Virtualization Benefits
Virtualization Benefits

- **Increase Utilization**
  - Non-virtualized servers often run at low average utilizations levels.
  - Idle resources on dedicated servers are often not usable.
  - Virtualized servers can run at high utilization levels and can share resources.

- **Simplify Workload Sizing**
  - Sizing new workloads is difficult.
  - LPARs can be resized to match needs.
  - Can over commit capacity.
  - Scale up and scale out applications.
Virtualization Benefits

- **Repurpose Assets**
  - Scale out servers are usually architected with a specific application in mind.
  - Virtualized servers can easily be changed to match a different requirement

- **Reduce Limited Use Servers**
  - DR and/or HA can often be combined with other functions on the same server
  - Resizable LPARs allow high volume testing without dedicated equipment
Virtualization Benefits

- **Rapidly Deploy New Workloads**
  - New workloads can be added quickly to a virtual pool reducing the time to value
  - LPARs can also be de-provisioned when no longer needed
  - Capacity on-demand can enhance this capability

- **Simplify Provisioning**
  - Virtualized servers have fewer physical dependencies
  - Automated provisioning is easier
Virtualization Benefits

- **Reduce I/O Infrastructure**
  - Shared I/O can reduce the time spent cabling physical servers
  - Virtualized I/O can also reduce adapter, port, and wiring costs.

- **Improve Networking**
  - Low latency in-the-box communications
  - Improved networking security
  - Reduced application response time
Virtualization Benefits

- Reduced Asset Management
  - Fewer servers to order, install, track, maintain, and retire.
  - Reduced floor and rack space

- Reduced Server Variation
  - Server technology is changing rapidly
  - It is very difficult to minimize the number of server models, drivers, BIOS levels, etc.
  - Virtualized servers can significantly reduce complexity due to variation
Virtualization Benefits

- **Simplify Disaster Recovery**
  - Virtualized images are easier to re-deploy on different physical hardware
  - Non-critical work can be shutdown as required
  - Virtual production and virtual DR servers do not have to match exactly

- **Ease Software Upgrades**
  - New software versions can be loaded on the same hardware
  - When the new version is ready, the LPAR can take over the previous resources
  - Allows rapid upgrade and/or fail back
Virtualization Benefits

- **Reduce Power and Cooling**
  - Virtualization allows servers to run at high utilization levels
  - Servers running at higher utilization typically use power more efficiently
  - Power and cooling costs are expected to become the dominating factor for a 5 year

- **Reduce Software Costs**
  - Virtualized servers may lower software costs
  - Running at higher utilizations can translate into fewer CPUs to license
Virtualization Benefits

- **Provide Partition/VM Mobility**
  - Ability to move running LPAR from server to server.
  - Improves application availability

- **Future Directions**
  - Server and network performance continues to grow
  - A dedicated model will continue to put more and more unused assets on the floor.
Virtualization - Consider Organizational Changes

- Virtualization is a significant trend within the computer industry.

- Virtualization provides the following benefits:
  - Reduced costs – hardware, software, people, environmental
  - Reduced time to market for business applications
  - Improved qualities of service – application availability, security, scalability

- Organizations may need to change how:
  - Equipment is procured – acquiring/justifying dedicated servers on a project by project basis is not conducive to virtualization.
  - Communication with end users – service needs to be framed in terms such as quality of service, response time, capacity, etc. – not hardware configurations.
  - Assets owned by IT not tied to a project or business unit.
  - Capacity management – capacity needs to be monitored / managed as part of shared organizational resource
Live Partition Migration
The HMC creates a compatible partition shell on the destination system
The HMC configures the mover service partitions on the source and destination systems
The HMC issues a prepare for migration event to the source operating system
The HMC creates the necessary virtual SCSI devices in the destination system’s VIOSes
The source mover starts sending partition state to the destination mover
Once sufficient pages have moved, the Hypervisor suspends the source partition
During the suspension, the source mover partition continues to send partition state information
The mobile partition resumes execution on the destination server
The destination partition retries all pending I/O requests that were not completed
When the destination mover partition receives the last memory page the migration is complete
Live Partition Mobility

1. **Power6 System #1**
   - **AIX Client 1**
     - M M M M M M M
     - en0 (if)
     - ent1
     - vscsi0
     - ent0
     - fcs0
     - ent2 SEA
   - **VLAN**
   - **PowerVM**
   - **Mover Service**
   - **VASI**

2. **Power6 System #2**
   - **AIX Client 1**
     - M M M M M M M
     - en0 (if)
     - ent1
     - vscsi0
     - en2 (if)
     - ent2 SEA
   - **VLAN**
   - **PowerVM**
   - **Mover Service**
   - **VASI**

3. **HMC**

4. **Storage Subsystem**

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**Process:**

1. Create virtual SCSI devices
2. Create shell partition on target system
3. Validate environment for appropriate resources
4. Start migrating memory pages
5. Once enough memory pages have been moved, suspend the source system
6. Finish the migration and remove the original LPAR definitions
7. Repeat the process for the second partition.
Live Partition Mobility Components

- **Hardware Management Console (HMC)**
  - Central point of control for migration

- **Resource Monitoring and Control (RMC)**
  - A distributed framework and architecture that allows the HMC to communicate with a managed logical partition

- **Dynamic LPAR Resource Manager**
  - HMC uses this capability to remotely execute partition specific commands.

- **Virtual Asynchronous Services Interface (VASI)**
  - Used by the mover service to communicate with the Hypervisor

- **Mover service partition**
  - Function that asynchronously extracts, transports, and installs partition state
  - Not used for inactive migrations

- **Virtual I/O Server (VIOS)**
  - Only virtual devices can be migrated
Live Partition Mobility Requirements

- **Live Partition Mobility Requirements**
  - The source and destination servers must be POWER6
  - The mobile partition must be
    - AIX 5L Version 5.3 Technology Level 7 or later, AIX Version 6 or later
    - Red Hat Enterprise Linux Version 5 (RHEL5) Update 1 or later
    - SUSE Linux Enterprise Services 10 (SLES 10) Service Pack 1 or later.
    - Both the source and destination systems must be at firmware level eFW3.2 or later
    - Virtual I/O Server at release level 1.5 or higher
  - A VIOS must be defined on each system with the move partition attribute set to TRUE and a VASI device defined and configured.
  - Network connectivity to source and destination partitions (via the VIOS), source and destination VIOSes, source and destination mover partitions and HMC must exist.
  - No required or physical I/O devices
  - All disks (O/S and applications) must be defined using external PV-VSCSI disks
  - The logical memory block size must be the same on the source and destination server.
  - The mobile partition must not be using huge pages
  - The mobile partition must not be configured with barrier synchronization registers
  - The mobile partition name must not already be in use on the destination system.
  - Adequate processors, memory, and virtual slots must be available on the destination system.
  - The destination VIOSes must have access to all the LUNs used by the mobile partition.
Thank You!