Direct Connect Oracle Exadata and Oracle Database Appliance with Oracle Private Cloud Appliance

Oracle Private Cloud Appliance X9-2
PURPOSE STATEMENT
This document provides an overview of Direct Connect functionality for Exadata/ODA included in Oracle Private Cloud Appliance X9-2, with Software Release 3.0.1. It is intended solely to help you assess the business benefits and get an understanding of the configuration procedure involving Exadata-X9/X8/X7/ODA and PCA-X9-2.

DISCLAIMER
This document in any form, software, or printed matter, contains proprietary information that is the exclusive property of Oracle. Your access to and use of this confidential material is subject to the terms and conditions of your Oracle software license and service agreement, which has been executed and with which you agree to comply. This document and information contained herein may not be disclosed, copied, reproduced, or distributed to anyone outside Oracle without prior written consent of Oracle. This document is not part of your license agreement, nor can it be incorporated into any contractual agreement with Oracle or its subsidiaries or affiliates.

This document is for informational purposes only and is intended solely to assist you in planning for the implementation and upgrade of the product features described. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described in this document remains at the sole discretion of Oracle.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose Statement</td>
<td>2</td>
</tr>
<tr>
<td>Disclaimer</td>
<td>2</td>
</tr>
<tr>
<td>Overview</td>
<td>4</td>
</tr>
<tr>
<td>Logical/Physical Network connectivity</td>
<td>6</td>
</tr>
<tr>
<td>Configuring the Oracle Private Compute Appliance</td>
<td>9</td>
</tr>
<tr>
<td>Create IAAS – from Customer Enclave UI</td>
<td>12</td>
</tr>
<tr>
<td>Configuring the Oracle Exadata Database Machine</td>
<td>18</td>
</tr>
<tr>
<td>Configuring the Oracle Database APPLIANCE (ODA)</td>
<td>19</td>
</tr>
<tr>
<td>Frequently Asked Questions</td>
<td>22</td>
</tr>
</tbody>
</table>
OVERVIEW

The Oracle Private Cloud Appliance provides a simple out-of-the-box converged infrastructure solution and is a key enabler for Oracle-As-A-Service platform. The Oracle Private Cloud Appliance (PCA X9) is the only OCI compatible Engineered System, providing the fastest and most efficient infrastructure for modern software and business applications.

The PCA X9 has the same Infrastructure constructs (APIs, SDK etc.) as the OCI. This enables customers to adopt a “Develop once and Deploy anywhere, on-premises or on OCI” approach to rapidly design and develop high performance applications and middleware.
Benefits:

- Intelligent and agile infrastructure
- Flexible support for any mix of Oracle and non-Oracle workloads
- Automation speeds install
- Built for rapid and cost-effective private cloud deployment
- Zero Downtime Rolling Upgrades
  - Continuous Integration/Continuous Development (CI/CD) methodology
- Software Define Networking – over 100Gb/s Ethernet backplane
- Migrate legacy Exalogic/BDA/Exalytics workloads to PCA
- No infrastructure license cost

The 100Gb Ethernet network inside Oracle Private Cloud Appliance, is implemented as spine and leaf topology. Each Compute Node has a connection to both leaf switches. Each leaf, is in turn, connected to both the spine switches. Each spine switch has connectivity to the Storage Nodes, as well as a group of ports for external connectivity.

Ports 1-4 on both the spine switches are reserved for the Layer3 based uplink to customer’s datacenter. Each of the four customer uplink ports, numbered 1 through 4, may be configured in several ways. Each port may be used as:

- A single 100Gb Ethernet port
- A single 40Gb Ethernet port
- Four 25Gb Ethernet sub ports
- Four 10Gb Ethernet sub ports

Ports 7-10 on both the spine switches are reserved for connecting to database-servers from Exadata/ODA for the Client Network. Each of the four ports is configured as 4x 25Gb Ethernet breakout ports to support a total of 16 database-servers which can come from any number of Exadata/ODA platforms.

