zPCR Capacity Sizing Lab

Sessions 2110/2111

August 26, 2009

John Burg
Brad Snyder

Materials created by John Fitch and Jim Shaw

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Washington Systems Center
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<table>
<thead>
<tr>
<th>Trademark</th>
<th>Description</th>
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<tbody>
<tr>
<td>AlphaBlox*</td>
<td>GDPS*</td>
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<td>APPN*</td>
<td>HiperSockets</td>
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<td>CICS*</td>
<td>HyperSwap</td>
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<td>IBM*</td>
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<td>Cool Blue</td>
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<td>DB2*</td>
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<td>DFSMS</td>
<td>IMS</td>
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<td>DFSMSShsm</td>
<td>Language Environment*</td>
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<td>DFSMSrmm</td>
<td>Lotus*</td>
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<td>DirMaint</td>
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<td>DRDA*</td>
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<td>DS6000</td>
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<td>DS8000</td>
<td>Parallel Sysplex*</td>
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<td>ECKD</td>
<td>Performance Toolkit for VM</td>
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<td>ESCON*</td>
<td>PowerPC*</td>
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<td>FICON*</td>
<td>PR/SM</td>
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<td>FlashCopy*</td>
<td>Processor Resource/Systems Manager</td>
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<td>RACF*</td>
<td>Resource Link</td>
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<td>RETAIN*</td>
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<td>TotalStorage*</td>
<td>WebSphere*</td>
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<td>xSeries*</td>
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Sessions at SHARE

- **2115 - Framework for doing Capacity Sizing on System z Processors**
  - Wed 9:30 AM
  - Brad Snyder

- **2110 - zPCR Capacity Sizing Lab – Part 1 Introduction and Overview**
  - Wed 1:30 PM
  - John Burg

- **2111 - zPCR Capacity Sizing Lab – Part 2 Hands on Lab**
  - Wed 4:30
  - John Burg and Brad Snyder
zPCR Capacity Sizing Lab – Part 1 Intro and Overview

Presented by: John Burg

Some Material Created by:
Kathy Walsh
IBM Washington Systems Center
Agenda

- Introducing zPCR
- LSPR Background
- MIPS Tables Vs. zPCR LPAR Configuration Capacity Planning
- Using zPCR to Correctly Size a Processor is Easy
  1. Gather Capacity/Performance Data
  2. Identify LPAR configurations
  3. Identify Workload Mix
  4. Impact of Specialty Engines
- Future Enhancements
- Where to get more Information
- Summary
Introducing **zPCR**

- Provides capacity relationships for System z processors, considering
  - LPAR configuration
  - SCP/workload environment
  - Use of specialty CPs (zAAP, zIIP, IFL, and ICF)

- Based on IBM Large Systems Performance Reference (LSPR)

- The IBM tool to properly size mainframe upgrades
  - Expected accuracy of ±5%

- A PC based tool written in Java for Windows XP/Vista
  - Available to customers since 10/2005

- New Processor Announcements available in zPCR for:
  - IBM Account Teams - at GA
  - Customers - generally within 30 days after GA
Introduction to LSPR

- **A set of representative SCP/workload environments**
  - SCPs: z/OS, z/VM, and Linux on System z
  - Workloads: Batch ↔ Online

- **A methodology focused on processor capacity**
  - No significant external constraints
  - Equivalent (reasonably high, e.g. >= 90%) processor utilization

- **A metric to communicate the results**
  - ITR: Internal Throughput Rate
  - Transactions or Jobs per processor busy second

- **Information stored on the web**
LSPR Data

- LSPR data is built from a set of benchmarks running representative workloads.
- Over time, LSPR benchmarks are changed to reflect changes in processor architecture, operating system capabilities, and new patterns for production workloads.
- Cannot directly compare relative processor capacity across different versions of LSPR benchmarks.
LSPR Tables

- Multi-image (MI) Processor Capacity Ratio table
  - Median complex LPAR configuration for each model based on customer profiles
  - Most representative for vast majority of customers
  - Same workload assumed in every partition
  - z/OS only
  - Used for “high level” sizing
  - Used to develop the MSU rating

