System z growth, IT Optimization aspects

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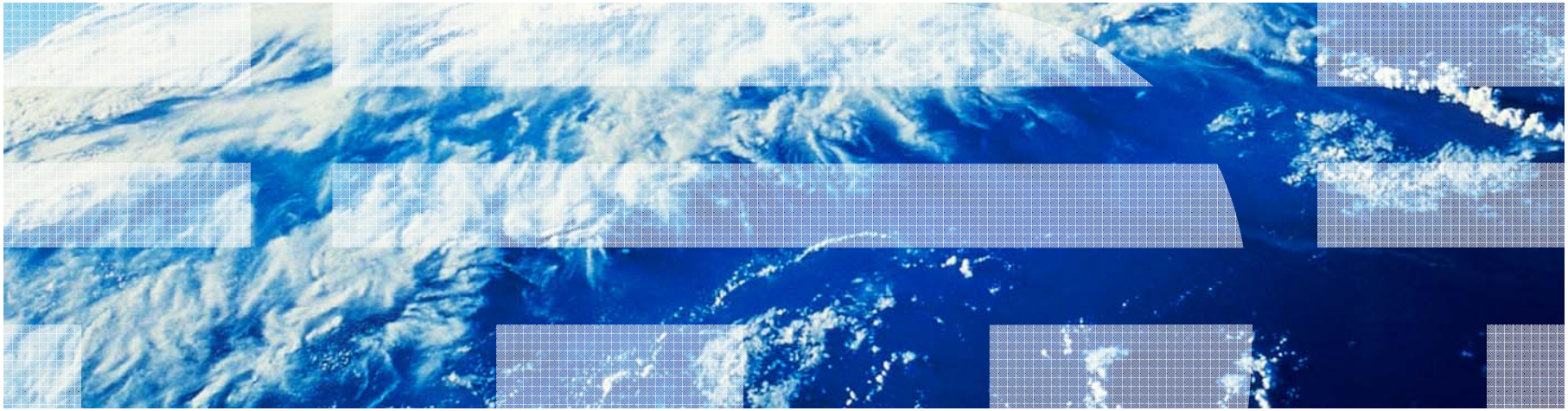

Trademarks

- This presentation contains trade-marked IBM products and technologies. Refer to the following Web site:

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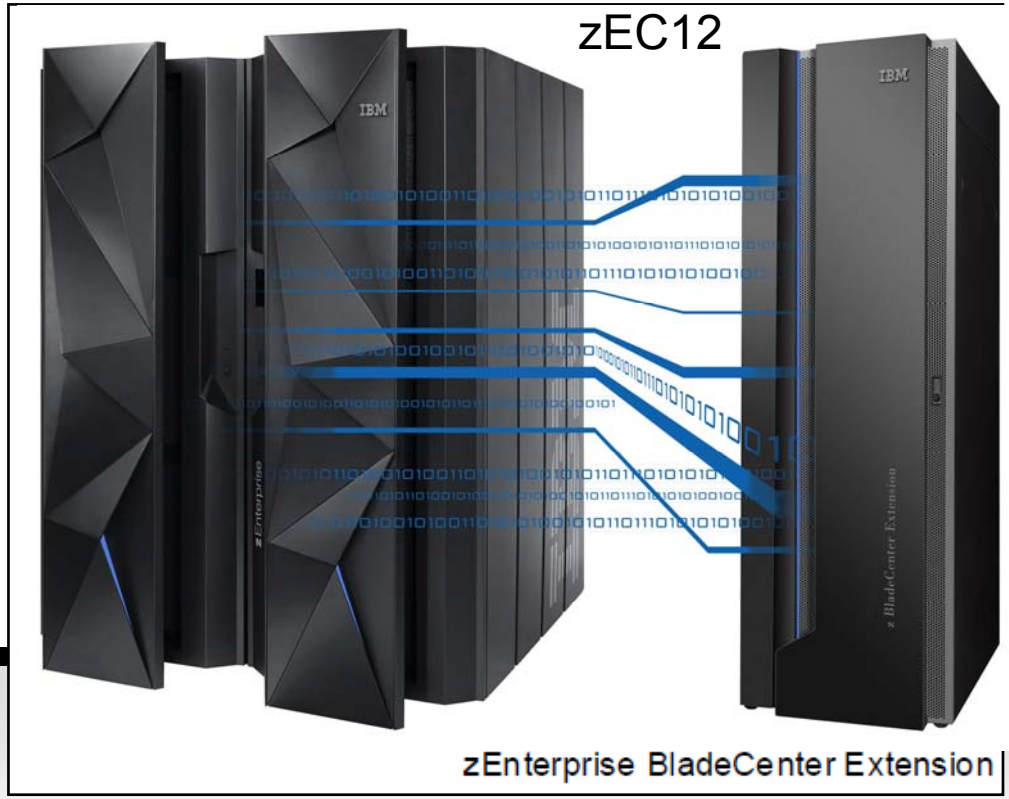
IBM zEnterprise System – big is not big enough !

Re-write the rulebook and set new standards for business-centric IT with IBM System z, to be the world's premier workload-optimized platform for enterprise applications.

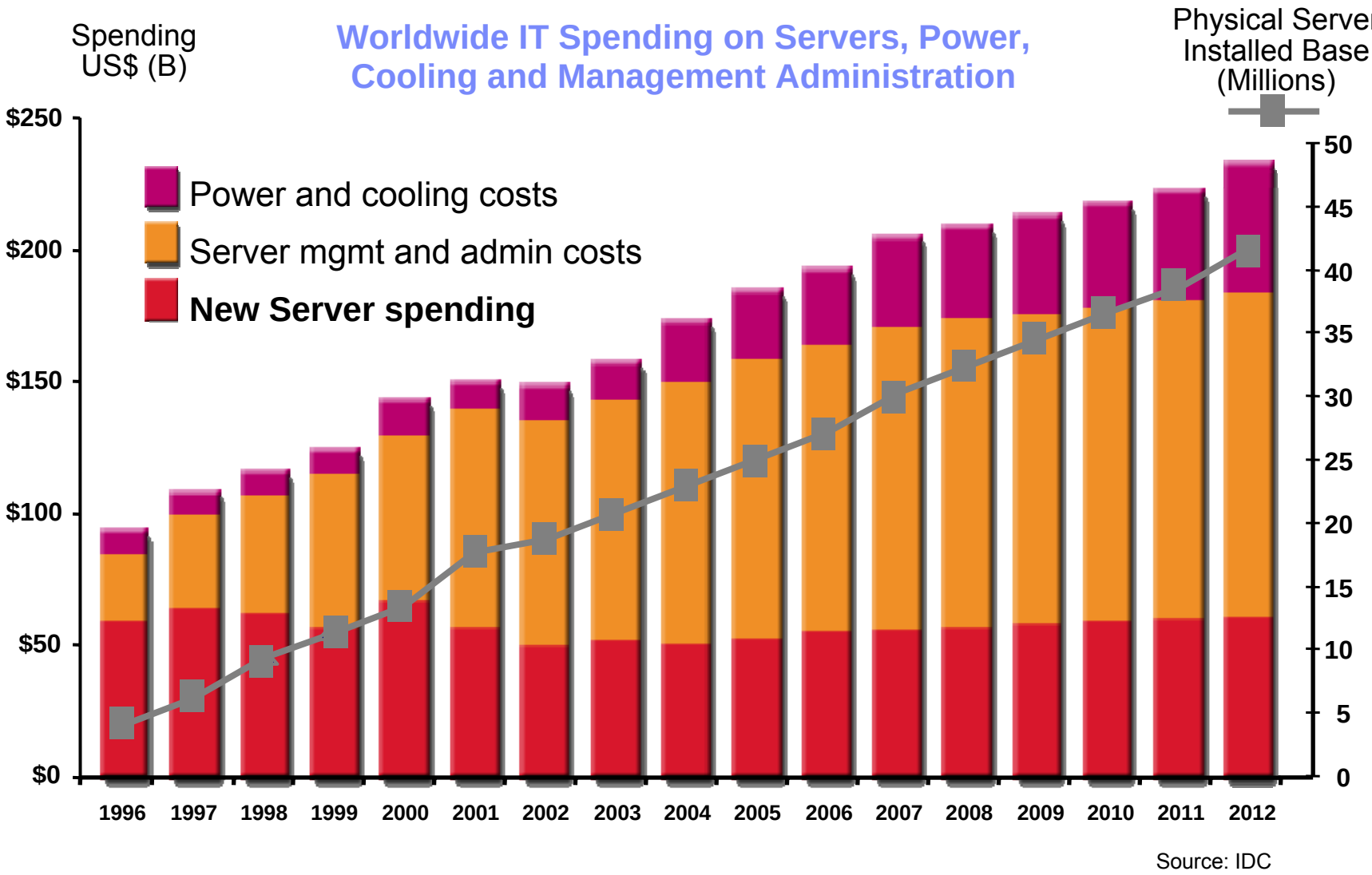


Our Vision:

An IT environment driven with one centralized System
- IBM zEnterprise System -

Deliver the best of all worlds - Mainframe, UNIX, x86 and single function processors - integrated in a single system for ultimate flexibility and simplicity to optimize service, risk, and cost across multiple heterogeneous workloads.

IT Operating Costs Are Out of Control



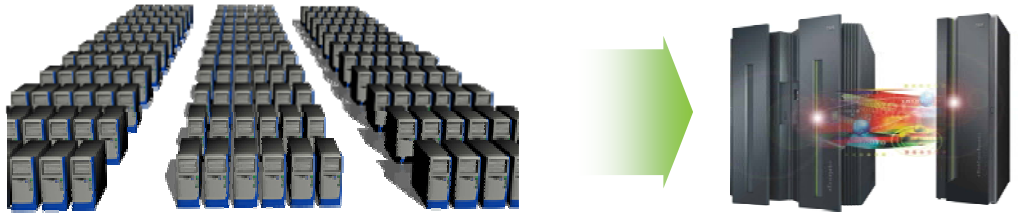
Source: IDC

The Data Center Challenge - Controlling IT complexity and cost while maintaining daily operations

- An Integrated system of multiple architectures for optimizing the deployment of multi-tier workloads
- Creating a single point of control for management and administration to reduce operational overhead by up to 80%, including:
  - Power and Facilities
  - Labor
  - Software License

zEnterprise

- Lowers cost of acquisition by up to 56%
- Reduces cost of ownership by up to 55%*



A strategic systems platform….
Helping to free up resources for critical projects and establish a base for the future

- Based on IBM analysis of a large Financial Services company Datacenter. See details on ibm.com/systems/zenterprise/ Deployment configurations based on IBM studies and will vary based on workload characteristics. Price calculations based on publicly available US list prices, prices will vary by country.

The journey has just begun...

System z Momentum is great !

250+ Companies around the World have migrated Workloads (incl. Oracle Workloads) to System z over the past 18 Months

BANKS

- Banco Itau
- Bank of NZ
- Bank of Montreal
- [Peru]
- Bank of China
- Central Bank of Russia
- FNB Namibia
- Industrial Bank of Korea
- Philippines Savings Bank
- Postbank [Germany]
- [Vietnam]

OTHER FINANCIAL INST.

- DTCC. The Depository Trust & Clearing Corporation
- Allianz

GOVERNMENTS

- CAIXA [Brazil]
- [Kazakhstan]
- NBC The National Business Center [USA]

RETAILERS

- HeiTech

TRANSPORTATION

- Con-way Freight
- БЕЛОРУССКАЯ ЖЕЛЕЗНАЯ ДОРОГА [Belarusian Railways]
- Delta

HEALTHCARE

- Aurora Health Care
- BlueCross BlueShield Association
- UNC HEALTH CARE

HOSTING PROVIDERS

- BRZ Deutschland Bauinformationstechnologie
- finanz informatik
- EFiS FINANCIAL SOLUTIONS
- TRANSZAP
- Atos Origin

UTILITIES / ENERGY

- nationalgrid
- PETROL [Slovenia]

OTHERS

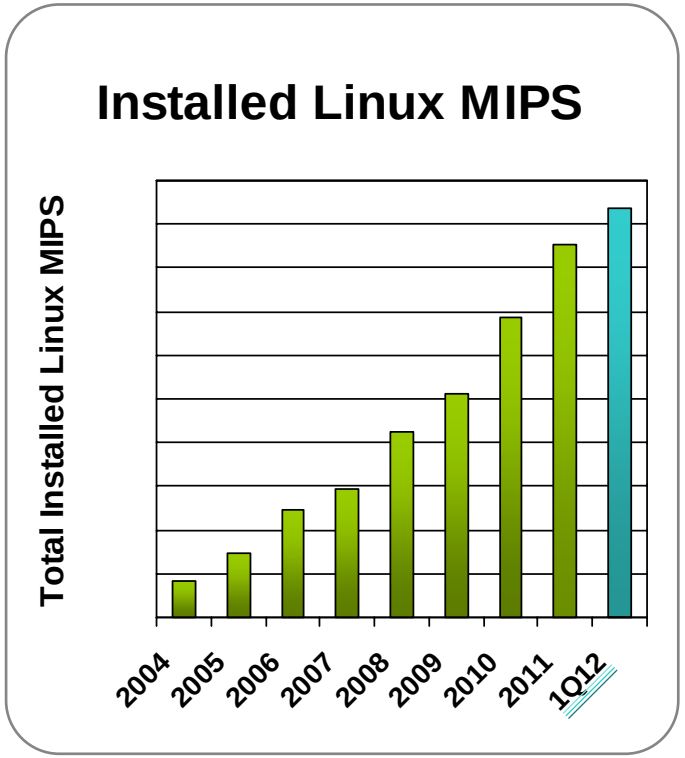
- HOPLON Infotainment [Gaming] [Brazil]
- [Russian Hydrometeorological Research Institute]
- BALDOR [Manufacturer/USA]

Users of Linux on System z

Linux on IBM System z in 1Q2012

Installed Linux MIPS at 39% CAGR*

- 20% of Total installed MIPS run Linux as of 4Q11
- Installed IFL MIPS increased 24% in 2011
- 36% of System z Customers have IFLs installed as of 1Q12
- 70 of the top 100 System z Customers are running Linux on the mainframe as of 1Q12
- 20% increase in Linux only servers from 1Q11 to 1Q12
- 30% of all System z servers have IFLs



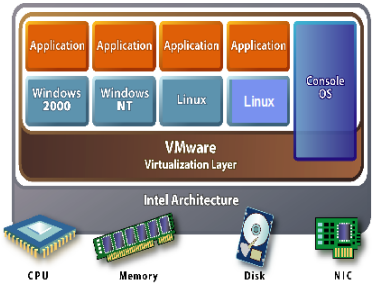
* Based on YE 2004 to YE 2011

IBM focus: Linux on IBM Systems

Linux on System z

- Applications close to the data
- Applications need "Mainframe" criteria
- Vertical and horizontal scaling (hundreds of virtual servers at the same time)
- Great workload-management
- excellent virtualization

Linux on System x



- Low-priced entry
- Simultaneous operation of Windows and Linux via virtualization
- High reliability and simple manageability by Enterprise X-Architektur
- Very good price / performance ratio via Clustering
- Big performance density by BladeCenter

Linux everywhere

Linux on System p

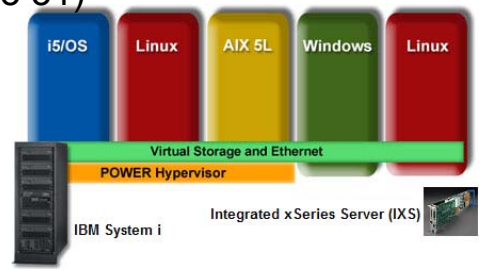
- Applications demanding high performance
- Consolidation of multiple servers / applications via LPARs
- Native Linux or AIX

Linux on CBE

- Applications demanding highest performance
- special purpose

Linux on System i

- If an integrated solution is required (hardware / software / network)
- Simple administration and operation
- If midrange system is required
- Consolidation of applications via LPARs (up to 31)
- High degree of security



Open Source and Linux drives business critical applications

The growth and expansion of Linux as a mature, cost-effective alternative for business-critical workloads

Linux *continues to enable new ways of doing business*

Edge and Web Infrastructure

- Community Driven
- Internet Enabled
- Worldwide Volunteers

Typical Applications

- E-mail Servers
- Apache
- Lightweight database
- DHCP
- HPC

Application and Data Serving

- Open Industry Driven
- Open elements of IT industry join existing community
- Linux adoption in the enterprise accelerates

- e-Business Applications
- Application Servers
- Mission critical database
- Dynamic Business Models

Business-Critical Enterprise Workloads

- Competition Driven
- Accepted as mature, open, lower-cost alternative for hosting DB, BI, ERP, CRM in business-critical environments
- Linux is a permanent presence in the datacenter

- Next-generation workloads
- Virtualization / consolidation
- Cloud and dynamic infrastructure
- New business models

1991 – 2004 | 2005 – 2006 | 2007 – 2012

Fit for Purpose

All of these “tools” can very quickly move a person from one place to another.
But, which one is the right tool to move one person?
Fifty people? Five hundred people?

