Linux for Business Critical Workloads

Linux + IBM System z = Real Customer Value

Agenda

- Linux Market Growth and Acceptance
- Next Generation Applications for zLinux
- Business Critical Workloads on zLinux Solutions
- Key Partners: Novell & RedHat
- Support and Resources

- Q&A

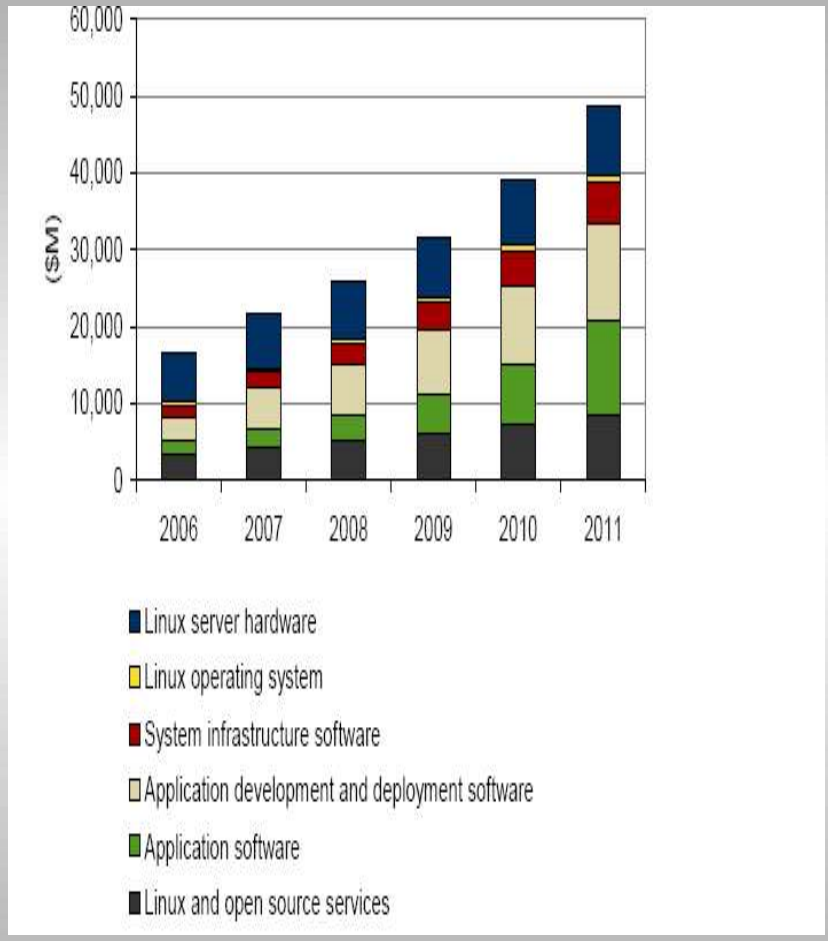
Linux Market Dynamics (2Q08 data)

IDC: Linux Servers & Commercial Workloads

- IDC White Paper
  - Published April 2008, sponsored by The Linux Foundation
- Linux now used for business critical workloads
  - Business processing (eg ERP), decision support, databases
- Linux platform now a major software opportunity
  - $10B (4% share) in 2006 growing to $31B (9% share) in 2011
- Linux software growth outpacing Linux growth
  - 35.7% CAGR for Linux server software 2006-2011
  - 24.1% CAGR for Linux ecosystem (software, hardware, services)
  - 8.2% CAGR for Linux itself (paid and non-paid deployments)

Source: IDC April 2008

IDC: Linux Ecosystem Revenue Growth



Source: IDC April 2008

Linux Market Dynamics (2Q08 data)

Gartner: Future Server Operating Systems

- Gartner White Paper
  - Published April 2008, available to Gartner subscribers
- Operating systems are increasingly modular
  - Linux, Mac (inside MacOS)
- Monolithic kernel ill-suited for future server OS
  - Windows, Unix
- One kernel unlikely to address all needs
  - At least 4 variants: Scale-up, Distributed, Real-time, Appliance
- Hypervisors will not replace OS kernels
  - Applications are built on operating systems, not hypervisors

Source: Gartner April 2008

Gartner: Operating System Trends 2007-2012

- Gartner White Paper
  - Published April 2008, available to Gartner subscribers
- Operating System Revenues growing
  - 3.7% CAGR for Server Operating Systems
- Linux is fastest growing Server OS by revenue
  - 9.3% CAGR for Linux (vs 6.9% for Windows)
- Unix being substituted by Linux and Windows
  - Complexity, price/performance, cost of support/maintenance
- Linux OS revenue now greater than Solaris
  - $1.528B for Linux in 2007 (vs $1.394 for Solaris)

Source: Gartner April 2008

IBM actively contributes to Linux

Many of IBM's customers are already familiar with Linux and Open Software; IBM continues to make significant contributions to the Linux world.

... has been an active participant since 1999
... is one of the leading commercial contributors to Linux
... has over 600 full-time developers working on Linux and open source software

Linux Kernel and Subsystem Development
- Kernel Base Architecture Support
- GNU
- Security
- Systems Management
- RAS
- Virtualization
- Special Projects
- Filesystems
- … and more

Expanding the Open Source Ecosystem
- Apache & Apache Projects
- Eclipse
- Mozilla Firefox
- OpenOffice.org
- PHP
- Samba
- … and more

Legal Support
- Software Freedom Law Center
- Free Software Foundation (FSF)
- Open Invention Network
- … and more

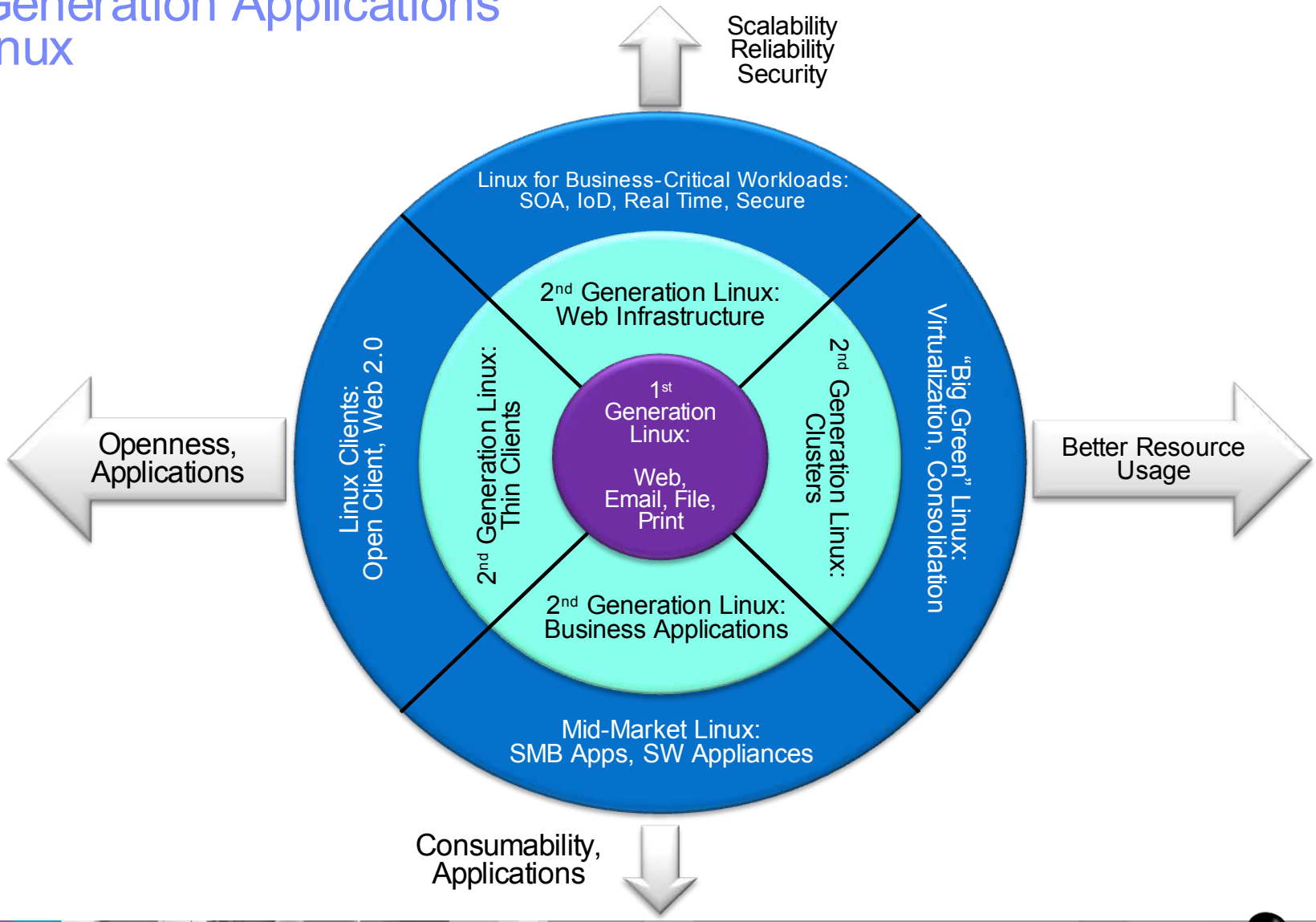
Promoting Open Standards & Community Collaboration
- The Linux Foundation
- Linux Standards Base
- Common Criteria certification
- Open Software Initiative
- … and more

Who Contributes to the Linux Kernel? *

Company Name	# of Changes	% of Total
None	11,594	13.9%
Unknown	10,803	12.9%
Red Hat	9,351	11.2%
Novell	7,385	8.9%
IBM	**6,952**	**8.3%**
Intel	3,388	4.1%
Linux Foundation	2,932	3.5%
Consultant	2,055	2.5%
SGI	1,649	2.0%
MIPS Technologies	1,341	1.6%

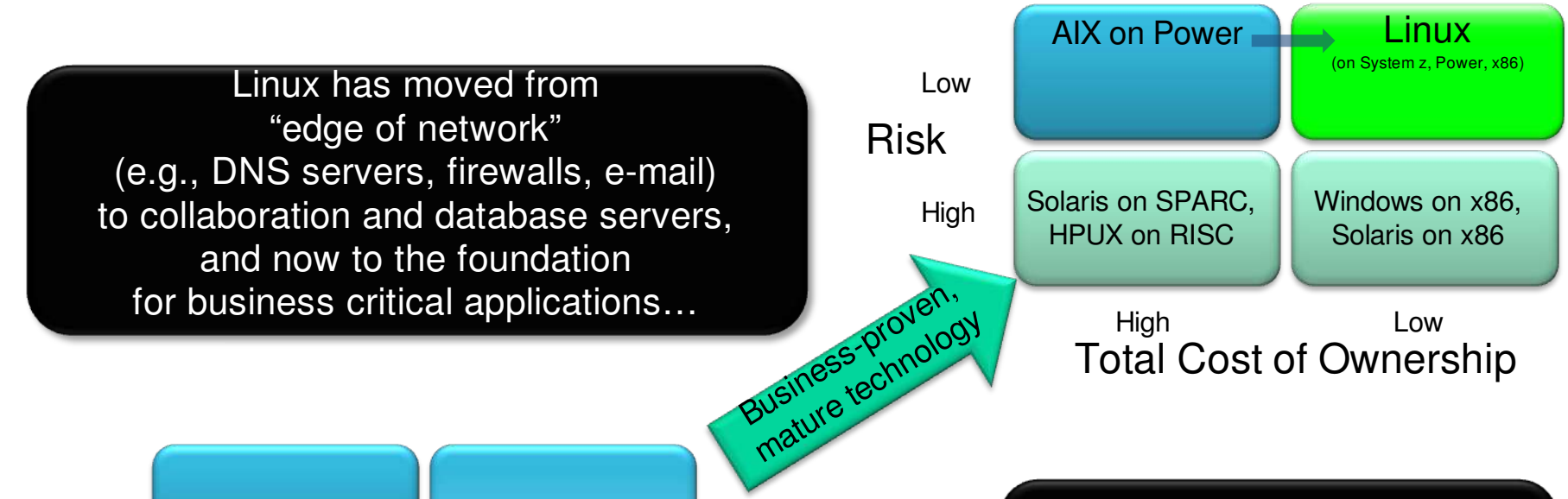
* Linux Foundation, March 2008

Next Generation Applications for zLinux



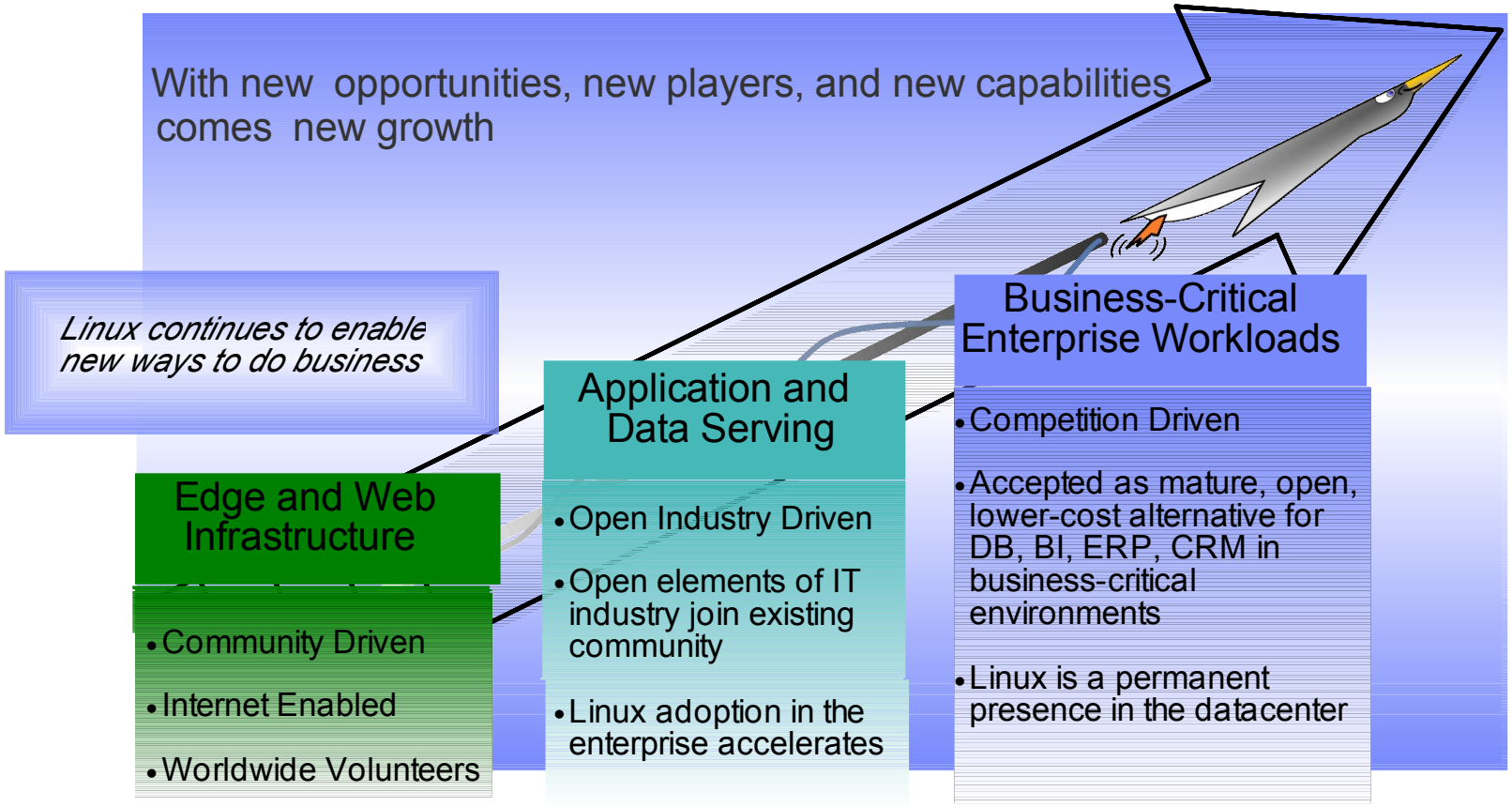
Linux has found a "sweet spot" in the OS landscape: There has been a significant change in the "cost vs. risk" landscape: Linux is ready for the enterprise *and* available for significantly less money than the competition.

