

Linux on IBM System z

A Simple Idea that Changed the World



2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 ...



Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

IBM*	HiperSockets	System z10 Business Class
IBM Logo*	HyperSwap	Tivoli*
IBM eServer	Maximo*	z9*
Cognos*	S/390*	z10
DB2*	System/390*	z/OS*
DB2 Universal Database	System z*	z/VM*
Domino*	System z10	

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

INFINIBAND, InfiniBand Trade Association and the INFINIBAND design marks are trademarks and/or service marks of the INFINIBAND Trade Association.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

10 YEARS of Enterprise Linux® on System z®

A Simple Idea That Changed the World



Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

IBM

The Values of Linux



1999

Enabling Business Innovation

based on open standards it is base for innovative uses of technology

Application mobility

Linux[®] makes it a reality. Increased solution availability via Linux application portfolio

Industry Wide Initiative

first operating system that the entire industry has rallied around. Not just select vendors

Large Skill Pool

preferred by university students

Multi-platform

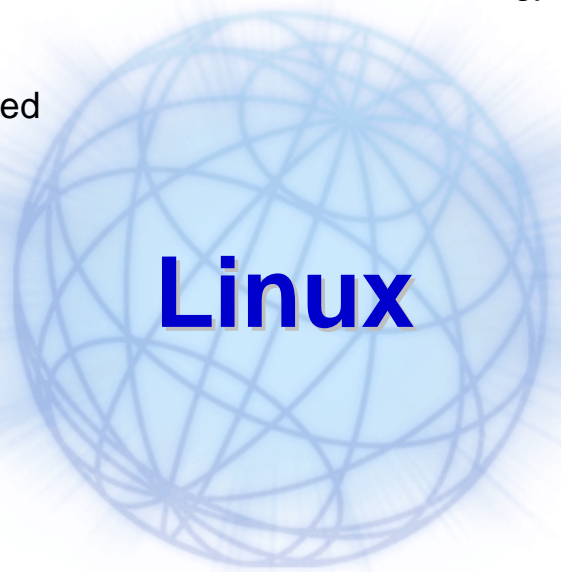
runs on every platform. There is no other OS with this characteristic

Community Developed & Owned

collaboration for Linux among the best programmers. It is freely available

Growing Marketplace Acceptance

continual compound growth of deployments



"It's out there... LINUX is already inside most companies in some form or another and will continue to spread - with or without the CIO's support"

- CIO Magazine, 12/15/2000



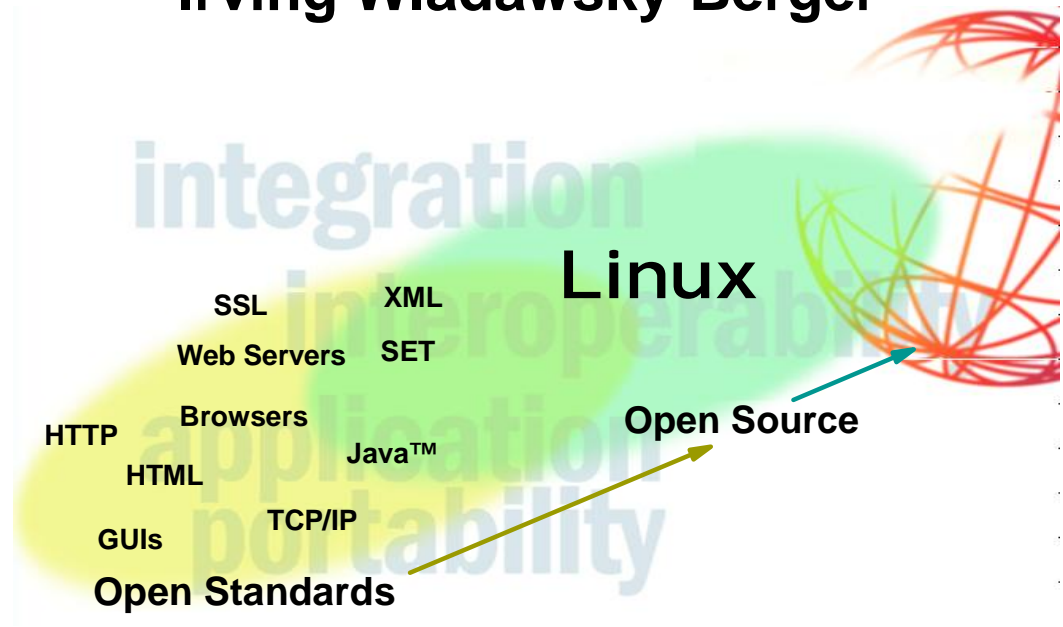
Linux on IBM System z

A Simple Idea that Changed the World

Innovation, Vision and Strategic Direction

***“Linux will do for applications,
what the Internet did for networks”***

Irving Wladawsky-Berger



In the beginning ... Bigfoot

- § The original i370 project was started in August 1998 by Linas Vepstas, at the instigation of Daniel Lepore
- § Later, Neale Ferguson, Peter Schulte-Stracke, and Rob van der Heij joined in to provide code and shoot bugs
- § Rick Troth helped with boot-loader issues
- § The result of this effort was a compiler, an assembler, a port of glibc, and a kernel that would usually boot but was missing important features, such as disk drivers and network drivers, never mind a variety of infrastructure



Timeline – 1999

§ January

- A splinter group begins work on a Linux on S/390 project in Böblingen, Germany, just for the “coolness factor.” Their work is neither sanctioned nor budgeted and most likely cannot be found on any official charts.

§ October

- Embracing Linux at IBM became Sam Palmisano’s bet while he was a senior vice president. “*The Internet has taught us all the importance of moving early, the advantage of being a first-mover,*” Palmisano said in an interview. “*We want to be riding that Linux momentum at the front, not trailing it.*”
- First public discussion of IBM’s Linux for S/390 port at WAVV by Dr. Strassemeyer in his keynote address with a “secret” preview running on an IBM MP3000

§ December

- IBM publishes a collection of patches and additions to the Linux 2.2.13 kernel for System/390 to start a market evaluation, and creates excitement in the developer community.

The IBM project team

§ The sponsors

- Karl-Heinz Strassemeyer
- Boas Betzler



§ The early development team

- Ingo Adlung*
- Eberhard Pasch*
- Hartmut Penner*
- Martin Schwidefsky*
- Holger Smolinski
- Ulrich Weigand*

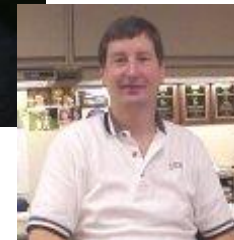


* IBM Corporate Award for Linux on S/390

The IBM project team

§ Some of the “sales team”

- Jim Elliott
- Erich Amrehn
- Jim Savoie
- Bill Reeder
- Len Diegel
- Tom Murphy



Timeline – 2000



§ January

- Linux for S/390 becomes available for technology demonstration from the Marist College Server, which allows clients to test it. Clients respond with over 4,000 downloads.