The Oracle Exadata X8M product line introduces a new and improved networking infrastructure built on high-speed, low latency 100Gb Ethernet optimized for RDMA over Converged Ethernet (RoCE). Connectivity to Applications and Middleware tier is provided via physical Ethernet interfaces on the database-servers. Each Oracle Exadata Database Machine X8M-2 database server consists of the following network components and interfaces:

- 1 embedded 1 GbE (eth0 RJ-45)
- 2 embedded 10GBaseT ports (RJ-45) or 2 embedded 10GbE/25GbE ports (SFP+/SFP28)
- 1 dual-port QSFP28 100Gb/s RDMA Network Fabric Card
- 1 embedded Ethernet port for Integrated Lights Out Manager (ILOM) remote management
- 1 dual-port 25GbE PCIe 3.0 network card with Broadcom BCM57414 10Gb/25Gb Ethernet Controller

Note: The SFP28 modules for the 25GbE PCIe 3.0 network cards are purchased separately.

Similarly, Oracle Database Appliance X9-2L/ X8-2S/X8-2M provides support for the following NIC which can be used for connecting to the PCA-X9 Spine switches.

- **Oracle Dual Port 25Gb Ethernet Adapter**

This document focuses on network attachment and configuration steps needed to create secure, private, and high-bandwidth connectivity between the VMs/Containers, comprising the apps/middleware tier running on Oracle Private Cloud Appliance X9, and the database tier running on the Oracle Exadata/ODA.

Directly connecting the database-servers in the Exadata-X8M/X9M, ODA rack to the spine switches in the PCA-X9 rack is ideal for migrating Oracle Exalogic workloads to PCA. This configuration will eliminate the need to acquire and manage dedicated top of rack switches. This option will also provide superior ROI, tighter integration, lowest latency for database transactions and provisions the maximum available bandwidth.
Important Considerations:

- PCA-X9 Spine switch configuration for Direct Connect requires 25Gbps links from the database-servers.
- PCA-X9 Spine switch configuration for Direct Connect creates an exclusive Layer3 network for the attached database-servers.
- Spine switches inside PCA rack have vPC configuration to make the 2 spines appear as a single-virtual-switch.
- LACP must be enabled for the Client-Network interfaces to enable maximum bandwidth and failover.
- The connection between PCA-spine-switch and database-servers is setup as a private network.
  - DefaultGateway/DNS/NTP can be reachable via the Spine switches.
- The subnet-mask for Client/Other-network should be chosen to accommodate the ip addresses for the VMs in the Oracle Private Compute Appliance.
  - /22 mask provides 1024 addresses, /23 mask provides 512 addresses.

This paper addresses the following topics:

- Logical/Physical network connectivity.
- Network configuration on Oracle Private Compute Appliance X9-2.
- Network configuration on Oracle Exadata X8M database-servers.
- Network configuration on Oracle Database Appliance nodes.

LOGICAL/PHYSICAL NETWORK CONNECTIVITY

Figure 3: Logical Reference Architecture for connecting Exadata/ODA

The Client-Network is used by the applications to access the database. The database-servers provide 2-pairs of physical interfaces configured by OEDA as bondeth0 and bondeth1 (Exadata) or as btbond1 (ODA), which can be used to create a direct connection to the spine switches in the Oracle Private Cloud Appliance.
Figure 4: Logical Network diagram of Exadata X8M networks

Figure 5: Available physical interfaces on the database-servers inside Exadata X8M

Figure 6: Available physical interfaces on Oracle Database Appliance X8-2 HA nodes
Figure 7: Physical cable connections between the PCA spine switches and database-servers

**PCA Direct Connect**
Using OM3 fiber QSFP28 to 4xSFP28 breakout cable and SFP28 cables with a LC-LC Patch-Panel is highly recommended.

