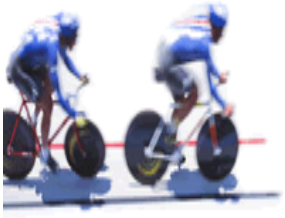
Data Management offerings for Linux on zSeries

Powering the world's e-business solutions

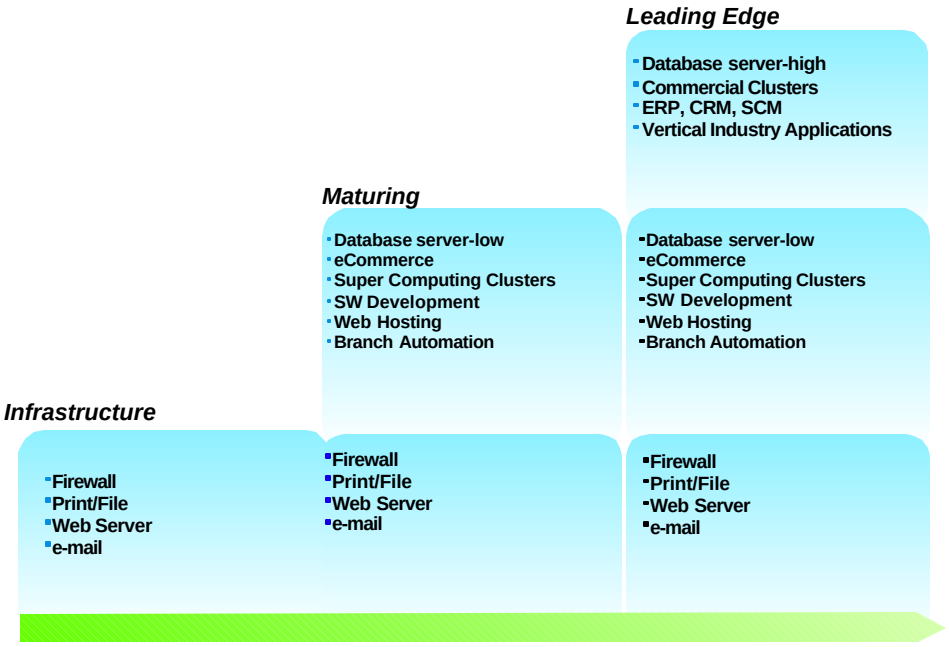


Announcing
Informix Dynamic Server 9.4
Performance. Reliability. Scalability

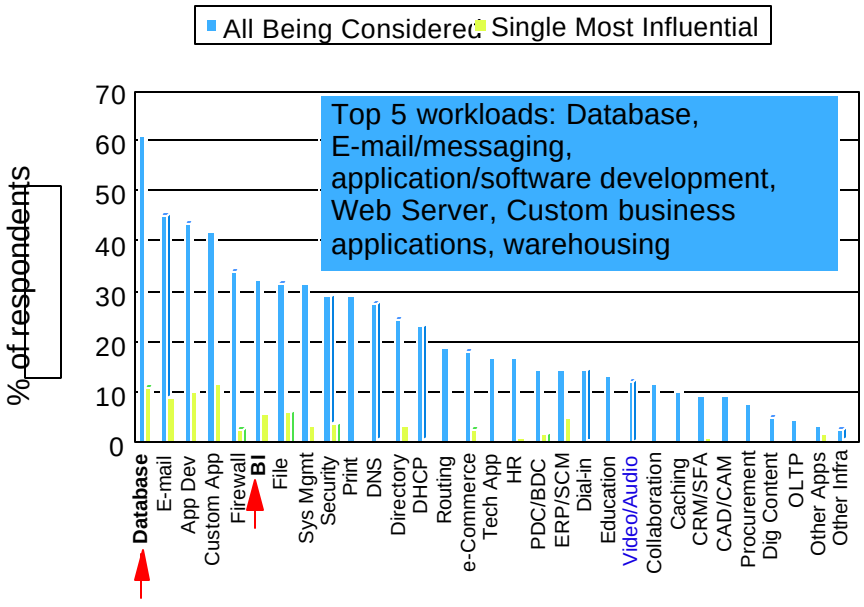
Linux Deployment

Yesterday	Today	Coming Soon
Firewall Print/File Web Server e-mail	Firewall Print/File Web Server e-mail	Firewall Print/File Web Server e-mail
	Database server eCommerce Super Computing Clusters SW Development Web Hosting Branch Automation	Database server eCommerce Super Computing Clusters SW Development Web Hosting Branch Automation
		Commercial Clusters ERP, CRM, SCM Vertical Industry Applications

