The Mainframe Marketplace and the role of the mainframe in 2009 and Beyond or Old love never dies

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Hamburg

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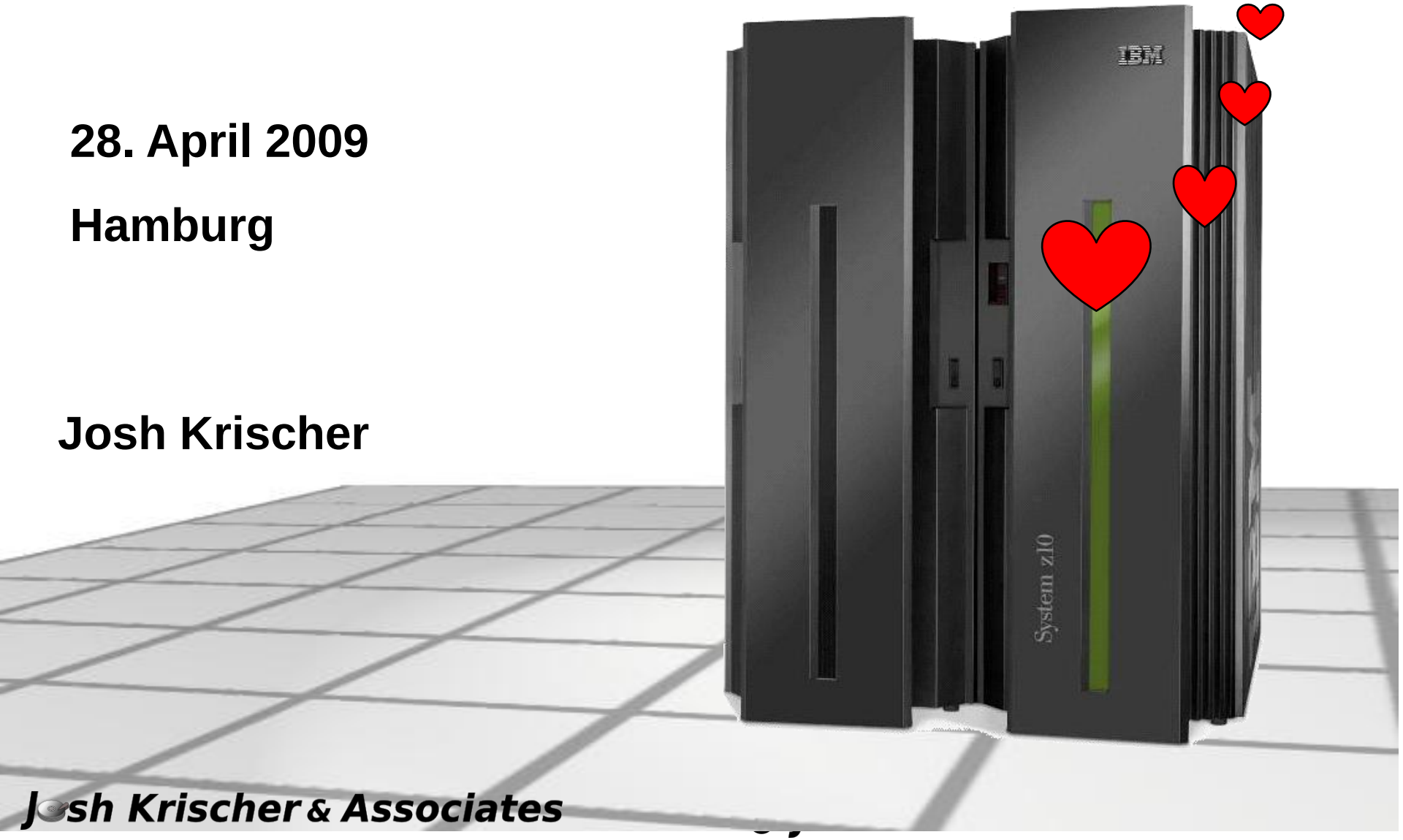


Today the mainframe represents the most mature and very advanced technology, but new users are rare. Why ?

Public perception that the mainframe is obsolete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?