Figure 8: Physical cable connections between the PCA spine switches and database-servers

**PCA-X9 Exadata Network**
Sample cable connections for Eighth, Quarter and Half Exadata/ExaCC
CONFIGURING THE ORACLE PRIVATE COMPUTE APPLIANCE

The Client-Network connection will always be using 25Gb Ethernet cards in the database-servers. Hence, the PCA spine-switch ports 7-10 are pre-configured as 4x25G breakout mode by default, this configuration cannot be changed.

Connecting the Client-network directly to the PCA spine-switches has the benefits of isolating the Client-network from other workloads and providing a greater level of control. Dedicated 50Gbps of bandwidth capacity to each database-server for large workloads and the ability to use jumbo frames, enables higher application efficiency.

Figure 8 depicts the network cabling diagram for a half-rack Exadata-X8M with 4 database-servers. Smaller configurations, like Exadata eighth, and quarter rack or the ODA (Figure 9) will only require connecting port 7 from both switches.

The configuration on PCA is done in multiple steps.

1. Configuration of Exadata Network using PCA-Admin CLI

```
PCA-ADMIN> showallcustomcmds
...
exaDataCreateNetwork: ExadataNetwork
exaDataDeleteNetwork: ExadataNetwork
exaDataDisableAccess: Vcn
exaDataEnableAccess: Vcn
exaDataGetNetwork: ExadataNetwork
exaDataListNetwork: ExadataNetwork
```

   a. Create Exadata/ODA Network
      i. Identify physical ports on Spine switch where database-servers will connect
      ii. Identify ClientNetwork subnet and reserve 3 IP addresses (one for each Spine, and a VIP)
PCA-ADMIN> exaDataCreateNetwork ?
  *cidr  
  vlan  
  *spine1lp  
  *spine2lp  
  *spineVip  
  *ports  
  advertiseNetwork

**exaDataCreateNetwork**  

cidr="10.80.65.0/24"  
vlan=2001  
spine1Ip="10.80.65.101"  
spine2Ip="10.80.65.102"  
spineVip="10.80.65.1"  
ports="7/1,7/2"  
advertiseNetwork=true

Note: advertiseNetwork=true is needed if you want the database-servers to be accessible from customer’s datacenter network, in the case of Dynamic-routing-based config.

b. Verify successful creation and record the OCID

PCA-ADMIN> exaDataListNetwork << No Additional Argument >>

**exaDataListNetwork**

<table>
<thead>
<tr>
<th>id</th>
<th>vlan</th>
<th>cidr</th>
<th>spine1lp</th>
<th>spine2lp</th>
<th>spineVip</th>
<th>ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>ocid1.exadata.1913XD300H.broom2.ffc2apzh0dhhfjksbhxavllqc413jnlpqv4wedft7s417tqg6g0ht51nz7szu</td>
<td>2001</td>
<td>10.80.65.0/24</td>
<td>10.80.65.101</td>
<td>10.80.65.102</td>
<td>10.80.65.1</td>
<td>7/1,7/2</td>
</tr>
</tbody>
</table>

2. Create IaaS from the Customer Enclave (UI)
   a. Physical cable connections using QSFP28 to SFP28 breakout cables – *refer to Table-2 for the cable and transceiver part-numbers*
   b. Create IaaS – *see example in the next section*
      i. Create a DRG first (VMs can only access the Exadata via the DRG)
      ii. Create VCN(s), Subnets, Route Tables and IGW (if needed)
      iii. Create DRG-attachment to enable VCN to use DRG
      iv. Recommendations/Considerations:
         1. If the VM also needs to be accessed from DC, a 2nd VNIC will be needed
         2. Use IGW (Public subnet) for DC access using the Primary VNIC
         3. Use DRG (Private subnet) to access Exadata network
         4. Use separate Route Tables, one for IGW with “0.0.0.0/0” and one for DRG with a “specific” route rule for Exadata subnet
         5. Update Security List(s) as needed to enable ingress traffic
         6. Record the OCIDs of all subnets which would need to access Exadata network

