

# IT Optimization Experiences using Linux on System z

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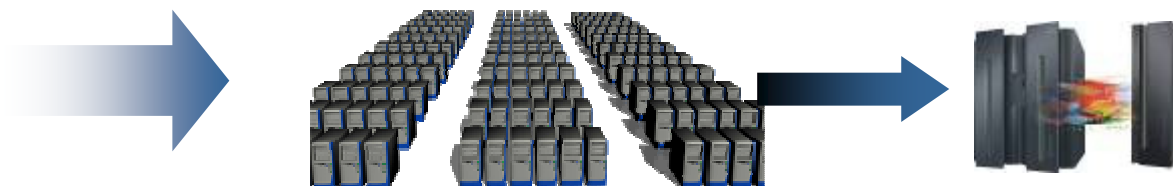
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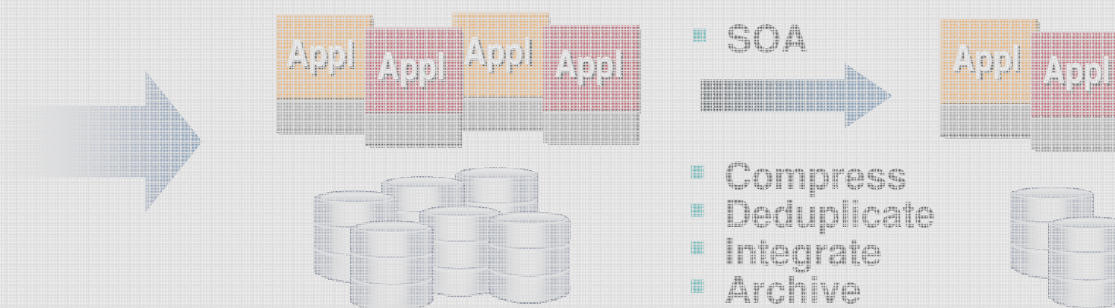
# Strategies to Improve Value and reduce Complexity and Costs

## Optimize the Overall IT Environment

➤ Simplify Hardware Infrastructure



➤ Integrate Redundant Software and Data

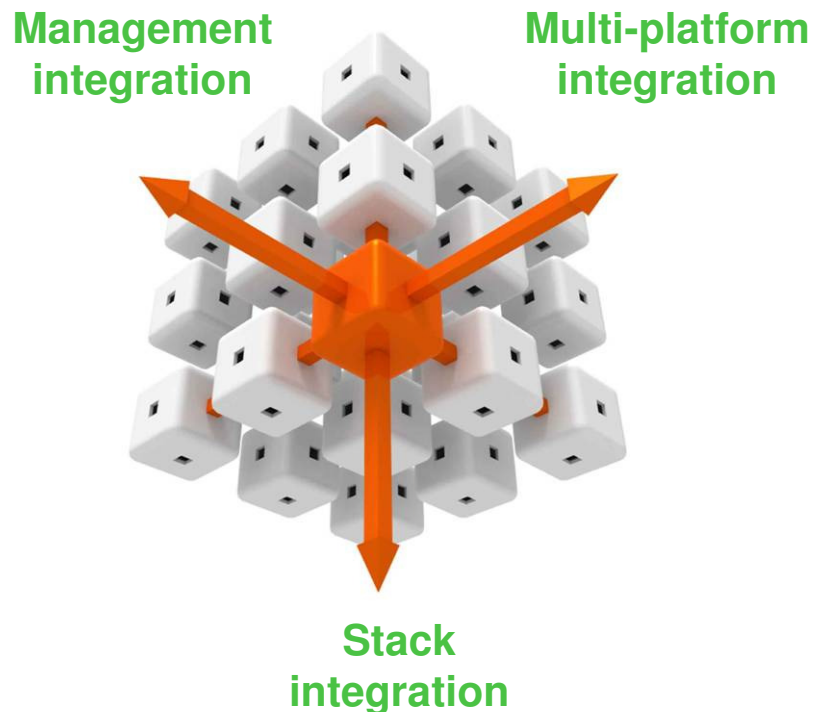


➤ Improve Service Delivery



# 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.

# IBM focus: Linux on IBM Systems

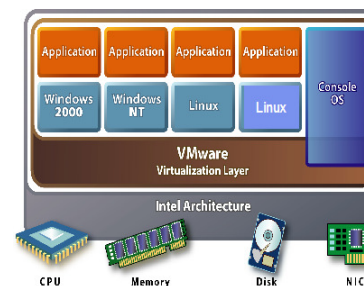
## Linux on System z

- 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



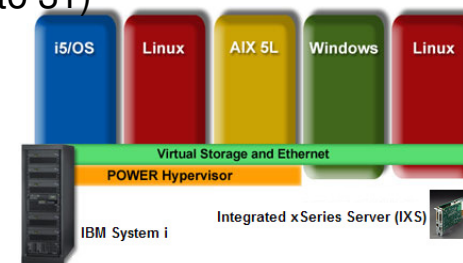
## Linux on CBE

- Applications demanding highest performance
- special purpose

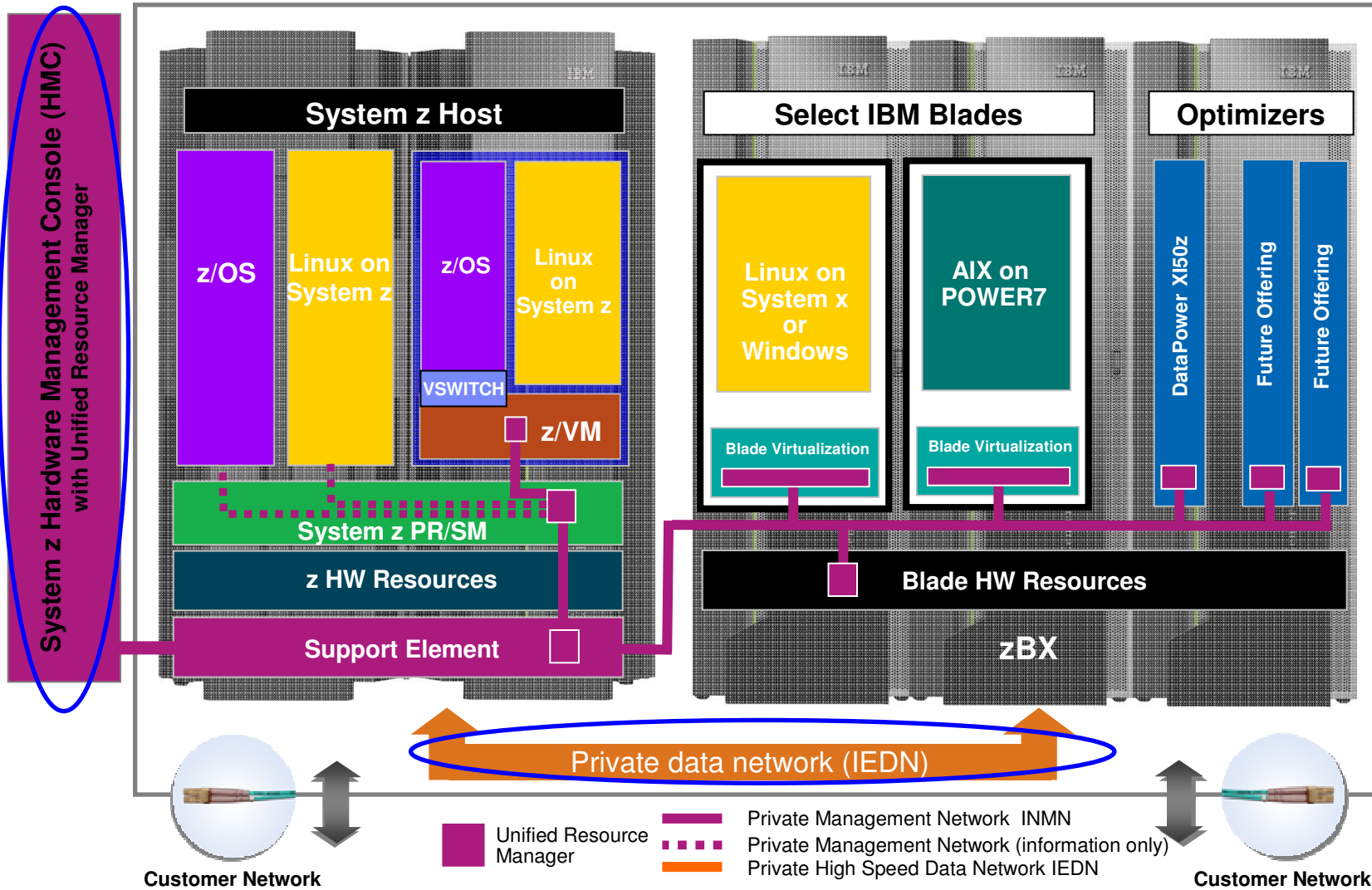


## Linux on System i

- 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



# The zEnterprise designed for workload integration



## Enterprise Linux Distributions – Tested & Supported

The table below shows IBM tested Linux environments. IBM remote technical support for these environments is provided when you obtain a [Support Line](#) contract.