- Single-image (SI) Processor Capacity Ratio table
  - One z/OS partition equal in size to N-way of model (limit to max CPs supported by SCP version)
  - Representative for truly single image z/OS cases
  - Used as the base for zPCR LPAR Configuration Capacity Planning
zPCR Capacity Sizing Tool

- MIPS Tables
- LSPR Multi-Image
- zPCR LPAR Configuration Capacity Planning
- Built on LSPR Single-Image MIPS Table
### LSPR Tables – Versions Supported: Current, Prior and Legacy

<table>
<thead>
<tr>
<th>LSPR Versions Supported / Processors</th>
<th>SCP</th>
<th>LSPR Primitive Workloads</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current</strong> - z10 and IBM System z *</td>
<td>z/OS 1.9</td>
<td>ODE-B, CB-L, WASDB, OLTP-T and OLTP-W</td>
</tr>
<tr>
<td>- Measured using HiperDispatch; applies to z10 only</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong> - z10 and IBM System z *</td>
<td>z/OS 1.8</td>
<td>ODE-B, CB-L, WASDB, OLTP-T and OLTP-W</td>
</tr>
<tr>
<td>- Measured using HiperDispatch, applies to z10 only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Excludes z10 BC</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong> - z10 and IBM System z *</td>
<td>z/VM</td>
<td>WASDB/LVm</td>
</tr>
<tr>
<td><strong>Current</strong> - z10 and IBM System z *</td>
<td>Linux</td>
<td>WASDB/L</td>
</tr>
<tr>
<td><strong>Prior</strong> - z9, z990, z900, z890 and z800 *</td>
<td>z/OS 1.6</td>
<td>CB-L, CB-J, WASDB, OLTP-W and OLTP-T</td>
</tr>
<tr>
<td><strong>Prior</strong> - z9, z990, z900, z890 and z800 *</td>
<td>z/VM</td>
<td>WASDB/LVm</td>
</tr>
<tr>
<td><strong>Prior</strong> - z9, z990, z900, z890 and z800 *</td>
<td>Linux</td>
<td>WASDB/L</td>
</tr>
<tr>
<td><strong>Legacy</strong> – (excludes z10 and z9), z990, z900, z890 and z800 *</td>
<td>z/OS 1.4</td>
<td>CB-L, CB-S, WASDB, OLTP-W and OLTP-T</td>
</tr>
<tr>
<td><strong>Legacy</strong> – (excludes z10 and z9), z900, z890, z800, G6, G5, Multiprise® 3000 and prior measured in basic mode</td>
<td>OS/390® 2.10</td>
<td>CBW2, CB84, TSO, CICS® /DB2®, and IMS™</td>
</tr>
<tr>
<td><strong>Legacy</strong> – (excludes z10 and z9), z900, z890, z800, G6, G5, Multiprise® 3000 and prior measured in basic mode</td>
<td>z/VM</td>
<td>CMS1</td>
</tr>
<tr>
<td><strong>Legacy</strong> – (excludes z10 and z9), z900, z890, z800, G6, G5, Multiprise® 3000 and prior measured in basic mode</td>
<td>VSE/ESA</td>
<td>CICS</td>
</tr>
</tbody>
</table>

* - measured in LPAR-Mode
## LSPR Considerations: Current, Prior and Legacy

<table>
<thead>
<tr>
<th>LSPR Versions Supported / Processors</th>
<th>SCP</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Current** - z10 and IBM System z *  | z/OS 1.9 | Supports up to 64 CPs  
LSPR data for 1 through 64 CPs assumes a single partition  
Supports zAAP/zIIP Logical CPs  
Measured using HiperDispatch**  
N-way capacity relationships of z/OS-1.9 may differ from those of z/OS-1.6 |
| **Current** - z10 and IBM System z *  | z/OS 1.8 | Supports up to 32 CPs  
LSPR data for 1 through 32 CPs assumes a single partition  
Supports zAAP/zIIP Logical CPs  
Measured using HiperDispatch**  
N-way capacity relationships of z/OS-1.8 may differ from those of z/OS-1.6 |
| **Prior** - z9, z990, z900, z890 and z800 * | z/OS 1.6 | Supports up to 32 CPs  
LSPR data for 1 through 32 CPs assumes a single partition  
Supports zAAP/zIIP Logical CPs  
N-way capacity relationships of z/OS-1.6 differ from those of z/OS-1.4 (in general z/OS 1.6 is better) |
| **Legacy** – (excludes z10 and z9), z990, z900, z890 and z800 * | z/OS 1.4 | Supports up to 16 CPs  
LSPR data for 17 through 32 on z990 assumes 2 partitions |

