The IBM zEnterprise System:
A system of systems that unifies IT for predictable service delivery

Unified management for a smarter system:
zEnterprise Unified Resource Manager

- Part of the IBM System Director family, an integrated System z management facility responsible for zEnterprise platform management
- Unifies management of resources, extending System z qualities of service across the zEnterprise System

Scale out to trillion of instructions per second:
zEnterprise BladeCenter Extension (zBX)

- Selected IBM POWER7 blades and IBM x86 Blades for tens of thousands of AIX and Linux applications
- High performance optimizers and appliances to accelerate time to insight and reduce cost
- Dedicated high performance private network

The world’s fastest and most scalable enterprise system: IBM zEnterprise 196

- Ideal for large scale data and transaction serving and mission critical applications
- Most efficient platform for Large-scale Linux consolidation
- Capable of massive scale up, over 50 Billion Instructions per Second (BIPS)
IBM zEnterprise System

IBM zEnterprise 114/196
IBM zEnterprise BladeCenter Extension (zBX)
IBM zEnterprise Unified Resource Manager
zBX Hardware Components Overview

**zBX Infrastructure**

- Rack
- Top-of-Rack Switch
- Blade Center Chassis
- Ethernet & FC Cables
- Switches (ESM, FC)
- Power Dist. Units
- Opt: Heat Exchanger, Power cord types

**Blades**

- POWER7 Blades
- IBM x86 Blades
- DataPower XI50z
zBX – A uniquely configured extension of the zEnterprise

Looks like a rack with BladeCenters but much more...

- **zBX is assembled and built at the IBM plant**
  - All parts and microcode - tested and shipped as a completed package

- **zBX HW redundancy provides improved availability**
  - Redundant switches provide guaranteed connection between z196 and zBX
  - Redundant Power Distribution Units improve availability
  - Extra fans manage heat dispersion/removal

- **zBX provides an isolated and secure network**
  - Four top-of-rack switches for connection to the controlling z196
  - Redundant 10 GB private data network (IEDN)
  - Traffic on user networks not affected

Rack infrastructure hosting IBM BladeCenters
BladeCenter

- **Form factor/height rack-mount chassis/9U Blade bays**
- **Power supply module**
  - Up to 4 hot-swap and redundant 2900W AC with load-balancing and failover capabilities. Operating at 200-240V
- **Cooling modules**
  - Two hot-swap and redundant blowers standard, additional fan packs on power supplies
- **Systems Management for hardware**
  - Advanced Management Module standard; additional Management Module for redundancy required

Standard BladeCenter Chassis
IBM Blades and Optimizers Integrated in the zBX

- IBM WebSphere® DataPower® Integration Appliance XI50 for zEnterprise
  - Purpose-built hardware for simplified deployment and hardened security helps businesses quickly react to change and reduce time to market
  - DataPower XI50z can provide connectivity, gateway functions, data transformation, protocol bridging, and intelligent load distribution

- Select IBM POWER7 and IBM System x blades
  - Brings a larger application portfolio to zEnterprise
    - Front end applications to centralized data serving … e.g., SAP
    - Front end to core CICS® or IMS™ transaction processing … e.g., WebSphere
  - Applications certified to run on zBX-supported POWER7 and System x blades will run on them when installed in the zBX
IBM POWER7 Blade Hardware Configurations

- **MT 8406-71Y (PS701)**
  - Power 7 8 Core Processor
  - 8 Processor Cores activated
  - 1 Processor socket
  - Single wide Blade only
  - 3.0GHz
  - 16 dimm slots (4, 8, & 16 GB/core)
  - 300GB HDD Internal Disk

- Supports 10GbE IEDN - HSS in Bay 7 & 9 is 10GbE uplink
- zBX Chassis attaches to INMN TOR via 1GbE through AMM 1&2 and Switch Bay 1&2
- Blades acquired by the customer through existing channels or through IBM (not from System z)
- IBM blades require:
  - 8406-8242 QLogic 2-port 8Gb Fibre Channel Expansion Card (CIOv)
  - 8406-8275 QLogic 2-port 10Gb Converged Network Adapter (CFFh)
- PowerVM Enterprise Edition licence and Software Maintenance Agreement required for all 8 Cores - must be maintained for duration of use
- AIX 5.3+, 6.1+, 7.1+

