Specializing in IT Service Optimization

TeamQuest®

Server Virtualization: The Essentials

Part 1 of 4

Jim Smith
TeamQuest

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Agenda

- Server Virtualization: The Essentials
  - What is virtualization?
  - Why consolidation and virtualization?
  - Advantages of Virtualization
  - Disadvantages of Virtualization
  - Different Approaches
  - CPU Measurements

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What is virtualization?

- Virtualization creates a level of indirection or an abstraction layer between a physical object and the managing application.
- Storage virtualization refers to the presentation of a simple file, logical volume or other storage object (ie. disk drive) to an application in such a way that allows the physical complexity of the storage to be hidden from both the storage administrator and the application.
- Virtualization involves the process of presenting computing resources in ways that users and applications can easily get value out of them, rather than presenting them in a way dictated by their implementation, geographic location, or physical packaging.
- Virtualization is an abstraction layer that decouples the physical hardware from the operating system to deliver greater IT resource utilization and flexibility.

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Why consolidation and virtualization?

- Mainframes (Centralized Computing)
- Open Systems (Distributed Computing)
- Computer Sprawl (Application-driven)
- Service Level (Business-driven)

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Advantages of Virtualization

- Increased server utilization
- Rapid service deployment
- Hidden complexity
- Reduction of datacenter footprint

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Disadvantages of Virtualization

- Administration complexity
- Skilled personnel
- Confusion over different approaches
- Confusion regarding standard statistics
- Licensing issues

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Different Approaches

- IBM (AIX)
- Hewlett-Packard (HP-UX)
- Sun Microsystems (Solaris)
- VMware (ESX)
- Microsoft (Windows Virtual Server)

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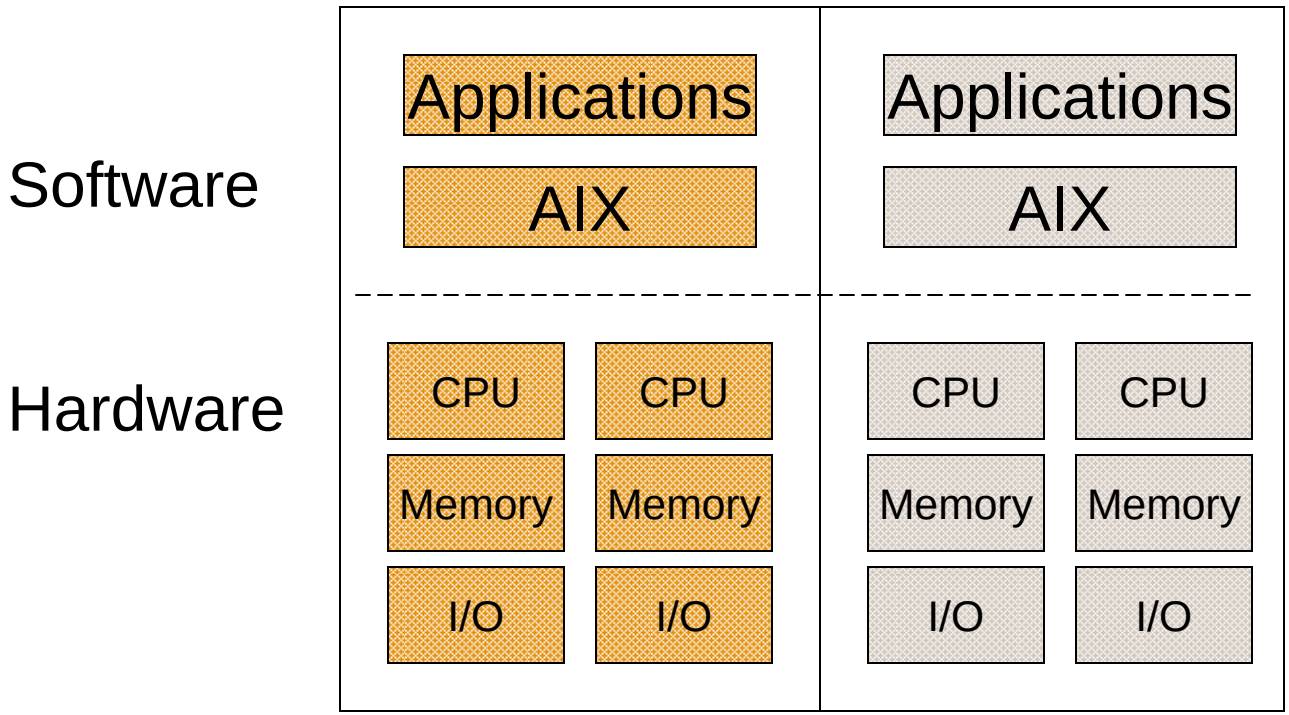
Different Approaches: IBM LPARs



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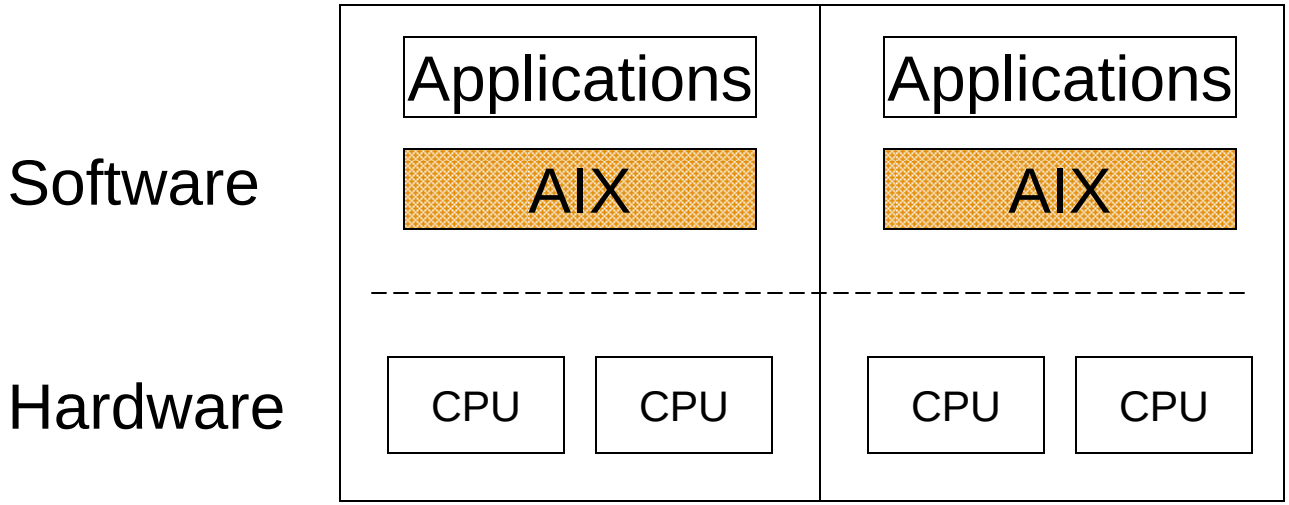
Different Approaches: IBM LPARs

- Single OS in each LPAR
- CPUs are not shared across LPARs
- CPUs are provisioned by whole CPUs



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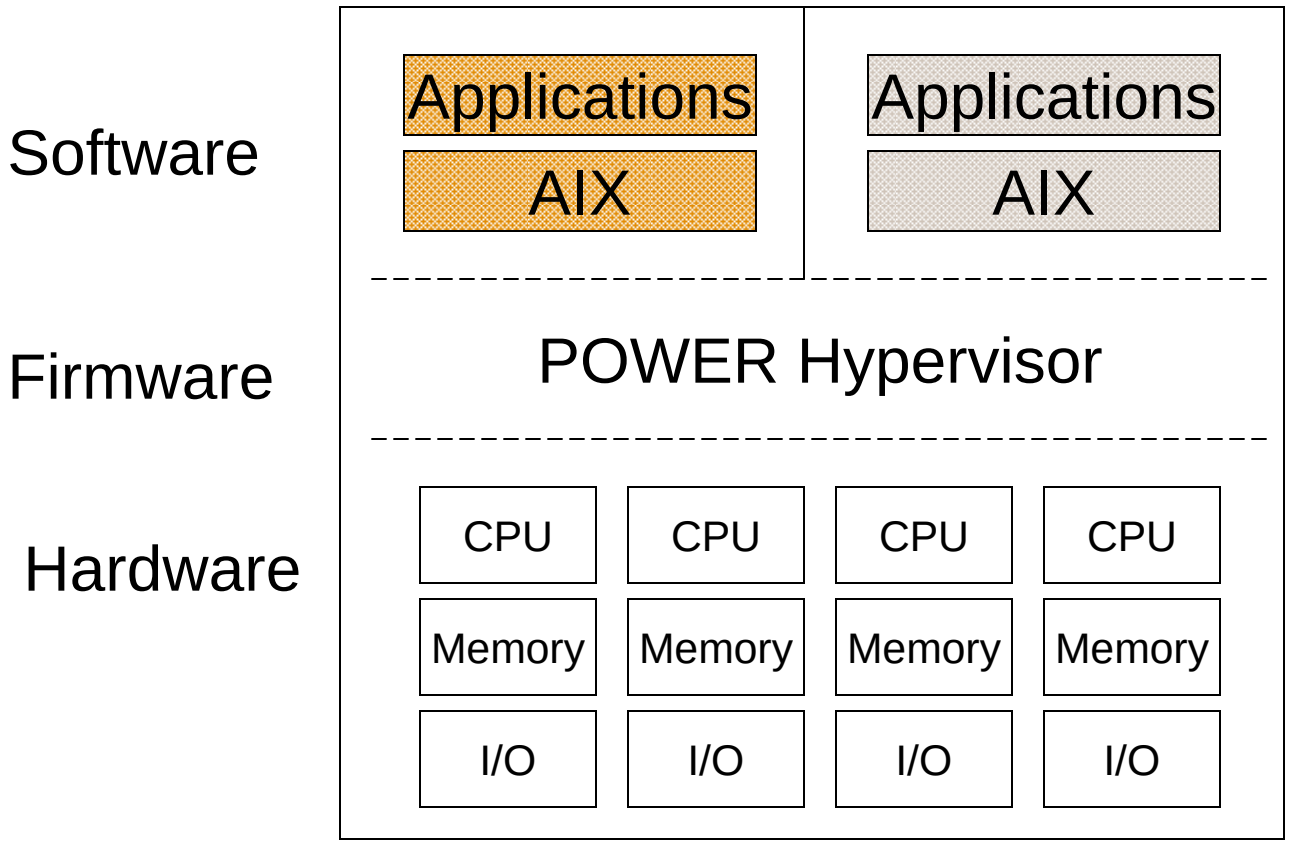
Different Approaches: Firmware, IBM Micropartitions



