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Integrating Oracle SuperCluster Engineered Systems with a Data Center's 1 GbE and 10 GbE Networks Using Oracle Switch ES1-24

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Introduction

This white paper outlines the physical connectivity solutions supported by Oracle SuperCluster engineered systems and the newly introduced and smaller Oracle Switch ES1-24 for connecting to a data center's 1/10 GbE network infrastructures.

Integrating Oracle SuperCluster T5-8 with a Data Center LAN

Oracle SuperCluster T5-8 includes 16 SFP+ 10 GbE ports in the half rack configuration and 32 SFP+ 10 GbE ports in the full rack configuration. These SFP+ ports can be connected to data center 1/10 GbE fiber infrastructure using Oracle's high-density Sun Network 10 GbE Switch 72p. This switch has 16 QSFP (4x 10 GbE) ports and 8 SFP+ ports. Each QSFP port supports four 10 GbE SFP+ ports by using Oracle's fiber and copper splitter cables. The switch also provides an option to connect the 8 SFP+ ports to a 1 GbE copper infrastructure using an SFP+ to 1GBase-T RJ45 adapter.

The newly introduced and smaller Oracle Switch ES1-24 is an excellent choice to connect Oracle SuperCluster T5-8 to the data center 1/10 GbE copper infrastructure, as shown in Figure 1. This switch is a Layer 2 and Layer 3 half-width 1U 10 GbE switch with twenty 1/10GBase-T ports (1 GbE and 10 GbE) and four SFP+ ports (1 GbE and 10 GbE), as shown in Figure 3.

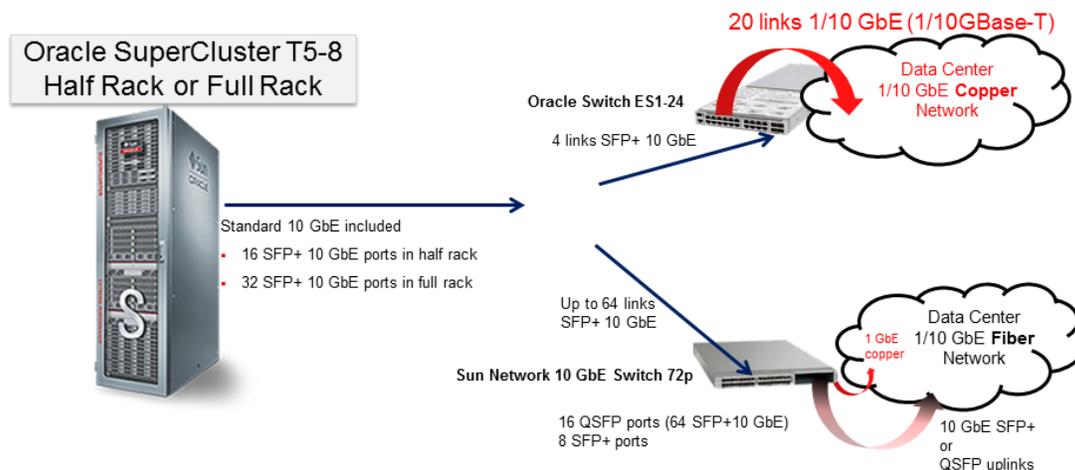


Figure 1: Oracle SuperCluster T5-8 connectivity to the data center 1/10 GbE fiber and copper infrastructure

Integrating Oracle SuperCluster M6-32 with a Data Center LAN

Oracle SuperCluster M6-32 includes sixteen 10GBase-T ports in the minimum configuration and thirty two ports in the maximum configuration. Existing twisted pair Cat 5e/6A cables can be used to connect these 10GBase-T ports to data center 1/10 GbE copper infrastructure using Oracle Switch ES1-24. The switch can be connected to the data center LAN using available 10GBase-T ports or the four SFP+ ports.

Oracle SuperCluster M6-32 supports optional low-profile 10 GbE SFP+ adapters in the available PCIe slots. These 10 GbE SFP+ ports can be connected to data center 1/10 GbE fiber infrastructure using Oracle's high-density Sun Network 10 GbE Switch 72p. This switch also provides an option to connect the eight SFP+ ports to a 1 GbE copper infrastructure using an SFP+ to 1GBase-T RJ45 adapter, as shown in Figure 2.