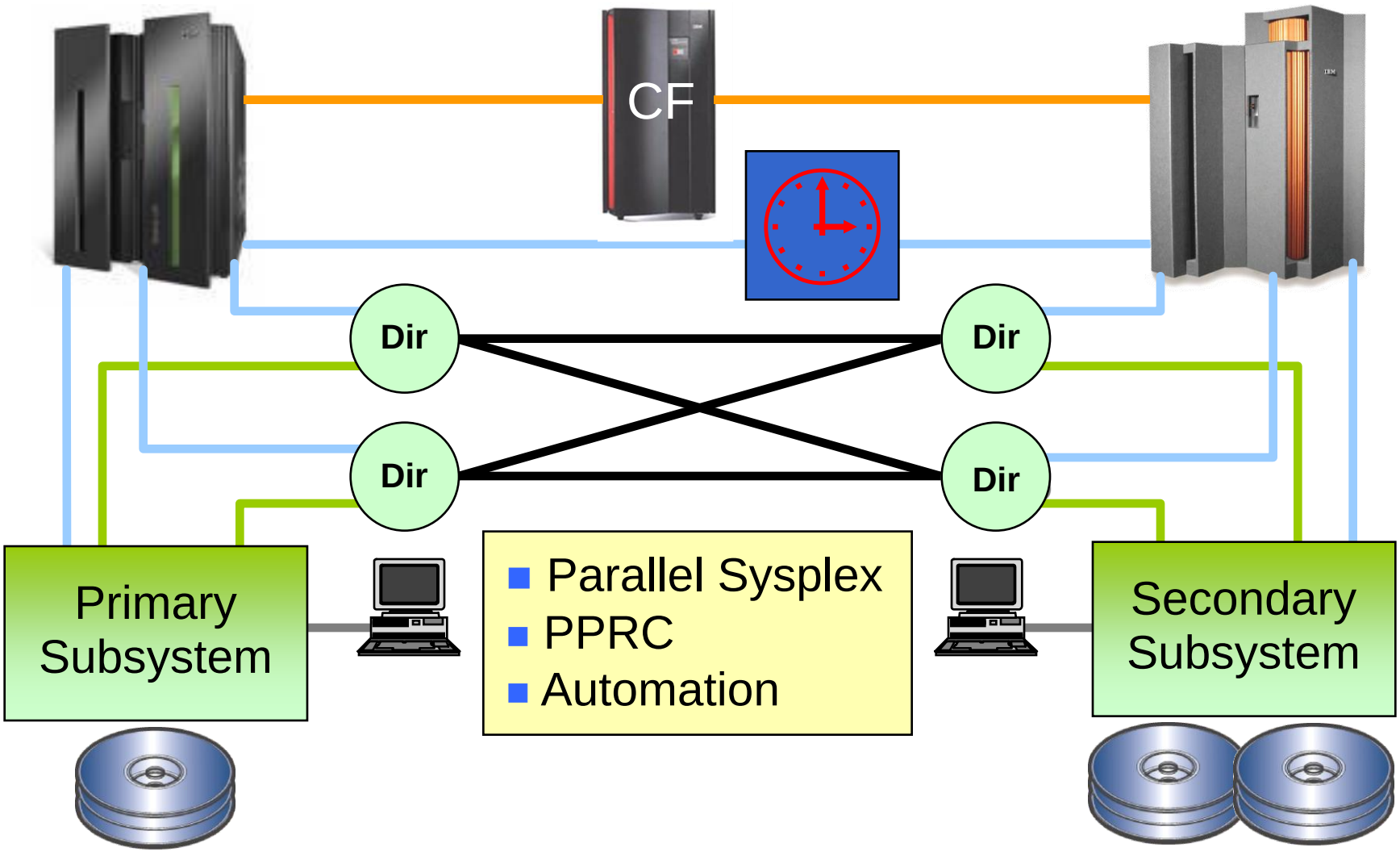
IT Users‘ Requirements

- 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



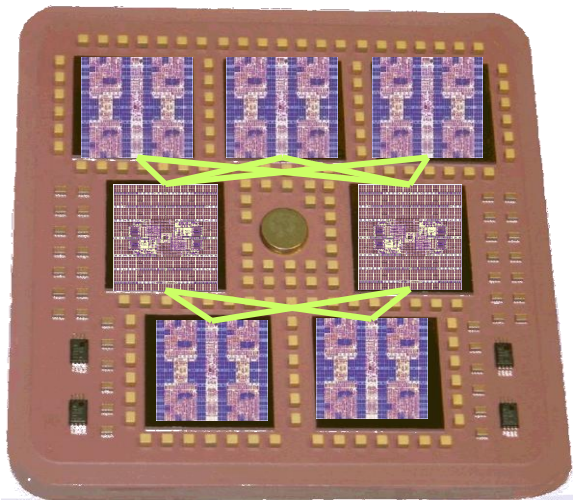
GDPS

- 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

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 System z10 Enterprise Class (z10 EC) Scalability and Flexibility