Platform Selection Is All about Using the Right Tool for the Right Job

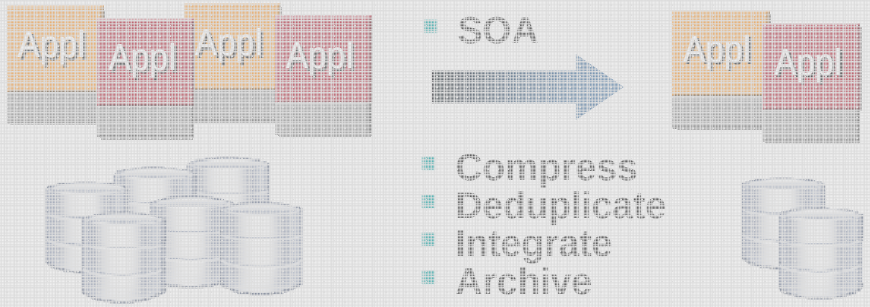
Workload optimized systems

Strategies to Improve Value and reduce Complexity and Costs

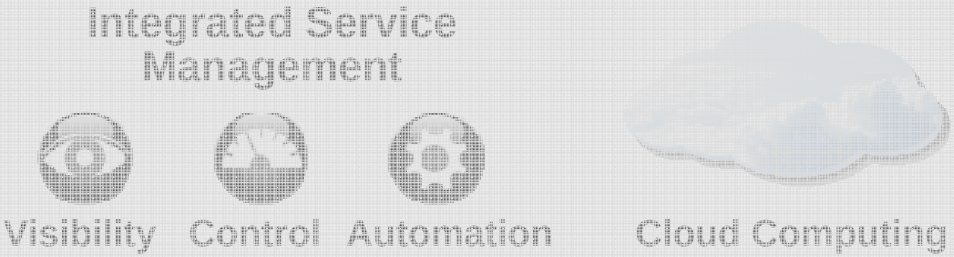
Optimize the Overall IT Environment

- **Simplify Hardware Infrastructure**

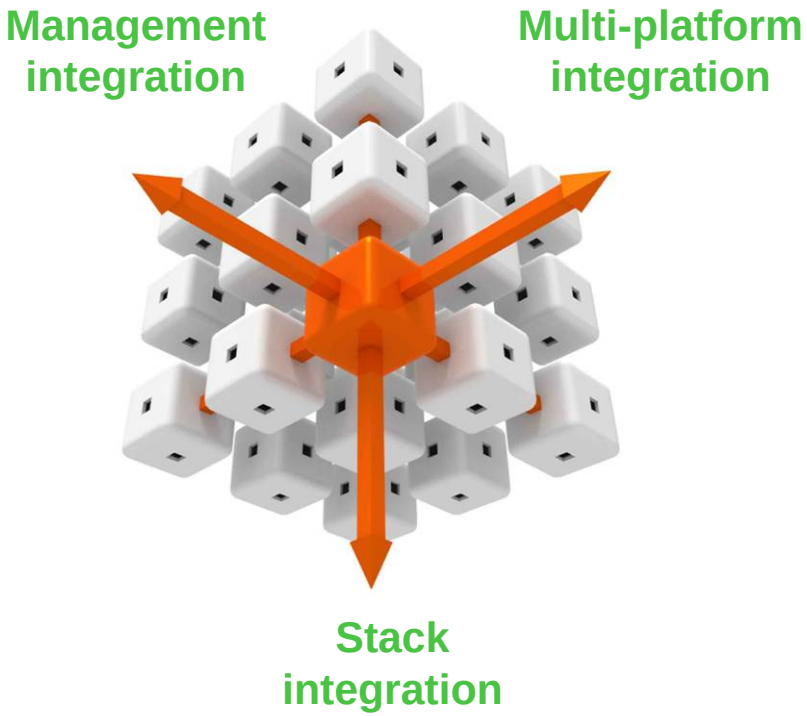
- **Integrate Redundant Software and Data**



- **Improve Service Delivery**

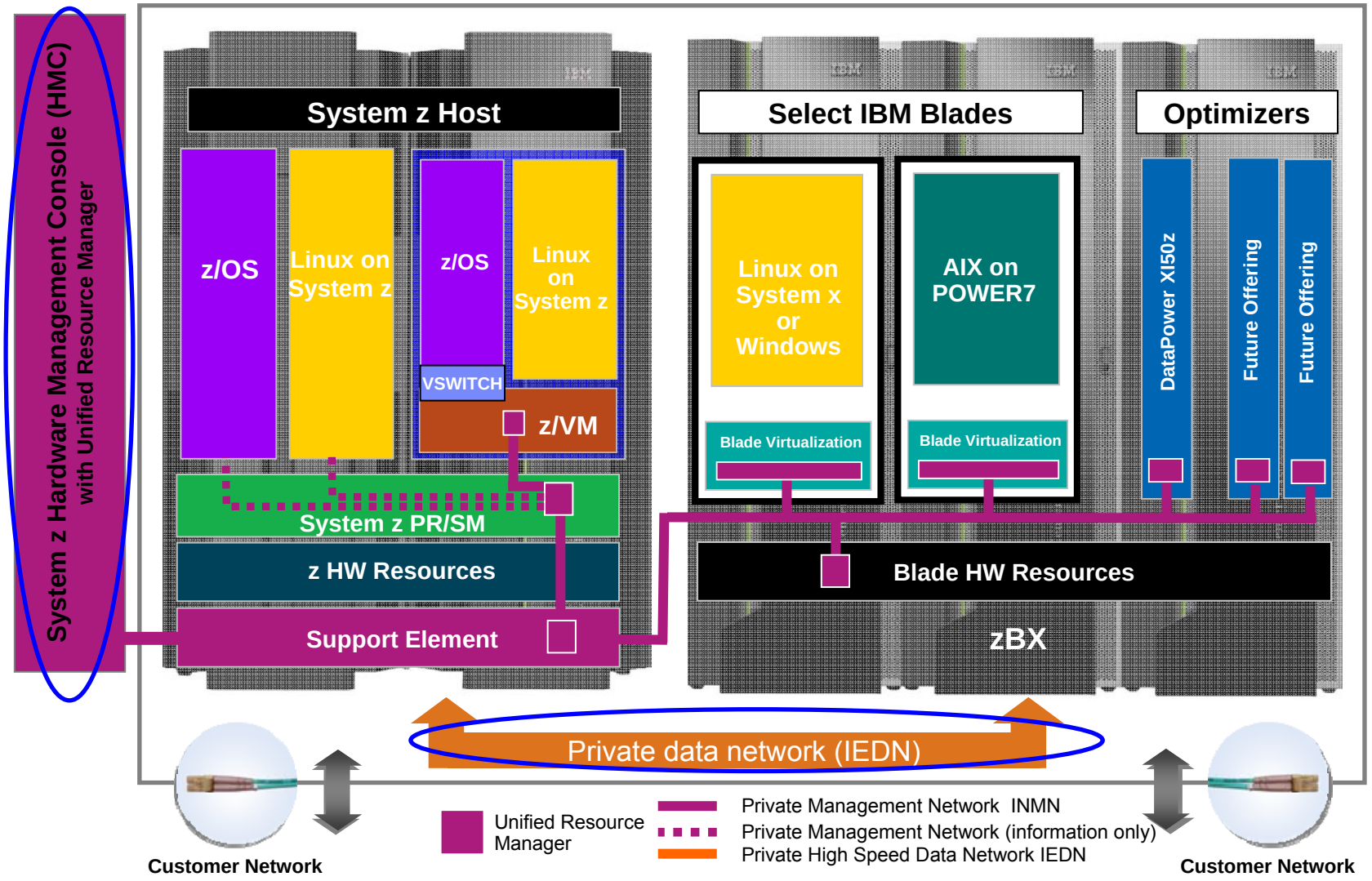


The IBM zEnterprise System
A New Dimension in Computing



- **A “System of Systems”, integrating IBM’s leading technologies to dramatically improve productivity of today’s multi-architecture data centers and private clouds.**
- **The world’s fastest and most scalable enterprise system with unrivalled reliability, security, and manageability.**
- **The industry’s most efficient platform for large scale data center simplification and consolidation.**

The zEnterprise designed for workload integration



Multidimensional Virtualization

Very large Shared Resource Space

Allows for consolidation and tight integration of Large Server Farms

into

VIRTUAL "BLADES"

VIRTUAL "RACKS"

VITUAL NETWORKS

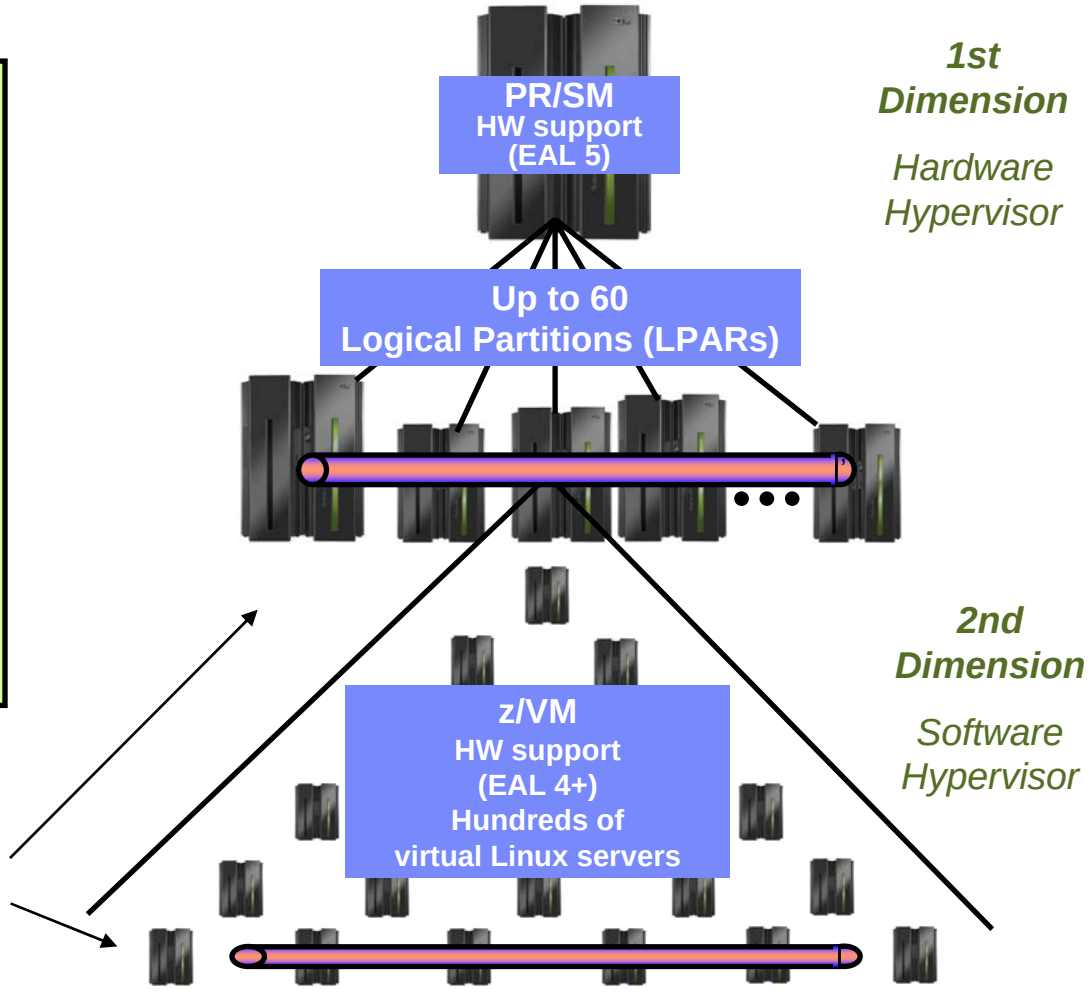
on the same footprint with managed performance, QoS and HW enforced security isolation

High speed (multiple GB/sec) and low latency interconnect

For integration with full integrity/isolation

The power of many

The simplicity of one



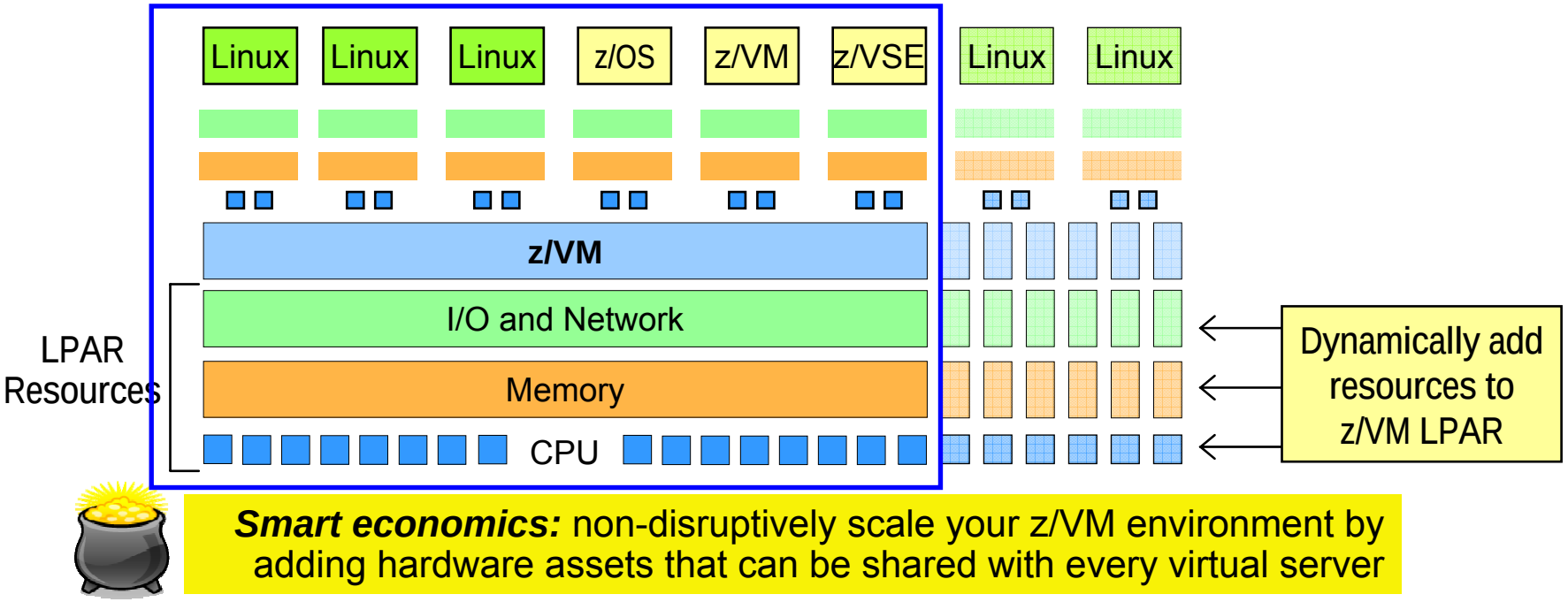
Virtualization is transparent for OS/Application execution
HW Enforced Isolation

Virtualization – platform integration

Virtualization for different workloads on the same layer

z/VM 6.2 Function Enhances System Availability

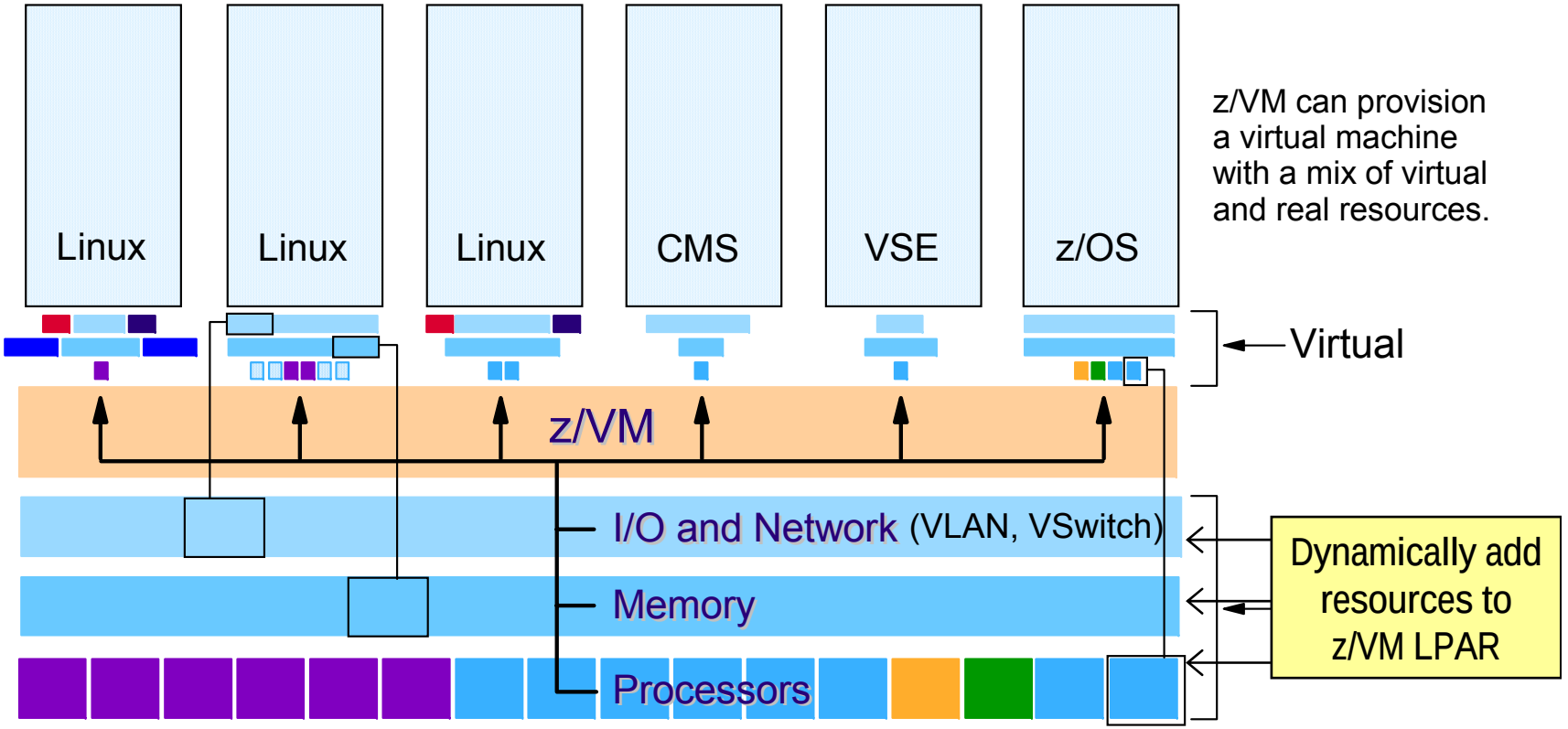
- **Users can non-disruptively add memory to a z/VM *LPAR***
  - **Additional memory can come from: *a)* unused available memory, *b)* concurrent memory upgrade, or *c)* an LPAR that can release memory**
  - **Memory *cannot* be non-disruptively removed from a z/VM LPAR**
- **z/VM virtualizes this hardware support for *guest machines***
  - **Currently, only z/OS and z/VM support this capability in a virtual machine environment**
- **Complements ability to dynamically add CPU, I/O, and networking resources**



Smart economics: non-disruptively scale your z/VM environment by adding hardware assets that can be shared with every virtual server

Virtualization in System z and zEnterprise
z/VM Technology: Share everything

- z/VM simulates the existence of a dedicated real machine, including processor functions, storage, and input/output resources.
- z/VM includes network Virtualization, high availability and integrated security between VMs
- It supports uniquely, over commitment on all levels.

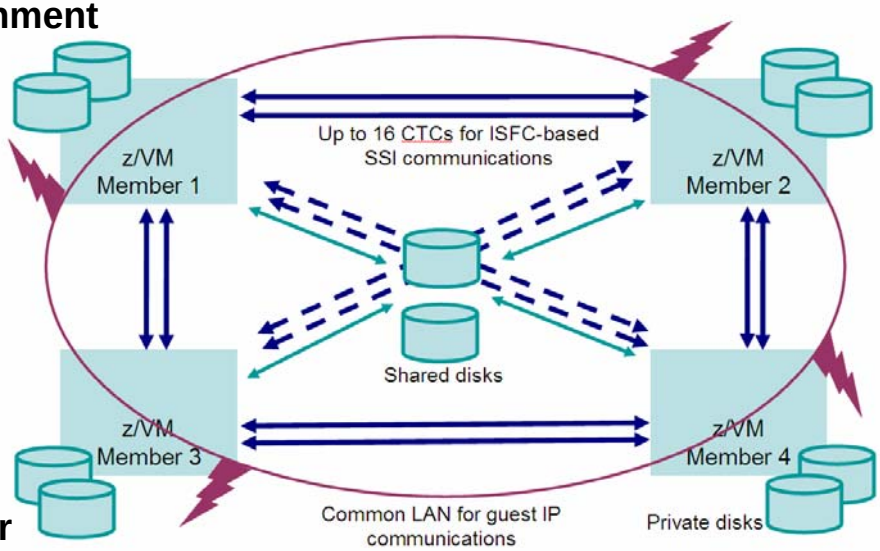


Linux on z/VM is the industry's most advanced virtual solution

z/VM V6.2 - Available since Dec, 2011

Single System Image, Clustered Hypervisor, Live Guest Relocation

- **Single System Image (SSI) - connect up to four z/VM systems as members of a cluster**
- **Provides a set of shared resources for member systems and their hosted virtual machines**
  - Directory, minidisks, spool files, virtual switch MAC addresses
- **Cluster members can be run on the same or different z10, z196, or z114 servers**
- Simplifies systems management **of a multi-z/VM environment**
  - Single user directory
  - Cluster management from any member
    - Apply maintenance to all members in the cluster from one location
    - Issue commands from one member to operate on another
  - Built-in cross-member capabilities
  - Resource coordination and protection of network and disks



