System z - the most versatile computing platform

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Today the mainframe represents the most mature and advanced technology, but new users are not rushing. Why?

Public perception that the mainframe is obsolete
High mainframe hardware and software costs (in comparison to other platforms)
Application portfolio and ISV enthusiasm
Perceived complexity of system
Desire for use of open standards
Other platforms becoming “good enough”
Single vendor
X86 servers consume less energy
Aging skills

But what is the reality?
IBM-Mainframe vs. other platforms

**High Capacity**
+ Processor
+ I/O bandwidth
+ Scalability

**Reliability, Availability and Serviceability**
+ Hardware
+ Software

**Security**
+ Hardware
+ Software
+ Integrity

**Real TCO**
+ 24x7
+ Disaster/recovery
+ Backup/recovery

**Operational Disciplines**
+ 24x7
+ Disaster/recovery
+ Backup/recovery

**Support of**
- SOA-Applications
- Mixed Workloads
- Advanced Virtualization
- Systems Management

**Perceived Shortcomings**
- High hardware costs
- High software costs
- Proprietary operating system
- Not user-friendly

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IT Users’ Requirements

- Availability
- Business Continuity
- Flexibility to quickly implement changes
- Scalability, easy migrations
- Constant response time
- Simplicity, skills
- Data security
- Affordable CaPex and OpEx
- “Greener” infrastructure
System z Availability and Business Continuity

- Proven Software
- Redundant and hot-swappable power supplies, blowers
- Chipkill or Advanced ECC memory technology
- Memory fencing
- Alternate channels and network paths
- Each z10 EC have up to two “spare” PUs which are automatically activated
- Automated Disaster Recovery techniques
Cluster technology GDPS: Geographically Dispersed Parallel Sysplex

- Parallel Sysplex
- PPRC
- Automation
GDPS

- Multi-site application availability solution with fast recovery time and highly automated control
- It manages application availability in and across sites for both planned maintenance and unplanned situations such as site failure or full-blown disaster.
- GDPS was initially designed for mainframe z/OS systems, but with continuous development was later enhanced to support select open systems platforms, as well.
- xDR expands GDPS/PPRC functionality to Linux for System z and provides disaster recovery for customers with distributed hybrid applications that span z/OS and Linux for System z
- GDPS is a 'product' which a customer license and deploy thru IBM Global Technology Services (formerly IGS). Once the installation and testing are completed the customer is self sufficient in operation, modifications, configuration changes, updates etc.
- GDPS includes resource sharing, data-sharing, workload balancing
- 2011 IBM GDPS active/active continuous availability is the next generation of GDPS and a fundamental paradigm shift from a failover model to a near continuous availability model.
GDPS/PPRC HyperSwap

- HyperSwap substitutes PPRC secondary for PPRC primary device
- Automated — GDPS-managed, no human interaction
- Swap large number of devices quickly
- Changes status in secondary disk subsystem
- Changes status in primary disk subsystem — if available
- Non-disruptive — applications keep using same device addresses
- GDPS/PPRC v.2.7 supports planned (remove site without stopping applications), v.2.8 and above support unplanned disk and site reconfiguration
- Basic HyperSwap without GDPS
IBM zEnterprise - Scalability and Flexibility

Two lines: Enterprise (z196) class and Entry level (z114)

- MIPS range: 26-3100 (z114), up to 52,000 (z196)
- 130 capacity settings
- Same technology, same qualities of service

IBM zEnterprise, BladeCenter Extension (zBX)

- Up to 112 PS701 Power blades
- Up to 28 HX5 System x blades
- Up to 28 DataPower XI50z blades (double-wide)
- Up to 56 IBM Smart Analytics Optimizer blades
- Supports z/OS, AIX, Linux and Windows

Fine granularity, multi-platform, hybrid IT
Simplicity, Skills

- Advanced system automation
- DFSMS
- IBM experts (no-charge support)
- GUIs
- Installation and operational wizards

**IBM Academic Program for System z**

- Now deployed at app. 850 Schools worldwide
- IBM recognizes thousands of students with awards and access to Enterprise Software to develop IT skills
- "Destination z" scholarship program, which provides funding for educational courses
- Students learning IBM enterprise systems are getting opportunities with leading enterprises
The major areas of IBM’s mainframe simplification strategy include:

- **Automated configuration checking** - to make it easier to predict and avoid technical problems.