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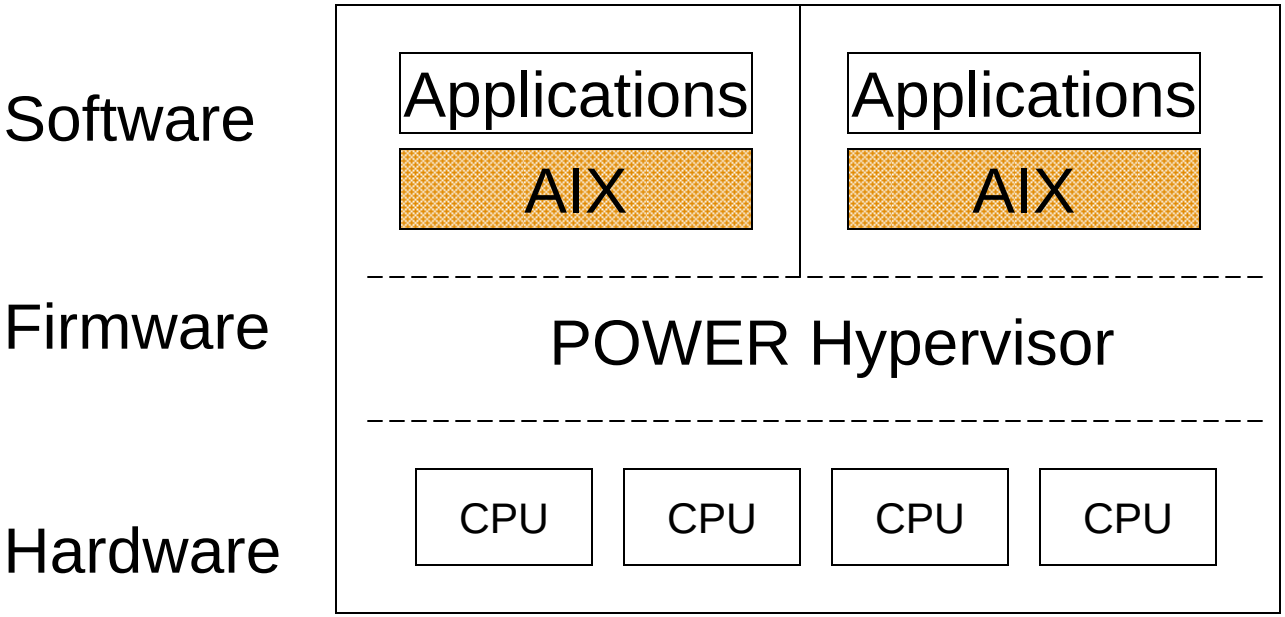
Different Approaches: Firmware, IBM Micropartitions

- Multiple OSs
- Partial CPU configuration
- CPUs can be shared across LPAR
- AIX sees physical and virtual CPUs



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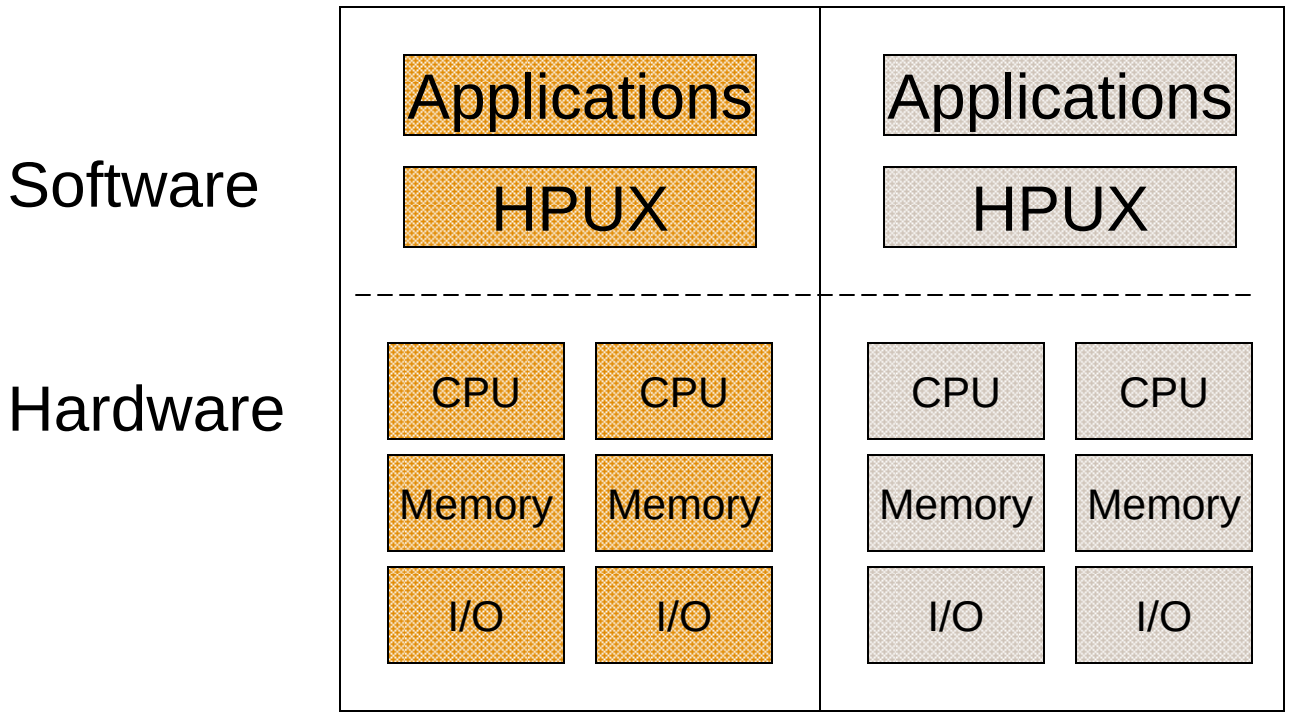
Different Approaches: Hardware, NPAR



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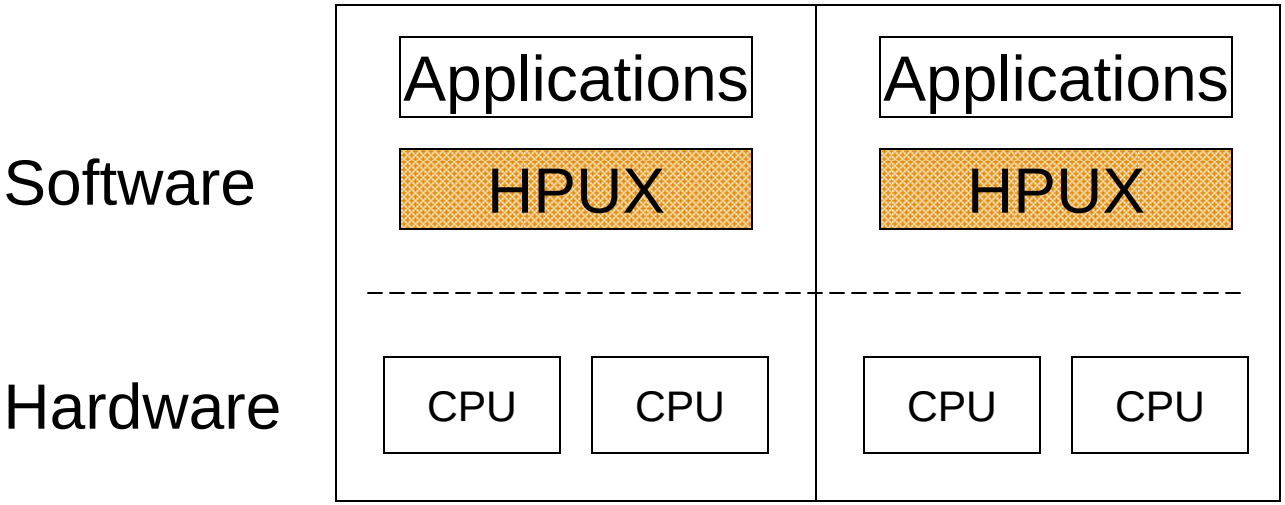
Different Approaches: Hardware, NPAR

- Single OS in each NPAR
- CPUs are not shared across NPAR
- CPUs are provisioned by whole CPUs



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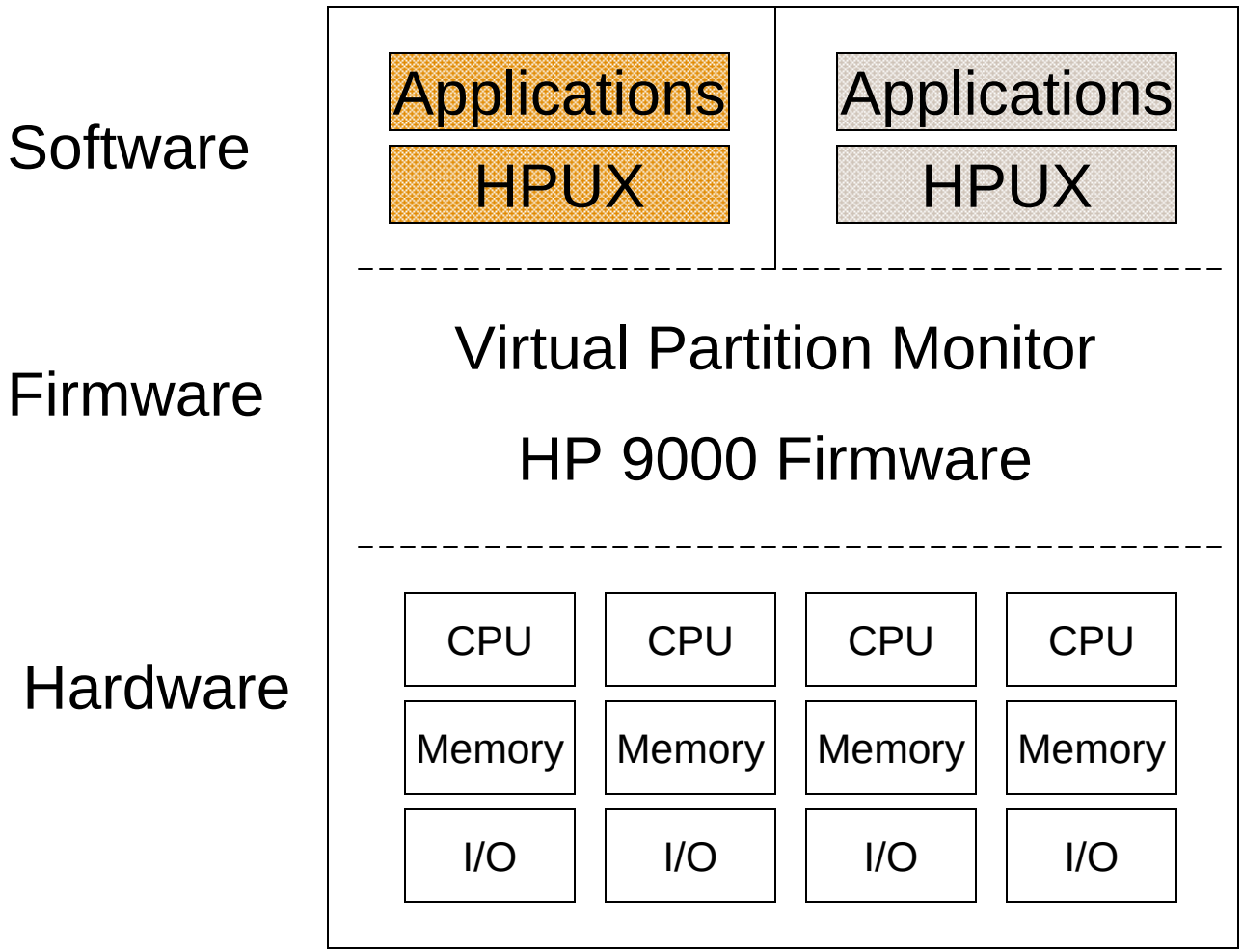
Different Approaches: Firmware, HP VPAR



