What's all the Hype on System z?

Linux – System z

Why linux experts are choosing the System z platform.

What makes System z an outstanding choice for linux workloads.

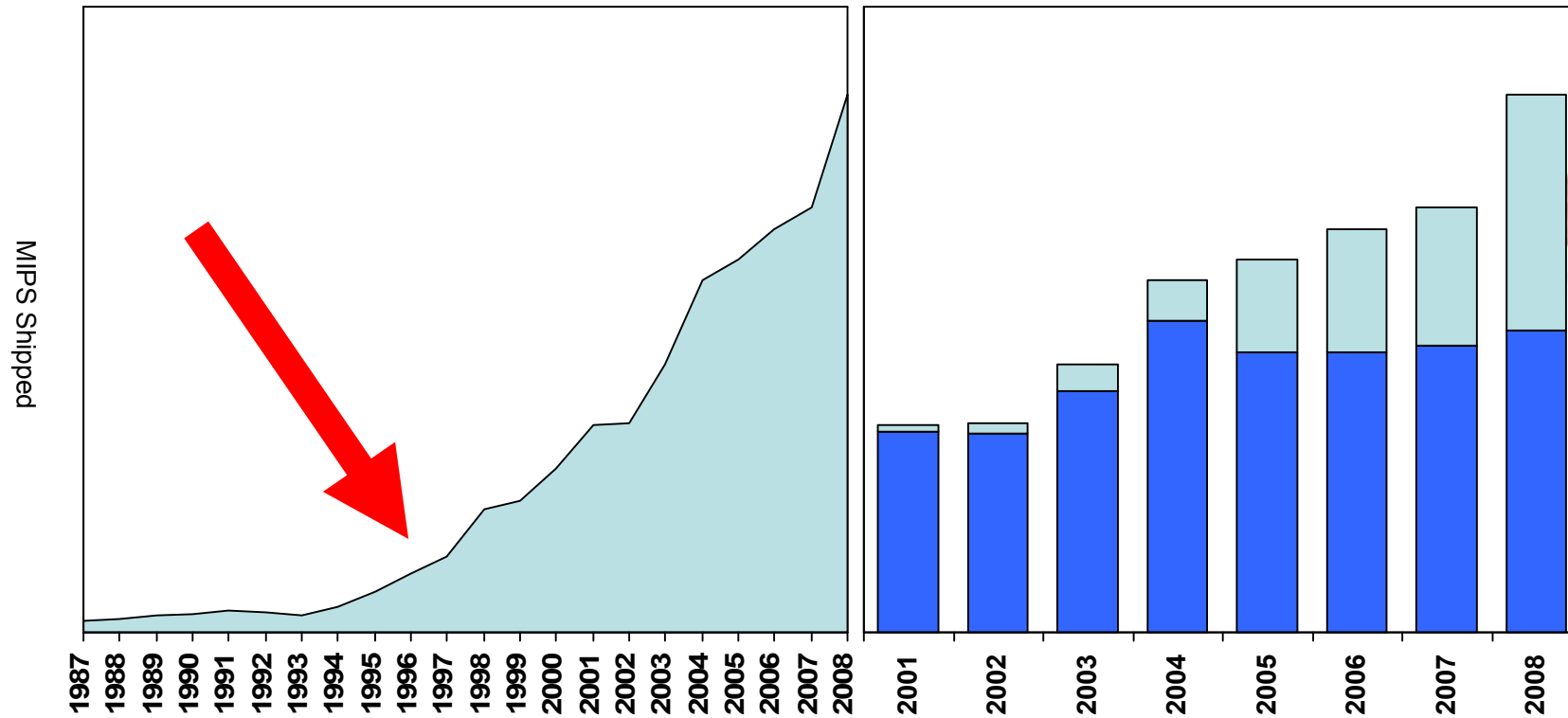Why IT organizations are turning to System z to solve common problems.

Bill Reeder
Linux for System z
Sales and Strategy
206-587-2152
breeder@us.ibm.com

IBM System z Workload Growth Worldwide

MIPS Shipped

1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

2001 2002 2003 2004 2005 2006 2007 2008

New Workload è

| IFLs | + | zIIPs | + | zAAPs | + | Core Business |

Source: IBM Market Research

What z10 brings to Linux Customers

Ø4.4 GHz… Quad Core Processor Up to 64 IFLs

ØUp to 1.5 TB memory

ØLarge Page Support

ØHardware Decimal Floating Point

ØJust in Time Deployment for capacity offerings – permanent and temporary
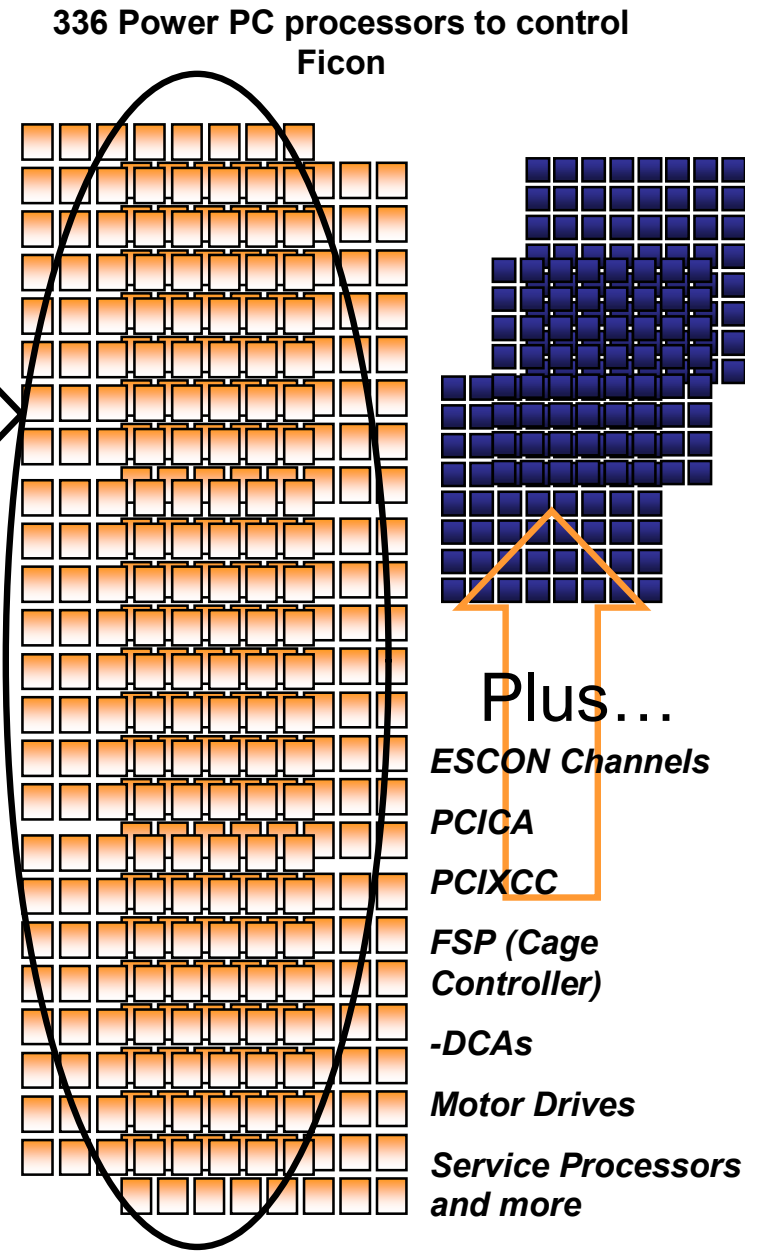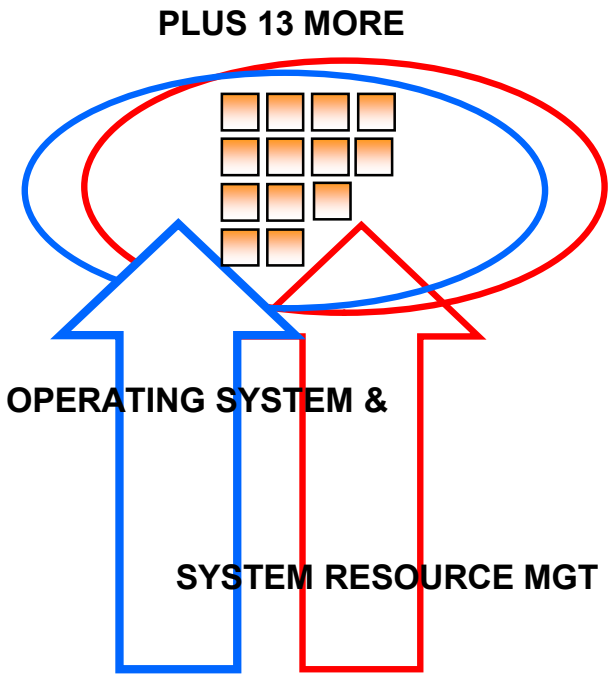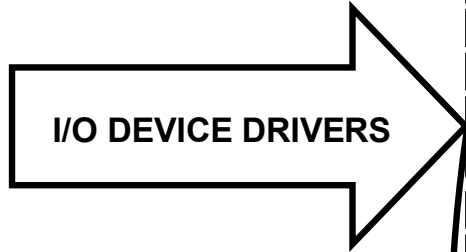
Ø6.0 GBps HiperSockets
ØSCSI IPL
ØOSA-Express3 10 Gbps
ØHiperSockets Layer 2 Support

Implementation
"How to build a 64-WAY Mainframe"

More than 400 Processors!

336 Power PC processors to control Ficon

64 way SMP

I/O DEVICE DRIVERS

PLUS 13 MORE

OPERATING SYSTEM &

APPLICATION CODE

& SOME OS and Crypto

SYSTEM RESOURCE MGT

Plus…

ESCON Channels

PCICA

PCIXCC

FSP (Cage Controller)

-DCAs

Motor Drives

Service Processors and more

4
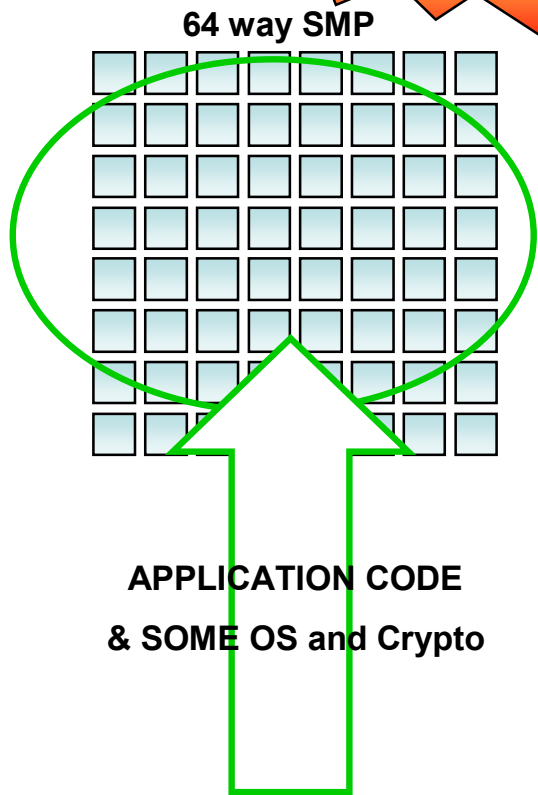
Unique Value of IFL, zAAP and zIIP
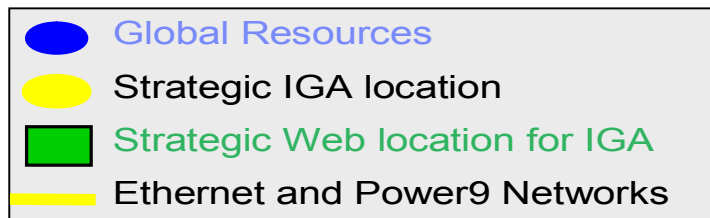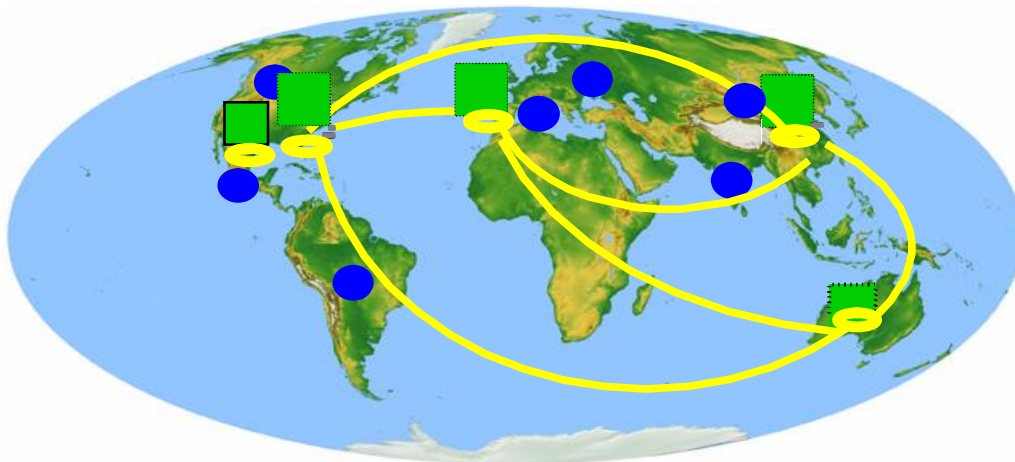
§ 55% more capacity from previous generation!!!

