Agenda

• Introduction
• Overall Consolidation Project
• Process
• Analysis and Strategy
  – Business Objectives and Metrics
  – Discovery and Inventory
  – Financial
• Architect and Validate
  – Analysis and Sizing
• Detailed Design
• Implementation
• Conclusions and Summary
• Additional Resources
Introduction
Definitions

• Critical Success Factors – Things that must be done to achieve your goals; strategic

• Best Practices – Guidelines to follow that will improve efficiency, performance, quality based on experience; tactical
IT Consolidation Requires a Balanced Approach
Steps for Consolidation Projects

1. Analysis & Strategy
2. Architect & Validate
3. Detailed Design
4. Implement
5. Manage
Possible Consolidation Projects

- r&d & engineering
- information
- business processes
- business applications

application and business process

- development & test servers
- compute servers
- messaging services
- file, print & infra servers

technology and infrastructure services

- database servers
- back office servers
- work place

- storage & backup
- printers
- networks
- facilities

IT governance & processes

- IT org
- tools
- support
- help desk

IT Consolidation Best Practices 7
Overall Consolidation Project
Overall Consolidation Project

• IT Champion that is committed to consolidation effort
  – From the start
  – Navigate the politics
  – Provide appropriate communications
  – Kick-off to get all parties affected involved
  – Not a one time deal
  – Rational way to get funding for the project

• IT Governance
  – Process
Overall Consolidation Project

- Time is not on your side
  - Effective consolidation analysis will take time (no quick fix)
  - Consolidation projects can be drawn out
- Once the designs/configurations are determined, stick with them
  - Value of speed
  - Don’t try to do it all at once
Overall Consolidation Project

• Phased approach to minimize impact

• Create a Consolidation Roadmap

• Create a Consolidation Project Management Office (PMO)

• Ensure realistic expectations are set with management as to what to expect with regards to cost savings, staff savings, risks, time, etc.
Customer Example - IT Optimization Futures Roadmap Project View

Distributed, Non-Standardized IT Environment

- Backup Server Consolidation
- File-n-Print Consolidation
- Web Server Consolidation
- Integrated Life-cycle Management (ILM) of Storage

Centralized, Standardized, Shared Services IT Environment (Improved Agility)

- SQL Server Consolidation
- Application Consolidation
- Asset Management
  (Common database of Intel/UNIX server hardware and software inventory)
- IT Service Management (ITSM)
  Improve Business-IT Processes
- Intel-UNIX Enterprise Management
  (cross platform systems management and help desk integration)
- Microsoft Exchange Migration
- Disaster Recovery Planning (DRP)
- Pre-Production Impact Assessment
  (lab facility with defined test processes and strategies)

Note: Projects build on the processes, infrastructure and experience gained from previous projects.

01-Mar-2004

HP WORLD 2004

Solutions and Technology Conference & Expo

31-Mar-2006
Overall Consolidation Project

- Team effort: Servers, Storage, Network, Financial, DBAs and Application owners

- IT and Business Unit Alignment

- Technology is not the major issue in consolidation projects

- Know the picture of where you want to go
Process
Process and Security

- IT Infrastructure Library (ITIL)
  - Change management
  - Configuration management
- HW and SW standardization
- Common Database of information about the IT environment
  - Configuration Management Database (CMDB)
- Automation
  - Event Management
  - Backups
  - Virus Protection
- Management across Platforms
  - Proactive
- Security / Disaster Tolerance
- Account Management
  - Centralized authentication
  - Application considerations
Analysis and Strategy: Business Objectives and Metrics
Business Objectives and Metrics

- Understand your organization’s objectives and metrics
  - Line of Business (LOB) Objectives
  - LOB Metrics
  - IT Objectives
  - IT Metrics

- Define and agree on measurable success criteria and project priorities
LOB Objectives and Metrics

- **Financial savings**
  - X% of budget
  - Reduce overall costs

- **Standardization due to mergers/acquisitions**
  - One email system
  - One expense system
IT Objectives and Metrics