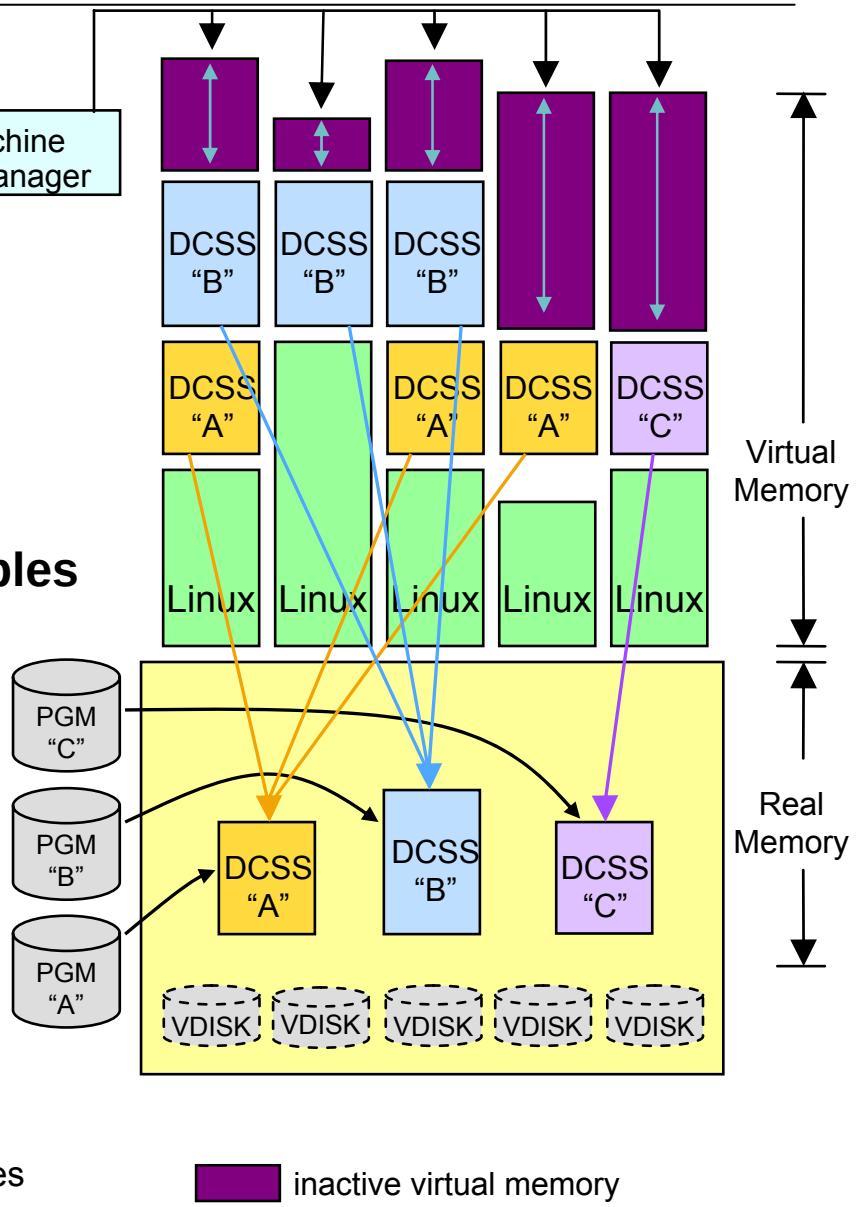
- **Live Guest Relocation (LGR) – Dynamically move Linux guests from one z/VM member to another**

  Reduce planned outages; enhance workload management
  - Non-disruptively move work to available system resources **and** non-disruptively move system resources to work
  - When combined with Capacity Upgrade on Demand, Capacity Backup on Demand, and Dynamic Memory Upgrade, you will get the best of both worlds

Optimize Virtualization with Linux on z/VM - DCSS

Discontiguous Saved Segments (DCSS)

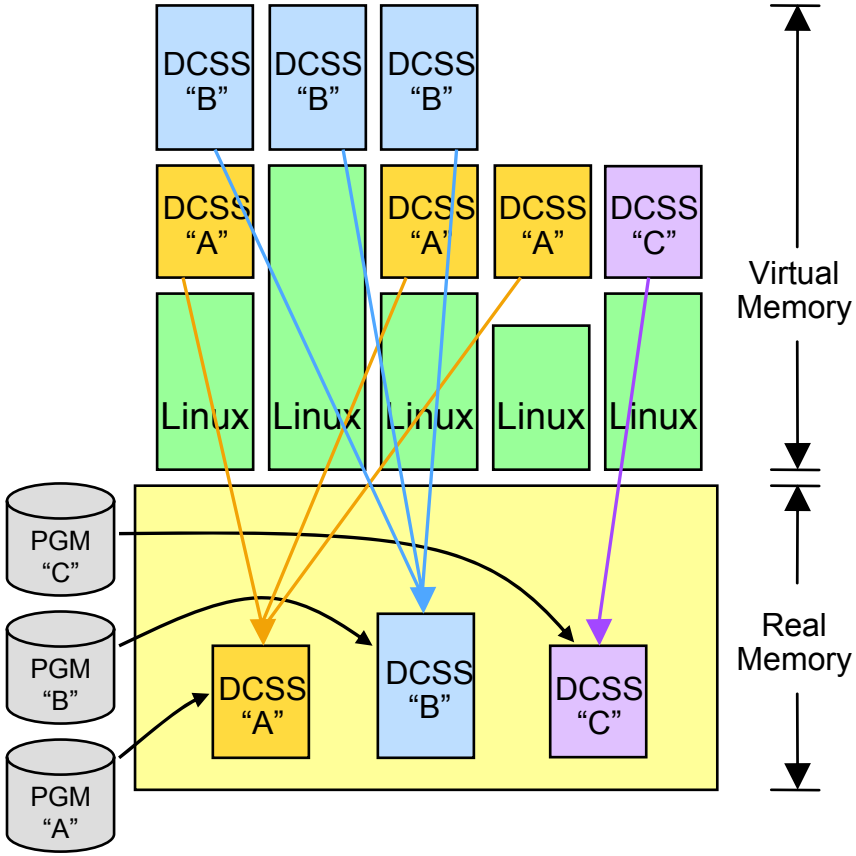
- **Data-in-Memory technology**
  - Share a single, real memory location among multiple virtual machines
  - Reduce real memory utilization
- **Linux exploitation: shared program executables**
  - Execute-in-place (xip2) file system
  - Access to file system is at memory speeds; executables are invoked directly out of the file system (no data movement required)
- **Real memory constraint corrected by z/VM** *Virtual Machine Resource Manager*
  - Linux images signaled to reduce virtual memory consumption
  - Demand on real memory and z/VM paging subsystem reduced
- **z/VM Virtual Disks in Storage (VDISK)**
  - Simulate a disk device using real memory
  - Use VDISKs for Linux swap devices instead of real disk volumes
  - Reduces demand on I/O subsystem



Extreme Virtualization with Linux on z/VM

Linux Exploitation of z/VM Discontiguous Saved Segments (DCSS)

- DCSS support is Data-in-Memory technology
  - Share a single, real memory location among multiple virtual machines
  - Can reduce real memory utilization
- Linux exploitation: shared program executables
  - Program executables are stored in an execute-in-place file system, then loaded into a DCSS
  - Execute-in-place (xip2) file system
  - Access to file system is at memory speeds; executables are invoked directly out of the file system (no data movement required)
  - Avoids duplication of virtual memory and data stored on disks
  - Helps enhance overall system performance and scalability



Strategy with zEnterprise - More options, highly integrated

Network simplification with zBX

Reduce
- Routers
- Switches
- Firewalls

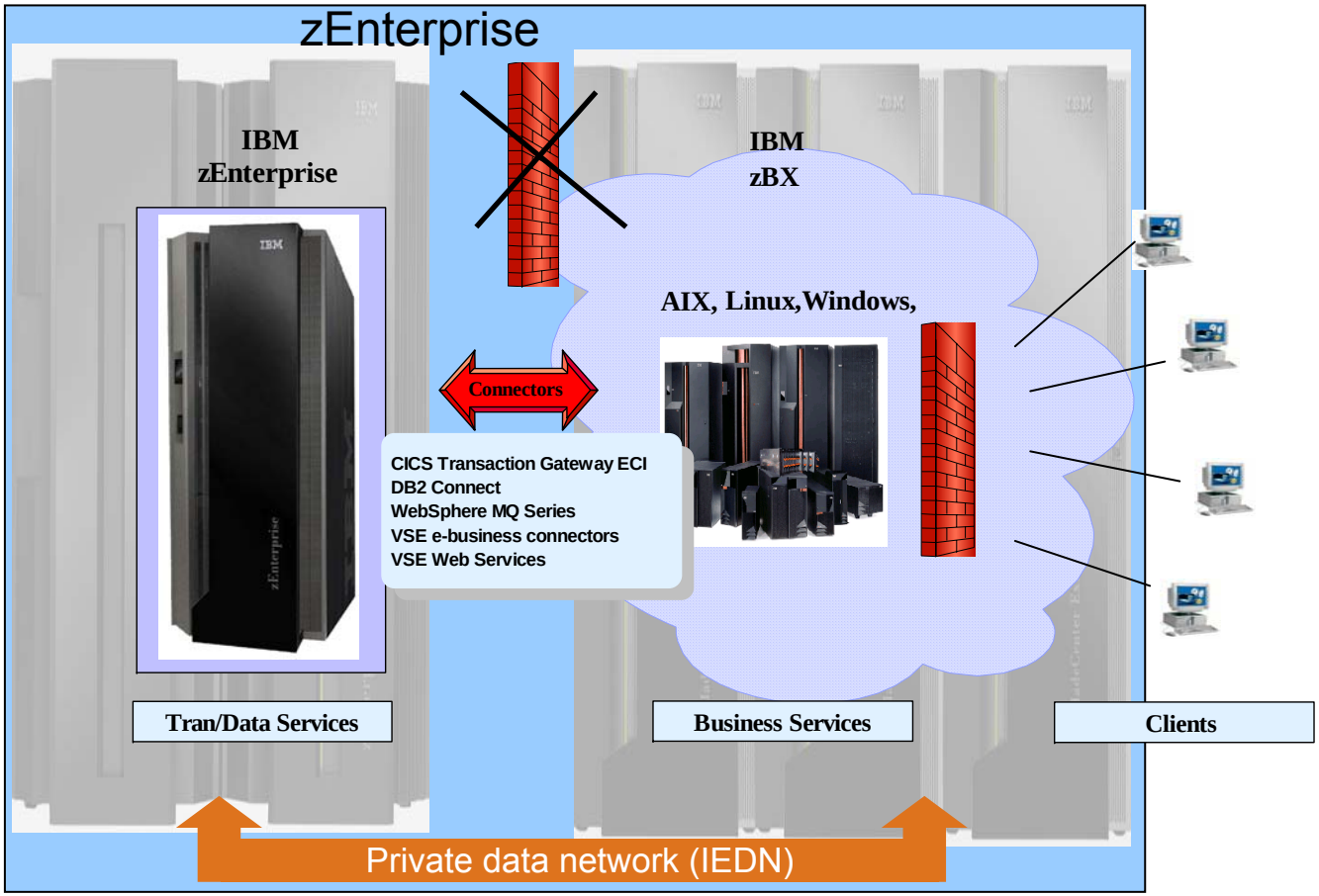
▪Centralize
- DNS Server
- Network filtering
- Work balancer
- Edge Server

▪ LDAP security integration

➢Uses the internal IEDN network.

➢No need for additional DMZ security

➢use standard Intel based software

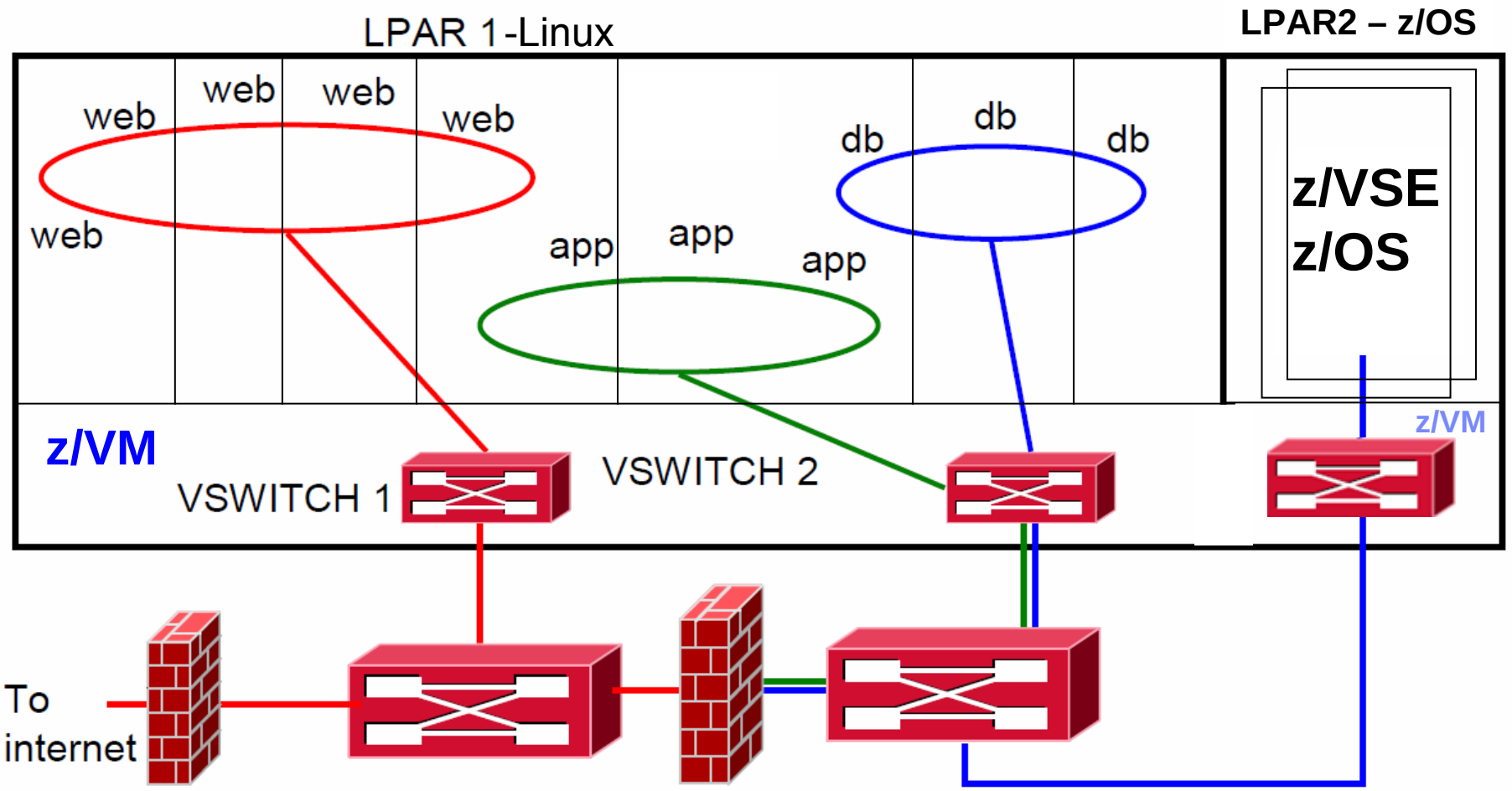


Protect existing z/VSE investments

Integrate using middleware and z/VSE connectors

Extend with zBX or with Linux on z to access new applications & solutions

Multi-zone Network VSWITCH (red zone physical isolation)

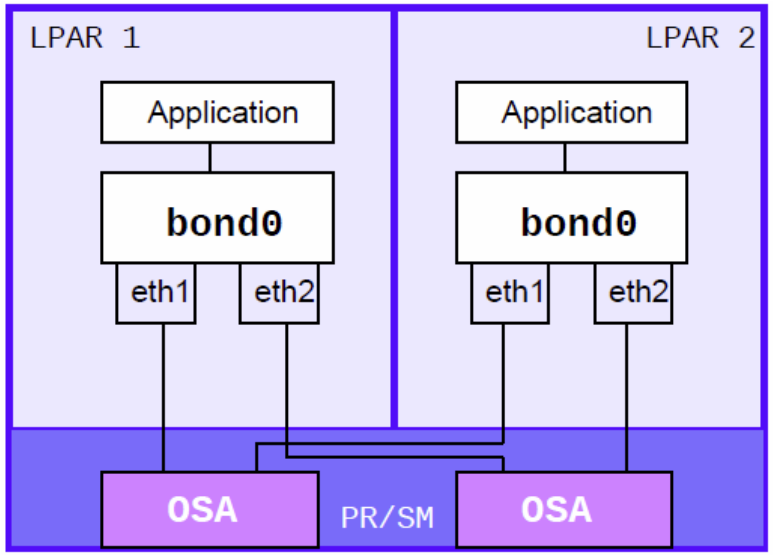


With 2 VSWITCHes, 3 VLANs, and a multi-domain firewall

Network Bandwith, Redundancy and Automated Failover

Resource Virtualization:

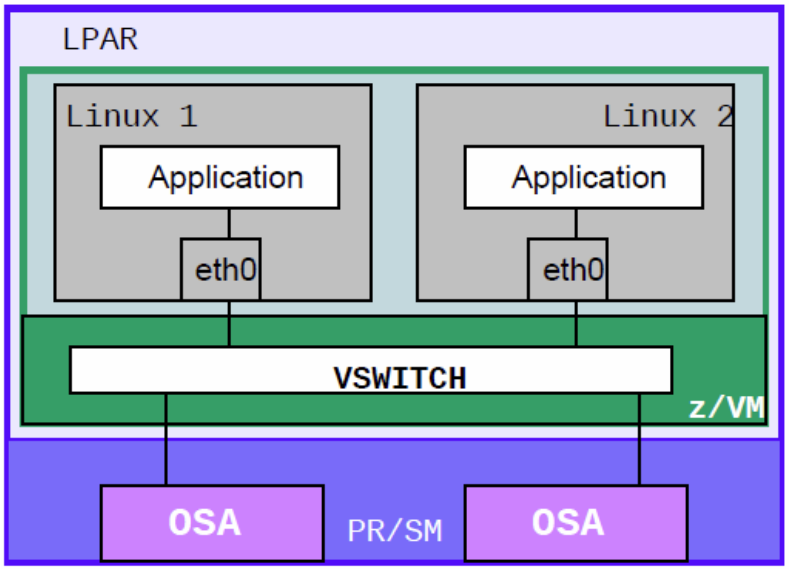
OSA Channel Bonding in Linux



- Linux *bonding* driver enslaves multiple OSA connections to create a single logical network interface card (NIC)
- Detects loss of NIC connectivity and automatically fails over to surviving NIC
- Active/backup & aggregation modes
- **Separately configured for each Linux**

Network Virtualization:

z/VM VSWITCH - Link aggregation

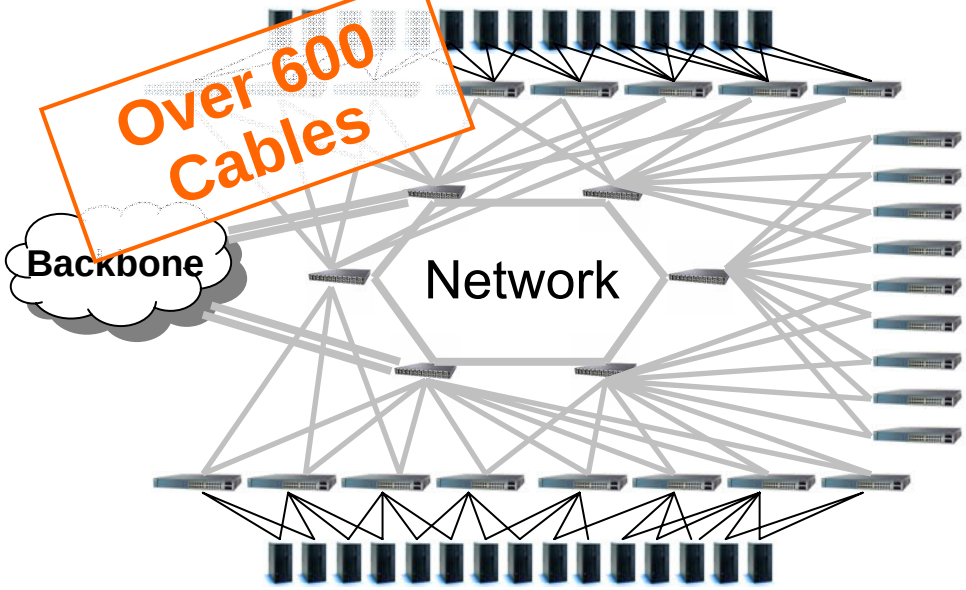


- z/VM *VSWITCH* enslaves multiple OSA connections. Creates virtual NICs for each Linux guest
- Detects loss of physical NIC connectivity and automatically fails over to surviving NIC
- Active/backup & aggregation modes
- **Centralized configuration benefits all guests**

