

# Hardware Administration

Maruthi Inukonda  
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# Agenda

- Precautions
- Datacenter hardware
- Busses
- Connectors

# Precautions

# Precautions

- To prevent damage to our parts :
  - Never insert anti-static strap in live or neutral pin of 3 pin sockets.
  - Switch off power supply to equipment & unplug power cables.
  - Wear ear muff while working in datacenter.
- To prevent damage to server parts :
  - Wear anti-static gloves if available.
  - Always wear an anti-static strap with proper grounding.
  - Best is to hook the strap crocodile pin to rack.

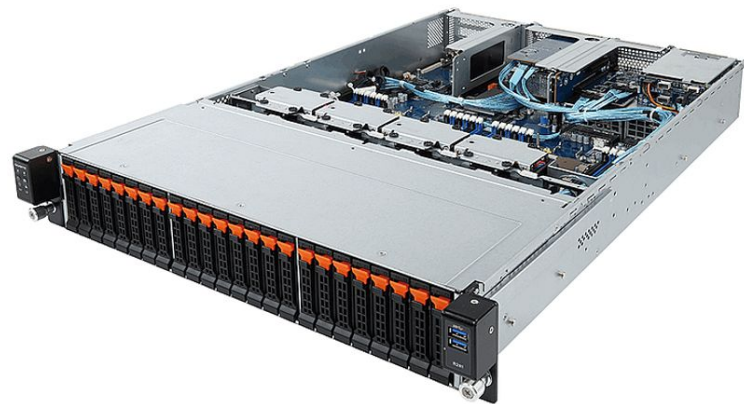


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# Datacenter Hardware

# Rack Server

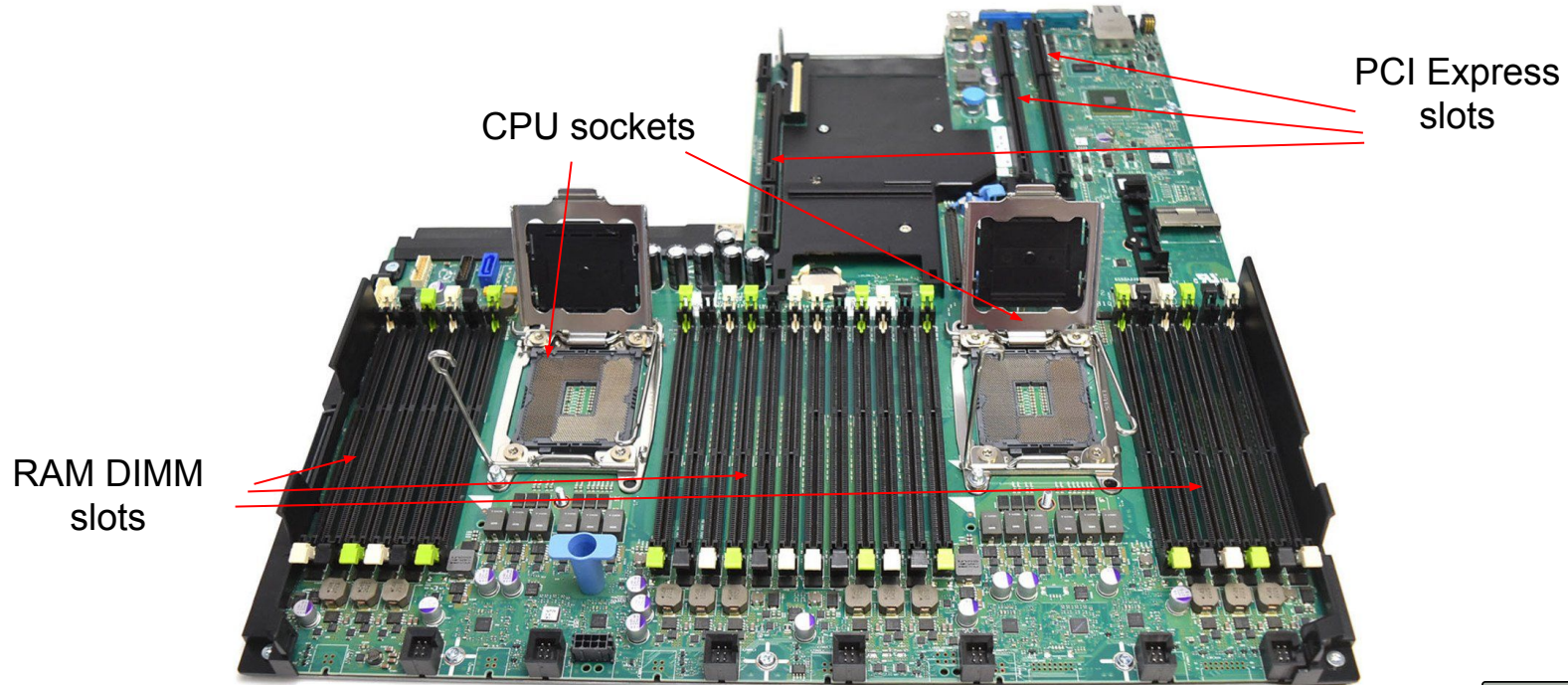
- A powerful data center computer made for 24x7 operation.
- Available in units of standard 1U, 2U, 4U. (1U = 1.75 inches).
- Each rack contains 19" width x 42 U height.