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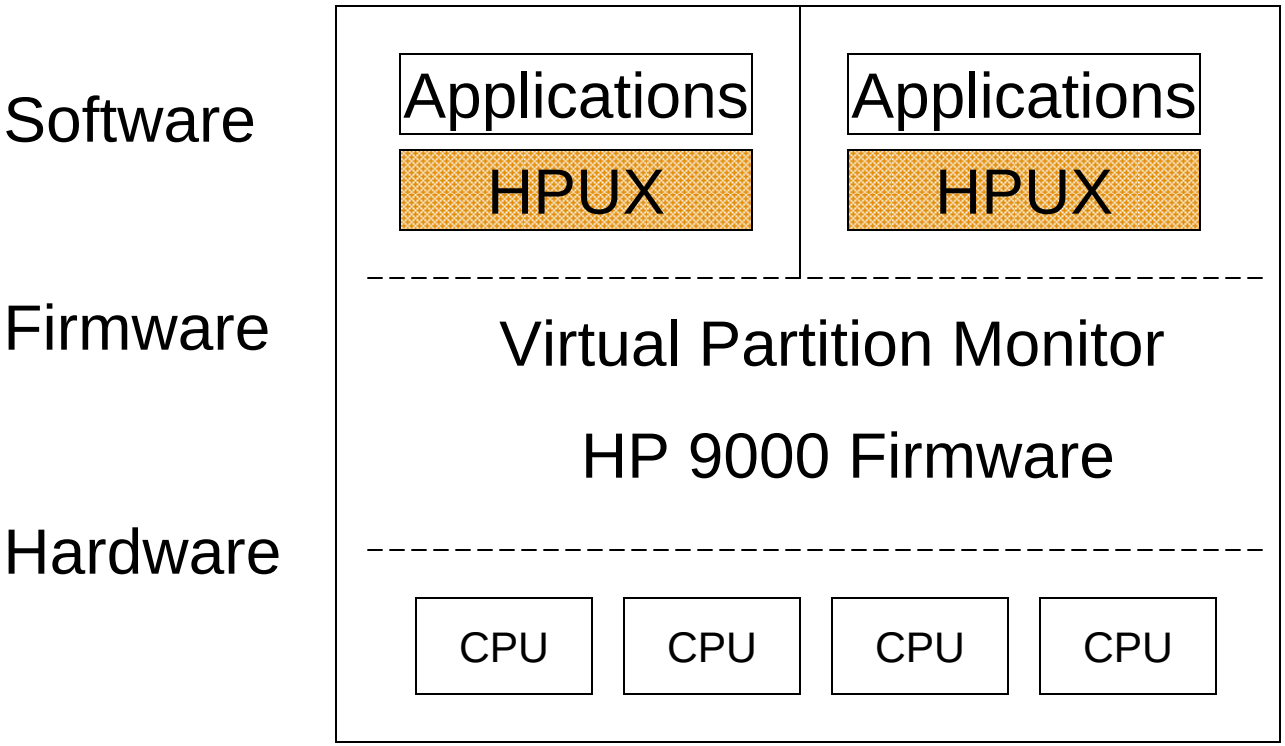
Different Approaches: Firmware, HP VPAR

- Multiple O.S.s
- No Partial CPU configuration (Core Granularity)
- CPUs can be shared across VPAR



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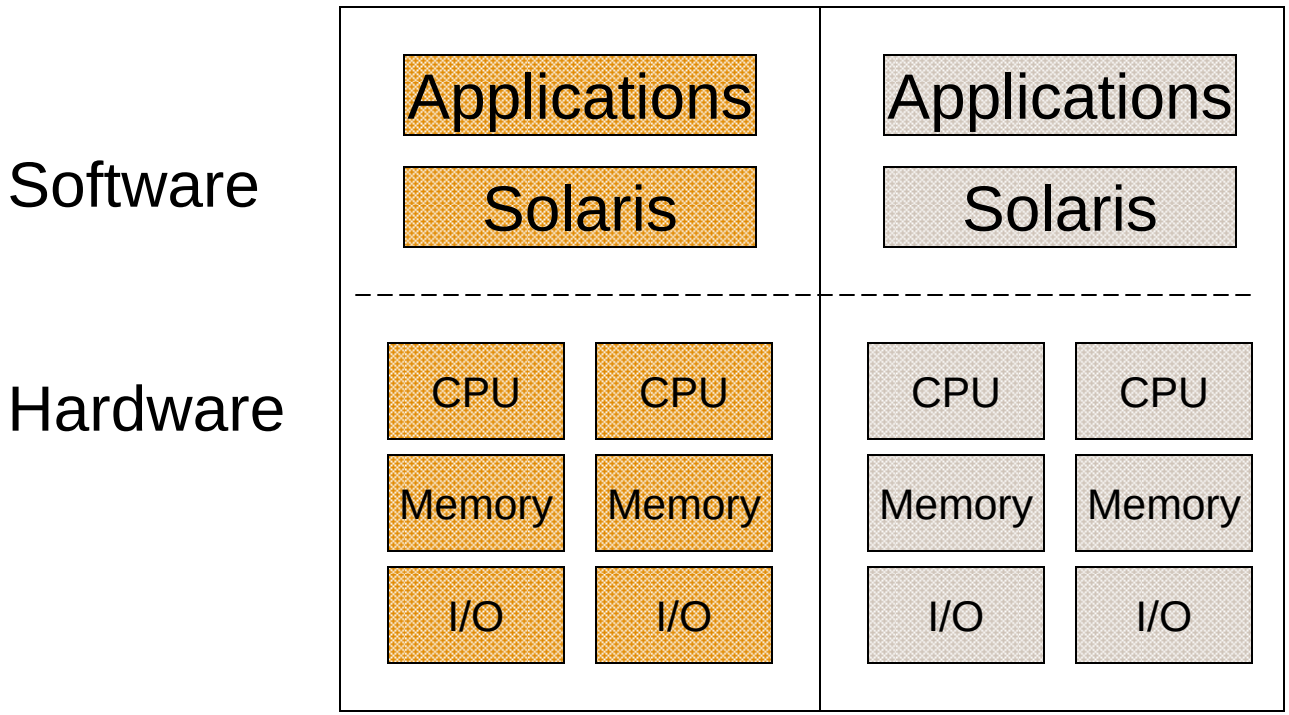
Different Approaches: Hardware, Sun Domains



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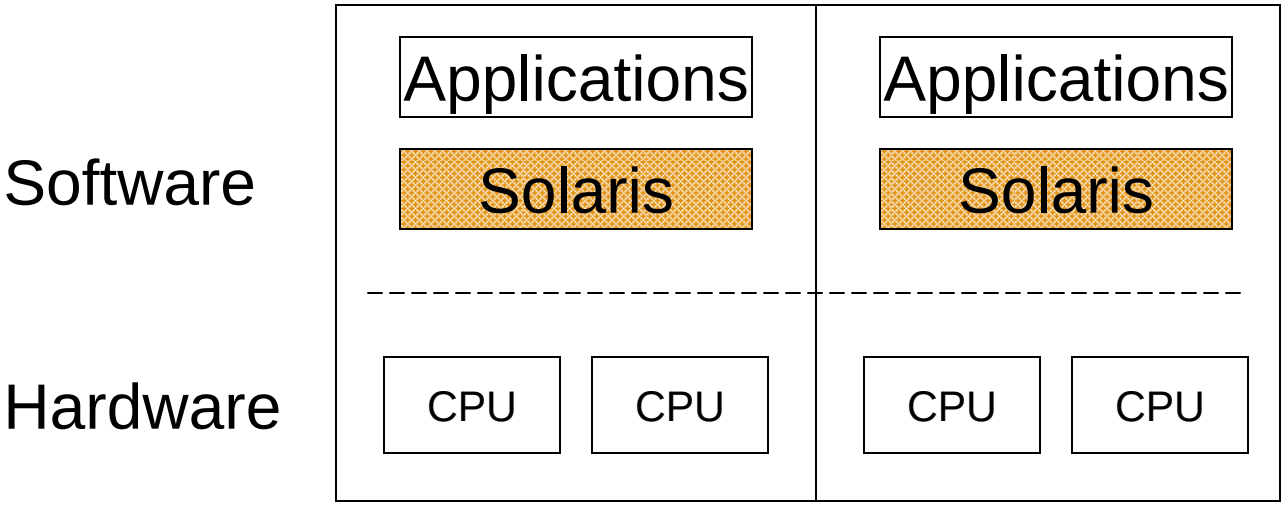
Different Approaches: Hardware, Sun Domains

- Single OS in each domain
- CPUs are not shared across domains
- CPUs are provisioned by whole CPUs