IBM's Perspective on Linux Adoption



Workloads Driving Selection of Next Server



Note: This analysis provided by IDC Multi Client Study on Linux for IBM

Data Management Software for z/Linux

- **Database Servers**
  - DB2 UDB v. 8.1
  - Informix Dynamic Server (IDS) 9.4
- **Data management**
  - DB2 Intelligent Miner Scoring, IM Modeling, IM Visualization
  - DB2 Text Search Extender, Net Search Extender, Spatial Extender, Net.Data
  - 4GL and ISQL (Informix RAD tool)
- **Connectors**
  - DB2 Connect
  - CICS Transaction Gateway
  - IMS Connect
  - IDS CSDK

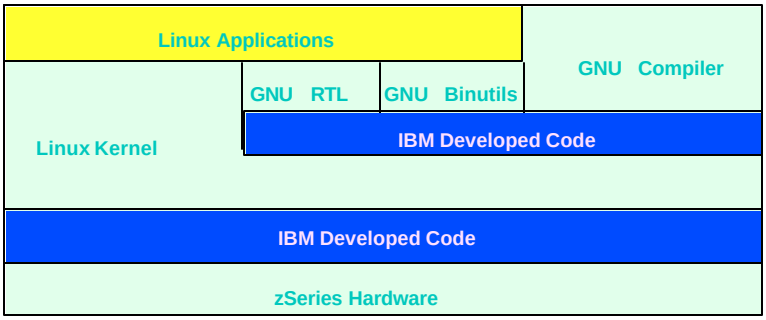
Data Management and z/Linux Benefits

"It's going to be almost 30 times cheaper to run and maintain" (than Sun systems) --Josh Levine, CTO, e*Trade

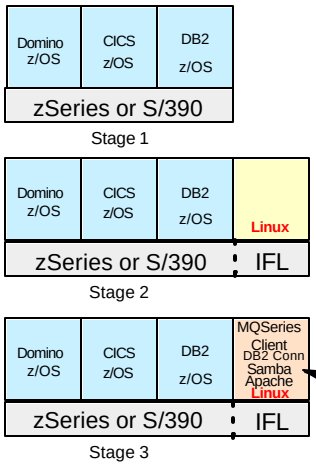
- **zSeries customers can extend and leverage their current investment in hardware**
  - ✓ customers wishing to consolidate or centralize their data processing environments
- **100s-1000s of Linux operating systems can coexist with other operating systems on a single zSeries under VM**
  - ✓ Linux customers needing a high-performance, Internet-scalable data management system
- **Customers can take advantage of the features specific to UNIX environments on DB2 UDB or IDS 9.4 on z/Linux**
- **IBM DB2 Connect on Linux for zSeries can also be used to consolidate all gateway connectivity processing at the host eliminating the need for a middle tier of hardware**
- **With DB2 UDB and DB2 Connect available on Linux for zSeries it is now possible for vendor applications that are currently available for UNIX customers (that are not yet ported to z/OS to leverage the zSeries platform).**
- **Customers can deploy new applications on Linux but connect to their existing data using DB2 Connect**

What is Linux for zSeries?

- Pure Linux, ASCII Environment.
- Not a unique version of Linux.
- Distributions available from SuSE, Redhat, TurboLinux
- Exploits IBM zSeries Hardware, including IEEE floating point.
- No intention to replace z/OS.
- Runs native, in an LPAR, or on z/VM
- Integrated Facility for LINUX engine(s) isolates traditional z/OS Software costs



Changing the value proposition: Integrated Facility for Linux



Business As Usual

Typical OS/390 environment on a 3 way processor

Same as above with one IBM Integrated Facility for Linux engine added

Traditional environment price remains the same
Cost of IBM Integrated Facility for Linux
Add cost of Linux for zSeries distribution