You may also find support for these environments by contracting with a third party provider.

Hardware Platform and Operating System Software Compatibility				
64-bit environment				
Release	zSeries	System z9	System z10	zEnterprise z196
★ SLES 9 (*)	✓	✓	✓	✓ <sup>(2)</sup>
★ SLES 10	✓	✓	✓	✓
★ SLES 11	✗	✓	✓	✓
★ RHEL 4 (*)	✓	✓	✓	✓ <sup>(1)</sup>
★ RHEL 5	✓	✓	✓	✓
★ RHEL 6	✗	✓	✓	✓

The listed distributions are 64-bit distributions, they all include the 31-bit emulation layer to run 31-bit software products.

✓ Indicates that the Linux distribution (version) has been tested by IBM on the hardware platform, will run on the system, and is an IBM supported environment. Updates or service packs applied to the distribution are also supported.

(1) RHEL 4.8 only. Some functions have changed or are not available with the z196, e.g. the Dual-port OSA cards support to name one of several. Please check with your service provider regarding the end of service.

(2) SLES 9 SP4 + latest maintenance updates only. Some functions have changed or are not available with the z196, e.g. the Dual-port OSA cards support to name one of several. Please check with your service provider regarding the end of service.

✗ Indicates that the distribution is not supported by IBM

(\*) Also available as 31-bit distribution.

For the hardware support information provided by the Linux distributors please see:

- Red Hat please visit the **Red Hat Hardware Catalog**: <https://hardware.redhat.com/hwcert/index.cgi>

- Novell SUSE, please visit the **SUSE YES Certified Bulletin Search**: <http://developer.novell.com/yessearch/Search.jsp>

To retrieve interoperability support information for Enterprise Storage products when used in a supported host server environment see the **System Storage Interoperation Center**: <http://www.ibm.com/systems/support/storage/config/ssic/index.jsp>



# Implement Virtualization on System z: LPAR and z/VM, when to use what

- **LPAR Virtualization**
  - *High Isolation* with fixed resource allocation
  - Direct attached I/O devices for max bandwidth
  
- **z/VM Virtualization**
  - **Vertical virtualization** - Grow workloads without linearly growing number of virtual guests
    - *Scalability*: one guest can be increased by allocating more resources (CPUs, memory)
  
  - **Horizontal virtualization** – server isolation
    - *Isolation* of guests in a network
    - *Redundancy* for application high availability
  
  - **Dynamically** add, remove and shift physical resources to optimize business results



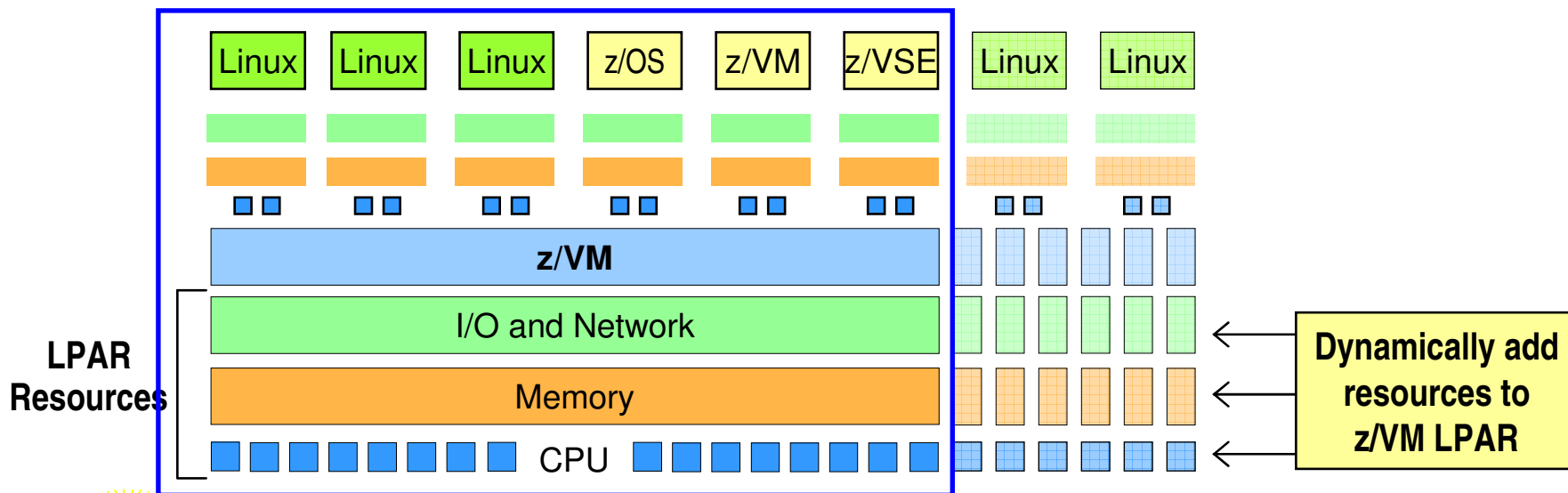
# Virtualization – platform integration



## 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

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

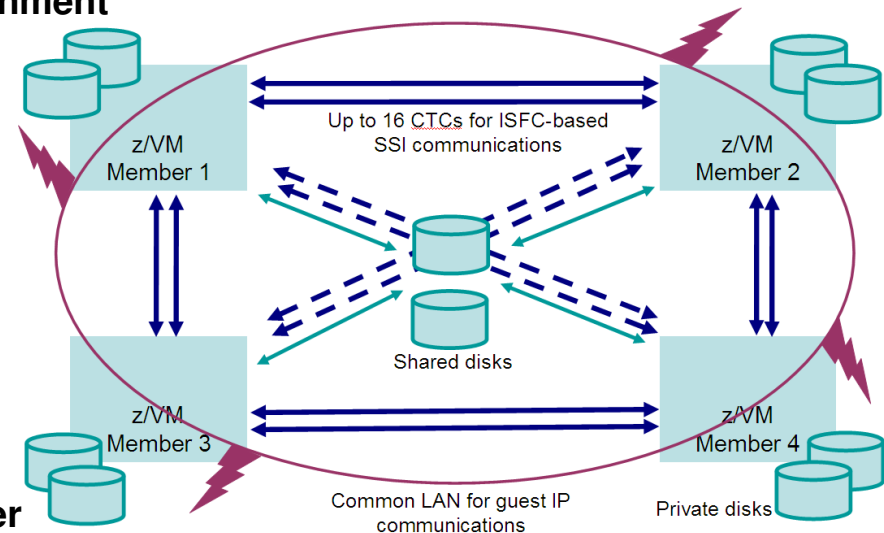
*Single System Image, Clustered Hypervisor, Live Guest Relocation*