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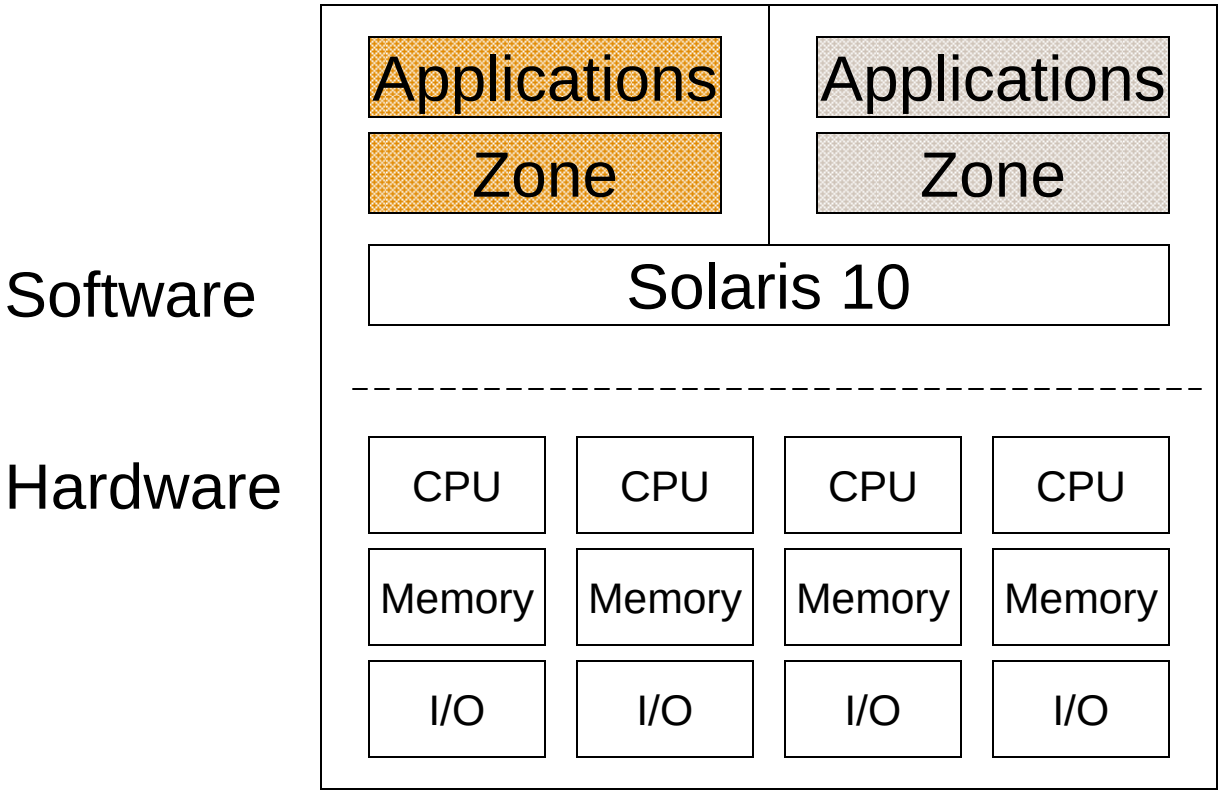
Different Approaches: Software, Solaris Zones



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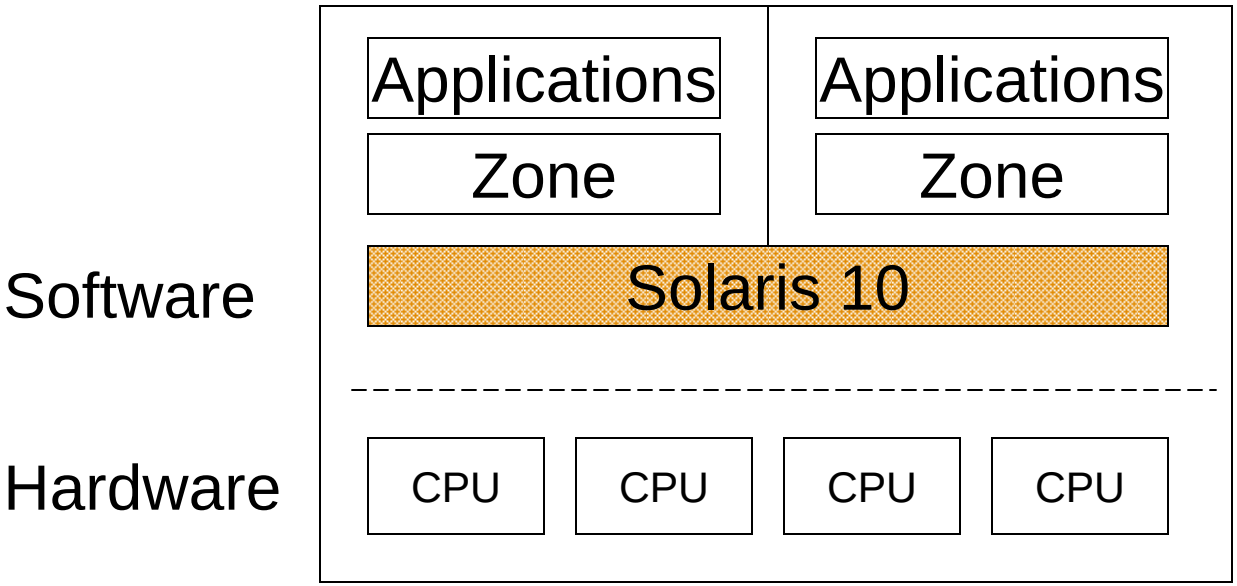
Different Approaches: Software, Solaris Zones

- Single OS
- Physical CPUs are visible to the OS



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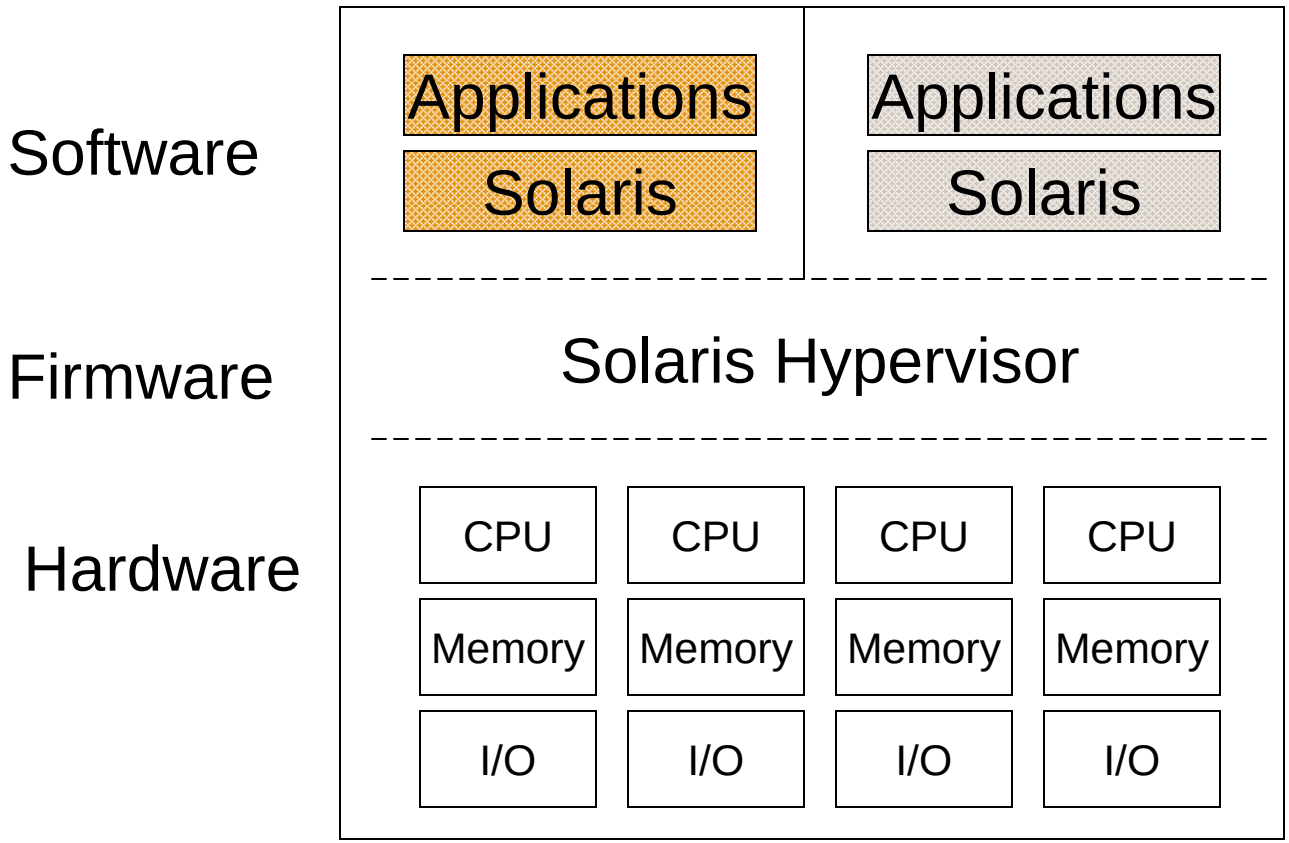
Different Approaches: Firmware, Solaris LDOMS



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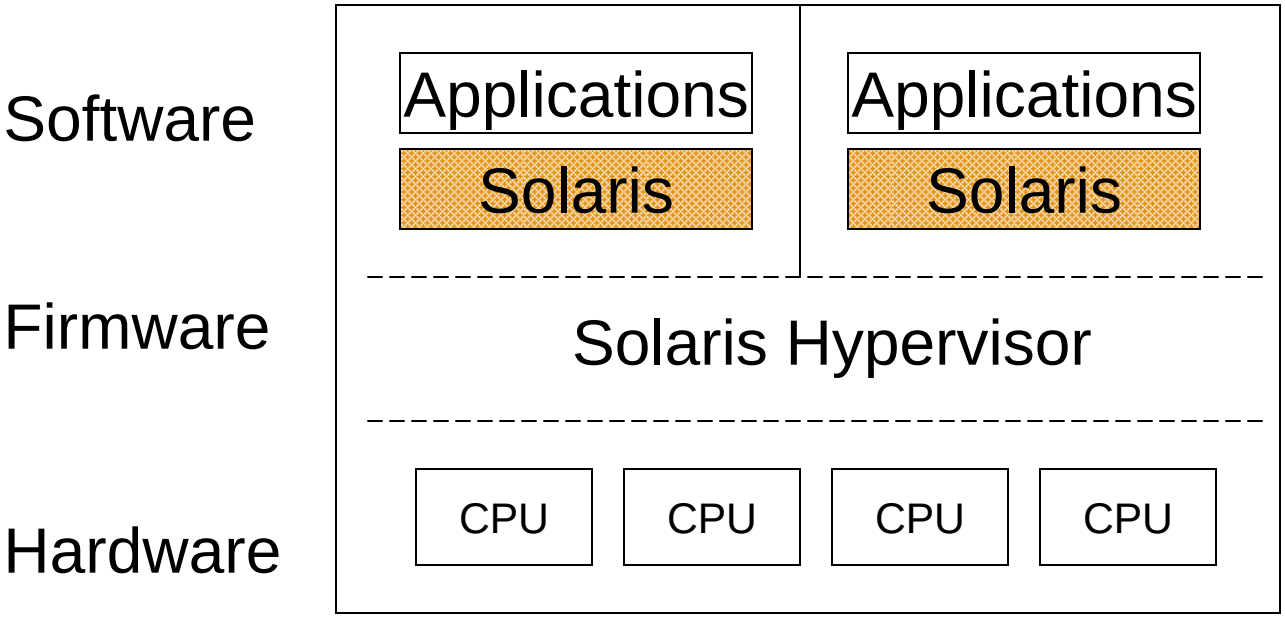
Different Approaches: Firmware, Solaris LDOMS