Linux has moved from
"edge of network"
(e.g., DNS servers, firewalls, e-mail)
to collaboration and database servers,
and now to the foundation
for business critical applications…



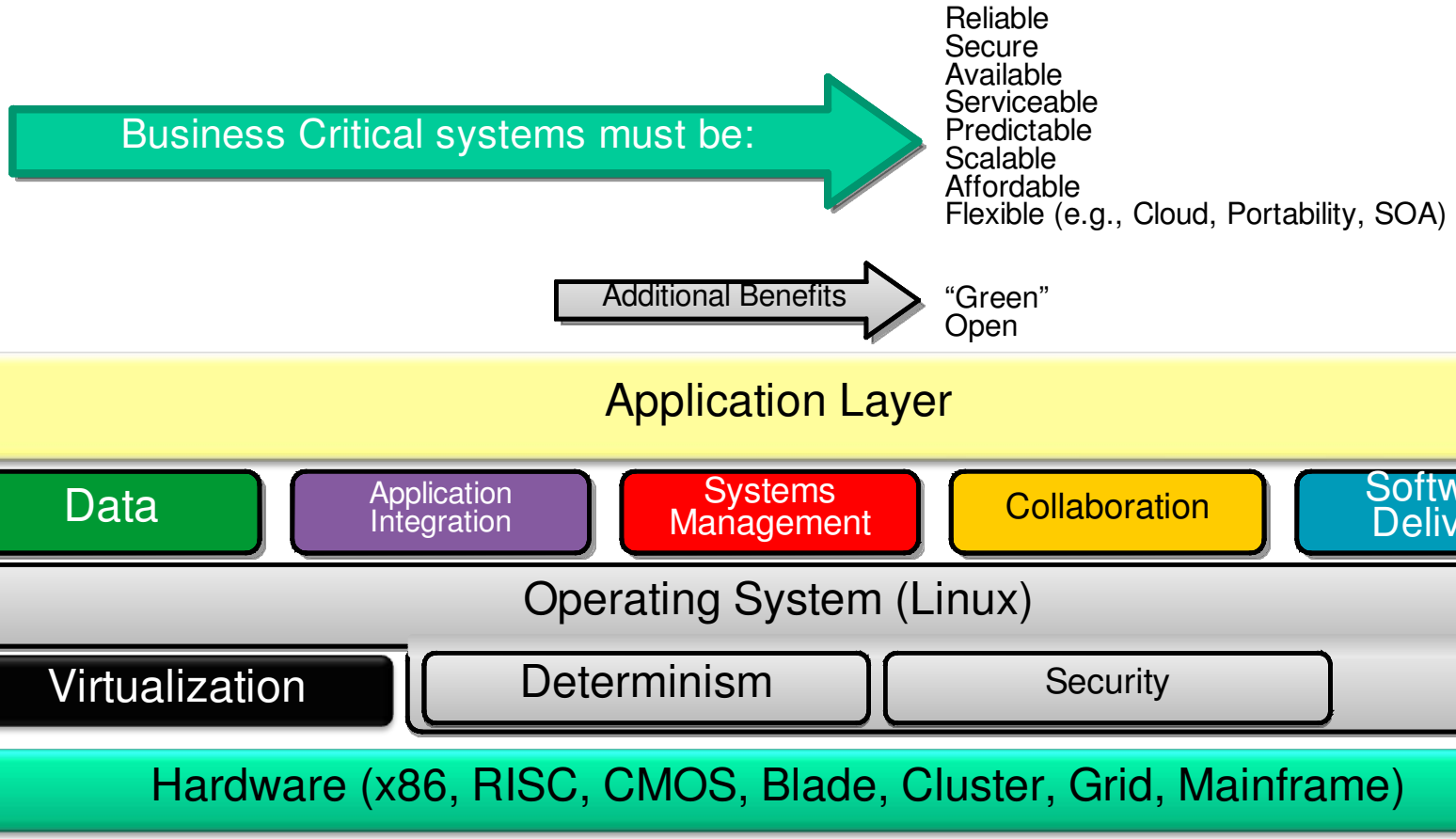
… but an operating system,
on its own,
isn't very interesting.

Growth and Expansion of Linux



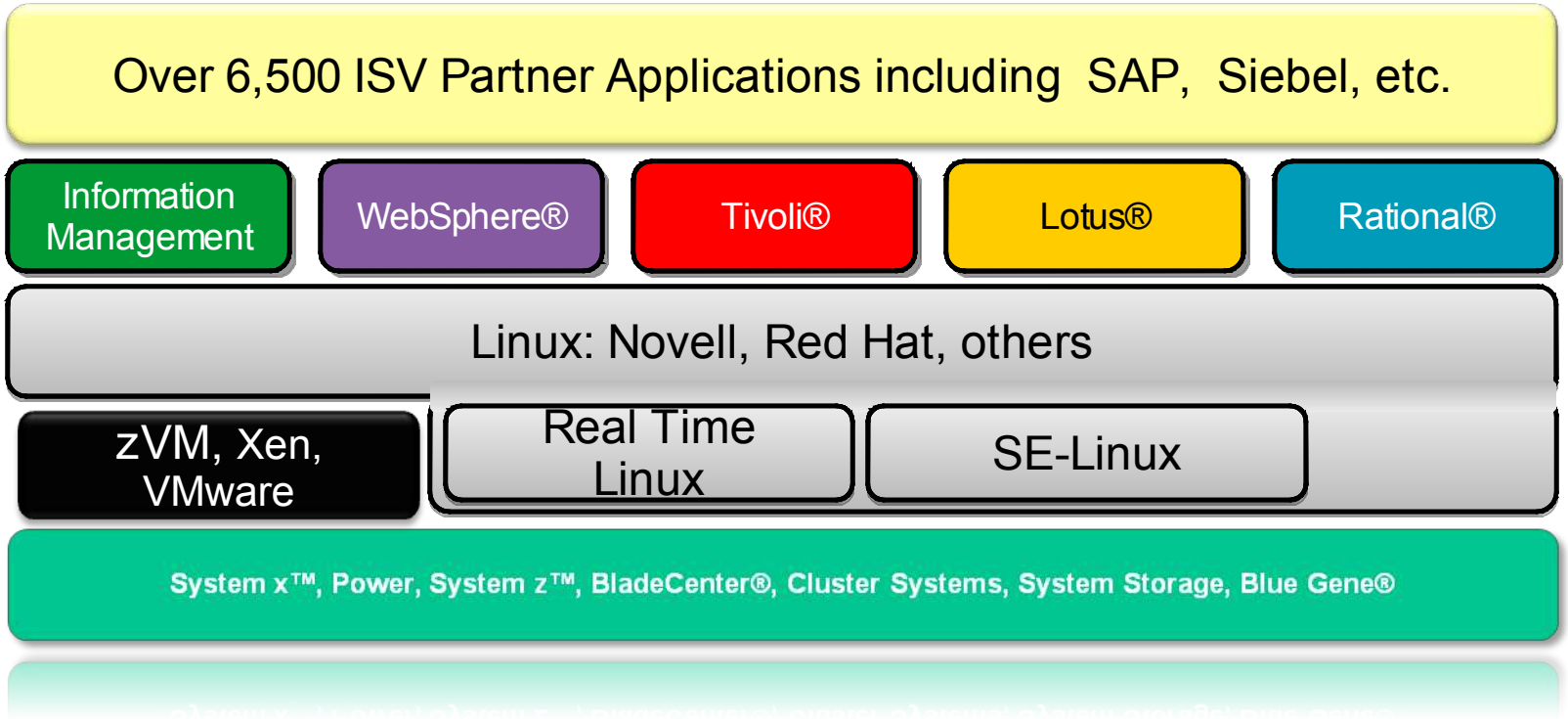
Linux is *ready for your business.*

It has the attributes that we know (and that CIOs tell us) are essential for the enterprise environment.



Linux for Business-Critical Workloads…

…is *business as usual* for IBM: Linux is certified on all IBM systems, the IBM Middleware portfolio is available on Linux, and IBM delivers on services across the entire lifecycle.



Linux supports a range of Business-Critical Workloads on System z

IBM's solution isn't a part number - it's a family of solutions that encompasses what System z customers around the globe rely on to run their businesses.

Linux for Business-Critical Workloads

Vertical Business Applications
Finance
Government
Retail
Manufacturing

Horizontal Business Applications
ERP / Accounting
CRM
SCM
e-Commerce

SOA and Integration
- OLTP & SOA Software
- Integration Software
- Business Process Mgt
- Application Servers

Information on Demand
- OLTP & Database Platforms
- Data Integration
- Bus Intelligence / Data Analysis
- Content Management

Next Gen Infrastructure
- Virtualization / Consolidation
- Cloud Computing
- Real-time
- MAC Security

Collaboration
- Email
- Instant Messaging
- Portals
- Web 2.0

Software Development
- Modeling and Design
- Application Development
- Change & Release Mgt
- Quality Management

Systems Management
- Systems & Network Mgt
- Security Software
- Storage Management
- Virtualization Management

ISVs ecosystem growth aided by increased resources

- 78% ISVs maintain OS currency
  - **1600+ applications on z/OS 1.7 and above**
- Over 125 Linux applications and tools added this year
  - **Over 400 Linux ISVs and 1100 applications total**
- Increased investments
  - **Benchmarking, remote access, developer discounts, , technical advocates, free training, consultative support and more**
- Strengthened relationships and teaming, ex:
  - SAS **sub capacity pricing and Enterprise Business Intelligence**
  - SAP **data serving and business intelligence**
  - ACI and eFunds **retail banking payments solutions**
  - Oracle **and System z Linux solutions**
  - Telcordia **extending trusted solutions to next generation services**
- 114 new/upgraded WebSphere® and DB/2 z/OS application/tools this year
  - **System z for ISV Program provides increased resources for enablement/support /go to market**

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- Finance
- Government
- Retail
- Manufacturing

Horizontal Business Applications
- ERP / Accounting
- CRM
- SCM
- e-Commerce

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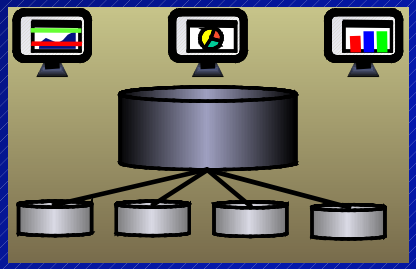
New applications that are driving growth

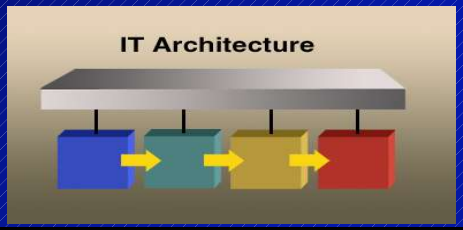
New self-service Web app

New business intelligence project

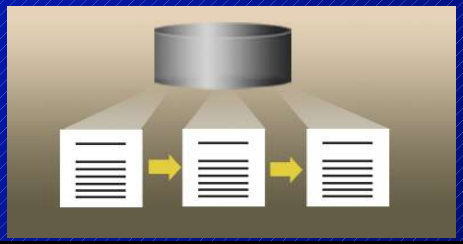


Web portals

Updated IT architecture to ↑ flexibility, responsiveness



Automated forms processing



and others

Primary Forces Causing Acceleration to System z

Customer forces

- Reduce TCO via consolidation of applications & data
- Provide quicker response to business requests
- Improve application performance
- Increase quality of service
- Ability to leverage modern skills on mainframe

Supplier forces

- Modern middleware honed for the mainframe
- Cross-platform, integrated software development and delivery
- Optimized cross-platform IT management for System z
- Increased ISV support
- Investment in skills development for new generation

SOA Entry Points Help Customers Get Started

Business requirements for time-to-market, lower project risks and ROI are key determinants for choosing a platform

IT requirements for reliability, scalability, security and manageability are also major factors

IBM is investing in all five SOA entry points. Key investment areas for these requirements are in:

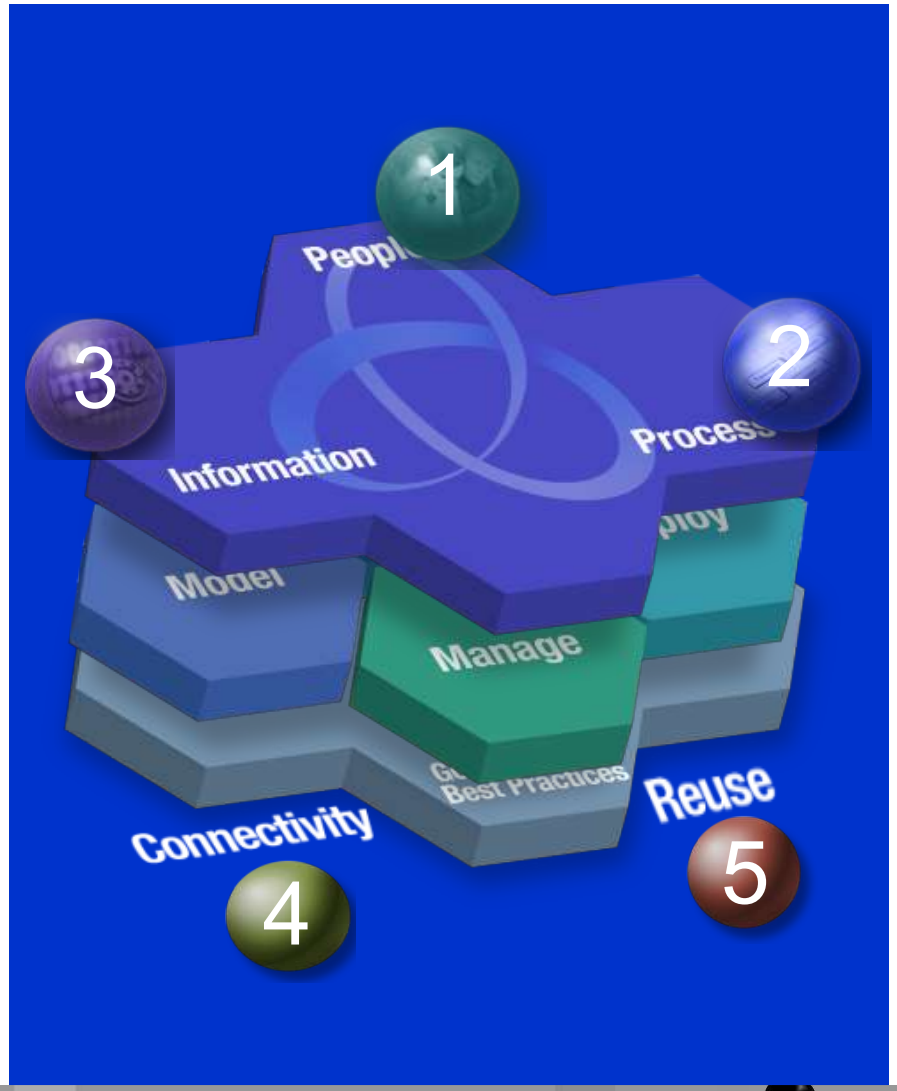
People:
- •Websphere Portal for Linux System z

Process Management & Automation:
- •WebSphere Process Server for Linux System z

Connectivity:
- •WebSphere Enterprise Service Bus for Linux System z
- •WebSphere Adapters for Linux System z

Reuse:
- •WebSphere Service Registry and Repository for Linux System z

Ecosystem:
- •WebSphere Application Server for Linux System z

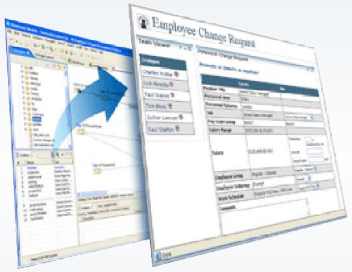


IBM WebSphere Portal for System z

Portal is the Front-End of SOA

- **Helping Organizations to Rapidly Respond to Change**
  - Integrates the applications, transactions & data in SOA environment to the desktop to make better business decisions
  - Easy to use Portlet development via Portlet Factory

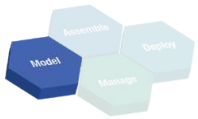
- **System z – Complement to the Portal environment**
  - Mission critical applications, transaction, data on mainframe
  - Portal on z Platform get the user closer to these processes resulting in the QOS that the platform is known for….higher performance & bandwidth, better response time, high availability, reliability, workload management, highly secure, efficient



- Tight integration with CICS, IMS, DB2, MQ, Websphere Application Server, Websphere Process Server
  - And the ability to integrate with .NET and the distributed environment

The characteristics that a mission critical PORTAL require are the same characteristics that z Platform was designed for…

Advanced Functionality: SOA composite applications



Model

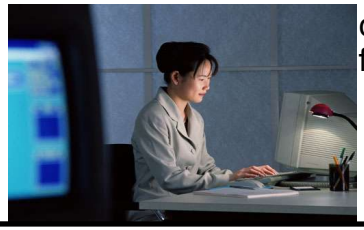
Model a new business process that builds on your current capabilities …..

WebSphere Business Modeler

…and discover program units and business rules you can reuse in the new process.

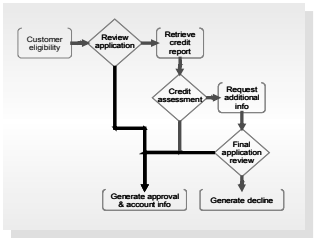
WebSphere Studio Asset Analyzer
Asset Transformation Workbench
CICS Interdependency Analyzer

Assemble



Wrap programs as services, creating composite appl'ns from core assets….

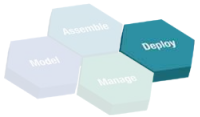
WebSphere Developer for zSeries



… and assemble the services across multiple platforms

WebSphere Integration Developer

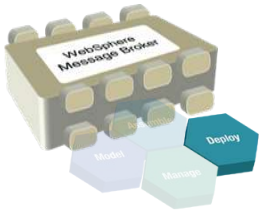
WSRR



Deploy

Choreograph and deploy your new composite applications ….

WebSphere Process Server
WebSphere Portal Server
WebSphere Application Server
WebSphere XD
Webshere Business Svcs



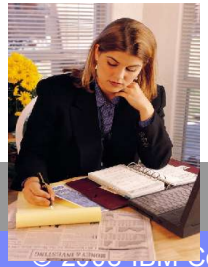
… using an ESB to power your SOA

WebSphere Message Broker (Advanced ESB)
WebSphere ESB
WebSphere Transformation Extender
WebSphere MQ

Manage

Monitor the processes across your SOA, and intervene if necessary ….

WebSphere Business Monitor



…. and export data for analysis and process improvement, back to ….

WebSphere Business Modeler

WebSphere software

First National of Nebraska

- **Challenge**
  - The company had 600 WinTel boxes, a Tandem Computer, the zSeries mainframe and 40 Sun servers. Twenty one engineers supporting Intel.
- **Solution**
  - Consolidation and Virtualization utilizing 3 z/OS CPU engines, one on-demand engine, 100 Intel Servers on blade servers running VMware, 5 IFLs replacing the 40 Sun servers. Eight engineers supporting Intel.
  - Websphere Application Server and MQ connectivity to mainframe with hypercard connectivity between WMware and z/OS
- **Key Benefits**
  - The robust security and reliability of system's z architecture allowed them to deliver high-quality transaction processing day-in and day-out
  - Ability to guarantee the high level of failover redundancy required for banking operations by using virtual systems on a single mainframe platform

Business

- One of the Top-50 financial services holding company in the US. Serves more than 6.6 million customers in all 50 states with more than 90 banking locations

Why Linux?

- Reliable and secure open desktop platform
- Ability to run on the specialty engines

Why IBM?

- IBM continues to make big R&D investments to system z, such as new capabilities like zAAP
- The robust security and the reliability of the system z architecture

Blue Cross and Blue Shield of Kansas

WebSphere software

One of the largest health insurance companies in Kansas saves when they move to a web-based application infrastructure, served from a System z running Linux

* ***The Challenge***
  - BCBSKS needed to move to a web-based, OS-independent environment
  - The client required a solution that avoided purchasing additional distributed servers
* ***The Partners***
  - **IBM** and **Sirius Computer Solutions**, an IBM Premier Business Partner
* ***The Solution***
  - Mixed Linux and z/OS environment
  - **WebSphere Application Server, WebSphere MQ**
  - System z990 with 2 IFLs, running 9 instances of SUSE Linux Enterprise Server
* ***The Advantage***
  - Savings from consolidation allowed BCBSKS to eliminate distributed servers and the associated network infrastructure
  - Because of the reliability and availability of their Linux platform, the client estimates near-100% uptime for their business-critical applications

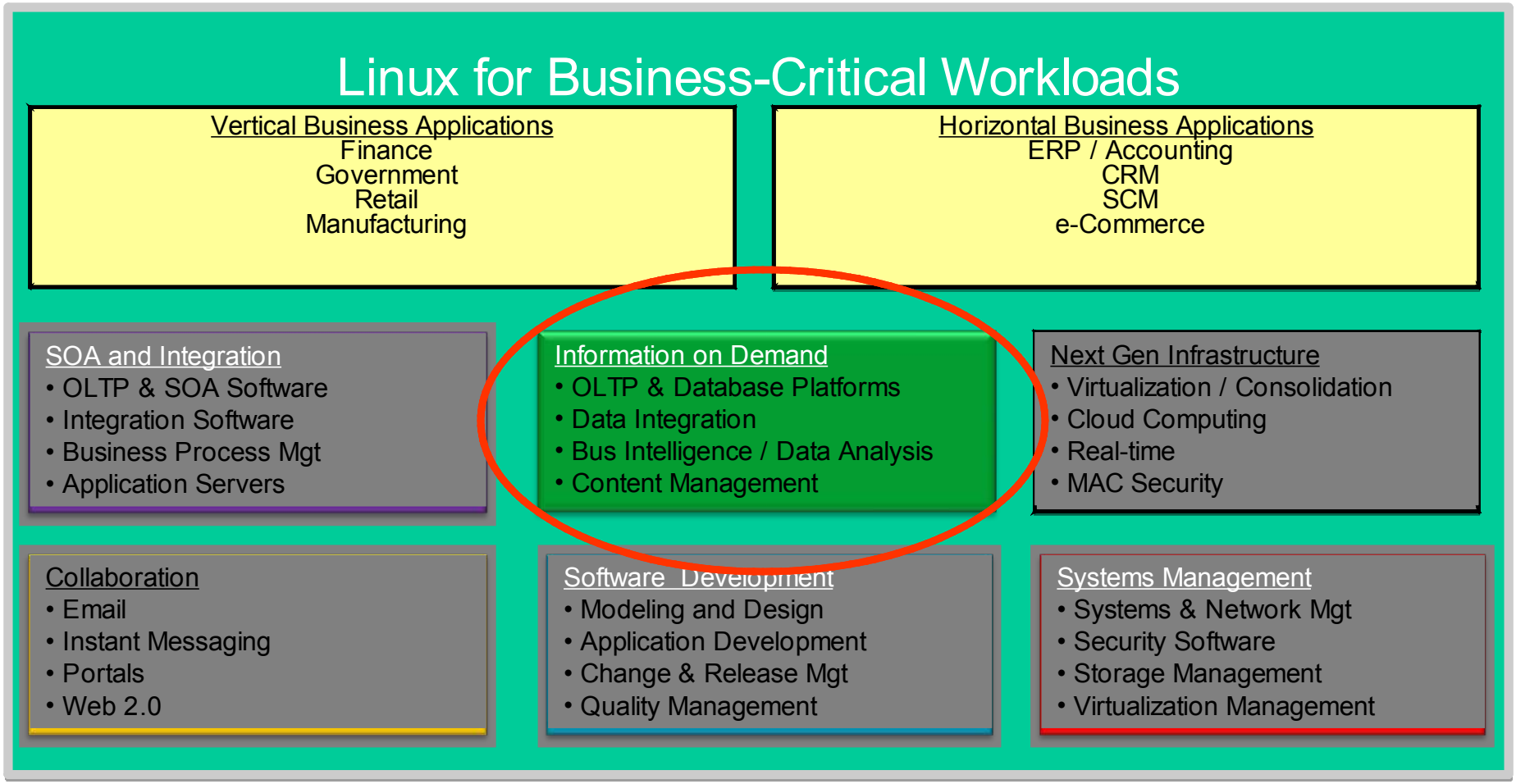
BCBSKS can deploy new virtual servers in only a few hours - a process that previously took a week - resulting in improved productivity for IT staff

The single-server solution also provides simple disaster recovery capabilities and enables the client to easily complete annual disaster recovery exercises at an offsite location.

IBM Novell SIRIUS COMPUTER SOLUTIONS

Linux supports a range of Business-Critical Workloads on System z

IBM's solution isn't a part number - it's a family of solutions that encompasses what System z customers around the globe rely on to run their businesses.