Insurance Company Consolidated 292 Servers to a z10

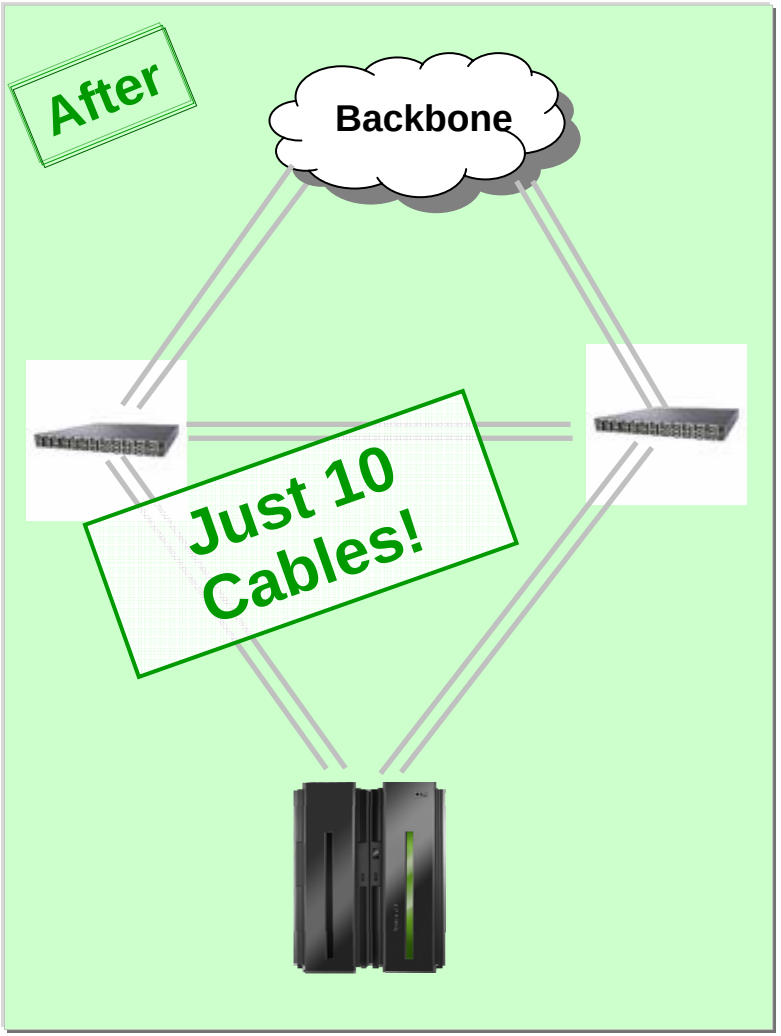
Before

3560E-24TD	8
3560E-24TD	17
3560E-12D	6
50 Ft UTP Cable	584
10GB Eth Fiber Cable	60



The diagram only shows **30** of **292** servers

After



Data is based on real client opportunity and on internal standardized costing tools and methodologies.
Client results will vary by types of workloads, technology level of consolidated servers, utilization factor, and other implementation requirements. Savings will vary by client.

Approach: Host 76 Linux Servers

...should I use ELS & z/VM Enterprise Virtualization or x86 Virtualization?

Enterprise Linux Server

Grow inside the box

X86 Virtualization

<<Rack and Stack>> approach:
Add more Servers

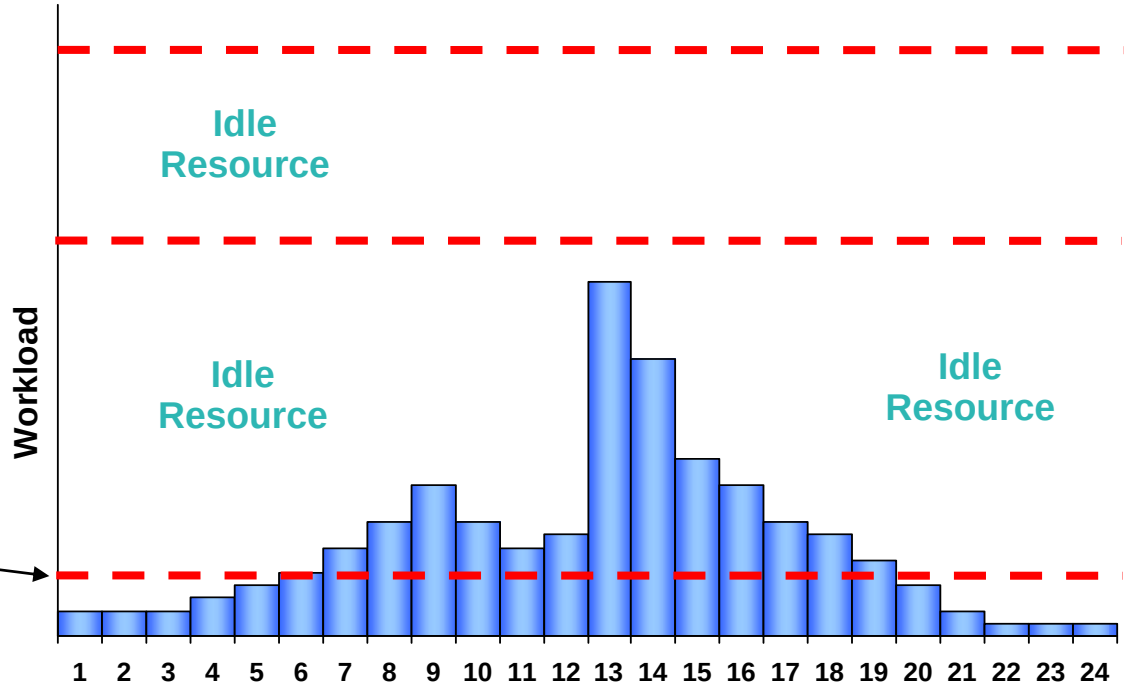
Utilization of Distributed Servers

Provision for expected growth

Provision capacity for peak workload

Server dedicated to one application

Average utilization

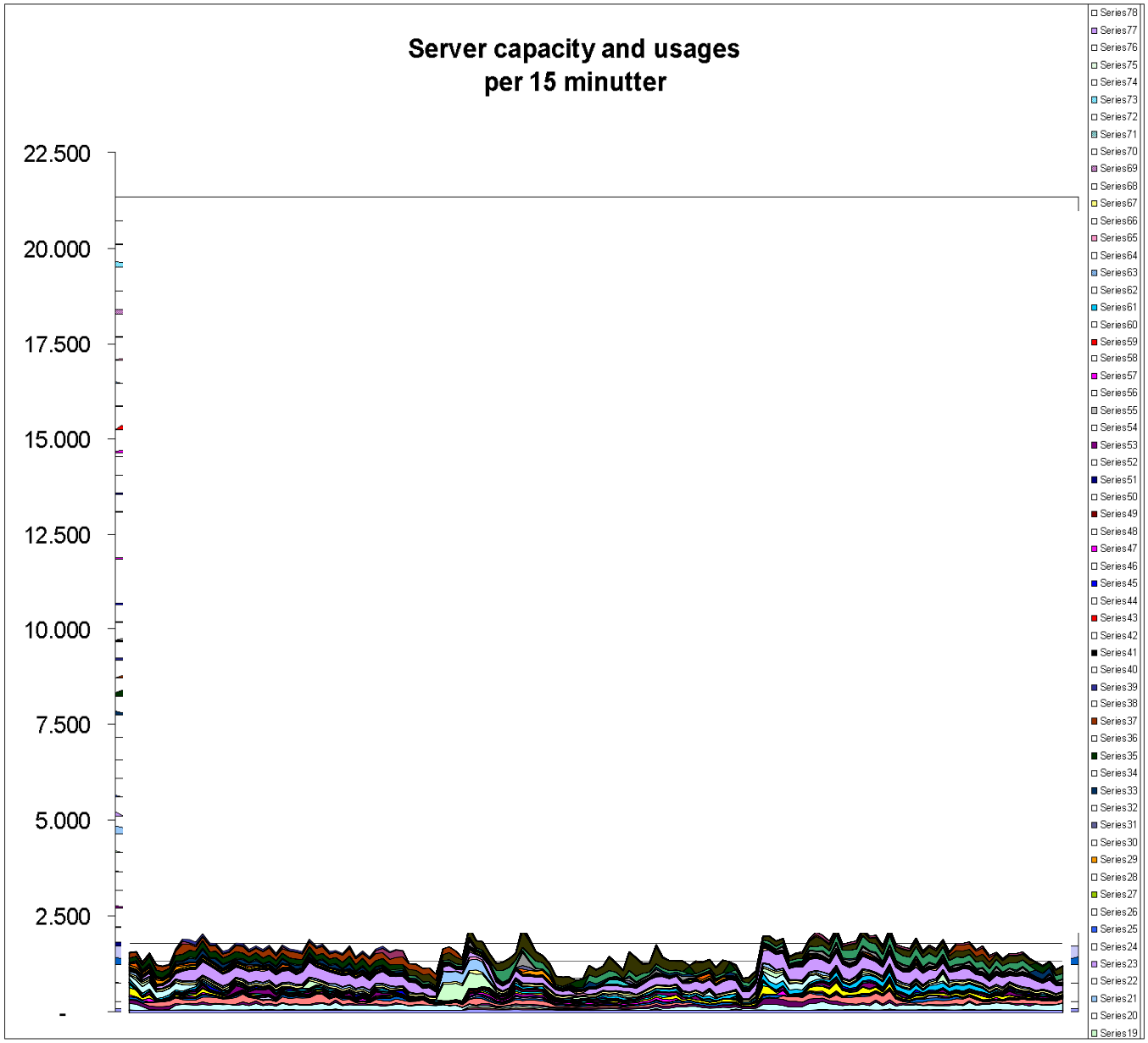


- **Typical utilization of Windows Servers 5 – 10%**
- **Typical utilization of UNIX Servers 10 – 20%**
- **Typical utilization of System z Servers 85 – 100%**

Accumulated USED Distributed Server capacity

RPE2

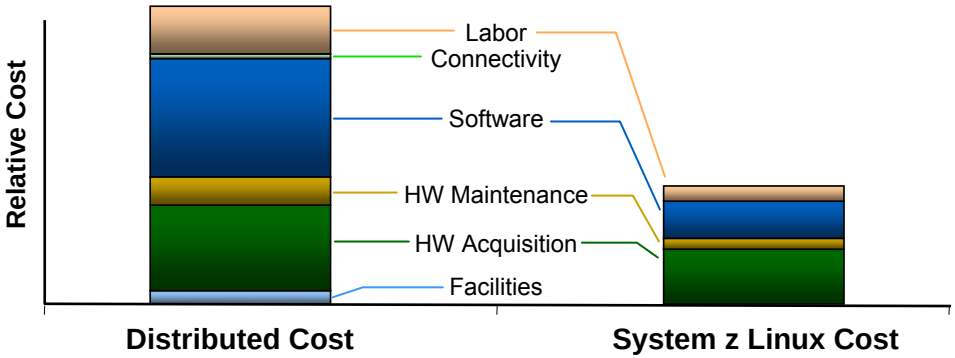
(from Ideas International)



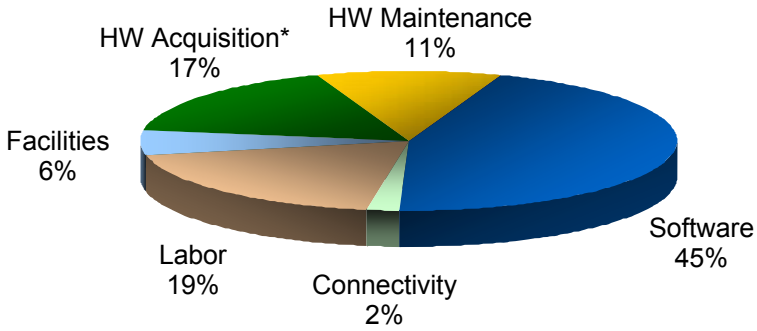
IBM Consolidation: 4500+ servers to Linux on System z

Similar distributed workload vs. System z Linux results in potential 60-75% Gross Costs Savings

Operating Cost: Distributed vs. Mainframe



Potential Savings: Categories as a % of Gross Savings



* HW Acquisition compares server/disk refresh of distributed environment to the cost of acquiring new mainframes/storage

Dramatic Simplification

Unit	Distributed	System z Linux	% Reduction
Software Licenses	**26,700**	**1,800**	**93%**
Ports	**31,300**	**960**	**97%**
Cables	**19,500**	**700**	**96%**
Physical Network Connec-tions	**15,700**	**7,000**	**55%**

Results will vary based on several factors including # of servers and work load types

High Core-to-Core Ratios for Consolidations from Distributed IT-Environments to Linux on System z

Real customer examples with real workloads!

Industry	Distributed Cores	IBM System z10™ Cores	Core-to-Core Ratio*
Public	292	5	58 to 1
Banking	111	4	27 to 1
Finance	442	16	27 to 1
Banking	131	5	26 to 1
Insurance	350	15	23 to 1
Insurance	500+	22	22 to 1
Banking	63	3	21 to 1
Finance	854	53	16 to 1
Health care	144	14	10 to 1
Transportation	84	9	9 to 1
Insurance	7	1	7 to 1

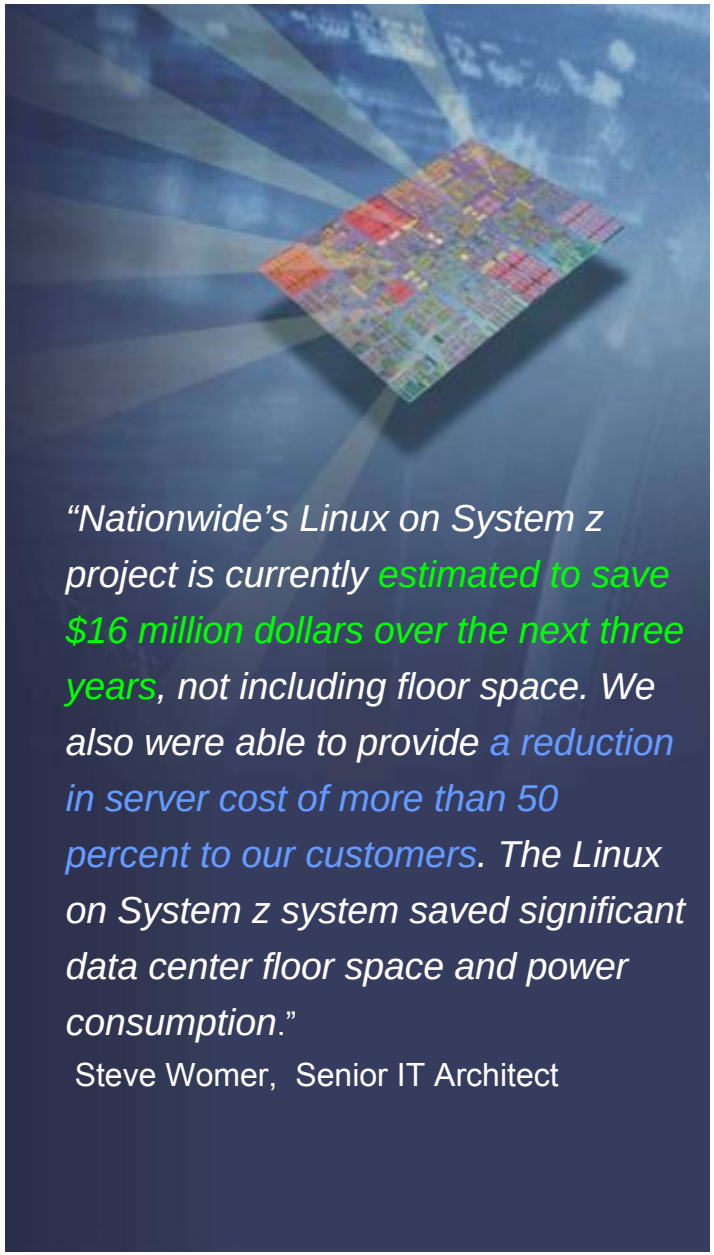
*Client results will vary based on each specific customer environment including types of workloads, utilization levels, target consolidation hardware, and other implementation requirements.

Nationwide®
On Your Side℠

Key Benefits (Value Proposition)

- Expects to save $16M over the next 3 years
- Initial phase consolidated 250+ Production, Development & Test servers to 6 IFLs

- Nationwide.com runs on WebSphere on Linux for System z
- Superbowl 2006 commercial -- anticipate 22X increase in traffic.
- Rent 1 IFL for 2 weeks.
- Test to anticipated load before superbowl.
- Handle superbowl load for a few weeks.
- After superbowl, returned the IFL.
- Zero downtime during this process. Zero time spent acquiring/provisioning new servers. Zero time spent changing server configurations.



"Nationwide's Linux on System z project is currently estimated to save $16 million dollars over the next three years, not including floor space. We also were able to provide a reduction in server cost of more than 50 percent to our customers. The Linux on System z system saved significant data center floor space and power consumption."

Steve Womer, Senior IT Architect

Allianz Australia

Support growth with green savings

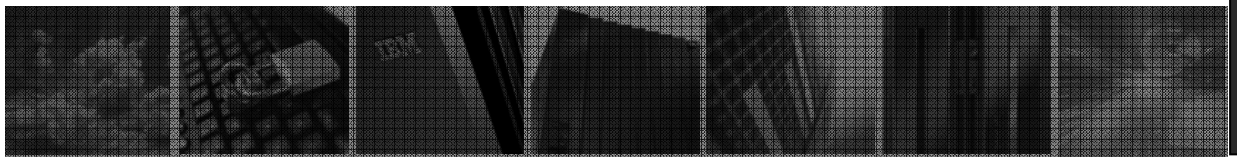
Consolidated **60** Wintel servers → **1** System z

Energy use **40kVA** to **4kVA (-90%)**

$1m Savings in facilities, hardware and software costs

Production cutover 48 hrs
Zero impact to customers

Investment paid back in just over a year



BENEFITS to Clients

Comparison to Distributed

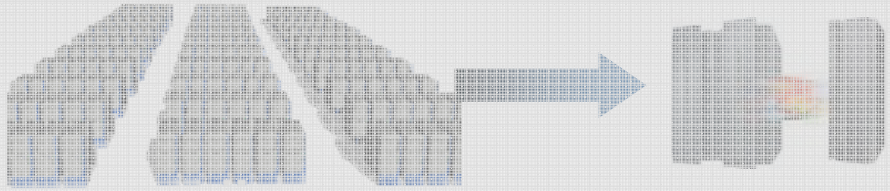
Allianz Australia Limited offers a wide range of insurance and risk management products and services.

