_VCN			0
letwork			
Normal setup: subnet		Advanced setup: VLAN	
The typical choice when adding a VNIC to an instance.	~	Only for experienced users who have purchased the Oracle Cloud VMware Solution.	
elect a subnet in sigstechnology (root) (Change Compartment)			
Private Subnet-NEV_VCN (regional)			0
Use network security groups to control traffic (optional) ()			
Use network security groups to control traffic (optional)			
Use network security groups to control traffic (optional) () Skip source/destination check ()			
Use network security groups to control traffic (optional) () Skip source/destination check ()			
Use network security groups to control traffic (optional) () Skip source/destination check ()			
Use network security groups to control traffic (optional) () Skip source/destination check ()			
Use network security groups to control traffic (optional) () Skip source/destination check () Primary IP information			
Use network security groups to control traffic (optional) () Skip source/destination check () Primary IP information			
Use network security groups to control traffic (optional) () Skip source/destination check () Primary IP information Invate IP address Optional 10.0.1.15			
Use network security groups to control traffic (optional) () Skip source/destination check () Primary IP information rivate IP address Optional 10.0.115 Lat be within 10.0.2.0 to 10.0.2.255. Must not already be in use. Access on patient ID address on patient ID address on patient Access on patient ID address on patient Access on patient ID address on patient			
Use network security groups to control traffic (optional) ① Skip source/destination check ① Primary IP information Invate IP address Optiona/ 10.0.1.15 Lat be within 10.0.2.0 to 10.0.2.295. Must not already be in use. Assign public IP address (cannot create public IP addresses in a private subnet)			
Use network security groups to control traffic (optional) () Skip source/destination check () Primary IP information Private IP address Optional 10.0.1.15 Table within 10.0.2 to 10.0.2.295. Must not already be in use. Assign public IP address (cannot create public IP addresses in a private subnet) INS record			
Use network security groups to control traffic (optional) ① Skip source/destination check ① Primary IP information Private IP address Optional 10.0.1.15 Aution 10.0.2.0 to 10.0.2.295. Must not already be in use. Assign public IP address (cannot create public IP addresses in a private subnet) NS record Assign a private DNS record ① Do not assign a private DNS record			
Use network security groups to control traffic (optional) Skip source/destination check  Primary IP information Private IP address Optional 10.0.1.15 Native within 10.0.2.0 to 10.0.2.299. Must not already be in use. Assign public IP address (cannot cireate public IP addresses in a private subnet) NS record Assign a private DNS record Do not assign a private DNS record Hostname Optional			_
Use network security groups to control traffic (optional) ① Skip source/destination check ① Primary IP information Private IP address Optiona/ 10.0.1.15 Int be within 10.0.2.0 to 10.0.2.295. Must not already be in use. Assign public IP address (cannot create public IP addresses in a private subnet) NS record Assign a private DNS record Do not assign a private DNS record Restname Optiona/ DKCE-NODE01			
Use network security groups to control traffic (optional) ① Skip source/destination check ① Primary IP information Private IP address Optiona/ 10.0.1.15 Nat be webn 10.0.2.09 to 10.0.2.299. Must not already be in see. Assign public IP address (cannot create public IP addresses in a private subnet) NS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record Assign a private DNS record Do not assign a private DNS record DNS reco			
Use network security groups to control traffic (optional) ① Skip source/destination check ① Primary IP information Private IP address Optione/ 10.0.1.15 Assign public IP address (cannot create public IP addresses in a private subnet) Assign public IP address (cannot create public IP addresses in a private subnet) NS record Assign a private DNS record Do not assign a private DNS record Acatname Optiona/ DKCE-NODED1 bit publics, numbers, and hyphens, 88 obstacters max			