* Measured in LPAR-Mode  
**Measured using HiperDispatch, applies to z10 only. Minimizes cross book effects, Attempts to keep important Logical CPs on same Real CPs, Improves high speed buffer efficiency
Don’t use “single-number tables” for capacity comparisons!

Use zPCR to model before and after configurations
MIPS Tables Vs zPCR

- **MIPS Tables**
  - Adequate for Business Planning
    - High level sizing for hardware and software budget planning
    - Based on “averages”
  - Must be referenced to a specific set of LSPR benchmarks or invalid

- **zPCR Sizing - LPAR Configuration Capacity Planning**
  - Detailed Capacity Sizing based on:
    - Specific LPAR configuration (number, weights, and logical processors)
    - Specific SCP/workload mix
    - Specific use of specialty engines (zAAP, zIIP, IFL, and ICF)
  - Built around concept of a Reference CPU
The Use Of A Reference Processors

- Define and keep the same reference processor for any analysis
  - Never Change a Reference Processor during a zPCR Study
  - Now limited to a 1-way processor
  - Do Not Use the Multi-Image Table to get a MIPS ratings for the Reference-CPU
  - To set a specific capacity rating for an LPAR host, use the Reference- CPU Calibrate function to adjust the scaling factor

<table>
<thead>
<tr>
<th>Processor</th>
<th>MIPS (SI)</th>
<th>MIPS (MI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Partition</td>
<td>5 Partitions</td>
</tr>
<tr>
<td>2064-1C1</td>
<td>237</td>
<td>226</td>
</tr>
<tr>
<td>2084-301</td>
<td>450</td>
<td>429</td>
</tr>
<tr>
<td>2094-701</td>
<td>602</td>
<td>580</td>
</tr>
</tbody>
</table>
zPCR LPAR Configuration Capacity Planning – SI Reference CPU

- The “Typical Setting” should be utilized
  - Family z9 EC/700
  - Model 2094-701
  - Scaling-Factor 602
  - Scaling-Metric - MIPS

Confirmation of SI Reference and scope
zPCR Calibrate Window

(1) Enter 3,600 MIPs which is what the customer thinks the 2084-310 (B16) is rated at

(2) Click *Return*
MIPS Tables Vs zPCR Detailed LPAR Configuration Capacity Planning

- **Objective:** Upgrade z9 to z10 with like capacity and add 1 zIIP engine to largest LPAR for future workload growth and 3 new LPARs for Development and Testing

### MIPS Table - LSPR Multi-Image z/OS 1.9 LSPR MIX

<table>
<thead>
<tr>
<th>Processor</th>
<th>N-way</th>
<th>MIPS TABLE</th>
<th>MSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>2094-608</td>
<td>8-way</td>
<td>3,204</td>
<td>428</td>
</tr>
<tr>
<td>2097-704</td>
<td>4-way</td>
<td>3,237</td>
<td>401</td>
</tr>
</tbody>
</table>

Equivalent Capacity Expected

- z9 3204 MIPS vs. z10 3237 MIPS = +1.0%

### zPCR LPAR Configuration Capacity Planning

- **8 LPARs, 8GCPs, 0 zIIP**
  - **2094-608**
  - z9 MIPS with 8 LPARs and 0 zIIPs via zPCR
    - 3,158 GCP MIPS
    - 0 zIIP MIPS
    - 3,158 Total MIPS
  - **2097-704**
  - z10 MIPS with 11 LPARs and 1 zIIP via zPCR
    - 3,013 GCP MIPS
    - 826 zIIP MIPS
    - 3,839 Total MIPS

**Capacity Received**

- 3,158 vs. 3,013 = -4.6%
- +5% Capacity Received
  - 3,158 vs. 3,164 = +0.2%
- -5% Capacity Received
  - 3,158 vs. 2,862 = -9.4%
- +22%
Using zPCR to Correctly Size a Processor is EASY!