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# Mainboard

- Printed circuit board to which all other parts are connected.

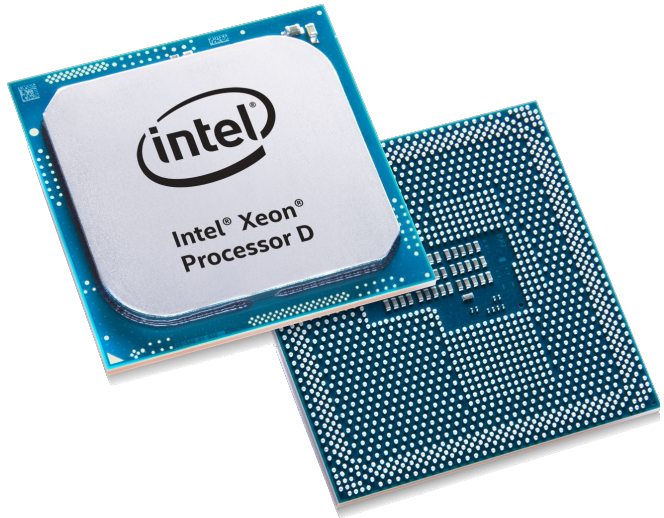


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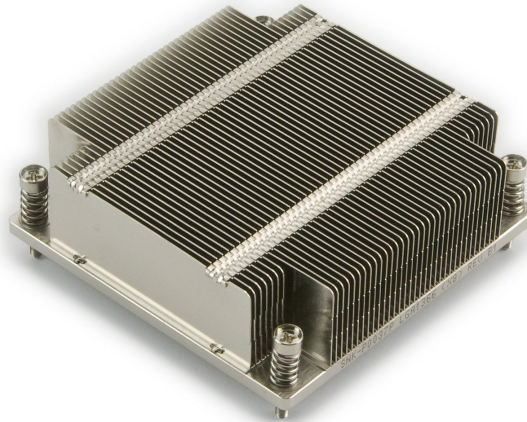


# Central Processing Unit (CPU)

- Where programs run. Not be confused with “Primary-school CPU”.



CPU



Passive heat sink



Active heat sink

Figures not to the scale



# Random Access Memory (RAM)

- Used for high speed volatile storage made with transistors, capacitors



RAM Dual-In-Memory-Module (DIMMs)

Figures not to the scale

# Graphics Processing Unit (GPU)

- Few servers come with on-board graphics processing unit.
- Used for rich graphics/gaming and compute acceleration.
- Inserted into PCI express slot.
- Takes power supply from PCI slot.
- Advanced GPU require additional power supply from PSU.