§ February 2000

- Mentioned at LinuxWorld Expo in NYC in keynote address by Linus Torvalds
- Public showing at the Expo on an IBM MP3000 by Boas Betzler and Ed Gauthier
- “*S/390: The Linux Dream Machine*” article by Scott Courtney
<http://www.linuxplanet.com/linuxplanet/reports/1532/1/>

§ March 2000

- Romney White presents Linux on S/390 at SHARE 94 in Anaheim (Session 9309) to a standing room only crowd

Linux on z 2000 Big Application Focus



SAMBBA

Linux Under VM One Perspective



**VM - continually nourished by
new technology**

S/390

© Copyright
IBM 1999

Timeline – 2000

§ May 17, 2000

- Formal announcement of Linux for S/390 by IBM at Vista (IBM's mainframe customer executive event) by Bill Zeitler (GM S/390) with a demo by Jim Elliott
- IBM takes out a full page advertisement for Linux for S/390 in the Wall Street Journal



§ May 2000

- David Boyes described “Test Plan Charlie” where it was demonstrated that >41,400 separate instances of Linux could run simultaneously on one LPAR of a single S/390 server under VM. The S/390 was pushed until it had no more resources to allocate, but the system never crashed.

§ August 2000

- At the Atlanta Linux Fest, Linux for S/390 won “Best of Show” award

Timeline – 2001



§ February 2001

- IBM announces plans to spend \$1B on Linux development at LinuxWorld Expo in NYC
- IBM wins “Best Hardware” at the Expo with an eServer zSeries 900 running Linux
- Linux Community Development System launched

§ August 2001

- My 1st SHARE presentation on Linux on zSeries (9200)



§ 2001

- HiperSockets becomes available.
- SUSE Enterprise Linux Server 7 becomes available.

Timeline – 2002 and 2003

§ 2002

- Major ISV announcements include: mySAP.com, Oracle9i Database Server, System Management Solutions from BMC, CA and Tivoli.
- Open FCP (Fibre Channel Protocol) support and Storage Area Network (SAN) enablement are developed.
- SUSE Linux Enterprise Server 8 becomes available.

§ 2003

- Over 250 apps are now available, including Lotus Notes and Tivoli System Automation for Linux.
- Virtualization improvements such as the Discontiguous Saved Segments (DCSS) technology and Parallel Access Volume (PAV) support for improved I/O performance are developed.
- Red Hat Enterprise Linux 3 becomes available.

Timeline – 2004 and 2005

§ 2004

- Increasing numbers of businesses think that Linux on zSeries delivers true business value – great security and resiliency, simple infrastructure, great utilization of resources, and application flexibility to respond to changing market demand.
- SUSE Linux Enterprise Server 9 becomes available.

§ 2005

- The biggest Linux on zSeries client now runs more than 290 IFLs.
- New reliability and virtualization enhancements through developed HyperSwap and N-Port-ID Virtualization (NPIV) support are unveiled, allowing for continuous operations and high utilization.
- Red Hat Enterprise Linux 4 becomes available.

Timeline – 2006 and 2007

§ 2006

- The number of available applications approaches 1,000, with over 300 ISVs developing.
- SUSE Linux Enterprise Server 10 becomes available.

§ 2007

- IBM announces project “Big Green,” which shrinks 3,900 servers to about 30 System z servers running Linux, in order to reduce power consumption by 80% in five years. Project Big Green spurs a global shift to Linux on System z.
- z/VM 5.3 supercharges System z virtualization – over 1,000 virtual images can run on a single copy of z/VM, which helps reduce energy consumption and data-center costs.
- Red Hat Enterprise Linux 5 becomes available.

Timeline – 2008, 2009 and 2010

§ 2008

- IFLs include authorization to run OpenSolaris Operating System.

§ 2009

- IBM introduces Enterprise Linux Server and Solution Edition for Enterprise Linux for large-scale consolidation and savings; both are quickly embraced by clients worldwide.
- z/VM V6.1 – A foundation for future virtualization growth becomes available
- SUSE Linux Enterprise Server 11 becomes available.

§ 2010

- Now over 3,150 Linux applications are available.
- Cloud Computing, Business Intelligence and Collaboration are only a few workloads that are best fit to Enterprise Linux on System z.
- Large-scale server consolidations on System z starting at \$2,000 per virtual server instance.



Innovation and Risk



1999

Will Linux be accepted by clients on the world's most secure server platform?

- Free Software Foundation UNIX[®]-like operating system
 - GNU - GNU is Not UNIX
 - GPL - GNU General Public License
- ➡ December 1999: IBM published a collection of patches/additions to the Linux 2.2.13 kernel for System/390[®] to start a market evaluation



We are not alone!!!



- § **Turbolinux Releases z/Linux 6.5 for IBM zSeries and S/390 Mainframe Computers**
- § **August 2001 TurboLinux owns the trademark “zLinux”**
- § **Turbolinux, Big Blue Partnership Going Strong** IBM and Turbolinux weigh in at LinuxWorld, continue to embark on a torrid pace of co-licensing deals

- § **Debian: June 2003** Linux 2.4.21 kernel
- § Packages as Tape, CD or Download



- § **07/06/2004** Slackware
- § **Welcome to the Slack/390 Project**
- § **Slack/390 is the official port of Slackware® Linux to the IBM mainframe platform.**
- § **10/18/2009 64-bit Slack/390x Available for Testing!**



- § **OpenSolaris for System z**
- § **Build 100 - Updated 30 Mar 2009**



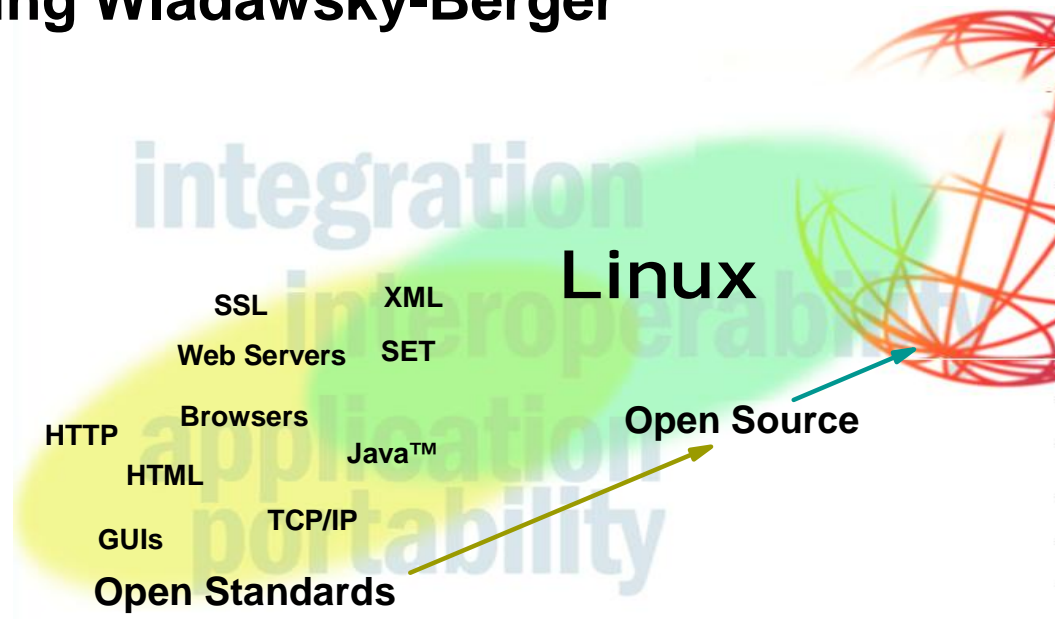
Innovation, Vision and Strategic Direction