- Getting control of your IT environment
  - Good server inventory
- Improved availability (SLAs)
  - Uptime and recovery
- Improved reliability
  - Uptime and recovery
- Centralization of operations
  - Fewer operations staff
  - Utilization of enterprise management software
- Reduction in data center space
  - Fewer data centers
  - X data centers to X – Y data centers
  - Reduction in floor space
  - Floor space (current = X); (future = X-Y)
- Standardization
  - HW
    - Fewer server configurations
  - SW
    - Fewer OS or application versions
Analysis and Strategy: Discovery and Inventory
Discovery and Inventory

• How much do you think you know about your IT environment today?
  − Availability of baseline inventories that detail server hardware, applications residing on the servers, and performance characteristics of the in-scope servers

• What data do you need to collect?
  − Servers:
    • CPU, Memory and I/O utilization
    • What applications
    • Mission criticalness of these applications
  − Data Centers
    • Current floor plan and square footage
    • Future floor plan and square footage
Discovery and Inventory

• Low impact discovery tools
  – Agentless
  – Scripts

• When is data good enough for analysis?
  – How much time and many resources

• What does the operations staff know?

• One Place for data
  – CMDB

• Timeliness of data you collect
## Sample Discovery Info

| Server Name | Model | Manufacturer | Serial Number | # of CPUs | Memory (MB) | OS Version | Site | Country | Secure | HA | Partition – HW | Partition – SW | SLA | Server Age | BU Owner | Application Name | Application Interdependencies | Total Storage (MB) | Used Storage (MB) | Month n CPU Utilization | Month n CPU Queue | Month n Disk Utilization | Month n Memory Utilization | Month n Memory Que | Month n Memory |
## Sample Analysis and Strategy Tasks

<table>
<thead>
<tr>
<th>Week</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Install Discovery tool and begin data collection</td>
</tr>
<tr>
<td>2</td>
<td>Data Collection</td>
</tr>
<tr>
<td>3</td>
<td>Data Collection</td>
</tr>
<tr>
<td>4</td>
<td>Data Collection, Prep for Workshop, VMware and Blade Evaluation</td>
</tr>
<tr>
<td>5</td>
<td>IT Service Management (ITSM) Process Assessment</td>
</tr>
<tr>
<td>6</td>
<td>Workshop</td>
</tr>
<tr>
<td>7</td>
<td>Workshop Analysis</td>
</tr>
<tr>
<td>8</td>
<td>Presentation of Findings</td>
</tr>
</tbody>
</table>
Analysis and Strategy: Financial
Financial

- Really understand the LOB and IT objectives and metrics (not always in alignment)
- Create reasonable metrics
- SLAs stated in terms of metrics
- Choose the “appropriate” metric over time
- Determine the business value of the applications
- Following the dollars may not be the best way (your program must have no control over costs)
- Integrate the data about the IT environment to “one” common database
Financial

- Determine “appropriate” level of Financial analysis
  - ROM (initial analysis and strategy)
  - Detailed Investment Justification (architect and validate)

- Once you have established the objectives and metrics, now to the practical matters at hand
  - Understand the data for the metrics that need to be collected:
    - Servers
      - Current environment: initial outlay, depreciation, software and hardware maintenance costs, staff costs, facility costs, power costs, A/C costs
      - Future configurations and the associated costs
    - Data Centers
      - Current environment including lease or monthly costs associated with facility ownership, all associated server costs
      - Future facility costs
Sample Financial Information

**Existing Environment**
- Vendor Maintenance Costs
- Systems Admin and Operations
- Floor Space
- Power
- Air Conditioning
- Refresh existing environment
- Other

**Target Environment**
- Vendor Maintenance Costs
- Systems Admin and Operations
- Floor Space
- Power
- Air Conditioning
- Other

Maybe estimates at this point
Sample Financial Information

**Difference**
- Vendor Maintenance Costs
- Systems Admin and Operations
- Floor Space
- Power
- Air Conditioning
- Refresh existing environment
- Other
- New Hardware Purchases
- Integration
- Retirement of Existing Systems