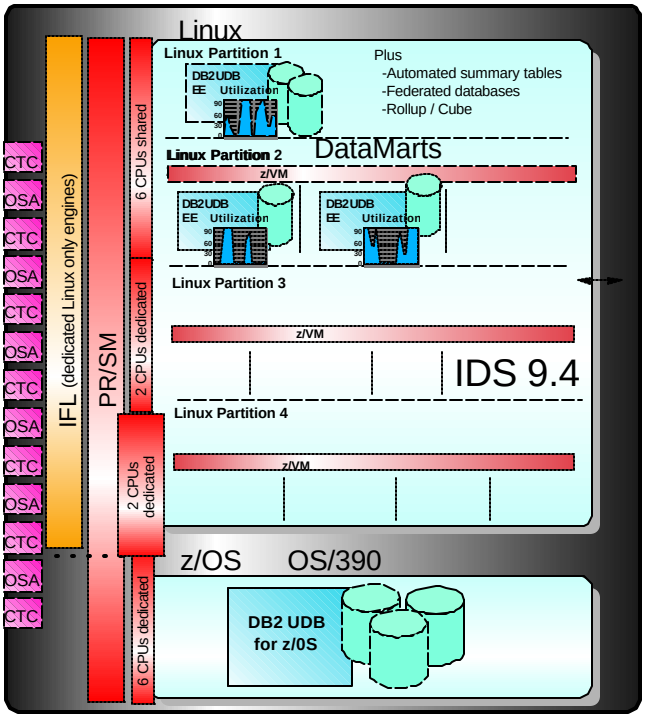
Same configuration as above with IBM middleware for Linux for zSeries added

Traditional environment price remains the same
Cost of IBM Integrated Facility for Linux
Add cost of Linux for zSeries distribution
Add cost of IBM middleware MQSeries client and DB2 Connect

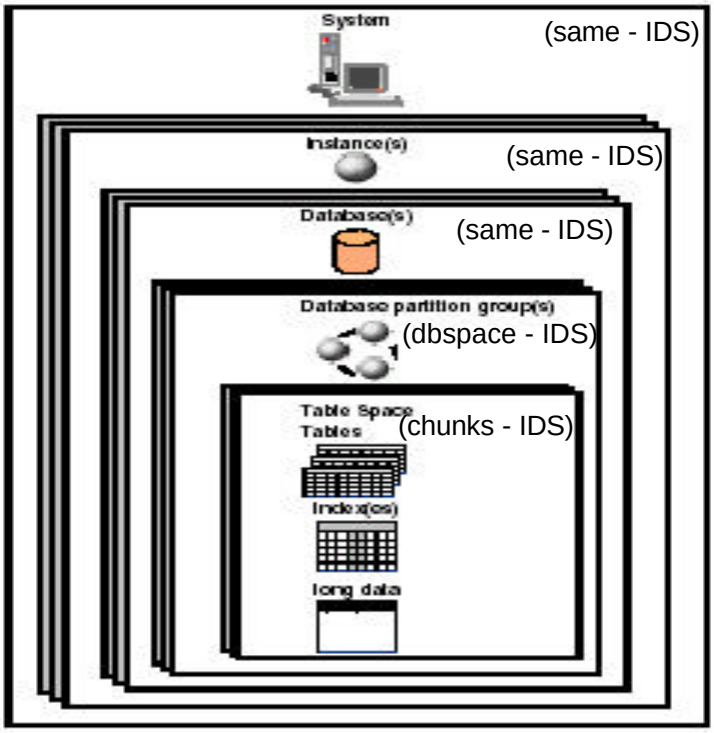
UDB or IDS

- Add compute power for Linux workloads without increasing charges for traditional zSeries software from IBM and ISVs
- Available as a feature on Multiprise 3000, 9672 G5/G6 and zSeries systems
- Adding IFL processors has NO effect on existing software prices running on zSeries

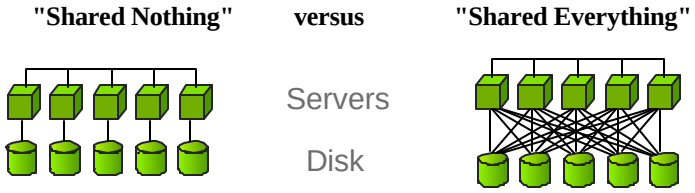
UDB/IDS for Linux (zSeries)