Press release: http://www.computerworld.com.au/article/324815/allianz_consolidates_from_60_servers_1_mainframe_48_hours

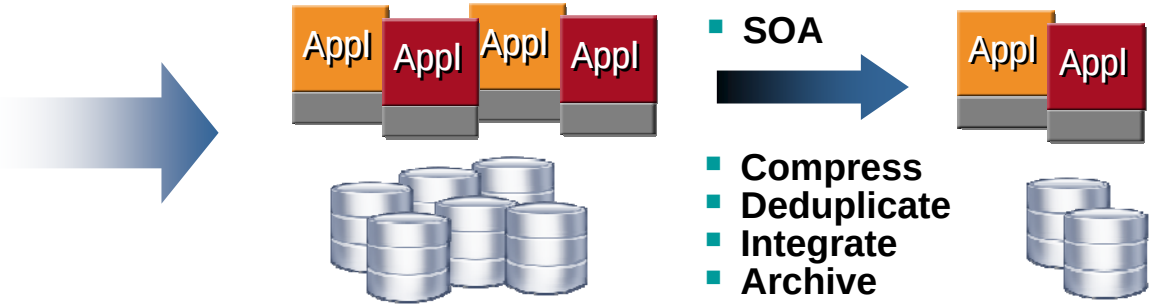
Strategies to Improve Value and reduce Complexity and Costs

Optimize the Overall IT Environment

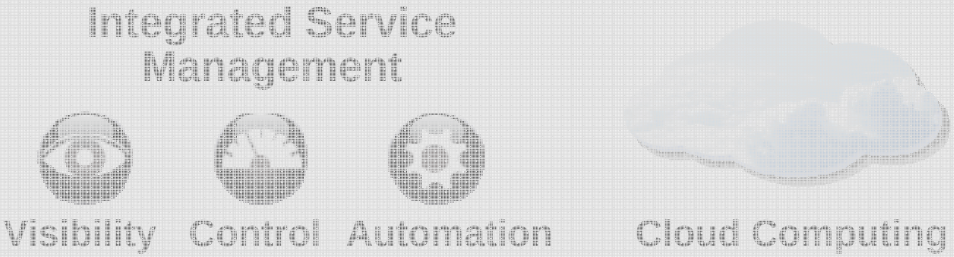
➢ Simplify Hardware Infrastructure



➢ **Integrate Redundant Software and Data**



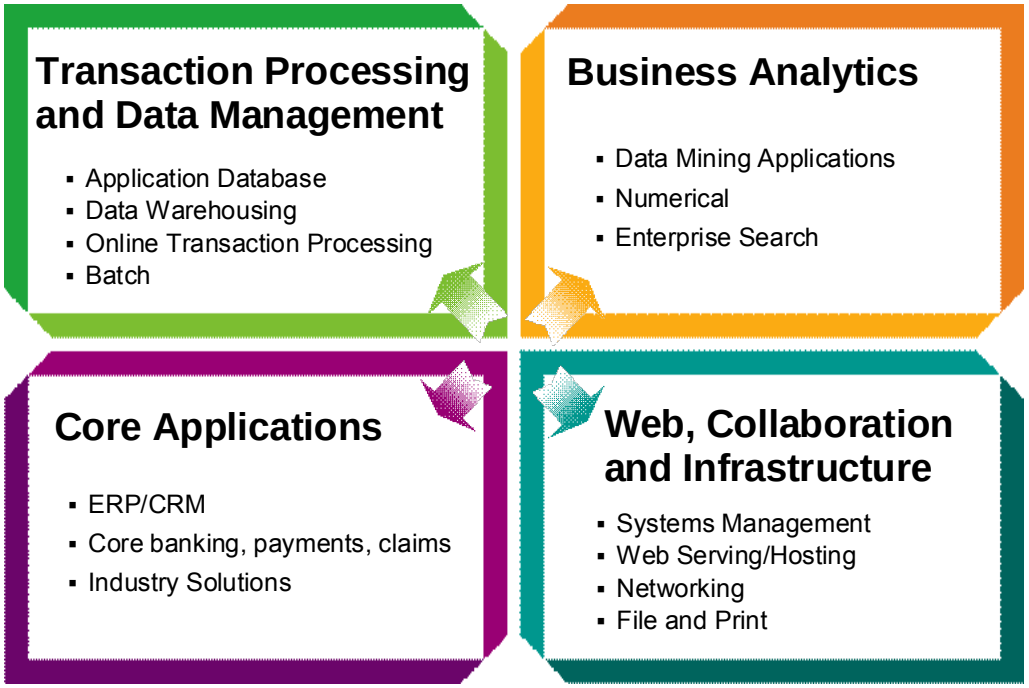
➢ Improve Service Delivery



Do more with less

Requirements for an Enterprise System

Business Applications require integration of multiple workload components with varying workload characteristics



- Explosive systems and data growth require high flexibility and scalability
- Responsiveness to client needs and market opportunities
- Deployment for business processes in mixed workloads, centrally managed
- Optimized single system integration of data, applications, and web serving

A strategic systems platform for critical enterprise applications
Helps to integrate workloads and establish a base for the future

Baldor Electric

An international electrical equipment manufacturer slashes ongoing management costs and drastically improves flexibility with SAP and Linux on the mainframe

- The Challenge
  - Over 8,000 employees in 28 facilities across the globe, rapidly expanding business, overworked IT staff
  - **UNIX and Windows environment sprawling fast and difficult to manage, driving 5-8 outages per year**
  - **Downtime cost Baldor hundreds of thousands of dollars**
- The Solution
  - **A single System z10 mainframe, with 50 virtual servers**
  - **Consolidated 6,000 ft^2 of data center to just 900 ft^2**
  - **Novell SUSE Linux Enterprise Server**
- The Benefits
  - Baldor estimates the solution paid for itself in months by avoiding the cost of planned and unplanned outages
  - Overall IT spend slashed by 45%
  - Reduced energy consumption by 80%

*"We chose Linux over UNIX or Microsoft Windows because we wanted to **standardize on an operating platform that would run on any kind of hardware**."*

*"SUSE Linux Enterprise Server Priority Support for SAP gives us a **single point of contact** for our support issues."*

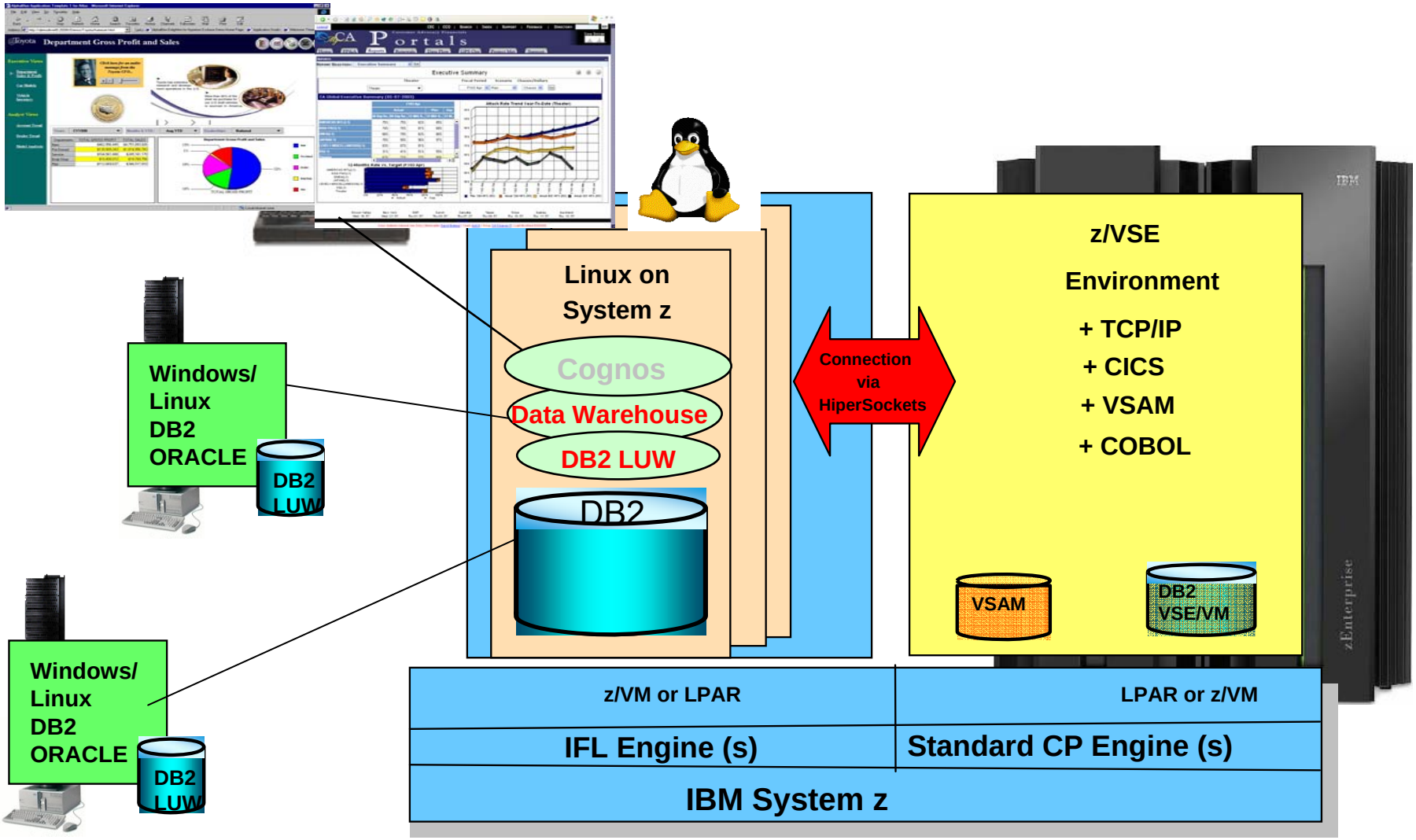
*"It's clear that we made the right decision to move to a mainframe environment and we find that **SAP runs much better on Linux than any other platform**."*

Mark Shackelford,
Vice President of Information Services
Baldor Electric

http://www.novell.com/success/baldor_electric.html
http://www-306.ibm.com/software/success/cssdb.nsf/CS/DNSD-6K9H7V

Data Warehouse and BI with Linux on System z

Consolidate, Integrate, Evaluate - DB2 Client, VSAM Redirector



z/OS or Linux on System z as Data Warehouse and BI

Integrate, Consolidate, Evaluate, Decide,
Explore Business Intelligence (BI)

Windows/
Linux
DB2
ORACLE
DB2

Windows/
Linux
DB2
ORACLE
DB2

Linux on
System z
Cognos
Data Warehouse
DB2 LUW
DB2 /
Oracle

Connectio
via
HiperSock

z/OS
Environment
+ TCP/IP
+ CICS
+ COBOL
Cognos
Data Warehouse
DB2 LUW
DB2
z/OS
IMS
DL/I
VSAM

z/VM or LPAR
LPAR or z/VM
IFL Engine (s)
Standard CP Engine (s)
IBM System z

Service provider Benelux

Business challenge:

A service provider in the Benelux region wanted a solution that would help the company to do the following:

- Achieve economies of scale by simplifying the heterogeneous distributed computing architecture.
- **Use its business intelligence tools as an individualized communication channel with its stakeholders (clients, business partners, shareholders).**

Solution:

IBM helped the client build intelligence architecture by leveraging the scaleable capabilities of its information to increase service. The solution enables also the client to:

- Reduces data content of the data warehouse
- Reduces number of queries
- Redesign and re-implement the data warehouse: expensive and time-consuming and high risk (business continuity) option
- Reconsider the computer architecture.

Benefits:

- The ability to serve multiple users with the very simple architecture from this PoC.
- **An application that does not require a redesign to accommodate its growth in data volumes or in terms of users.**
- **Scalability to a more complex architecture without increased hardware complexity.**

Solution components:

- ***IBM System z10 EC***
- *IBM Information Management* ***Cognos 8 BI***
- ***DB2 9 for Linux*** *UNIX and Windows*
- *WebSphere Application Server for* ***Linux on z***
- *Novell SUSE Linux*

Register for more information at:
ibm.com/software/sw-events/teleconference/P701489M19013R36.html

Customers are talking about our Business Analytics solutions

"The IBM® DB2 Analytics Accelerator delivers the speed to create the insights we need to work smarter. By putting the right answers into the hands of decision makers across our business, enables us puts us to quickly adapt and grow."

Reto Estermann, Director of Information Technology, Swiss Reinsurance Company Ltd.

""The goal is to book inventory down to the last room available to maximize yield," said Kravchenko. We can expeditiously do this from a centralized reservations system, no matter where in the world the reservation is requested."

Misha Kravchenko, Vice President, Global Enterprise Mainframe Systems for Marriott International

"Moved from data mining to full scale data warehousing on System z to deliver the high performance and 24x7 availability required for hospital processes and the consistent uptime, superior scalability and recoverability"

Bob Goodman, Senior Database Administrator, Florida Hospital

"Business users at Chartis Insurance require SLA with no down time, high performance and fast time to market. With System z, business users benefit from seamless up time of 99.99 percent, the fastest performance available and time to market measured in days."

Travis Neel, VP BICC, Chartis Insurance

"Running our data warehouse platform on System z allows us to achieve consistent performance and reliable uptime, which are crucial for maintaining the highest degree of customer confidence in the bank and its services."

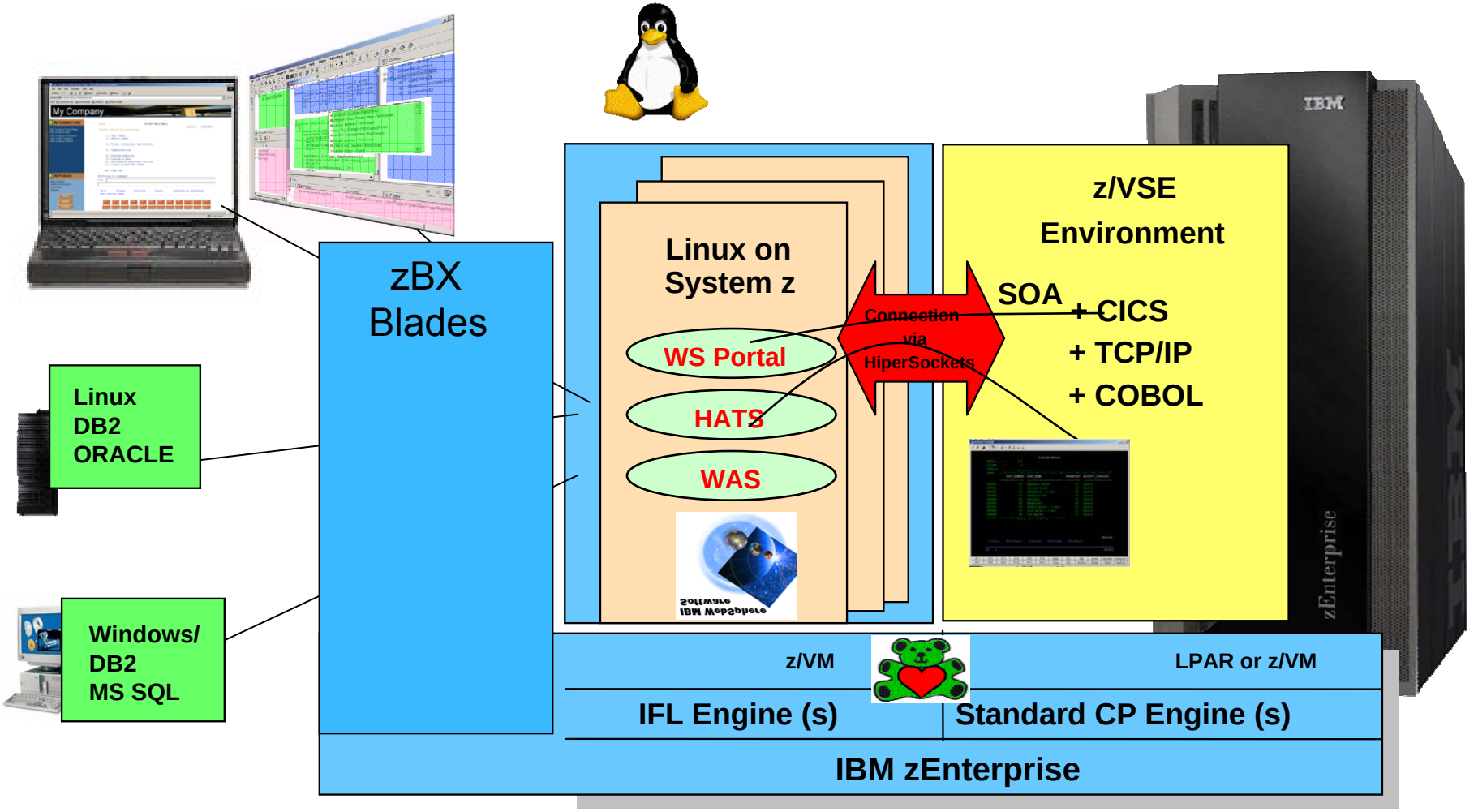
Hermann Schelling, Head of Database Engineering, Zürcher Kantonalbank

"Our commitment to informed decision making led us to consider private cloud delivery of Cognos BI via System z, which is the enabling foundation that makes possible the support of 200,000 users and +$25M savings over 5 years."

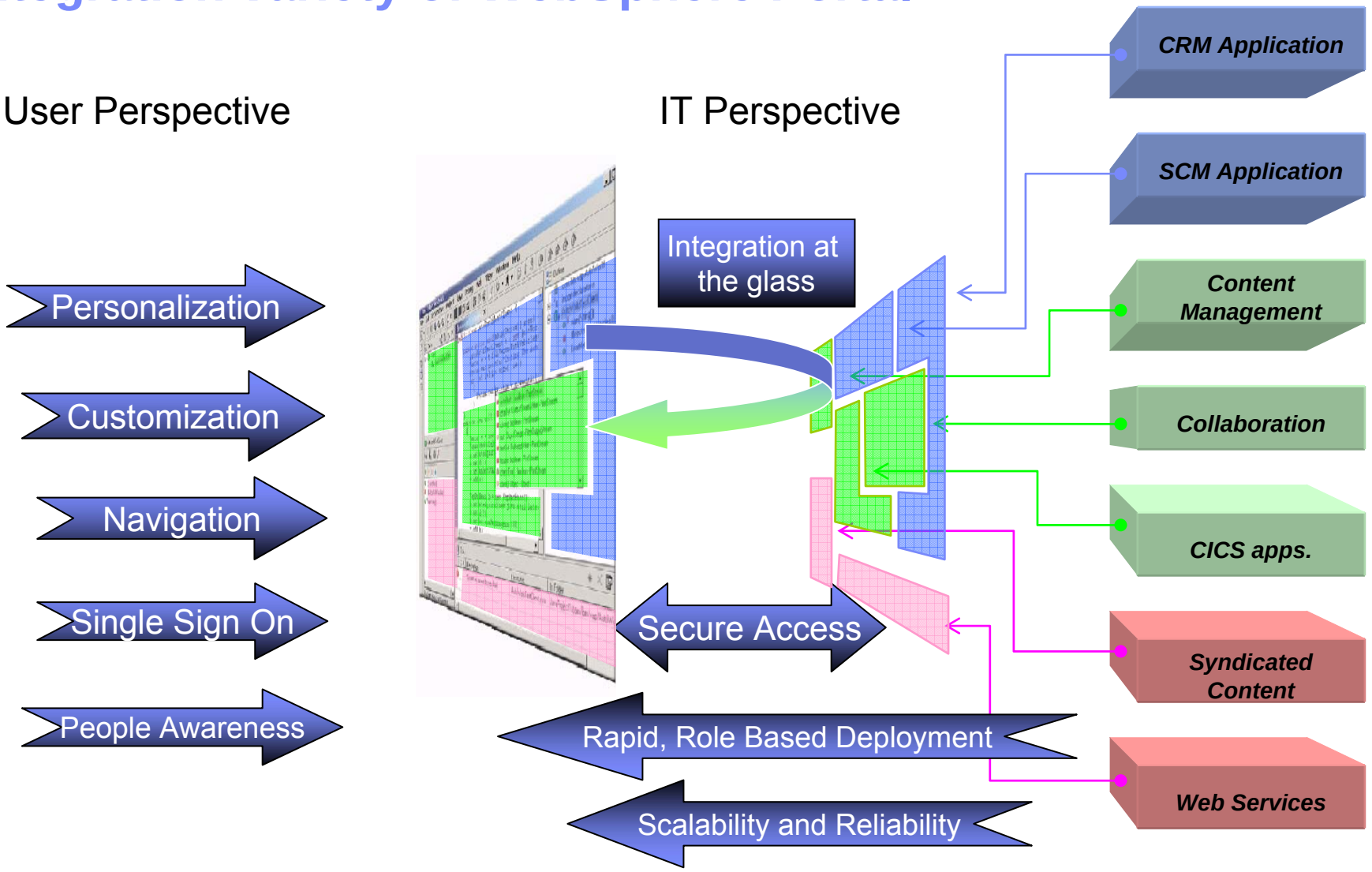
IBM CIO Office

Linux on System z as Central Access Point

Web enable, improve interface, simplify, extend existing applications



Integration variety of WebSphere Portal



Cross platform Application Integration

SOA with ESB – Enterprise Service Bus on zEnterpise

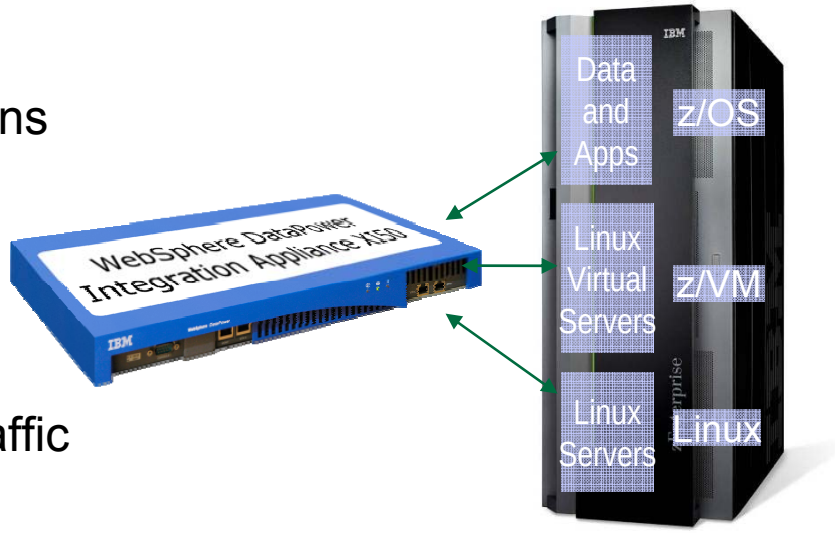
Quickly connects:

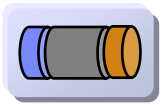
- CICS®-based services
- IMS™-based services
- DB2® database

WebSphere DataPower XI50z for zBX on zEnterprise

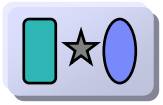
Purpose-built hardware for Enterprise Service Bus (ESB) functionality

- SOA Integration / ESB Message Enrichment / Web Service virtualization for legacy applications
- Enforce high levels of security independent of protocol or payload format
- Integrate with enterprise monitoring systems
- Service level management options to shape traffic

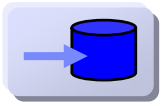




- Advanced protocol-bridging seamlessly supports a wide array of transports, including HTTP, WebSphere MQ, WebSphere JMS, Tibco EMS, FTP, NFS, et al.