*Maybe estimates at this point*
Financial Analysis Example

### Current System vs. Proposed Consolidation

#### Cost of Use

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Existing Cost of Use</th>
<th>Total Proposed Cost of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$17,792,216</td>
<td>$14,657,782</td>
</tr>
<tr>
<td>Year 2</td>
<td>$17,985,816</td>
<td>$10,791,057</td>
</tr>
<tr>
<td>Year 3</td>
<td>$18,187,160</td>
<td>$10,944,526</td>
</tr>
</tbody>
</table>

#### Cash Flow Savings w/ Proposed Solution

<table>
<thead>
<tr>
<th>Year</th>
<th>Initial</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flow Savings</td>
<td>$(1,803,834)</td>
<td>$6,212,267</td>
<td>$4,892,436</td>
<td>$4,924,991</td>
<td>$14,225,861</td>
</tr>
</tbody>
</table>

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*Maybe estimates at this point*
Architect and Validate: Analysis and Sizing
Analysis and Sizing

- Remember to keep the server hardware and OS software standard consistent
- Don’t lose sight of the Business drivers
- Understand the applications
- Time Zones may need to be considered
- Testing is critical
- Don’t forget the Network
- Do you have the data you need to properly analyze the environment?
  - Assumptions
- Appropriate amount of time to accurate analyze the environment
- Detailed reports
  - Inventory
  - Network bandwidth
  - Utilization of servers
- Migration – consistent methodology
## Analysis and Sizing – Meeting your needs

<table>
<thead>
<tr>
<th>Server Considerations</th>
<th>Data Center Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Architecture: 32 bit or 64 bit</td>
<td>- How many? (Disaster Tolerance)</td>
</tr>
<tr>
<td>- Operating System</td>
<td>- Location</td>
</tr>
<tr>
<td>- Form Factor</td>
<td>- Leases</td>
</tr>
<tr>
<td>- New to market</td>
<td>- Space</td>
</tr>
<tr>
<td>- Max CPU</td>
<td>- Power</td>
</tr>
<tr>
<td>- Max Memory</td>
<td>- Air Conditioning</td>
</tr>
<tr>
<td>- Max I/O slots</td>
<td>- Network Bandwidth</td>
</tr>
<tr>
<td>- Power requirements</td>
<td>- Logistics and Planning for moving of equipment</td>
</tr>
<tr>
<td>- Reliability</td>
<td>- Spare equipment</td>
</tr>
<tr>
<td>- Warranty</td>
<td>- Vendor support during move</td>
</tr>
</tbody>
</table>
Analysis and Sizing – Meeting your needs

- **Storage Considerations**
  - No single point of failure in overall design
  - Testing all fail-over AND fail-back features is critical
  - Ensure SAN controller and switch firmware is current
  - Determine storage requirements: capacity, performance, growth and security
  - Use spreadsheet to map old to new storage
  - Review storage / SAN configuration rules.
  - Review current storage configurations, device naming and addressing
Architect and Validate: Financial
Sample Financial Information

Existing Environment
- Vendor Maintenance Costs
- Systems Admin and Operations
- Floor Space
- Power
- Air Conditioning
- Refresh existing environment
- Other

Target Environment
- Vendor Maintenance Costs
- Systems Admin and Operations
- Floor Space
- Power
- Air Conditioning
- Other

Detailed Real data
Sample Financial Information

**Difference**
- Vendor Maintenance Costs
- Systems Admin and Operations
- Floor Space
- Power
- Air Conditioning
- Refresh existing environment
- Other
- New Hardware Purchases
- Integration
- Retirement of Existing Systems
## Sample Architect and Validate Tasks

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 – 11</td>
<td>High Level Design / Investment Justification (Wintel Shared)</td>
</tr>
<tr>
<td>12 – 14</td>
<td>High Level Design / Investment Justification (Web Shared)</td>
</tr>
<tr>
<td>15 – 17</td>
<td>High Level Design / Investment Justification (SQL Shared)</td>
</tr>
<tr>
<td>18</td>
<td>Presentation of Findings</td>
</tr>
</tbody>
</table>
Detailed Design
Detailed Design