UDB/IDS Architecture



Database serving — some basic terms



- Informix and DB2 UDB, run shared-nothing architectures
- Every server/partition/node has its own resources, such as memory, CPU and disk
- Failover

- DB2 for z/OS run shared-disk architectures via CF
- All instances have access to all data and synchronize data changes via a lock manager
- Don't go down

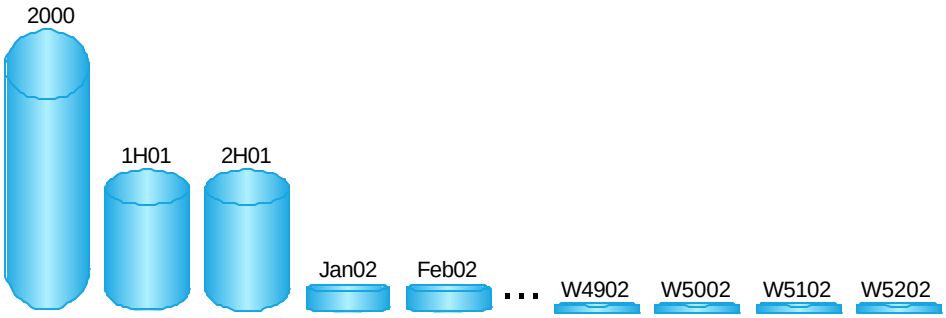
Data Partitioning

UDB/IDS Hashed based provides neutral data bias access

Partitioning Map for Group 2

Index	0	1	2	3	4	5	6	7	8	**9**	10	11	...	...	...	4094	4095
Partitions	1	2	3	4	1	2	3	4	1	**2**	3	4	...	...	...		

DB2 Range based provides flexible horizontal partitioning on ZSeries



IBM Informix Dynamic Server

- April, 2001 IBM acquired Informix
- Informix had strong portfolio of database servers, business intelligence products, application development tools and datablades
- IBM will continue to support, enhance and develop IDS for as long as customers require
- Over next x... yrs develop DB2 will be developed to meet IDS customer needs and allow for an easy migration
- Official Whitepaper with this information at http://www.ibm.com/informix with defined product roadmaps going out past 2006

IBM Informix Dynamic Server

- IDS is a general purpose online transaction processing (OLTP) database server designed for Enterprise and Workgroup computing
- High performance OLTP via parallel everything architecture (Dynamic Scalable Architecture)
- Known for Extensibility, Reliability, Availability, Advanced Replication Functionality
- Available on a wide variety of HW/OS platforms
- Estimated 10,000 direct & 25,000 indirect customers.
  - Top 10 Retailers in NA including Sears & HomeDepot
  - 20 of the 25 Supermarkets in NA
  - Travel Management - American Airlines & Sabre
  - Telecom - Verizon & Deutsche Telecom
  - On Line Banking - Chase Manhattan, Providian Financial

IDS 9.4

The most scalable, available, highest performing IDS ever produced

- Performance and Reliability
  - IDS 9.4 performance exceeds all previous releases
  - Security enhancements
    - Secure over-the-wire encryption using OpenSSL encryption libraries
    - Configurable user authentication mechanisms using Pluggable
- No Limits Scalability
  - 2 GB chunk limit removed
  - up to 128 petabytes can be stored in a single instance

IDS 9.4

- Allows more business to be done with less resources
  - High Availability Data Replication and Enterprise Replication fully interoperable
  - Improved ISA liberates DBAs from their desks
  - Automated backup and restore functions insure high level of data availability and restroation while eliminating many manual tasks
  - Simple, highly automated upgrade from early versions of IDS
- Application Development Enhancements
  - Support for most SQL-99 join types
  - Support for Sequences
  - Named Return Parameters in Stored Procedures
  - Expanded Unicode support
  - Multiple collation support
  - NEW! Client-SDK, v.2.81
  - Continued support of IBM Informix 4GL,SQL,ODBC,JDBC,OLE/DB,SQLJ

IDS 9.4 for Linux on zSeries

- Fully implemented 64-bit architectures:
  - Remove the 31-bit limitations from files, files systems and applications
  - Reduce the work of the application programmer by removing the design constraints inherent in 31-bit architectures.
- Results are improved performance, ease of use and the ability to handle larger problems more easily

What is new in DB2 UDB V8.1 for Linux?