1. Gather capacity/performance data

2. Assess the impact of LPAR on the Current Processor and the Proposed Processor by defining specific LPAR configurations

3. Identify the Workload Mix to represent production work

4. Assess the impact of using specialty engines (zAAP, zIIP, IFL, ICF) by defining them to the LPAR configuration
1. Data Inputs to zPCR Process

- RMF CPU Activity Report for the installed machine
  - Machine type and model
  - LPAR definitions

- RMF Workload Activity Report(s)
  - Determine the workload mix for each partition

- Proposed machine
  - Processor type and model
  - LPAR definitions
Automated Input

- **RMF Reports**
  - RMF CPU Activity Report for the current processor
  - Supported levels of RMF include:
    - z/OS 1.4 or later
  - Supported Processors
    - IBM System z
  - # LCPs must be adjusted when HiperDispatch is active because “parked” CPs are included in the partition report but are not active

- **From an “External File”**
  - ISV performance and capacity planning tools can read performance data bases and produce input to zPCR studies
    - The file is an XML file with various tags that look similar to a zPCR study file. The tags are used to identify all the aspects of the LPAR host and its partitions to zPCR
  - Previous zPCR studies
2. Understand the Impact of LPAR

- Both current and proposed processor should be modeled

- Information required
  - Current and Target CEC
    - Model
    - CP (engine) configuration
  - Partition configuration (define each LPAR)
    - Type (GP, IFL, ICF)
    - Partition name
    - SCP and workload
    - Dedicated / Shared
    - Number of logical CPs
    - Weight
    - Capping
    - For GP LPs, any associated zAAP or zIIP CPs
zPCR Partition Definition Window

![zPCR Partition Definition Window](image)

**Define General Purpose Partitions**

- z990 Host = 2084-B16 with 10 CPs: GP=10
- 6 Active Partitions: GP=6

### Partition Identification

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Name</th>
<th>SCP</th>
<th>Workload</th>
<th>Mode</th>
<th>LCPs</th>
<th>Weight</th>
<th>Weight...</th>
<th>Capping</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GP</td>
<td>Batch</td>
<td>z/OS-1.8*</td>
<td>LoIO-Mix</td>
<td>SHR</td>
<td>3</td>
<td>150</td>
<td>16.30%</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>GP</td>
<td>CICS-1</td>
<td>z/OS-1.8*</td>
<td>TM-Mix</td>
<td>SHR</td>
<td>8</td>
<td>350</td>
<td>38.04%</td>
<td>n/a</td>
</tr>
<tr>
<td>3</td>
<td>GP</td>
<td>CICS-2</td>
<td>z/OS-1.8*</td>
<td>TM-Mix</td>
<td>SHR</td>
<td>3</td>
<td>100</td>
<td>10.87%</td>
<td>n/a</td>
</tr>
<tr>
<td>4</td>
<td>GP</td>
<td>CICS-3</td>
<td>z/OS-1.8*</td>
<td>TD-Mix</td>
<td>SHR</td>
<td>2</td>
<td>70</td>
<td>7.61%</td>
<td>n/a</td>
</tr>
<tr>
<td>5</td>
<td>GP</td>
<td>IMS</td>
<td>z/OS-1.8*</td>
<td>OLTP-T</td>
<td>SHR</td>
<td>4</td>
<td>200</td>
<td>21.74%</td>
<td>n/a</td>
</tr>
<tr>
<td>6</td>
<td>GP</td>
<td>Test</td>
<td>Linux</td>
<td>WASDB/L</td>
<td>SHR</td>
<td>1</td>
<td>50</td>
<td>5.43%</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Partition Configuration

<table>
<thead>
<tr>
<th>zAAP LCPs</th>
<th>zIIP LCPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Partition Summary by Pool

- CP Pool: GP, zAAP/JFL/ICF
- LPs, RCPs, DED LCPs, SHR LCPs, LCP:RCP, Sum of Weights

- GP: LPS = 6, RCPs = 10, DED LCPs = 0, SHR LCPs = 21, SHR:RCP = 2.100, Sum of Weights = 920
- zAAP/JFL/ICF: LPS = 0, RCPs = 0, DED LCPs = 0, SHR LCPs = 0, SHR:RCP = 0.000, Sum of Weights = 0