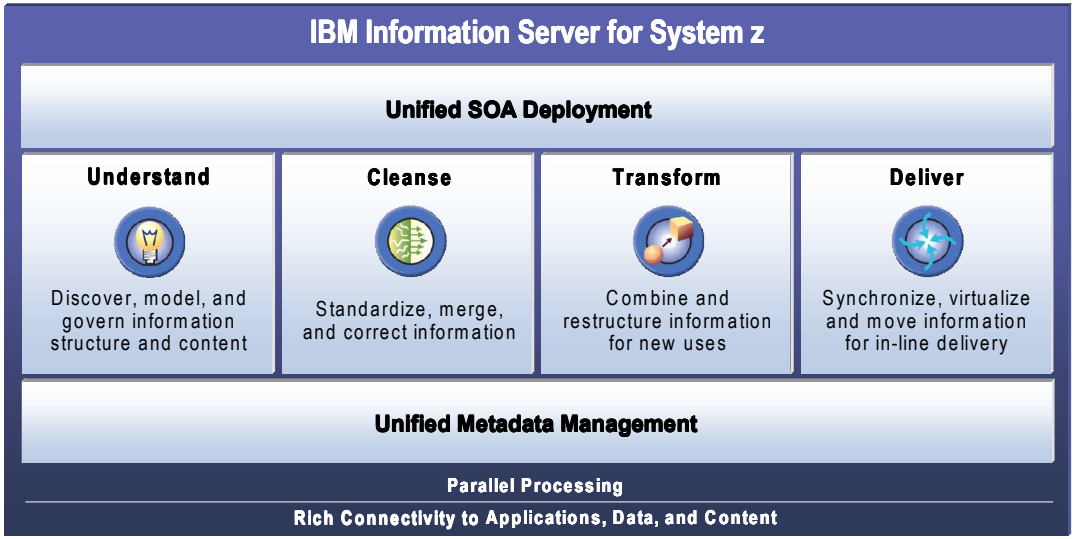


Unlocking the Business Value of Information for Competitive Advantage

System z and Information On Demand

Introducing InfoSphere Information Server for Linux on System z

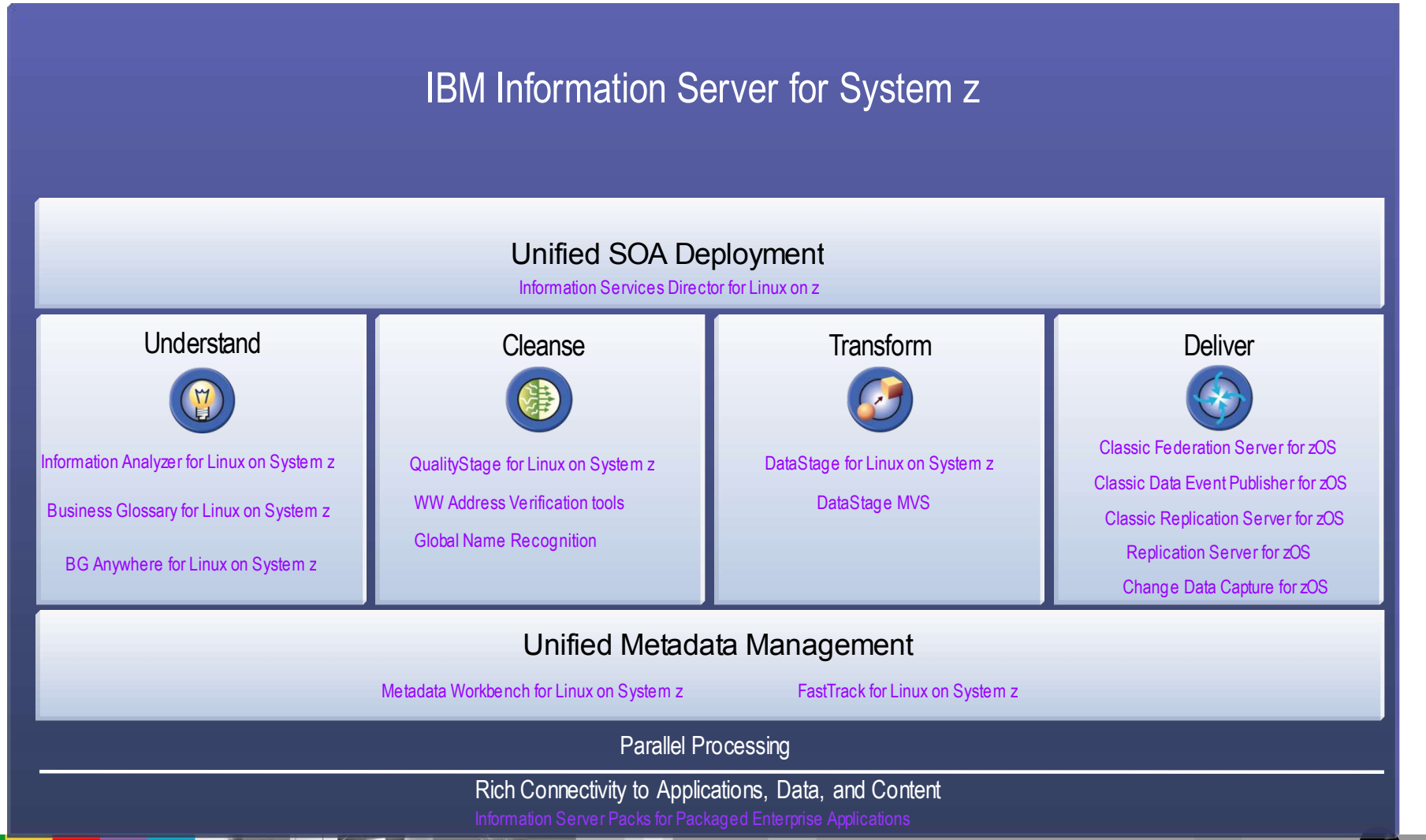
- Complete Information Server on System z
- Native Parallel Processing
- Native Data Access
- Easy SOA Enablement
- Low cost IFL Engine
- Metadata managed and protected in DB2 on MVS



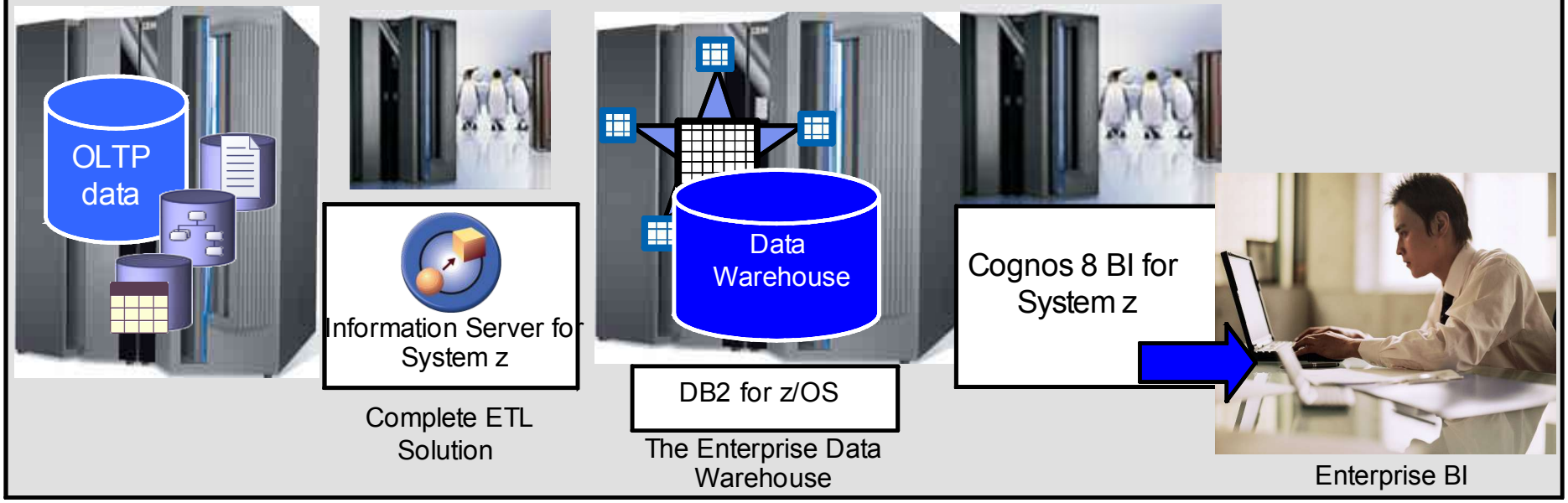
Great for customers with large volumes of data on the mainframe

IBM Information Server for System z

Delivering information you can trust



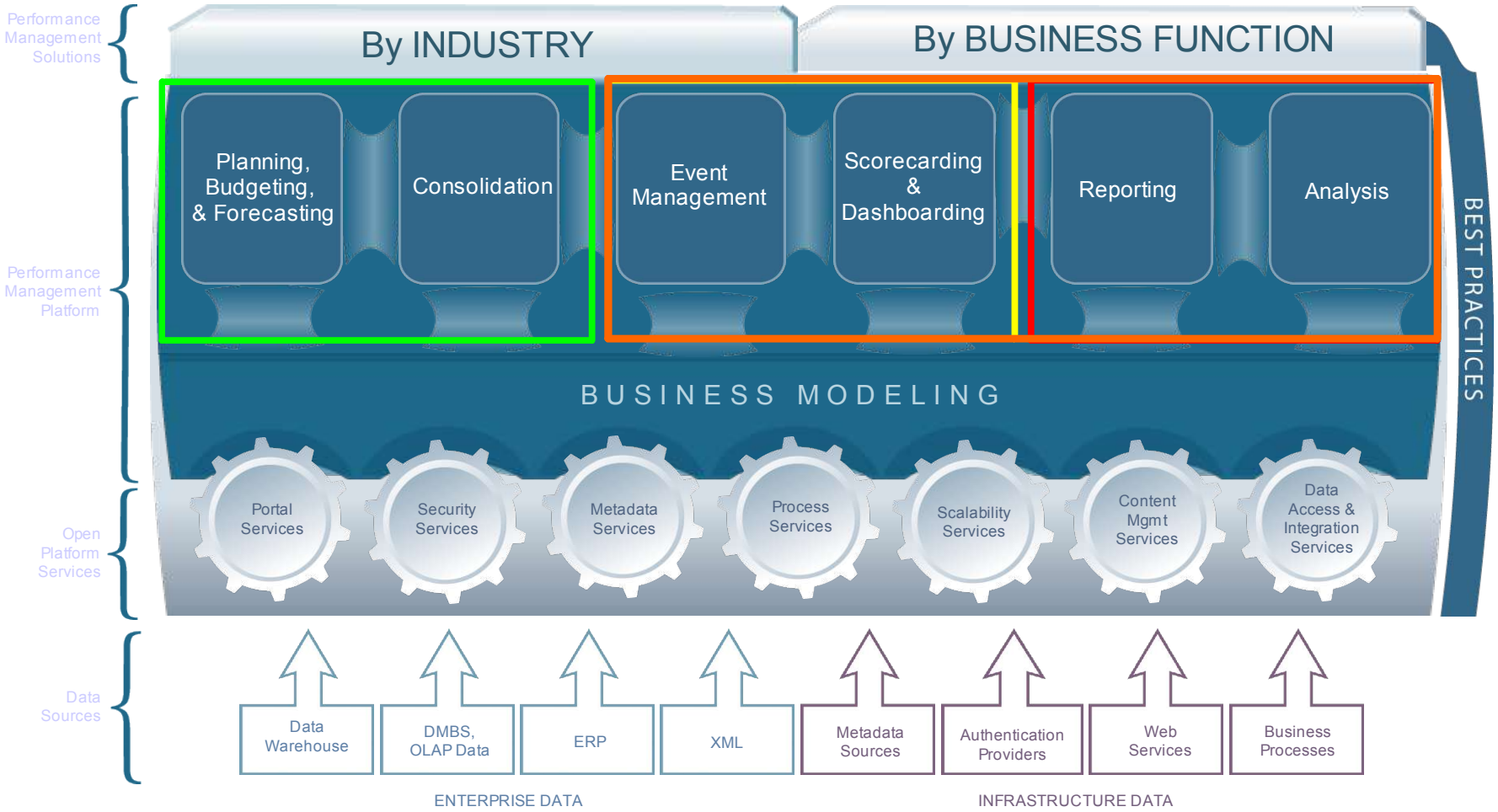
Data Warehouse and BI on System z



Core Offering for Enterprise Data Warehouse and BI:

- Information Server for System z
  - A complete set of ETL tools for warehouse population and management
- DB2 for z/OS, including the new DB2 for z/OS Value Unit Edition
  - A new value point for new DB2 z/OS workloads
- IBM Cognos 8 BI for System z

Cognos Performance Management System



Information Management software

Winn-Dixie

- **Challenge**
  - The company had filed for Chapter 11 protection. IT operations were partly to blame for the financial problems. Applications were very old in green screen environment and were fragmented. A single job by an employee could involve logging onto 5 separate screens. Should they keep the mainframe or move to a distributed environment.
- **Solution**
  - Upgraded the mainframe to a System z9. Consolidated applications running on 2 older systems, ran PeopleSoft ERP applications, financial applications and the DB2 database
- **Key Benefits**
  - The setup's virtualization capabilities and scalability made the solution a tremendously leveragable asset
  - The ability to now be able to build a single portal for all its applications that will eventually be tied into a lightweight Directory Access Protocol directory that will give employees access to the services they need based on their roles in the company

Business

- 521 stores in the Southeast United States

Why Linux?

- Reliable and secure open platform
- Ability to run on the specialty engines

Why IBM?

- Provided Winn-Dixie the ability to do more work on the mainframe as supposed to less
- Scalability, security, reliability and high availability of System z mainframe
- Virtualization capabilities on System z on the specialty engines.