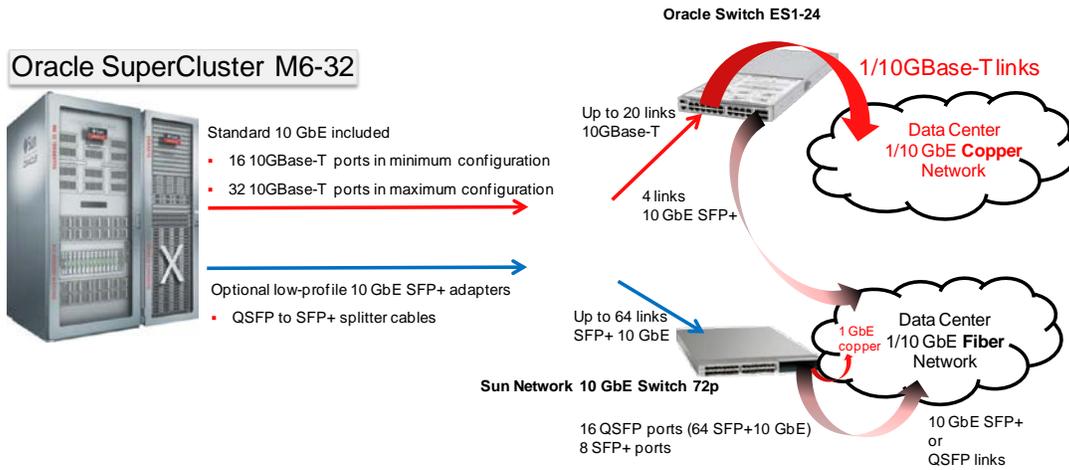


Figure 2: Oracle SuperCluster M6-32 connectivity to the data center 1/10 GbE fiber and copper infrastructure

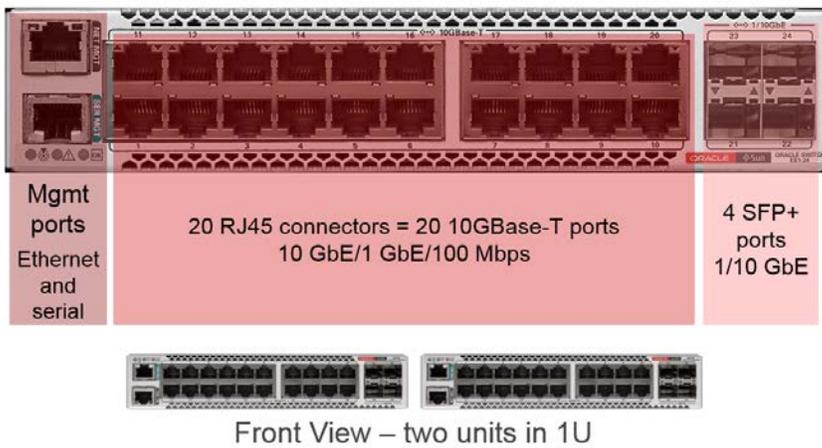


Figure 3: Oracle Switch ES1-24

Connectivity Options for Data Centers

Figure 4 and Figure 5 depict the simple and cost-effective network connectivity between Oracle SuperCluster T5-8 and the data center copper LAN infrastructure for four and eight domains, respectively. 10 GbE SFP+ links from Oracle SuperCluster T5-8 are connected to four SFP+ ports of the switch using optical transceivers. Up to twenty 1/10GbE-T ports of Oracle Switch ES1-24 can then be connected to the customer's 1/10 GbE copper infrastructure using twisted copper pair cables (Cat 5e/6A). The 10GbE-T ports of the switch auto-negotiate between 1 GbE and 10 GbE allowing a seamless upgrade to 10 GbE copper infrastructure in the data center.

The 10 GbE links of Oracle SuperCluster T5-8 are configured as active/standby and, therefore, the two access switches should be configured for high availability as active/standby.

