



Boston University



Enterprise Data Warehouse **Oracle Linux on System Z** **Experiences**

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Wednesday, August 4, 2010: 11:00 AM-12:15 PM



SHARE in Boston



Boston University Agenda



- Services Operation Philosophy
- BU-brief History of zTime
- Experiences in a Centralized Enterprise Data Warehouse
- The Business Value Gained
- Some interesting lessons learned



Services Operation Philosophy

Standardize:

- Continue to build on Linux zVirtual Machines as a practice
- Oracle Grid Infrastructure - Centralize server management
- Linux Operating System – Open platform
- IBM System z – Oracle Enterprise Data Server

Services Operation Philosophy

Virtualize:

- Oracle Maximum Availability Architecture (MAA) LoZ
 - Dynamically add and manage disk (Oracle ASM)
 - Dynamically generated Centralized backup and recovery of Oracle databases (Oracle RMAN)
 - Protect data from failures, disasters, errors, and corruptions (Oracle Data Guard)
 - Acquire resources once use many (IBM zVM server virtualization)
 - Native high-speed support for internal data flows (IBM z Hipersockets)
 - Point in Time Back-up (IBM Systems z feature)
 - Linux virtual server monitoring and capacity planning (Velocity ESALPS)
 - Remote read/support configuration (Metalink Credential Configuration)
 - Automated systems management (LoZ, Oracle Grid)



Services Operation Philosophy

Consolidate:

- Business Driver: Operational Efficiency & Cost Reduction
- Single guests running multiple Oracle applications/databases
 - It either works or you fix it.
- Distributed servers to z virtual servers
 - New Application – JEE and Oracle all on LoZ.
 - Consolidate database systems to Oracle Database
- Database administration oracle-help mailing list
- Result: **All Database Administration for BU IS&T**

BU-brief History of zTime

- **History of zLinux at BU (Prod 08/2000)**
 - Involvement in the LCDS – Test Drive
 - 9672 -> z800 -> z890 ->z9BC ->z10BC
- **Business Intelligence BU-DAR - Oracle (Prod 10/2007)**
 - Data Warehouses (marts) built for client data.
 - Oracle Warehouse Builder and database replication with Java – XML utilities.
 - Running Stable for Enterprise Reporting for (3) years..
- **University Document Imaging (Prod10/2008) – 2 years freshman applicant processing (~38,000)**
 - Scanning, retrieval, workflow
 - Onbase System Selected
 - Target Oracle 10G
 - Enterprise Wide System (5 Intel front ends thick, ~ 50 web front ends)
 - Platform Integrated with zOS system (via Hipersockets)
- **Oracle Enterprise Grid Control (Prod 10/2008)**
 - Agent based low weight Oracle monitoring for the enterprise.
 - Monitor Report Resolve
- **Enterprise Data Warehouse (Prod 10/2009)**
 - Design Build Deploy Refresh
 - Oracle Automatic Storage Magement
- **Informatica PowerCenter (Prod 10/2009)**
 - Utilizes Hipersockets for Extract/Transformation/ Load – Oracle -