GPU

Figures not to the scale

# Network Interface Card (NIC)

- Used for connectivity with network.
- Inserted into PCI express slot.
- Takes power supply from PCI slot.
- Few servers come with on-board network controller/ports.



NIC

Figures not to the scale

# Power Supply Unit (PSU)

- Takes AC (100-250v) and converts to DC (3, 5, 12 v) power supply for the main board, fans, HDDs and other parts.



PSU

Figures not to the scale

# Fan

- Helps in air circulation
- Rotations per minute is controlled by CPU



Fan

Figures not to the scale

# Hard Disk Drive (HDD)

- Used for persistent storage using rotating magnetic media.



Small Form Factor (SFF) Drive

Large Form Factor (LFF) Drive

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# Solid State Drive (SSD)

- Used for persistent storage using solid state media.

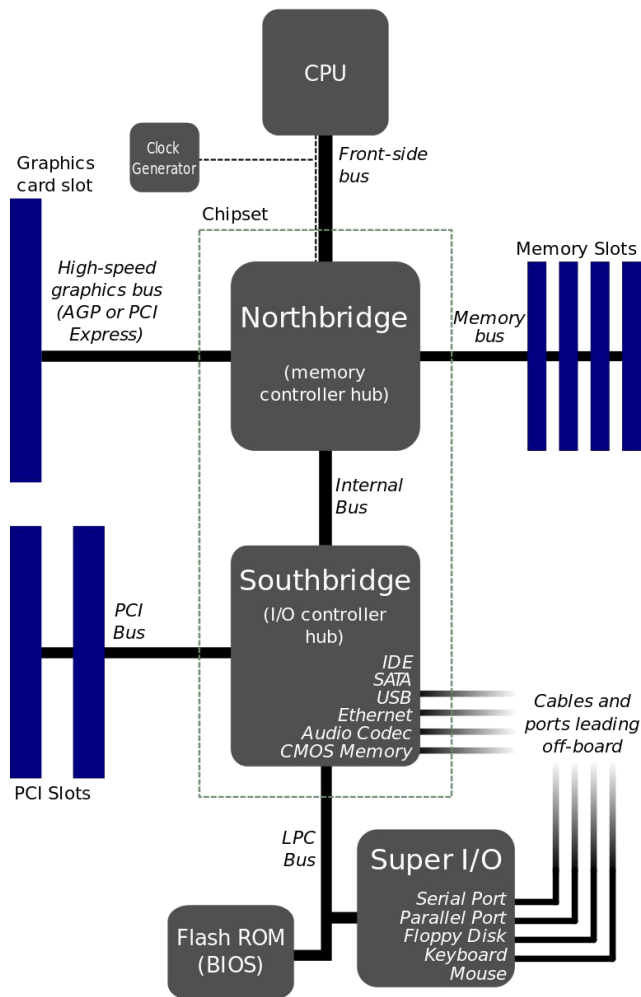


Small Form Factor (SFF) Drive -  
2.5"