- Any-to-any “DataGlue” engine supports XML and Non-XML (Binary) payloads, promoting asset reuse and enabling integration without coding



- Direct database access enables message-enrichment and data-as-a-service messaging patterns (DB2, Oracle, MS-SQL, Sybase)

- High performance architecture creates low-cost, easily-scalable ESB solution for Smart SOA needs

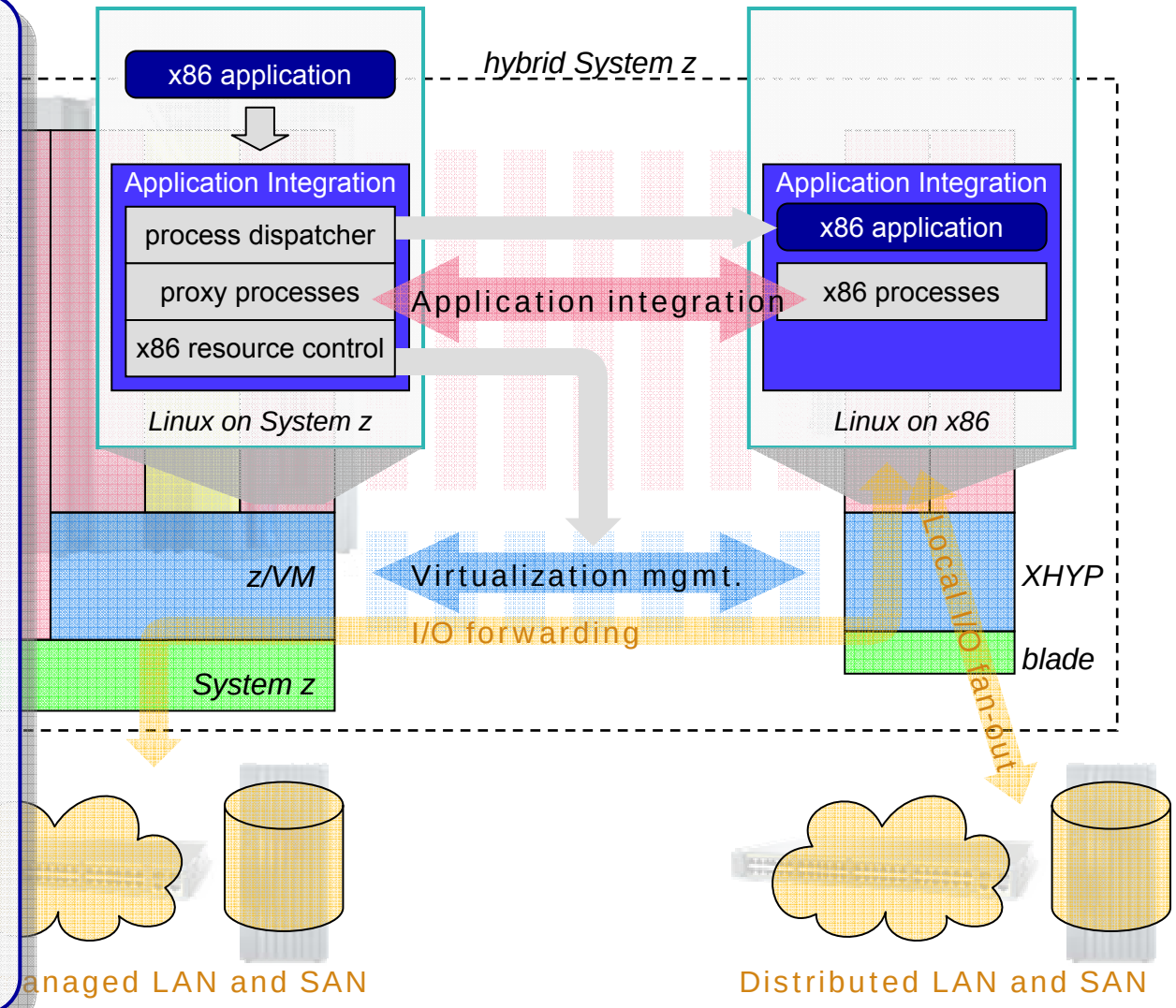
Linux Application Integration
- Linux Intel controlled from Linux on z

Capabilities:

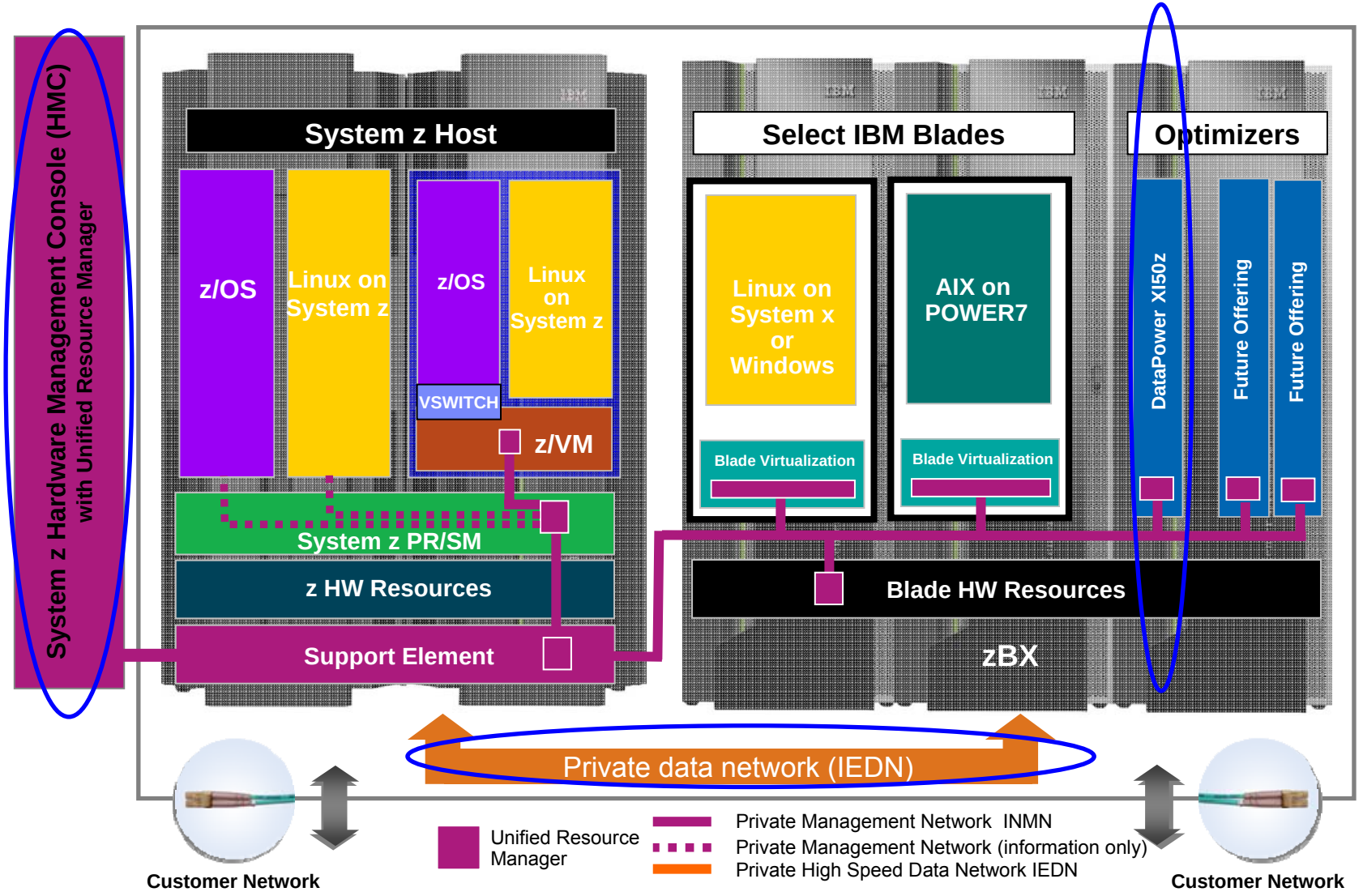
- Reduce complexity: present single system image
- run x86 Linux applications from Linux on System z
- x86 blades feel like additional processor and memory capacity

Values:

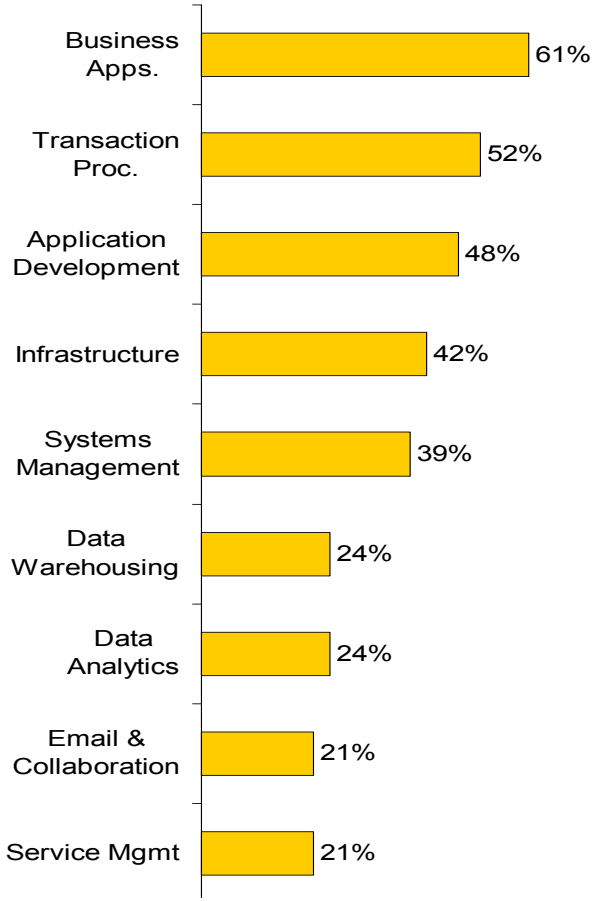
- reduced number of application management endpoints
- retains certified x86 distribution environments
- leverage Linux on System z security model for x86 systems
- can integrate with eWLM, TSA, Energy Management
- converged data management to better comply to regulatory requirements
- offline and online package management for both sides
- complete consolidation scenarios



The zEnterprise designed for workload integration



Client Feedback: Preferred Workloads on Linux on z

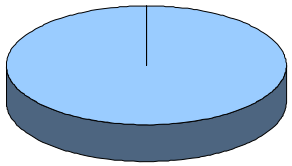
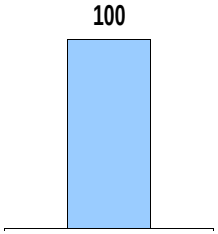
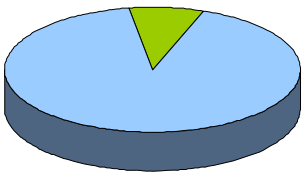
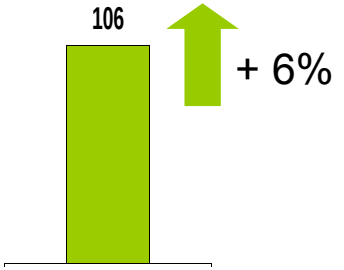
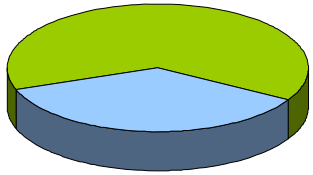
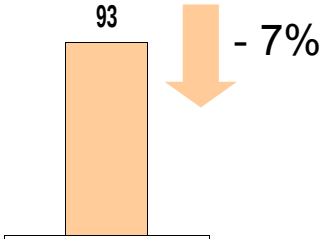


Source: IBM Market Intelligence Mar2012 , Percentage of survey respondents

Recommended workloads for Linux on System z:

- **Data services**: Cognos, SPSS, DB2, InfoSphere, Informix, Oracle Database, Builders WebFOCUS, …
- **Business applications**: WebSphere Application Server, WebSphere Process Server, WebSphere Commerce, SAP, …
- **Development & test**: e.g. of WebSphere/Java applications – Rational® Asset Manager, Build Forge®, ClearCase®, Quality Manager
- **Email & collaboration**: Lotus Domino, Lotus Collaboration (Sametime, Connections, Quickr, Forms) WebSphere Portal, …
- **Enterprise Content Management**: FileNet Content Manager, Content Manager, Content Manager On Demand
- **Business Process Management**: Business Process Manager, WebSphere Business Monitor, FileNet Business Process Manager, WebSphere Operational Decision Management, …
- **Infrastructure services**: WebSphere MQSeries®, WebSphere Message Broker, WebSphere Enterprise Service Bus, DB2 Connect, FTP, NFS, DNS, Firewall, Proxy, …
- **Cloud management**: Infrastructure (IaaS), Platform (PaaS), Software (SaaS), Business Process as a Service – Tivoli System Automation Manager, Tivoli Provisioning Manager, Integrated Service Management for z, Maximo Asset Management, …

Overcommitment Test Results

Memory – less is better		Performance – more is better
 **100%**	**BASE settings = 100%** • Sum of guest size definition • Base performance	
8% overcommit 	**OPTIMAL settings** + Reduce memory by 8% + Improved performance by 6%	
64% overcommit 	**CHEAPEST settings** + Reduce memory by 64% – Decreased performance by 7%	

Test Scenario

- Test environment
  - Running a mix of server types as Linux guests on z/VM:
    LPAR with 28GB central storage + 2 GB expanded storage

Guest workload	Guest Memory
WebSphere Application Server	**13.5 GB (Java heaps 8GB)**
Database DB2	**12.0 GB (memory pools about 2 GB)**
Tivoli Directory Server (ITDS)	**1.5 GB**
Idling guest	**1.0 GB**

- **Test scenarios**
  - Leave the guest size fix
  - Decrease the LPAR size in predefined steps to scale the level on memory overcommitment
  - Measure the execution time of a predefined workload (TPM)

113 of top 120 banks by asset size choose System z…

To directly impact the bottom line

SMART IS

Reducing costs and serving the client

Caixa Galicia: Dramatic growth and national success, spurred by lean , efficient System z to deliver bank transaction costs 30% below Spain Average

To serve the customer

SMART IS

Business continuity, security and agility

Handelsbanken (Sweden): *"Customers entrust us with their hard earned savings so it's paramount that we select one of the industry's most powerful and secure servers - the IBM System z,"* said Roger Rydberg, technical manager at Handelsbanken. *"[System z] allows us to keep up with business climate changes because we can add or eliminate capacity any time based on customer demands. We can even make changes easily without having to stop any services."*

To deliver growth

SMART IS

Improved speed to market with integration

St Georges Bank: Integration of disparate systems and data to improve customer service, bringing new products to market. *"We no longer want to invest the time and resources in two or three year initiatives. Business is changing so fast these days that we can't afford to roll something in production that represents the thinking of three years ago."*

Smart is not just for existing mainframe clients:

Vietnam: Protecting data from risks, while allowing responsiveness to the high demands of banking

VietinBank

Quotes and Case Studies Financial Institutes

- **"Our core banking modernization will place us well ahead of our competitors. The new architecture behind the SAP platform gives us the power to treat IT as a utility." - Michael Harte, chief information officer, Commonwealth Bank Group**
- **Montserrat Torres Torres, Computer Systems Manager, Banco Pastor says, "With the IBM z10 System servers, we resolved our issues of scalability, speed and cost. We have reduced our footprint by ten times, and minimized our overall business risks. The z10 servers are based in two separate sites and provide us with the utmost security by ensuring that even if there is a natural disaster we can maintain high availability.**
- **Thanks to the IBM System z platforms, virtualization technologies and the SUSE Linux Enterprise Server for System z operating system, EFiS EDI Finance Service AG successfully consolidated its environment while deploying hundreds of Linux instances to support its performance requirements.**

CLABBY ANALYTICS

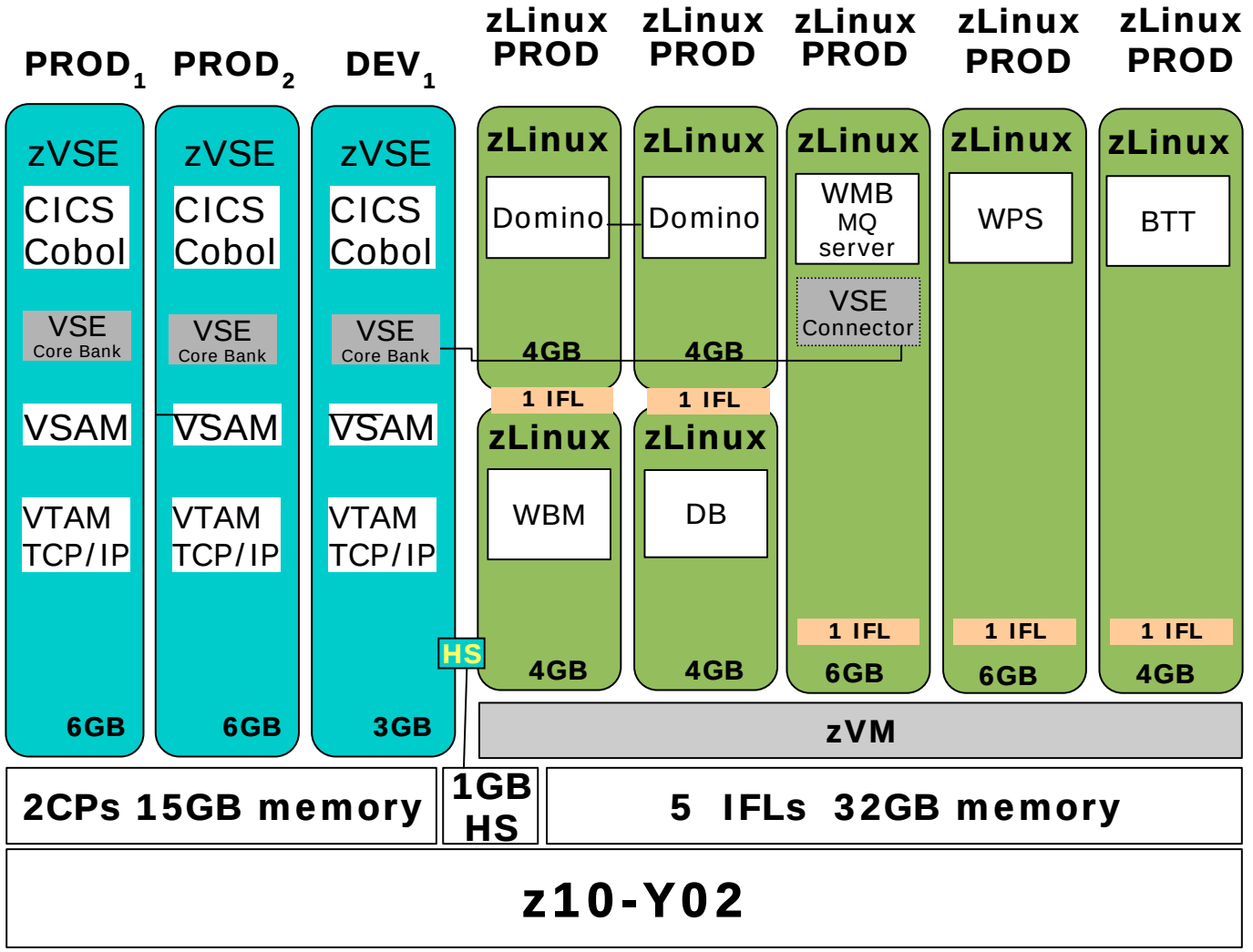
Case Study

According to Ahmed Mohammed Anwar, Al Rajhi Bank's Head of Production, a move to distributed computers would not help the bank meet is processing goals in the timeframe the bank needs to meet them due to government mandated deadlines.