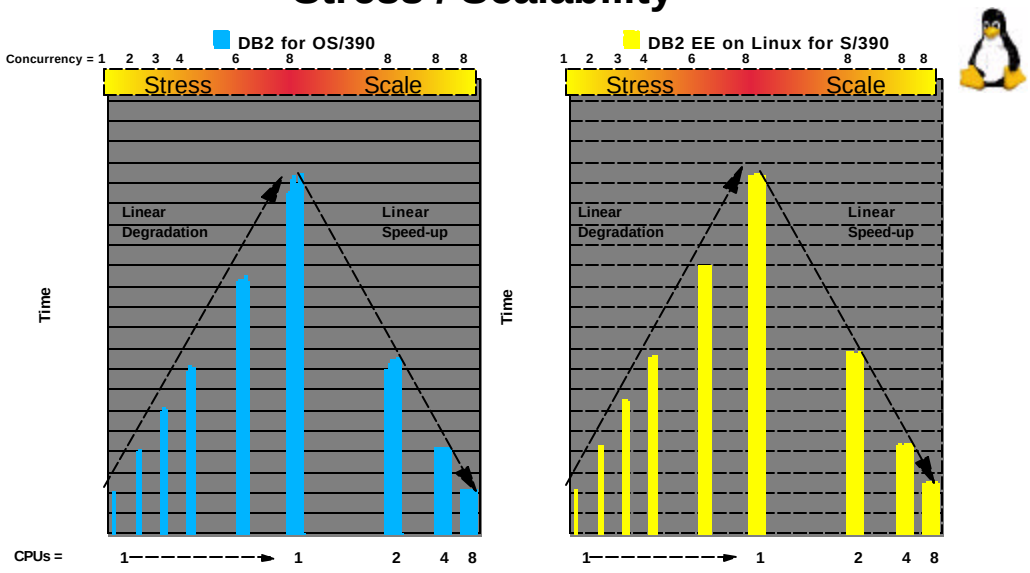
- **Major enhancements for zSeries**
  - 64 bit file I/O and support for file sizes (containers) > 2GB
  - Access to raw I/O devices
  - Auto-configuration of Kernel parameters
  - Introduced Linux "validation" program
    - Joint testing between IBM, Linux community and Linux distribution partners
    - Ensures better Interoperability

UDB Teraplex Center Results

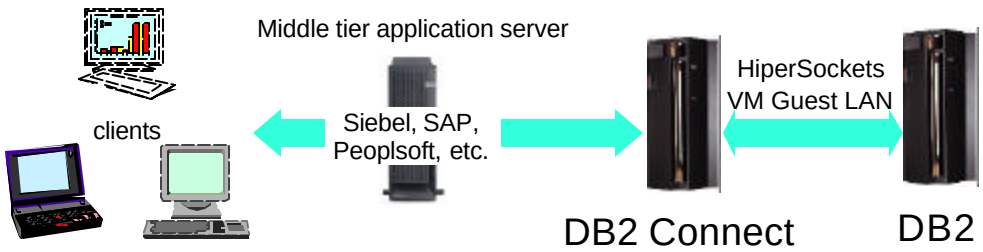
"Comparable attributes"

"Leading edge SMP scalability for Linux"