2000

***“Linux will do for applications,
what the Internet did for networks”***

source: Irving Wladawsky-Berger



A Simple Idea

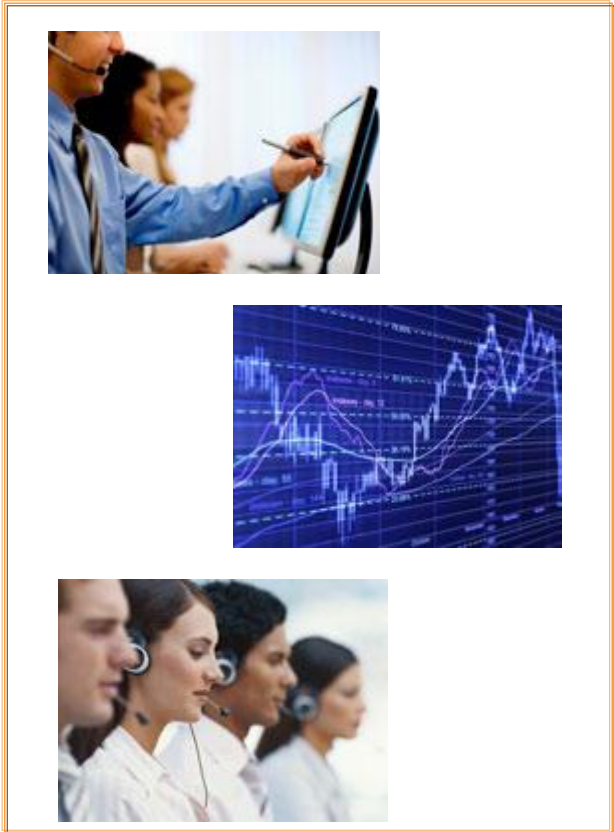
10 years ago



- § **Increased solutions** through Linux application portfolio
- § Large number of **highly skilled programmers** familiar with Linux
- § **Integrated business solutions**
 - Data richness from IBM eServer™ zSeries®
 - Web capability of Linux applications
- § **Industrial strength environment**
 - Flexibility and openness of Linux
 - Qualities of service of zSeries and S/390®
- § **Unique ability to easily consolidate large number of servers**



Today, Businesses and IT Face More Challenges and Uncertainty Than Ever Before



- § An unprecedented global economic downturn
- § Increasing customer expectations and competitive pressures
- § An explosion in the volume of data
- § Exponential growth in communication subscribers and devices

The result: systems and infrastructure that are reaching a breaking point



A Simple Idea that Changed the World



Linux on IBM System z[®] is providing a scalable and flexible virtual infrastructure inside a single IBM System z server.

It is customized for **server virtualization and consolidation, business relevant workloads** such as business intelligence and collaboration, and **new business models** such as cloud computing.

The Linux on System z infrastructure provides significant IT cost savings opportunities:

- **People Cost** – increase the productivity of the IT staff
- **Software Costs** – reduce software license fees by consolidating a large number of virtual machines per System z core
- **Energy Costs** – dramatic reduction in power usage
- **Facilities Costs** – reduce floor space with dense server consolidation on System z
- **Networking Costs** – consolidate networks inside the box too



Client Adoption Continues to Drive Linux Success

*Installed Linux MIPS at 43% CAGR**

§ The momentum continues:

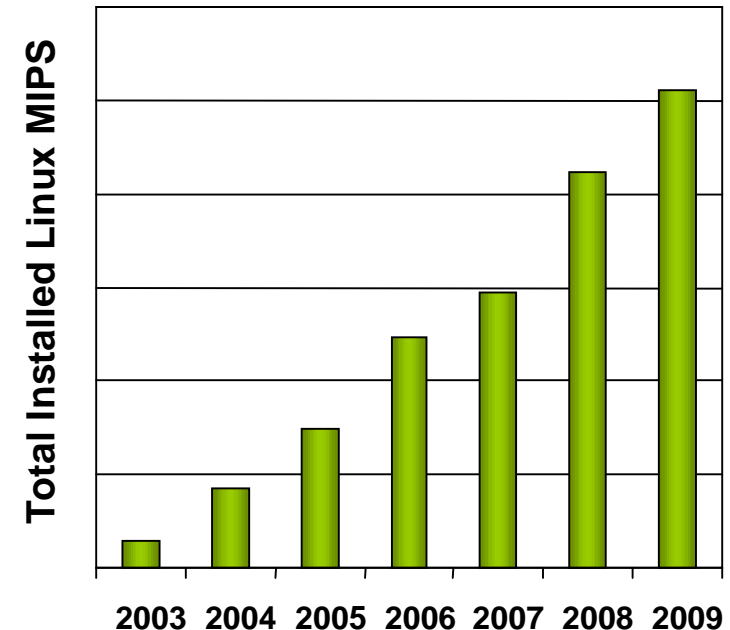
- Shipped IFL engine volumes increased 35% from YE07 to YE09
- Shipped IFL MIPS increased 65% from YE07 to YE09