Input fields are white background; Single click selection field for drop-down list; Double click entry fields to open.
Number of Logical CPs in an LPAR

- Provide number of logical CPs needed to provide the LPAR weight plus 1 additional
  - *Determining the Logical CP Requirements for a Partition* – Tech Doc TD101238
    - [http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD101238](http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD101238)

- For z10s, HiperDispatch=YES will automatically manage the logical processors
  - *Planning Considerations for HiperDispatch Mode* - white paper WP101229

- Ensure for a planned migration the MIPS per CP is equal to or greater than that of the current processor

- Understand the impacts of LPAR on a uni-processor
  - *Managing CPU-Intensive Work on Uniprocessor LPARs* - white paper WP100925
3. Identifying the Correct Workload Mix for each LPAR

- **zPCR provides predefined z/OS Workload Mixes**
  - Provides better accuracy when mapping workloads to LSPR data
  - Improved consistency when working across multiple LSPR releases

- **Mixes are preferred over LSPR workload primitives**

<table>
<thead>
<tr>
<th>Predefined mixes suggested for capacity planning purposes and common to all LSPR tables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LoI0-Mix</strong></td>
</tr>
<tr>
<td><strong>CB-Mix</strong></td>
</tr>
<tr>
<td><strong>TM-Mix</strong></td>
</tr>
<tr>
<td><strong>TD-Mix</strong></td>
</tr>
<tr>
<td><strong>TI-Mix</strong></td>
</tr>
</tbody>
</table>

**Other Mixes**

- **LSPR-Mix** is a simple average and is used for software pricing and is not intended to be used for capacity planning
- **Web-Mix** Only available when using the IBM System z LSPR data
zPCR Workloads and Mix Definitions
Workload Selection Assistant

• Use the CP Calculator - Workload Selection Assistant tool within zPCR
  • Need Family/Model/Feature
  • LPAR %
  • DASD I/O rate
• Slider “Selection” gives recommendation

• USED MSU = (Processor MSU Rating x CEC Utilization by LPAR)
  • Cannot use MSU value in multi-image table.

- LoI/O Mix
  - Lolo is the typical mix used by customers
  - DASD I/Os per Used MSU is <= 30
4. Impact of Specialty CPs

- **zAAP and/or zIIP Engines**
  - zAAPs are available on System z10, z9, z990, and z890 only
  - zIIPs are available only on System z10 and z9
  - LCPs must be associated with a GP partition running z/OS-1.6 or later
  - Capacity is characterized as independent partitions with their own LCPs that compete for resources within their assigned CP pool
  - Included are switching costs that impact the capacity of both the GP and the zAAP/zIIP partition

- **IFL and/or ICF Engines**
  - IFL partitions must run Linux native or Linux under VM
  - ICF partitions must run CFCC
  - These are independent partitions with their own LCPs that compete for CPU resource within their assigned CP pool
## Final Output

### LPAR Host and Partition Capacity

**z10-EC Host = 2097-E12/700 with 5 CPs; GP=4 z1IP=1**  
**13 Active Partitions; GP=11 z1IP=2**

Capacity is relative to a 2094-701 assumed at 602 MIPS  
System z10 processor capacity for z/OS is represented with HiperDispatch turned ON

<table>
<thead>
<tr>
<th>Include</th>
<th>No.</th>
<th>Type</th>
<th>Name</th>
<th>SCP</th>
<th>Workload</th>
<th>Mode</th>
<th>LCPS</th>
<th>Weight</th>
<th>Weight %</th>
<th>Capping</th>
<th>Minimum</th>
<th>Maximum</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>GP</td>
<td>LP-01</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>4</td>
<td>100</td>
<td>12.90%</td>
<td></td>
<td>380.8</td>
<td>2,951.1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>GP</td>
<td>LP-02</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>4</td>
<td>100</td>
<td>12.90%</td>
<td></td>
<td>380.8</td>
<td>2,951.1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>GP</td>
<td>LP-03</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>3</td>
<td>80</td>
<td>10.32%</td>
<td></td>
<td>313.2</td>
<td>2,275.9</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>GP</td>
<td>LP-04</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>3</td>
<td>80</td>
<td>10.32%</td>
<td></td>
<td>313.2</td>
<td>2,275.9</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>GP</td>
<td>LP-05</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>2</td>
<td>50</td>
<td>6.45%</td>
<td></td>
<td>195.7</td>
<td>1,516.5</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>GP</td>
<td>LP-06</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>2</td>
<td>50</td>
<td>6.45%</td>
<td></td>
<td>195.7</td>
<td>1,516.5</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>GP</td>
<td>LP-07</td>
<td>z/OS-1.9*</td>
<td>Lo10-Mx</td>
<td>SHR</td>
<td>2</td>
<td>50</td>
<td>6.45%</td>
<td></td>
<td>195.7</td>
<td>1,516.5</td>
</tr>
</tbody>
</table>