Enterprise Class (z10 EC)

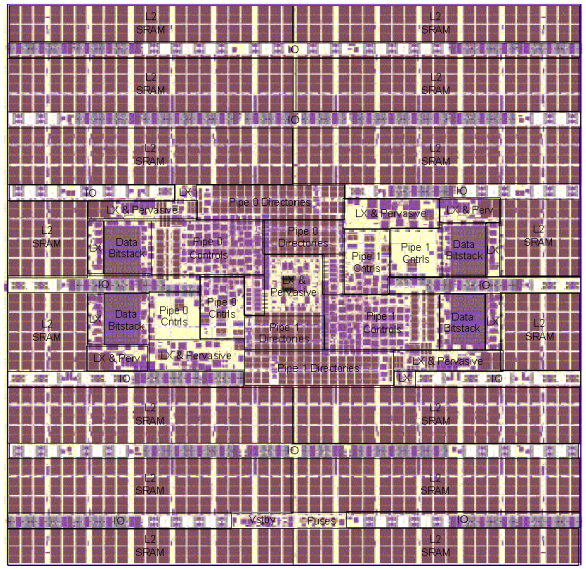
- 5 model offerings between 1 to 64 configurable processor units (PUs) and can support up to 64 PUs in a single z/OS V1.9 image
- 100 capacity levels; 216 -3739 Gartner MIPS
- Up to 1.5 Tbyte memory

Business Class (z10 BC) for SMBs

- 130 capacity levels ; 26-2749 Gartner MIPS

Fine granularity

Performance, Constant Response Time



- The z10 uni-processor can deliver up to 62% more performance than z9 EC uni-processor
- The z10 EC 64-way can deliver up to 70% more server capacity than the largest z9 EC
- Up to 1024 FICON channels
- Up to 64 coupling links, up to 32 new 6Gbps InfiniBand CL
- Up to 16 HiperSockets high-speed ‘virtual’ Local Area Networks (LANs)
- Capacity for Planned Events (CPE)

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. 550 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

IBM Announces Five Year March to Mainframe Simplification; Oct 2006

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 t**ools that enable novices to quickly learn how to program for the mainframe.

The z/OS V1R8 on System z or higher - contains several programs, features and tools supporting mainframe simplification including:

- ✓ **The IBM Health Checker for z/OS**: This z/OS "personal trainer" actively monitors z/OS systems and recommends configuration tune-ups that can improve system resilience, security, and performance.
- ✓ **Tivoli's IBM OMEGAMON z/OS Management Console** provides a modern, graphical user interface for z/OS management.
- ✓ **Hardware Configuration Manager (HCM):** In z/OS V1R8, HCM has taken a leap forward in simplifying System z hardware configuration. Enhancements include new configuration wizards, the ability to import and export I/O Definition Files, and assist in detection and resolution of performance bottlenecks.
- ✓ **IBM Configuration Assistant for z/OS Communications** Server which guides network administrators through the setup of the latest network features of z/OS and is designed to help avoid costly configuration errors.
- ✓ **Application Development Simplification:** WebSphere and Rational continue to deliver a strong set of solutions to simplify the development, maintenance and modernization of new and core z/OS business applications.

Data Security Protection

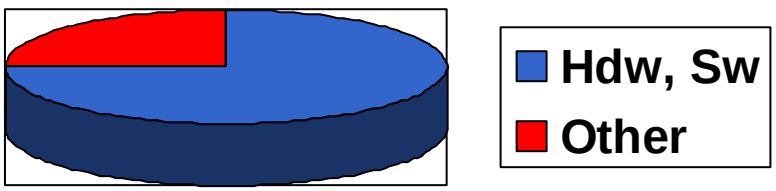
Compliance, privacy laws, Industry espionage

- **Authentication** - validation of users, security administrators, and system administrators.
- **Access control** - limits what data portion can be seen by a user; assigning of appropriate privileges for a specific job responsibility.
- **Integrity -** ensures that data is consistent and correct and has not changed as result of transfer, malfunction, or malicious attack.
- **Data encryption** - protects, beyond access control, content from unauthorized access, in particular on storage media or during data transmission.
- **Secure key management** - ensures that data can be accessed when required; losing a key is equivalent to data shredding.
- **Non-repudiation of data** (safe digital signature) - acknowledgements or receipts to verify that the sender/receiver did send/receive the message.
- **Auditing capability** – logging of all accesses and administrative changes for later analysis.

System z cryptographic solutions

- The **z10 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.