Attached VNICs								
A situal network interface card (AbiC) lets an instance connect to a virtual cloud network (VCN) and determines how the instance connects with endpoints inside and outside the VCN.								
Create VNC								
	A 4 - 1 - 10 40 O		CODIN CO.					
Name	SUBHE OF VLAN ()	State	FULN	VLAN tag	MAC address			
nex-dice-nodel1.trang (Primary VWC)	Subnet - Public Subnet NEV_VCN	Attached	dice-node3 Show Copy	549	02:00:17:14:13:AE			
nev-dice-nodel1-trangenic2	Subret - Private Subret-NEX_VEN	Atlached	dice-nade0 Show Copy	3785	02:00:17:02:FE:29			
					Showing 2 items $\langle$ 1 of 1 $\rangle$			

Attached block volumes

Click on Attached block volumes and Attach block volume on your instance:

Attached block volume for DataKeeper Replication using Access Read/Write

Attached block	volumes	e to support a broad range of	UD Intensive workloads.						
Attach block volume									
Name	State	Volume type	Device path	Туре	Access	Size	WPU	Multipath	Created
NEV-Volume 1	<ul> <li>Attached</li> </ul>	Block volume		paravirtualized	Readwrite	50 (98)	10	No	Frt, Apr 22, 2822, 09:56:11 UTC I
									Showing 1 litern < 1 of 1 >

### Preparation for Installing DataKeeper Cluster Edition for Windows

• Change the firewall settings.

#### Turn off Private/Public Firewall

Control Panel	> System and Security > Windows Defender Firewall > Customize Settings	~ (
	Customize settings for each type of network	
	You can modify the firewall settings for each type of network that you use.	
	Private network settings	
	Turn on Windows Defender Firewall	
	Block all incoming connections, including those in the list of allowed apps	
	Notify me when Windows Defender Firewall blocks a new app	
	Turn off Windows Defender Firewall (not recommended)	
	Public network settings	
	O Turn on Windows Defender Firewall	
	Block all incoming connections, including those in the list of allowed apps	
	Notify me when Windows Defender Firewall blocks a new app	
	Turn off Windows Defender Firewall (not recommended)	
	<b>V</b> -	
	OK Ca	ncel
	ON Ca	inc.e.t

• Windows Domain Setting

In this document, the cluster nodes are members of a Windows domain, add the cluster nodes (DKCE-NODE01 and DKCE-NODE02) to the domain (SIOS-LKW.local) and log in as the domain administrator (SIOS-LKW\Administrator).

## 1.5. Building a DataKeeper Cluster Edition Volume Cluster

### **Creating a DataKeeper Cluster Edition for Windows on OCI Instances**

Connect the same size volume to each node. DataKeeper will use this volume. Refer to <u>https://docs.cloud.oracle.com/en-us/iaas/Content/Block/Tasks/attachingavolume.htm</u> for information on attaching a volume to an instance.

### **Creating the Failover Cluster**

Before you create the failover cluster, we strongly recommend that you validate the configuration to make sure that the hardware and hardware settings are compatible with failover clustering. Microsoft supports a cluster solution only if the complete configuration passes all validation tests and if all hardware is certified for the version of Windows Server that the cluster nodes are running.

- 1. Open Failover Cluster Manager from Windows.
- 2. In the right panel, select Validate Configuration...
- 3. In the Validate a Configuration Wizard, use the following:

Before You Begin	Default
Select Servers or a Cluster	DKCE-NODE01.sios-lkw.local DKCE-NODE02.sios-lkw.local
Testing Options	Default (Run all tests)
Confirmation	Default
Validating	Check all successes
Summary	Check to "Create the cluster now using the validated nodes" and Finish

4. In the Create Cluster Wizard, use the following:

Before You Begin	Default
Access Point for Administering the Cluster	Cluster Name: sqlCluster Address: 10.0.1.100
Confirmation	Default
Creating New Cluster	Wait to install
Summary	Finish