<table>
<thead>
<tr>
<th>POWER7 Blade</th>
<th>Config 1</th>
<th>Config 2</th>
<th>Config 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor 3.0GHz@150W</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Processor Activations</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Memory kits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 GB (2 x 4 GB)</td>
<td>4</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>16 GB (2 x 8 GB)</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1066 MHz</td>
<td>1066 MHz</td>
<td>800 Mhz</td>
<td></td>
</tr>
<tr>
<td>GB per blade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>64</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>GB per core</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>HDD 300GB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8406-8275 QLogic 2-port 10Gb Converged Network Adapter (CFFh)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8406-8242 QLogic 2-port 8Gb Fibre Channel Expansion Card (CIOv)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PowerVM</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
**IBM System x blades: IBM BladeCenter HX5 7873**  
IBM US Hardware Announcement 111-053, dated April 6, 2011

- **Four Supported Configurations:** Client acquired, not configured or shipped by System z manufacturing
- **Processor Chips**
  - Intel® Xeon® E7-2830 processors
    - Nehalem microarchitecture
    - Westmere-EX core (32 nm)
- **Memory DIMMs**
  - DDR3, 1333 MHz capable
  - Operating frequency 1066 MHz
  - 6.4 GT per second
- **Speed Burst Card**
- **SSD Expansion Card**
- **SSD Internal Disks (Two 50 GB)**
  - Hypervisor storage controlled by Unified Resource Manager
- **Broadcom 10 GbE Expansion Card**
  - CFFh PCIe 2.0 x16 slot
  - 2 ports
- **QLogic 8Gb FC Expansion Card**
  - CIOv PCIe 2.0 x4 slot
  - 2 ports

<table>
<thead>
<tr>
<th>Description</th>
<th>Config 0</th>
<th>Config 1</th>
<th>Config 2</th>
<th>Config 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>7873-A4x</td>
<td>7873-A5x</td>
<td>7873-A6x</td>
<td>7873-A7x</td>
</tr>
<tr>
<td>HX5 EX Blade Base and Planar</td>
<td>Single wide 30 mm blade Two processor sockets CFFh and CIOv slots</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intel® Xeon® Processor E7-2830</td>
<td>Two Xeon E7-2830 8-core processors 2 threads per core</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory DIMMs: 8 GB, DDR-3 1333 MHz</td>
<td>8</td>
<td>16</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Frequency:</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>1066 MHz</td>
<td>1066 MHz</td>
<td>1066 MHz</td>
<td>1066 MHz</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>GB/Blade</td>
<td>64</td>
<td>128</td>
<td>192</td>
<td>256</td>
</tr>
<tr>
<td>GB/Core</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>HX5 1-Node Speed Burst Card</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>HX5 SSD Exp Card</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>50GB SATA MLC SSD</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Broadcom 10 Gb Gen2 2-port Ethernet CFFh</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Qlogic 8 Gb FC Expansion Card CIOv</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise (DataPower XI50z) – Updated Firmware (December 16, 2011, Driver 93)

- **DataPower XI50z (2462-4BX)**
  - Same hardware as DataPower XI50B (4195-4BX)
    - “Double-wide” Blade: 2 BladeCenter slots
    - IBM HS22 Blade + DataPower expansion unit
  - Current firmware based on DataPower firmware v3.8.1
  - New firmware based on DataPower firmware v4.0.1
  - Same Acceleration, Security, and Integration capabilities

- Can coexist with POWER7 and x86 blades in the same zBX BladeCenter

- **Leverages advanced zBX BladeCenter networking infrastructure**
  - 2 x 1 GbE interfaces to zBX 1 GbE top of rack switches (zManager - INMN)
  - 2 x 10 GbE interfaces to zBX 10 GbE top of rack switches (IEDN)

- **Ordering, configuration and installation**
  - Hardware and firmware are configured and ordered by eConfig as zBX features
  - Ships installed in a new-build zBX or field installed by IBM service as an MES

- **Tightly integrated with zEnterprise**
  - Unified hardware and firmware management by zManager
  - Inherits zEnterprise Ensemble serviceability, monitoring and reporting capabilities
... Value Made Possible By the Unified Resource Manager

- Simplified installation of hypervisors
- Gain significant time to market with improved speed of deployment
- Save time, cost and simplify asset management
- Decrease problem determination and resolution time for cross-platform resources
- Improve and simplify cross-platform availability procedures
- Enable broader and more granular view of resource consumption
- Factory installed and configured network
- Improved network security with lower latency, less complexity, no encryption/decryption
- Simplified energy management
- Energy cost savings
- Allow critical workloads to receive resources and priority based on goal-oriented policies established by business requirements
- Smart business adjustments based on workload insight
- Provide deep insight into how IT resources are being used
- Gain flexibility, consistency and uniformity of virtualization
- Provide the business with faster time to market
- Simplified network management for applications
Despite the allure of a “one size fits all” server approach …

Today’s enterprise computing environments are multi-platform for a reason. They’re optimized to run different workload components:

– **Database and transaction processing**
– **Analytics**
– **Web-based interactions**
– **Enterprise applications such as ERP**
– **The myriad of x86 applications**

Complex solutions are optimally deployed on multi-tier heterogeneous infrastructures
Workload deployments often look something like this...

