Welcome to the architecture and features module. This module will cover the architecture and feature information about the Sun Fire X2270, X4170, X4270 and X4275 along with the M2 versions of each model, that supports a new processor and features. You will use this information for installation, configuration, administration and troubleshooting of these products.
Objectives

- Identify the server models
- Identify the features of the servers
- Explain the architecture of the servers
- List the FRUs and CRUs of each server

Upon completion of this module, you should be able to:

1. Identify the server models
2. Identify the features of the servers
3. Explain the architecture of the servers
4. List the FRUs and CRUs of each server
The following references provide additional information on the servers and their components.¹
The following references provide additional information on the M2 servers and their components ¹ along with the links to the TOI presentations that served as the source information for this module.²
The Sun Fire X2270 and X2270 M2 Servers are 1U form factor high performance rack mount servers.\(^1\) The Sun Fire X4170 and X4170 M2 Servers are also 1U form factor high performance rack mount servers.\(^2\) While the Sun Fire X4270 and X4275 Servers along with the M2 models are 2U form factor high performance rack mount servers.

The M2 systems introduced an upgraded version of the Intel processor along with other I/O enhancements. The key physical differences between the server models are the number of adapter slots and the number of disks each support.
The Sun Fire X2270 and X2270 M2 Servers front and rear sides are displayed here. Click on the feature’s hot buttons to view a description of their functionality.
The Sun Fire X4170 and X4170 M2 Servers front and rear sides are displayed here. Click on the feature’s hot buttons to view a description of their functionality.
The Sun Fire X4270 and X4270 M2 Servers front and rear sides are displayed here. Click on the feature’s hot buttons to view a description of their functionality.
The Sun Fire X4275 and X4275 M2 Servers front and rear sides are displayed here. Click on the feature’s hot buttons to view a description of their functionality.
The Sun Fire X2270 and X2270 M2 Servers internal components are displayed here. Click on the feature’s hot buttons to view a description of their functionality.
The Sun Fire X4270, X4275 and their M2 models have their internal components displayed here. With some exceptions, the X4170 and X4170 M2 Servers are also represented. Click on the component’s hot buttons to view a description of their functionality.
The Sun Fire X2270 Server internal architecture centers around the Intel Nehalem-EP CPUs while the Sun Fire X2270 M2 Server uses the Intel Westmere-EP CPUs.

In both cases, each CPU has three internal memory channels that support two DDR3 DIMM slots per channel. The CPUs are connected to each other with a common I/O interface through its Quick Path Interconnects, that are referred to as the QPIs which replaces Intel’s traditional front-side bus architecture. The QPI that connects the two CPUs together which functions as a memory share path allowing each CPU access to the other CPU’s memory. There are also QPI paths out to the I/O Hub, code named Tylersburg.
The IOH performs a QPI to PCIe bridge function, as well as, provides an ESI connection to the ICH SouthBridge chip which supports an optional PCIe generation 2 16-lane board. The IOH supports one Intel Kawela Dual Port Ethernet controller by providing two PCIe2 lanes to the controller. Its PCIe2 interconnect configuration depends on the server, so it will be discussed in detail later in this presentation. Note that the non-M2 servers support a Zoar Dual Port Ethernet controller.

1The ICH SouthBridge chip also supports five USB buses, six SATA buses, two FMOD slots and four interfaces to the service processor board: a PCI bus, two USB buses and an LPC bus.

2If an SP board is installed, the serial and network management ports are controlled by the SP board, graphics support is available, fan and LED support is performed by the SP board and the side-band connection to the Kawela chip is enabled. If an SP board is not installed, there is no network management support, no graphics support, the serial port is supported by the SuperIO chip and the LEDs and fans are controlled by BIOS. 3For more component specifications review the Specification Table attachment file.
The Sun Fire X4170, X4270 and X4275 server internal architectures, along with their M2 models, are similar to each other. The X4170, X4270 and X4275 servers support Nehalem-EP CPUs while the M2 models support Westmere-EP CPUs. Each CPU has three internal memory channels that supports three DIMM slots per channel. The DIMM types supported are DDR3. The CPUs are connected to each other and to the I/O Hub through Quick Path Interconnects, that are referred to as the QPIs, which replaces Intel’s traditional front-side bus in this architecture.

The IOH performs a QPI to PCIe bridge function, as well as, provides 32 PCIe generation 2 lanes to the ICH SouthBridge chip which supports three riser card connectors. The IOH supports two Intel Kawela Dual Port Ethernet controllers by providing two PCIe generation 2 lanes to each of the controllers. Its PCIe interconnect configuration depends on the server, so it will be discussed in detail later in this presentation.
The ICH SouthBridge chip also supports five USB buses dedicated to two front panel, two rear panel and one internal connection. Notice that the X4275 and X4275 M2 servers have no USB connectors on the front panel. The ICH is connected to the service processor or SP through a PCI 32 bit 33Mhz bus, two USB buses and a Low Pin Count bus referred to as LPC. The ICH also supports two other USB buses that are used to connect to two FMOD connectors and a CD/DVD drive, after converting the USB buses to IDE and SATA buses, respectively. Note, the FMODs are supported on the M2 and the X2270 servers. The other servers support compact flash cards. The disk configuration will be discussed in detail later in this presentation.

