

CS305

Computer Architecture

Introduction to Buses

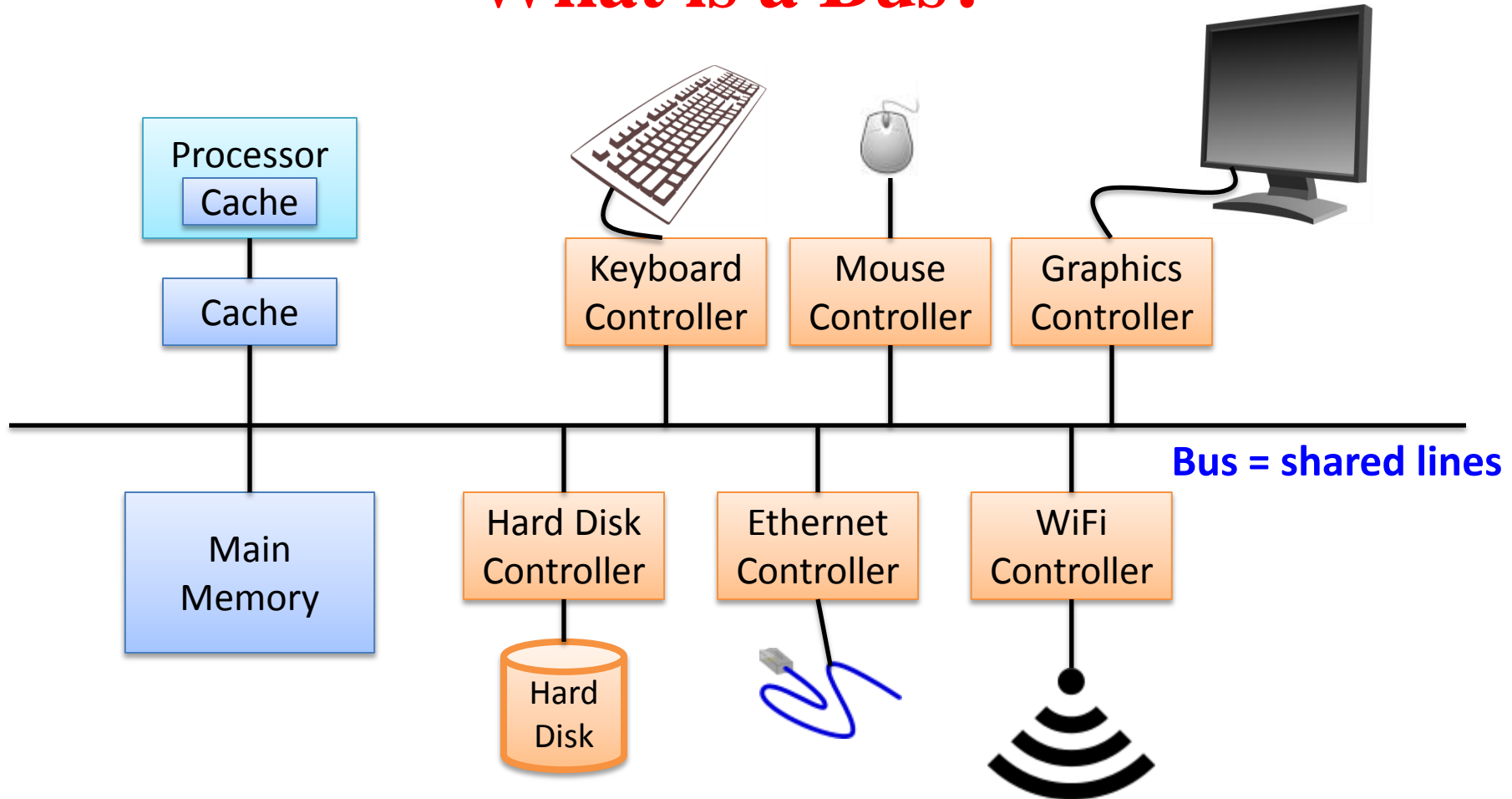
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<http://www.cse.iitb.ac.in/~br>

Reference

- “Computer Architecture and Organization”, John P Hayes, McGraw Hill, 3rd Edition

What is a Bus?



Buses: Merits and Demerits

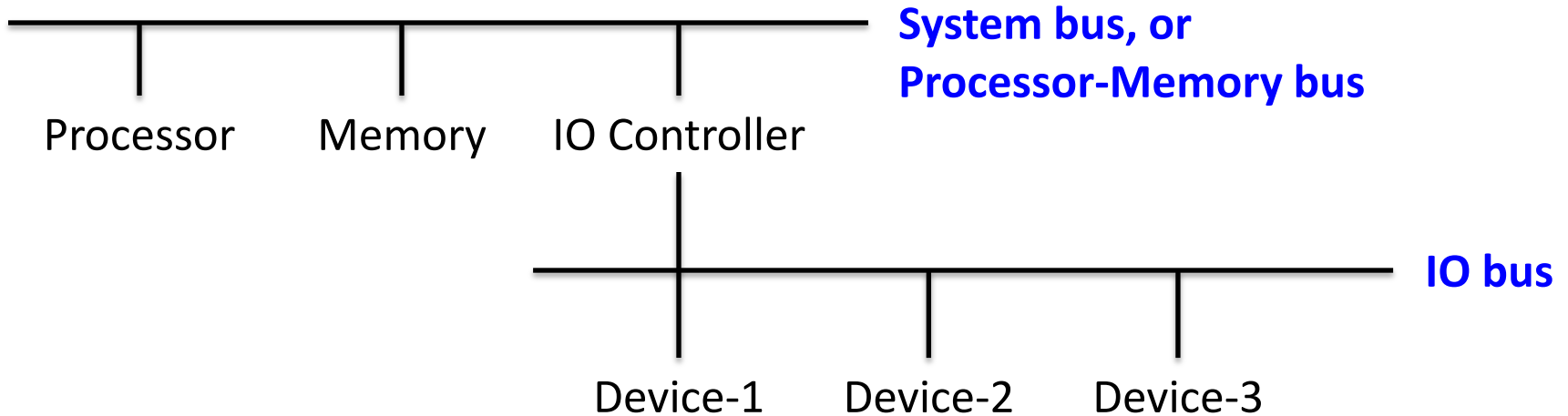
- Advantages:

- Versatility or flexibility: Same IO device can be used in different computers
- Low cost (compared to individual lines betn. proc. & device)

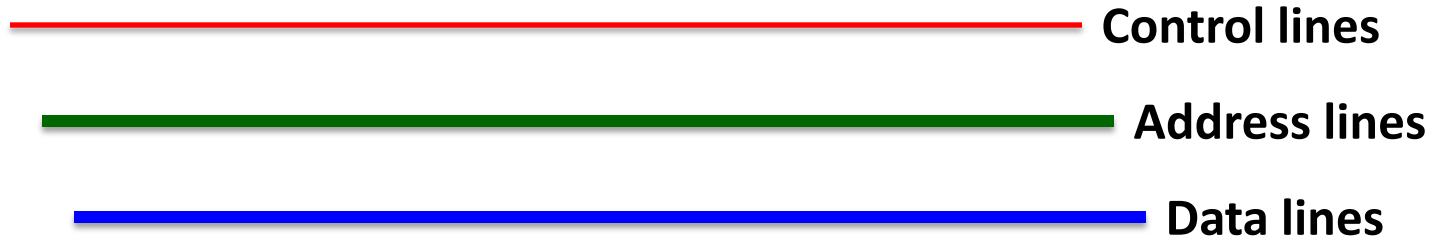
- Disadvantage:

- Communication bottleneck
- Max bus speed: limited by length, #devices

System Bus vs IO Bus

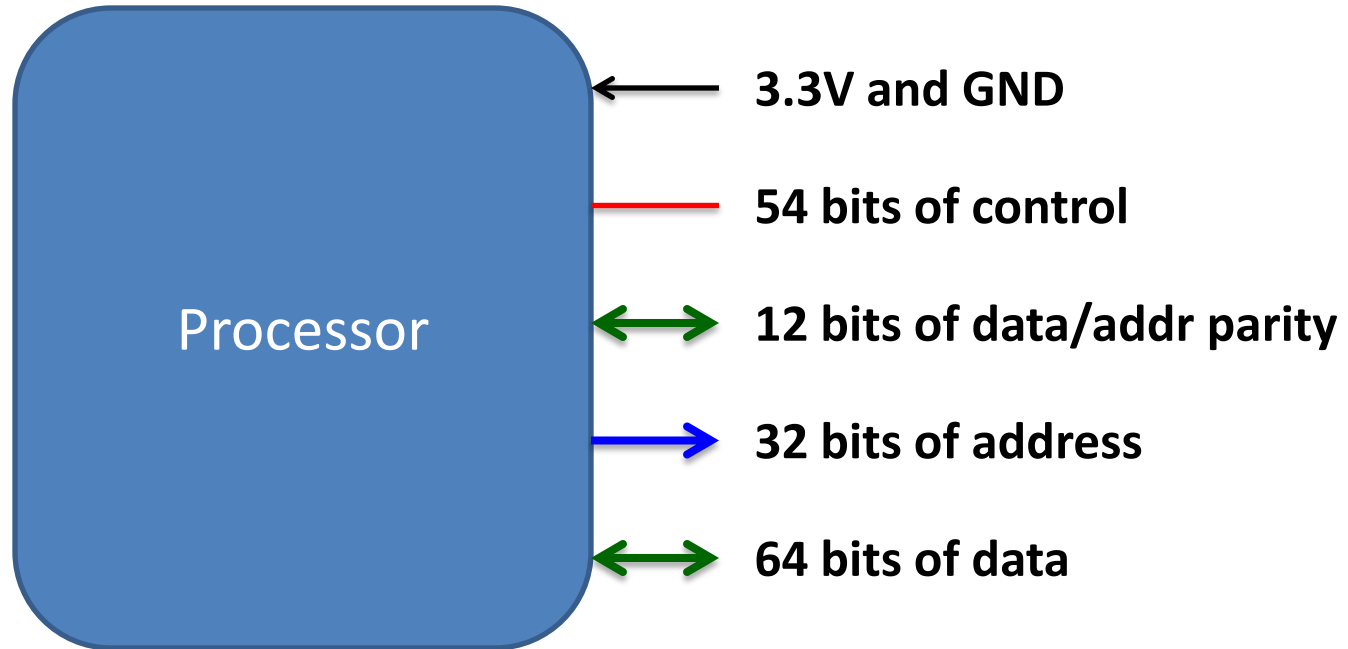


Bus Lines



- Control lines: for bus control
- Address and data lines may be shared in some buses
- Data: up to 4 words in width

Bus Lines in the Power-PC Processor



Bus Standards

- Standards: interoperability
- SCSI: Small Computer System Interconnect
- PCI: Peripheral Component Interconnect
- USB: Universal Serial Bus (hot pluggable)
- IEEE 1394: Firewire (hot pluggable)
- Standards specify: length, frequency, protocol, number of devices, etc
- Our focus: concepts, not standards

Going Forward

- Three bus related concepts:
 - Bus interfacing: how do devices connect to the bus?
 - Bus protocols: how do devices exchange data on the bus?
 - Bus arbitration: who gets access to the bus?