§ IFL, zAAP and zIIP Price has remained constant

§ Customer upgrading to new machine can migrate IFL, zAAP and zIIP to new machine

§ Specialty Engines run at FULL speed even on sub-capacity machines

IFL Value Increase

1100% over G5
55% over z9BC

IFL Capacity
%IFL Increase

G6 z800 z900 z890 z990 z9 z10

Machine Type
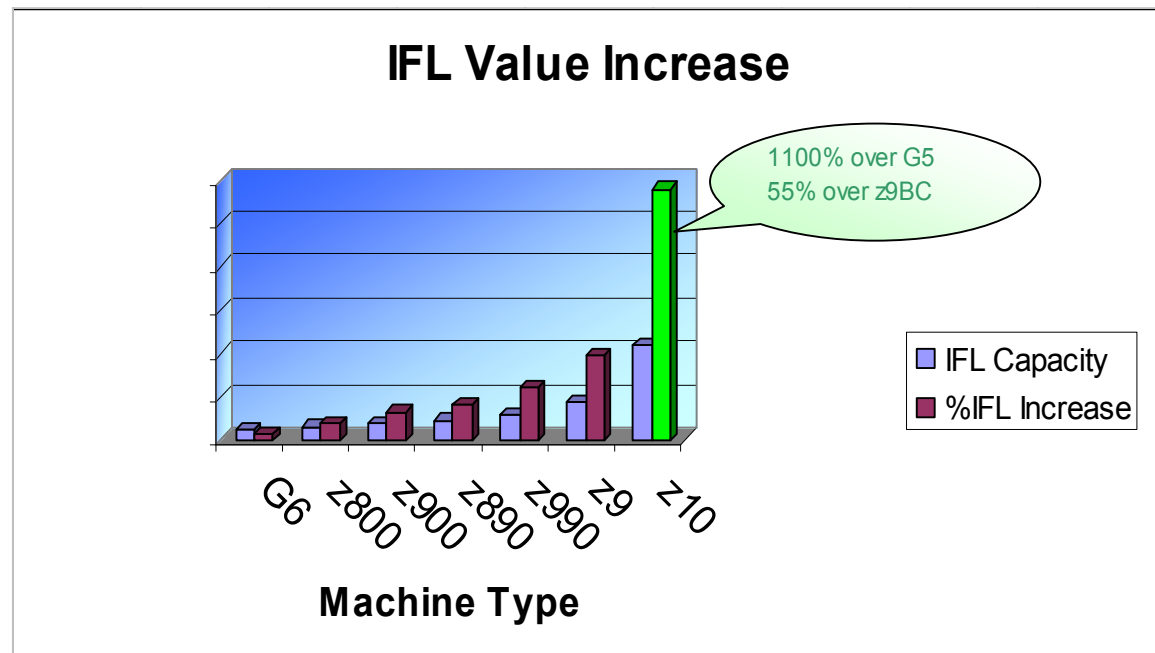
IBM's Transformation: An Ongoing Journey

IBM Strategic Delivery Model

TECHNOLOGY	IBM Metrics	1997	Today
	CIOs	128	1
	Host data centers	155	7
	Web hosting centers	80	5
	Network	31	1
	Applications	15,000	4,700

Legend:
- 🔵 Global Resources
- 🟡 Strategic IGA location
- 🟩 Strategic Web location for IGA
- ▬ Ethernet and Power9 Networks

Tactical and operational efficiencies
§ Consolidation of infrastructure
§ Application consolidation/reduction
§ Global resource deployment
§ Enterprise end-to-end architecture optimization

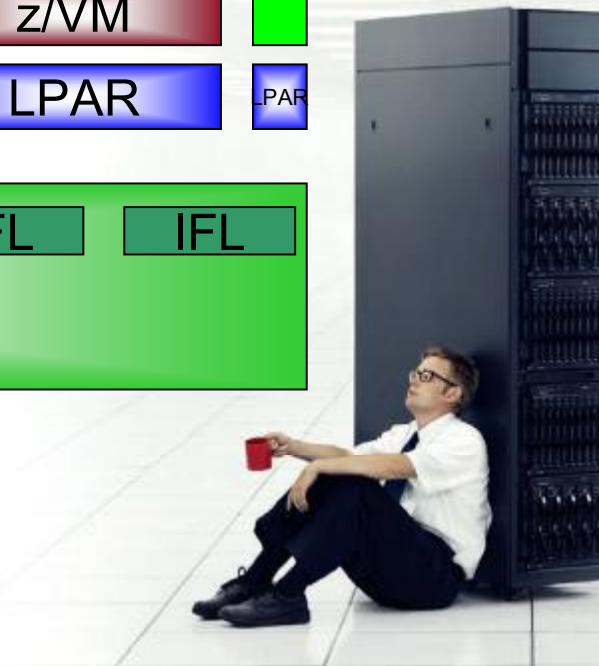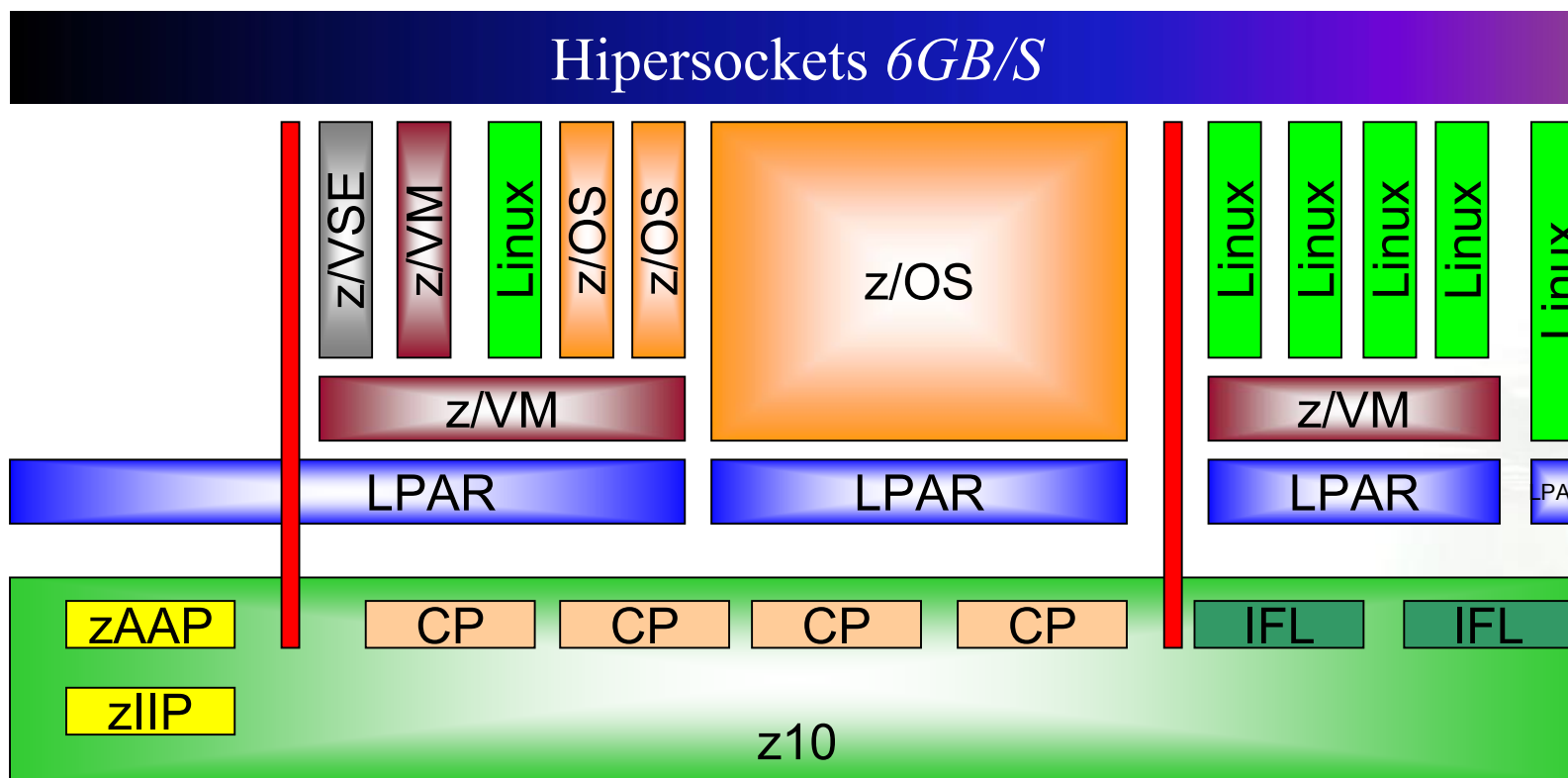# *Applications moving to System z tend to be strategic and mission critical*

Application View

§ Includes all business units, a cross-section of business functions

§ Most are internally developed web and domino-based

§ Tend to be complex with multiple servers and interfaces

§ Almost 50% of initial applications are classified as "Gold"

http://ecm.bluehost.ibm.com/success/iga.htm

Bronze

Help Now!

IBM's Innovation Application

ThinkPlace

Gold

Treasury System

Sales Information Warehouse

IBM's Intranet

IBM.com configurator

Enterprise Directory

IBM Portfolio – Application Classification

Blue

Silver

Delivery Services Request System

Hearts & Hands Together

Employee Charitable Contribution Campaign

Mission Critical — Yes / No

No — Strategic — Yes

7

Linux for System z Choices

Hipersockets *6GB/S*

z/VSE · z/VM · Linux · z/OS · z/OS · z/OS · Linux · Linux · Linux · Linux · Linux