TCO, IT Costs Shift



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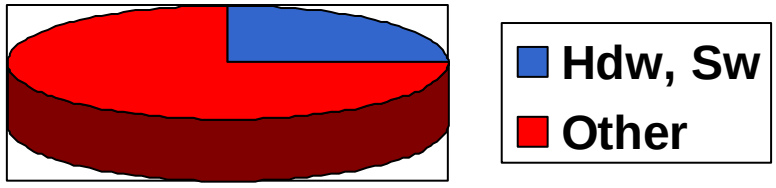


Today

- IT costs shifts from hardware and software to personnel and energy
- In few years energy costs of data center may exceed equipment costs

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
- Check 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

The IBM Mainframe Charter from 2004: the framework for future announcements

It is IBM's intention for the mainframe to:

Provide innovation

- Maintain System z as gold standard for mission-critical workloads
- Provide System z leadership in on-demand computing solutions
- Improve autonomic and self-management capabilities

Offer value

- Lower cost of System z solutions
- Enhance on-demand solutions
- Increase accountability of resource usage for on-demand

Foster a community

- Promote application portfolio
- Provide skills
- Leverage open standards

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 System z 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!

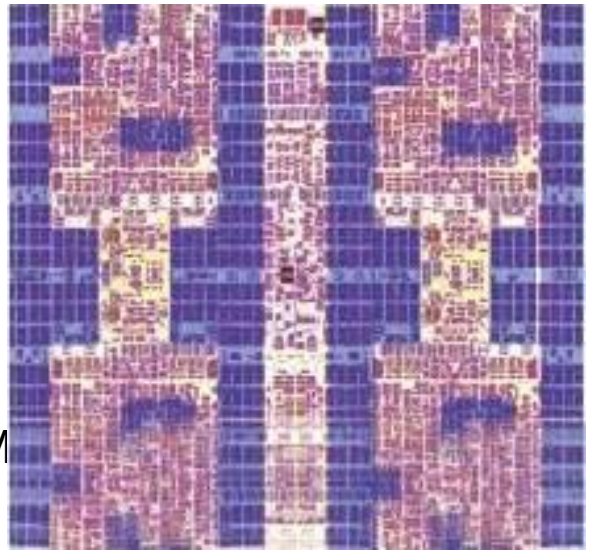
System z9 Application Assist Processor (zAAP)
System z9 Integrated Information Processor (zIIP)