- Multiple OSs
- Partial CPU configuration
- Solaris sees physical and virtual CPUs



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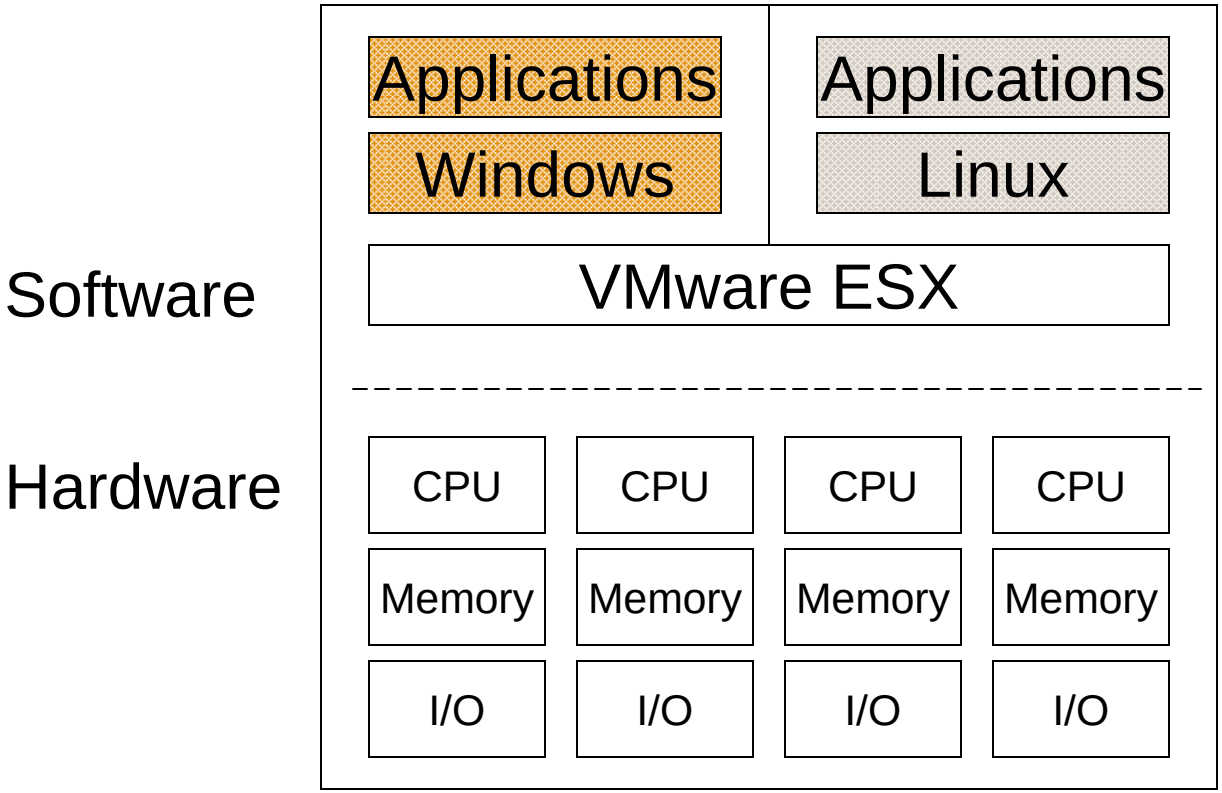
Different Approaches: Software, VMware ESX Server



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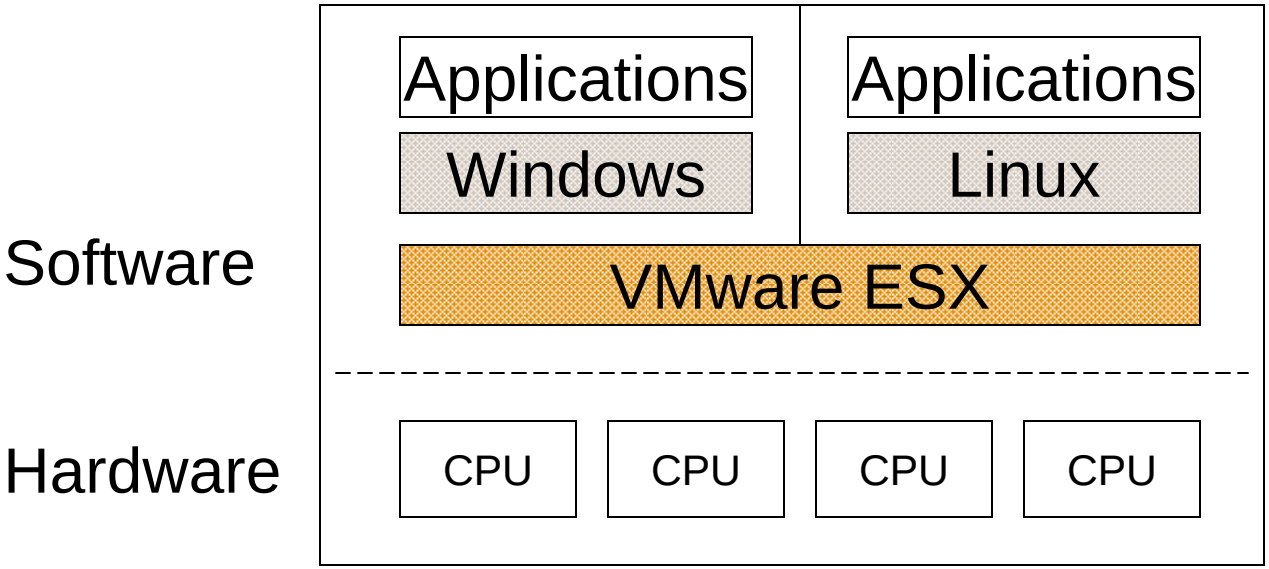
Different Approaches: Software, VMware ESX Server

- Single “host” OS
- Physical CPUs visible to the host OS
- “Guest” OS sees virtual CPUs



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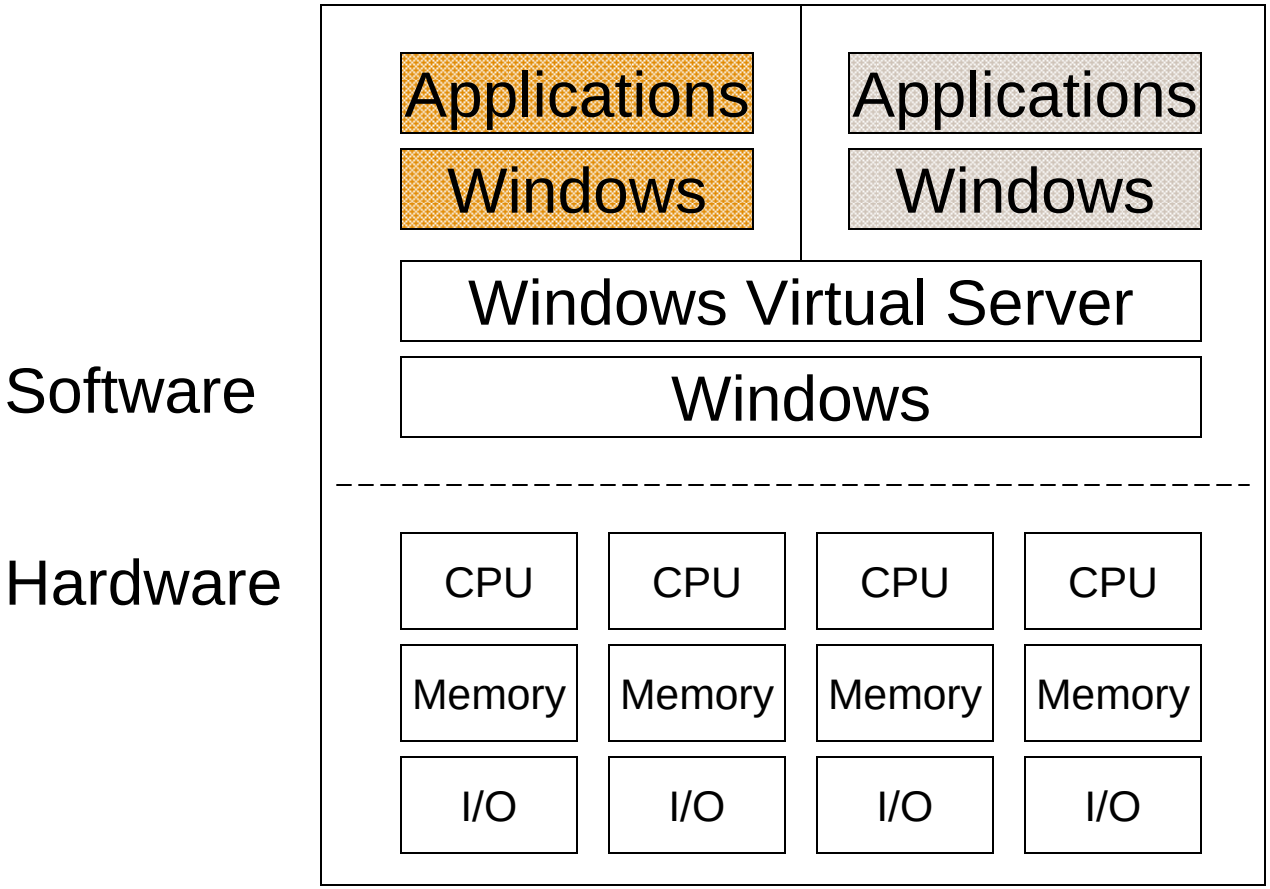
Different Approaches: Software, Windows Virtual Server



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Different Approaches: Software, Windows Virtual Server