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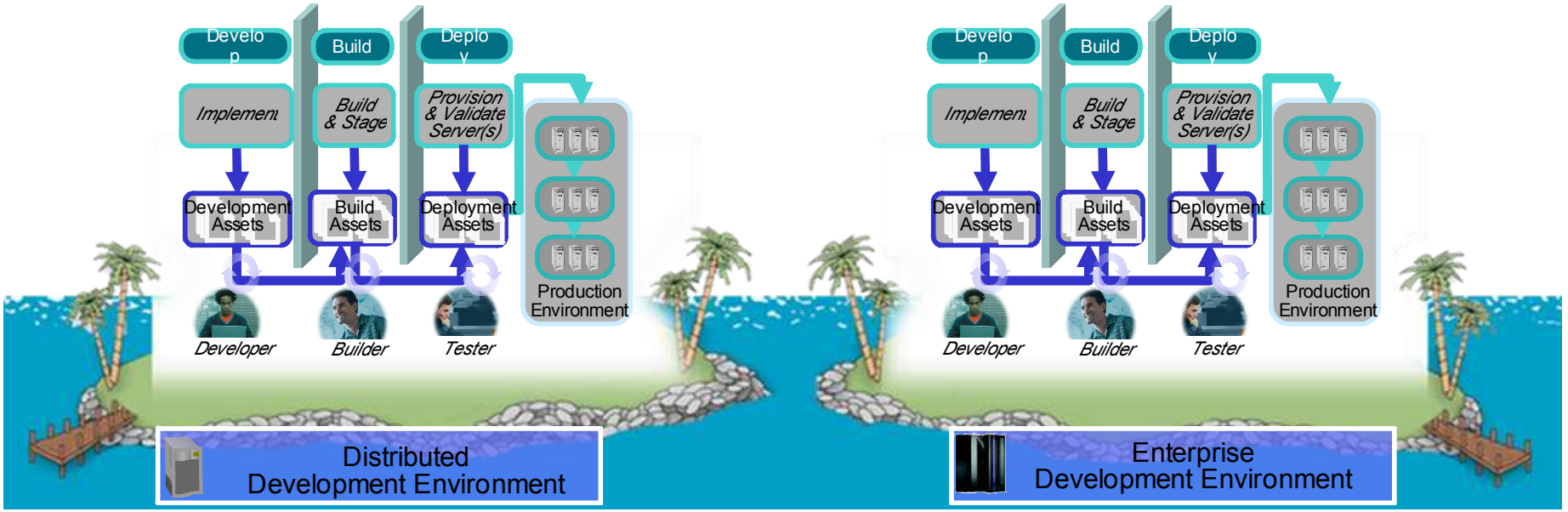
- Virtualization Management

Today's realities – What customers have:

Islands of development for enterprise and distributed

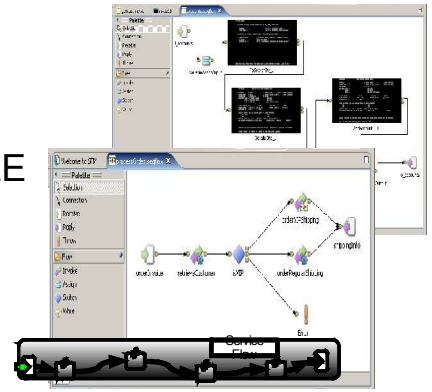
- Duplicate infrastructures limit IT and skills flexibility, introduce errors, reduce productivity
- Multiple infrastructures increase costs, so less capital is available to invest in new projects
- Lack of traceability inhibits end-to-end governance



Modernize your architectures

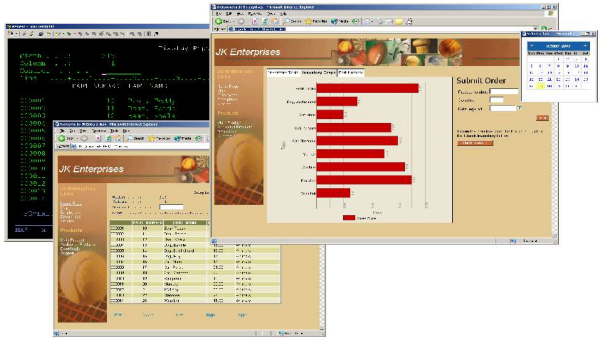
Develop new SOA applications rapidly, reuse existing applications

- Use Model-Driven Development (MDD) to architect services and data with Rational Software Architect and Rational Data Architect. Transform UML to EGL, COBOL, Java, WSDL, and C++



- Rapidly build, publish, and consume web services using support built into Rational Business Developer Extension. Leverage *Service* and *Interface* keywords to re-enforce SOA development principles; supports CICS and J2EE

- Build web services from existing CICS applications using XML Enablement and Service Flow Modeler support in WebSphere Developer for System z. Also supports full J2EE stack



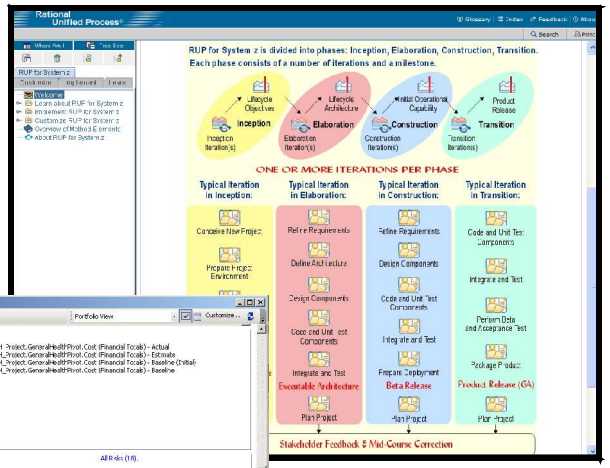
- Develop web services using RPG, COBOL, CL, and Java with WebSphere Development Studio Client – Advanced Edition. Web Service Wizard creates web service wrappers for RPG & COBOL

- Transform green screen applications to web UIs and/or web services using Host Access Transformation Services (HATS) and Web Facing Deployment Tool with HATS Technology (WDHT)

Modernize Your Processes

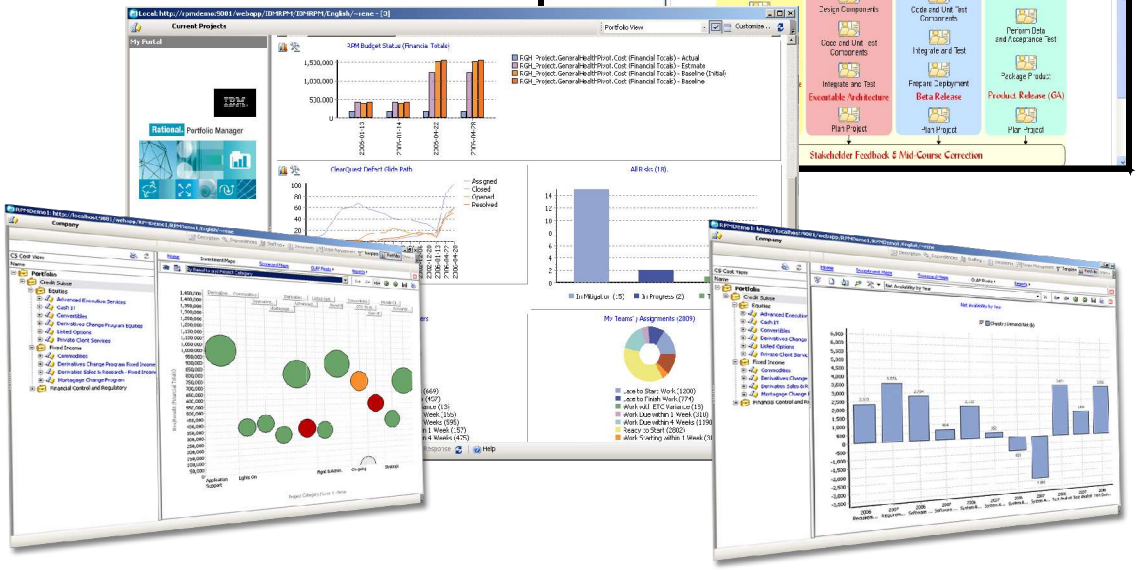
Centrally manage requirements, processes, activities, best practices, projects

- Take advantage of best practices in collaborative distributed development using Rational Method Composer and Rational Unified Process for z



- Manage requirements for both distributed and enterprise projects with Rational RequisitePro

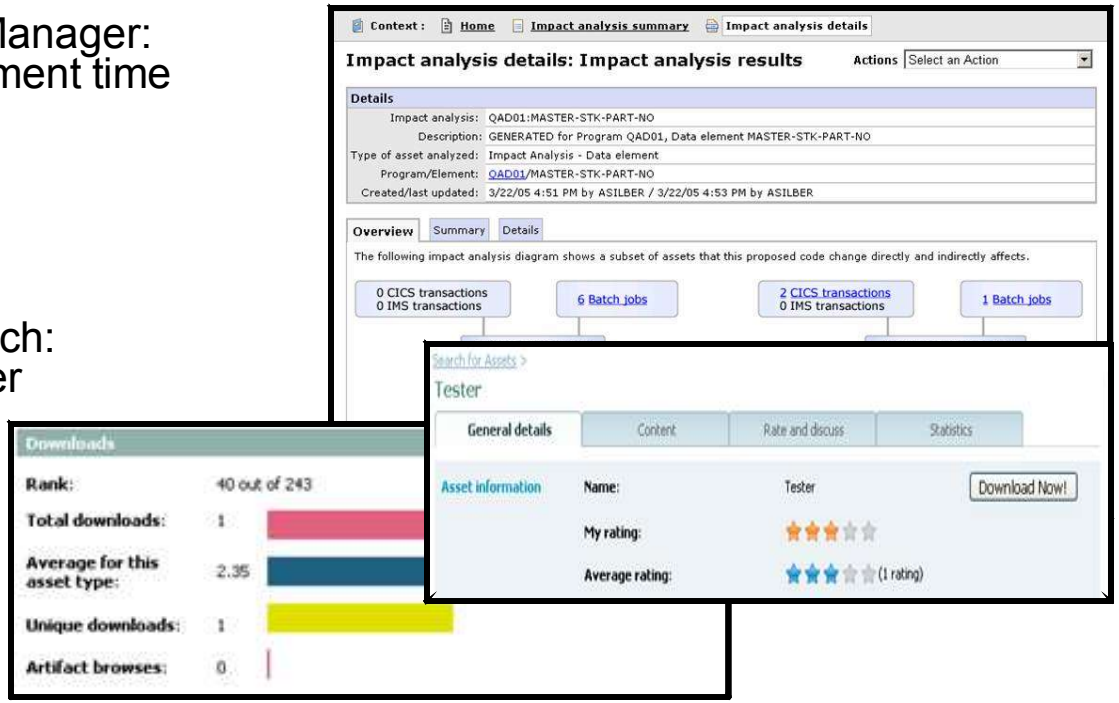
- Provide a unified dashboard for your organization with Rational Portfolio Manager



Modernize your asset management

Discover, understand, and leverage existing applications and services

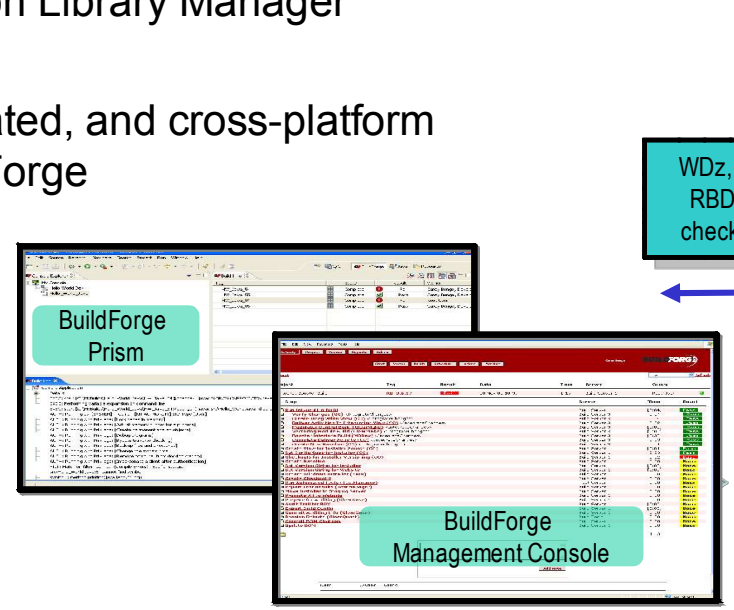
- WebSphere Service Registry & Repository: Deploy and manage services accessible at runtime
- Rational Asset Manager: Manage development time reusable assets
- Rational ClearQuest: Manage change to code base.
- Asset Transformation Workbench: Refactor existing assets; discover potential services
- WebSphere Studio Asset Analyzer: Understand existing assets & relationships

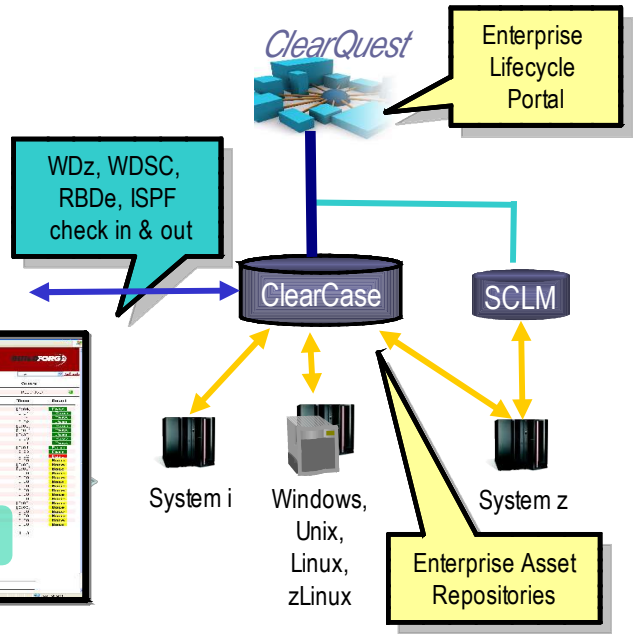


Modernize Your Team Infrastructure

Provide coordination, traceability, consistency across platforms

- Orchestrate all problem tracking and configuration management with Rational ClearQuest
- Manage enterprise assets with Rational ClearCase and/or Source Configuration Library Manager
- Produce traceable, automated, and cross-platform builds with Rational Build Forge





Leading International Airline

Modernize (Optimize) Your Development Investments

Rational. software

- Migrate off of out-of-date and expensive legacy development platforms onto Enterprise Generation Language and the IBM Rational Software Delivery Platform

Background:

- A leading international airline maintenance, repair and overhaul company
- Rapid growth and expansion of services

Solution:

- **Enterprise Application Transformation** of existing Natural / ADABAS system to **EGL**, IBM DB2® and WebSphere software
  - 30 million lines of Natural code
  - New user interface required
  - Complete ADABAS to DB2 migration

"There are many benefits to legacy modernization tools and they significantly reduce the risk of failure when maintaining or transforming aging legacy systems." - Dale Vecchio, research director, Gartner

Hoplon Infotainment

- **Challenge**
  - To offer a robust, streamlined, open standards-based deployment platform for a new online game.
  - Integrate multiple “shards” so that all users are playing in the same game universe
- **Solution**
  - The Linux- and IBM DB2-based TaikoDom game is hosted by IBM on an IBM zSeries 900.
- **Key Benefits**
  - Hoplon’s game platform places all users in a single shard and the same game universe
  - IBM DB2 delivered a 30 percent performance increase over the earlier Oracle database system.
  - IBM Rational Purify enabled programmers to quickly fix issues with game code, including a memory leak that was hurting game performance and causing server shutdowns

Information Management software

Rational. software

HOPLON infotainment

Business

- Provider of massive multiplayer online games, based in Brazil

Why Linux?

- Flexibility and ability to run on a mainframe with multiple virtual machines

Why IBM?

- Scalability, security, reliability and high availability of System z mainframe
- *“We wanted to create a game deployment platform that was much more scalable and flexible than existing models, and it was clear that IBM’s approach would allow us to do that in a way we had not considered before…a way that is new to the industry”*

Linux supports a range of Business-Critical Workloads on System z

IBM's solution isn't a part number - it's a family of solutions that encompasses what System z customers around the globe rely on to run their businesses.