z/VM · z/VM

LPAR · LPAR · LPAR · LPAR

zAAP · zIIP · CP · CP · CP · CP · IFL · IFL

z10

Flexible and Robust Linux Installation

System z *(up to 60 partitions)*

VM

ŸTape

Prod 1

Prod 2

RedHat

SUSE

Debian

Examples of Prod Servers

ŸDB2

ŸOracle WebSphere

ŸApache

ŸeMail

ŸFirewall

ŸFile/Print

| Srv1 | Srv2 | Srv3 | Srv4 | Srv5 | ... | Dev1 | Dev2 | Firewall |

OSA 1

OSA 2

OSA3

Internet
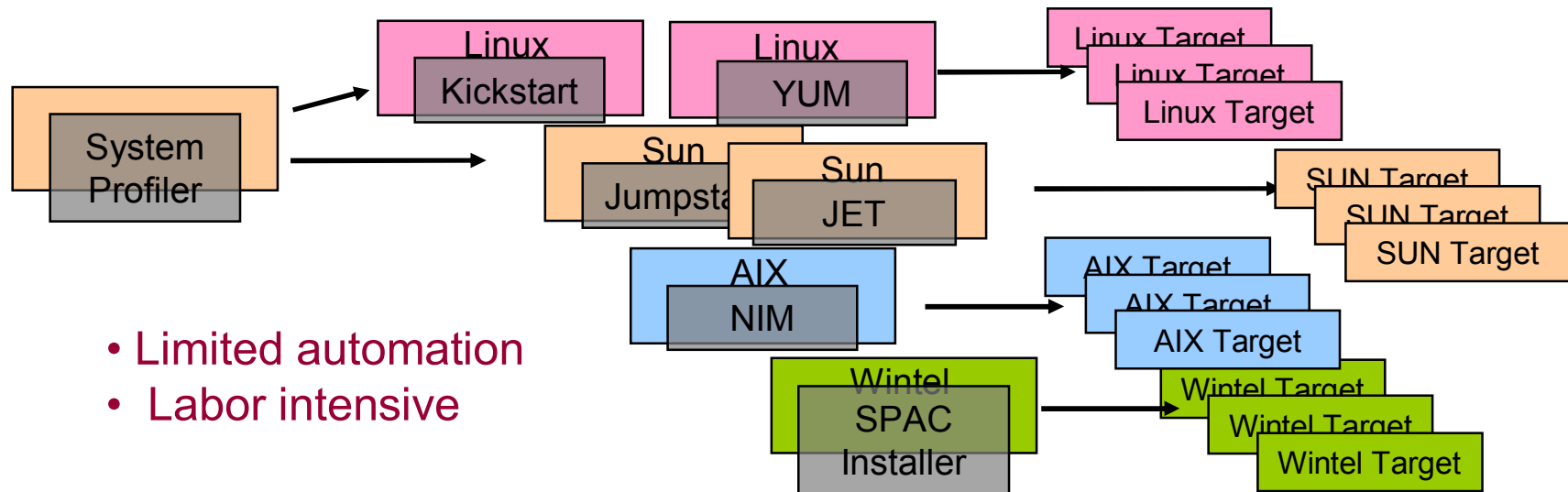
9
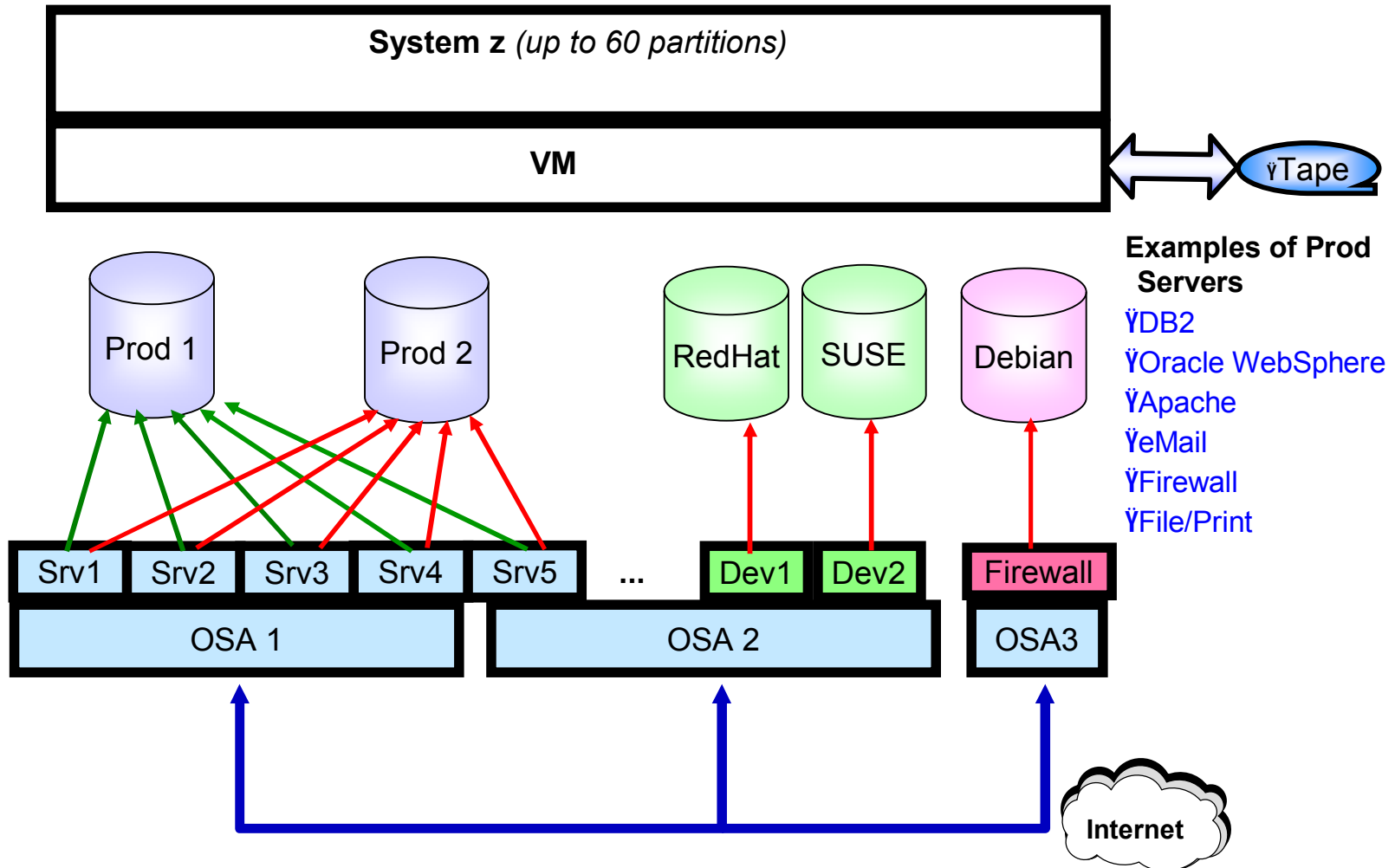
Extreme Virtualization and Server Management Leadership

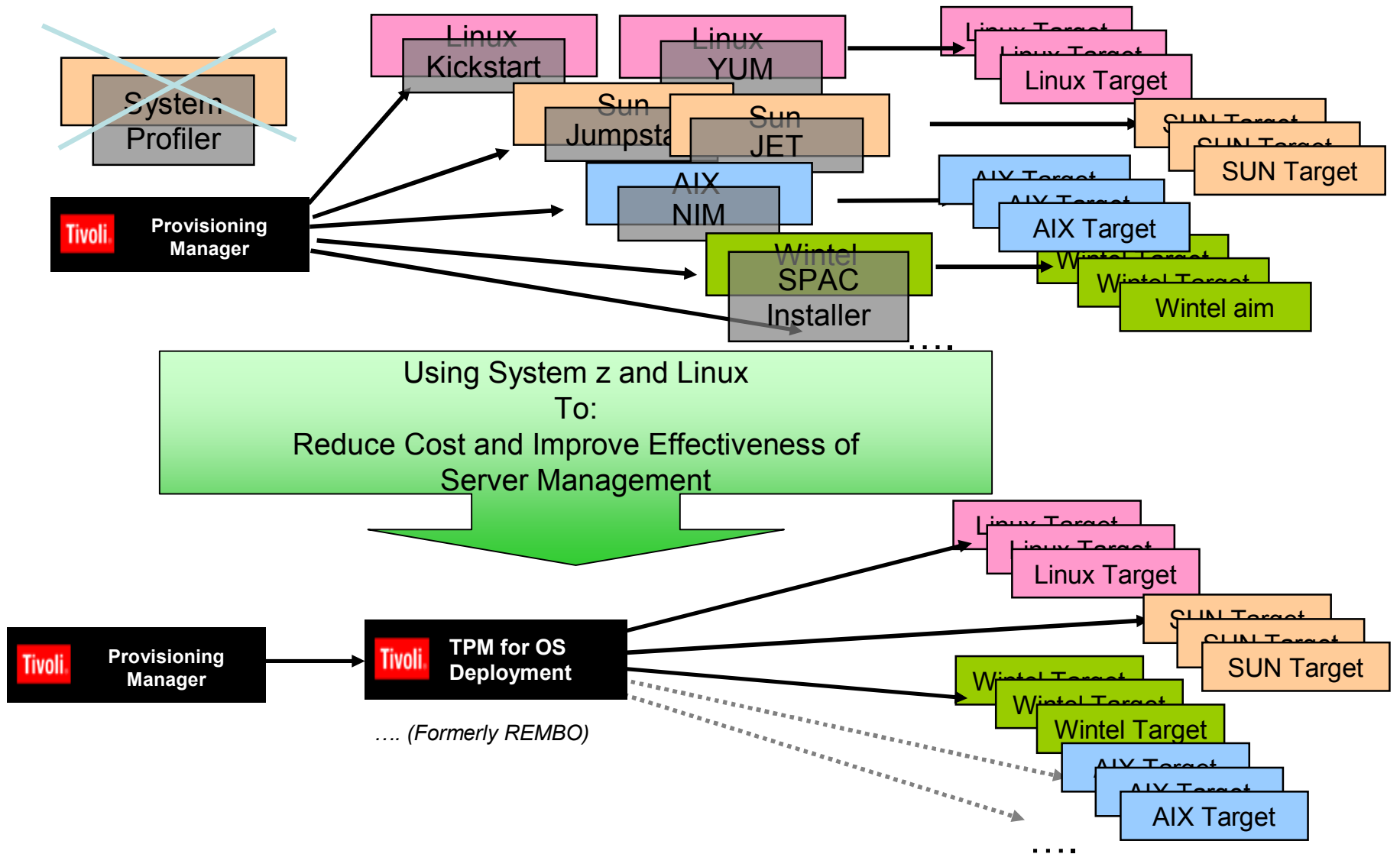§ 32% of Server farm for distributed servers are for administration , managing and provisioning servers

§ Real Customer example.. Managing 37,300 servers world wide would take 26 IFLs on a z990.

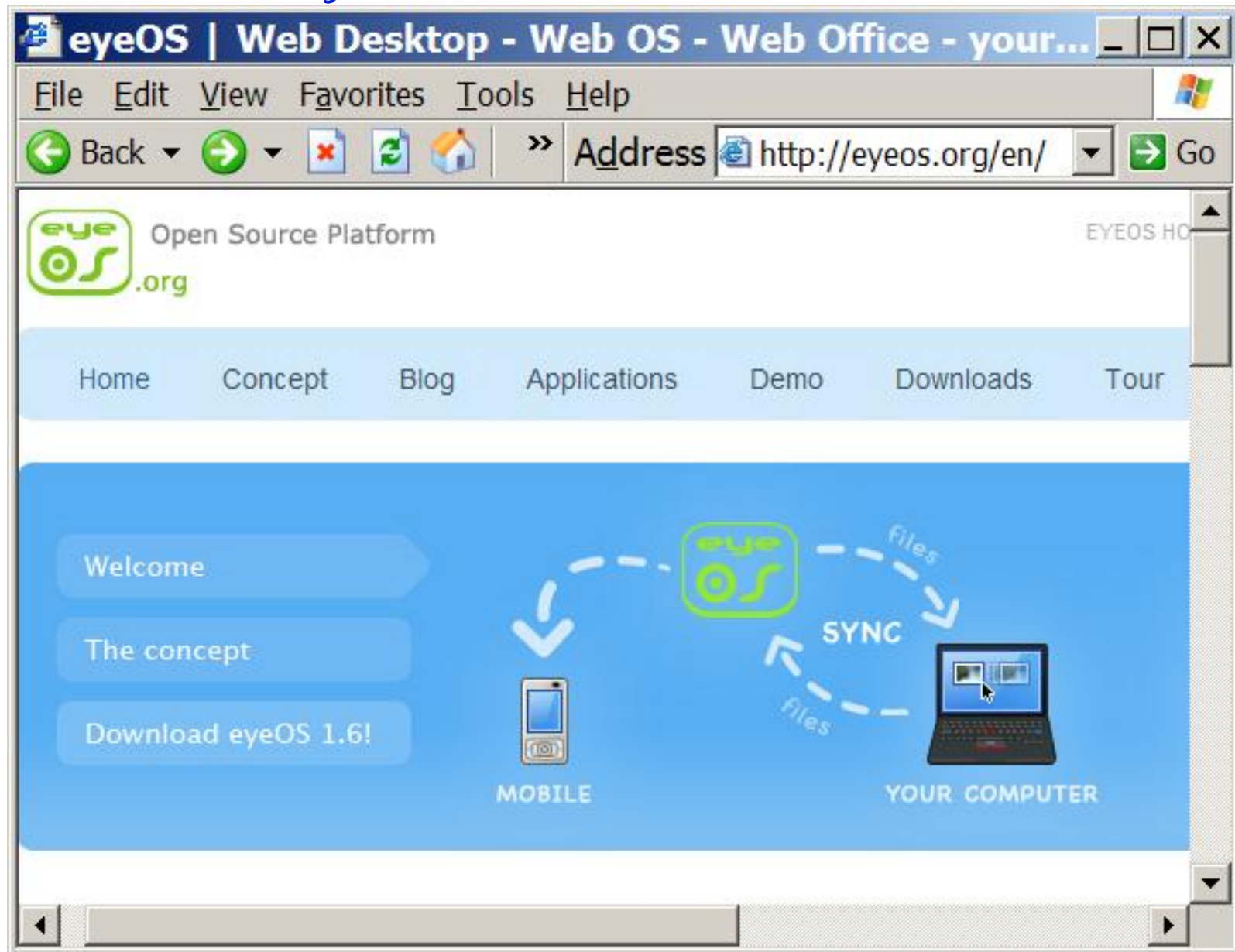|		
System Profiler	Linux Kickstart	Linux Target Linux Target Linux Target
	Linux YUM	
	Sun Jumpsta	SUN Target SUN Target SUN Target
	Sun JET	
	AIX NIM	AIX Target AIX Target AIX Target
	Wintel SPAC Installer	Wintel Target Wintel Target Wintel Target

• Limited automation
• Labor intensive

Local Implementation (per site)

10

Phase one simplification and administrative cost reduction

System Profiler

Tivoli Provisioning Manager

Linux Kickstart

Linux YUM

Sun Jumpstart

Sun JET

AIX NIM

Wintel SPAC Installer

Linux Target
Linux Target
Linux Target

SUN Target
SUN Target
SUN Target

AIX Target
AIX Target
AIX Target

Wintel Target
Wintel Target
Wintel aim

Using System z and Linux
To:
Reduce Cost and Improve Effectiveness of
Server Management

Tivoli Provisioning Manager

Tivoli TPM for OS Deployment

…. (Formerly REMBO)

Linux Target
Linux Target
Linux Target

SUN Target
SUN Target
SUN Target

Wintel Target
Wintel Target
Wintel Target

AIX Target
AIX Target
AIX Target

eyeOS hosted on System z

Logon screens follow accepted interface rules

Welcome to ns27lnx3.nivt.raleigh.ibm.com - Microsoft Inter...