5. The following screen appears when a failover cluster is created.

Failover Cluster Manager					- 0	×
File Action View Help						
(+ - + ) 2 📰 🖬 🖬						
📲 Failover Cluster Manager	Nodes (2)				Actions	
<ul> <li>sqlCluster.sios-lkw.local</li> <li>Roles</li> </ul>	Search		۹,	Queries 🔻 🔛 🔻 👻	Nodes	•
Nodes	Name	Status	Assigned Vote	Current Vote	🚰 Add Node	
🗸 📇 Storage	B DKCE-NODE01	🕞 Up	1	1	View	•
E Disks	B DKCE-NODE02	🕑 Up	1	1	G Refresh	
Enclosures					🛛 Help	
Networks	<			3	> DKCE-NODE01	•
		DE01			Pause	•
		OC01			📑 Resume	•
	Status:	Up			💀 Remote Desktop	
	Node ID:	2			S Information Details	
	Memory:	5 14 GR Available 7 9	GB Total		Show Critical Events	
	Processors:	(2) AMD EPYC 7J13 64	-Core Processor			
	CPU Usage:	22%			More Actions	,
	Operating System:	Microsoft Windows Ser	ver 2019 Standard		🛛 Help	
	Version:	10.0.17763				
	Service Pack:	No Service Pack Instal	led			
	System Type:	x64-based PC				
	Manufacturer:	QEMU				
	Model: Summary Network C	Standard PC (440FX +	PIIX, 1996) isks Pools Physical Dis	ks		
	]]				- 1	

6. Add the File Share Witness. First, create a folder on another server in a 3rd availability zone. Once you have the folder created, share it and give the Cluster Name Object (CNO). Change permissions at the Share level and Modify permissions at the Security level.

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Permissions for Sapcluster		>
Share Permissions		
Group or user names:		
Section Everyone Section Administrators (DATAKEEPE	R\Administrators)	
sapcluster (DATAKEEPER\s	apcluster\$)	
	A <u>d</u> d	<u>R</u> emove
Permissions for sapcluster	Allow	Deny
Permissions for sapcluster Full Control	Allow	Deny
Permissions for sapcluster Full Control Change Read		Deny
Permissions for sapcluster Full Control Change Read	Allow	Deny
Permissions for sapcluster Full Control Change Read	Allow	Deny
Permissions for sapcluster Full Control Change Read	Allow	Deny
Permissions for sapcluster Full Control Change Read	Allow	Deny
Permissions for sapcluster Full Control Change Read	Allow	

Permissions for Sapcluster		×
Security		
Object name: C:\Sapcluster		
Group or user names:		
SYSTEM		
Administrator		
Administrators (DATAKEEPER	R\Administrators)	
sapcluster (DATAKEEPER\sa	apcluster\$)	
	A <u>d</u> d	<u>R</u> emove
Permissions for sapcluster	A <u>d</u> d Allow	<u>R</u> emove Deny
Pemissions for sapcluster	A <u>d</u> d Allow	Remove Deny
Permissions for sapcluster Full control Modify	Add Allow	Remove
Permissions for sapcluster Full control Modify Read & execute	Add Allow	Deny
Pemissions for sapcluster Full control Modify Read & execute List folder contents	Add Allow	Remove
Permissions for sapcluster Full control Modify Read & execute List folder contents Read	Add Allow	Remove Deny
Permissions for sapcluster Full control Modify Read & execute List folder contents Read	Add Allow	Remove Deny □ ^ □ ↓ □ ↓
Permissions for sapcluster Full control Modify Read & execute List folder contents Read	Add Allow	Remove
Permissions for sapcluster Full control Modify Read & execute List folder contents Read	Add Allow	Remove Deny

Once the permissions are assigned, run the following PowerShell command to update the cluster quorum to add this file share witness.

Set-ClusterQuorum -FileShareWitness cluster name

### Installing DataKeeper Cluster Edition

Install DataKeeper Cluster Edition on each of the two OCI instances. For this example, we used DataKeeper Cluster Edition v8.9.0-1543246.