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

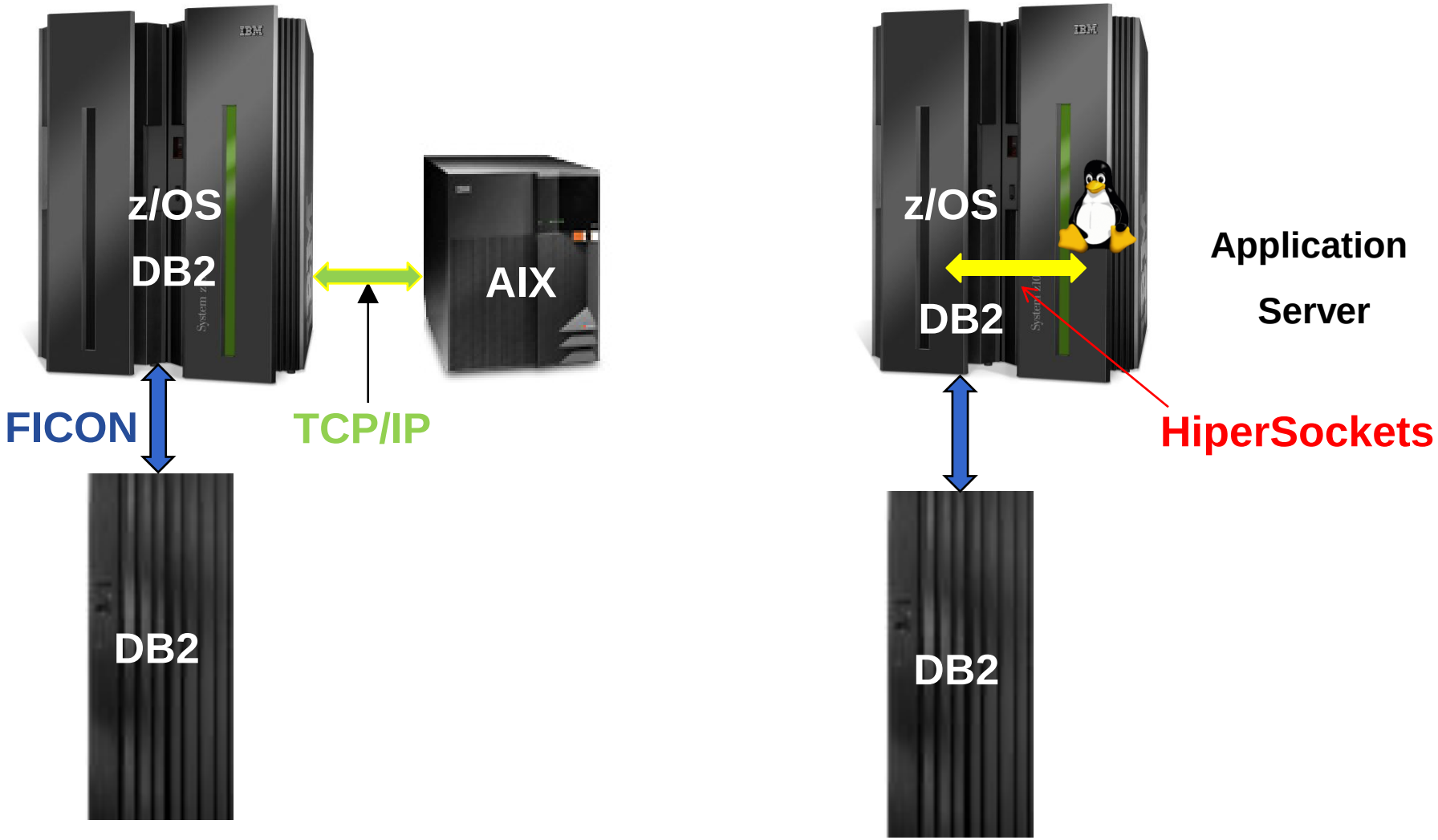
- Available skill sets

Special engines orders grow 68% in 2008!

SAP ERP Users‘ Trends

- Increase percentage of moving from UNIX to LINUX
- Main motivations:
  - Costs
  - Vendors’ independence,
- The average Linux migration customer gets bigger in size, revenue, and number of users
- The applications become more critical for company operation
- Larger data bases

SAP ERP on System z



Why SAP ERP on System z?

- The highest availability, for DB and application servers
- Fastest communication between DB and applications servers
- Powerful WLM to deliver performance according to SLAs
- GDPS and HyperSwap
- Powerful disk and tape storage management
- Largest databases
- DB2 (hardware) data sharing
- Highest security
- Lower software costs
- Powerful partitioning, server consolidation
- Less energy requirements

EPA Report and Energy Efficient Servers*: An extremely strong recommendation to businesses

- Public Law 109-431 (executive summary p. 5)

  SEC. 2. SENSE OF CONGRESS. It is the sense of Congress that it is in the best interest of the U.S. for purchasers of computer servers to give high priority to energy efficiency as a factor in determining best value and performance for purchases of computer servers.

- Potential Energy efficiency Improvements for Servers and Data Centers – IT Hardware Design improvements (Table 3-6 p54)
  - Use centralized servers (large systems) to improve sharing of computer resources
  - Use built in monitoring
  - Improve hardware support for virtualization
  - Improve microprocessors to lower leakage current
  - Increase Systems integration

System z10 provides all of these TODAY!

* **Source:** U.S. Environmental Protection Agency (EPA) Published Aug. 7, 2007

IBM-Mainframe vs. other platforms

High Capacity
+ Processor
+ I/O bandwidth
+ Scalability

Reliability, Availability and Serviceability
+ Hardware
+ Software

Security
+ Hardware
+ Software
+ Integrity

Real TCO

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

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
- OpenSolaris™

Application Portfolio
- Linux on the mainframe
- Java
- IBM tools/utilities
- Unix System Services
- Selected incentives/help for ISVs
- 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.**

My management asks to evaluate mainframe exit strategy?

- If cost reduction is the primary goal, have you optimized the hardware and software charges?
- Are the press articles and stories relevant to your environment and business requirements?
- Are „special“ engines used or considered?
- Is there a real TCO calculation study performed?
- How much time and effort will it *really* take to migrate?
- Are migration cost and ROI break-even calculated
- What is the lost business opportunity costs?
- How was the whole target environment (not only the platform) architected?
- Can we provide the same SLA guarantee?

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.
- ✓ Evaluate zIIP and zAAP engines to offload the z/OS hardware and lower harware 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!

Josh Krischer & Associates GmbH

A selection of our coverage areas:

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

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