- **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**

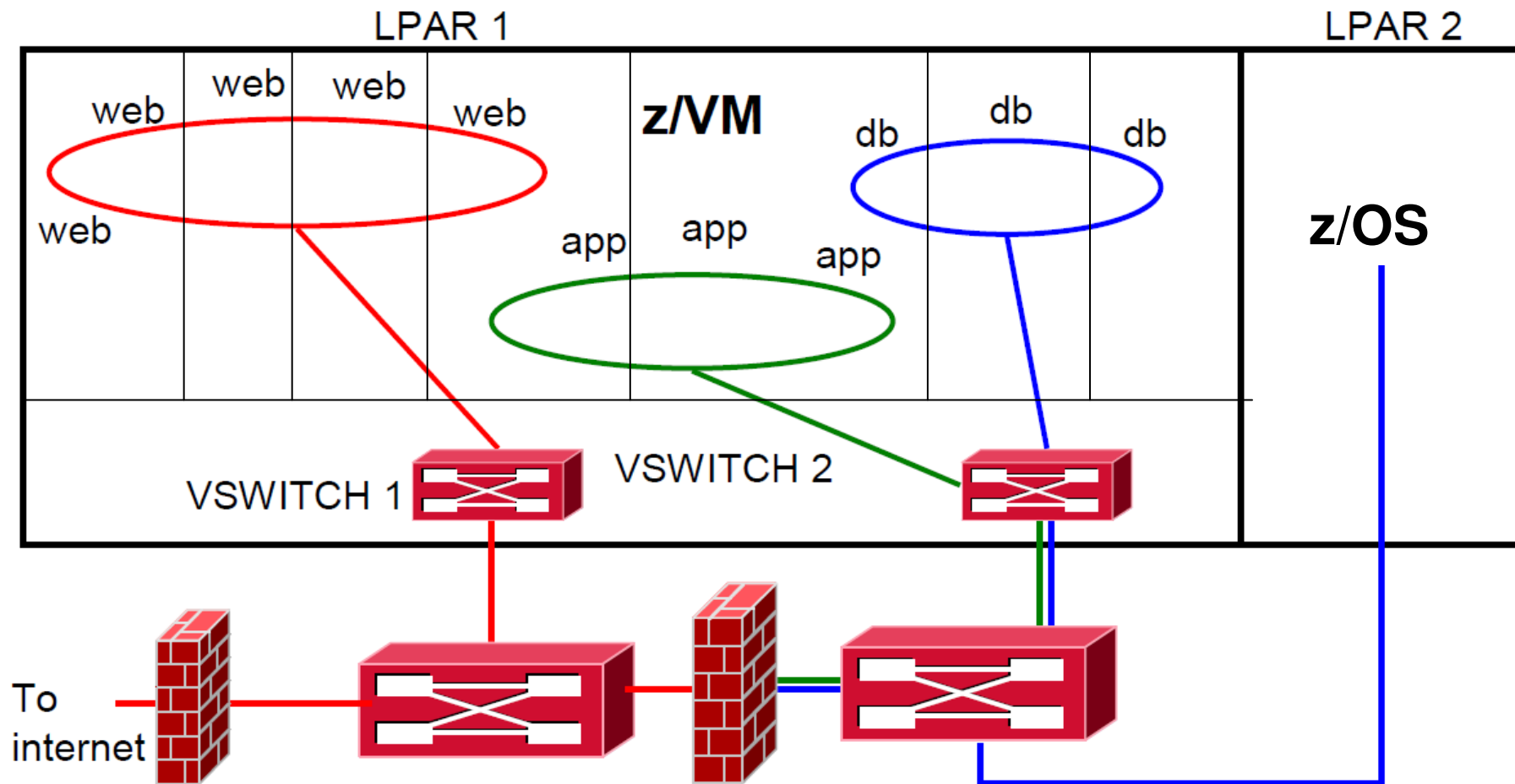
- Single user directory
- Cluster management from any member
  - Apply maintenance to all members in the cluster from one location
  - Issue commands from one member to operate on another
- Built-in cross-member capabilities
- Resource coordination and protection of network and disks

- **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

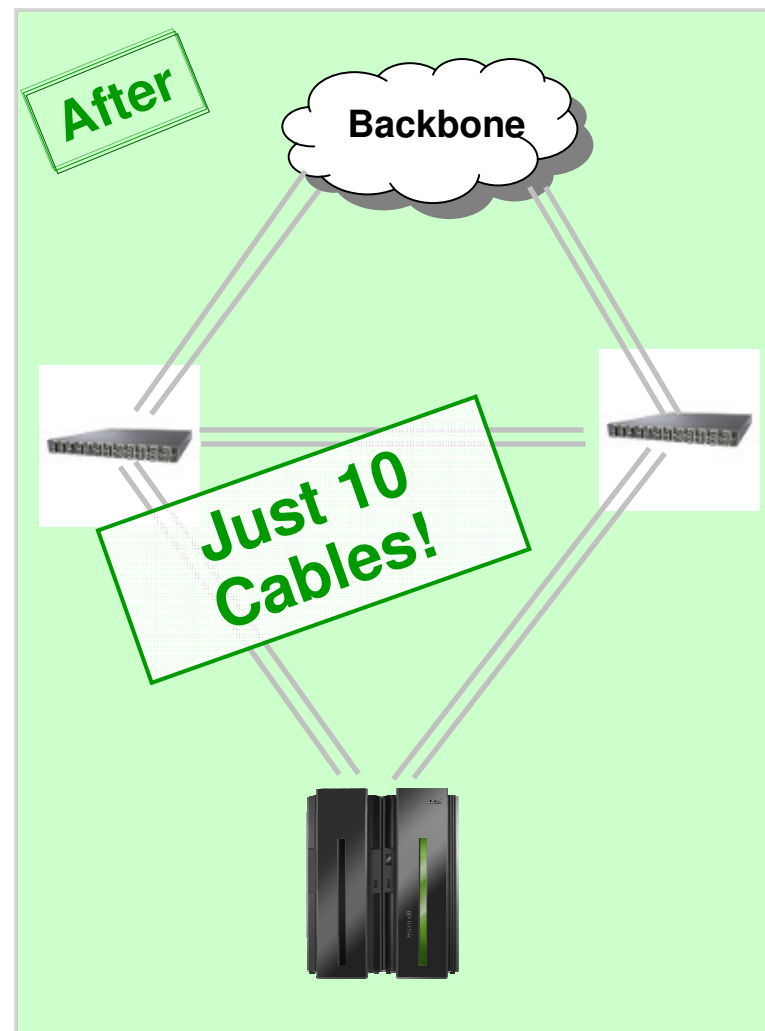
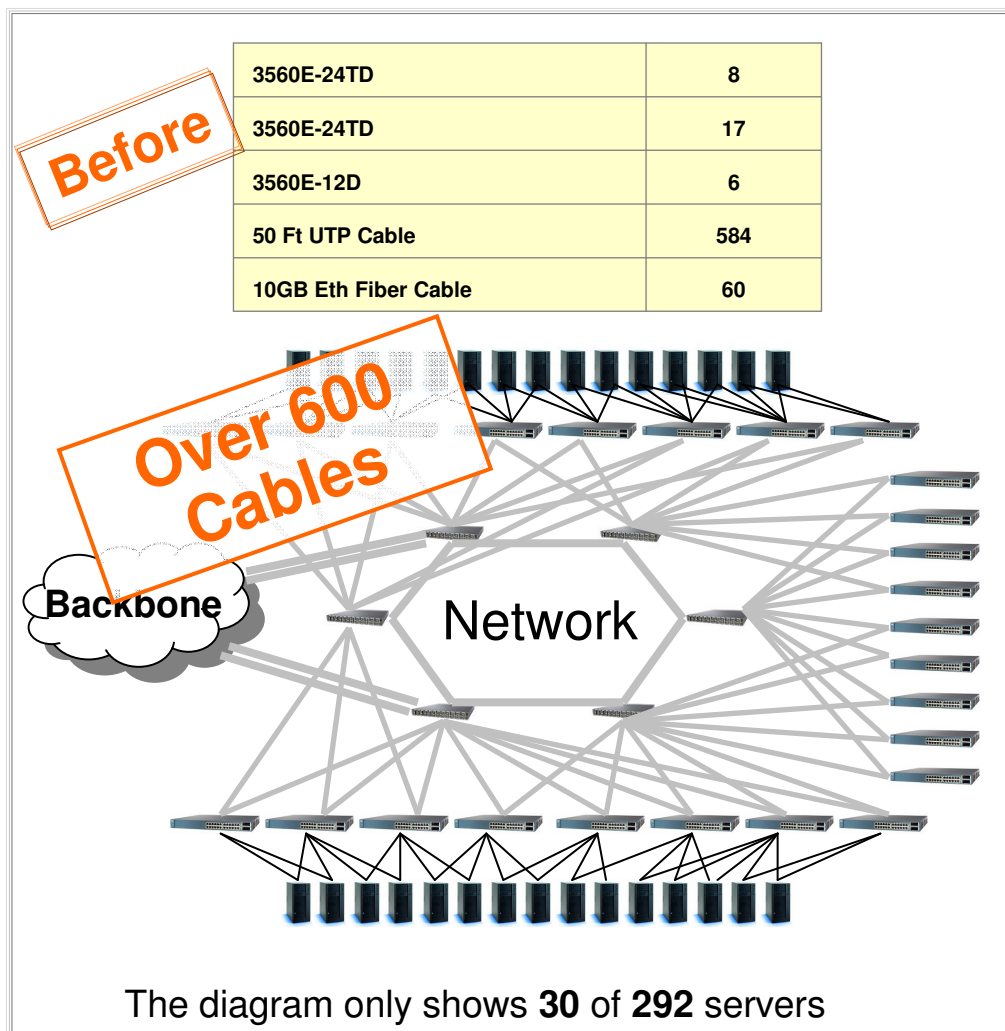