Run DK-8.9.0-Setup.exe file as administrator.

DataKeeper Cluster Edition				
Select feature	Default			
Choose Destination Location	C:\Program Files (x86)\SIOS\DataKeeper			
System Configuration change prompt	Yes			
Service Setup	Domain or Server account (recommended)			
DataKeeper Service Logon Account Setup	Password: xxxxxxxxxxx			

	Password Confirm: xxxxxxxxxx
SIOS DataKeeper for Windows	Finish
SIOS License Key Manager	Install License File
Restart OS	

### **Creating a Volume Mirror**

- Create a DataKeeper (Replication) resource. DataKeeper specifies a network route between the nodes to be replicated. In order to allow ping over this network route, add a rule to enable ICMP (type 0, 8) communication to the security list of the network you want to use from the OCI management screen.
- Create a new mirror using volume D. Refer to Creating a Mirror.

🙋 DataKeeper - [SIOS Data	Keeper\Jobs\job1.VoID]	– 🗆 X
File Action View Help	p	
🗢 🄿 🖄 📰 💽		
SIOS DataKeeper		Actions
V Jobs	Summary of job1.VolD -	job1.VoID
<ul> <li>Reports</li> </ul>		Create Job
> Job Overview	Job name: job1.VolD	Connect to Server
Server Overview	Job description: Job state: 🕢 Mirroring	Disconnect from Server(s)
	<b>V</b> internet	Pause and Unlock All Mirr
	Source Server Target Server Target Volume Source IP Target IP State Resync Remaining	Continue and Lock All Mirr
	Source volume: D	Break All Mirrors
	DKCE-NODE01.SIOS-LKW.LOCAL DKCE-NODE02.SIOS-LKW.LOCAL D 10.0.1.15 10.0.1.16 Mirroring 0.00 KB	Resync All Mirrors
		Switchover Mirrors
		+ Create a Mirror
		🛒 Rename Job
		X Delete Job
		View •
		Pelp
		Target: DKCE-NODE02.SIOS-LK 🔺
		Pause and Unlock Mirror
		🖻 Break Mirror
		Continue and Lock Mirror
		Resync Mirror
	Mirror Source Server Target Server	📌 Switchover Mirror
	Mirror type: Asynchronous	📔 Reassign Job
	Disk space: 49.98 GB Compression: None	🗙 Delete Mirror
	Maximum bandwidth: 0 kbps	Mirror Properties
	Edit	📥 Manage Shared Volumes
		👔 Help
	) 	1

# 1.6. Creating a SQL Server Cluster on a Failover Cluster

### Installing MSSQL Server 2016 on the Source Node

1. Download the SQL Server 2016 (Windows x86-64) installation image from the following site, save it anywhere, and right-click to Mount.

https://www.microsoft.com/en-us/evalcenter/evaluate-sql-server-2016

- 2. After mounting the iso file, double-click on the setup.exe file to open.
- 3. The SQL Server Installation Center screen appears. Select New SQL Server failover cluster installation.
- 4. Complete the following steps:
- When the Feature Selection screen appears, select **Database Engine Service**, **SQL Server Replication**, **Full-Text and Semantic Extractions**, and **Data Quality Services**.
- When the Instance Configuration screen appears, input MSSQLSERVER2016 to fields SQL Server Network Name, Name Instance, and Instance ID.
- When the **Cluster Network Configuration** screen appears, select the **IPv4** checkbox, and input an available **IP Address** in the Address field.
- When the Server Configuration screen appears, go to the SQL Server Agent Account Name field and click the drop-down, then Browse. Type in Administrator, then click the option to click names. Return to the Server Configuration page. Then, type in the password field and repeat these same steps for SQL Server Database Engine.
- When the **Database Engine Configuration** screen appears, click **Add Current User** at the bottom of the page.
- 5. Complete the **Install**.