### Capacity Summary by Pool

<table>
<thead>
<tr>
<th>CP Pool</th>
<th>RCPs</th>
<th>Partitions</th>
<th>LCPS</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>4</td>
<td>11</td>
<td>30</td>
<td>3,012.6</td>
</tr>
<tr>
<td>zAAP</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>z1IP</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>826.3</td>
</tr>
<tr>
<td>IFL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>ICF</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Totals</td>
<td>5</td>
<td>13</td>
<td>32</td>
<td>3,838.9</td>
</tr>
</tbody>
</table>

For significant configuration changes, capacity comparisons should be considered to have a +/-5% margin-of-error  
Upgrading the processor family is considered a significant configuration change

**Warning:** GP shared LCP:RCP ratio is excessive for this configuration  
Note: 1 defined partitions are excluded from consideration in the results

Input fields have white background; Clickable is a selection field; Use dropdown list; Double click a “Box-in-field” to open
zPCR – Confidence Factor

- **Degree of Error in methodology of +/- 5% needs to be included when building capacity plans**
  - Confidence of the estimation process and of the measuring process
  - Red flag when new processor is the same MIPS rating
  - Safe approach when planning for a new processor would be to always consider at least +5% growth.
Future Enhancements – Planned for 4Q 2009

- LPAR Configuration Capacity Planning function will be enhanced
  - A new Advanced-Mode capability will be implemented. In Advanced-Mode, multiple LPAR configurations (currently limited to two) can be created and analyzed within a single zPCR invocation.
  - Each LPAR configuration is identified with a unique name and icon. A configuration description field is also added for each. Generally, the 1st configuration would be considered the current one and the 2nd configuration would be considered as the alternate or replacement.
  - Only Contemporary plans can be done in Advanced-Mode.

- All windows in the LPAR Configuration Capacity Planning function will have HTML output capability
  - PRN file and Clipboard output is no longer supported for these windows.
Single Spot on the Web to Get More Information

- zPCR Getting Started Page
  - Contains:
    • Downloadable Code
    • zPCR Users Guide
    • External File Layout documentation
  - Technical Support Information
    • Training materials in .avi format (voice over foils)
    • Education Exercises
      - 4 Optional Exercises which become more complex to demonstrate the use of zPCR
    • Registration Information
    • Special Notices and FAQs

- Q&A and defect support are available through email: zpcr@us.ibm.com
Summary

- zPCR models **your unique** Processor configuration
  - Based on LPARS, weights, # of logical processors, workload mix and Specialty Engines
- Built upon LSPR benchmarks
- Using zPCR is Easy
- Use zPCR to correctly size your processor

It's QUESTION TIME!!
Acknowledgements

- Many people contributed to this presentation including:
  
  John Fitch
  Gary King
  Jim Shaw
  Kathy Walsh
Thank You
for attending!
Appendix
### Specify Host