## Multi-zone Network with VSWITCH (red zone physical isolation)



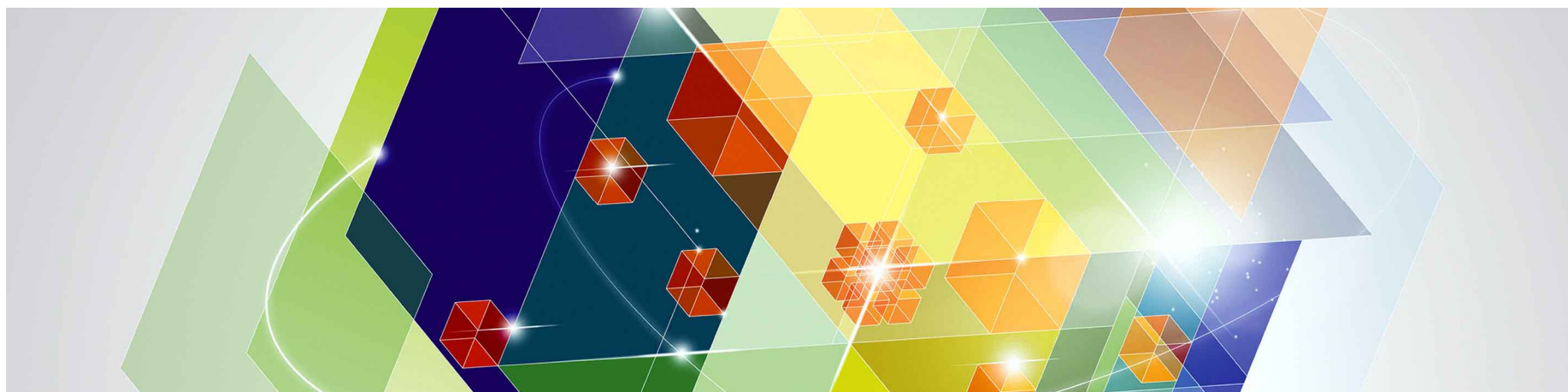
With 2 VSWITCHes, 3 VLANs, and a multi-domain firewall

# Insurance Company Consolidated 292 Servers to a z10



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.