- Single “host” OS
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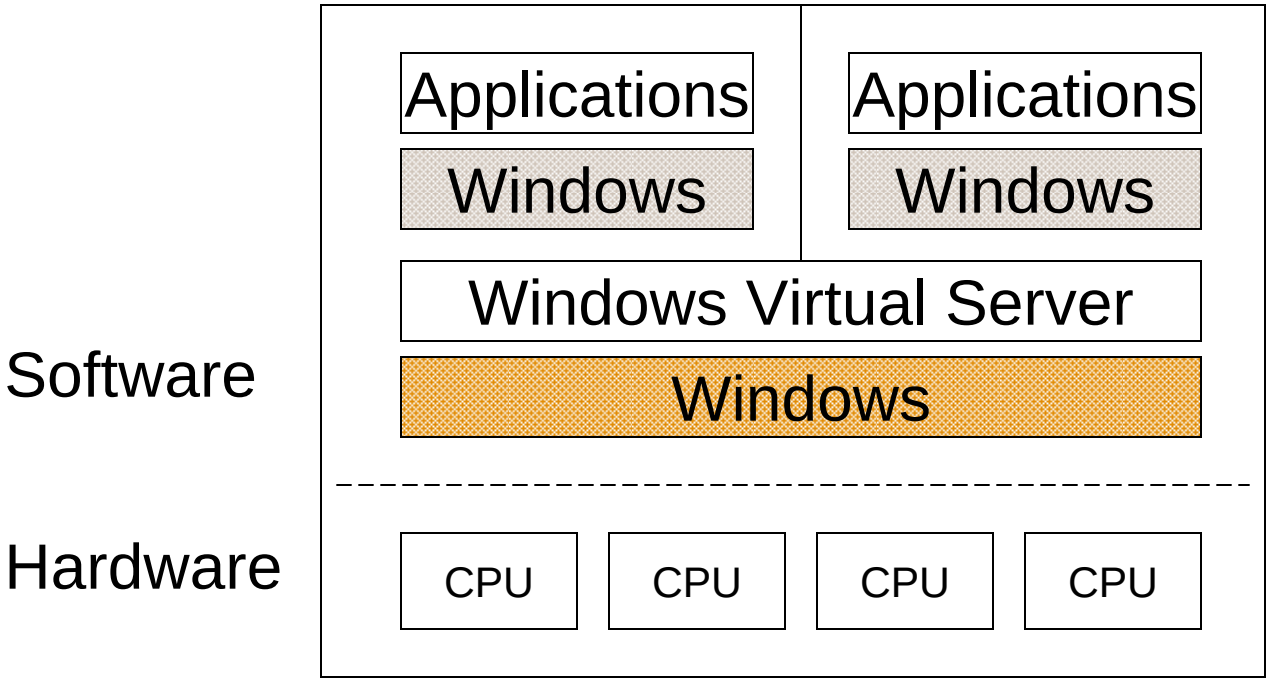

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CPU Measurements

- Traditional CPU measurements now have very different meanings
- CPU measurements are gathered from operating system APIs
- Pay close attention to where you look for CPU resource usage
- There is still real hardware somewhere

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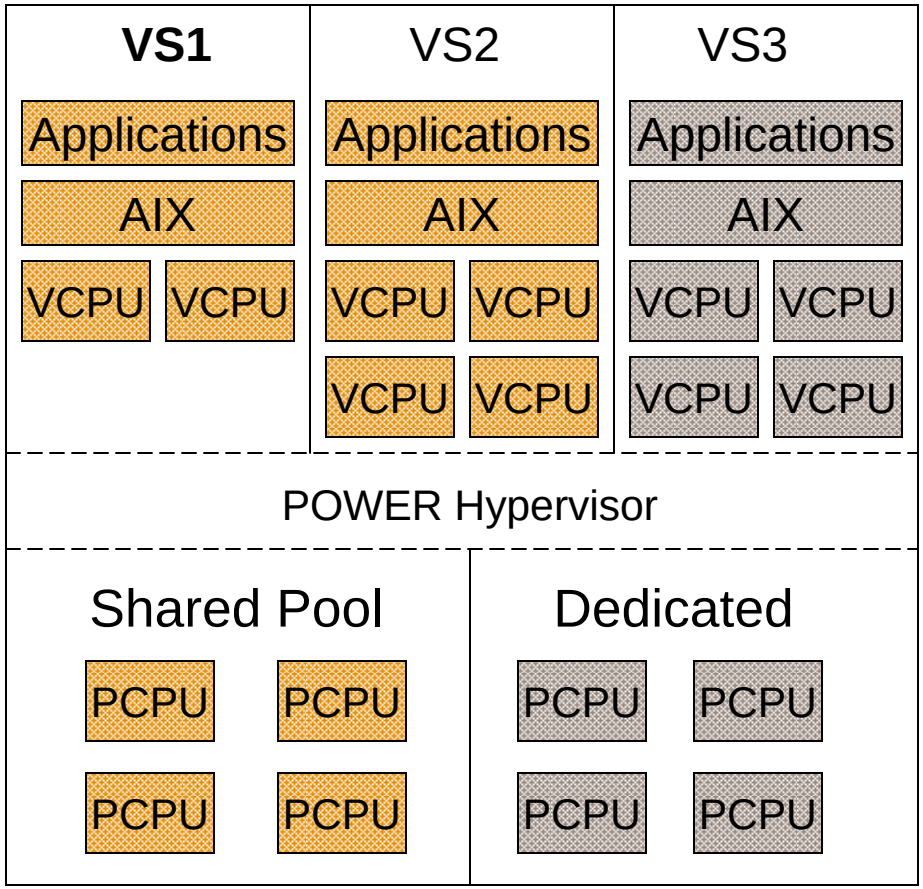
Example Configuration – IBM Micropartition

- VS1 Configuration
  - 2-Virtual CPUs, 1-Entitled Capacity
  - Capped, SMT off, Shared Processor Pool
- Single process running in VS1 using 45 seconds of a physical CPU in a 60 second interval



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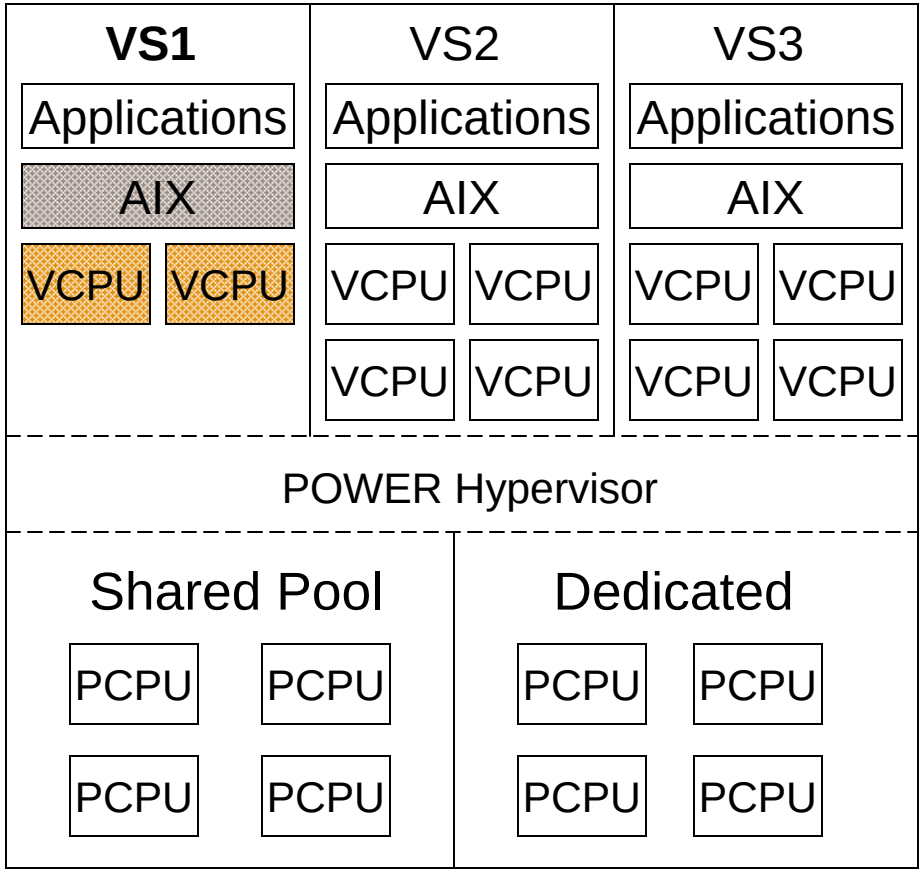
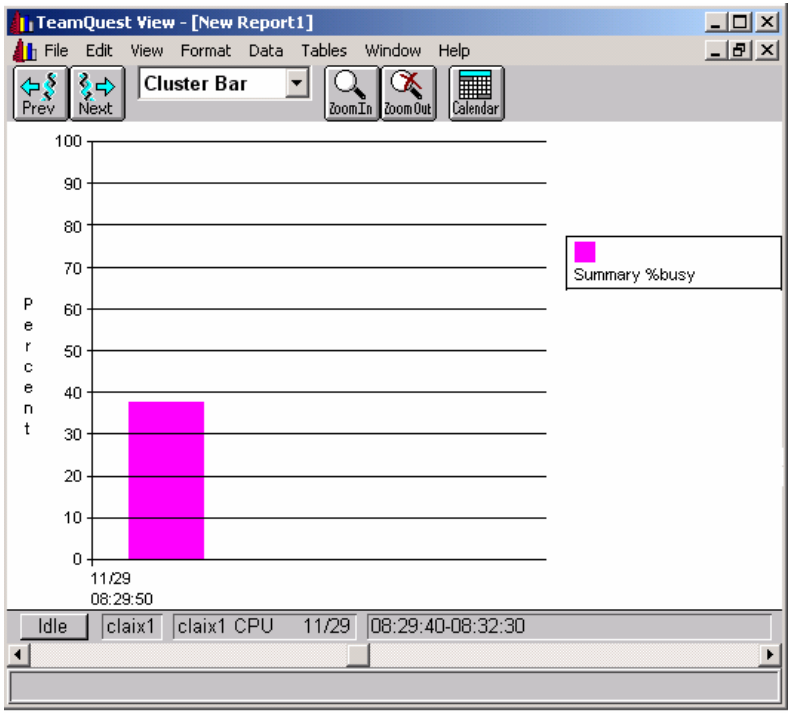
Virtual Processor

CPU:Summary::%busy

The percentage of the virtual processor capacity consumed. Affected by both SMT and Capping.