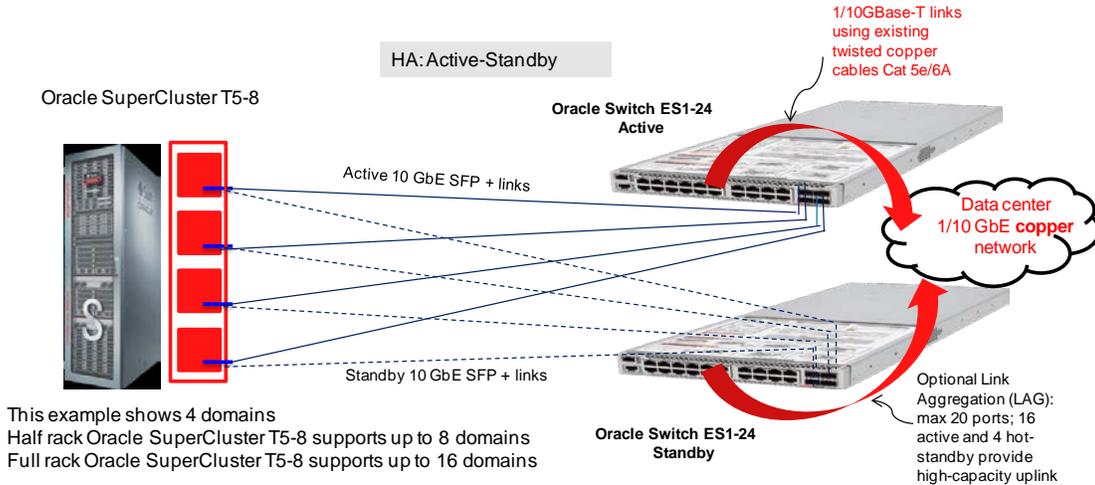


Figure 4: Active-standby Layer 2 switch high availability configuration for Oracle SuperCluster T5-8 with four domains

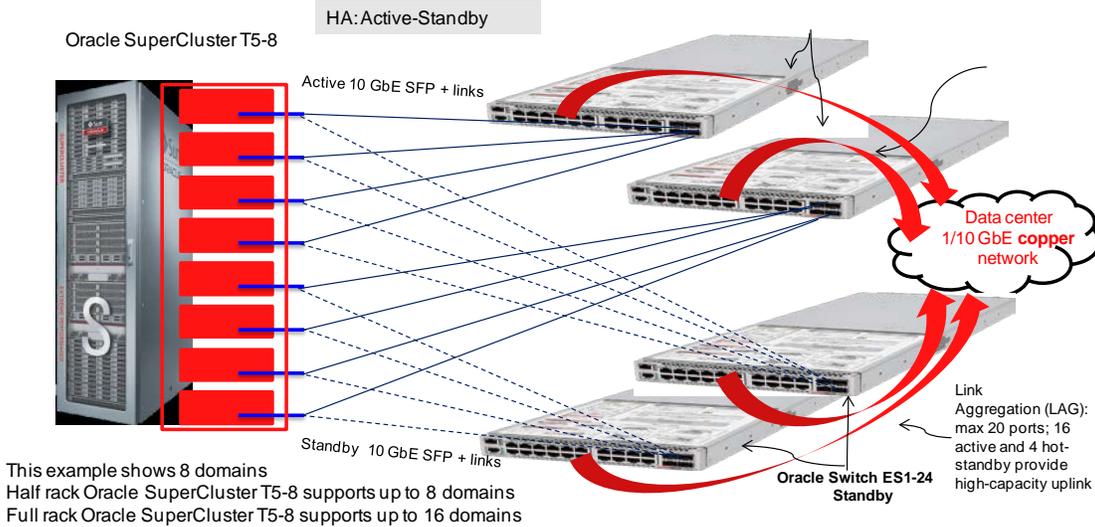


Figure 5: Active-standby Layer 2 switch high availability configuration for Oracle SuperCluster T5-8 with eight domains

Similarly, a high availability active/standby configuration for Oracle SuperCluster M6-32 is depicted in Figure 6 and Figure 7 for the base configuration and extended configuration, respectively. 10GbE-T links from Oracle SuperCluster M6-32 can be connected to Oracle Switch ES1-24 using existing twisted copper pair cables (Cat 5e/6A). Oracle Switch ES1-24 can then be connected to the customer's 1/10 GbE copper infrastructure using available 10Gbase-T ports in the switch or the 1/10 GbE fiber infrastructure using four SFP+ 10 GbE ports.