File   Edit   View   Favorites   Tools   Help

Enter   **New User**

Username

Password

Language for the session

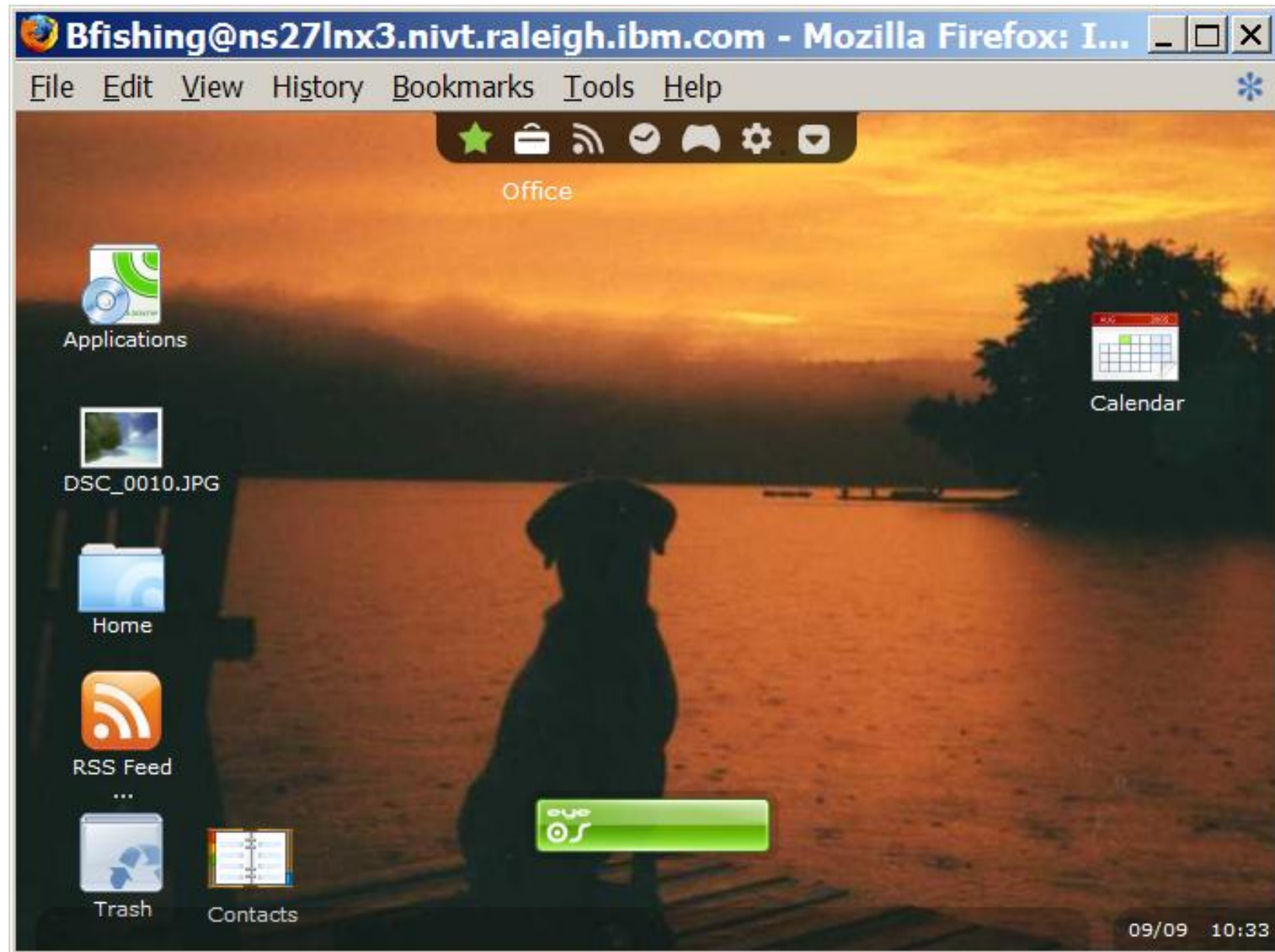(Default / User's profile)

Create account
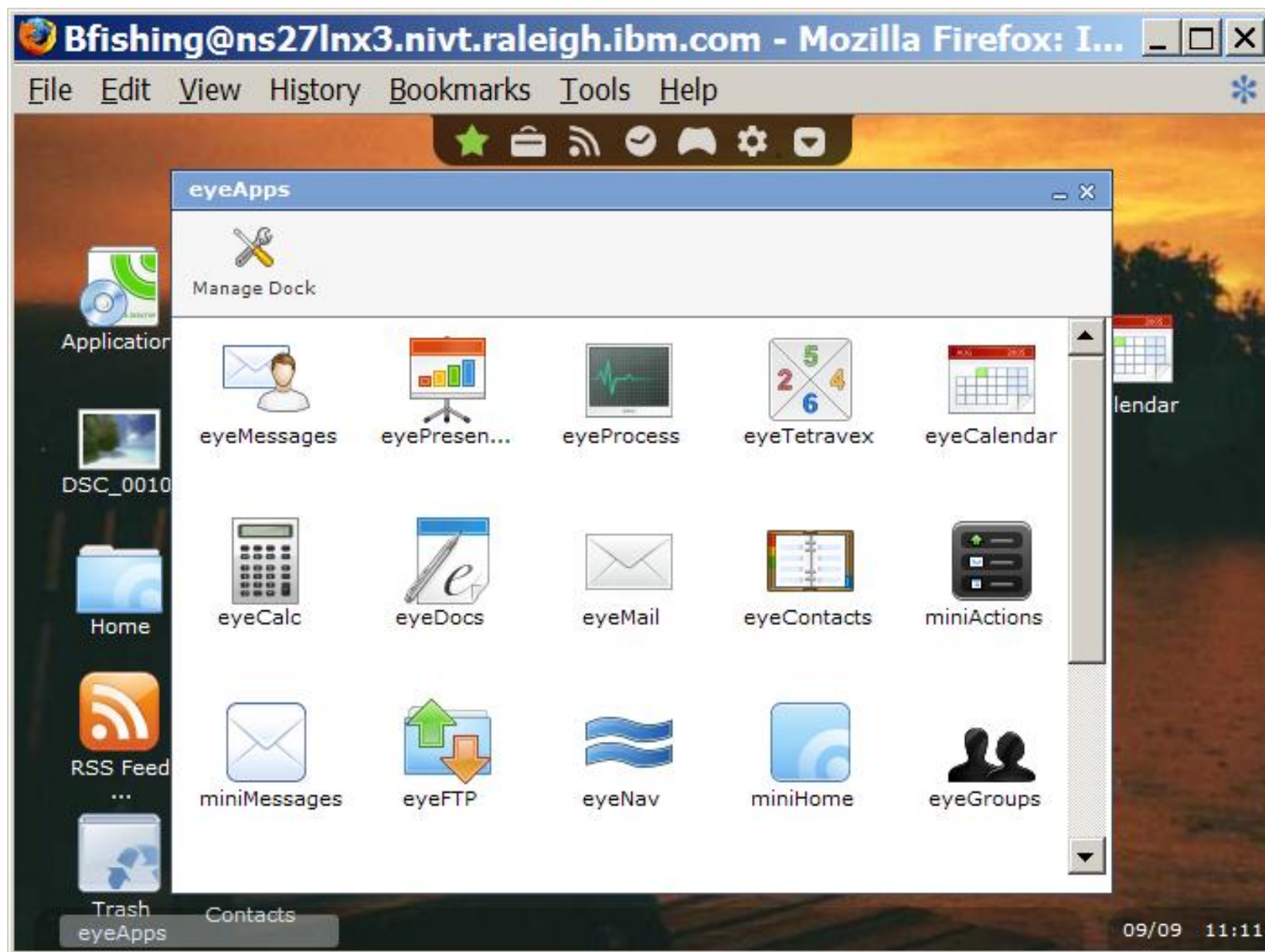
New User

Password

Retype pass

Language

English

Powered by eyeOS

Customize it just like your home PC

And all your tools are here

IBM Director for Linux on System z V5.20
With z/VM Center and Software Distribution Premium Edition

IBM Director Base Functions
- Discovery
- Group Management
- Inventory
- Basic Resource Monitor
- Event Action Plan (EAP)
- Process Management
- Remote Session
- File Transfer
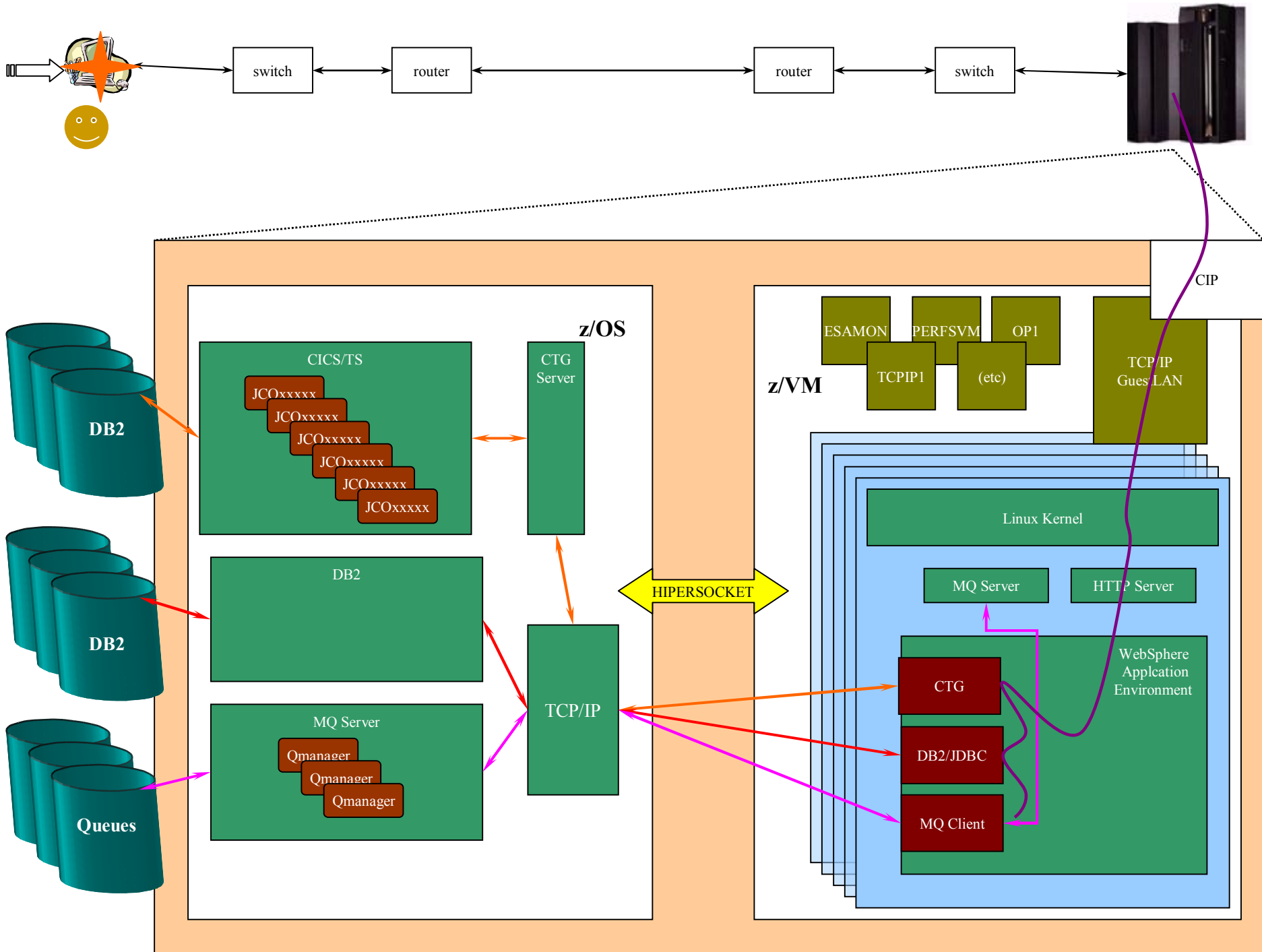- Network Configuration
- Software Distribution
- SNMP Browser