3. Enable access for the required subnets to Exadata Network
   a. Enable communication between Exadata network created in step-1 and VM subnet(s) created in step-2
   b. Repeat the exaDataEnableAccess command for each subnet
PCA-ADMIN> exaDataEnableAccess?
  *exadataNetworkId
  *subnetId

exaDataenableAccess
exadataNetworkId=ocid1.exadata.1913XD300H.broom2.ffc2apzh0dhrfjkkshxavllqcc4l3nlpvq4wedft7s417tgg6g0ht51nz7suz
  subnetId=ocid1.subnet.1913XD300H.broom2.3yppx4r7hmipms0r9d9kxx4x5ry3rzvq4z6zib0hi0ww6mv2mmy0i8brydnn

c. Validate and record final settings

exaDataGetNetwork
exadataNetworkId=ocid1.exadata.1913XD300H.broom2.ffc2apzh0dhrfjkkshxavllqcc4l3nlpvq4wedft7s417tgg6g0ht51nz7suz
Data:
  CIDR = 10.80.65.0/24
  Vlan = 2001
  Spine1Ip = 10.80.65.101
  Spine2Ip = 10.80.65.102
  SpineVip = 10.80.65.1
  Ports = 7/1,7/2
  advertiseNetwork = true
  Access List 1 - Vcn Id =
  ocid1.vcn.1913XD300H.broom2.3qg8a4985mrfwmshtnx3whqxpjyxyz6s4nomqf9f6p1xs25l9uz
  Access List 1 - Subnet Ids 1 =
  ocid1.subnet.1913XD300H.broom2.3yppx4r7hmipms0r9d9kxx4x5ry3rzvq4z6zib0hi0ww6mv2mmy0i8brydnn
  Lifecycle State = AVAILABLE
CREATE IAAS – FROM CUSTOMER ENCLAVE UI

• Each VM has a VNIC with a Public IP address
• Each VM has a secondary VNIC in a Private subnet to access the database-servers

1. Create VCN:
   • CIDR 10.100.0.0/16
   • Name VCN-Exadata2

2. Create DRG:
   • Name DRG1
3. **Attach DRG to VCN**

VCN-Exadata2

- **Dynamic Routing Gateways**
  - **DAG1**: Attached, 07/25/2022, 04:41:01 PM

4. **Create IGW:**
   - Name Ext-IGW-LB

5. **Create Subnets:**
   - Exa-Priv-SN1 – 10.100.101.0/24, Exa-Priv-SN2 – 10.100.102.0/24, Exa-Priv-SN3 – 10.100.103.0/24
   - Exa-Pub-SN4 – 10.100.104.0/24
6. Create and update Route tables and Security Lists:
7. **Launch VMs with Primary VNIC in Public subnet**

**Launch Instance**

- **Shape**
  - Select shape: VM:PCAStandard1.2

- **Memory (GBs):** 32
- **OCPPUs:** 2
- **Disk count/total size (GBs):** 0/0

**Boot Volume**

- □ Specify a custom boot volume size

**Subnet**

- VCN: VCN-Exadata2
- Subnet: Ext-Pub-SN1

**Public IP Address**

- □ Assign Public IP

8. **Create Secondary VNIC in Private subnet for each of the VMs**

**Attached VNICS**

- **Name:** LB-Demo-Inst11
- **State:** Attached
- **VLAN Tag:** 0
- **MAC Address:** 00:13:97:db:55:21
- **Created:** 06/28/2022, 01:06:30 AM

**Create VNIC Attachment**

- **Subnet**
  - VCN: VCN-Exadata2
  - Subnet: Ext-Priv-SN1

- □ Skip Source/Destination Check
- □ Assign a Public IP Address

**Primary IP Information**

- **Private IP Address (Optional)**

  Must be within 10.0.0.0 to 10.255.255. Must not already be in use.

- **Hostname (Optional)**

  No spaces. Only letters, numbers, and hyphens. All characters max.