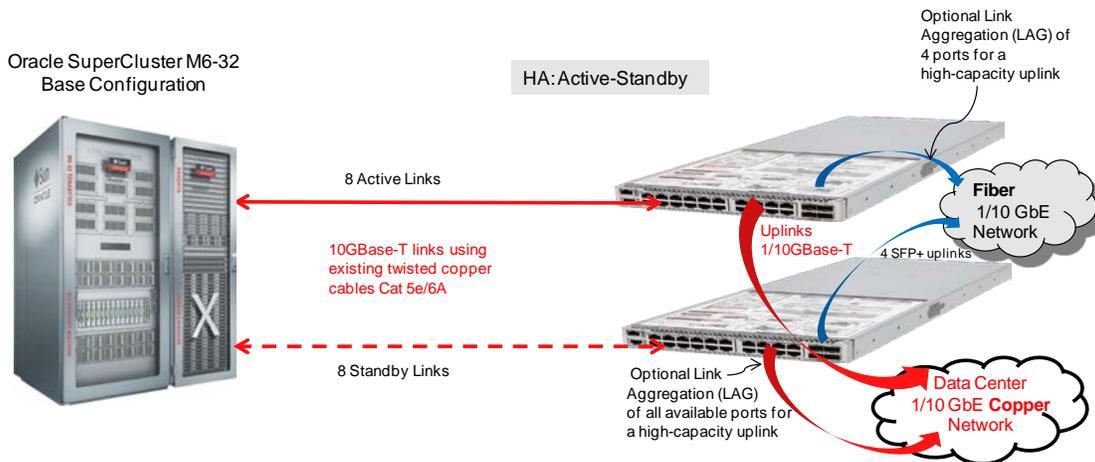


Figure 6: Active-standby Layer 2 switch high availability configuration for Oracle SuperCluster M6-32 base configuration

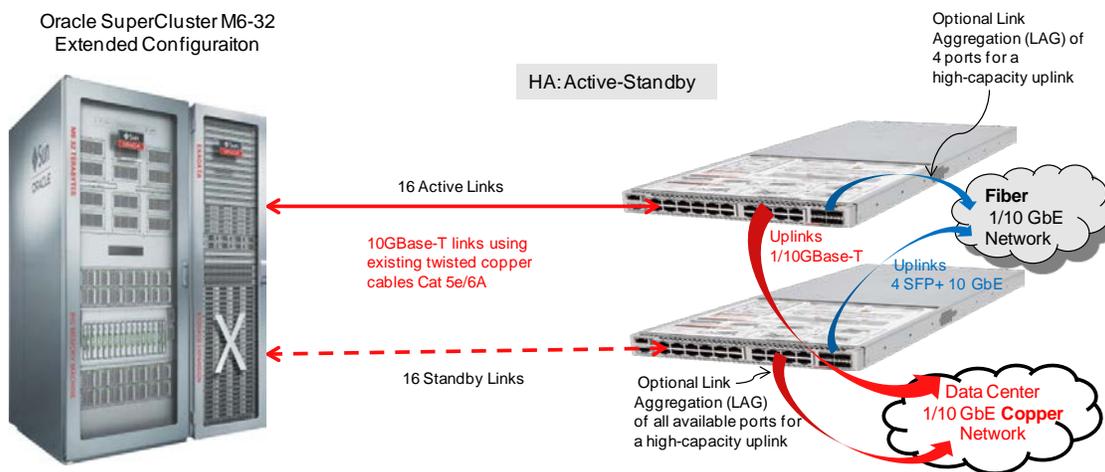


Figure 7: Active-standby Layer 2 switch high availability configuration for Oracle SuperCluster M6-32 extended configuration

Oracle Switch ES1-24 is positioned as an access switch and is typically connected to the distribution and/or core switch in the data center LAN. Oracle Switch ES1-24 supports 4k virtual LANs (VLANs). Data traffic from servers and storage is segregated into different groups, such as applications and users, by configuring VLANs.