The SP function is incorporated on the motherboard and its ILOM application can be accessed through a serial or network management port. The SP also has a side-band connection to both Kawela chips and the video port can be used to support a console monitor. For more component specifications review the Specification Table attachment file.
The IOH supports 3 PCIe2 connectors. On the X4170 and X4170 M2, PCIe2 slot 0 support a 16-lane board while the other two PCIe2 slots support 8-lane boards all through riser boards. On the X4270, X4275 and their M2 models, there are PCIe2 slot pairs supported by a riser card per pair. PCIe2 slots 0 and 3 are supported directly from the CPUs while PCIe2 slots 1 and 4 and PCIe2 slots 2 and 5 are supported through PCIe2 switching off their respective riser cards.

1The X4170 and X4170 M2 servers support two different disk configurations depending on whether you use a PCIe2 HBA or not. Without a PCIe2 HBA, you can connect up to six 2.5 inch SATA HDDs or SSDs directly off the ICH SouthBridge SATA interface. With a PCIe2 HBA installed in slot 0, you can support up to eight 2.5 inch SAS or SATA drives.

3The X4270 and X4270 M2 servers support its disk configuration from a PCIe2 HBA that can be installed in PCIe2 slots 0, 2, or 5. The HBA will support 16 2.5 inch SAS or SATA HDDs or 12 SATA SSDs. The X4275 and X4275 M2 servers also support its disk configuration from a PCIe2 HBA that can be installed on PCIe2 slots 0, 3, 2, or 5. The HBA will support 12 3.5 inch SAS or SATA HDDs or SSDs. Note, the middle PCIe2 HBA slots cannot support these configurations due to physical constraints.
There are multiple OSes supported by these servers. All the major OSes are represented: Oracle Linux, Oracle Solaris, Windows, Red Hat Linux, SuSE Linux and VmWare.
Firmware Supported

The firmware supported on these servers are:

- **ILOM 3.0.9.x** - Upgraded using ILOM
- **BIOS** - Upgraded using ILOM
- **CPLD** - Upgrade using `cpld_update` and `cpld2_update`
- **Adaptec HBAs** - Upgraded using the Adaptec Flash Utility
- **LSI HBAs** - Upgraded using the SASFlash Utility
- **LSI SAS Expander** - Upgraded using the SASFlash Utility
- **NICs** - Upgrade procedure in product notes

Here we going to list the key field upgradeable firmware images. ¹BIOS and ILOM are a packaged image that can be downloaded and installed by ILOM. ²The Complex Programmable Logic Device or CPLD may also need to be field upgraded using the `cpld_update` and the `cpld2_update` scripts. The upgrade procedures for ³the HBAs will use either the Adaptec Flash or the SASFlash utility depending on the HBA type. ⁴The SASFlash can also be used to upgrade the LSI SAS Expander chips. The network interface controllers ⁵or NICs upgrade procedures will also be supplied separately in the product notes. ⁶
The PCIe2 HBAs supported at release of these servers are listed here. The presentation will now stop to allow you to view these items.
Determine the FRU Inventory

Displaying FRU inventory from ILOM root account:

```
-> show /SYS/<target>
```

Displaying FRU inventory from ILOM sunservice account:

```
-> prtfru
```

**NOTE:** For a list of FRUs select the FRU Lists attachment file, but for a current list access the Sun System Handbook at:


ILOM under the root account can display the current FRU inventory by executing the show command. ILOM under the sunservice account has the prtfru command that displays similar FRU inventory. Within the Configuration and Administration module of this course, we will cover the procedures to access ILOM and use these types of commands. Note, for a list of FRUs select the FRU Lists attachment file, but for a current list access the Sun System Handbook at the website listed.
Check Your Knowledge - Module 1

Which processor is supported by all the rack mount servers?

- Sun SPARC T1 and T2
- AMD Opteron
- Intel Nehalem and Westmere
- Sun SPARC T2 and T2 Plus

PROPERTIES
On passing, 'Finish' button: Goes to Next Slide
On failing, 'Finish' button: Goes to Next Slide
Allow user to leave quiz: At any time
User may view slides after quiz: At any time
User may attempt quiz: Unlimited times
Now that you can completed this module, you should be able to identify the servers and their features, explain their architecture and list their FRUs and CRUs. This completes this module.
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