- **Modernizing the mainframe user interface** - including network configuration, systems management, and data center hardware configuration.

- **Improving software asset management technologies** - to make it easier for users to control software costs and, as well, simplify and automate the acquisition of software services.

- **Modernizing the mainframe’s development environment with visual tools** that enable novices to quickly learn how to program for the mainframe.
The **zEnterprise PU** chip has on board cryptographic functions - standard clear key integrated cryptographic coprocessors provide high speed cryptography for protecting data in storage.

**CP Assist for Cryptographic Function (CPACF)** supports DES, TDES, Secure Hash Algorithms (SHA) for up to 512 bits, Advanced Encryption Standard (AES) for up to 256 bits and Pseudo Random Number Generation (PRNG).

**The Crypto Express2** feature can be configured as a secure key coprocessor or for Secure Sockets Layer (SSL) acceleration. The tamper resistant cryptographic coprocessor is certified at FIPS 140-2 Level 4.

**RACF**, the backbone of mainframe security, which controls access to all protected z/OS resources or **ACF2 and Top Secret** from CA

**Tivoli’s zSecure Suite**

**Consul’s** (acquired by IBM in 2007) **zSecure Suite** offer a friendly RACF administration and reporting interface for users.
IT costs shifts from hardware and software to personnel and energy
How to lower System z CaPex and OpEx?

- IBM is more flexible when negotiating hardware and software charges for new applications
- New applications such as SAP ERP fall under the category of NALC (Workload License Charges)
- Evaluate replacing ISV tools with IBM
- Lower energy requirements per computing power capability
- Less personnel
- If migrating from Windows or RISC Unix – less processor cores, less software charges
- Flexible CoD options
- Use special engines; zIIP, zAAP
  - Lower hardware price
  - No OS charges for the zAAP, zIIP engines
System z Application Assist Processors

zAAP Potential Benefits
- Offload of Java code and z/OS XML processing from z/OS processors
- Stemming the growth of z/OS portion, with reduced TCO
- Improved performance

Challenges
- Available skill sets
- High initial cost (in particular for small number of applications)

zIIP Potential Benefits
- Fully transparent to different applications such as CRM, ERP and Data Warehousing
- Offloading z/OS MIPS and slowing growth demands

Challenges
- Available skill sets
Installed Capacity Through 2Q11

System z Installed Capacity

- z/OS MIPS*
- zLinux MIPS

* these MIPS could also be used for z/VM, z/VSE or z/TPF Operating Systems

63 of the top 100 System z customers are running Linux on the mainframe

More than 3,000 applications are available for Linux on System z
On SAP benchmarks the average zIIP utilization in all tests was higher than the CPU utilization, which demonstrates the very effective offloading of DB2 processing to a much more price-attractive portion of the mainframe.
CoD and other special options

- **Capacity Upgrade on Demand (CUoD)**
  - CUoD for processors can add, *concurrently*, more CPs, IFLs, ICFs, zAAPs and zIIPs to a System z Server by assigning available spare PUs.

- **Customer Initiated Upgrade (CIU)**
  - CIU is similar to CUoD, but the capacity growth can be added by the customer.

- **On/Off Capacity on Demand (On/Off CoD)**
  - Ability to install concurrently temporary capacity

- **Capacity Backup Upgrade (CBU) with special engines**
  - Enables alternative System z processors to activate “sleeping engines” to compensate lost capacity at not-full price
  - The z9 off-load engines are included in this CBU and can be integrated in GDPS

- **New z10 feature: Capacity For Planned Event (CPE)**
  - A variation of CBU. CPE can be used when capacity is unallocated, but available, and is needed for a short-term event.

