**AIM** : Case Study on PCI (Peripheral component Interconnect)

**Introduction:**

* PCI stands for Peripheral component interconnect.
* PCI is a local bus that connects different hardware devices to computer.
* It supports the function of processor bus, but in standardized format that is independent of either processor.
* It was first implemented in IBM PCI compatibilities. Its first version was found in consumer desktop computers, 32 bit operating system.
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**Features:**

* It utilizes multiple address and data bus.
* System clock: 33Mhz to 66Mhz
* Bus width:32bit to 64 bit bus width
* Supports multiple masters
* PCI bus is shared between data and addresses(they are send alternating on bus)
* Another feature is PCI burst;
* Here address is sent along with the data block
* Address is automatically incremented by bridge and adapter
* Every device on PCI has definite address
* PCI bus itself is an identifier
* The slot The PCI card is plugged into, also has an identifier
* Device itself has function numbers for each subunit
* Moving card changes address
* This is why windows discover new hardware
* Driver must find the device
* Initialization of device drivers requires to find any external device
* Software transparency: same command set and status definition , when communicating with PCI device or its expansion bus-oriented cousin

**Advantages:**

* As compared to ISA (Industry standard architecture) , PCI allows higher rate of data transfer and external devices connected to USB.
* Each devices connected to PCI bus has shared access to primary resources of computer through parallel connection
* Usually in ISA bus, its edge triggered , that is interrupts look for transition from 0-5 volts or vice-a-versa ,this makes it difficult to share interrupts because the PC may be busy when the transition occurs, if so edge is not recognized and request is not processed; however PCI bus provides Level triggered interrupts, interrupts requests are always serviced no matter when they occur
* Versatility;
* New devices can be added easily
* Peripheral devices can be used between computer systems that use same bus standard
* Low Cost:
* Single set of wires is shared in multiple ways
* Provides a way to manage complexity of design
* Device only has to implement the bus standard

Memory

I/o device

I/O device

Processor

Disadvantages:

* It creates communication bottleneck
* Bus bandwidth can limit maximum I/O throughtput
* Maximum bus speed is largely limited by:
* Length of the bus
* Number of devices on the bus
* Need to support range of devices with;
* Widely varied latencies
* Widely varied data transfer rate
* It connects only that many devices equal to number of slots present on PCI bus
* If the PCI bus is synchronous one, then every device on the bus must run at same clock speed
* To avoid clock skew , they cannot be long as they are fast
* Low arbitration latency
* Low complexity
* Reserved bandwidth of one system must be used on some other system
* Throttling of high bandwidth devices to prevent such devices from monopolizing the bus and disrupting reservation of other bus.

Applications:

* PCI for Imaging and Machine vision applications,for image processing PCI lets applications stream live video to a display or system memory , virtually eliminating the need for costly onboard memory
* Real Time display , non-destructive overlays: Data translation PCI Mac series, allows us to display real time , live video with non-destructive overlays, without adding costly display hardware to the frame gabbler , this offers various advantages over traditional frame gabblers; including following features;
* Minimal CPU bandwidth;

Leaving the CPU free to perform image processing or other tasks, ideal for applications where display video and processing occurs simultaneously

It allows stage free image processing, smooth processing, image flow

* Upgarde compatibility: We can upgrade it using compatible graphic card, we can upgrade it by simply loading new driver
* Validated Payement Applications:
* Functioning of PCI bus is designed in such a way that Valid payments can be made
* available through PCI bus
* Developing applications which emphasis on high speed I/O data communications and networking systems are reviewed, it also includes moving functionality from host computer to destination computer or logical subsystems with new intelligent subsystems.