Linux for Business-Critical Workloads

Vertical Business Applications
Finance
Government
Retail
Manufacturing

Horizontal Business Applications
ERP / Accounting
CRM
SCM
e-Commerce

SOA and Integration
- OLTP & SOA Software
- Integration Software
- Business Process Mgt
- Application Servers

Information on Demand
- OLTP & Database Platforms
- Data Integration
- Bus Intelligence / Data Analysis
- Content Management

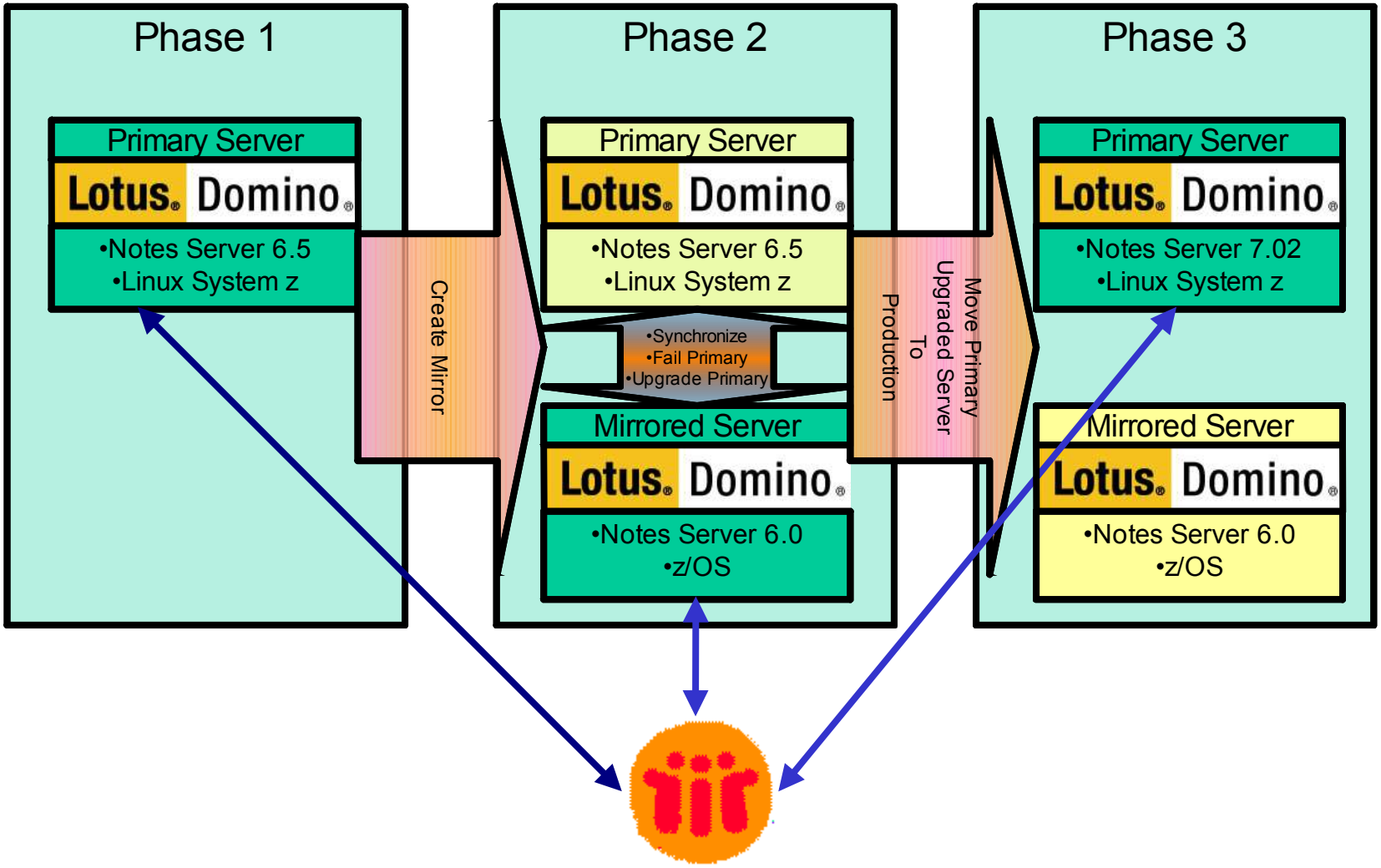
Next Gen Infrastructure
- Virtualization / Consolidation
- Cloud Computing
- Real-time
- MAC Security

Collaboration
- Email
- Instant Messaging
- Portals
- Web 2.0

Software Development
- Modeling and Design
- Application Development
- Change & Release Mgt
- Quality Management

Systems Management
- Systems & Network Mgt
- Security Software
- Storage Management
- Virtualization Management

Domino for Linux on System z, Imagine the Possibilites...



IBM Office of the CIO

- **Challenge**
  - Cost-effectively deliver global communication and collaboration tools in a secure and heterogeneous environment to a broad array of 450,000 IBM end users
- **Solution**
  - Lotus Notes, Lotus Domino, Lotus Symphony and Lotus Sametime software running on Microsoft Windows, Linux and Macintosh operating systems
- **Key Benefits**
  - Integrated communication, collaboration, instant messaging and business productivity tools help users connect efficiently, simplify workloads, save time and increase productivity
  - A platform for over- and under-provisioned users with a single client programming model offered through IBM Lotus Expeditor software helps reduce costs and provides an alternative to Microsoft software

Lotus. software

Business

- 450,000 end users in 64 countries across 2,041 location

Why Linux?

- Reliable and secure open desktop platform

Why IBM?

- Open standards approach to document formats
- *"The Lotus portfolio provides an open, powerfu desktop platform, with differentiated collaboration and communication capabilities that support role-based execution of business processes in a global, heterogeneous environment"*

WebSphere software

RENFE

- **Challenge**
  - Lack of consistency of information presentation across 18 business units; high IT administration costs and low scalability
- **Solution**
  - Single consistent source of corporate information using **WebSphere Portal** running on SUSE Linux Enterprise Server on the IBM System z platform
- **Key Benefits**
  - Fast access to information on a unified platform
  - Reduced operational costs through IT consolidation
  - Ability to create new virtualized servers rapidly and easily, without the expense and delay of procuring new hardware
- **Business**
  - Spanish national railway operator, with 32,000 people, plus track and trains
- **Why Linux?**
  - Virtualization capabilities of Linux provided the ideal environment for consolidated intranet services
- **Why IBM?**
  - System z combined high availability and security with virtualized Linux servers
  - *"Both the non-disruptive scalability of the mainframe and the virtualization capabilities of Linux mean that we can make large-scale upgrades without having to waste time, money and efforts hiring and training new personnel and installing new physical servers."*

Linux supports a range of Business-Critical Workloads on System z

IBM's solution isn't a part number - it's a family of solutions that encompasses what System z customers around the globe rely on to run their businesses.

Linux for Business-Critical Workloads

Vertical Business Applications
Finance
Government
Retail
Manufacturing

Horizontal Business Applications
ERP / Accounting
CRM
SCM
e-Commerce

SOA and Integration
- OLTP & SOA Software
- Integration Software
- Business Process Mgt
- Application Servers

Information on Demand
- OLTP & Database Platforms
- Data Integration
- Bus Intelligence / Data Analysis
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Next Gen Infrastructure
- Virtualization / Consolidation
- Cloud Computing
- Real-time
- MAC Security

Collaboration
- Email
- Instant Messaging
- Portals
- Web 2.0

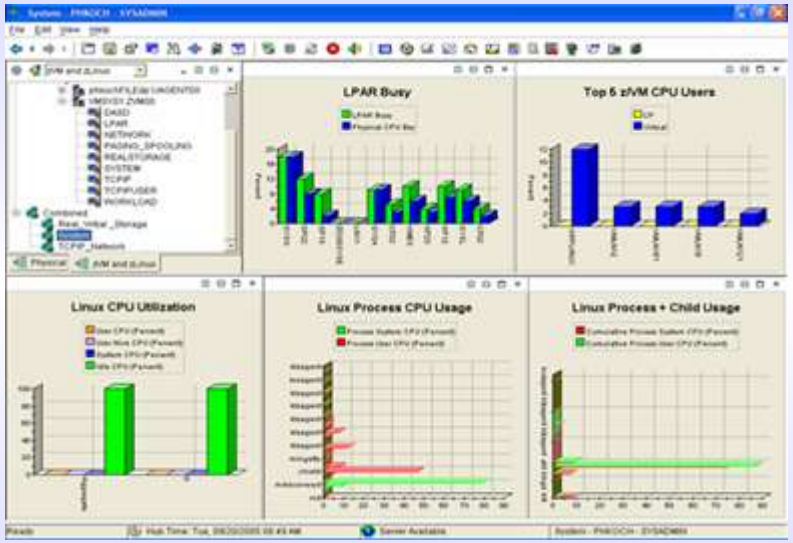
Software Development
- Modeling and Design
- Application Development
- Change & Release Mgt
- Quality Management

Systems Management
- Systems & Network Mgt
- Security Software
- Storage Management
- Virtualization Management

Gain Visibility into System Health and Resolve Issues

Quickly with IBM Tivoli OMEGAMON XE on z/VM and Linux

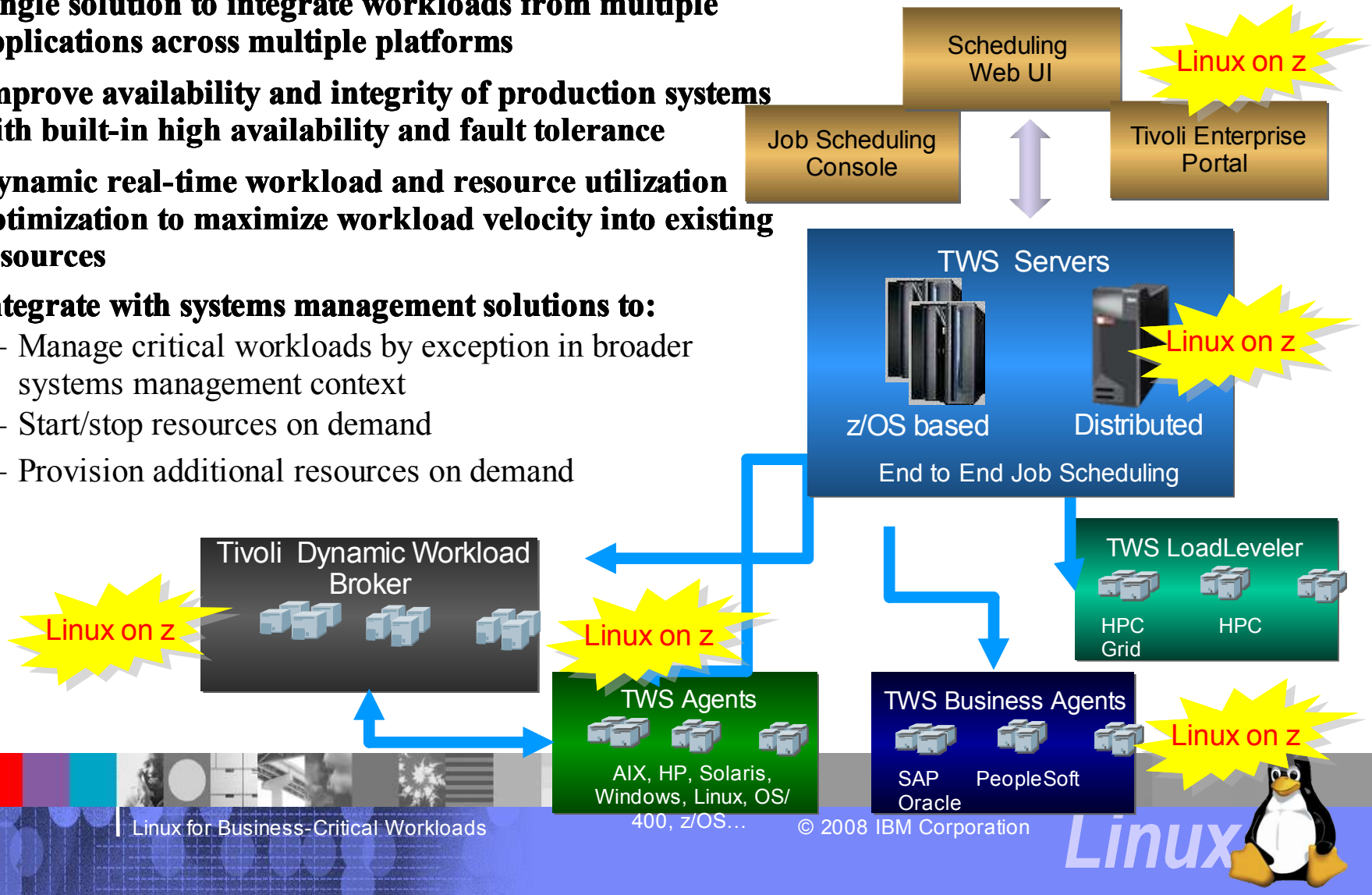
- **Combined product offering that monitors z/VM and Linux for System z**
- **Provides work spaces that display:**
  - Overall system health
  - Workload metrics for logged-in users
  - Individual device metrics
  - LPAR Data
- **Provides composite views of Linux running on z/VM**