The components are placed across heterogeneous architectures.
The difficult question is…

Each platform architecture is different…
… and has a natural affinity to different workload characteristics

Match the workload characteristics to the right platform(s)…
… to deliver a best fit solution for the workload

Repeat this across the infrastructure…
… to optimize service delivery for the business

How do you match the workload characteristics to the right platform?
Different architectures have different characteristics

- **Workloads**
  - Huge transaction volume
  - Extreme I/O bandwidth
  - Data Integrity Statement
  - EAL5
  - High Performance Encryption
  - Guest: Core Ratio (50+:1)
  - Highest QoS

- **Workloads**
  - HPC, parallel, compute intensive
  - High I/O bandwidth
  - EAL4+
  - Guest: Core Ratio (10:1 HPC)
  - Best in class UNIX/RISC QoS

- **Workloads**
  - Respectable single thread performance
  - Scale out clustering
  - Modest I/O bandwidth
  - Guest: Core Ratio (Simple e.g. 5:1)
  - Best in class Intel QoS

---

**System z**
- z/OS - z/VM & Linux

**POWER**
- AIX

**x86**
- Windows/Linux
Workload Segmentation

**Transaction Processing and Database**
- High Transaction Rates
- High Quality of Service
- Peak Workloads
- Resiliency and Security

**Analytics and High Performance**
- Compute or I/O intensive
- High memory bandwidth
- Floating point
- Scale out capable

**Business Applications**
- Scale requirements
- High Quality of Service
- Large memory footprint
- Responsive infrastructure

**Web, Collaboration and Infrastructure**
- Highly threaded
- Throughput-oriented
- Scale out capable
- Lower Quality of Service
Workload Types

Shared data and Work Queues – Type 1 *(Transaction Processing and Database)*

Scaling characteristics of a shared workload:
- Scales up well on large robust SMP
- Shared cache or low latency cache intervention is desirable
- There is significant potential for coherence, contention, and saturation delay.
- Rapid context switches required

Highly Threaded – Type 2 *(Business Applications)*

Scaling characteristics of a highly threaded workload:
- The scaling comes from a large number of cores or SMT
- There is some contention delay but limited coherence delay
- Serialization of code can limit scaling
Workload Types (continued)

Parallel Data Structures – Type 3 (*Analytics and High Performance*)

![Diagram of parallel data structures]

**Scaling characteristics of parallel data structures:**
- The scale well on clusters.
- They benefit from dedicated caches, large memory and I/O bandwidth.
- Have limited contention delay but can be affected by coherence and saturation delays.

Small Discrete – Type 4 (*Web, Collaboration and Infrastructure*)

![Diagram of small discrete workloads]

**Scaling characteristics of discrete workloads:**
- No contention or coherence delay.
- They scale nearly linearly.
- Are suitable for almost any hardware type.
Multiple platforms may be appropriate

- **A workload**
  - May have multiple types
  - Can exhibit multiple types based on usage patterns

- **A mix of optimized platforms may be more cost effective**

- **Other local factors and non-functional requirements apply**
And that is why workload deployments often look like this...

The components are placed across heterogeneous architectures.
zEnterprise gives you the choice of best fit deployment
And increases your ability to manage hybrid workloads

- Expanded ISV support for enterprise applications
- Targeted for applications that interact with mainframe data and transactions
- Provisioned and managed by System z
- Extreme consolidation of servers and networking
- Superior levels of virtual server provisioning, monitoring and workload management
- Extreme scalability and performance for transaction processing and data serving
- High availability and cross-system scalability with Parallel Sysplex® and GDPS
- Leading policy-based capacity provisioning and workload management
- Pervasive, high-performance security support

- Silo managed islands of computing
- Less dynamic
- Minimal resource sharing

- Distributed Systems

- Linux-on-z/VM
  - Industry-best virtual I/O bandwidth and reliability
  - Fewer components and reduced complexity
  - System z qualities of dynamic resource management and capacity-on-demand
  - Seamless integration with z/OS backup and disaster recovery solutions

- z/OS
  - Extreme scalability and performance for transaction processing and data serving
  - High availability and cross-system scalability with Parallel Sysplex® and GDPS
  - Leading policy-based capacity provisioning and workload management
  - Pervasive, high-performance security support