BU zEnvironment

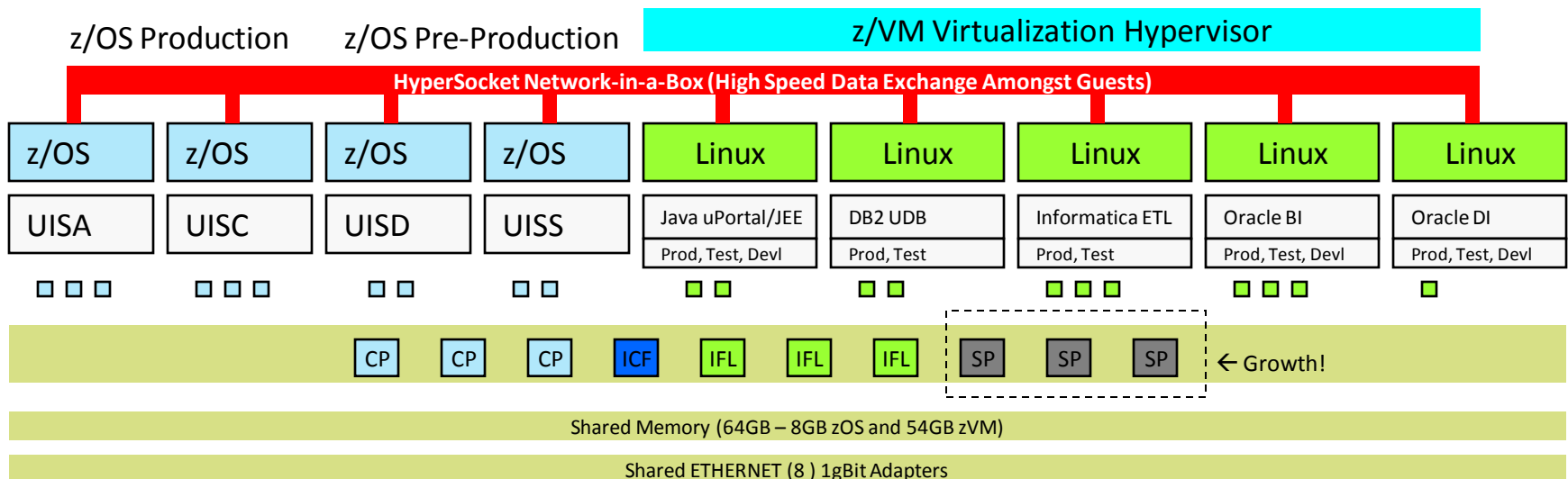


Power and Flexibility - System z10 Virtualization

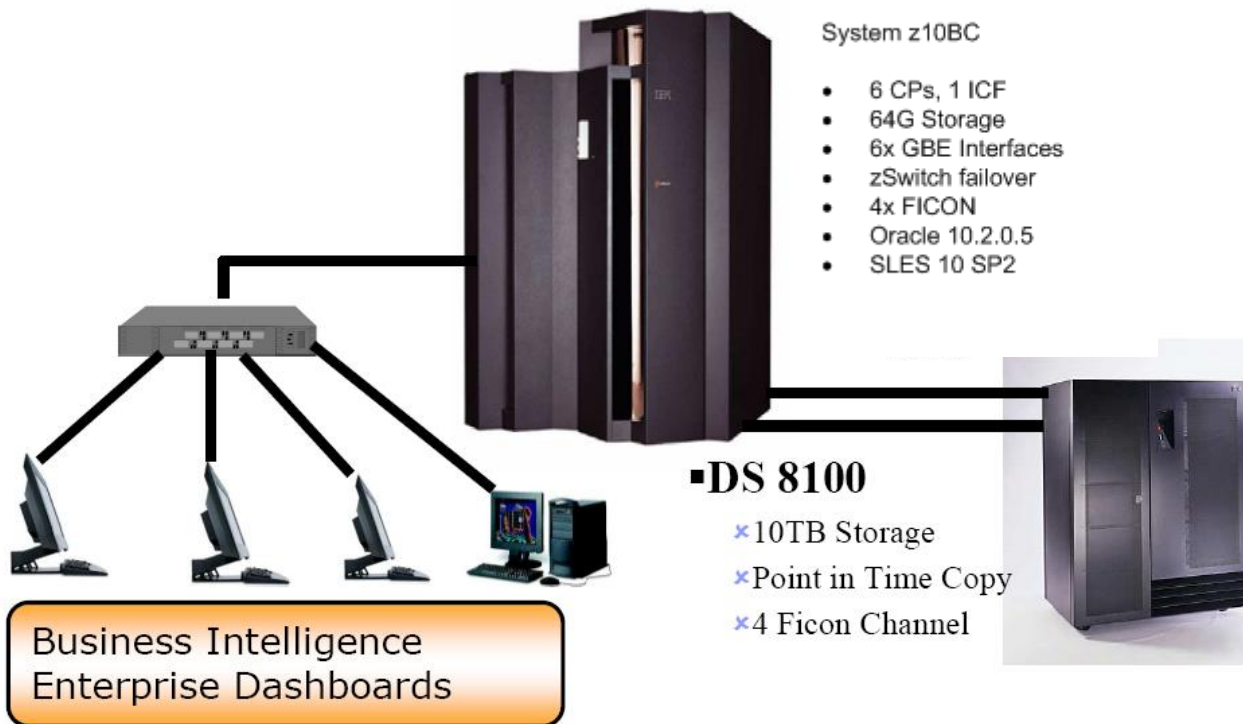


Shared Everything - CPU, Memory, Network and DISK Resources

- Multiple Images Concurrently Share All Physical Resources (CPU, Memory, Network)
- Resources Delivered As Required, Automatically, Based On Business Oriented Goals
- New zVM Guests Can Be Created/Started Without Affecting Ongoing Work
- Hardware Assists Used To Accelerate Virtualization Operations
- Native Rock Solid Security