Dynamically Manage Workloads across

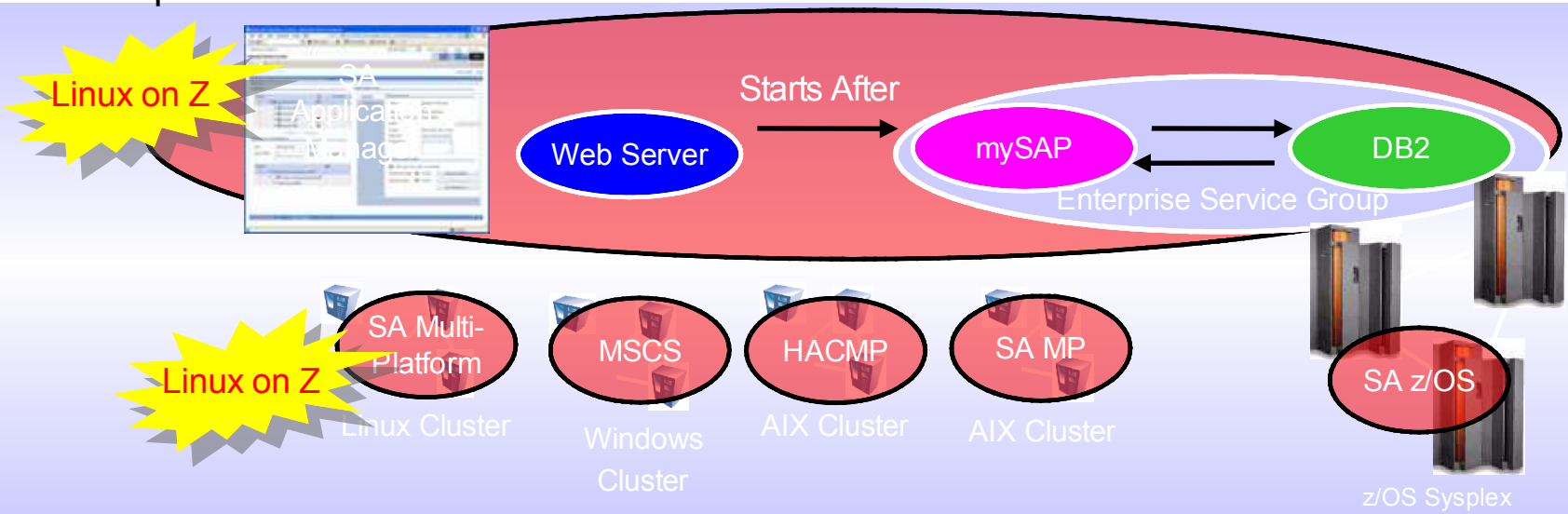
Virtualized resources with Tivoli Workload Automation Portfolio

- **Single solution to integrate workloads from multiple applications across multiple platforms**
- **Improve availability and integrity of production systems with built-in high availability and fault tolerance**
- **Dynamic real-time workload and resource utilization optimization to maximize workload velocity into existing resources**
- **Integrate with systems management solutions to:**
  - Manage critical workloads by exception in broader systems management context
  - Start/stop resources on demand
  - Provision additional resources on demand



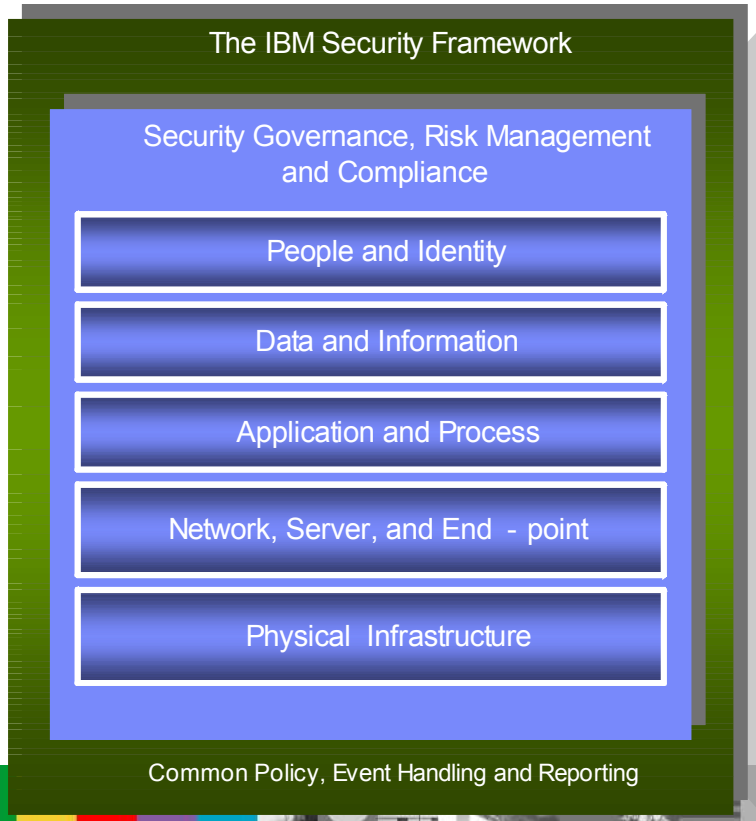
Maintain a Single Point of Control for HA/DR Automation
with the IBM Tivoli System Automation Portfolio

- Provides single point of control for HA/DR automation across heterogeneous, distributed applications
- Extends goal-based automation to the entire application topology
  - Automatically maintains cross-cluster resources and dependencies when driving observed resource states to desired states
  - Manages HA/DR operations so resources start, stop or move in right sequence in right system
  - Initiate start, stop and move operations with a single click
- Includes a Business Continuity Process Manager for Enterprise Class HA/DR driven by ITIL-based processes



Security, Risk and Compliance Management
Enabling collaboration while mitigating risk

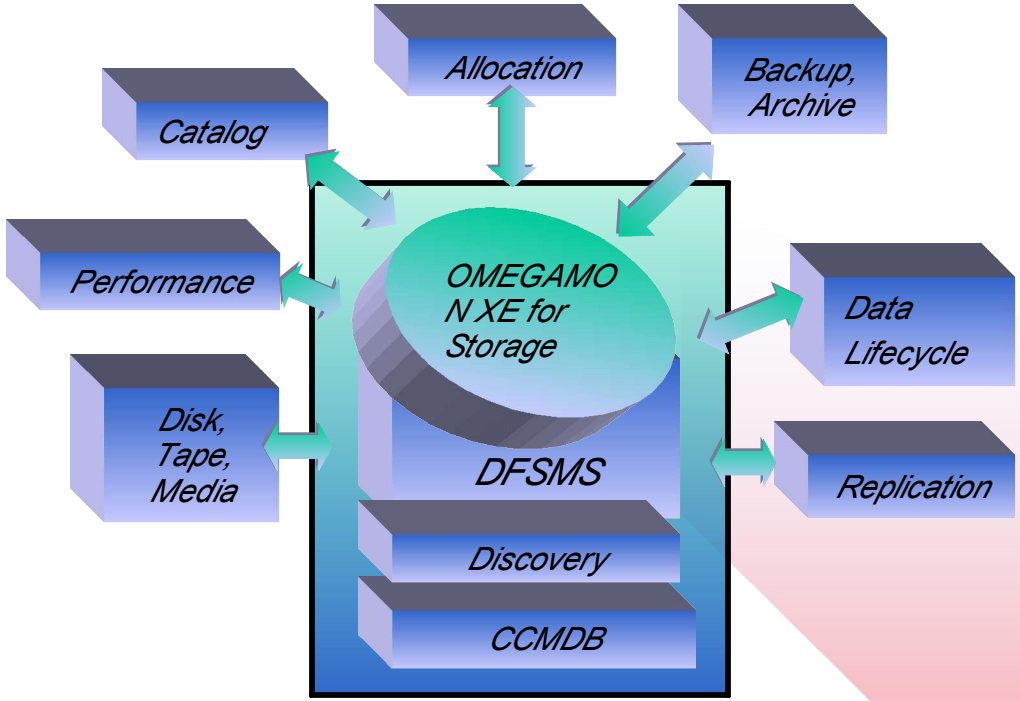
- IBM delivers:
  - Timely **visibility** into business continuity risks and compliance posture
  - More effective **control** over utilization of sensitive business assets
  - Efficient **automation** of the identification and remediation of vulnerabilities and the addressing of compliance mandates



- **SECURITY COMPLIANCE**
  - Demonstrable policy enforcement aligned to regulations, standards, laws, agreements (PCI, FISMA, etc..)
- **IDENTITY & ACCESS**
  - Enable secure collaboration with internal and external users with controlled and secure access to information, applications and assets
- **DATA SECURITY**
  - Protect and secure your data and information assets
- **APPLICATION SECURITY**
  - Continuously manage, monitor and audit application security
- **INFRASTRUCTURE SECURITY**
  - Comprehensive threat and vulnerability management across networks, servers and end-points

IBM Storage Management Portfolio for System z Capabilities

Ensure rapid data recovery for compliance and auditability!



- ✓ *Automation, Visibility, and Control of backup & recovery processes*
- ✓ *Control use of storage devices more efficiently while governing data migration to tape, and catalog management*
- ✓ *Audit and report on archiving – status, problems, take corrective action to ensure compliance with retention policy*
- ✓ *Visibility to backup & recovery of both key data and key infrastructure files (e.g. ICF and Tape Catalogs)*

Infrastructure Management

IBM Tivoli OMEGAMON XE for Storage on z/OS | IBM Tivoli Advanced Catalog Managment for z/OS | IBM Data Facility Product (DFSMSdfp) | IBM Tivoli Tape Optimizer on z/OS

IBM Removable Media Managers (DFSMSrmm, IRMM) | Softek Transparent Data Migration Facilities (TDMF, LDMF) | IBM Transactional VSAM (DFSMStvs) | IBM Tivoli Allocation Optimizer for z/OS

Allows administrators to manage data and a broad range of devices, such as switches, tape, removable media and storage servers

Business Continuity

IBM Data Set Services (DFSMSdss) | IBM z/OS Global Mirror | IBM Backup and Restore Manager for z/VM | IBM Tivoli Advanced Backup and Recovery for z/OS | IBM TotalStorage Productivity Center for Replication for System z

Minimizes operational risk by ensuring business data meets backup and recovery objectives

Lifecycle and Retention

IBM Hierarchical Storage Manager (DFSMShsm) | IBM Tivoli Advanced Reporting for DFSMShsm | IBM Tivoli Automated Tape Allocation Manager for z/OS

IBM Archive Manager for z/VM | IBM Tape Manager for z/VM | IBM Tivoli Advanced Audit for DFSMShsm

Helps control storage growth and control costs for data requiring long retention periods.

IBM Cross Platform Software Portfolio

Software Development	e-Business Integration	Integrated Information Infrastructure	Human Productivity	Business Impact Management
Rational. software	WebSphere software	DB2 Information Management Software	Lotus. software	Tivoli software
Requirements & Analysis Rational Suite AnalystStudio Rational RequisitePro Rational Rose Family Rational XDE Family **Visual Modeling & Devel.** Rational Suite DevelopmentStudio Rational Rose Family Rational XDE Family Rational PurifyPlus Family: ✓ Rational Purify ✓ Rational Quantify ✓ Rational PureCoverage **Automated Testing** Rational Suite TestStudio Rational Robot Rational TeamTest Rational PurifyPlus Rational TestManager Rational Test RealTime Rational ClearQuest **Team Unifying Platform:** Project Management ✓ Rational RequisitePro ✓ Rational ProjectConsole ✓ Rational Unified Process ✓ Rational soDA ✓ Rational TestManager Software Configuration Mgmt ✓ Rational ClearCase Family ✓ Rational ClearQuest Family	**Foundation and Tools** WebSphere Application Server WebSphere Edge Server IBM VisualAge WebSphere Studio (Family) Websphere Business Components Composer WebSphere Host Integration (Family) IBM Fault Analyzer **Reach and User Experience** IBM File Manager WebSphere Portal Server IBM Application Monitor WebSphere MQ Everyplace IBM Debug Tool WebSphere Transcoding Publisher WebSphere Commerce Suite WebSphere Voice Server WebSphere Personalization **WebSphere Integration** WebSphere Business Integration for Industries WebSphere Interchange Server WebSphere Business Integration Modeler WebSphere Business Integration Monitor WebSphere MQ WebSphere MQ Integrator Broker WebSphere MQ Workflow WebSphere Event Broker WebSphere Data Interchange Server WebSphere Business Connection WebSphere Business Integration Adapters	**Database and Tools** DB2 Universal Database DB2 for zOS & OS/390 Informix Dynamic Server (IDS) Informix DataBlades Informix 4GL DataJoiner DataPropagator DB2 DataPropagator DB2 Tools IMS DB/DC IMS Tools for OS/390 **Business Intelligence** DB2 OLAP Server DB2 Intelligent Miner for Data DB2 Intelligent Miner for Text DB2 Intelligent Mining Scoring DB2 Warehouse Manager Query Management Facility Informix XPS Red Brick Warehouse **Content Management** IBM Content Manager ✓ On-Demand ✓ CommonStore ✓ VideoCharger IBM Enterprise Information Portal	**Messaging and Wireless** Domino Notes Family: ✓ Notes ✓ iNotes ✓ Mobile Notes Domino Everyplace Access Domino Everyplace Enterprise **Advanced Collaboration** WebSphere Portal Server ✓ Lotus Collaboration components Lotus Discovery Server Domino Extended Search QuickPlace Sametime Lotus Workflow **eLearning** Domino.Doc Lotus LearningSpace Lotus LearningSpace Forum	**Configuration & Operations** Tivoli Configuration Manager Tivoli Workload Scheduler Tivoli Remoe Control Tivoli Data Exchange Tivoli Provisioning Manager Tivoli Orchestrator **Performance & Availability** Tivoli Service Level Advisor Tivoli Web Site Analyzer Tivoli Business Systems Manager Tivoli Enterprise Console Tivoli Tivoli NetView Switch Analyzer Tivoli NetView for TCP/IP Performance **Security** Tivoli NetView Performance Monitor Tivoli Identity Manager Tivoli Monitoring Tivoli Access Manager Tivoli Risk Manager Tivoli Privacy Manager Tivoli Intrusion Manager **Storage** Tivoli Storage Manager Tivoli Storage Manager for SAN Tivoli Storage Resource Manager Tivoli SANergy Tivoli Storage Manager for Mail Tivoli Storage Manager for Hardware Tivoli Storage Manager for Database Tivoli Storage Manager for Applications TSM for Space Manager Tivoli Storage Network Manag

Business-Critical Workloads on Linux with IBM

Extensive Choices on the Industry's Most Efficient Platforms

Why Linux *on* IBM *for* Business-Critical Workloads?