**Network Security Group**

- □ Enable Network Security Groups

**Create Attachment**
9. **Verify VNICs**
   - Each VM should have Primary VNIC in Ext-Pub-SN4 and Secondary VNIC in Exa-Priv-SNx
10. **Verify VNIC configuration inside each VM**

*Note: The Secondary VNIC is not enabled automatically, it will need to be configured manually or using the script provided by OCI*

Virtual Network Interface Cards (VNICs) (oracle.com)
https://docs.oracle.com/en-us/iaas/Content/Resources/Assets/secondary_vnic_all_configure.sh
https://docs.oracle.com/en-us/iaas/Content/Resources/Assets/secondary_vnic_windows_configure.ps1

```
[opc@lb-demo-inst1 ~]$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNOWN group default qlen 1000
   link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
   inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
   inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever

Public
2: ens3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9000 qdisc pfifo_fast state UP group default qlen 1000
   link/ether 00:13:97:0c:d1:fe brd ff:ff:ff:ff:ff:ff
   inet 10.100.104.2/24 brd 10.100.104.255 scope global dynamic ens3
       valid_lft 3399sec preferred_lft 3399sec
   inet6 fe80::213:97ff:fe0c:d1fe/64 scope link
       valid_lft forever preferred_lft forever

Private
3: ens6: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9000 qdisc pfifo_fast state UP group default qlen 1000
   link/ether 00:13:97:d1:a7:8c brd ff:ff:ff:ff:ff:ff
   inet 10.100.101.2/24 scope global ens6
   inet6 fe80::213:97ff:fed1:a78c/64 scope link
   valid_lft forever preferred_lft forever

```

Return to PCA-Admin shell and execute the final Step to enable subnets to access Exadata Network created in Step1.
CONFIGURING THE ORACLE EXADATA DATABASE MACHINE

The Client-network from Exadata is represented by the green or red 25Gb SFP28 ports in Figure 5.

The Client-network is configured as bondeth0 or bondeth1 interface on each database node. In our example, we will use bondeth1 comprising eth3 and eth4 and should be configured with Linux bonding in active-active/LACP (mode=4). The configuration steps in this solution brief require the use of LACP. Oracle Exadata Deployment Assistant (OEDA) can assist with the configuration of the Client-network.

LACP should be configured to use a policy of layer3+4 and “fast” LACP rate. The default MTU is 1500 bytes but configuring jumbo frames (9000 bytes) is highly recommended. It reduces the level of IP fragmentation and allow for more efficient processing of large streaming workloads with lower CPU overhead. IP networks perform path MTU discovery and auto-negotiate the MTU size between the client (VMs), switches and database-server. Client interfaces using a smaller MTU can still communicate with switches and servers that support jumbo frames.

Optimal settings for bondeth1 are shown in this example:

**Client Access Network Configuration**

```
Starting IP Address : 10.80.5.110
Subnet Mask: 255.255.255.0
Gateway: 10.80.5.1
Client Network Type: SFP28 PCI Dual Port Card Optical Bonded
Client Network Interface: eth3, eth4
Network Speed: 25000

LACP: Enabled, please ensure switches support LACP and configured for LACP and aggregation
```

BONDING_OPTS="mode=802.3ad mimon=100 downdelay=200 updelay=200 lacp_rate=1 xmit_hash_policy=layer3+4"
$ cat /proc/net/bonding/bondeth1
Bonding Mode: IEEE 802.3ad Dynamic link aggregation
Transmit Hash Policy: layer3+4 (1)
MII Status: up
MII Polling Interval (ms): 100
Up Delay (ms): 200
Down Delay (ms): 200

802.3ad info
LACP rate: fast
Min links: 0
Aggregator selection policy (ad_select): stable

<table>
<thead>
<tr>
<th>Slave Interface: eth3</th>
<th>Slave Interface: eth4</th>
</tr>
</thead>
<tbody>
<tr>
<td>MII Status: up</td>
<td>MII Status: up</td>
</tr>
<tr>
<td>Speed: 25000 Mbps</td>
<td>Speed: 25000 Mbps</td>
</tr>
<tr>
<td>Duplex: full</td>
<td>Duplex: full</td>
</tr>
</tbody>
</table>