• Detailed Specifications for Future State
  – Servers
  – Storage
  – High Availability
  – Acceptance Test Plans
  – Technical Migration Guide

• Implementation and Migration Plans
  – Site prep and installation of equipment
  – OS, application, middleware, user files deployment
  – Data migration process
  – Functional, User, System and Certification testing
  – Operational Schedule
  – Estimate effort, skills and Work Breakdown Structure
## Sample Detailed Design Tasks

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 - 15</td>
<td>Wintel Shared</td>
</tr>
<tr>
<td></td>
<td>Technical planning</td>
</tr>
<tr>
<td></td>
<td>Define Test Plan</td>
</tr>
<tr>
<td></td>
<td>Define Migration Strategy and Plan</td>
</tr>
<tr>
<td></td>
<td>Define System and Application Cutover</td>
</tr>
<tr>
<td></td>
<td>Schedule</td>
</tr>
<tr>
<td></td>
<td>Final Plan</td>
</tr>
<tr>
<td>16 - 17</td>
<td>Web Shared</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
<tr>
<td>19 - 21</td>
<td>SQL Shared</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
</tbody>
</table>
Implementation

- Analysis & Strategy
- Architect & Validate
- Detailed Design
  Implement
- Manage
Implementation

• Minimal Impact!
  – Planning and scheduling
  – Communications
  – Testing
  – Fall back plan

• Staffing / Training
  – Job descriptions
  – Career counseling
## Sample Implementation Tasks

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 - 23</td>
<td>Consolidated Wintel Shared  &lt;br&gt; Configure Consolidated Systems  &lt;br&gt; Integrate servers, network, storage  &lt;br&gt; Functionality and interoperability testing  &lt;br&gt; Load application  &lt;br&gt; Test  &lt;br&gt; Cut over</td>
</tr>
<tr>
<td>24 - 25</td>
<td>Consolidated Web Shared  &lt;br&gt; ...</td>
</tr>
<tr>
<td>26 - 27</td>
<td>Consolidated SQL Shared  &lt;br&gt; ...</td>
</tr>
</tbody>
</table>
Conclusions and Summary
Summary - IT Methodology

- Set business goals, analyze benefits and risks of consolidation
- Assess the server / application portfolio for consolidation opportunities then develop a high level consolidation roadmap
- Develop a detailed consolidation design and project plan, pilot new technologies, and validate the design
- Implement the consolidated environment design while managing coexistence and migration
- Ensure the consolidated environment operational disciplines meet the new service level objectives
Summary - Keys to Success

- Business driver alignment to the consolidation project
- Don’t forget people, process and technology
- Understand the technology enablers and what will work in your environment
- Continuous performance monitoring of network, servers, databases & applications is required
- IT Governance is key
- Strong Project Management is required for more complex consolidation projects
- Planning and testing is critical

Tough issues on project will not be technical!!!
Additional Resources
Additional Resources

• HP Industry Standard Server technology papers (server consolidation)

• HP ProLiant Consolidation Tool for Microsoft SQL Server

• Data Centre Advisory Council (DCAC) Server Consolidation Best Practices

• Best Practices for Application Server Consolidation using Internet Information Services (IIS) 6.0
Additional Resources

- Server Consolidation: Strategies and Best Practices for Reducing Costs in Windows Environments

- Best Practices: Solution Accelerator for Domain Server Consolidation and Migration

- Server Consolidation 2004: Trends and Success Factors
  [http://www.idc.com/getdoc.jsp?containerId=31399](http://www.idc.com/getdoc.jsp?containerId=31399)

- Infrastructure Consolidation: Update and Best Practices

- CIO Update: Server Consolidation Can Offer a Range of Benefits
  [http://www.gartner.com](http://www.gartner.com)
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