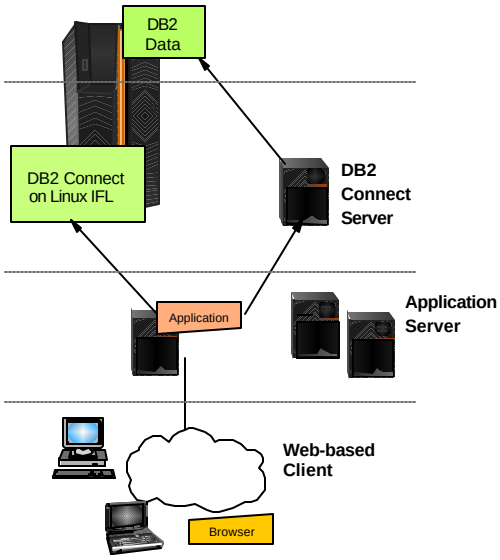
Stress / Scalability



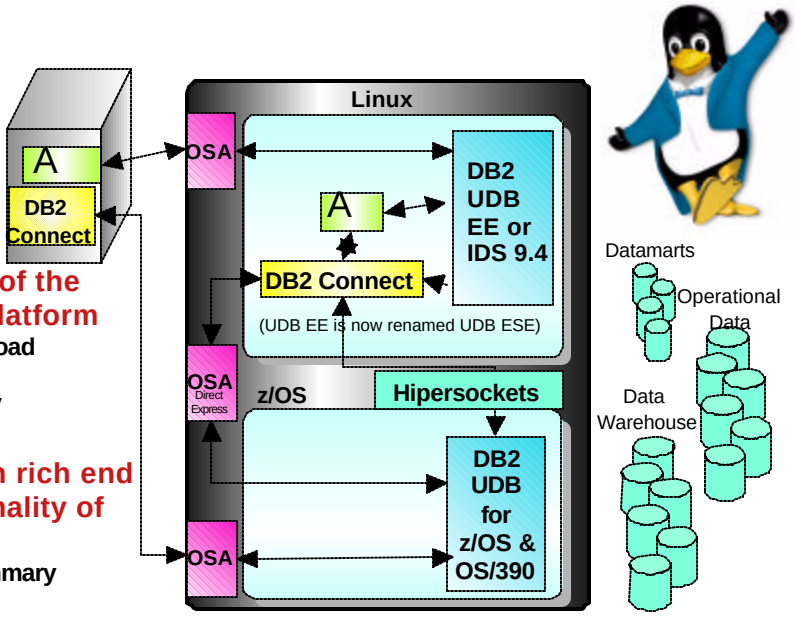
DB2 Connect on Linux on zSeries: Access to zSeries



DB2 Connect Example



Connectivity: zSeries & Linux



The strengths of the mainframe platform

- **Dynamic Workload Prioritization**
- **High Availability**

Combined with rich end user functionality of DB2 UDB:

- **Automated summary tables**
- **Federated databases**
- **Rollup/Cube**

DB2 Connect V8 - Installation and Licensing

DB2 Connect	Client	Application Server	Gateway Server	Host (zSeries or iSeries)
Personal Edition ▶installed on client ▶license per install ▶desktop applications with direct connection				
Enterprise Edition ▶installed on gateway ▶license per user and per gateway server ▶desktop applications connecting via gateway				
Application Server Edition ▶installed on application. server, gateway server or IFL ▶license per application server processor ▶server based applications				
Unlimited Edition ▶installed on client and/or gateway server ▶license per # of host servers/syplexes and MSU capacity on that host or sysplex				

Linux Distributions

- **Validated environments for DB2 UDB V8.1**
  - RedHat 7.2 -- Kernel 2.4.9-38
  - SuSE Linux Enterprise Server (SLES) 7 -- Kernel 2.4.7-58
  - SuSE Linux Enterprise Server (SLES) 8 -- Kernel 2.4.1
- **Supported environments for DB2 UDB V7.2**
  - RedHat 7.2 -- Kernel 2.4.9-38
  - SuSE SLES 7 -- Kernel 2.4.7
  - SuSE 7 -- Kernel 2.2.16
  - TurboLinux Server 6 -- Kernel 2.2.16
- **Validated environments for IDS 9.4**
  - SuSE SLES 8 (64-bit), Kernel 2.4.19-3

User Experiences

Common themes

- Expecting z/OS quality of service/support, at lower price
- Start small
- Not mission critical, 24x7, initially, unless DB2 Connect
- Mainframe and Open teams must work together
- UDB works different from DB2

Motivations

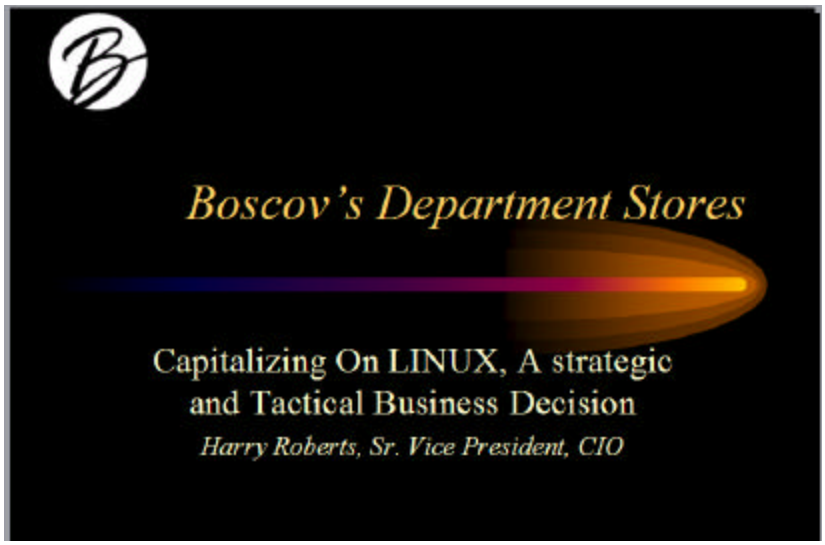
- Free up or slow down z/OS mips growth
- Server Consolidation