z/VM Center
- Utility Service Configuration Manager **New**
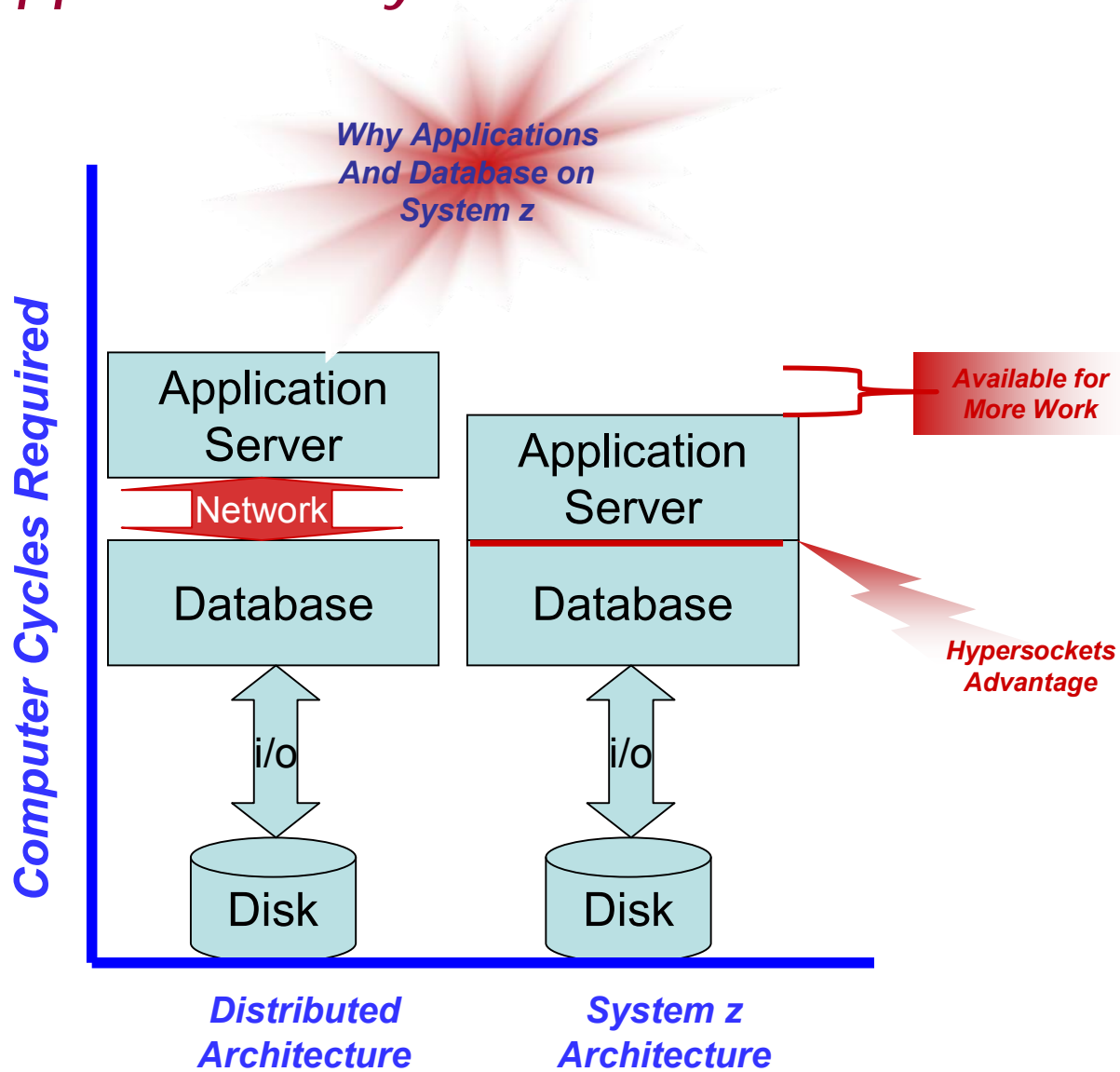- z/VM Virtual Server Deployment
- z/VM Server Complexes

Software Distribution Premium Edition **New**
- Software package distribution
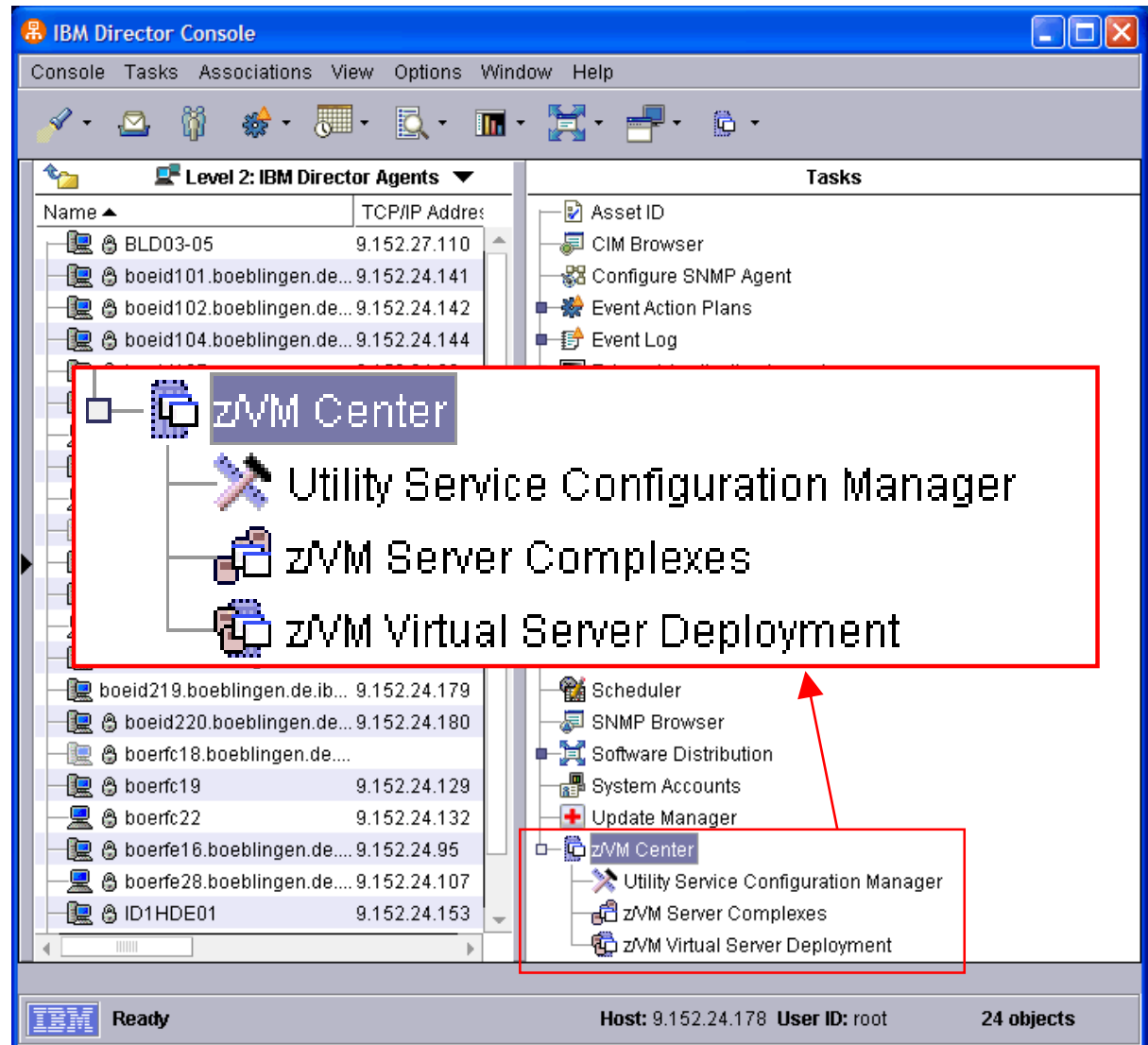
Application Layer Performance

ISV Application Server Options

ü**Web Sphere**

ü**IBI Web Focus**

ü**SAP**

ü**INFORMS**

ü**Java**

Computer Cycles Required

Why Applications And Database on System z

| Application Server |
| Network |
| Database |

Available for More Work

| Application Server |
| Database |

Hypersockets Advantage

i/o

i/o

Disk

Disk

Distributed Architecture
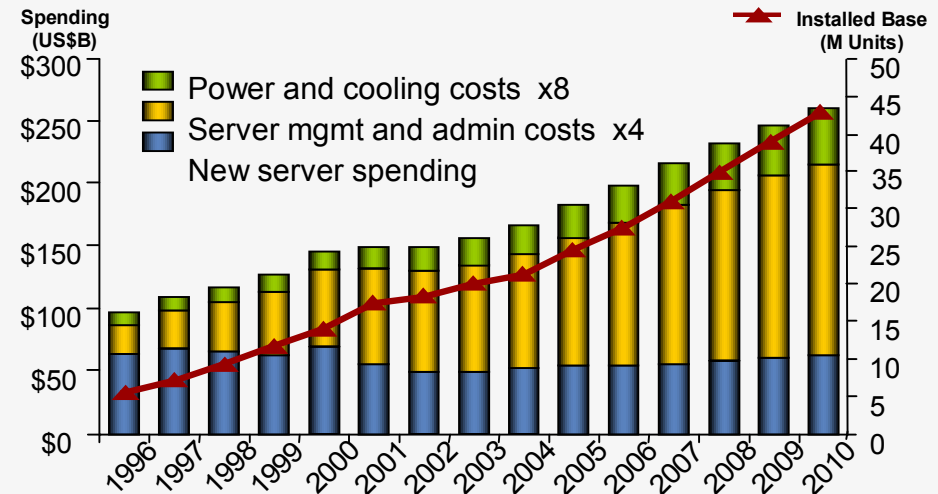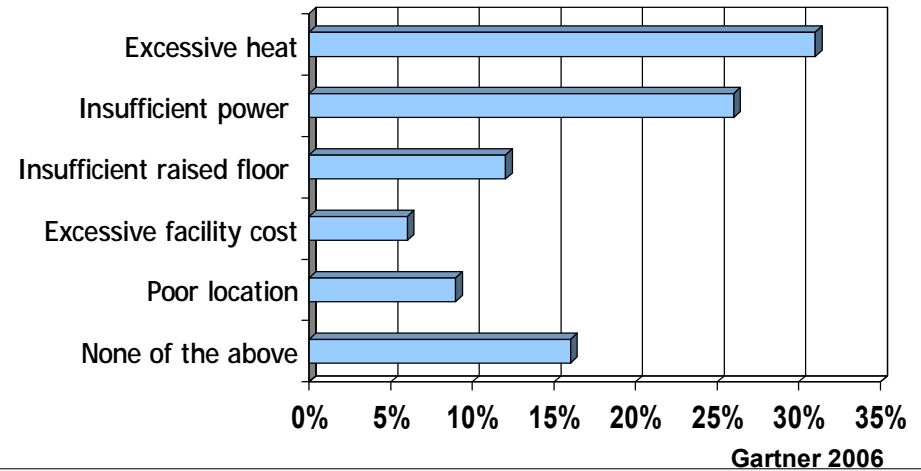
System z Architecture

18

What is the greatest facility problem with your primary data center?

"**Power and cooling** will be a top 3 issue with all CIO's in the next 6-12 months"

Michael Bell – Gartner Group

"**Power and cooling** costs will increase to more than one-third of the total IT budget"

Robert Frances Group, January 2006

Gartner 2006

Source: IDC, Virtualization 2.0: The Next Phase in Customer Adoption,
Doc #204904, Dec 2006

IDC 2006

What Makes Best Fit

§ Leverage classic strengths of the System z
  § High availability
  § High i/o bandwidth capabilities
  § Flexibility to run disparate workloads concurrently
  § Requirement for excellent disaster recovery capabilities
  § Security
§ Shortening end to end path length for applications
  § Collocation of applications
  § Consolidation of applications from distributed servers
  § Reduction in network traffic
  § Simplification of support model
§ Consolidation Effect
  § Power requirements
  § Software costs
  § People Costs
  § Real Estate
  § Workloads requiring EXTREME Flexibility

Best Fit Application Workloads

§ WebSphere MQ Series
§ DB2 Connect
§ CICS Transaction Gateway , IMS Connect for Java
§ SAP
§ WebSphere and JAVA applications development
§ WebSphere Application Server (WAS), Portal
§ Domino
§ Network Infrastructure, FTP, NFS, DNS etc..,
§ Oracle Database
§ Applications requiring top end disaster recovery model
§ ComServer and Communications Controller for Linux
§ Virtualization and Security Services
§ InfoSphere/Cognos
§ Communigate Pro (VoIP)