**Family and Model specification**

<table>
<thead>
<tr>
<th>CPU Activity</th>
<th>z/OS V1R8</th>
<th>SYSTEM ID SYSD</th>
<th>DATE 02/28/2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RPT VERSION V1R8 RMF</td>
<td>TIME 11.30.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU</th>
<th>MODEL</th>
<th>H/W MODEL</th>
<th>ONLINE TIME</th>
<th>LPAR BUSY</th>
<th>MVS BUSY</th>
<th>CPU SERIAL</th>
<th>I/O TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CP</td>
<td>100.00</td>
<td>61.32</td>
<td>61.52</td>
<td>04B10E</td>
<td>30.92</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CP</td>
<td>100.00</td>
<td>61.55</td>
<td>61.54</td>
<td>04B10E</td>
<td>220.7</td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td>TOTAL/ AVERAGE</td>
<td>61.43</td>
<td>61.53</td>
<td>04B10E</td>
<td>251.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>IIP</td>
<td>100.00</td>
<td>23.23</td>
<td>23.08</td>
<td>04B10E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIP</td>
<td>AVERAGE</td>
<td>23.23</td>
<td>23.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### RMF report source for zPCR LPAR Config: Partition Definition panel – which fields to use

<table>
<thead>
<tr>
<th>zPCR Metric</th>
<th>RMF CPU Activity Partition Data Report source column</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>PARTITION DATA NAME</td>
</tr>
<tr>
<td><strong>SCP</strong></td>
<td>Upper left corner of all RMF reports for reporting system. You would need a report from each system to verify the release. Use z/OS-1.6 for z/OS-1.6 or later. Otherwise use z/OS **.</td>
</tr>
<tr>
<td><strong>Workload</strong></td>
<td>Use zPCR’s <em>Workload Selection Assistant</em> to determine Workload Mix.</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>The PARTITION DATA WGT column will contain DED instead of a numeric value if the engines are dedicated. If there is a numeric value the engines, then specify SHR for shared. zAAP and zIIP LPARs on z9 will have same mode as the same names LPARs for the CP engines</td>
</tr>
<tr>
<td><strong>LCPs</strong></td>
<td>PROCESSOR NUM column for the CP engine type</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>PARTITION DATA WGT column for the applicable engine type. For zAAP and zIIP LPARs on z9 processors, this value is entered on the Capacity Report Detail panel</td>
</tr>
<tr>
<td><strong>Capping</strong></td>
<td>CAPPING DEF column is YES then check this box</td>
</tr>
<tr>
<td><strong>zAAP LCPs</strong></td>
<td>PROCESSOR NUM column for the AAP engine type</td>
</tr>
<tr>
<td><strong>zIIP LCPs</strong></td>
<td>PROCESSOR NUM column for the IIP engine type</td>
</tr>
<tr>
<td></td>
<td>Also use zPCR’s online Help describing input metrics for each zPCR window.</td>
</tr>
</tbody>
</table>
### PARTITION DATA REPORT

**SYSTEM ID** WSC1  
**START** 05/02/2005-08.00.00  
**INTERVAL** 008.47.56  
**END** 05/02/2005-17.00.00  
**CYCLE** 2.000 SECONDS

#### MVS PARTITION NAME

- **WSC1**
  - **IMAGE CAPACITY**: 327
  - **NUMBER OF PHYSICAL PROCESSORS**: 12
  - **WAIT COMPLETION**: NO
  - **DISPATCH INTERVAL**: DYNAMIC

#### Name

**--- MSU --- CAPPING --- PROCESSOR --- PHYSICAL PROCESSORS ---**

<table>
<thead>
<tr>
<th>NAME</th>
<th>S</th>
<th>WGT</th>
<th>ACT</th>
<th>DEF</th>
<th>WLM%</th>
<th>NUM</th>
<th>TYPE</th>
<th>LPAR</th>
<th>MGMT</th>
<th>EFFECTIVE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSC1</td>
<td>A</td>
<td>421</td>
<td>0</td>
<td>125</td>
<td>NO</td>
<td>9</td>
<td>CP</td>
<td>0.24</td>
<td>37.98</td>
<td>38.22</td>
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<tr>
<td>SDEV</td>
<td>A</td>
<td>25</td>
<td>0</td>
<td>7</td>
<td>NO</td>
<td>5</td>
<td>CP</td>
<td>0.10</td>
<td>2.11</td>
<td>2.21</td>
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<tr>
<td>TDEV</td>
<td>A</td>
<td>25</td>
<td>0</td>
<td>7</td>
<td>NO</td>
<td>5</td>
<td>CP</td>
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<td>2.06</td>
<td>2.15</td>
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<tr>
<td>WSC2</td>
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<td>NO</td>
<td>10</td>
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<td>49.53</td>
<td>49.81</td>
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<tr>
<td><em>PHYSICAL</em></td>
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<td>1.03</td>
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<tr>
<td>TOTAL</td>
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<td></td>
<td>1.76</td>
<td>91.67</td>
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</tbody>
</table>