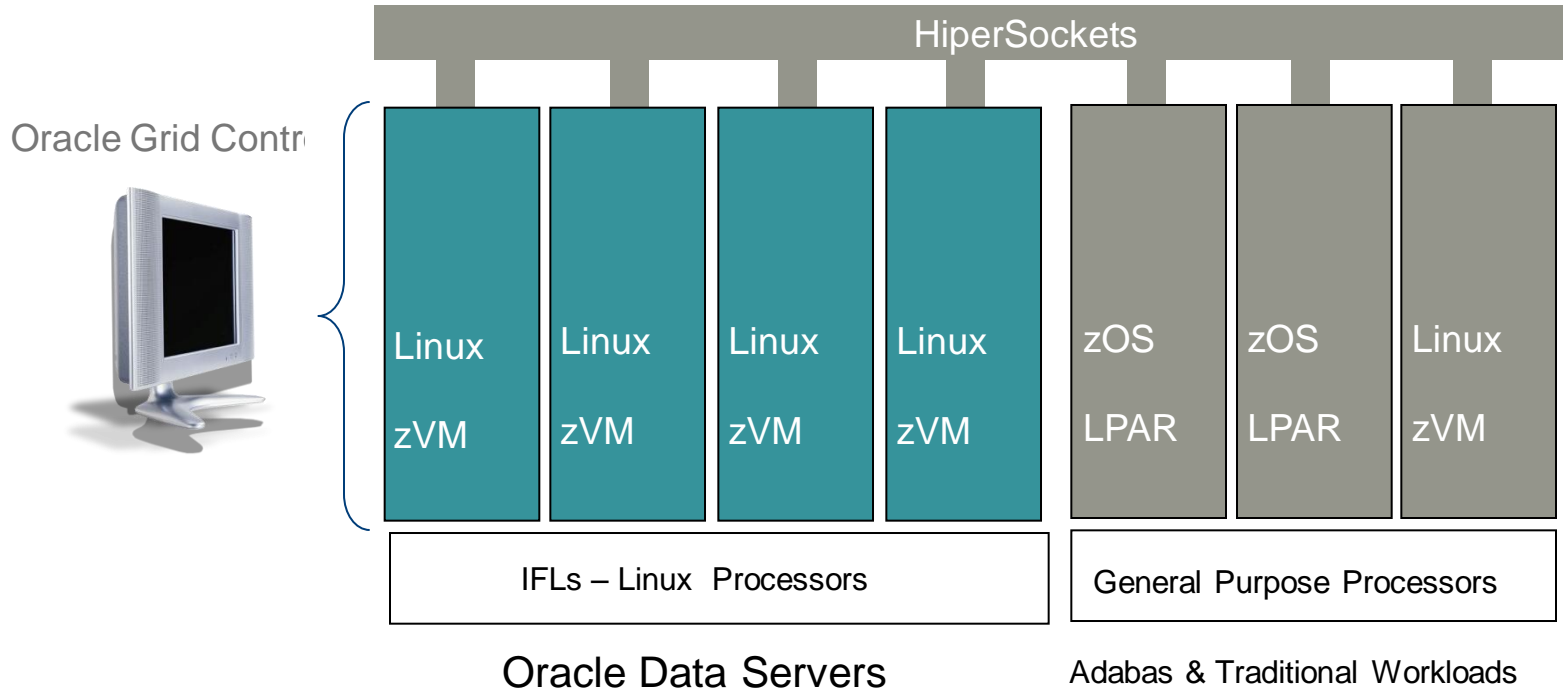
zHardware Infrastructure



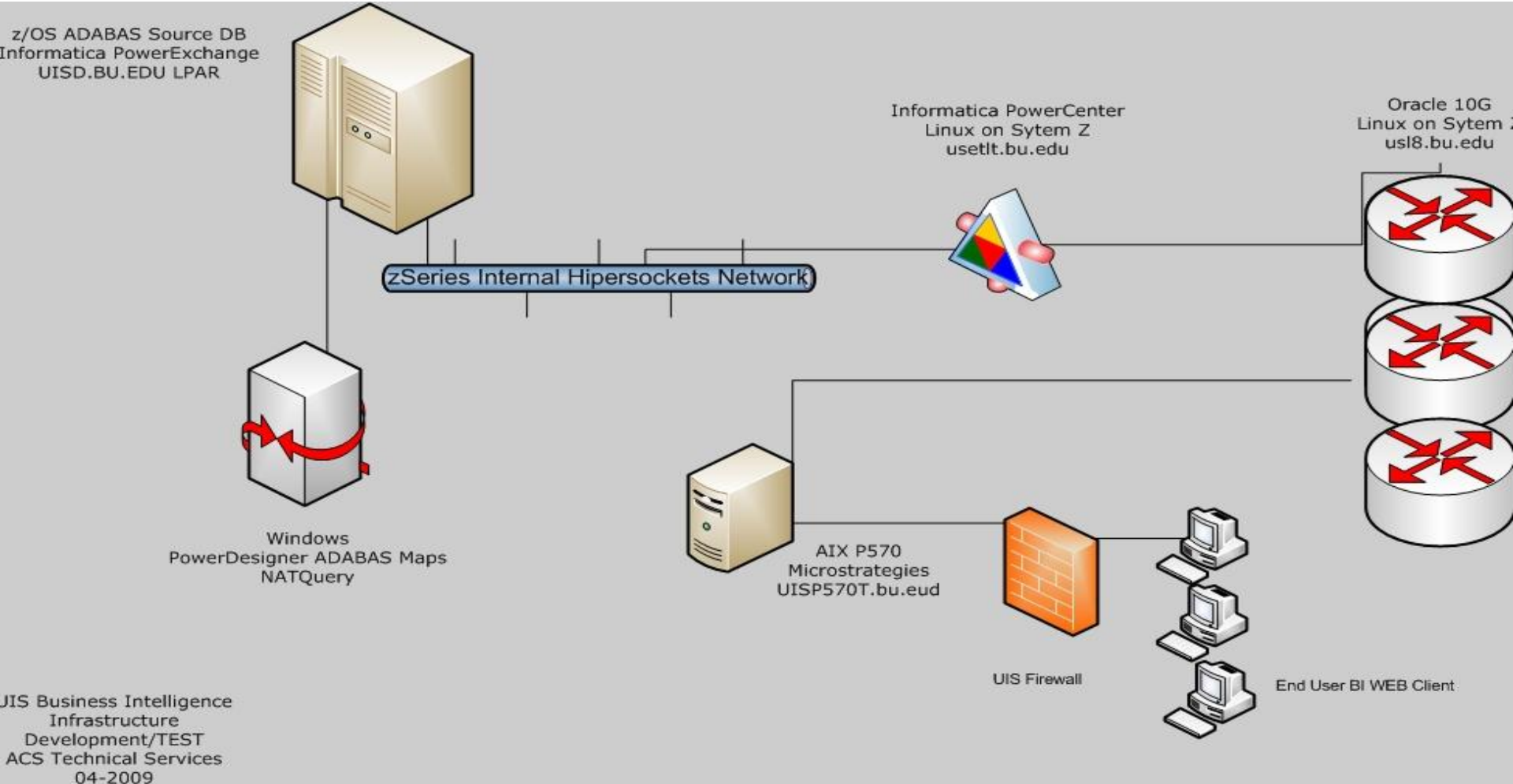
IBM XIV

- 45 TB Usable
- 9 Module system
- Thin Provisioning
- Snapshots
- Differential snapshots