# IT Infrastructure simplification



# Utilization of Distributed Servers

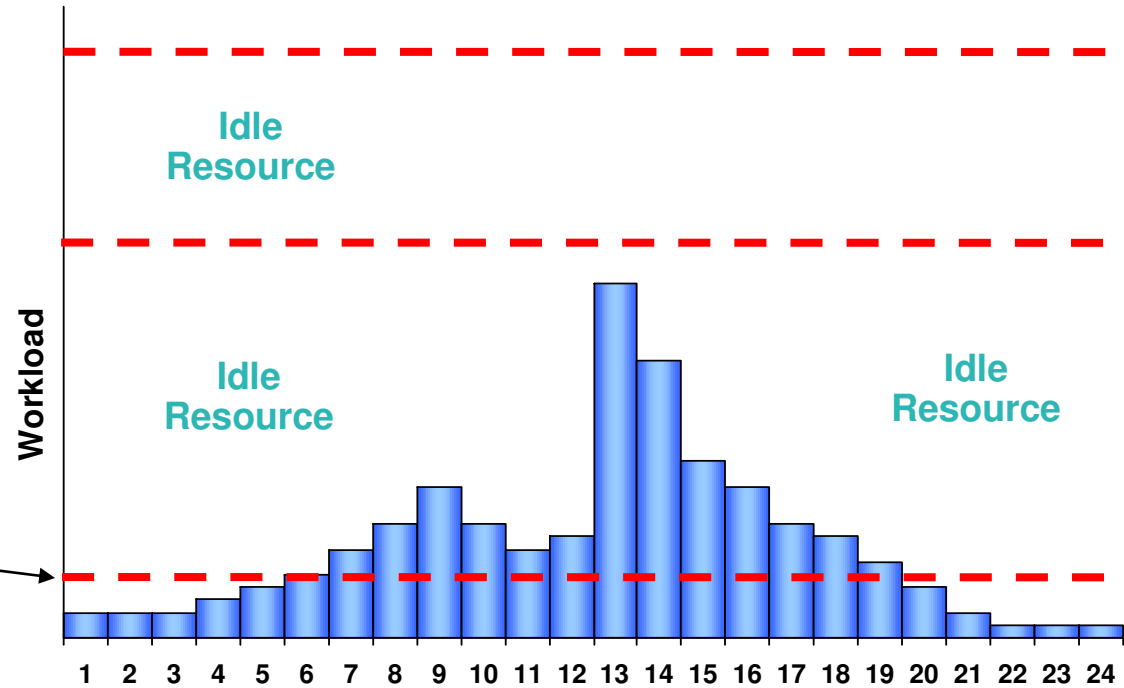
Provision for expected growth

Provision capacity for peak workload



Server dedicated to one application

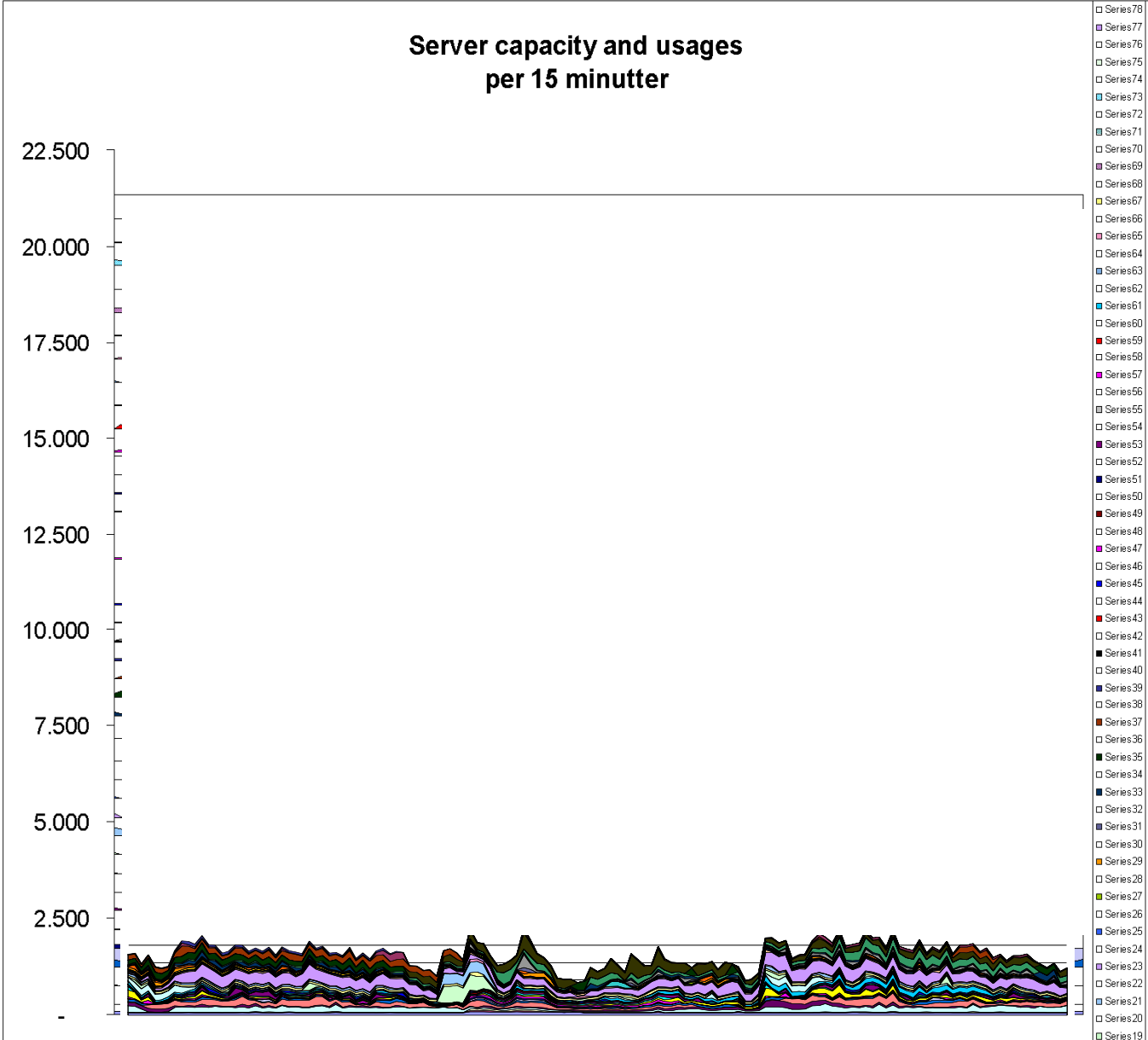
Average utilization



- ▶ 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)**





# 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

# Enterprise Linux Server – Real Customer Configuration



Tangible benefits:

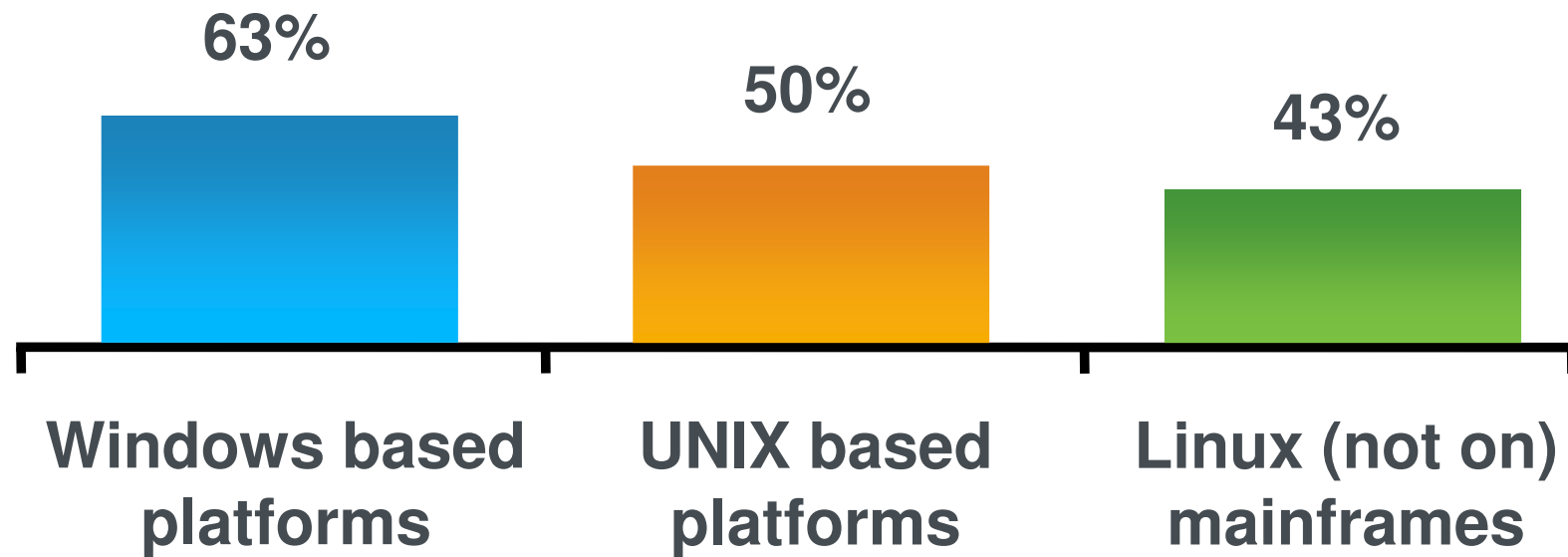
	Existing 4 HP Alpha Server ES45 + HP disks 4x3 CPU Alpha 21264C 9x1 core Oracle license	IBM Bladecenter H 2 HS22 w/2 proc. 4-core IBM Storwize V7000 disks 16x0.5 core Oracle license	IBM Bladecenter H 2 IBM P7 PS700 4-core IBM Storage DS5020 8x1 core Oracle DB license	IBM System z10 ELS 1 IFL IBM Storwize V7000 1 Oracle EE license
1st year	164,234	219,998	242,888	234,040
2nd year	164,234	74,234	74,234	8,248
3rd year	164,234	74,234	74,234	8,248
<b>Total (3 years)</b>	<b>€ 492,701</b>	<b>€ 368,465</b>	<b>€ 391,355</b>	<b>€ 250,537</b>

*Prices based on actual European market prices (Euro). Local pricing and conditions will vary!*

### Intangible benefits:

- Improved security – no information leak during data copy between servers
- Improved availability – no network routers or switches
- Highest reliability and centralized systems management