§ **Linux is 16% of the System z customer install base (MIPS)**

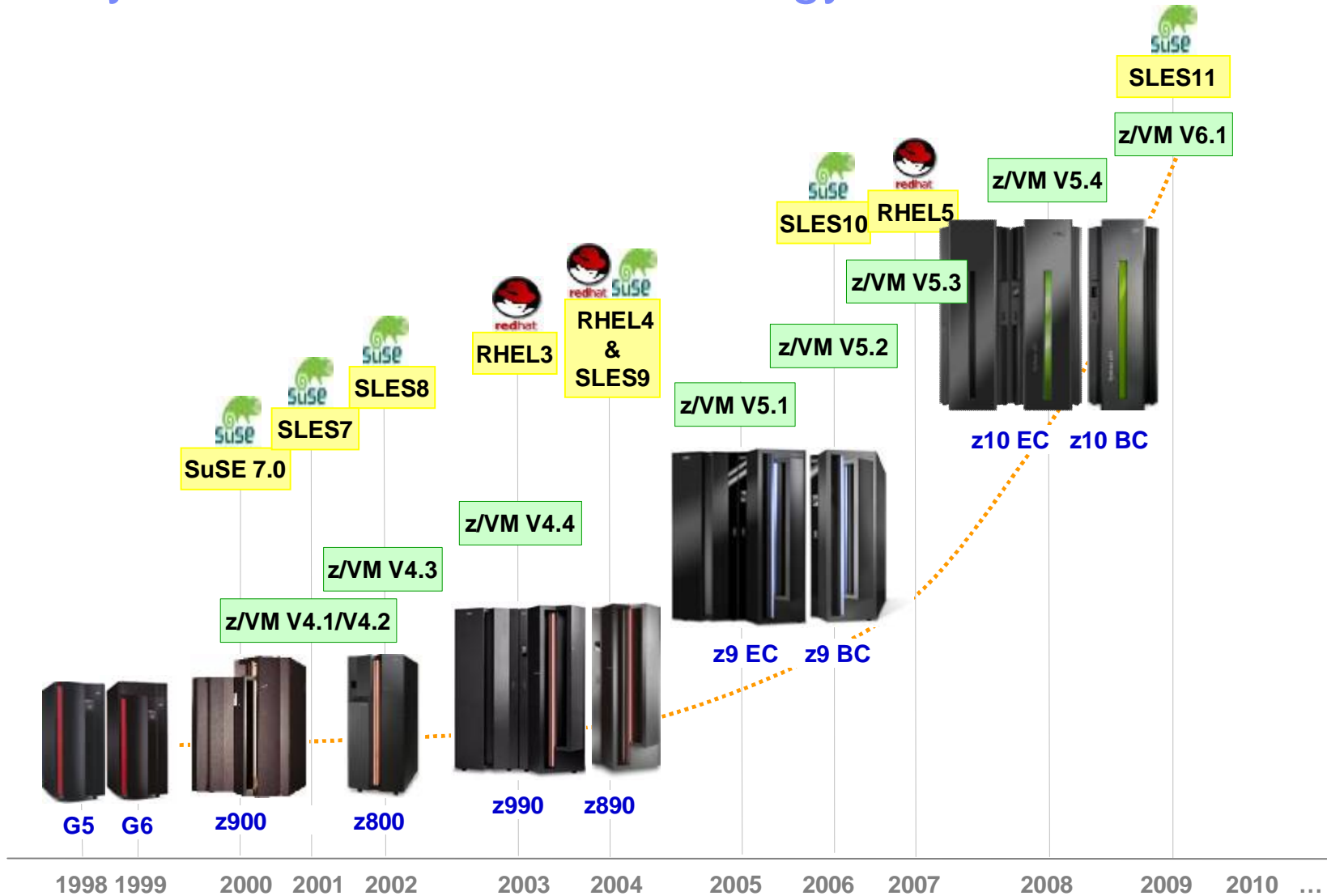
§ **70% of the top 100 System z clients are running Linux on the mainframe**

§ **More than 3,100 applications are available for Linux on System z**

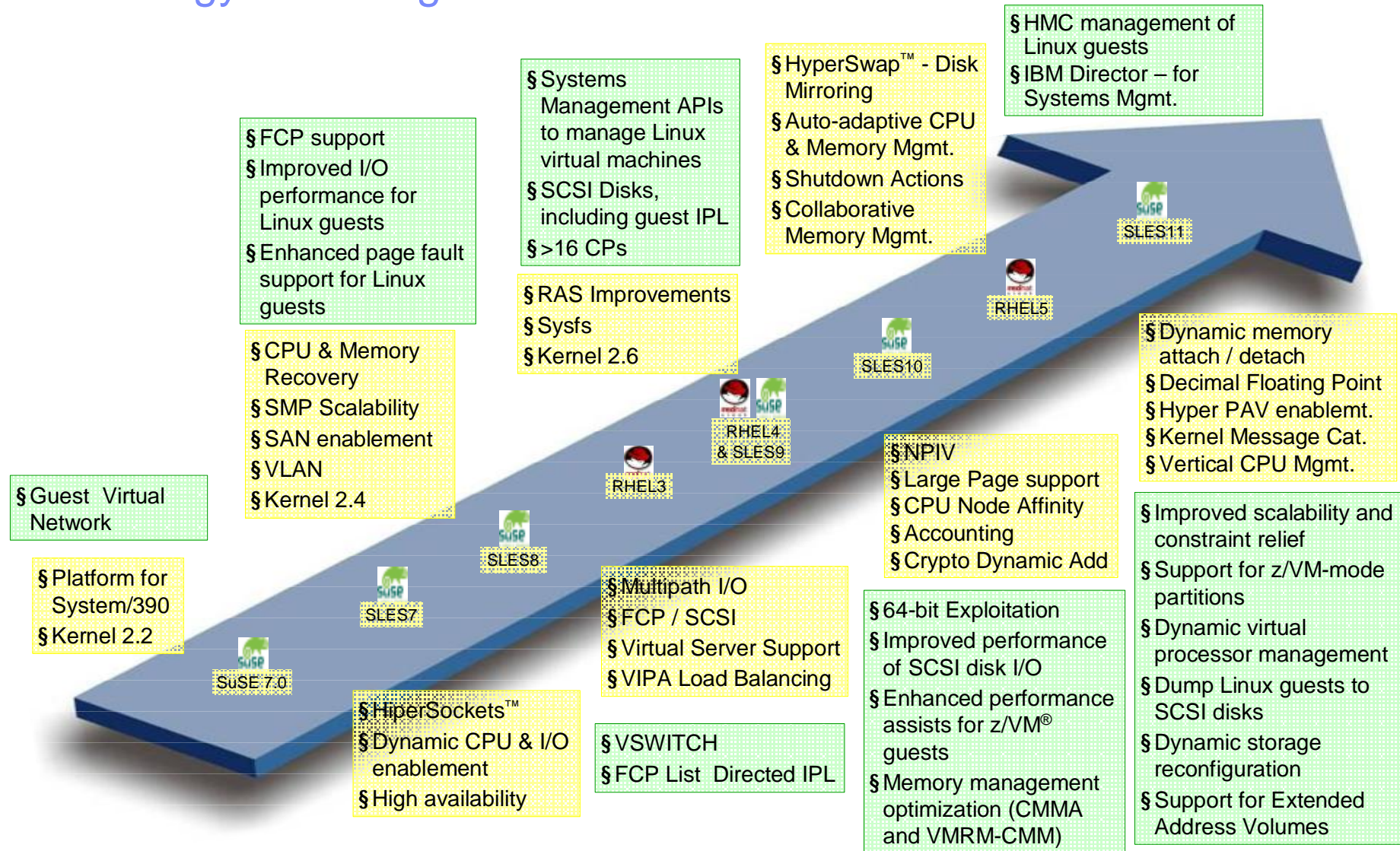
Installed Linux MIPS



Linux on System z – Unique Advantages based on IBM System z and z/VM Technology Innovation