- Mainframe QoS extended to multi-tier applications

- zBX Blades
  - Industry-best virtual I/O bandwidth and reliability
  - Fewer components and reduced complexity
  - System z qualities of dynamic resource management and capacity-on-demand
  - Seamless integration with z/OS backup and disaster recovery solutions

- Lower Scalability, Security, Dynamic Workload Management

- Higher

- Low TCO
- Low TCA

© 2012 IBM Corporation
zEnterprise simplifies the hybrid environment

The workloads can be collapsed onto the zEnterprise.
What to look for in zBX candidate workloads

- **Workloads with strong affinity to System z**
  - Applications and/or Data reside on System z
  - Access to applications and data from distributed environments

- **Workloads with ability to scale out**
  - Independent units of work with limited sharing
  - Workload unit size limited to zBX blade size
  - No virtualization across zBX blades

- **Workloads that could benefit from higher qualities of service**
  - Not meeting current Service Level Agreements
  - Need tighter management of the environment
Some examples of potential zEnterprise candidates...

### Core Applications

<table>
<thead>
<tr>
<th>Database (z)</th>
<th>Application (z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2® for z/OS®, IMS™</td>
<td>CICS®, IMS, COBOL, WebSphere®</td>
</tr>
</tbody>
</table>

### Multi-Tier Web Serving

<table>
<thead>
<tr>
<th>Database (z)</th>
<th>Application (z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2 for z/OS</td>
<td>WebSphere</td>
</tr>
</tbody>
</table>

### Data Warehouse

<table>
<thead>
<tr>
<th>Master Data Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database (z)</td>
</tr>
</tbody>
</table>

- DB2 for z/OS
- WebSphere MDM (AIX, Linux on z)

### SAP

<table>
<thead>
<tr>
<th>Database (z)</th>
<th>Application (z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2 for z/OS</td>
<td>Linux® for z</td>
</tr>
</tbody>
</table>

### Analytics & Business Intelligence

<table>
<thead>
<tr>
<th>Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>System z/OS</td>
</tr>
<tr>
<td>DB2</td>
</tr>
<tr>
<td>Cognos®</td>
</tr>
<tr>
<td>SAS</td>
</tr>
<tr>
<td>Linux for System z</td>
</tr>
<tr>
<td>Cognos</td>
</tr>
<tr>
<td>SPSS</td>
</tr>
<tr>
<td>InfoSphere™ Warehouse</td>
</tr>
</tbody>
</table>
zBX Workload Selection Process

- **Initial Workload Assessment**
  - Does the workload have affinity to System z applications or data?
  - Are the workload component supported in the zBX environments?
  - Will the workload fit within the sizing constraints of the zBX?

- **Right Fit for Purpose (RF4P) Assessment**
  - Assess ability of the zBX to meet service level objectives
  - Non-functional requirements and other local factors considered

- **Total Cost of Ownership (TCO) Analysis**
  - Assess the TCO of each potential platform
  - Only assess platforms which meet or exceed requirements
  - IBM Studies: RACEv, Eagle, Scorpion, etc.

- **Technical Validation**
  - Modeling
  - POC/POT
  - Benchmarks
  - Stress Test
Initial Workload Assessment
Factors to consider in initial workload assessment

- **Topology of the workload**
  - *Does the workload have System z (z/OS or Linux) components?*
  - *What are the connection protocols?*

- **Workload environments supported?**
  - *Do the workload components run in a zBX supported environment?*
    - AIX 5.3, 6.1, 7.1
    - Linux on x86 (64 bit)
      - RHEL 5.5, 5.6, 6.0
      - SLES 10 SP4, 11 SP1
    - Windows 2008 R2 Datacenter Edition (64 bit)
    - *If not, can they be certified to run there?*
  - *Do supporting workloads (e.g. management tools) also run in the supported environments?*
  - *Can the workload run in the zBX supported virtualization environments?*
    - PowerVM
    - KVM

- **Workload sizing**
  - *Can the workload fit (or scale out, if necessary)?*
    - Maximum of 8 cores (POWER) or 16 cores (x86) per blade
    - Maximum of 128 GB (POWER) or 256 GB (x86) memory per blade
    - Maximum of 10 GbE network connectivity (shared across zBX)
    - Maximum of 8 Gb FC storage connectivity per blade
Spreadsheet provided for data collection