Al Rajhi Bank's 3000 MIP IBM Mainframe: The Best Machine for the Job

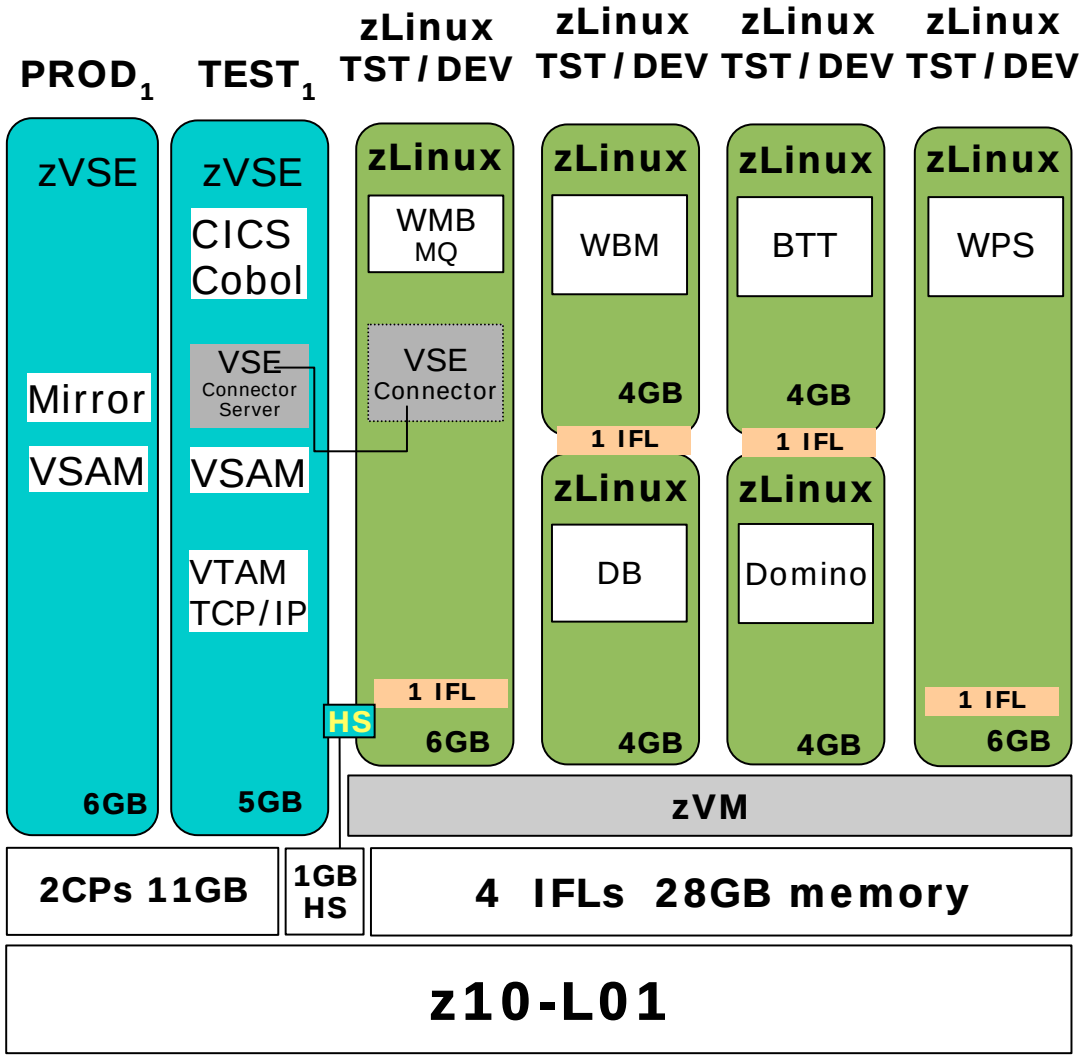
IBM zEnterprise 114 and zBX

Production Site Layout for SOA and Domino



Asian Bank - DR

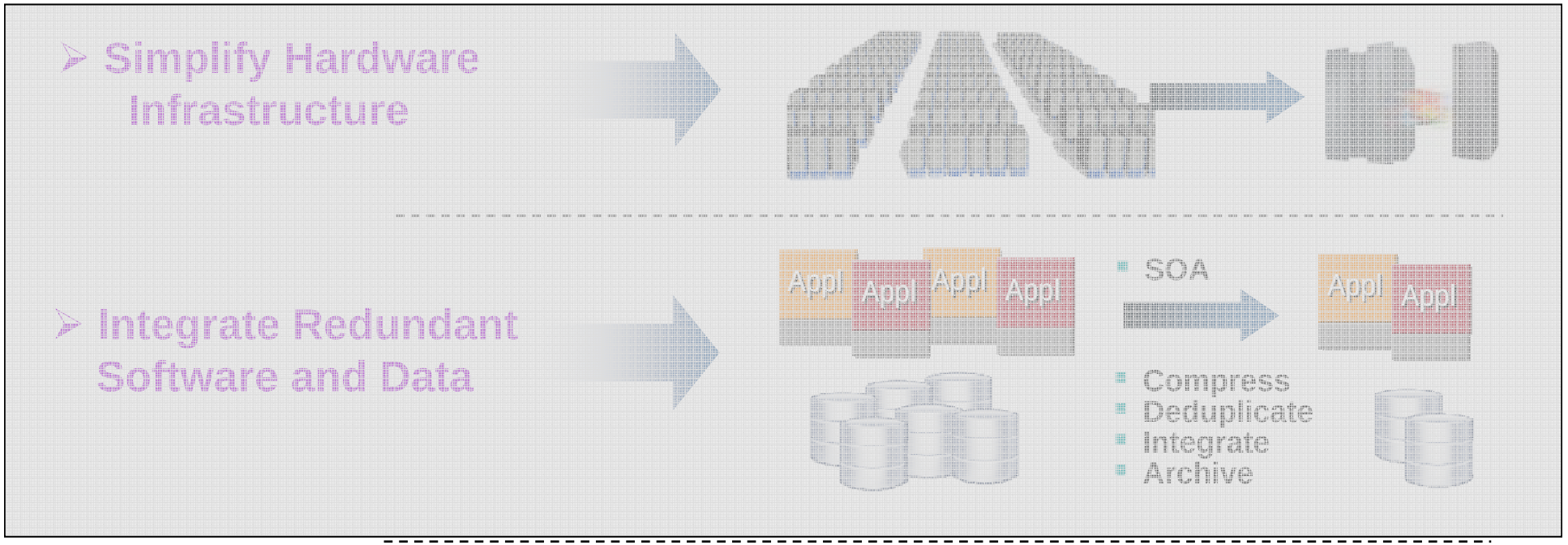
DR Site Layout for SOA and Domino



HS - Hipersockets

Strategies to Improve Value and reduce Complexity and Costs

Optimize the Overall IT Environment



Improve Service Delivery

Integrated Service Management

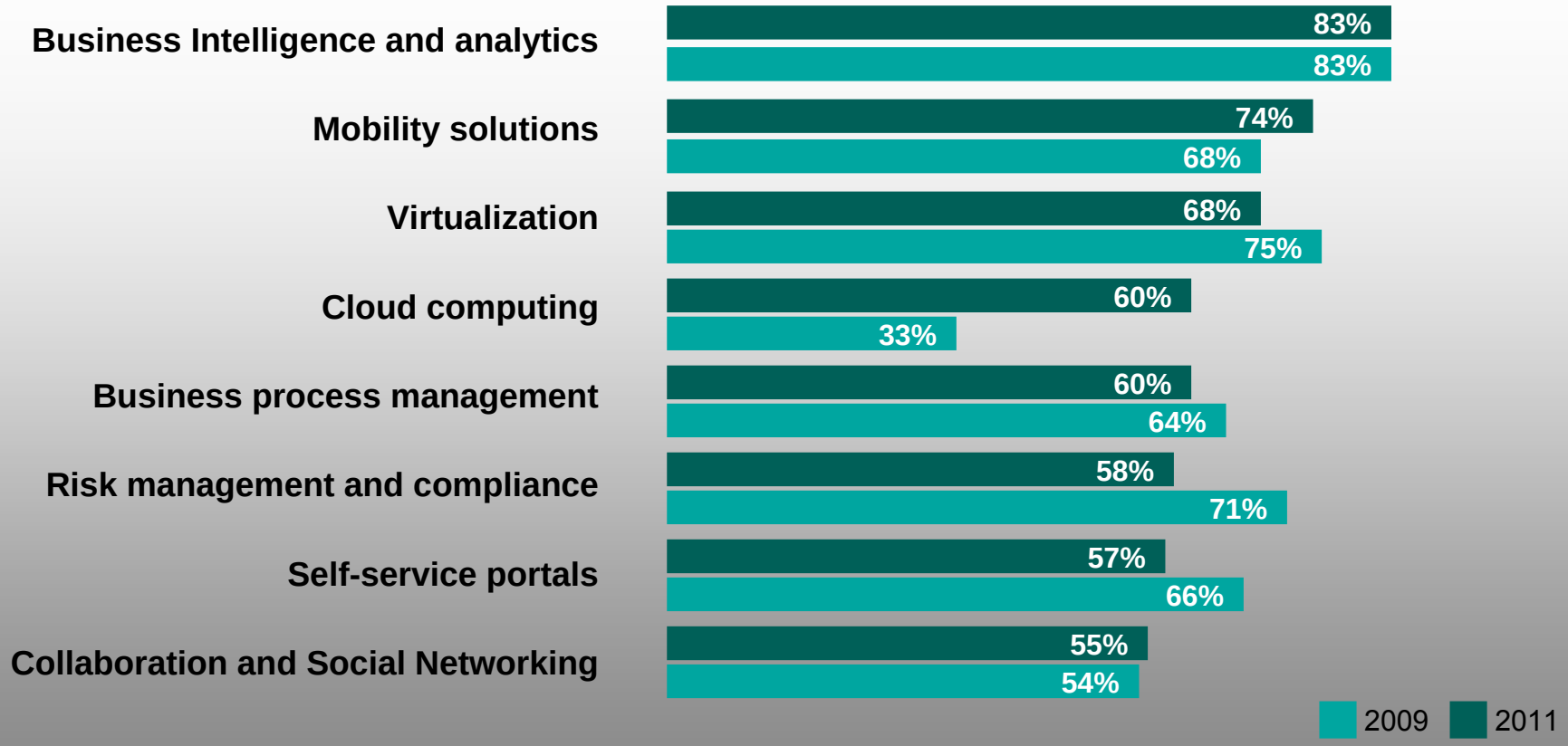
Visibility **Control** **Automation**

Cloud Computing

CIO plans today: business intelligence and analytics remain at the top, with cloud computing moving into the top four

Most important visionary plan elements

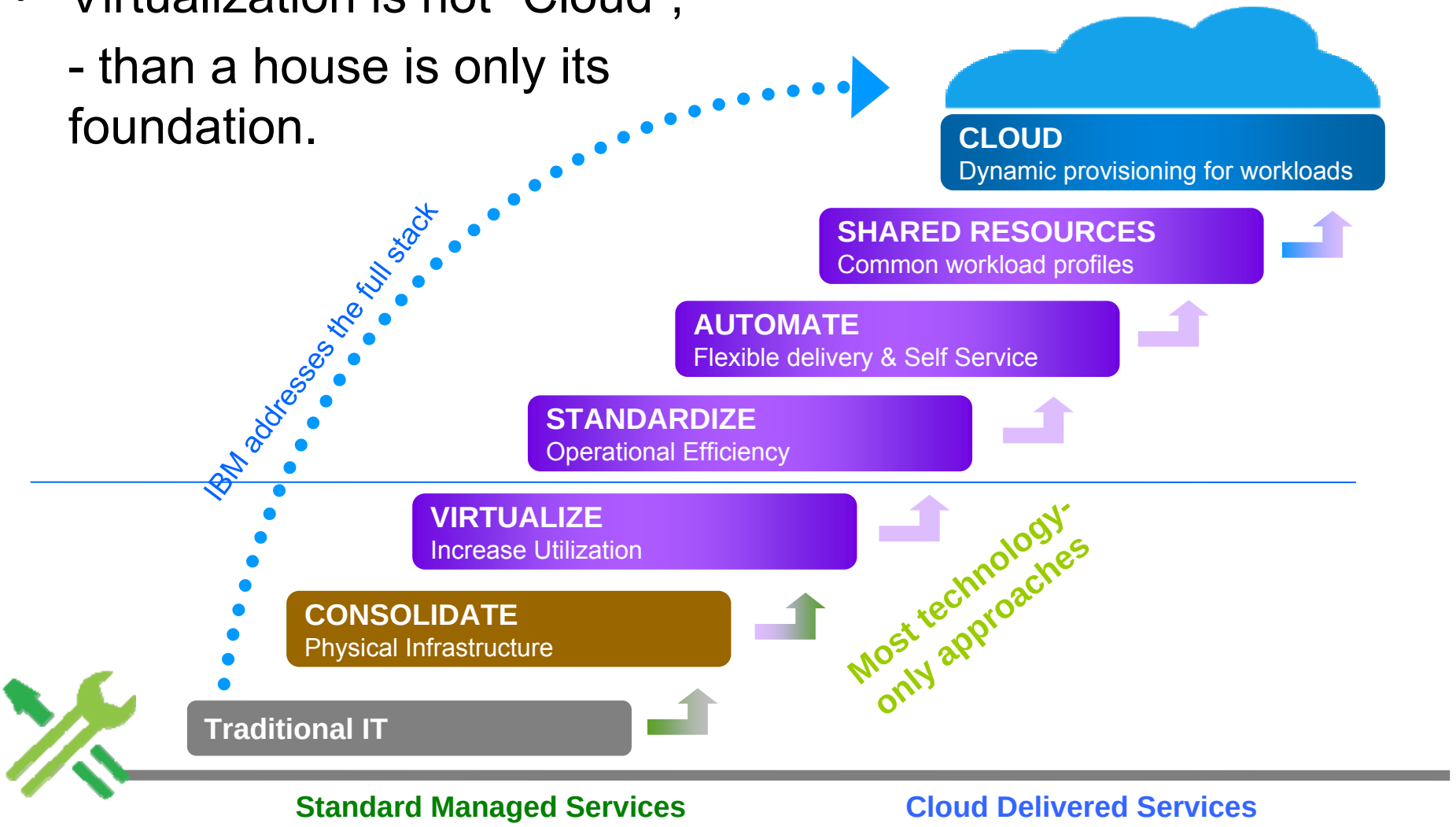
(Interviewed CIOs could select as many as they wanted)



Source: 2011 CIO Study, Q12: "Which visionary plans do you have to increase competitiveness over the next 3 to 5 years?"(n=3,018)

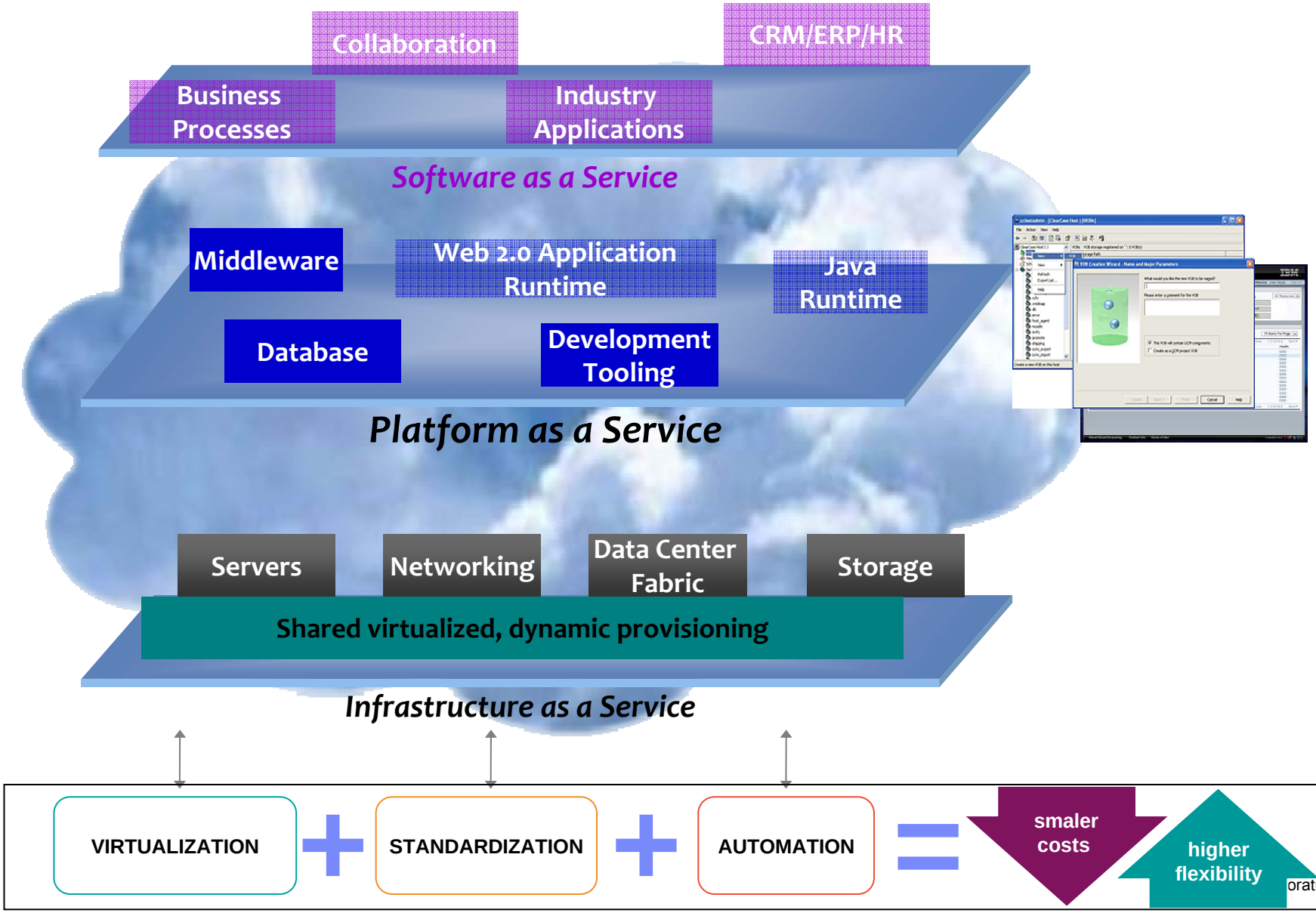
Cloud computing is a natural progression from infrastructure transformation…

- Virtualization is not “Cloud”,
  - than a house is only its foundation.