%busy = 37.5%

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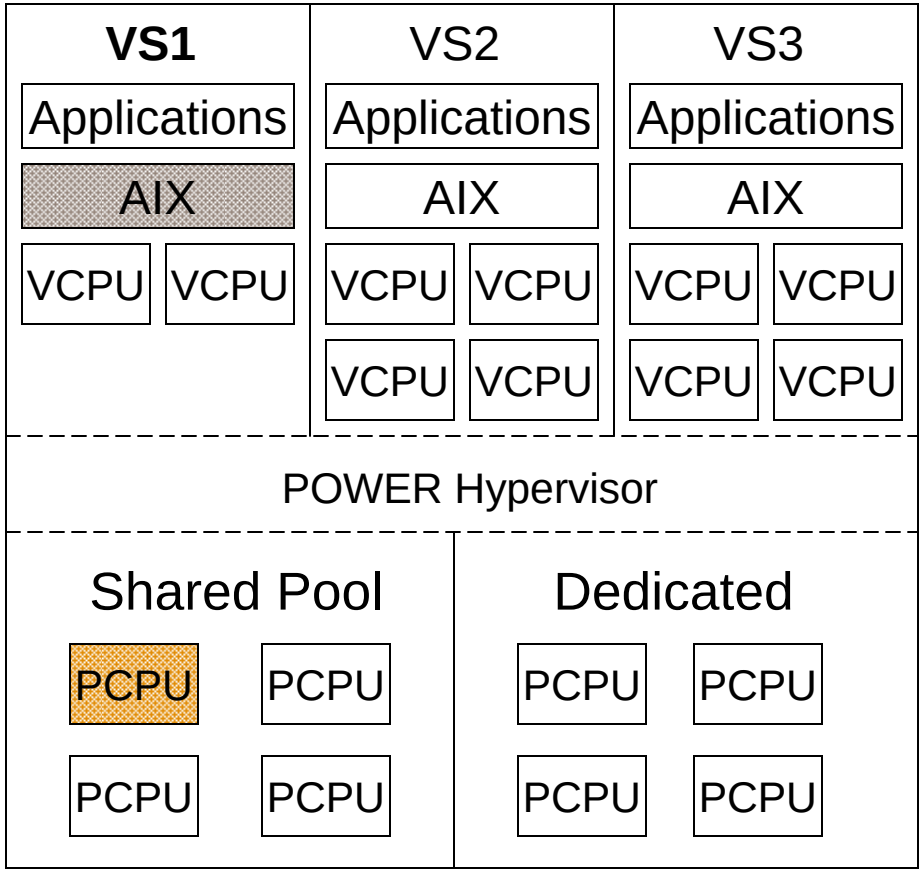
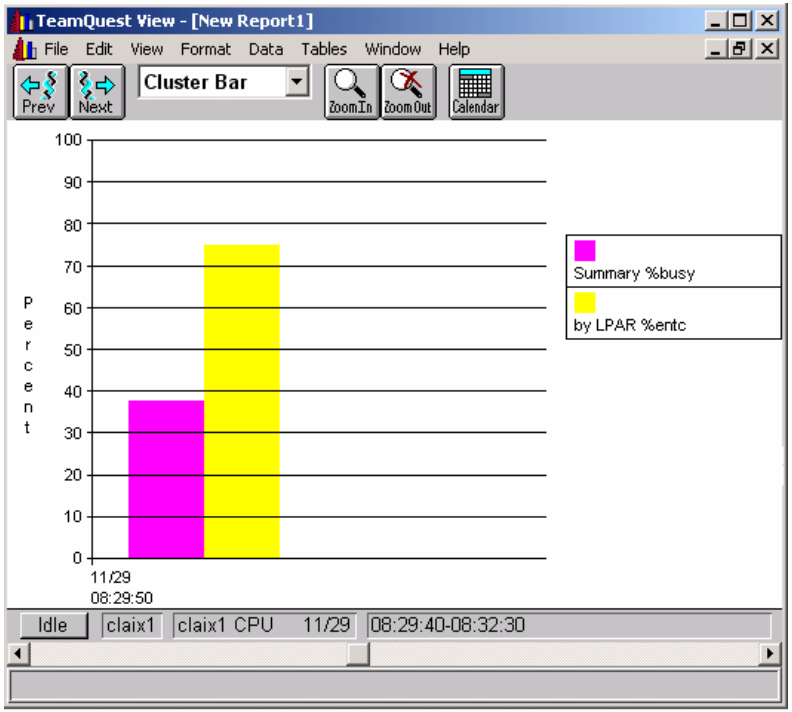
Entitled Processor

CPU:by LPAR::%entc

The percentage of the entitled processor capacity consumed by the partition.





%entc = 75%

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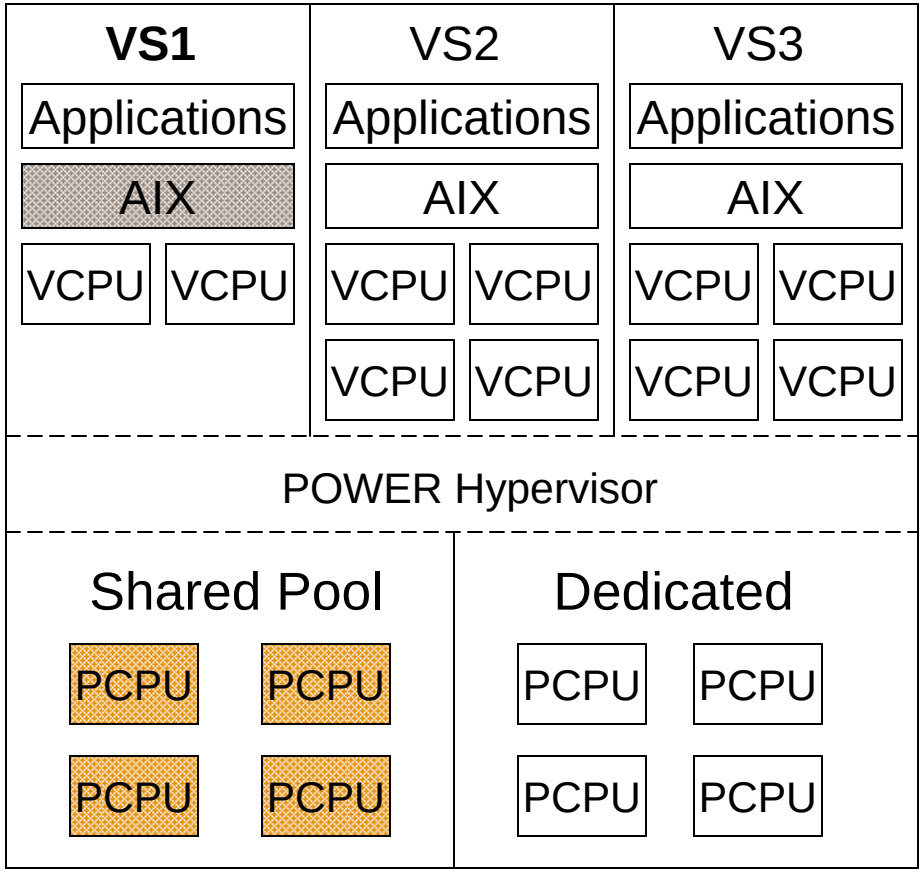
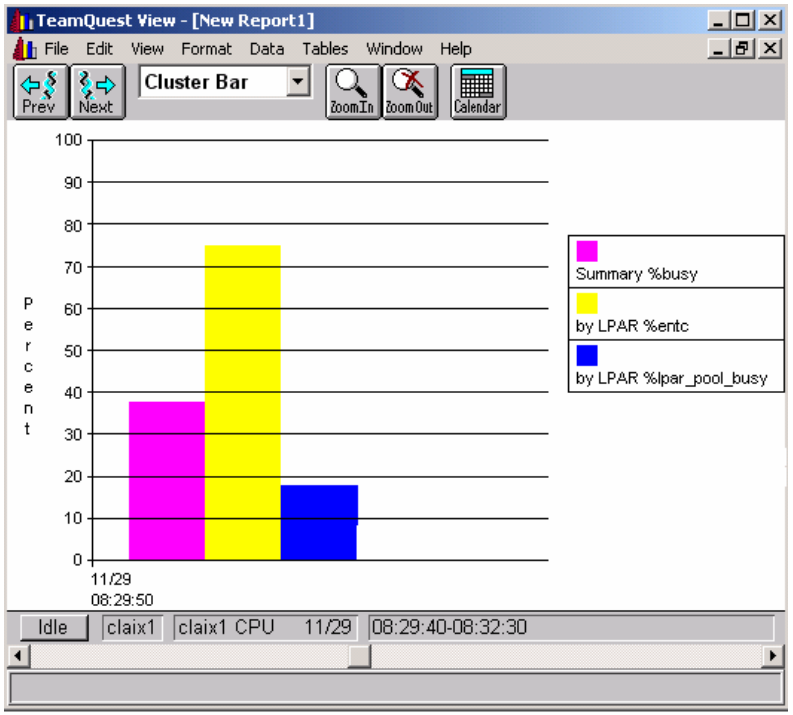
Processor Pool

CPU:by LPAR::%lpar_pool_busy

The percentage of the processor pool capacity consumed by the partition.





%lpar_pool_busy = 18.75%

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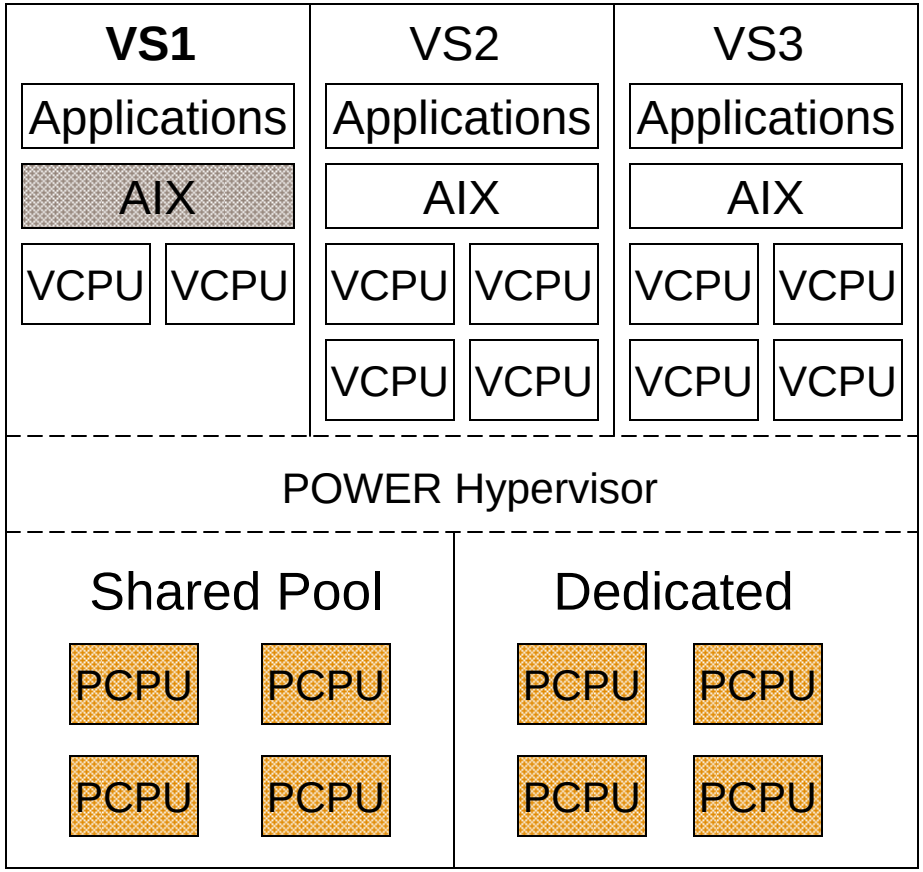
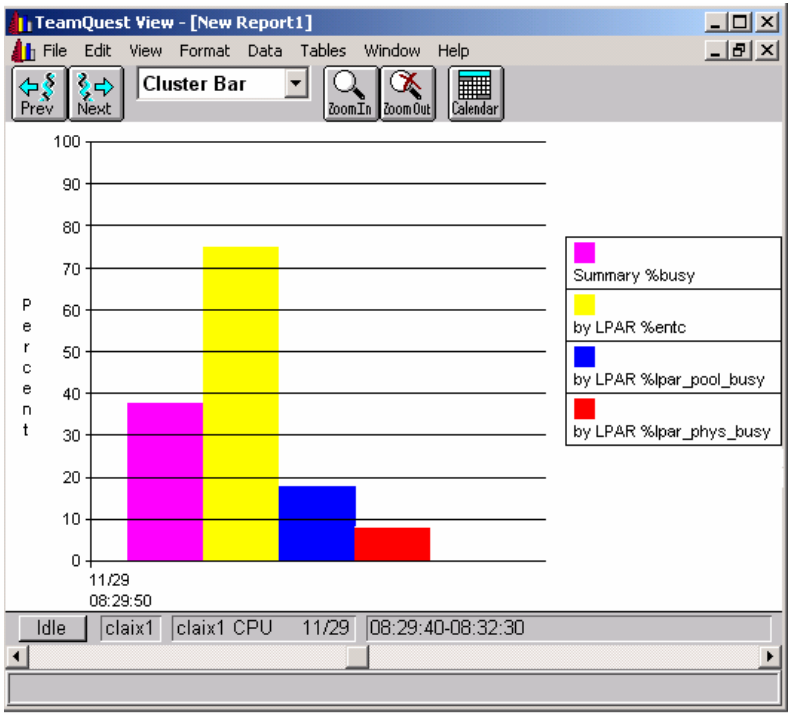
All Processors