Oracle Grid Infrastructure for Applications



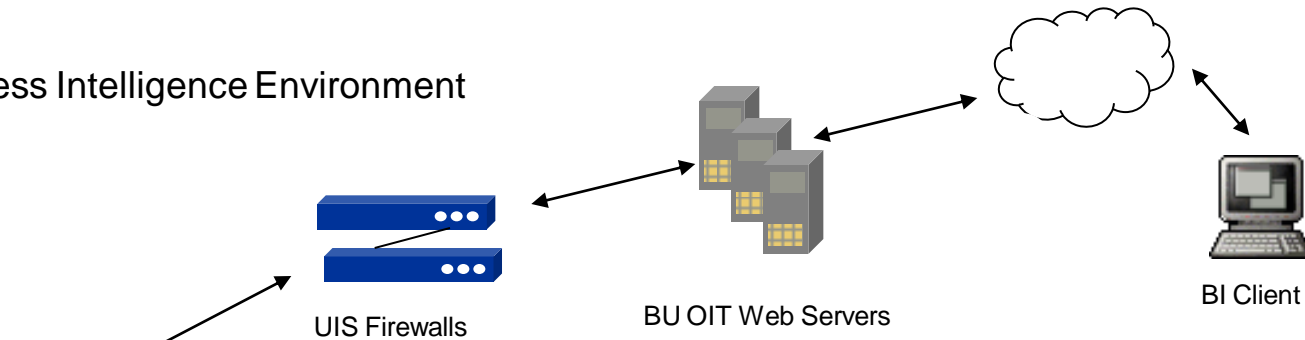
System z – BU Enterprise Enterprise DW



UIS Business Intelligence
Infrastructure
Development/TEST
ACS Technical Services
04-2009

Business Intelligence

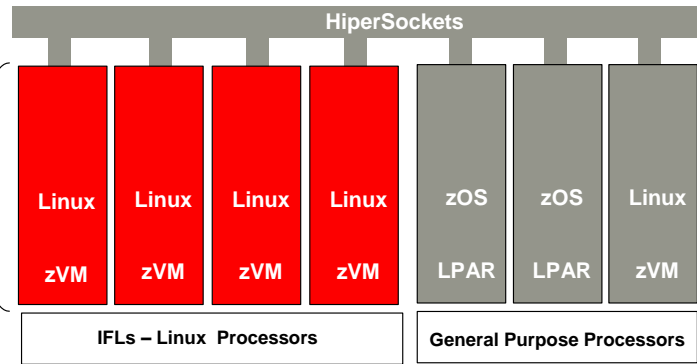
Business Intelligence Environment



System p5 570
 Microstrategies 80
 WEB Application
 Java 1.4.2
 Tomcat 5.5.20
 Microstrategies
 Intelligence Server