Infrastructure Reduction

What's Missing? à Support Infrastructure!
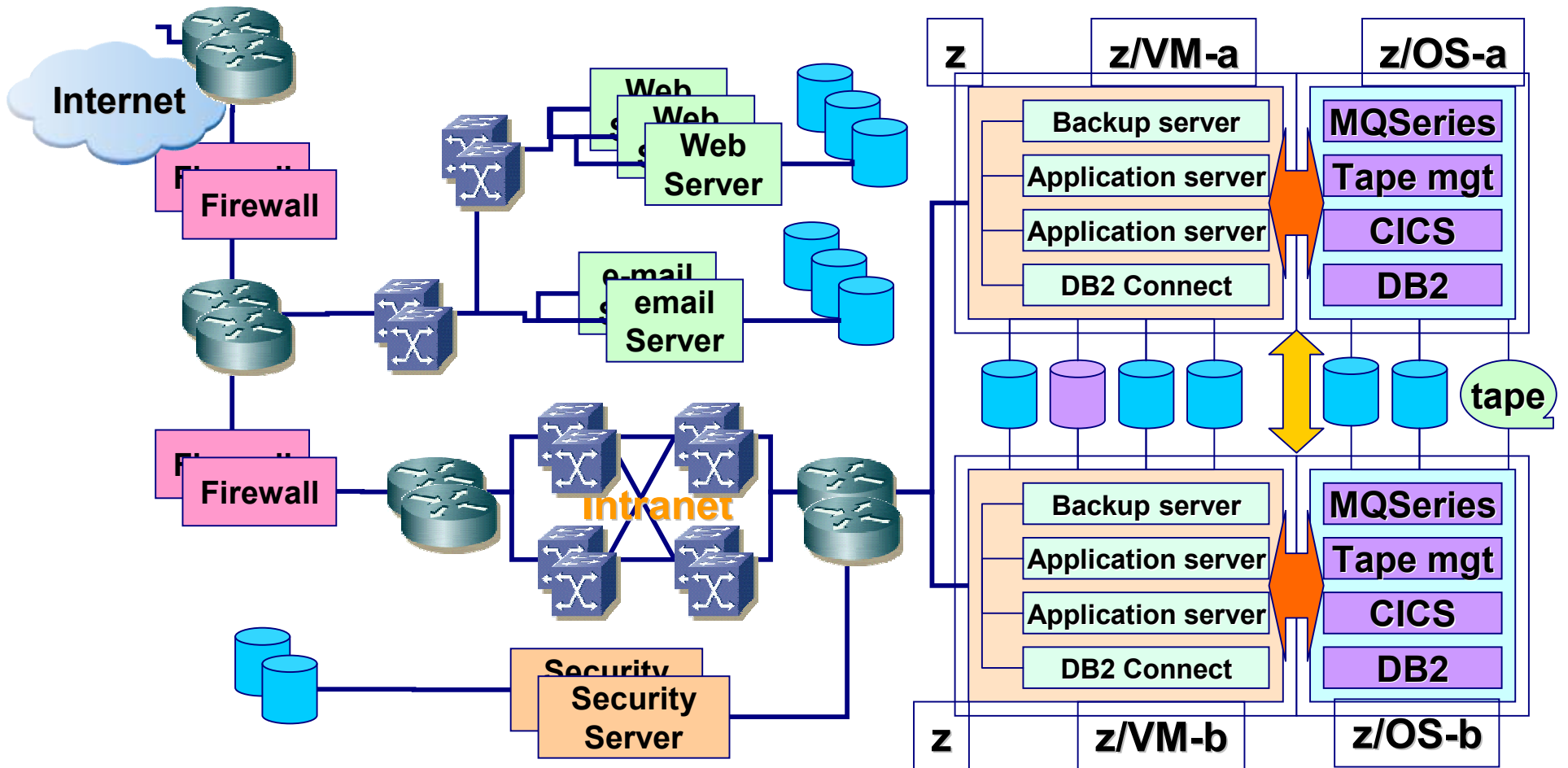
Internet

Firewall

Firewall

Firewall

Web Server

eMail Server

Intranet

Security Server

Database Server

Application Server

Backup Server
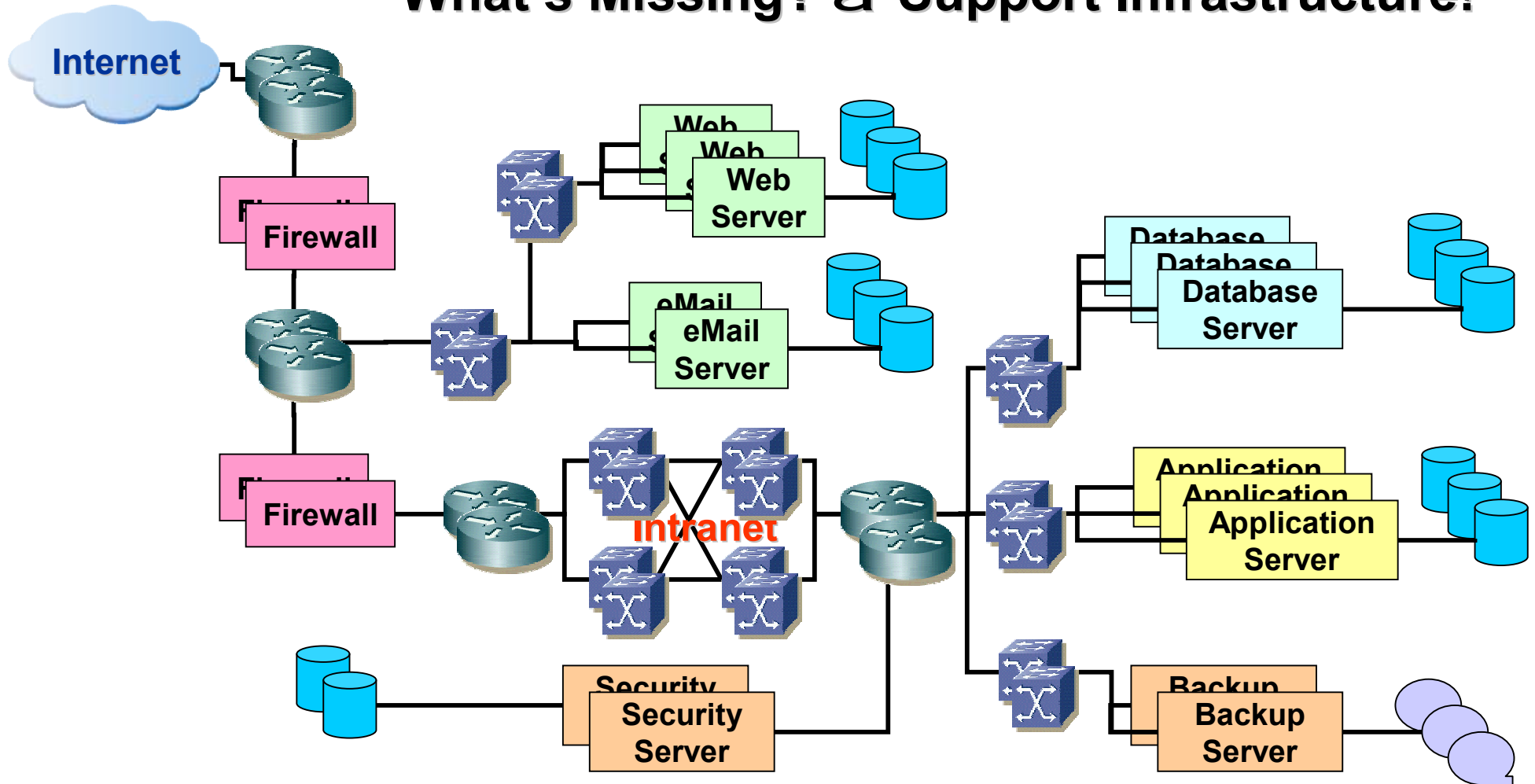
This configuration contains 50+ levels of infrastructure

Reduce Infrastructure with Linux on System z

Internet

Firewall

Firewall

Intranet

Web Server

Web Server

Web Server

email Server

Security Server

Security Server

z | **z/VM-a** | **z/OS-a**

- Backup server
- Application server
- Application server
- DB2 Connect

- MQSeries
- Tape mgt
- CICS
- DB2

tape

z | **z/VM-b** | **z/OS-b**

- Backup server
- Application server
- Application server
- DB2 Connect

- MQSeries
- Tape mgt
- CICS
- DB2

In this configuration, 14+ levels of infrastructure have been eliminated

Net Sales vs. I.T. Percentage of Sales SAP Customer
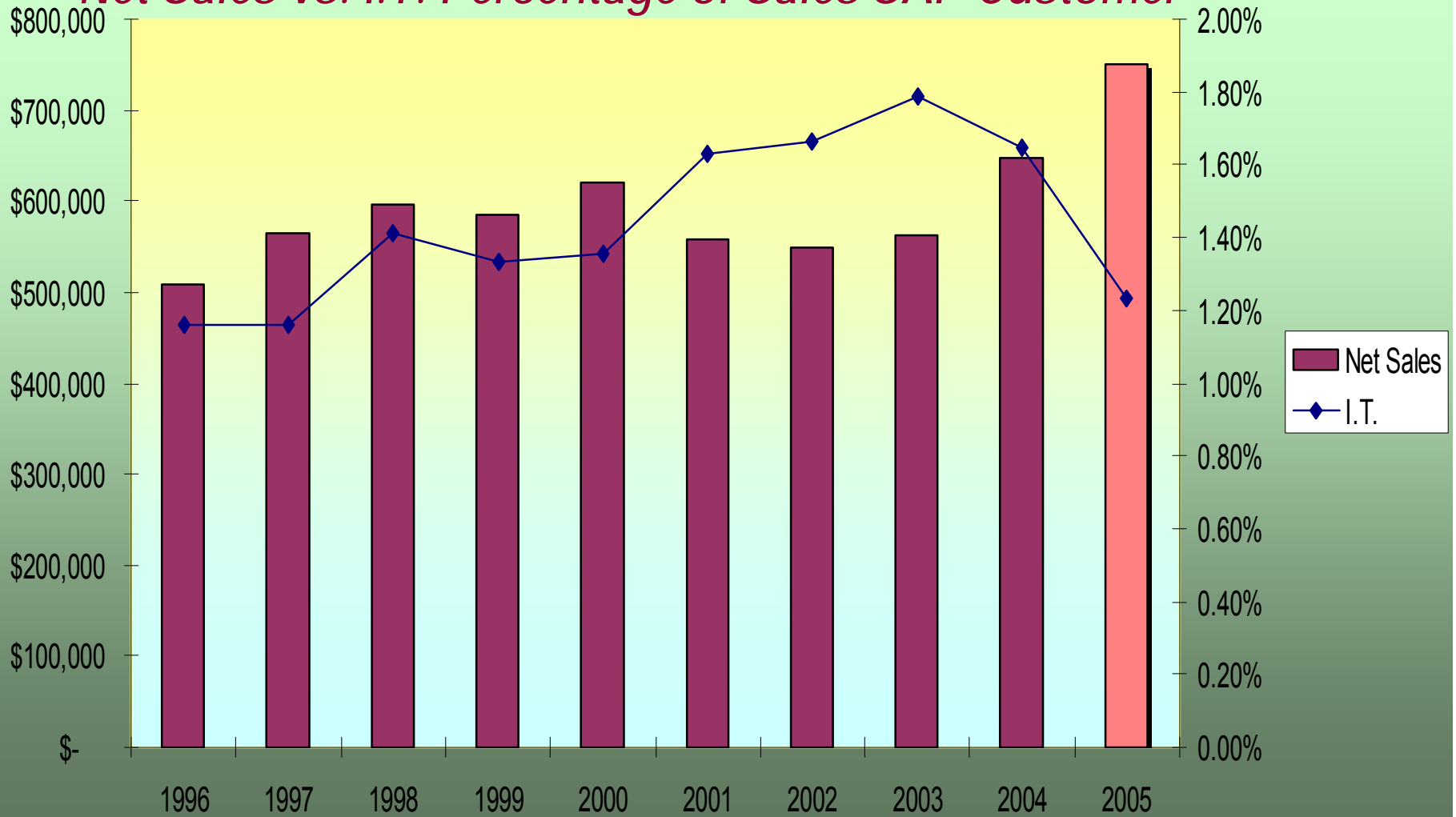
Enabling Technology
Visual MainWin for J2EE, Enterprise & Portal Editions

Visual Studio .NET

Code, Compile, Debug, and Deploy

C#

VB.NET

Microsoft Intermediate Language

Mainsoft Cross Compiler

WebSphere Server

Java Bytecode

- ASP.NET
- ADO.NET
- Web Services
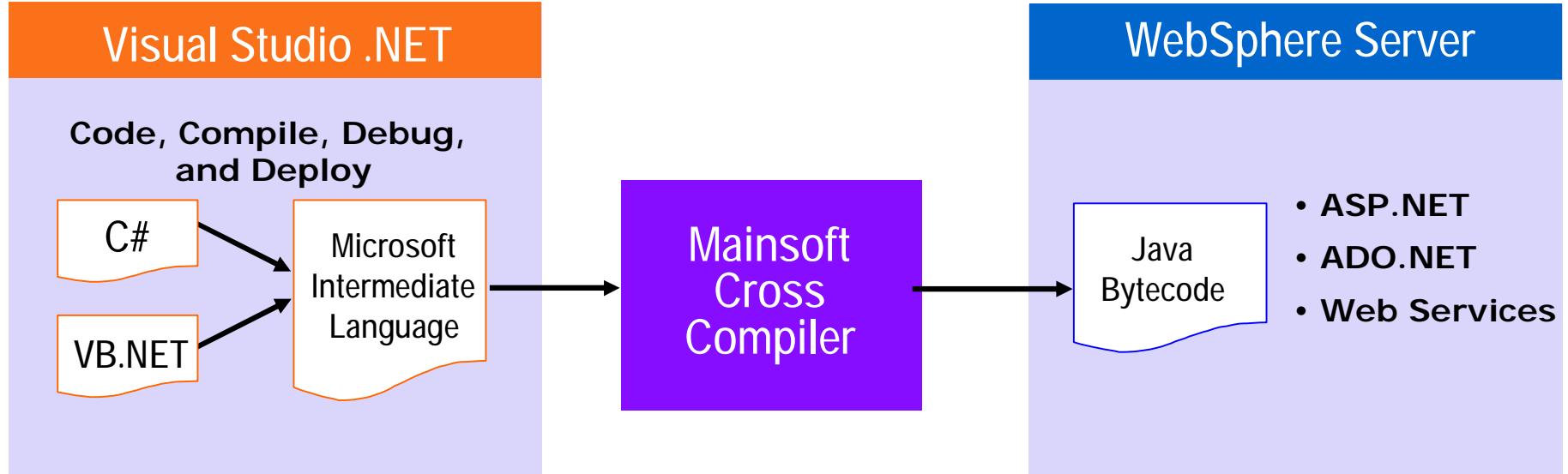
Mainsoft software has been validated on System z & other eServer platforms.