Unique Linux Extensions to Leverage Powerful System z Technology Advantages



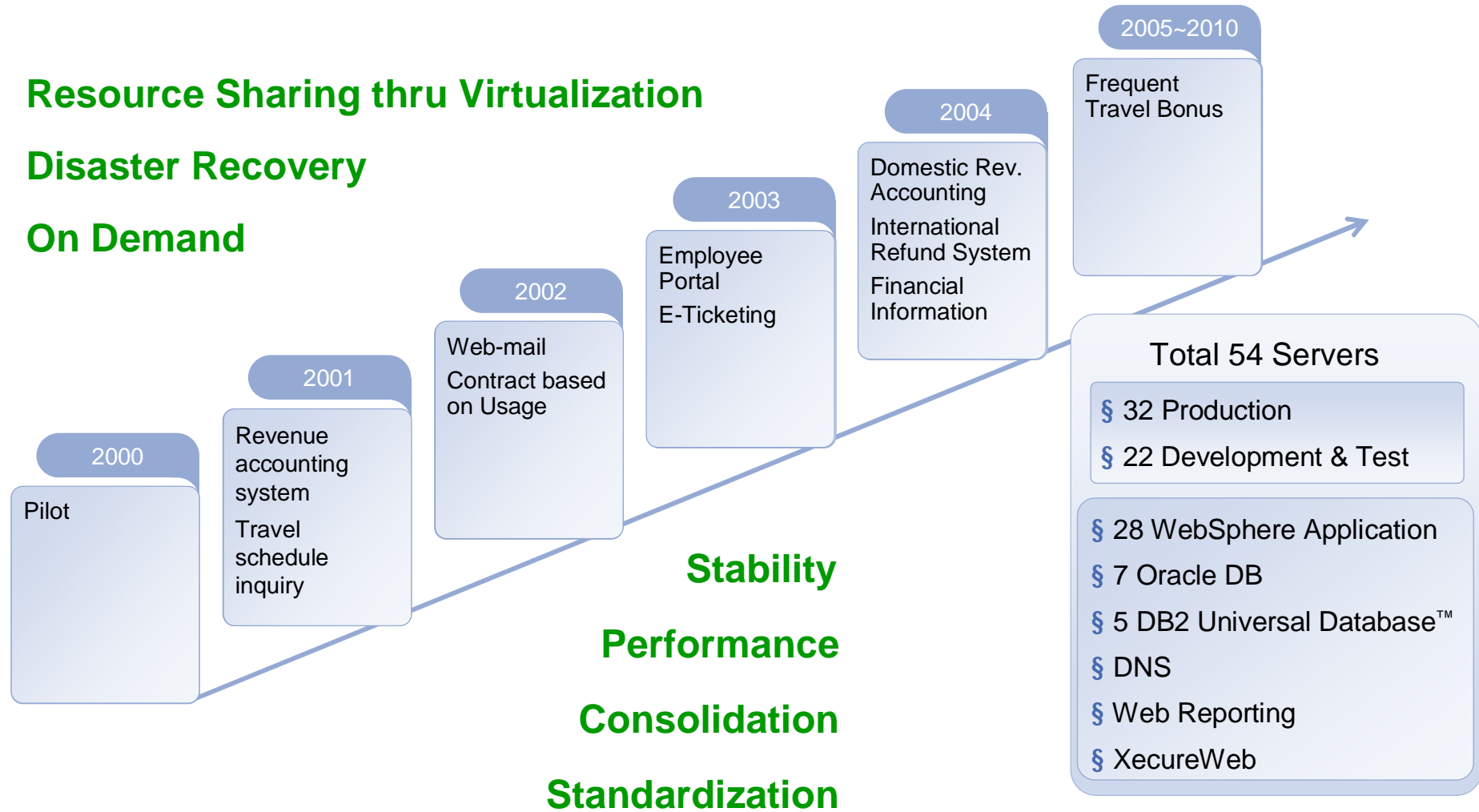


Continuous Improvements *and Deployments* From the Beginning till Today – Real client case

Resource Sharing thru Virtualization

Disaster Recovery

On Demand



Blue Cross and Blue Shield of Minnesota (BCBSM)

Reducing TCO with virtualized Linux on System z

Business Challenge:

The Microsoft® Windows® and Intel® processor-based server landscape was inflexible and costly to operate and maintain.

Five-year TCO Study:

“Even without factoring in the maintenance and support costs—which would be considerable for a large estate of physical servers—we found that running a virtualized Linux environment on System z would be somewhere between 30 and 50 percent less expensive than a distributed architecture,” says Ted Mansk.

“Suddenly, the choice of infrastructure had become an easy decision.”

Solution:

IBM helped BCBSM consolidate 140 servers to a single IBM System z with six Integrated Facility for Linux (IFL) engines. Key applications now run in Linux virtual servers, while IBM DB2® databases run on z/OS® on the same physical machine.

Benefits:

- § Significant TCO reduction over five years
- § Virtualization cuts server provisioning times by 99 percent
- § Disaster recovery can be achieved 97 percent faster than before

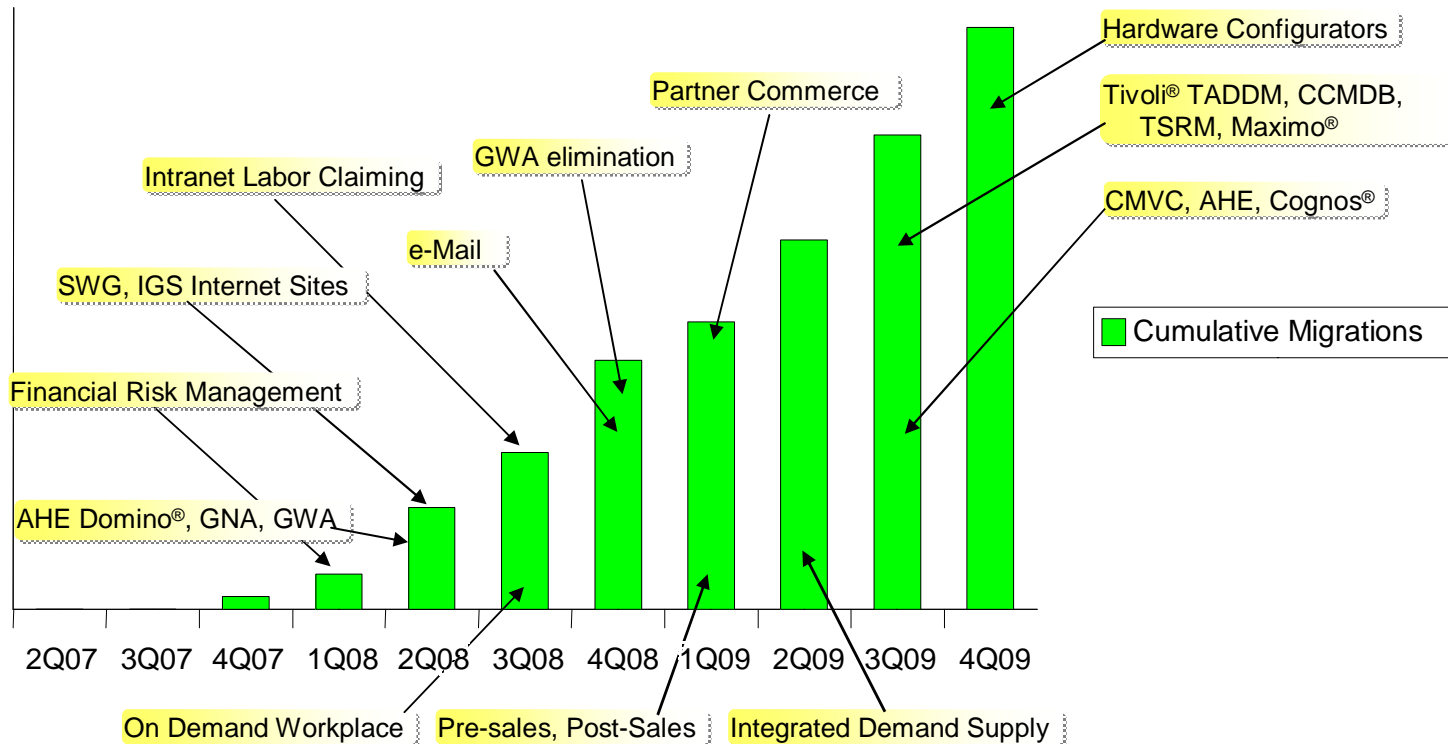
“From every perspective, running applications under Linux on System z makes sense for our organization.