## Latest Customer Survey: Previous Platform for Consolidated Workloads





**Nationwide**<sup>®</sup>  
*On Your Side*<sup>SM</sup>

## 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.



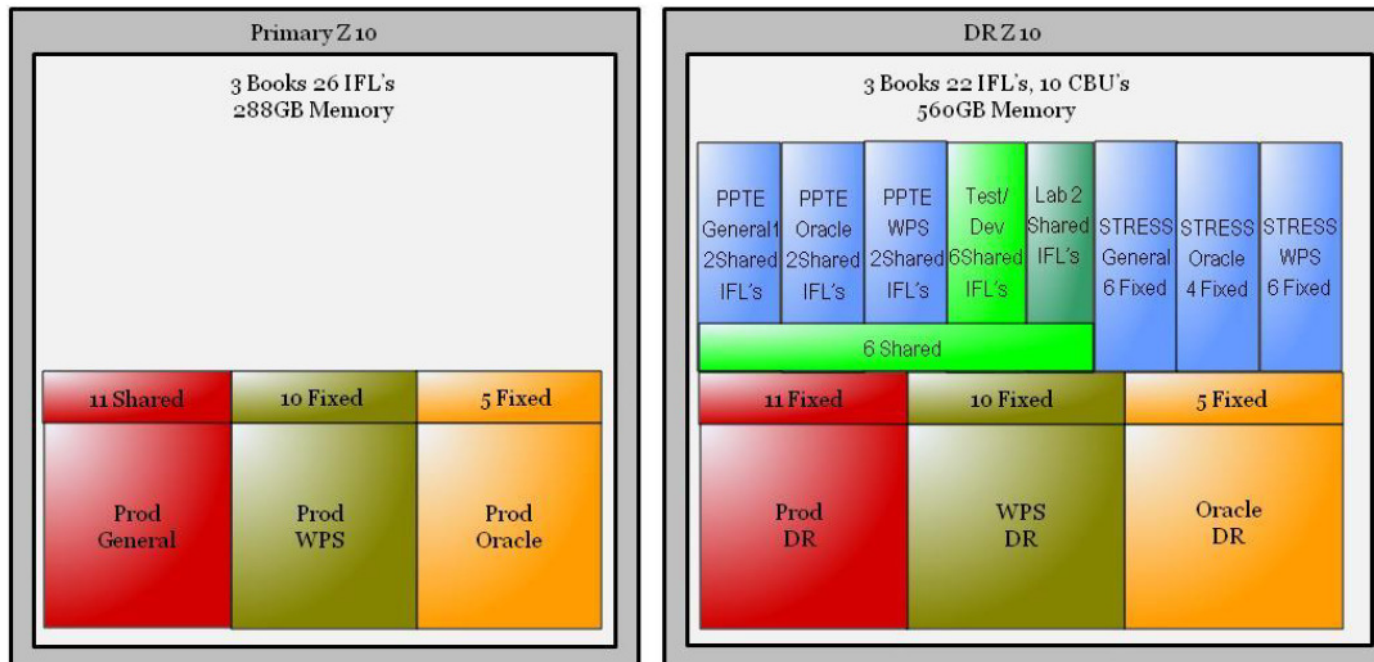
*“Nationwide’s Linux on System z project is currently **estimated to save \$16 million dollars over the next three years**, not including floor space. We also were able to provide **a reduction in server cost of more than 50 percent to our customers**. The Linux on System z system saved significant data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

Steve Womer, Senior IT Architect

# Bank of New Zealand



- Consolidated 200 Sun servers down to one System z10 running Red Hat Enterprise Linux
- Reduced data center footprint by 30%, heat output by 33%, and power consumption by close to 40%
- Only one administrator needed per 200 virtual servers
- New environments are deployed in minutes, not days



## Consolidates from 60 Servers to One Mainframe in 48 Hours

Based on:

[www.computerworld.com.au/article/324815/allianz\\_consolidates\\_from\\_60\\_servers\\_1\\_mainframe\\_48\\_hours](http://www.computerworld.com.au/article/324815/allianz_consolidates_from_60_servers_1_mainframe_48_hours)

### *Insurance giant goes with a z10 mainframe and Linux on System z for its virtualization and consolidation path*

There aren't that many organizations which would consider consolidating 60 servers holding the most critical customer-facing applications down to one mainframe in the space of a weekend. But that's exactly what insurance giant, Allianz did in May 2011.

### **Realize the benefits and value of an optimized IT environment**

- Virtualization to increase resource utilization
- Server and Storage Consolidation to help reduce cost
- Energy Efficiency to maximize work per watt
- Systems Management and Automation to reduce complexity and operations costs

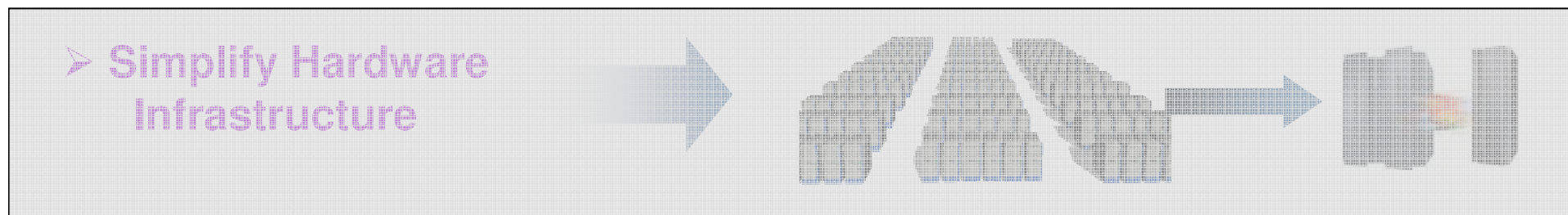
*"It has really ticked all the boxes. It reduced the dependency on a data center, it reduced the complexity from over 60 servers down to one box, it enabled us to put a lot more robustness around it in terms of DRP and scalability, and was environmentally friendly as well.*

*It took our kVA power usage down from about 40 to 4 – so a significant environmental benefit as well. Plus it significantly reduced our IT running costs and paid for itself in just over a year."*

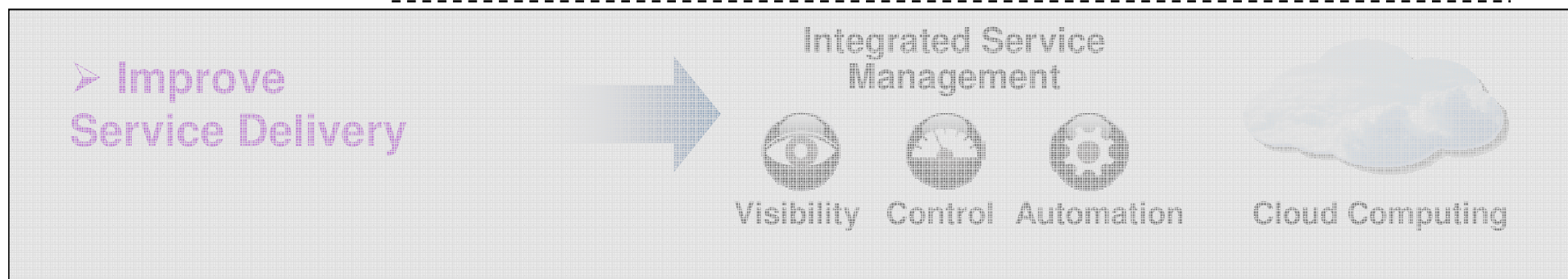
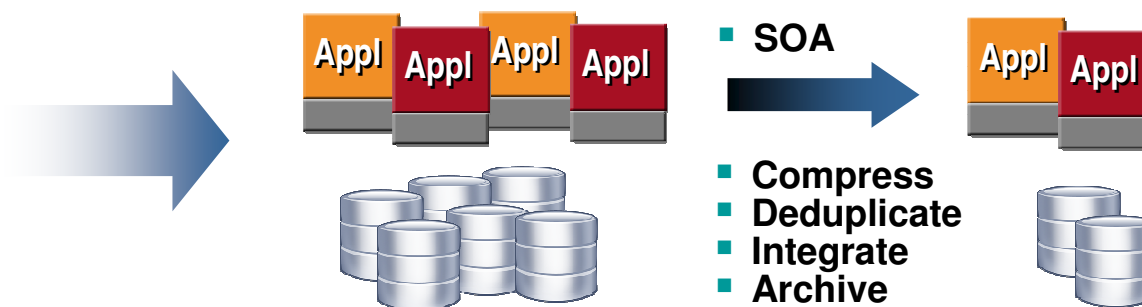
*-- Steven Coles  
Allianz CIO*