Oracle Grid Control



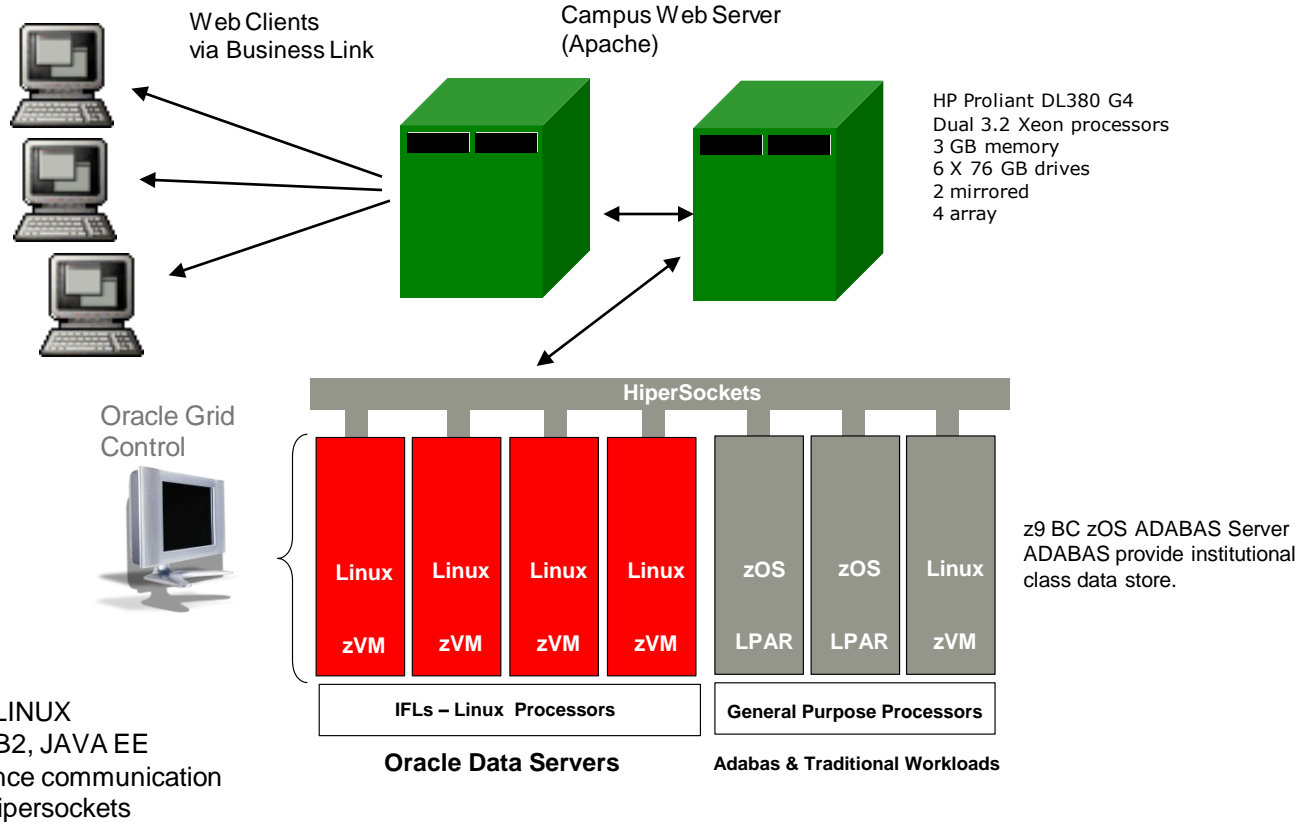
Linux on z9 BC
 •Oracle 10g
 •Data from zOS ADABAS via ADABAS Replicator