State of Hawaii

ICSD

- Information and Communications Services Division
- Pull together Financial and Budget systems reports
- One version of the truth data warehouse
- 9672-RC5 with IFL to z800-0C1 (June 2003)
- 60 users with 5GB
- Showcase for other 19 Departments

Boscov's - US Retailer



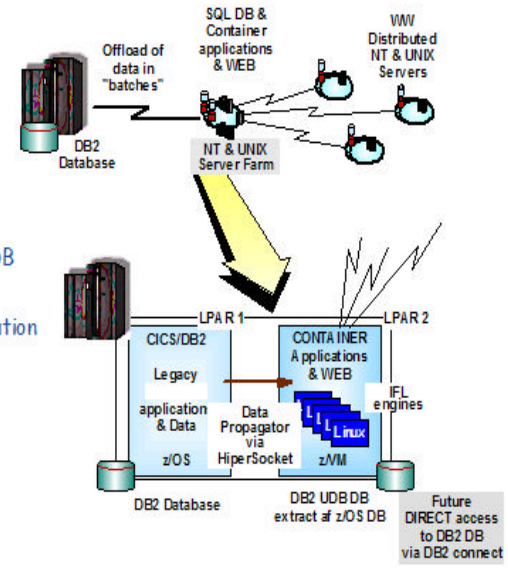
Boscov's Background

- 37 store retailer, and growing
- 9672-R44 no longer big enough
- Growing one NT server/month
- Need 1 FTE for every 10 -12 NT servers
- Wanted a 3 to 5 year solution

- Installed z102 with an IFL
- Installed SUSE Linux under z/VM; 40 instances
- Started JAVA to replace COBOL
- Added Websphere
- Will replace old POS terminals with Linux

European Container Shipping Company

- OLD System - Multiple NT and UNIX servers providing
  - Container Scheduler application
  - Batch application (data move from z/OS to Intel)
  - Web interface for remote users running queries
  - WW Data Distribution (batch oriented)
  - Availability not satisfactory
  - Limited Scalability (large growth expected)
- NEW Linux/zVM/zSeries based system
  - Data Propagator moves Data in real time from z/OS DB2 DB to DB2/UDB temporary DB's under zLinux
  - ALL functions (DB, Web, Applications & WW Data Distribution moved to zSeries under Linux and z/VM)
  - Multiple Web, Application and DB2 UDB servers
  - DB2 UDB used for DB update - manipulate and move data from temporary DB's to Query DB's
  - DB2 UDB used for complex queueries
- FOR GROWTH (scalability)
- FOR AVAILABILITY
- FOR changing Batch to Online Data update



Banco Mercantil

Leading Bank in Venezuela

- **Challenge**
  - **Growing infrastructure of NT Servers became costly and unmanageable**
  - **Gain reliability and systems management capabilities while providing for workload growth**
- **Solution**
  - **Phase 1- Replaced 30 NT file, internet domain, and firewall servers with a G6 zSeries running Linux**
  - **Phase 2 - Moving applications from Unix systems to the zSeries**
  - **Replaced Oracle/NT data warehouse with UDB/zLINUX**
  - **Reduced administrative support**
  - **Higher availability**
  - **Improved price/performance**