Domino for Linux on System z, Imagine the Possibilites

Phase 1

Primary Server

Lotus. Domino.

- Notes Server 6.5
- Linux System z

Create Mirror

Phase 2

Primary Server

Lotus. Domino.

- Notes Server 6.5
- Linux System z

- Synchronize
- Fail Primary
- Upgrade Primary

Mirrored Server

Lotus. Domino.

- Notes Server 6.0
- z/OS

Move Primary Upgraded Server To Production

Phase 3

Primary Server

Lotus. Domino.

- Notes Server 7.02
- Linux System z

Mirrored Server

Lotus. Domino.

- Notes Server 6.0
- z/OS

Notes Client

System z THE Database and Warehouse Engine

External Applications

WAS SAP CICS IMS

DB2 IMS DB
z/OS Databases

Oracle DB2 LUW
Linux Databases
Informix MySQL

Cognos DataBase Application FileNet

z10

Users

SQL Server Distributed Servers Sybase
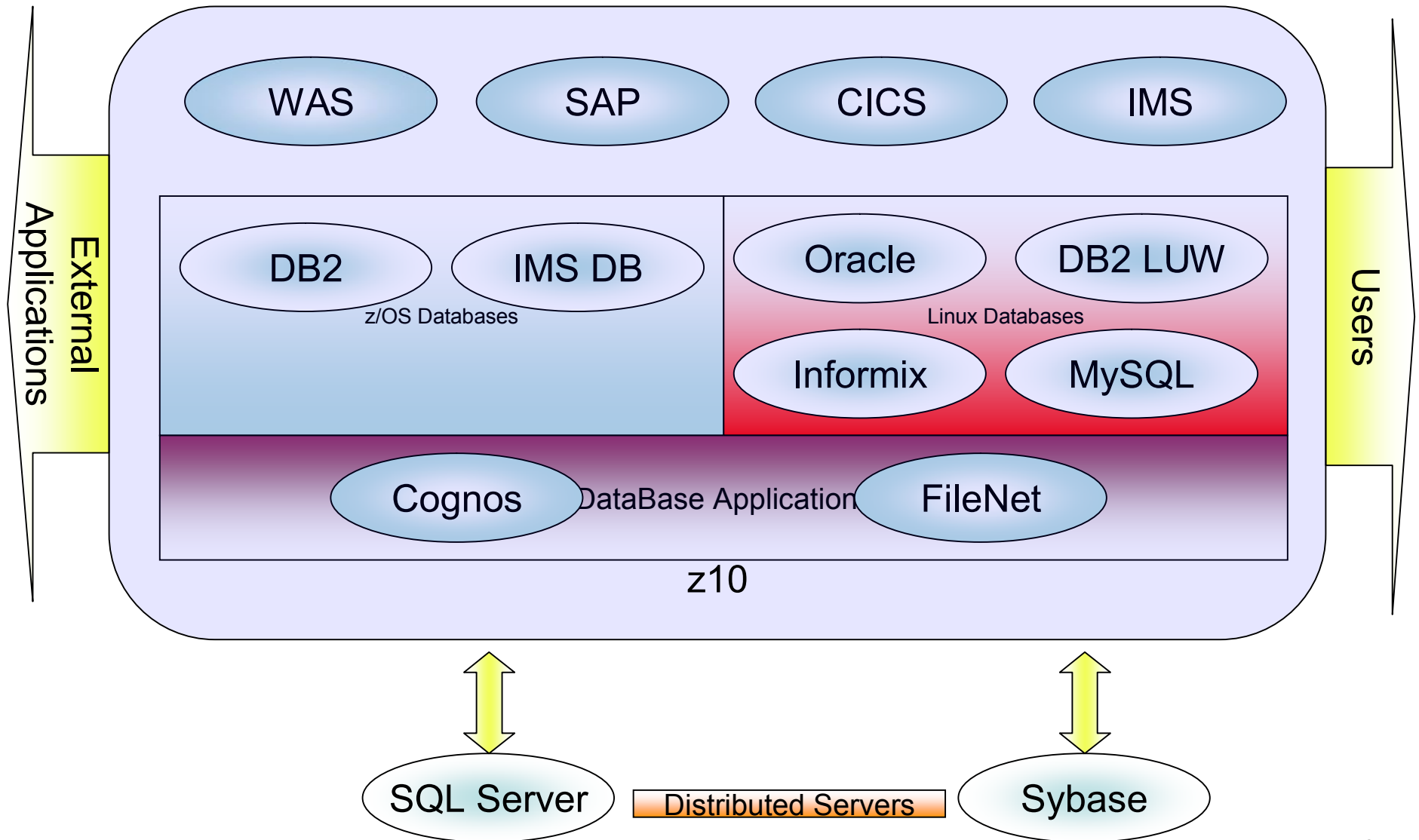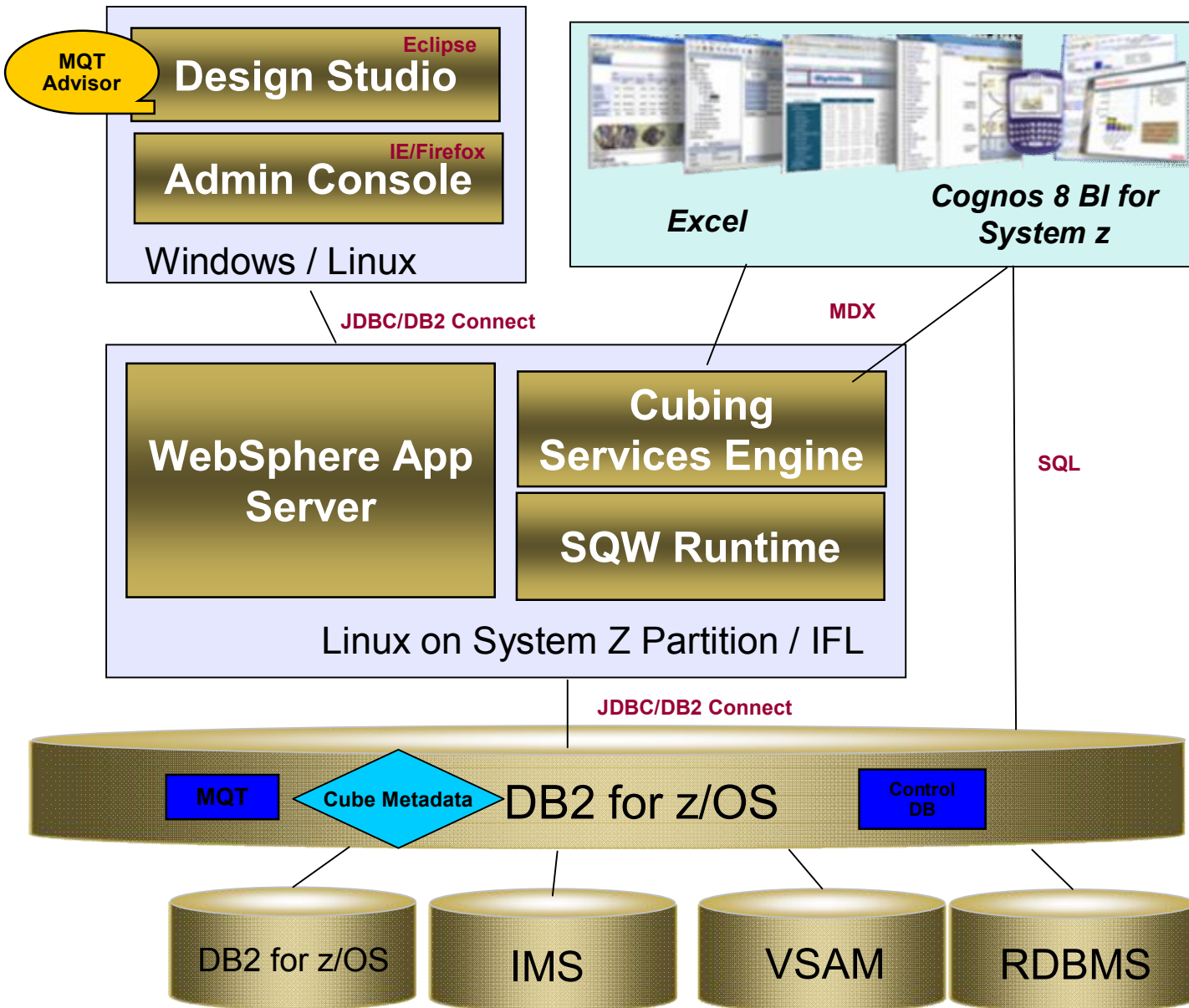
Client Layer
- Design and admin client
- BI / Reporting tools and apps