## CONFIGURING THE ORACLE DATABASE APPLIANCE (ODA)

Oracle Database Appliance is the easiest and most affordable way for small or medium-size organizations to run Oracle databases and applications and is an ideal platform for remote and edge computing environments. It provides a choice of networking connections for easy integration with current customer infrastructure. The ports needed to connect Client-Network from ODA to PCA-X9, are available from PCIe slots which support Oracle Dual Port 25Gb Ethernet NICs. The following table provides connectivity options from ODA-X8/X9, refer to the ODA documentation to determine the appropriate ports and additional details:

<table>
<thead>
<tr>
<th>PLATFORM</th>
<th>NETWORK INTERFACES</th>
<th>NETWORK BONDS</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODA X8-2-HA BM: [p7p1 p7p2] [p2p1 p2p2] [p10p1 p10p2] [eth3 eth8] [eth1 eth12]</td>
<td>[btbond1] [btbond3] [btbond5] [bond0] [bond2] [bond4]</td>
<td>Network Cabling</td>
<td></td>
</tr>
<tr>
<td>ODA X8-2S/2M BM: [p7p1 p7p2] [p2p1 p2p2] [p10p1 p10p2]</td>
<td>[btbond1] [btbond3] [btbond5]</td>
<td>Network Cabling</td>
<td></td>
</tr>
<tr>
<td>ODA X9-2-HA BM: [p6p1 p6p2] [p4p1 p4p2] [p8p1 p8p2]</td>
<td>[btbond1] [btbond3] [btbond5]</td>
<td>Network Cabling</td>
<td></td>
</tr>
<tr>
<td>ODA X9-2S/2L BM: [p6p1 p6p2] [p4p1 p4p2] [p8p1 p8p2]</td>
<td>[btbond1] [btbond3] [btbond5]</td>
<td>Network Cabling</td>
<td></td>
</tr>
</tbody>
</table>

By default, the bond configuration on ODA nodes uses mode=1 (Active/Standby) during initial provisioning using “odacli configure-firstnet”; this mode is incompatible with PCA-X9 DirectConnect feature.

PCA-X9 requires LACP (802.3ad) mode on the peer device. MOS note ID 2198475.1 provides detailed steps to reconfigure the bonding configuration on ODA nodes to use LACP. Bond configuration after successful setup:

$ cat /proc/net/bonding/btbond1
Bonding Mode: IEEE 802.3ad Dynamic link aggregation
Transmit Hash Policy: layer3+4 (1)
MII Status: up
MII Polling Interval (ms): 100
Up Delay (ms): 200
Down Delay (ms): 200

---

Copyright © 2022, Oracle and/or its affiliates | Public
802.3ad info
LACP rate: fast
Min links: 0
Aggregator selection policy (ad_select): stable
System priority: 65535
System MAC address: 00:10:e0:de:fe:1b
Active Aggregator Info:
  Aggregator ID: 2
  Number of ports: 2
  Actor Key: 15
  Partner Key: 32939
  Partner Mac Address: 00:23:04:ee:be:01

<table>
<thead>
<tr>
<th>Slave Interface: p6p1</th>
<th>Slave Interface: p6p2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MII Status: up</td>
<td>MII Status: up</td>
</tr>
<tr>
<td>Speed: 25000 Mbps</td>
<td>Speed: 25000 Mbps</td>
</tr>
<tr>
<td>Duplex: full</td>
<td>Duplex: full</td>
</tr>
<tr>
<td>&lt;…&gt;</td>
<td>&lt;…&gt;</td>
</tr>
</tbody>
</table>