Performance, reliability, disaster recovery, server provisioning and cost efficiency have all seen dramatic improvements—helping BCBSM deliver better service and better value to its members across the state.”

— Ted Mansk, Director of Infrastructure Engineering and Databases at BCBSM

IBM's Own Smart Transformation Has Delivered Results

Realizing the Value of Virtualization



**80% less energy and 85% less floor space.
2x existing capacity, no increase in consumption or impact by 2010**



Core Values will Further Drive Leadership Capabilities *Linux for System z, z/VM virtualization software and System z server technology*

§ Linux on System z will further strengthen unrivalled virtualization, integration, optimization and leadership capabilities across the stack

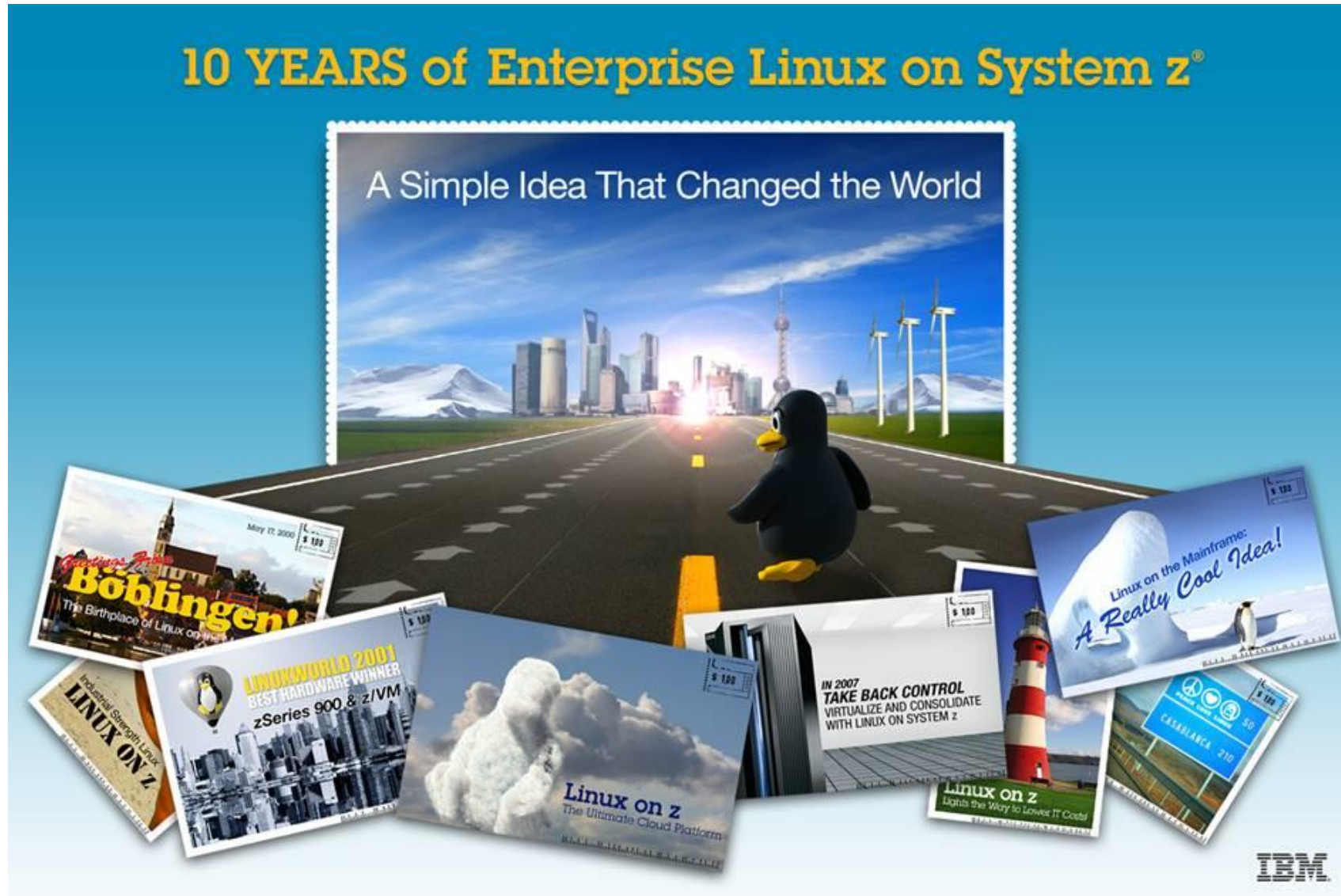
- *Higher core-to-core consolidation ratios*
- *Higher levels of resource sharing and utilization*
- *Higher levels of staff efficiency*

§ Linux on System z will exploit the core values of z/VM virtualization software and System z server technology for leadership capabilities:

- *Fully virtualized infrastructure with virtually unlimited scale*
- *Highest levels of quality of service (QoS)*
- *Excellent financial, environmental and labor stewardship*
- *Centralize management integration and control of business services*
- *Excelling in developing and deploying of data serving and enterprise applications*

Linux on System z will progress to set the gold standard for enterprise Linux computing that delivers unrivalled virtualization and consolidation, performance, service qualities, and cost leadership