髋 Install a SQL Server Failover Clu	ster		-		×
Complete					
Vour SOL Server 2016 failove	cluster installation is complete with product updates				
	constant in summary of the second s				
Product Key	Information about the Setup operation or possible	next stens			
License Terms	internation about the setup operation of possible	next steps.			_
Global Rules	Feature	Status			
Microsoft Update	Database Engine Services	Succeeded			
Product Undates	2 Data Quality Services	Succeeded			. 1
lestall Setue Files	Full-Text and Semantic Extractions for Search	Succeeded			
install Setup Files	SQL Server Replication	Succeeded			
Install Failover Cluster Rules	SOL Writer	Succeeded			
Feature Selection					
Feature Rules					
Instance Configuration	Details:				
Cluster Resource Group					
Cluster Disk Selection					
Cluster Network Configuration	Product Undator				
Server Configuration	Product Update has successfully applied KB	4052908 <http: support.microso<="" td=""><td>ft.com/</td><td>?id=</td><td></td></http:>	ft.com/	?id=	
Database Engine Configuration	4052908>. These updates have set the patch level of t	he Setup operation to 13.2.5026.0.			
Feature Configuration Rules					
Ready to Install	Summary log file has been saved to the following log	scation			
Installation Presses					
Constantion Progress	C:\Program Files\Microsoft SQL Server\130\Setup E \Summany SIOS188_20210521_012012_tvt	300tstrap\Log\20210531_012912			
complete	wanning source courses or struct				
				Close	e i

### Installing MSSQL Server 2016 on the Target Node

1. Download the SQL Server 2016 (Windows x86-64) installation image from the following site, save it anywhere, and right-click to Mount.

https://www.microsoft.com/en-us/evalcenter/evaluate-sql-server-2016

- 2. After mounting the iso file, double-click on the setup.exe file to open.
- 3. When the SQL Server Installation Center screen appears, select Add node to a SQL failover cluster.
- 4. Complete the following steps:
- For Service Accounts, input the Password fields as same as the source node.
- Follow the remaining setup to complete.

•

Complete					
Your SQL Server 2016 faile	over cluster add node operation is complete with product u	updates.			
Product Key	Information about the Setup operation or possible	next steps:			
License Terms	Feature	Status			
Global Rules	Database Engine Services	Succeeded			-1
Microsoft Update	DataDase Engine Services	Succeeded			
Product Updates	Euli-Text and Semantic Extractions for Search	Succeeded			- 1
nstall Setup Files	SQL Server Replication	Succeeded			
dd Node Rules	SQL Browser	Succeeded			
Juster Node Configuration	SOL Writer	Succeeded			_
Juster Network Configuration					
antice Accounts	Details				
ienture Accounts					
eature Rules					
leady to Add Node					
Add Node Progress	Product Update:				
Complete	Product Update has successfully applied KB 4	4052908 <a href="http://support.microso">http://support.microso</a>	ft.com/?	id=	
	4052908>. These updates have set the patch level of the	he Setup operation to 13.2.5026.0.			
	I Summary log file has been saved to the following lo	cation:			
	C:\Program Files\Microsoft SQL Server\130\Setup B	Bootstrap\Log\20210531_021012			
	\Summary SIOS189 20210531 021012.txt				
	\Summary SIOS189 20210531 021012.txt				