<table>
<thead>
<tr>
<th>Connection Protocol</th>
<th>Virtual Server Systems</th>
<th>Virtual Server Level</th>
<th>Virtual Server Environment</th>
<th>Number of Virtual Servers</th>
<th>Largest Virtual Server</th>
<th>Average Server Utilization</th>
<th>Largest Virtual Memory</th>
<th>Network I/O Throughput</th>
<th>Disk I/O Throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td>MQ</td>
<td>AIX / Power7</td>
<td>AIX 6.1</td>
<td>J2EE server</td>
<td>2</td>
<td>8 cores @ 2.66 GHz</td>
<td>20%</td>
<td>256 GB</td>
<td>1 Gbps</td>
<td>4 Gbps</td>
</tr>
<tr>
<td>JDBC</td>
<td>AIX / Power7</td>
<td>AIX 6.1</td>
<td>Oracle DB server</td>
<td>2</td>
<td>16 cores @ 2.66 GHz</td>
<td>25%</td>
<td>512 GB</td>
<td>10 Gbps</td>
<td>8 Gbps</td>
</tr>
<tr>
<td>CTG</td>
<td>Windows / x86</td>
<td>Windows 2008 R2</td>
<td>.NET server</td>
<td>4</td>
<td>4 cores @ 3.0 GHz</td>
<td>10%</td>
<td>128 GB</td>
<td>10 Gbps</td>
<td>2 Gbps</td>
</tr>
<tr>
<td>MQ</td>
<td>Linux / x86</td>
<td>RHEL 5.3</td>
<td>J2EE server</td>
<td>2</td>
<td>5 cores @ 2.66 GHz</td>
<td>5%</td>
<td>128 GB</td>
<td>2 Gbps</td>
<td>4 Gbps</td>
</tr>
</tbody>
</table>

- Most data collection is gathered offline
- Data is analyzed with IBM to assess zBX eligibility
  - Mitigation strategies can be considered (e.g. scaling out)
  - Additional certifications can be considered for environments
- Go or No-go decision is made to proceed to next step
  - Right Fit for Purpose Assessment (optional)
  - Total Cost of Ownership study (optional)
Right Fit for Purpose Assessment
There are many factors that influence platform selection making it difficult to develop a simple platform selection matrix.
Factors to consider

- Unique to a specific customer / workload
- You assign factor importance level (scale of 1-10)
- Gathered as a part of the Pre-Work for the workshop
- Includes Non-Functional Requirements
  - Availability
  - Scalability
  - Performance
  - Manageability
  - Security
  - Etc.
- Includes other Local Factors
  - Skills
  - Standards
  - Existing Infrastructure
  - ISV support
  - Etc.
Determine factors and prioritize them

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Importance weighting</th>
<th>Linux on x86 assessment</th>
<th>AIX on POWER7 assessment</th>
<th>Linux on System z assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalability</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workload Fit – Web Application Server</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manageability</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disaster Recovery</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintainability</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology Adoption</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Importance weightings are scaled 1-10 with 10 being the most important
- Eliminating lower importance factors will make it easier to get through the rest of the assessment.
Assess each platform against factors

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Importance weighting</th>
<th>Linux on x86 assessment</th>
<th>AIX on POWER7 assessment</th>
<th>Linux on System z assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>9</td>
<td>2</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Scalability</td>
<td>9</td>
<td>4</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Security</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Performance</td>
<td>7</td>
<td>4</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Workload Fit – Web Application Server</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Skills</td>
<td>5</td>
<td>9</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Manageability</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

- Requirements under 5 in importance eliminated from list (negotiable)
- Platform assessments are scaled 0-10
  - 0: Does not meet
  - 1-2: Marginal
  - 3-4: Likely to meet
  - 5-6: Demonstrated meets
  - 7-8: Likely to exceed
  - 9-10: Demonstrated exceeds
Multiple assessment by weighting

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Importance weighting</th>
<th>Linux on x86 assessment</th>
<th>AIX on POWER7 assessment</th>
<th>Linux on System z assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>9</td>
<td>18</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Scalability</td>
<td>9</td>
<td>36</td>
<td>72</td>
<td>81</td>
</tr>
<tr>
<td>Security</td>
<td>7</td>
<td>28</td>
<td>49</td>
<td>56</td>
</tr>
<tr>
<td>Performance</td>
<td>7</td>
<td>28</td>
<td>63</td>
<td>49</td>
</tr>
<tr>
<td>Workload Fit – Web Application Server</td>
<td>6</td>
<td>24</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Skills</td>
<td>5</td>
<td>45</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Manageability</td>
<td>5</td>
<td>30</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>209</strong></td>
<td><strong>353</strong></td>
<td><strong>370</strong></td>
</tr>
</tbody>
</table>

- Multiply each assessment by the requirement weighting
- Eliminate any that are very small
  - In this example Linux on x86 is clearly assessed significantly lower
- If there is close to a tie (<10%), then run both through TCO study
  - In this example, AIX and Linux on z are close enough to let a TCO study be the tiebreaker
Thank you!