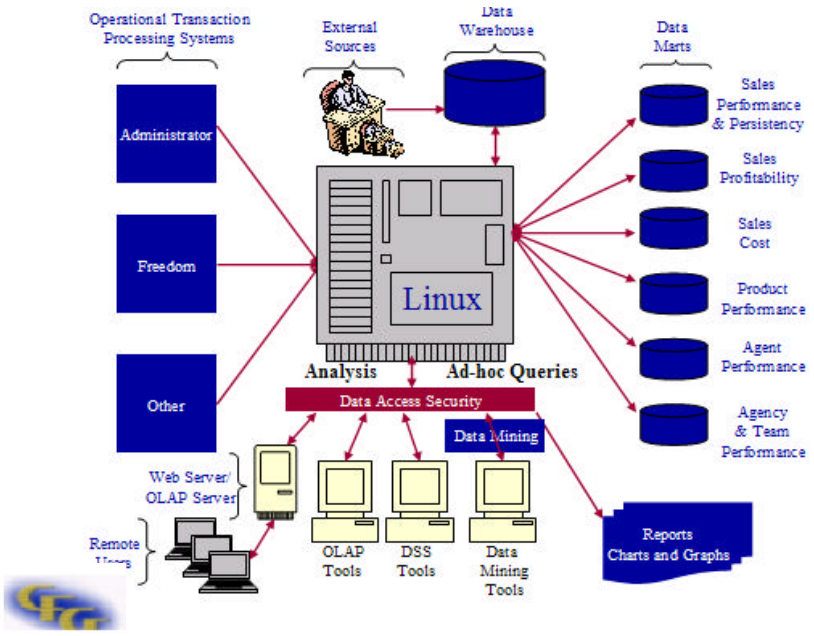
US Toy Retailer

- z900-103 with 2 IFLs; adding HiperSockets
- Moved from SLES7/UDB V7 to SLES8/UDB V8
- Piloting 13 stores out of 1000+
- Purchased Retail application package
- Three data bases:
  - Flash report - report prior day's store sales; 3 hours now
  - Credit authorization - HQ function
  - General back office application
- z/VM with Test and Production LINUX instances (X3)
- Retail application Test and Production
- DB2 Connect

A State Education Dept

- Student financial aid application
- From loan application to payoff
- Replaced manual system with home grown web application under zLINUX and UDB
- Tens of thousands of "users"
- Two LPARs: z/OS and z/VM with LINUX instances
- Leveraged existing skills and need for RAS

VM/VSE Customer



Other Customers

- Regional Bank - first of three data marts implemented
- County in California - home grown web portal for property tax applications; view by owner; later add payment component
- University - migrated old Teradata system
- Mobil Travel Guide,& Telemar - Oracle on zLINUX
- Customers for Informix - large home supply company, and bank in South America; plus others in Europe

Northern Trust and DB2 Connect

Application	Financial services for individuals as well as credit, operating, trust and investment management services for corporations, institutions and organizations worldwide.
Business Benefits	NTC has created a strategic, standard central access point to DB2 information with this solution.
Software	IBM DB2® Connect Unlimited Edition for Linux®

Northern Trust Financial Implements Linux as the Strategic Deployment Platform

Data Management and z/Linux Benefits

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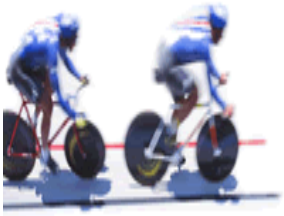
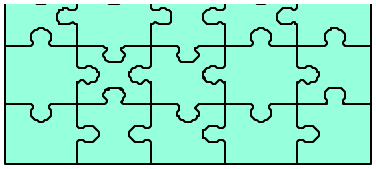
IDS 9.4 Upgrade Promotion

- From July 22, 2003 through December 31, 2003 when a customer buys a trade up from IDS 7.x to IDS 9.4 - or - IDS 7.x to the Transaction Processing Gold Bundle they are eligible to receive a rebate on the purchase of a NEW IDS 9.4 or Transaction Processing Gold license.
- Offer is 1 for 1 (1 upgrade/1 rebate) - same item; Transactions must be done at the same time
- Valid in US & Canada only
- For more information:
  - http://www.ibm.com/informix/ids/
  - http://www-3.ibm.com/software/data/informix/linux4zs

Data Management for Linux on zSeries Summary

- Competitive Advantage
  - Significant savings
- Technology Leadership
  - Performance
  - Scalability
  - Accessibility
  - Openness
- Leverage Investments
  - Personnel
  - Data
- Best of Breed Solutions
- Investment Protection
- Service and Support





Questions?