5. The SQL Server Failover cluster has been successfully installed on the Windows Server Failover Cluster.

📲 Failover Cluster Manager							- 🗆	$\times$
File Action View Help								
🗢 🔿 🙋 📰 🛛 🗊								
📲 Failover Cluster Manager	Roles (1)						Actions	
v 🎼 sqlCluster.sios-lkw.local	Search			Q,	Queries 🔻	. • •	Roles	· ^
Nodes	Name	Status	Туре	Owner Node	Priority	Informatic	🧑 Configure Role	
🗸 🙇 Storage	SQL Server (MSSQLSERVER2016)	Running	Other	DKCE-NODE01	Medium		Virtual Machines	•
Disks		_					Create Empty Role	
Enclosures							View	•
Metworks	<					>	Q Refresh	
Cluster Events							I Help	
	SQL Server (MSSQLSERVER2016)     Preferred Owners: Any node						SOL Server (MSSOL SERVE	
	Name		Status	Information			SQL Server (IVISSQLSERVE	-
	Storage		0.0.00				Stan Pala	
	DataKeeper Volume D		( Online				Add File Chase	
	Server Name		0				Add File Share	-
	Name: MSSQLSERVER2016		🕥 Online				Move	
			( Online				Change Startup Prior	· •
	Other Resources						Information Details	
	SQL Server (MSSQLSERVER2016	)	( Online				Show Critical Events	
	SQL Server Agent (MSSQLSERVE	R2016)	🕥 Online				Add Storage	
	Roles						Add Resource	<u> </u>
	SQL Server CEIP (MSSQLSERVER	2016)	🕥 Online				More Actions	•
	<					>	🔀 Remove	
	Summary Resources						Properties	
							1	

### **Check for Fault Tolerance**

Performing the switchover from Source Node to Target Node in Windows Server Failover Cluster console:

- 1. Log in to the Window OS on the Source Node (DKCE-NODE01) as SIOS-LKW\Administrator.
- Go to Failover Cluster Manager, select Roles and right-click on SQL Server, then select Move Best Possible Node.



3. Wait until the resource conversion is finished. The SQL Server is running on DKCE-NODE02.

Failover Cluster Manager

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*## F	allover Cit	ister ivia	inager
File	Action	View	Help

Hailover Cluster Manager	Roles (1)					Actions		
<ul> <li>sqlCluster.sios-lkw.local</li> <li>Roles</li> </ul>	Search			P Queries	•	Roles		
Nodes	Name	Status	Туре	Owner Node	Priority	🧑 Configure Role		
🗸 📙 Storage	Rever (MSSQLSERVER2016)	Running	Other	DKCE-NODE02	Medium	Virtual Machines 🕨		
Disks				2		📑 Create Empty Role		
Enclosures						View		
Networks						Refresh		
以 Cluster Events	<				>	Help		
	SQL Server (MSSQLSERVE	Preferred Owners: Any node						
	Name		Status	Information		Start Role		
	Storage							
	🗮 DataKeeper Volume D	🕥 Online			Add File Share			
	Server Name				Move •			
	Name: MSSQLSERVER2016	Online			🔞 Change Startup Priority 🕨			
	📑 IP Address: 10.0.1.101		🕥 Online			Information Details		
	Other Resources					Show Critical Events		
	SQL Server (MSSQLSERVER2016)		🕥 Online			🛃 Add Storage		
	I SQL Server Agent (MSSQLSERVER	R2016)	🕥 Online			Add Resource 🕨		
	Roles					More Actions		
	SQL Server CEIP (MSSQLSERVER	2016)	🕥 Online			🗙 Remove		
						Properties		
						P Help		
	<				>			
	Summary Resources							

### Connect to the database via SQL Server Management Studio

To connect to the database of SQL Server 2016, follow these steps:

1. Open Microsoft SQL Server Management Studio and connect to the SQL Server 2016 database.



2. Using the script, write constant date\time stamps to the database.

Administrator: Command Prompt - cscript "C:\Users\Administrator.SIOS-LKW\Deskto	p\LK	—		×
C:\Users\Administrator.SIOS-LKW\Desktop\LKW> C:\Users\Administrator.SIOS-LKW\Desktop\LKW> C:\Users\Administrator.SIOS-LKW\Desktop\LKW>hostname DKCE-NODE01				^
C:\Users\Administrator.SIOS-LKW\Desktop\LKW>cscript "C:\Users -LKW\Desktop\LKW\1VOL SQL Stress_Edited.vbs" Microsoft (R) Windows Script Host Version 5.812 Copyright (C) Microsoft Corporation. All rights reserved.	\Admi	nistrat	tor.SI X	:0S
	Write	s complete	ed	
		ОК		~