Backup



10 YEARS of Enterprise Linux on System z[®]

A Simple Idea That Changed the World

Böblingen!
The Birthplace of Linux on the Mainframe
May 12, 2000 \$ 1.00

LINUXWORLD 2001
BEST HARDWARE WINNER
zSeries 900 & z/VM
\$ 1.00

Linux on z
The Ultimate Cloud Platform
\$ 1.00

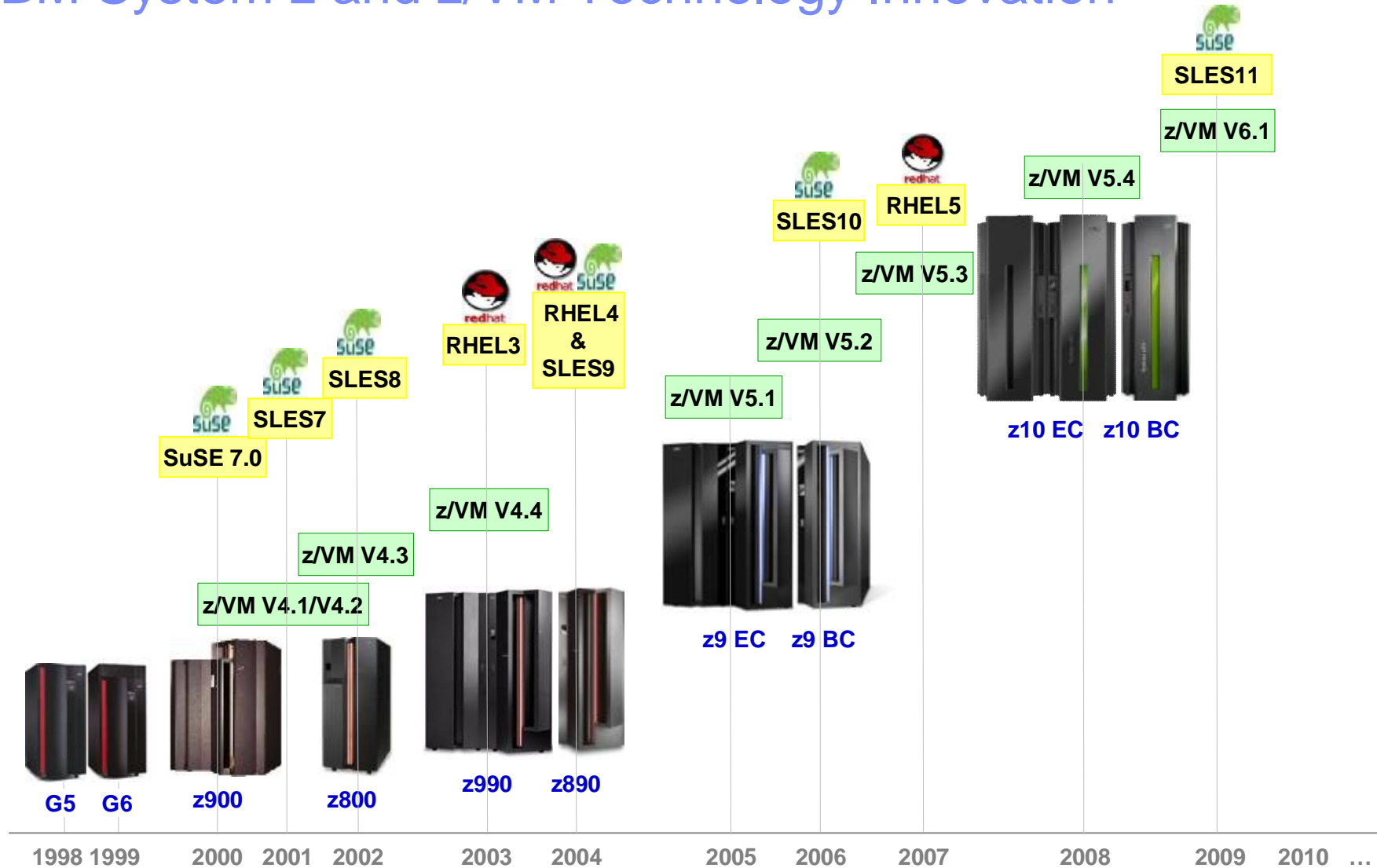
IN 2007
TAKE BACK CONTROL
VIRTUALIZE AND CONSOLIDATE
WITH LINUX ON SYSTEM z
\$ 1.00

Linux on the Mainframe:
A Really Cool Idea!
\$ 1.00

Linux on z
Lights the Way to Lower IT Costs
\$ 1.00

IBM

Linux on System z – Unique Advantages based on IBM System z and z/VM Technology Innovation



Why are Data Centers Consolidating to System z?

- § Virtualization on IBM System z offers unique value compared to competitive scale-out solutions from Sun, HP, and others
- § Superior availability and security reduces risks and improves service levels
- § Extremely efficient virtualization technology lowers costs – System z achieves very high core-to-core consolidation ratios
- § **Real customers, real workloads**

Customer	Distributed Cores	Ratio of Distributed to System z Cores*	Ratio of Distributed to System z cores*
Allianz	60	30 to 1	48 hour migration
Government Agency	292	58 to 1	70% cost savings
Bank of Russia	292	50 to 1	Reduces payment processing costs by 95%

* Client results will vary based on each specific customer environment including types of workloads, utilization levels, target consolidation hardware, and other implementation requirements.

Smarter Virtualization with the IBM System z and z/VM Virtualization Software

§ Do more with less

- Consolidate more servers, more networks, more applications, and more data with Linux running on z/VM virtualization software
- Achieve nearly 100% utilization of system resources nearly 100% of the time
- Enjoy the highest levels of resource sharing, I/O bandwidth, and system availability

§ Reduce costs on a bigger scale

- Consume less power and floor space
- Save on software license fees
- Minimize hardware needed for business continuance and disaster recovery

§ Manage growth and complexity

- Exploit extensive z/VM facilities for life cycle management: *provisioning, monitoring, workload management, capacity planning, security, charge back, patching, backup, recovery, more...*
- Add hardware resources to an already-running system without disruption – the epitome of Dynamic Infrastructure
- Consolidation on a “scale up” machine like IBM System z means fewer cables, fewer components to impede growth

Smarter Virtualization with Linux on IBM System z

§ x86 virtualization solutions have some hidden and some not-so-hidden issues

- Physical server sprawl is needed to scale a virtualized x86 environment – typically with linear, per-machine pricing
- x86 virtual machine sprawl can be difficult to manage, causing operational complexity
- Ineffective capacity planning can result in failure to meet service level agreements
- Limited core-to-core consolidation ratios and virtual machine mobility requirements can lead to costly software fees
- x86 systems do not have a heritage of robust security support
- Duplication of hardware and is needed for disaster recovery

§ Enterprise Linux on System z provides a superior scale-up system architecture for scale-out x86 applications

- Dynamically expand your system “on demand” – add capacity when you need it, not any sooner, not any later
- Enjoy superior operational capabilities for greater levels of command and control
- Total Cost of Ownership economics favor server virtualization on an Enterprise Linux System z Server, especially when factoring in disaster recovery and server technology refreshes