CPU:by LPAR::%lpar_phys_busy

The percentage of the physical processor capacity consumed by the partition.





%lpar_phys_busy = 9.38%

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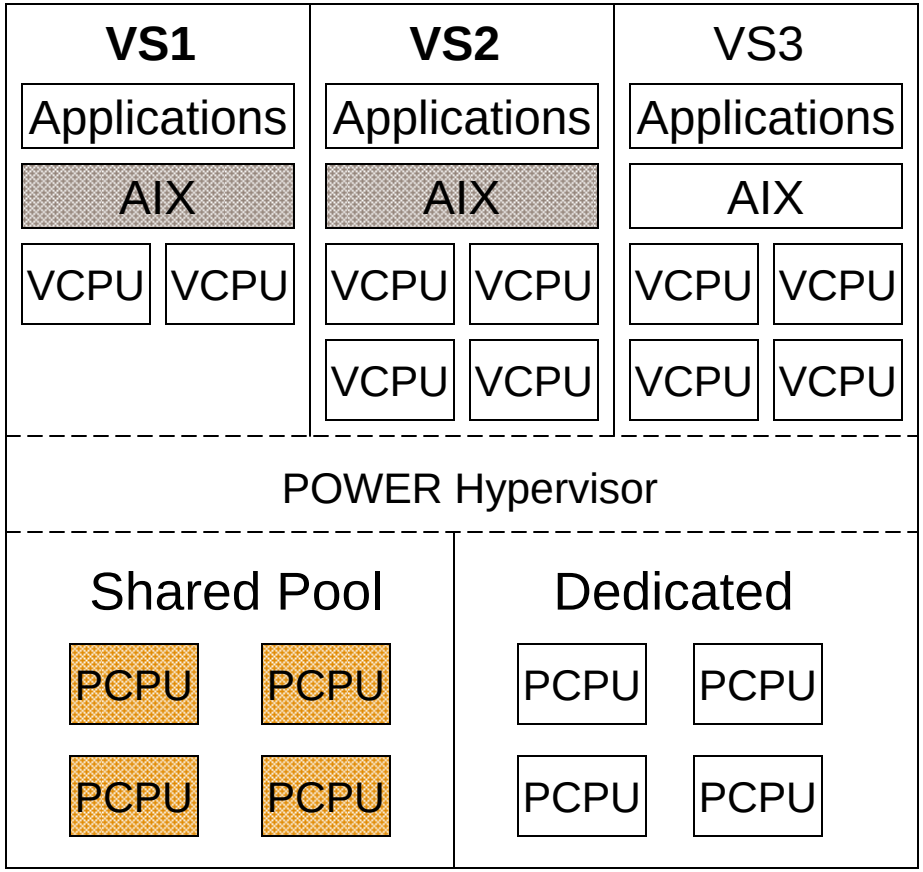
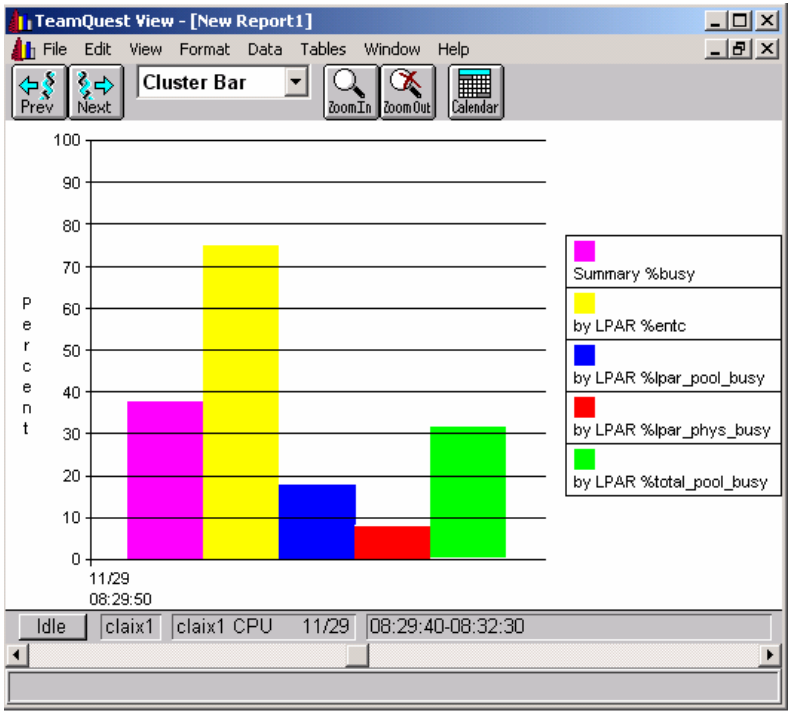
Processor Pool

CPU:by LPAR::%total_pool_busy

The percentage of the processor pool capacity consumed by all partitions using the pool.





%total_pool_busy = 32%

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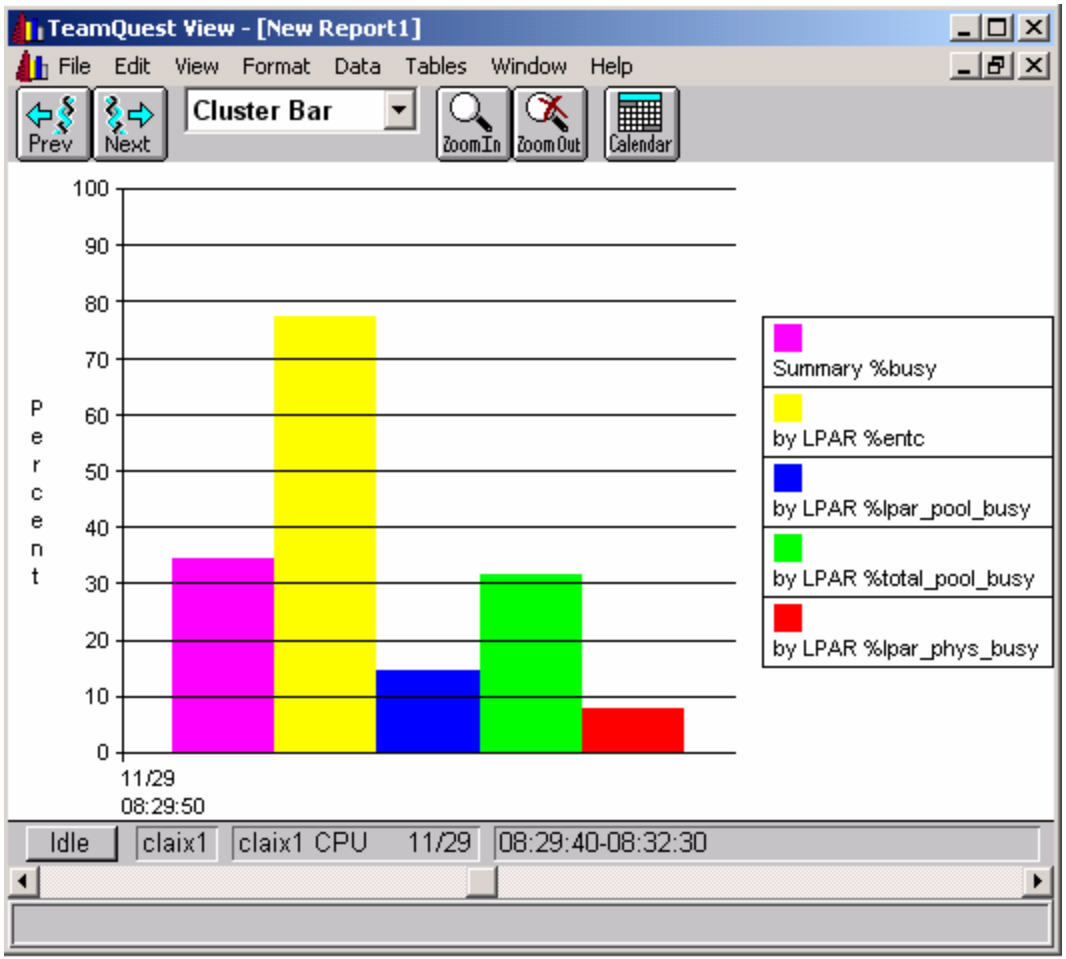
CPU Chart



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Additional Statistics

CPU:by LPAR::physc

The number of physical processors consumed by the partition.

CPU:by LPAR::app

The number of available processors in the shared pool.

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Is Capacity Planning Important?

- What happens to response times when activity changes?
- When will my guest get “full”?
- When will my application activity exceed my server capacity?
- When will my application activity exceed my cluster capacity?
- TeamQuest solutions tell you what you will need before you need it

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Conclusion of Part 1

For more discussion on this topic, please contact Jim Smith at: jim.smith@teamquest.com

To view demos on how to better manage the capacity of virtualized VMware ESX, Sun Solaris and IBM AIX server environments, simply close this video and return to the TeamQuest website

Thank you for joining us.

For Capacity Planning solutions please call:

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