A large amount of data traffic—such as web traffic, ZFS or NFS application data, cluster heartbeats, and so on—flows between the servers and storage and is not to be shared with external devices or users; this can be considered an internal VLAN. Traffic meant to go to the external network could be considered an external VLAN. Server internal VLANs carrying traffic are configured with a distribution switch in the data center LAN as the root bridge; this internal traffic will not reach the core switch. Server external VLANs are configured with a core switch as the root bridge.

Because the switch is half-width, a pair of the switches can be easily installed in 1U space using the optional rack rail kit, as shown in Figure 3. The switch ports are considered to be the front of the switch. The switch should be mounted with its ports facing the rear so the switch ports are close to the I/O ports of the server. When installed in the rack of servers and storage, the switch should be selected with the rear-to-front airflow option, so that the switch airflow is the same as the front-to-rear airflow of the servers. Installation of additional components in the empty space of Oracle SuperCluster would be subject to the approval of an exception request. When installed in the rack of other networking devices, the switch should be selected with the front-to-rear airflow option, so that the switch airflow is the same as the front-to-rear airflow of the other networking devices in the rack.

Components Required for Connectivity

Table 1 lists the number of components required for connectivity to Oracle SuperCluster T5-8 with two switches for high availability.

TABLE 1. COMPONENTS FOR CONNECTIVITY TO ORACLE SUPERCLUSTER T5-8

QUANTITY	PART NUMBER	DESCRIPTION
Oracle Switch ES1-24 to Oracle SuperCluster T5-8		
8	X2129A-N	SFP+ 10 Gb/sec optical SR transceiver
2	7105444	Oracle Switch ES1-24 rear-to-front airflow
1	7107048	Rack rail kit (mounts two Oracle Switch ES1-24 switches)
Oracle Switch ES1-24 to data center copper 1/10 GbE network		
Use existing twisted pair cables (Cat 5e/6A) in the data center		

Table 2 lists the number of components required for connectivity to Oracle SuperCluster M6-32 with two switches for high availability.

TABLE 2. COMPONENTS FOR CONNECTIVITY TO ORACLE SUPERCLUSTER M6-32

QUANTITY	PART NUMBER	DESCRIPTION
Oracle Switch ES1-24 to Oracle SuperCluster M6-32		
Use existing twisted pair cables (Cat 5e/6A)		
2	7105444	Oracle Switch ES1-24 rear-to-front airflow
1	7107048	Rack rail kit (mounts two Oracle Switch ES1-24 switches)
Oracle Switch ES1-24 to data center copper 1/10 GbE network		
Use existing twisted pair cables (Cat 5e/6A) in the data center		
Oracle Switch ES1-24 to data center fiber 1/10 GbE network		
8	X2129A-N	SFP+ 10 Gb/sec optical SR transceiver

Conclusion

Oracle SuperCluster is an integrated compute, storage, networking, and software system that provides maximum end-to-end database and application performance and minimal initial and ongoing support and maintenance effort and complexity at the lowest total cost of ownership. It is ideal for Oracle Database and best for Oracle Applications customers who need to maximize return on their software investments, increase their IT agility, and improve application usability and overall IT productivity.

Oracle's Ethernet switch portfolio provides flexible and cost-effective connectivity for Oracle SuperCluster engineered systems to a data center that has 10 GbE fiber infrastructure using Oracle's high-density Sun Network 10 GbE Switch 72p, which provides an option to connect eight SFP+ ports to a 1GBase-T copper infrastructure.

Oracle Switch ES1-24 is a compact half-width switch for high availability in 1U rack space. It provides four SFP+ ports for connectivity to Oracle SuperCluster T5-8 and twenty 1/10GBase-T links for connectivity to Oracle SuperCluster M6-32. For more information refer to the following resources:

- Oracle SuperCluster:
<http://www.oracle.com/supercluster>
- Oracle Switch ES1-24:
<http://www.oracle.com/us/products/networking/ethernet/switch-es1-24/overview/index.html>
- Sun Network 10 GbE Switch 72p:
<http://www.oracle.com/us/products/networking/ethernet/top-of-rack-switches/overview/index.html>



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10 GbE Networks Using Oracle Switch ES1-24
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