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# Busses

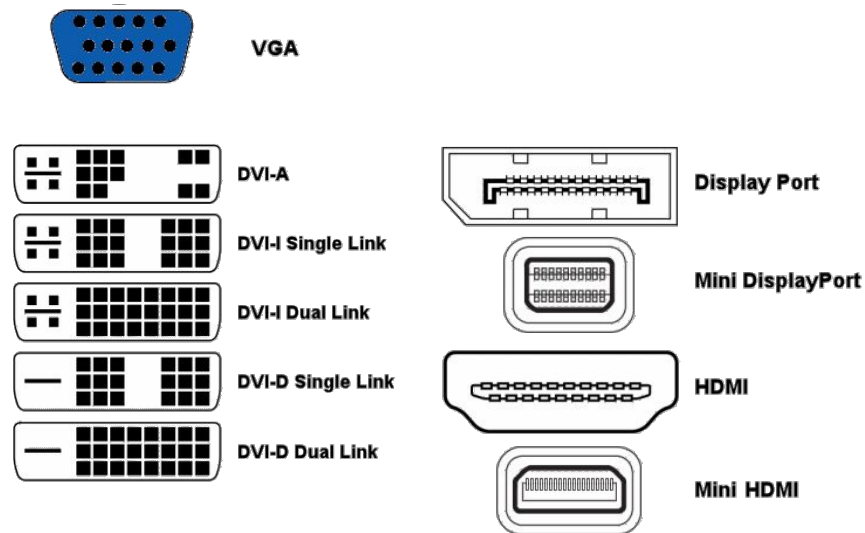
# Busses



# Connectors

# Video Connectors

- Video Graphics Adapter (VGA)
  - Analog
  - Max resolution : 1,920x1,200
- Digital Video Interface (DVI)
  - Digital & Analog
  - Max resolution : 1,920x1,200
- Display Port (DP)
  - Digital
  - Max resolution : 3840x2160
- High Density Media Interface (HDMI)
  - Digital
  - Max resolution : 3840x2160
  - Also contains audio.



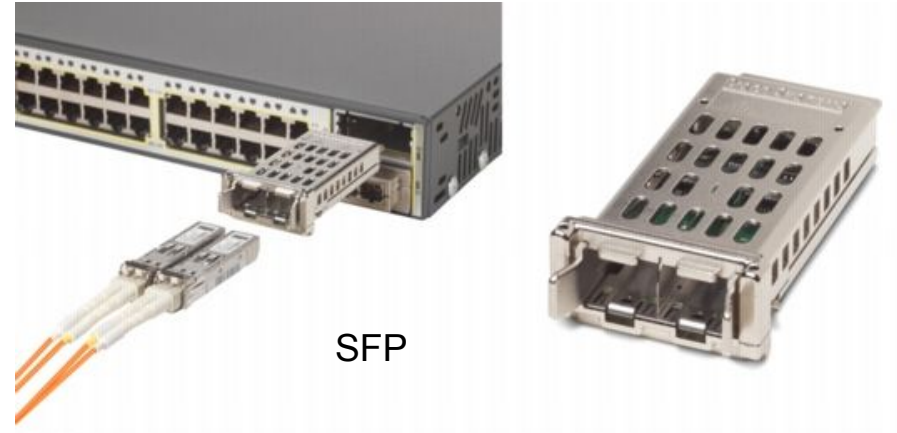
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# Network Connectors

- Registered Jack 45 (RJ45)
  - Max: 1Gbps
- Small Form-factor Pluggable (SFP)
  - Max : 100 Gbps
  - Also available in 10, 40Gbps.



RJ45



SFP

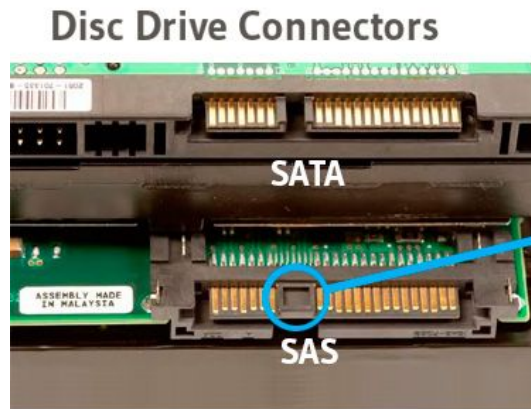
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# Storage Connectors

- Serial Attached SCSI (SAS)
  - Dual ported
  - Each port max: 12Gbps
  - Also available in 3, 6Gbps
- Serial Advanced Technology Attachment (SATA)
  - Single ported
  - Max : 6 Gbps
  - Also available in 1.5, 3 Gbps.

SATA



SAS Connector Flip Side



SAS Backplane Connector



Accommodates both SAS & SATA Drives

SAS

Figures not to the scale

# USB Connectors

- Universal Serial Bus (USB)
  - Max: 10Gbps (3.1)
  - Also available in 480Mbps (2.0), 5Gbps (3.0)



# References

# References

- [www.wikipedia.org](http://www.wikipedia.org)
- Courtesy Google images

# Q & A