↓ **Non-disruptive growth, less up-front investments!**
SAP ERP on System z – Options

Options:
- z/OS
- DB2
- TCP/IP
- AIX
- FICON
- HiperSockets

DataBase Server   Application Server

Application Server
SAP ERP on zEnterprise

- zManager as a central point of control—a centralized governance system that can manage an underlying z/OS, Linux on System z, AIX on POWER, or Linux and Windows on System x

- Better performance
- Support large Database
- Entry level pricing
- Extensive use of zIIPs
- Internal connections, highest security
- Top business continuity
- Lower TCO
Other Benefits of zEnterprise

An Ideal solution for users having application which span IT platforms

- zOS with internal connection to AIX or Linux on POWER7, or Windows, Linux on x86 virtualized blades
- Multi-Tier Web Serving which is typical to Banking, Insurance, Government, Healthcare and requires scalability and flexibility
- Business Intelligence (Cognos) / Data Warehousing which exploits processor speed of the POWER7 and DB2 features
- The most versatile platform with the most advanced virtualization which supports all mainframe operating systems, Java, Linux, AIX and now Windows as well.
Mainframe users‘ concerns

- Is the mainframe the right platform for existing applications?
- What’s about new applications?
- How to plan for better TCO?
- Graying of the mainframe staff?
- Will IBM continue to develop the mainframe?
- Which factors to consider to migrate to newest mainframe technologies?
What IBM does to address the challenges

TCO
- Improved price/performance
- Consolidation solutions
- New Application License Charge
- Workload License Charge
- IBM tools/utilities
- Special engines

Open Standards
- TCP/IP
- Linux
- Java
- SOAP
- HTML

Application Portfolio
- Linux on the mainframe
- Java
- IBM tools/utilities
- Unix System Services
- Blades for AIX, Linux and Windows
- ISV development support centers

Staffing
- University training efforts
- IBM experts (no-charge support)
- GUIs
- System automation
- Installation and operational wizards

The z10 was a $1.5 billion investment, which took 5 years to develop with a global team of more than 5,000 technical professionals. zEnterprise is the next big step
Mainframe Future Developments

- Further enhancements in HW/SW costs/workload
- Enhance Tivoli Integrated Service Management for System zEnterprise portfolio - Security, Monitoring, Storage, Automation
- Further enhancements in business continuity features
- More exploitation of the new zEnterprise Unified Resource Manager
- More hybrid applications to exploit the unique multiplatform infrastructure, such as IBM Smart Analytics Optimizer (Netezza, System p)

IBM zEnterprise Provides a New Dimension in IT
IT Users‘ Requirements

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- Affordable CaPex and OpEx
- “Greener” infrastructure

Since 2010, more than 250 companies have migrated workloads (including Oracle workloads) to System z!
2Q11 Revenues from System z mainframe server products increased 61 percent compared with the year-ago period. Total delivery of System z computing power, as measured in MIPS (millions of instructions per second), increased 86 percent.
Recommendations

✓ Evaluate at all costs, including so-called hidden costs, and energy costs when comparing platform solutions.
✓ Consider z Linux and IFLs for Unix and Windows consolidations.
✓ Consider hybrid zEnterprise for cross-platform applications
✓ Evaluate zIIP and zAAP engines to offload the z/OS hardware and lower hardware and software costs
✓ Evaluate on/off the CUoD,CIU, CoD, and the CBU options
✓ Evaluate “Mainframe Charter” savings options
✓ Consider to deploy GDPS, HyperSwap as a part of business continuity strategy. Justify investment based on reduced downtime for both planned and unplanned downtime.

The mainframe remains a viable platform for mission-critical applications, also for new ones!
A selection of our coverage areas:

- Mainframes
- Enterprise storage
- Mid-range storage
- Disaster recovery techniques
- Data center consolidation
- Procurement & price evaluations