# Strategies to Improve Value and reduce Complexity and Costs

## Optimize the Overall IT Environment

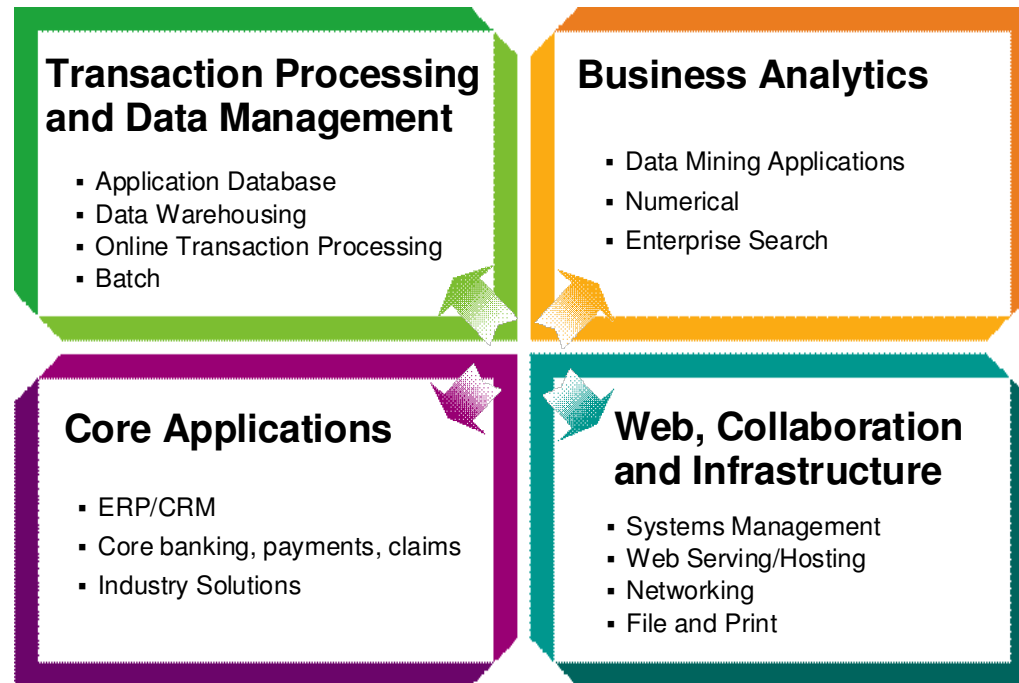


➤ Integrate Redundant Software and Data



## 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



# Workloads with recognizable patterns

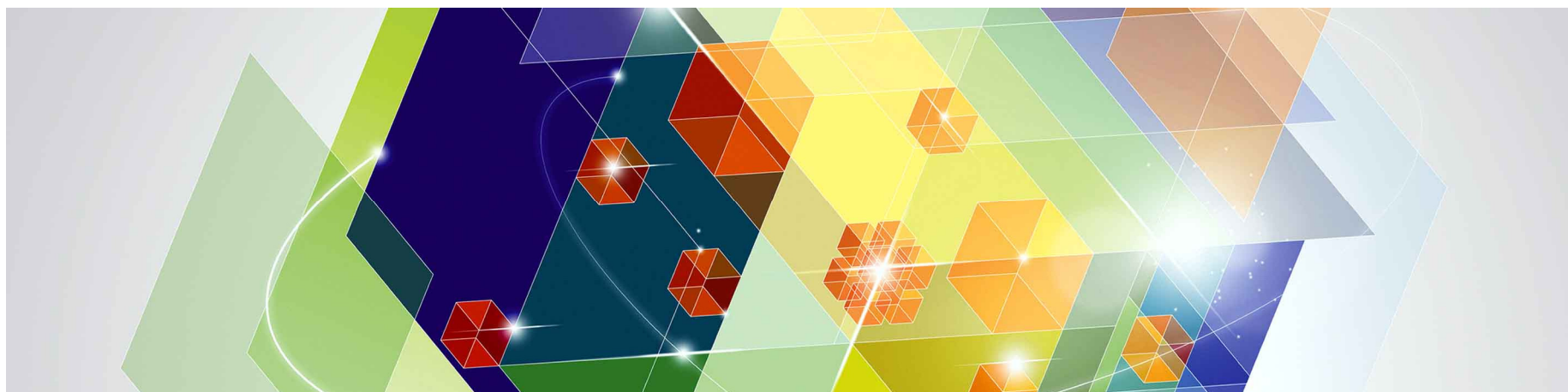
Core Applications	
<b>Application (z)</b> <ul style="list-style-type: none"> <li>• CICS®</li> <li>• COBOL</li> <li>• WebSphere®</li> </ul>	<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS</li> <li>• DB2 for Linux on System z</li> <li>• Oracle on Linux for z</li> </ul>
<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2® for z/OS®, IMS™</li> </ul>	<b>Application (z)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> </ul>

SAP	
<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS</li> </ul>	<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS</li> </ul>
<b>Application (z)</b> <ul style="list-style-type: none"> <li>• Linux® for z</li> </ul>	<b>Application (x86)</b> <ul style="list-style-type: none"> <li>• Linux for x86</li> </ul>
<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS</li> </ul>	<b>Database (p)</b> <ul style="list-style-type: none"> <li>DB2 for AIX</li> </ul>
<b>Application (Power)</b> <ul style="list-style-type: none"> <li>• AIX®</li> </ul>	

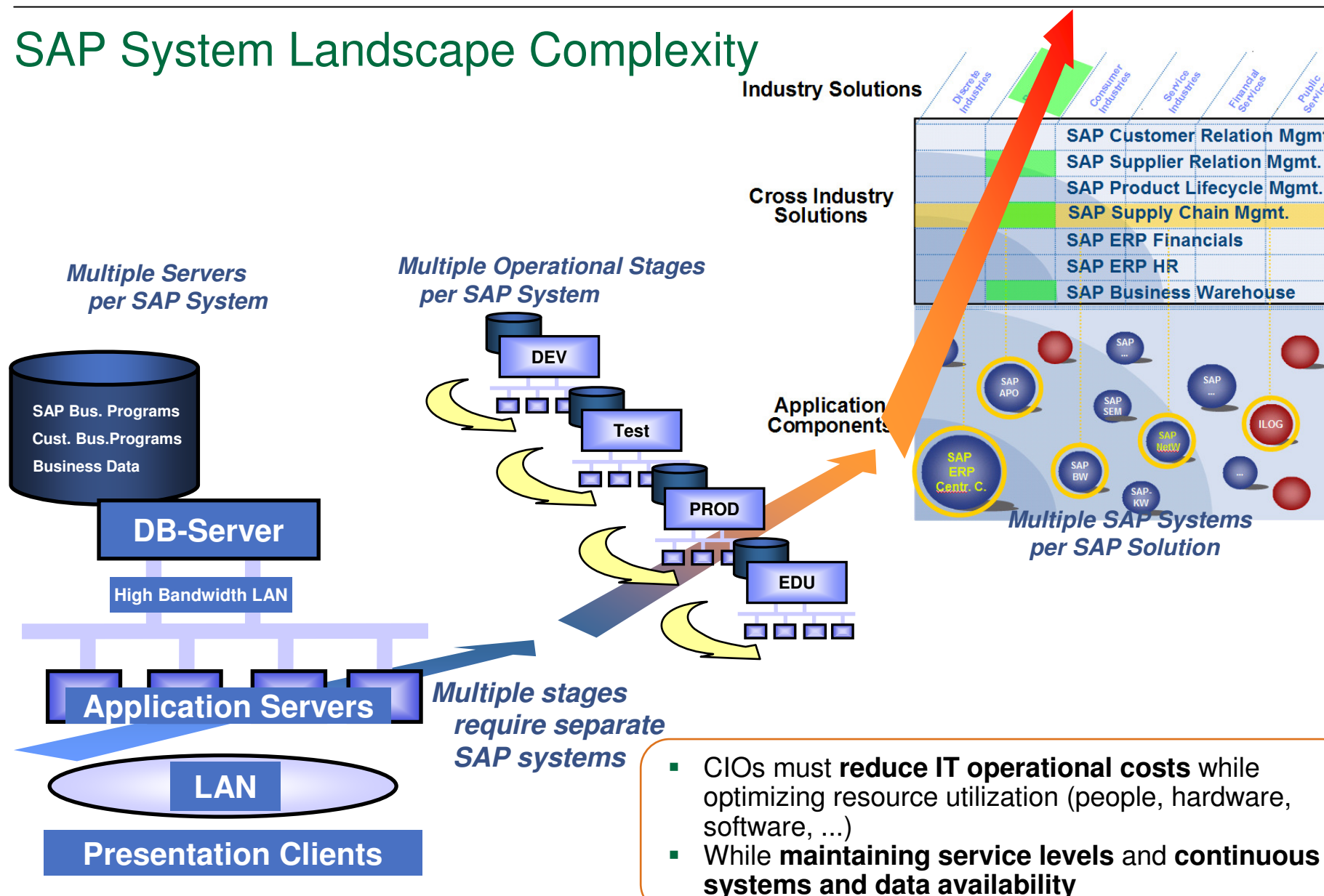
Multi-Tier Web Serving	
<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS</li> </ul>	<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS</li> <li>• DB2 for Linux on System z</li> </ul>
<b>Application (z)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> </ul>	<b>Application (Power / UNIX)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> <li>• JBoss</li> </ul>
<b>Application (x86)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> <li>• Apache / Tomcat</li> </ul>	
<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS, IMS</li> </ul>	<b>Database (z)</b> <ul style="list-style-type: none"> <li>• DB2 for z/OS or IMS</li> </ul>
<b>Transaction Processing (z)</b> <ul style="list-style-type: none"> <li>• CICS, MQ</li> </ul>	<b>Application (Power / UNIX)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> <li>• JBoss</li> </ul>
<b>Application (Power / UNIX / Linux)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> <li>• JBoss</li> <li>• WebLogic</li> </ul>	<b>Presentation (x86)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> <li>• Apache / Tomcat</li> </ul>
<b>Presentation (x86)</b> <ul style="list-style-type: none"> <li>• WebSphere</li> <li>• Windows</li> </ul>	