**--- CAPPING ---**

<table>
<thead>
<tr>
<th>NAME</th>
<th>S</th>
<th>WGT</th>
<th>ACT</th>
<th>DEF</th>
<th>WLM%</th>
<th>NUM</th>
<th>TYPE</th>
<th>LPAR</th>
<th>MGMT</th>
<th>EFFECTIVE</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>CFICMF</td>
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<td>ICF</td>
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<tr>
<td>CFICMF2</td>
<td>A</td>
<td>DED</td>
<td>1</td>
<td>ICF</td>
<td>0.01</td>
<td>49.76</td>
<td>49.77</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><em>PHYSICAL</em></td>
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<td></td>
<td></td>
<td>0.27</td>
<td>0.27</td>
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<tr>
<td>TOTAL</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.29</td>
<td>99.52</td>
</tr>
</tbody>
</table>

**Specify Host CPs for each type**

**Processor Utilization for Workload Selection Assistant**

**Capping**

**LCPs**
RMF report source for zPCR *Workload Selection Assistant*

<table>
<thead>
<tr>
<th>zPCR Metric</th>
<th>RMF report source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>CPU Activity CPU and MODEL fields at top of report section</td>
</tr>
<tr>
<td>Processor Utilization</td>
<td>CPU Activity Partition Data Report section TOTAL PHYSICAL PROCESSOR TOTAL Busy % FOR THE CP PROCESSOR TYPE (far right column)</td>
</tr>
<tr>
<td>DASD I/O per Second</td>
<td>Summary Interval Report DASD RATE for the same time period as CPU busy % or Workload Activity Report SSCHRT field - specify report type SYSRPTS(WLMGL( POLICY))</td>
</tr>
</tbody>
</table>

Also use zPCR’s online Help describing input metrics for each zPCR window.
RMF Workload Activity and Summary Interval Reports

**WORKLOAD ACTIVITY**

z/OS V1R8       SYSPLEX WSCZPLEX       DATE 02/28/
RPT VERSION V1R8 RMF       TIME 11.30.

POLICY ACTIVATION DATE/TIME

REPORT BY: POLICY=WLMPO

brown WLM test policy

TRANSACTIONS TRANS-TIME HHH.MM.SS.TTT --DASD I/O-- ---SERVICE---
AVG 60.54 ACTUAL 1.511 SSCHRT 237.1 IOC 17379
MPL 60.54 EXECUTION 1.464 RESP 9.2 CPU 2237
ENDED 43 QUEUED 47 CONN 7.3 MSO 0

**RMF SUMMARY REPORT**

z/OS V1R8       SYSTEM ID SYSD
RPT VERSION V1R8 RMF

NUMBER OF INTERVALS 30

DATE TIME INT CPU DASD DASD JOB JOB TSO TSO
MM/DD HH.MM.SS MM.SS BUSY RESP RATE MAX AVE MAX AVE
02/28 11.30.00 00.59 61.4 10.0 240.3 5 4 2 2
02/28 11.31.00 01.00 70.1 9.2 249.6 5 5 2 2

DASD I/O per Second
Capacity Planning Considerations cont’d

LPAR Configuration Definition (SCP/Workload)

- **z/OS** (1.9, 1.8, 1.6 or 1.4)
  - z10 can only be modeled with z/OS-1.9 (max 64 LCPs) or z/OS-1.8 (max 32 LCPs)
  - When z/OS-1.9, z/OS-1.8 or z/OS-1.6 is assigned to a partition, zAAP/zIIP LCPs may also be defined if zAAP/zIIP CPs are configured on the host.

- **z/VM** (WASDB/LVm workload only; maximum 16 LCPs)

- **Linux** (WASDB/L workload only; maximum 16 LCPs)

- **z/VSE** (Batch, Online, or Mixed; maximum 4 LCPs)

- **CFCC** (maximum 16 LCPs)