Oracle Data Servers
 Data Direct Wire Protocol Driver

Adabas & Traditional Workloads
 Feeds data to Oracle via Adabas

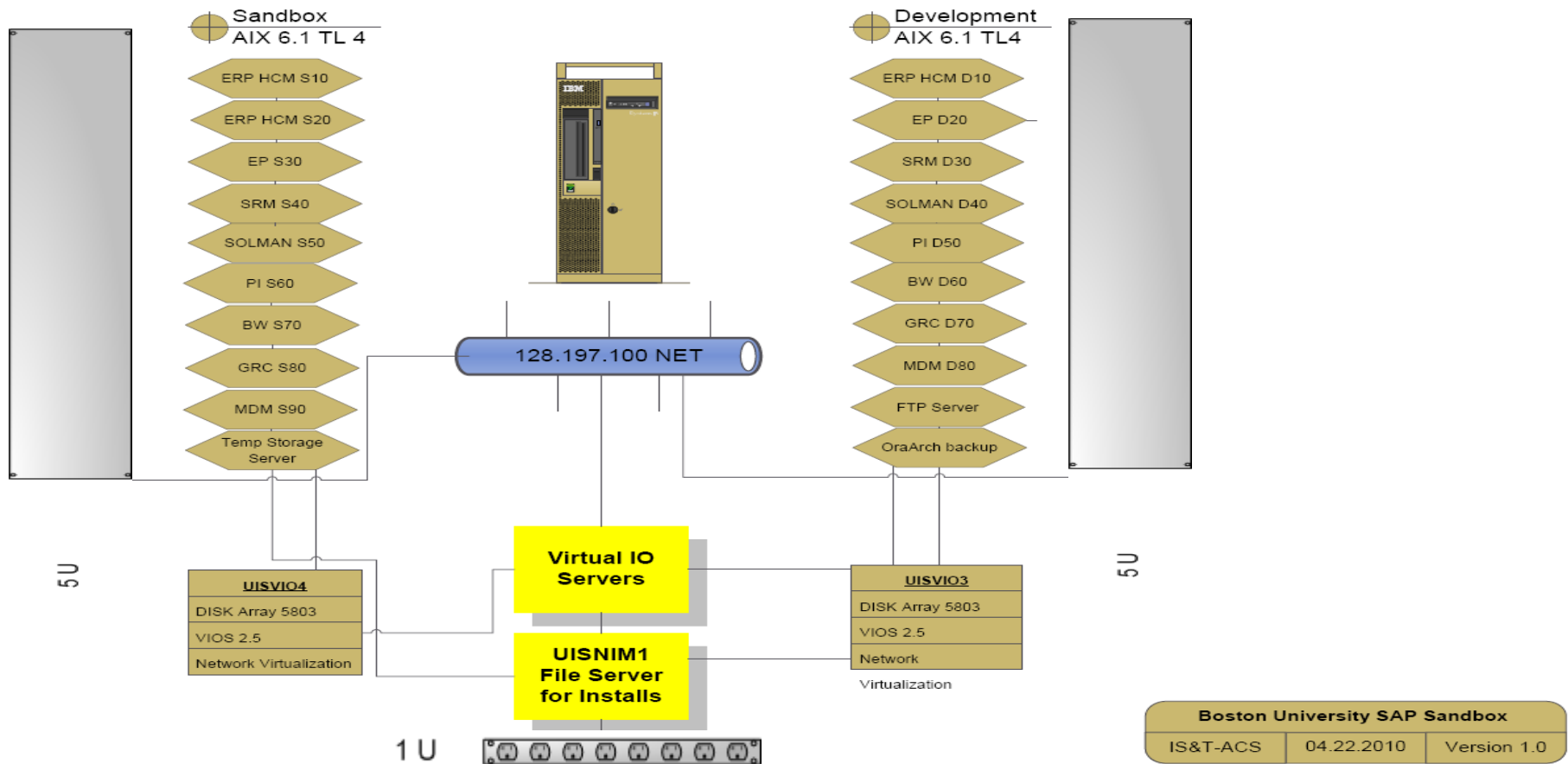
Z9 BC zOS ADABAS Server
 •ADABAS provides data to Oracle via Hipersockets Interface

Document Imaging



System P – BU SAP DEV Environment

*Boston University BUWorks SAP DEV/Sandbox
Server Topology
April 2010*



Boston University SAP Sandbox		
IS&T-ACS	04.22.2010	Version 1.0

Lessons Learned – Oracle Data Warehouse



- Implement a strategy that does not use ASM for RMAN backups (use FRA)
- Implement Oracle Auditing and a good Accounts policy for DBA teams
- Create Oracle Listeners () for each Instance. Separates Schemas and Objects
- Start with small sized DB SGA and PGA settings – Review Statistics for:
 - Use Grid Control for metrics
 - Database Wait Activity
 - Infrastructure Design – Guest Sizing and Creation –
 - <http://www.bu.edu/ist/intranet/uisacs>
- Application installation and tailoring profiling adjusting
- Disaster Recovery planning and validation
- Performance and Capacity planning – z/VM and z/Linux
- Tooling exploitation – Mix of OSS/vended components
- Get Involved – Oracle zSeries Special Interest Group –
- NEUVM.ORG – New England Users of VM's and Linux



The Future at BU

- Continue to build out EDW for BuWorks SAP environment
- Enterprise Grid monitoring non z Targets
- Develop High Availability Application Offerings (RAC,ASM)
- Integrate New BU Business Systems with MAA mindset
- Continue to build out EDW for SAP – Buworks
- Seek new consolidation opportunities for split tier



IBM

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