Innovation and Evolution of IBM System z Technology

System z Server Technology

- § **IBM System z10 Business Class™** - The smart choice for your business. System z can do IT better
- § **IBM System z10™ Enterprise Class** - The forward-thinking mainframe for the 21 century
- § **IBM System z9® Business Class** - z9® technology innovation for small and medium enterprises
- § **IBM System z9 Enterprise Class**: A security-rich, resilient and scalable mainframe for managing on demand enterprises
- § **IBM eServer zSeries 890** - A multipurpose server for an on demand world
- § IBM Introduces the **IBM eServer zSeries 990** Family of Servers
- § **New IBM eServer zSeries z800 Model** Accommodates New Linux Workloads and Small Traditional Workloads at an Attractive Price
- § **IBM eServer zSeries 900**: A Multipurpose Server for Enterprise-Class e-business
- § New Upgrades to **9672 G5 Servers**, with High-Bandwidth Capability for Linux Solutions

z/VM Virtualization Technology

- § **IBM z/VM V6.1** - Foundation for future virtualization growth
- § **IBM z/VM V5.4** - Extending virtualization technology for System z
- § **IBM z/VM V5.3** - Improving scalability, security, and virtualization technology
- § **IBM z/VM V5.2** enhances scalability for virtualization on System z9 and zSeries, including Linux guests
- § **IBM z/VM V5.1** extends zSeries on demand capabilities with Linux-related enhancements and introduces a new pricing model
- § **IBM z/VM V4.4** Improves Virtualization Capabilities for Linux on zSeries
- § **IBM z/VM V4.3** Expands Industry-Leading Virtualization Technology
- § **IBM z/VM V4R2** Extends Core Technology Support for the IBM eServer zServer
- § **IBM z/VM V4** Introduces Engine-Based Pricing - Reducing Your Computing Costs

Linux on System z for IT Optimization and Consolidation

Saving Money and Reducing Complexity

- § Consolidate more servers per core and spend less on software, more than 70% less in some cases
- § Manage more server images with fewer people, up to 50% improvement in staff productivity
- § Save up to 80% on energy and floor space
- § Deploy new servers and applications faster
- § Absorb workload spikes and maintain service level agreements with less complexity
- § Spend less on disaster recovery



**“Do More
with Less”**



**A refrigerator size box versus vs.
a full room of servers.**




The differences are quantum.

Summary

Why Choose Linux on System z for IT Optimization and Consolidation

<p>Reduce Cost</p>	<ul style="list-style-type: none"> ü “Do more with less” – consolidate more servers, more data, and save on software fees, energy, floor space, and operating costs ü Spend less on disaster recovery and business continuance ü Technology refreshes for System z are very cost attractive ü The <i>Enterprise Linux Server</i> and <i>Solution Edition for Enterprise Linux</i> greatly enhance the economics of server consolidation with Linux on System z – lowest overall TCO, competitive TCA, superior QoS
<p>Improve Service</p>	<ul style="list-style-type: none"> ü Deploy new workloads faster, with the highest levels of resource sharing and efficiency ü Dynamically add system resources to an already-running system to meet business demands now, not days or weeks later ü Enjoy unmatched levels of workload management to ensure high priority workloads get what they need and overall service level agreements are managed with the highest degree of certainty ü System z command and control enables superior levels of business agility and staff productivity
<p>Manage Risk</p>	<ul style="list-style-type: none"> ü System z offers unrivaled system availability and flexible business continuance and disaster recovery options to help clients protect their business ü CBU processors offer a cost-attractive and resource-efficient way to test your System z DR environment ü Performance monitoring facilities for capacity planning and overall system health checking ü The IBM Migration Factory simplifies the effort to migrate workloads to Linux on System z

IBM's Own Smart Transformation Has Delivered Results

<p>IBM IT Transformation</p>	<p>Cumulative benefit of approximately \$4 billion. For every dollar invested: a \$4 cumulative benefit.</p>	<table border="1"> <thead> <tr> <th></th> <th>1997</th> <th>Today</th> </tr> </thead> <tbody> <tr> <td>CIOs</td> <td>128</td> <td>1</td> </tr> <tr> <td>Host data centers</td> <td>155</td> <td>7</td> </tr> <tr> <td>Web hosting centers</td> <td>80</td> <td>5</td> </tr> <tr> <td>Network</td> <td>31</td> <td>1</td> </tr> <tr> <td>Applications</td> <td>15,000</td> <td>4,700</td> </tr> </tbody> </table>		1997	Today	CIOs	128	1	Host data centers	155	7	Web hosting centers	80	5	Network	31	1	Applications	15,000	4,700
	1997	Today																		
CIOs	128	1																		
Host data centers	155	7																		
Web hosting centers	80	5																		
Network	31	1																		
Applications	15,000	4,700																		
<p>Data Center Efficiencies Achieved</p>	<p>Thousands of servers è approximately 30 IBM System z and large Power Servers</p>																			
<p>Project Big Green</p>	<p>80% less energy and 85% less floor space. 2X existing capacity, no increase in consumption or impact by 2010</p>																			
<p>“Blue Insight”: IBM’s BI Cloud</p>	<p>Business Intelligence Cloud services for 200,000 IBM employees</p>																			

Smart Analytics Cloud at IBM

In the spotlight



Our commitment to informed decision making led us to consider private cloud delivery of Cognos via Linux on System z, which is the enabling foundation that makes possible

- IBM CIO Office

The Smart Analytics Cloud enables IBM to deliver business intelligence (BI) with greater efficiency across the enterprise

- § Establishes a corporate strategy for service delivery of BI
- § Reduces the time and cost to deliver BI to new divisions and departments
- § Maintains current departmental business processes, corporate security and compliance
- § Maximizes departmental budgets by subscribing to standard services
- § Private cloud solution implementation offers economies of scale and flexibility

Results:

- § Consolidating +20 multi-product, departmental BI deployments to Cognos 8 BI on Linux on System z
- § Deploying a private cloud to support +200,000 named users across our global workforce
- § Realizing value from +60 data sources across IBM

Learn more: ibm.com/systems/z/solutions/cloud/smart.html

IBM GTS Server Consolidation and Migration Services

New approach based on IBM's own IT Transformation experience

Leverages product manufacturing concepts and automation techniques to achieve "Factory Like" production results

Two Engagement Phases

**Phase I:
Design & Approach Services**

Logical

Create:

- § "As is" client environment and "To be" target architecture
- § High Level Solution Description
- § Business Case and High Level Transition Plan

**Phase II:
Planning & Implementation Services**

Physical

Create:

- § Physical Design and Implementation Plan

Execute:

- § Consolidated Environment
- § Application Migration

New integrated methods, assets and technologies

Benefits

- § Migration cycle time can be reduced from months to days; potential ROI in 6 to 18 months
- § Economy of Scale - shared global resource pool shared across contracts
- § Increased efficiency - from standardized, automated execution
- § Faster time to value with reduced costs and improved quality

Available Linux for System z Distributions

Kernel 2.6 based



Novell SUSE Linux Enterprise Server (SLES)



SLES 9 - (GA 08/2004)

- Kernel 2.6.5, GCC 3.3.3
- Service Pack 4 - GA 12/2007



SLES 10 - GA 07/2006

- Kernel 2.6.16, GCC 4.1.2
- Service Pack 3 - GA 10/2009



SLES 11 - GA 03/2009

- Kernel 2.6.27, GCC 4.3.2 + z10 support

Red Hat Enterprise Linux (RHEL)



RHEL AS 4 - GA 02/2005

- Kernel 2.6.9, GCC 3.4.6
- Update 8 - GA 05/2009



RHEL 5 - GA 03/2007

- Kernel 2.6.18, GCC 4.1.2
- Update 4 - GA 09/2009