SQLQuery4.sql - MSSQLSERVER2016\MSSQLSERVER2016.QA_SQ	L_DB_VOL1 (SIOS-LKW\Administrator (54))* Quick Launch (Ctrl+Q)	₽ = □ ×
File Edit View Query Project Tools Window Help	1	
🕒 🗢 🗢 🖹 🕶 📩 - 🐂 💾 💾 💭 New Query 📑 🎧 🎧	R 📾 🖌 🗗 💧 🤊 • 🤇 • 🞯 🖌 😡 🔝	- 🖬 🚆
🕆 😽 🛛 QA_SQL_DB_VOL1 🔹 🕨 Execute 🗉 🗸 🖧	· · · · · · · · · · · · · · · · · · ·	
Object Explorer 🔹 🕂 🗙	SQLQuery4.sql - MSAdministrator (54))* 😕 🔀	Ŧ
Connect 🕶 🏺 🎽 🛒 🖒 🚸	/****** Script for SelectTopNRows command from SSMS	*****/
😑 🐻 MSSQLSERVER2016\MSSQLSERVER2016 (SQL Server 13.0.5 🔺	,[Time]	<u></u>
🖃 📕 Databases	FROM [QA_SQL_DB_VOL1].[dbo].[QA_SQL_STRESS_VOL1]	
🗉 📕 System Databases		
🕀 🛑 Database Snapshots		
QA_SQL_DB_VOL1		
Database Diagrams		
E lables		
EleTables		
External Tables		
dbo.OA SOL STRESS VOL1	the second se	_
	100 % •	
🕀 💼 External Resources		
🗉 📕 Synonyms		
🕀 🛑 Programmability	Date Time	^
🕀 📕 Service Broker	1 2022-04-28 05:11:22.9600000	
	2 2022-04-28 05:11:22.9600000	
E Security	3 2022-04-28 05:11:22.9600000	
E Security	4 2022-04-28 05:11:22.9630000 5 2022-04-28 05:11:22.9630000	
Benlication	5 2022-04-26 05.11.22.9650000 6 2022.04.28 05.11.22.9670000	
PolyBase	7 2022-04-28 05-11-22 9670000	
🕀 🧰 Always On High Availability	8 2022-04-28 05:11:22 9670000	
💮 💼 Management	9 2022-04-28 05:11:22.9700000	
🗉 🔲 Integration Services Catalogs 🗸 🗸		× .
< >>	RVER2016\MSSQLSERVER SIOS-LKW\Administrator QA_SQL_DB_VOL1	00:00:00 100 rows

3. Switchover the SQL resource to Target Node then connect to the Database on Target Node.

📲 Failover Cluster Manager	Roles (1)					Actions			
<ul> <li>sqlCluster.sios-lkw.local</li> <li>Roles</li> </ul>	Search P Queries V 🔒 V				Roles			•	
Nodes	Name 🔺		Status Type		Owner Node	20	Configure Role		
✓ Contrage	SQL Server (MSSQLS	ERVER2016)	🕜 Running	Other	DKCE-NODE02		Virtual Machines		۲
Pools					E.		Create Empty Role		
Enclosures	<				>		View		×
Networks						Q	Refresh		
题 Cluster Events	SQL Server (MSSQLSERVER2016)     Preferred Owners: Any node			?	Help				
	Status:	Running				SQ	L Server (MSSQLSERVER2016)		•
	Priority:	Medium				G	Start Role		
	Owner Node:	DKCE-NODE02				ä	Stop Role		
	Client Access Name: IP Addresses:	ess Name: MSSQLSERVER2016 ess: 10.0.1.101					Add File Share		



4. In the SQL Management Studio editor, run the command **select \* from <database table>** to confirm the timestamps have been reflected.