Table 2. Transceivers and cable options
<table>
<thead>
<tr>
<th>TRANSCIEVERS AND CABLES</th>
<th>X-OPT MKTG PN</th>
</tr>
</thead>
<tbody>
<tr>
<td>QSFP28 100Gb Fiber Short-range Transceiver</td>
<td>7119728</td>
</tr>
<tr>
<td>QSFP+ 40Gb Fiber Short-range Transceiver</td>
<td>X2124A</td>
</tr>
<tr>
<td>SFP28 25Gb Fiber Short-range Transceiver</td>
<td>7341433</td>
</tr>
<tr>
<td>SFP+ 10Gb/1Gb Dual-Speed Fiber Short-range Transceiver</td>
<td>X2129A, 7358257</td>
</tr>
<tr>
<td>MPO to 4 LC Optical Splitter OM4 (extended breakout) 10m/20m/50m</td>
<td>7603516 (10m), 7603517 (20m), 7603518 (50m)</td>
</tr>
<tr>
<td>MPO to 4 LC Optical Splitter OM3 10m/20m/50m</td>
<td>X2127A-10M, X2127A-20M, X2127A-50M</td>
</tr>
<tr>
<td>CBL,1M,CU SPLITTER,QSFP28 to 4xSFP28</td>
<td>7118363</td>
</tr>
<tr>
<td>CBL,2M,CU SPLITTER,QSFP28 to 4xSFP28</td>
<td>7118364</td>
</tr>
<tr>
<td>CBL,3M,CU SPLITTER,QSFP28 to 4xSFP28</td>
<td>7118365</td>
</tr>
<tr>
<td>CBL,5M,CU SPLITTER,QSFP28 to 4xSFP28</td>
<td>7118366</td>
</tr>
<tr>
<td>QSFP+ to 4xSFP+ Splitter Cable 1m/3m/5m</td>
<td>X2125A-1M, X2125A-3M, X2125A-5M</td>
</tr>
</tbody>
</table>

Components and Connections – Cables and Transceivers

Copper Breakout Cable  Optical Breakout Cable  LC-LC Coupler  LC-LC Cable

QSFP28 Transceiver  SFP28 Transceiver

LC-LC OM3 MMF Patch Panel
FREQUENTLY ASKED QUESTIONS

1. Can older Exadata racks or ODA platform be connected to PCA-X9 directly?
   Yes, the steps shown above will be the same for Exadata-X7, X8 and ODA-X7 which support the Dual-Port-25Gb SFP28 adapters in the database servers.

2. Is Exadata CC supported?
   Currently, ExaCC can be connected to PCA-X9 using DirectConnect only if a single VM-cluster will be configured on the ExaCC database servers. During configuration, VLAN tag=1 should be used (see Create VM Cluster Network section for more details.)

3. Will the default-gateway, DNS and NTP servers be accessible over the Client-Network on the database-server which is connected to the PCA spine switches?
   Yes. PCA-X9 provides a Layer-3 network, the Spine switches act as the GW for the Client-Network for Exadata/ODA and provide a route to customer’s DNS/NTP servers via the data uplink ports.

4. How many Exadata racks and ODA nodes are support?
   Up to 16 database servers can be connected and these can come from any number of Exadata or ODA. Only 2 physical ports can be part of the same bond interface on the data-base-server.
   ODA example: if ODA has 3 Dual-Port-25Gb SFP28 NICs, only 1 NIC can be used to create a given Client-Network. The other 2 NICs can be used to create 2 additional Client-Networks (by repeating Step1 of the PCA-X9 configuration.) This approach provides a flexible, secure, physically isolated, and non-disruptive way to allow application VMs to access the databases running on ODA.

5. Are VLANs supported if customer wants to have Multi-VM Cluster on their ExaCC or ODA?
   No, currently the database configuration is expected to use a single VM cluster with access vlan configuration (see Create VM Cluster Network section for more details.)
CONNECT WITH US
Call +1.800.ORACLE1 or visit oracle.com.
Outside North America, find your local office at oracle.com/contact.

blogs.oracle.com  facebook.com/oracle  twitter.com/oracle

Copyright © 2022, Oracle and/or its affiliates. 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. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group. ©2020

Direct Connect Oracle Exadata and Oracle Database Appliance with Oracle Private Cloud Appliance
December 2222
Author: Lalit Bhola