Fact: Linux is certified on all IBM Systems

IBM Systems are designed for multiple operating systems, with robust capabilities delivered at the hardware level

The LTC strives for performance parity between Linux and IBM's own operating systems

Fact: Over 500 IBM Software products are enabled for Linux

IBM's extensive portfolio of software is ready for Linux, including many more applications from Business Partners

Fact: IBM delivers on services for Linux

IBM Global Services is positioned to deliver extensive services across the full product lifecycle for customers who choose Linux

Implementation Services can help ensure a smooth transition

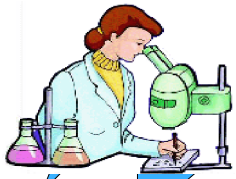
Enterprises around the world, in all industries, are choosing Linux for business critical applications

Telecommunications

Next Generation Networks

Life Sciences

Research, drug discovery, diagnostics, information-based medicine

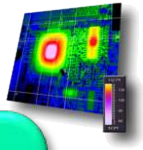


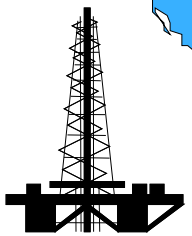
Distribution

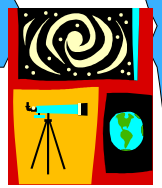
Open, cost-effective platform designed to help enhance POS operations

Cross Sector

Digital Media
IT Optimization
Enhanced Business Resiliency & Security







Financial Services

- ABB (Analytical Back Bone)
- Risk and Compliance
- Customer Insight
- Payment Systems

Industrial

Chemical and Petroleum – Upstream Exploration
Automotive – AEIF (Automotive Engineering Innovation Framework

Electronics

Advance process technology and manufacturing software. Help solve clients most important technical problems

Public Sector

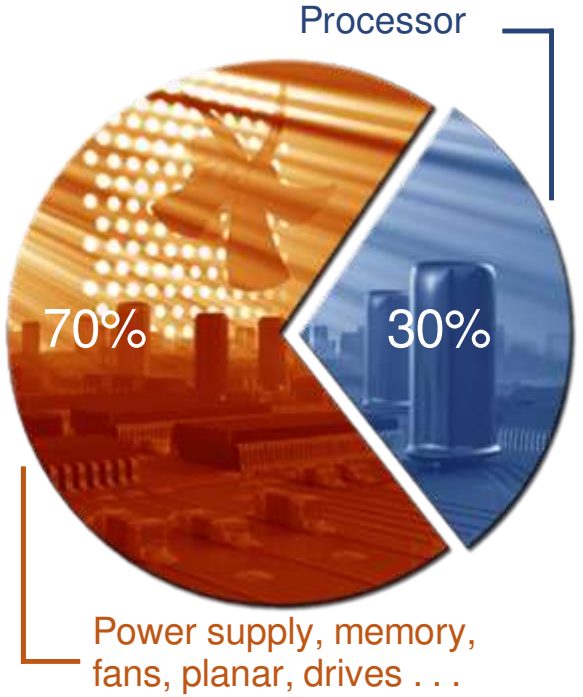
Scientific research, classified/defense, weather/environmental sciences, Public Safety and Security, Government access. Higher Ed

Project Big Green Linux

Cooperatively addressing energy consumption and management issues

- Linux kernel community efforts
  - Expanding support for scaling CPU clock speed and voltage
  - Keeping idle CPUs in a 'tickless,' low-power state longer
  - Power monitoring built into the kernel through PowerTOP
  - Create power-aware applications and policies
  - Linux Foundation Green Linux Workgroup
- IBM's “Project Big Green” includes consolidation on Linux
  - 3,900 internal servers consolidating onto Linux on System z
  - Estimate reduction in annual energy usage by 80%, reduce floorspace by 85%
- Enabling our Customers to realize savings and efficiency
  - IBM's Server consolidation factories enable smoother transitions to more efficient highly-virtualized platforms
  - IBM technologies such as System p AVE enable x86 applications to “just run” on POWER, IFLs enable Linux to run on the mainframe

Server hardware power usage



IBM Internal Linux Consolidation

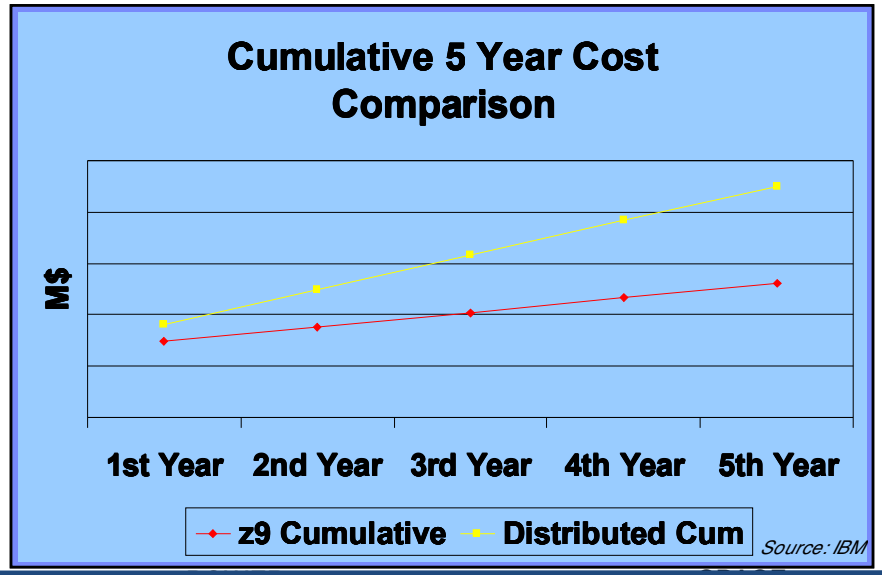
IBM will consolidate about 3,900 servers onto about 15 System z10 mainframes running Linux

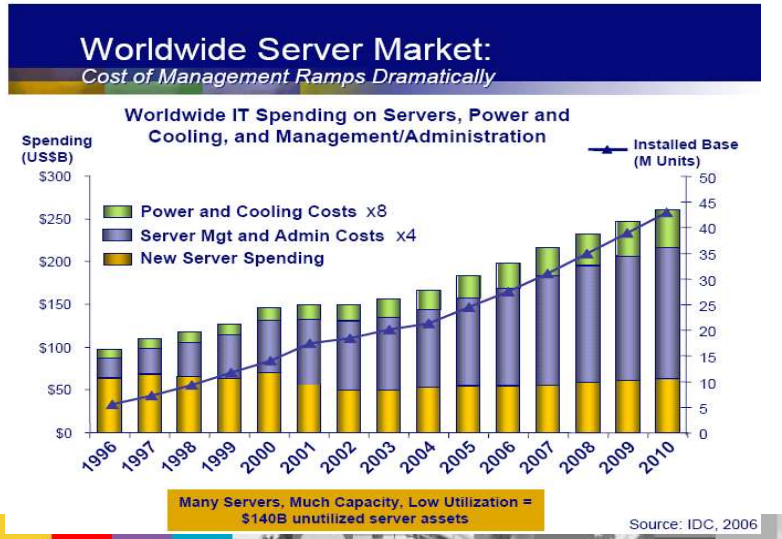
Used commercial TCO model to estimate savings in a Cross-IBM effort.

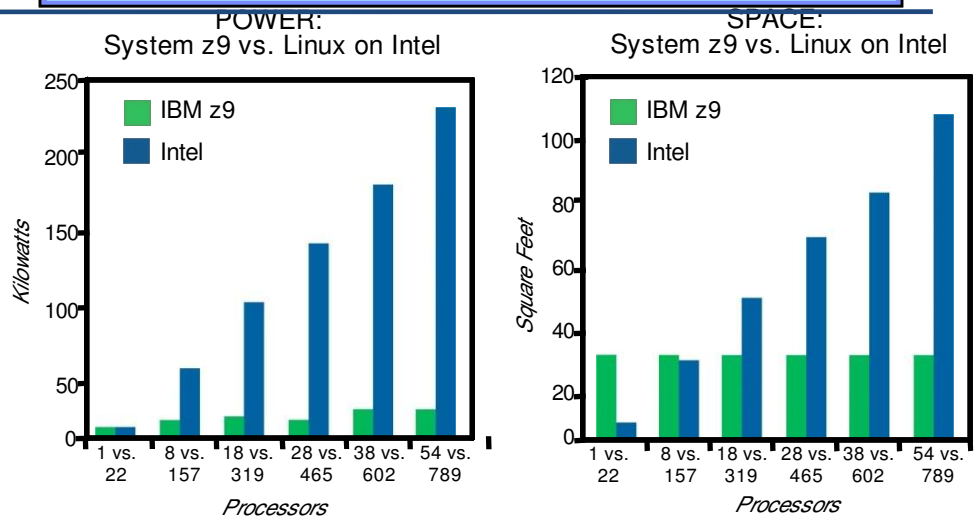
We expect substantial savings :

- Annual Energy Usage reduced by 80%
- Total floor space reduced by 85%

This transformation is enabled by the System z's sophisticated virtualization capability







Source: IBM. The Linux on Intel servers selected in this example are functionally eligible servers considered for consolidation to a System z running at low utilization such that the composite utilization is approximately 5%. The utilization rate assumed for System z EC is 90%. This is for illustration only actual power and space reductions, if any, will vary according to the actual servers selected for consolidation.

IBM Uses Linux

Transforming IBM's IT infrastructure - $10M+ in Savings

2,000+ Production Servers WW
www.ibm.com/linux & w3.ibm.com/linux
- redundant xSeries Linux servers
- TSM Client & Tivoli Monitoring Agent

Intranet search engine
- xSeries servers; Inktomi search engine
- TSM Client & Tivoli Monitoring Agent

IGS Internet Vulnerability Security Scanning
- 100 xSeries scanning 30k IP addresses/ week

Performance monitoring
- 75% fewer Linux servers than NT servers for same workload

IBM Global e-Mail Anti-virus Management
- xSeries scans incoming/outgoing mail for viruses

300mm Wafer Manufacturing Equip. Control
- Much more reliable than Win2000
- 174 xSeries; 200-300 by year end

Workstation Asset Management Applications
- 4 Linux zVM Guests on zSeries server
- Variable workload / on demand capacity

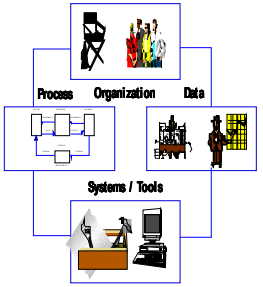
200+ z/VM Virtual Servers
- Application Development
- Mission Critical Applications

Web Content Management System
- DB2 on Linux
- zSeries

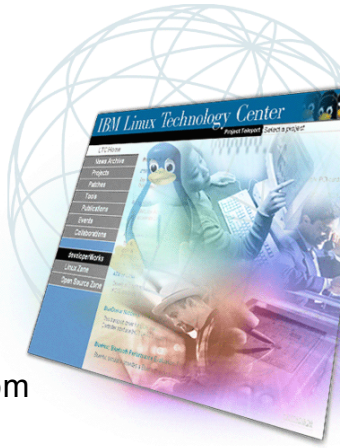
IBM Global Technology Services for Linux

Linux Distributions
- Red Hat or SUSE
- IBM & Non-IBM Platforms
- Enterprise Release

Linux Systems Management
- Backup & Recovery
- Problem & Change Mgt
- Tools Selection



Linux SupportLine & Subscriptions
- IBM selling Red Hat & Novell 1 & 3 years subscriptions WW with *IBM delivered local & remote usage and defect support for Linux avail 8x5 to 24x7*



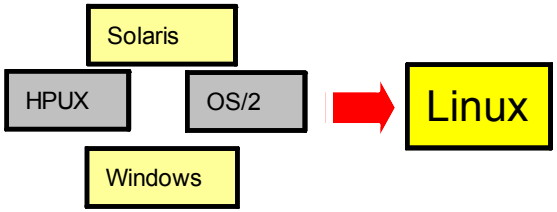
Linux Performance
- Performance Engineering
- Scalability Optimization
- Response Time Validation

Linux Infrastructure
- Server Consolidation
- Rollouts & Deployments
- Hosting
- Business Continuity and recovery

Linux Training
- Red Hat and SUSE (LPI)
- On-line, On-site, Class Room
- Unix to Linux Quick Starts
- Worldwide

Linux Security
- Ethical Hacking
- Tools Selection
- Assessment to Implementation

Linux Applications
- Custom Application Development
- Linux Package Applications
- Application Porting/Migration
- Application Hosting



Companies can exploit the benefits of zLinux by:

- Further Adoption: Enterprises expand Linux usage from the “edge” of the network to the core, and move existing applications (and Middleware) to Linux
- New Workloads: Companies develop new Enterprise applications or lines of business applications on open platforms
- Hardware Shift: Cost reduction initiatives can force customers to look at a change of platforms (e.g., Server consolidation, adoption of “green” technologies)
- Business Need / Cost: Customers turn to zLinux for new technology available at a lower total cost than on other platforms (e.g., real time, virtualization, portability)

Strategic Alliance Partners: Red Hat and Novell

Provide the Linux OS platform support for an estimated $6B in IBM HW, SW & Services revenues.

Novell

- IBM Global Strategic Alliance Partner & PartnerWorld Premier Partner
- Novell closely aligned with IBM's Strategic Linux Growth Strategies. CEO, CMO, CTO and EVP Sales all former IBM executives.
- Novell SUSE Enterprise Linux supports all major IBM HW and SW platforms
- Novell SUSE Linux was first to support IBM System z platform. Currently most prevalent Linux OS on IBM mainframes Worldwide.
- Novell SUSE Linux is only Global Strategic Linux Provider to include WAS Community Edition.

Red Hat

- RedHat is the worldwide Linux market share leader
- Red Hat is a Strategic Alliance Partner for IBM
- Red Hat has sales resources dedicated to IBM in all geographies and they welcome the opportunity to partner with IBM
- IBM was a Platinum Sponsor at Red Hat Summit in June where Jim Stallings will be a keynote speaker
- IBM supports Red Hat Enterprise Linux on all major IBM hardware and software platforms

IBM Linux support covers Linux on all platforms, regardless of ISV

Additional Linux-related Links

- IBM Linux on System z
  ibm.com/eserver/zseries/linux
- IBM z/VM resources for Linux on IBM System z
  ibm.com/vm/linux
- IBM z/VM
  vm.ibm.com
- IBM developerWorks
  ibm.com/developerworks/linux/linux390/index.html
  ibm.com/developerworks/linux/linux390/documentation_dev.html
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Summary

- By enabling organizations to consolidate, centralize and expand their Business Critical Workload infrastructure, the IBM System z delivers unsurpassed quality of service, enhanced manageability and low cost of ownership.
- Some considerations are:
  - Flexibility and Choice
  - Total cost of Ownership
  - Platform features
  - Platform support
  - etc …
- With System z scalability, customers can efficiently support Business Critical Workloads on fewer hardware servers and benefit from less complexity and lower cost of administration and management.

QUESTIONS AND ANSWERS