Application Server

Data Warehouse Server

Source Systems

MQT Advisor

Design Studio — Eclipse
Admin Console — IE/Firefox
Windows / Linux

Excel

Cognos 8 BI for System z

JDBC/DB2 Connect

MDX

SQL

WebSphere App Server

Cubing Services Engine

SQW Runtime

Linux on System Z Partition / IFL

JDBC/DB2 Connect

MQT

Cube Metadata

DB2 for z/OS

Control DB

DB2 for z/OS

IMS

VSAM

RDBMS

28

IBM Cognos 8 BI Architecture

Cliente

Celular

E-commerce
Loja Virtual

MCASH WEB

Media Gateway

Compra

Banco verifica
transação e aprova

WEB SERVER

DATABASE

COMMUNIGATE

SYSTEM Z

SYSTEM Z
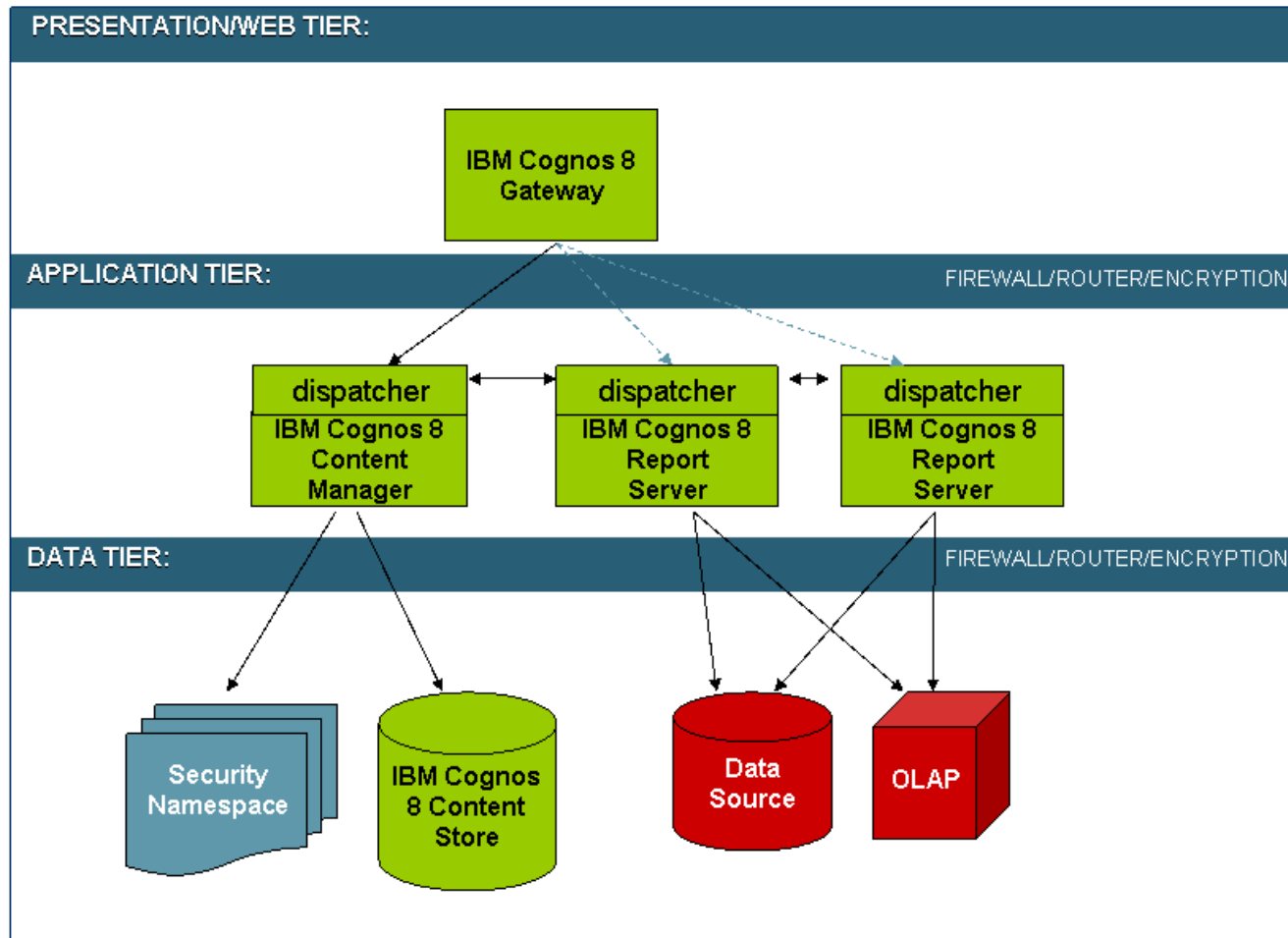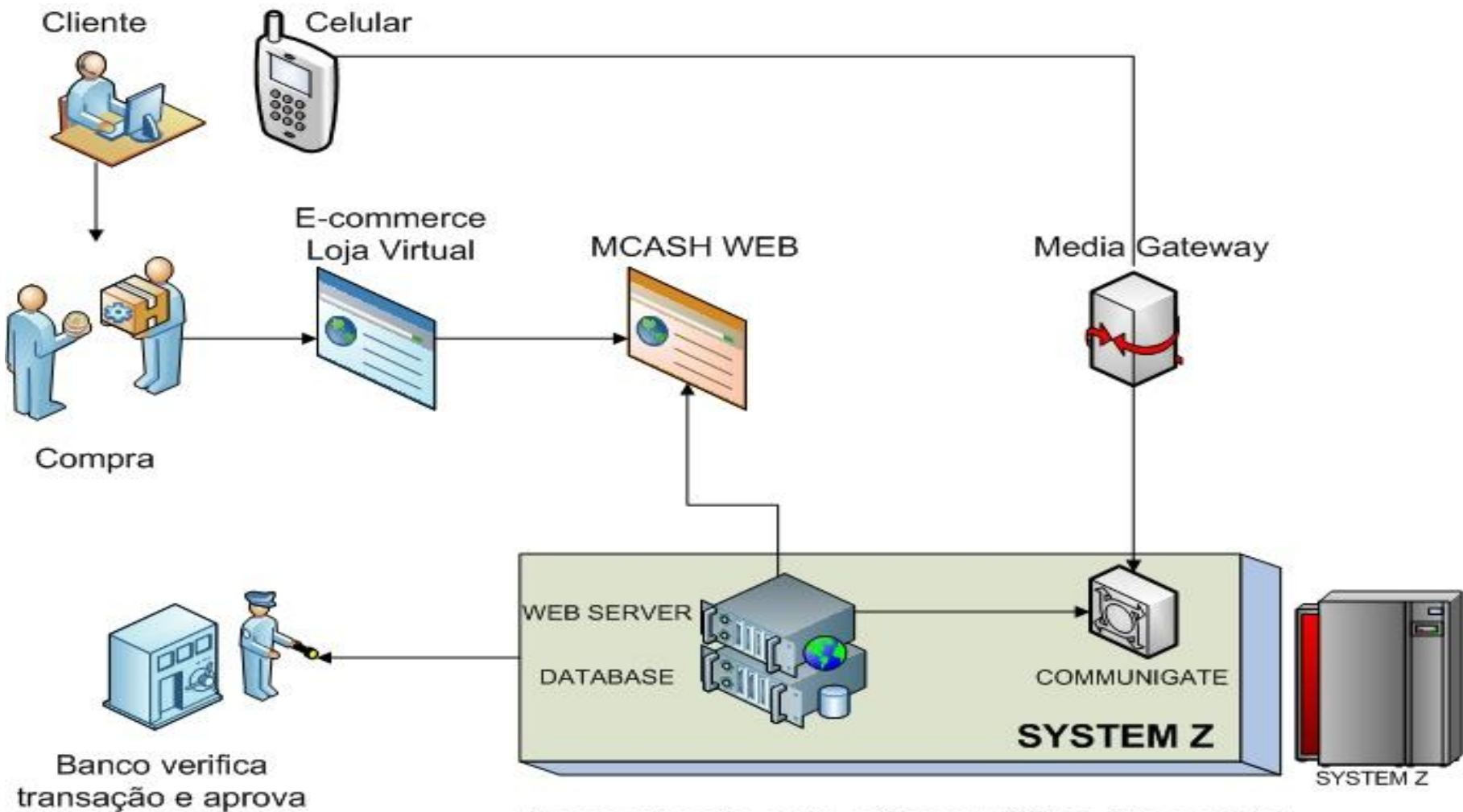
A comunicação entre o CommuniGate Pro e o Web
Server da Mcash é feita por meio de socket seguro
(SSH Tunnel) com o envio e recebimento de
informações programado em API do CommuniGate Pro
disponível para Java, Perl ou PHP.

What Makes Good Fit

§ Evaluate server choices

  § Correct application availability,

  § Supporting applications,

  § Total Cost of Ownership (TCO)

  § Politics within the organization.

  § Porting issues

§ Shortening end to end path length for applications

  § Collocation of applications

  § Consolidation of applications from distributed servers

  § Reduction in network traffic

  § Simplification support model

• Consolidation Effect
  • Power requirements
  • Software costs
  • People Costs
• Real Estate
• Workloads requiring EXTREME flexibility

Good Fit Application Workloads

- § UDB (DB2)
- § Informix, (IDS)
- § Apache web serving
- § SAMBA
- § TIM/TAM (LDAP Services)
- § TSM
- § Existing Linux Workloads

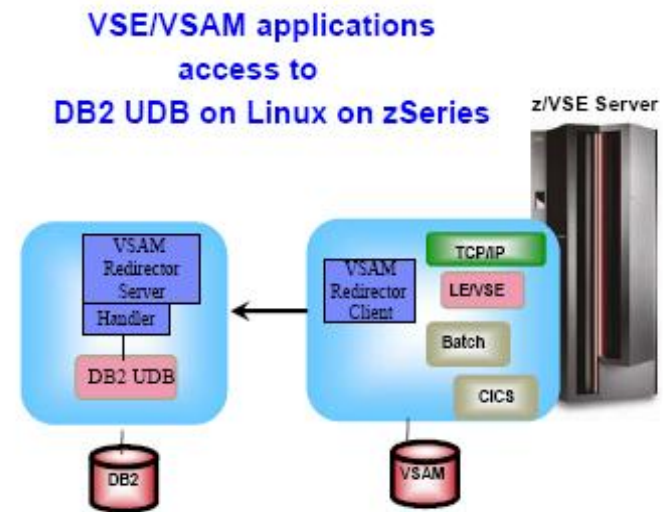# DB2, Imagine the Possibilities on Linux for System z

UDB 8.1
UDB V8.2
DB2 V9.1 Native XML

•Spatial Extenders

•Archive Expert

•Test Database Generator

•Net Search Extender

VSE/VSAM applications access to DB2 UDB on Linux on zSeries — z/VSE Server

Potentially Difficult Candidates

§ ISV and IBM applications that have not yet ported their application to run on Linux on System z

§ Applications that by design run at VERY High sustained utilization which I will define here as >95%.

§ Stand-Alone single applications as the only Linux for System z applications

§ Applications that are to internally sensitive to try and move

http://www-1.ibm.com/servers/eserver/zseries/os/linux/apps/all.html

§ This URL is a link to the IBM software running and supported to run under Linux on System z.

http://www-1.ibm.com/servers/eserver/zseries/os/linux/software.html

§ Call and ask if the software is not on one of the two lists above. Call Jeff Noel (POK), Ray Smith (POK), or Bill Reeder (Seattle).

System z ISV Ecosystem as of 1Q 2009

Ø Over 6,000 applications, from over 1,600 ISVs enabled on the System z platform

v **Over 2,000 applications on z/OS 1.8 and above**
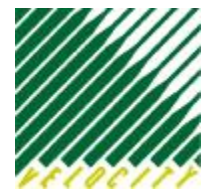
ü **More than 3,800 for all z/OS releases**

v **Over 2,900 applications on Linux on z**

ü **More than 500 new Linux applications added in 2008**

Ø **Represents 18% growth from 2007**

ü **Over 150 already added in 2009**

IBM Multi-Architecture Virtualization
Federated Hypervisor Support with System z
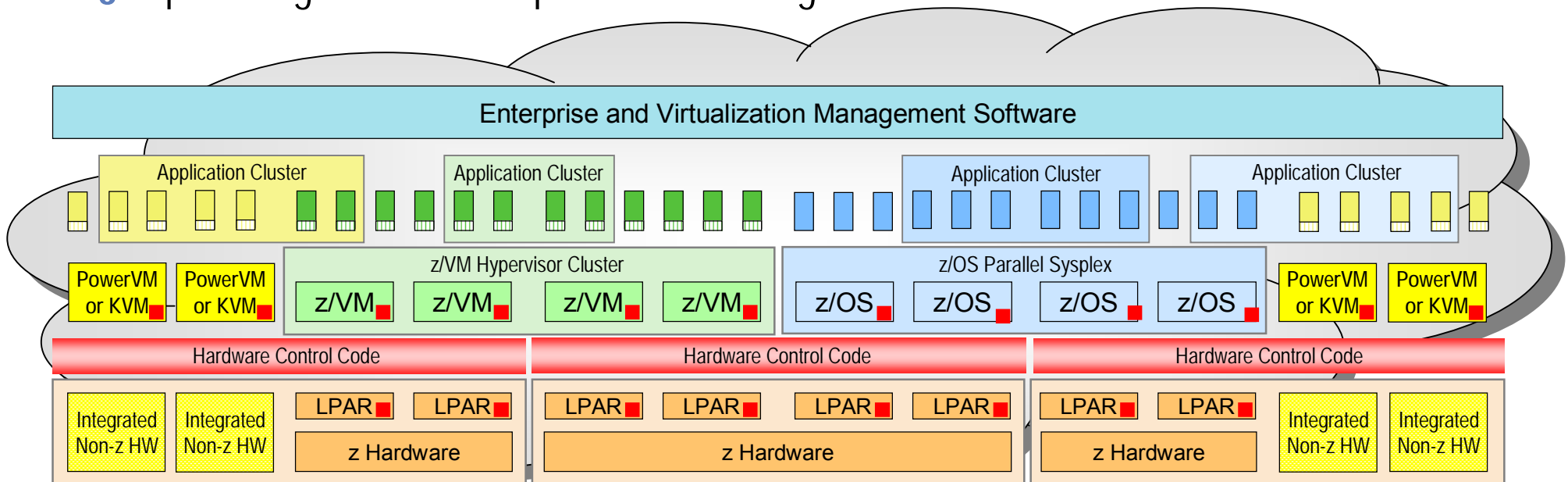## Enabling "Fit for Purpose" Application Hosting

§ System z futures: hosting a federation of platform management functions, including:
- Resource monitoring
- Image management
- Workload management
- Energy management
- Availability management

§ Integrates with hardware management and virtualization functions

§ Controls hypervisors and management agents on blades

§ Open integration to enterprise-level management software

Enterprise and Virtualization Management Software

Application Cluster	Application Cluster		Application Cluster	Application Cluster

PowerVM or KVM	PowerVM or KVM	z/VM Hypervisor Cluster	z/OS Parallel Sysplex	PowerVM or KVM	PowerVM or KVM
		z/VM z/VM z/VM z/VM	z/OS z/OS z/OS z/OS		

Hardware Control Code | **Hardware Control Code** | **Hardware Control Code**

Integrated Non-z HW	Integrated Non-z HW	LPAR LPAR	LPAR LPAR LPAR LPAR	LPAR LPAR	Integrated Non-z HW	Integrated Non-z HW
		z Hardware	z Hardware	z Hardware		

■ = Code that interfaces with hardware control code

RED HAT :: CHICAGO :: 2009
SUMMIT

JBoss WORLD
CHICAGO 2009

CHICAGO SEPTEMBER 1–4, 2009

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Presented by

Questions ????