Cloud Computing environments

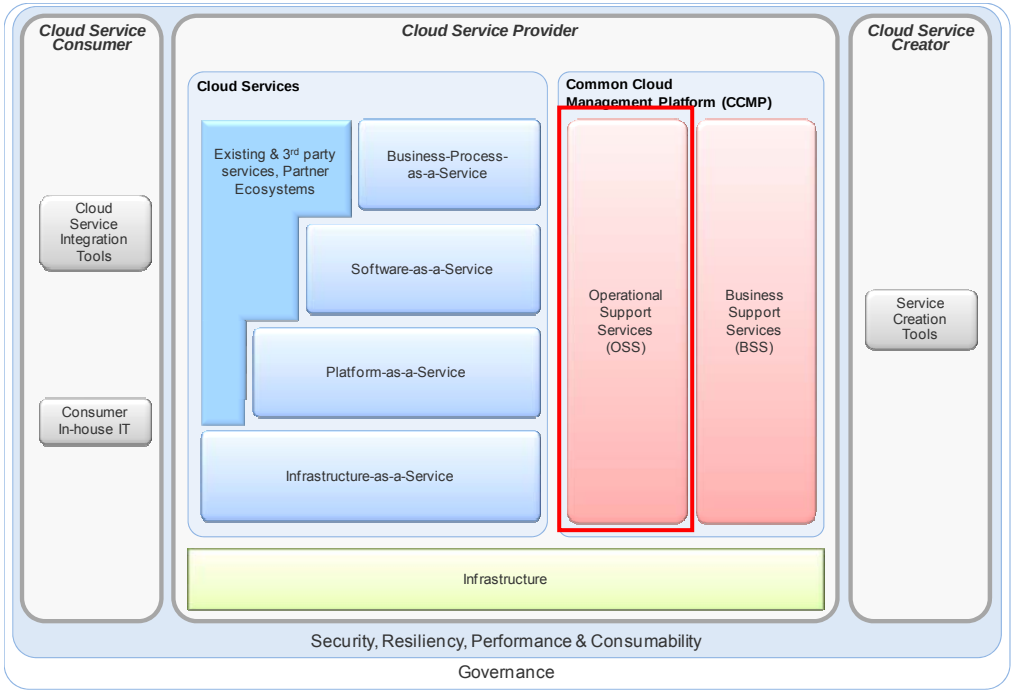
Infrastructure, Platform or Software as a Service



IBM Cloud Computing Reference Architecture (CC RA) – Cloud Livecycle Management 'Best Practices'

Publically available RA whitepaper on ibm.com:
http://public.dhe.ibm.com/common/ssi/ecm/en/ciw03078usen/CIW03078USEN.PDF

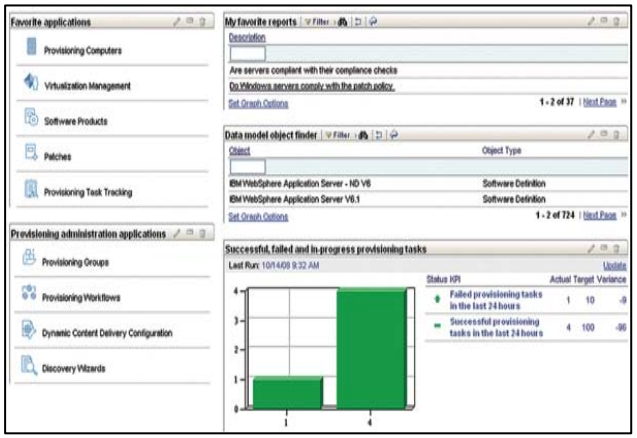
- The IBM CC RA is based on Best Practices from:
  - IBM Cloud Projects with clients
  - IBM Public Cloud Offerings like Smart Cloud Enterprise
- The CC RA consists of 21 detailed Documents, with best-of-industry knowledge regarding Cloud Architecture, Design and Implementation



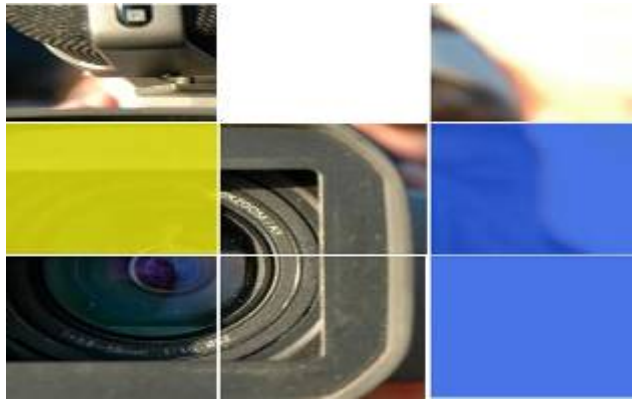
CCRA OpenGroup submission:
http://www.opengroup.org/cloudcomputing/uploads/40/23840/CCRA.IBMSubmission.02282011.doc

Automation and Pre-Packaged Automation Templates

- Resources can be provisioned in minutes versus weeks
- Resources are provisioned consistently every time
- Resources are quickly returned to pool when no longer needed instead of sitting idle
- Easily customizable by role

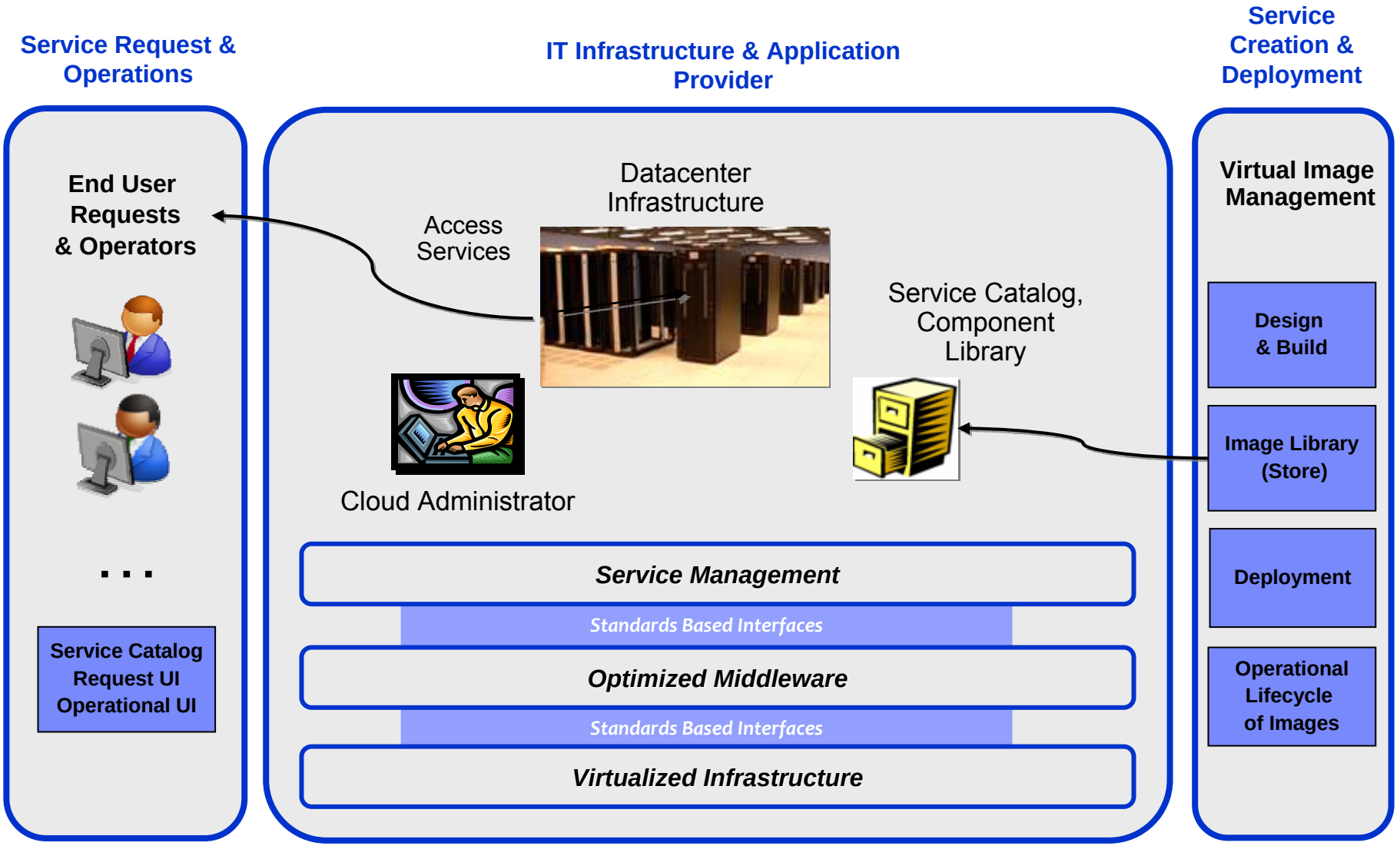


- Library of scenarios available for common provisioning tasks
- Web replay to record provisioning tasks once, then share with less-skilled administrators



…Speeds delivery of services via easy-to-use provisioning and reduces skill level required to perform provisioning tasks

The Architectural View of Cloud Computing



Universita di Bari

Innovative Cloud Solutions

Wine Market

Support for 60 wineries to determine demand and get best market price

Fish Market

Electronic fish auction for fishermen while on boats

MoniCA

Logistics solution tracks and collects data real time

Solution Edition for Cloud Computing

Solve community challenges







BENEFITS to Clients

Cloud computing allows multiple organizations to tap into heavy-duty computing power at minimal cost.

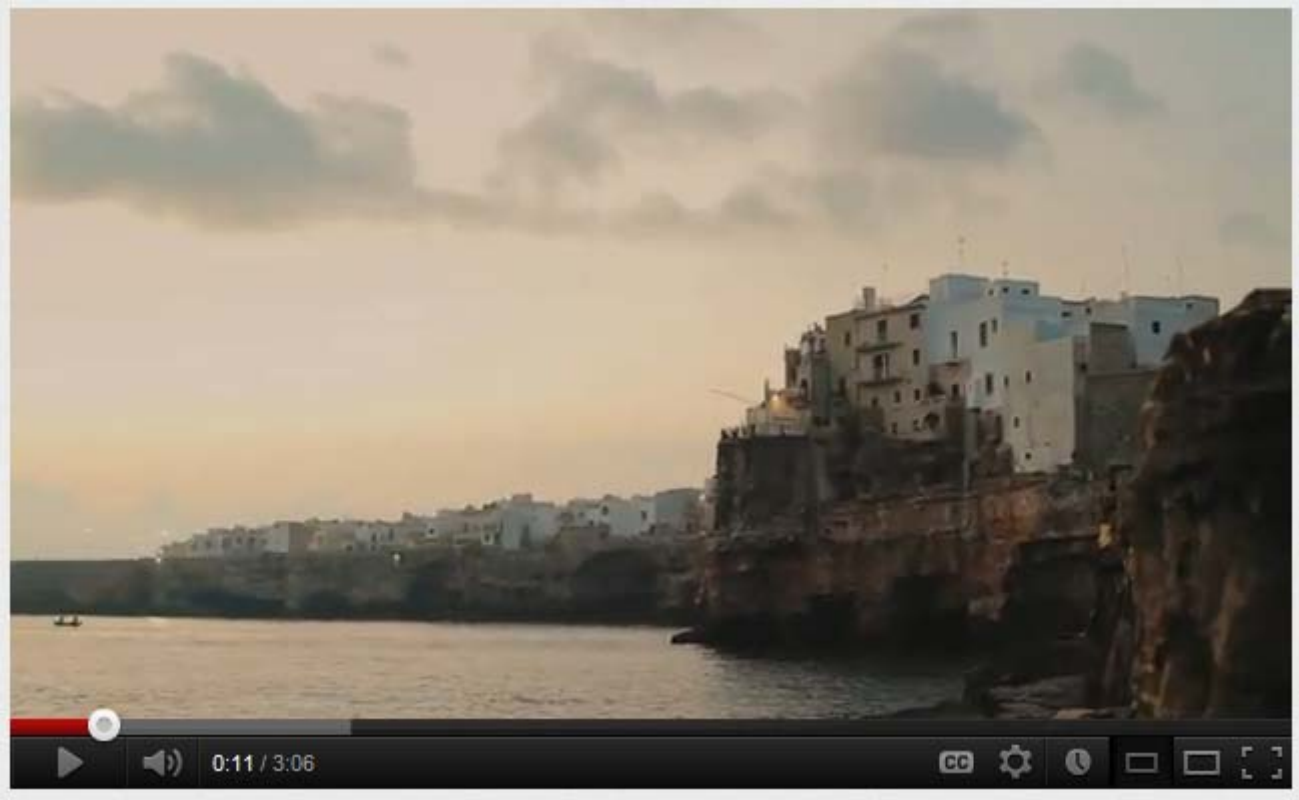
It lowers the barrier for local businesses to benefit from this technology.

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

Universita di Bari, established in 1924, is developing cloud-based solutions for a consortium of companies and universities from five regions of southern Italy.

http://www-03.ibm.com/press/us/en/pressrelease/32051.wss

Bari cloud solution in youtube:
http://www.youtube.com/watch?v=snZPevfRuus



IT Management

OCT
11

0 COMMENTS

PRINT

SHARE

CIOs See Significant Savings With Enterprise System z Consolidation

by Bill Moran in Enterprise Executive

Over the last few years, consolidation has assumed new forms, including data center consolidation and server consolidation.

Data center consolidation involves combining many data centers into one. Frequently, the data centers in question are located in different countries. Colgate-Palmolive, for example, has successfully consolidated 50 data centers worldwide into one. (For a detailed report, see www-935.ibm.com/services/us/cio/ciostudy/pdf/colgate01.pdf.)

You can correct x86 server sprawl by consolidating x86 servers. Servers running Windows can be virtualized, thus allowing each Windows application to have its own copy of the operating system. This eliminates the problems that can occur when several applications attempt to share one copy of Windows.

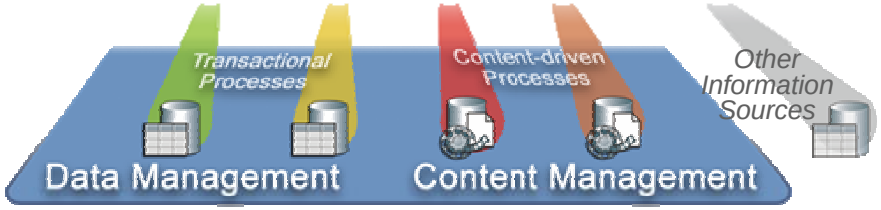
In the past, consolidating x86 servers on the mainframe required that either the workload be converted to z/OS or to Linux. It's relatively easy to convert UNIX servers to Linux servers and then consolidate them on a mainframe. Consolidating Windows servers onto the mainframe is more difficult because the conversion to Linux may be harder or even impractical.

Now, new technology on the mainframe has come to the rescue. By using the zEnterprise BladeCenter Extension (zBX), Windows servers can be consolidated onto a mainframe with no changes.

Integrate and Optimize (Advanced)

Business Optimization

Flexible Architecture for Leveraging Existing Investments



- SAP-as-a-Service
- Unified Resource Manager (zManager)

IBM Solutions & Appliances to Achieve a Smarter Planet

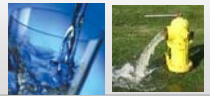
Peta² Data-centric System

Reactive + Deep Analytics Platform

Peta² Analytics Appliance

Big Analytics Ecosystem

DeepWater
Water management



DeepCurrent
Power Delivery

DeepEyes
Webcam Fusion

DeepTraffic
Area Traffic Prediction

DeepSafety
Police/Security

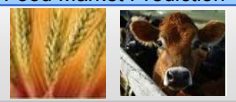
DeepFriends
Social Network Monitor

Let's build a smarter planet

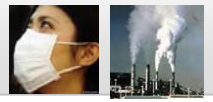
DeepSoil
Farm Prediction

DeepPulse
Political Polling

DeepBasket
Food Market Prediction

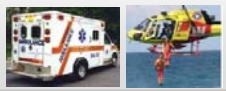


DeepBreath
Air Quality Control



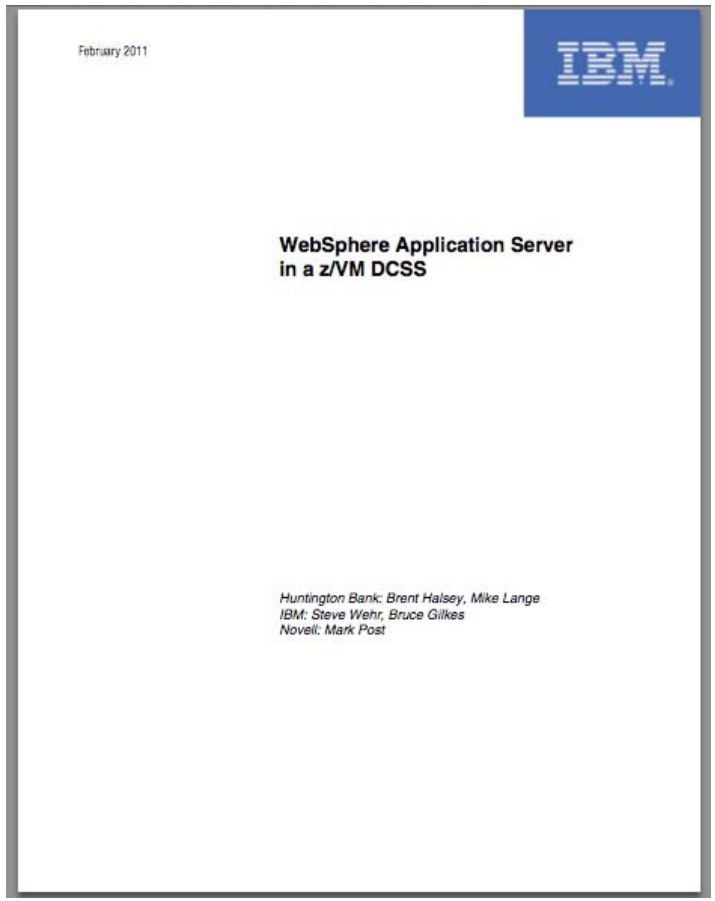
DeepThunder
Local Weather Prediction

DeepResponse
Emergency Coordination



New Whitepaper:

Huntington Bank: Brent Halsey, Mike Lange
IBM: Steve Wehr, Bruce Gilkes
SuSE: Mark Post



This paper will attempt to answer the question: "Does it make sense for me to run WebSphere® Application Server in a z/VM® DCSS for my IBM System z® Linux® guests?" This paper will help you decide whether running WebSphere in a DCSS is right for you.

Answering this question involves several factors that we address in this paper:

What is a DCSS?
How difficult is it to setup WebSphere in a DCSS?
How much memory and spool space will this consume?
How much memory is saved for each Linux guest?
Are there performance advantages?
How do you add fixes to WebSphere when it's in a DCSS

More Information: http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=SA&subtype=WH&appname=STGE_ZS_ZS_USEN&htmlfid=ZSW03178USEN&attachment=ZSW03178USEN.PDF

More information on zEnterprise

- IBM zEnterprise landing page: http://www.ibm.com/systems/z/hardware/zenterprise/index.html
- IBM zEnterprise 114 (z114): http://www.ibm.com/systems/z/hardware/zenterprise/z114.html
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Questions?

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