Data Warehouse & Analytics
<b>Master Data Management Database (z)</b> <ul style="list-style-type: none"> <li>▪ DB2 for z/OS</li> </ul>
<b>Application (z)</b> <ul style="list-style-type: none"> <li>▪ WebSphere MDM (AIX, Linux on z)</li> </ul>
<b>Analytics</b> <ul style="list-style-type: none"> <li>▪ System z/OS <ul style="list-style-type: none"> <li>▪ DB2</li> <li>▪ Cognos®</li> <li>▪ SAS</li> </ul> </li> <li>▪ Linux for System z <ul style="list-style-type: none"> <li>▪ Cognos</li> <li>▪ SPSS</li> <li>▪ InfoSphere™ Warehouse</li> </ul> </li> </ul>

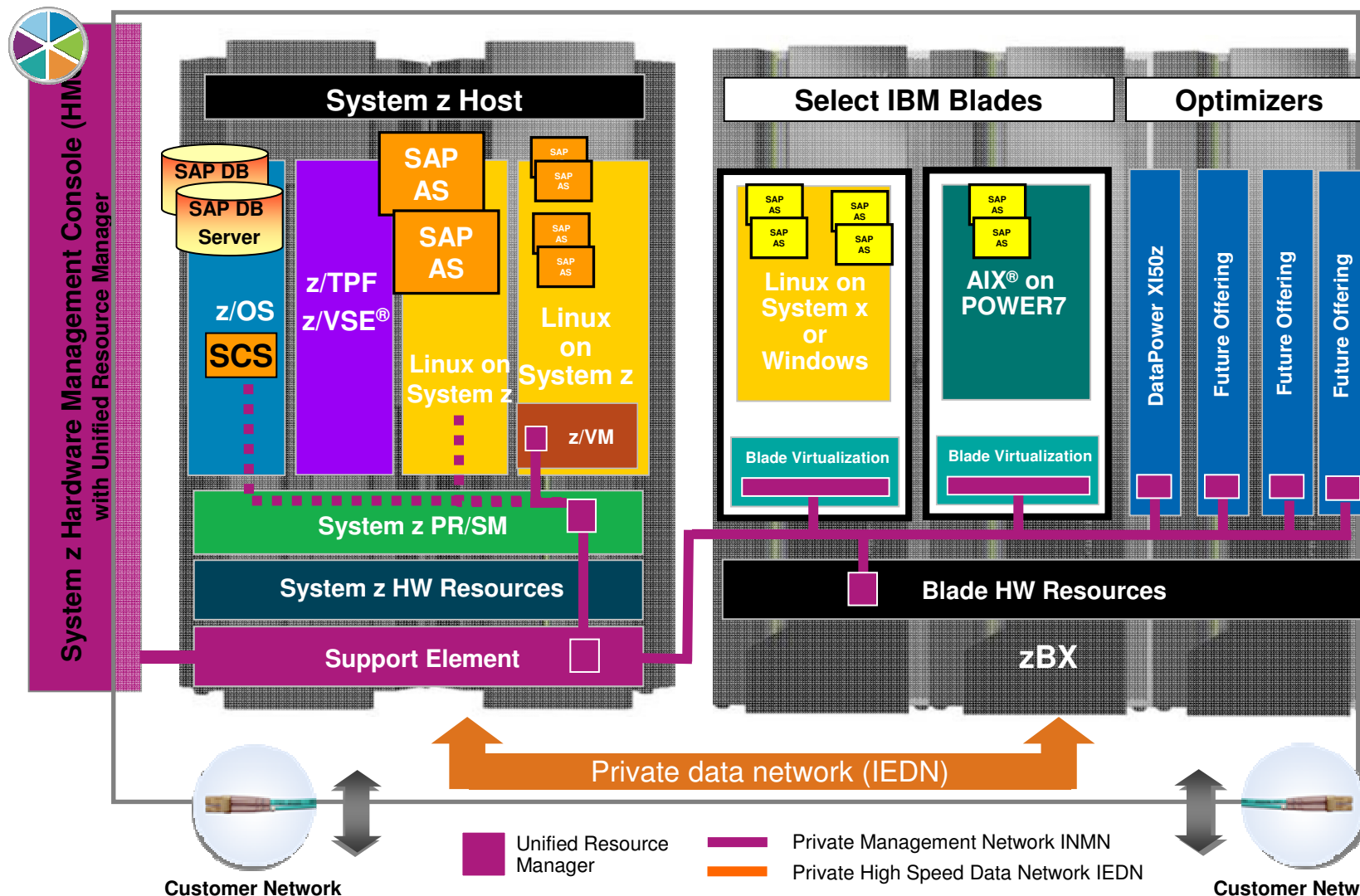
# SAP Solutions on IBM zEnterprise System



# SAP System Landscape Complexity



# SAP Solutions on IBM System zEnterprise



*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<sup>2</sup> of data center to just 900 ft<sup>2</sup>**
- **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.novell.com/success/baldor_electric.html)  
<http://www-306.ibm.com/software/success/cssdb.nsf/CS/DNSD-6K9H7V>

## The Home Depot - SAP on System z

- Second largest retailer in the United States with over 1800 stores, 300,000 employees
- Near continuous operations
- Moving application servers to Linux on z for easy provisioning and fast disaster recovery
- Flexible use of resources allows them to add capacity without disruption, and dynamically change priorities based on time of day, or application

***“Continuous availability and manageability are the design principles of our IT architecture. We’re proud of our ability to fail-over without data loss in a very short period of time. The improved availability and disaster recovery capabilities delivered by running the SAP applications on Linux for System z provide an extra layer of insurance against potentially damaging and expensive outages.”***

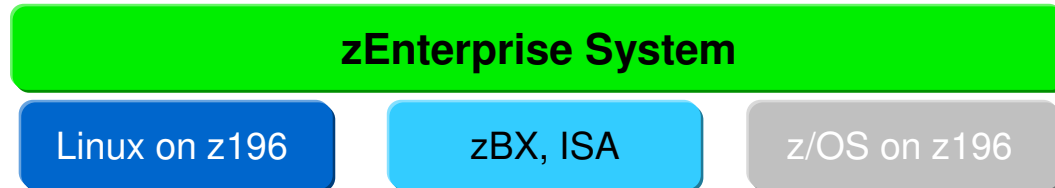
Clifford W. Gum; SAP Technical Architect, The Home Depot



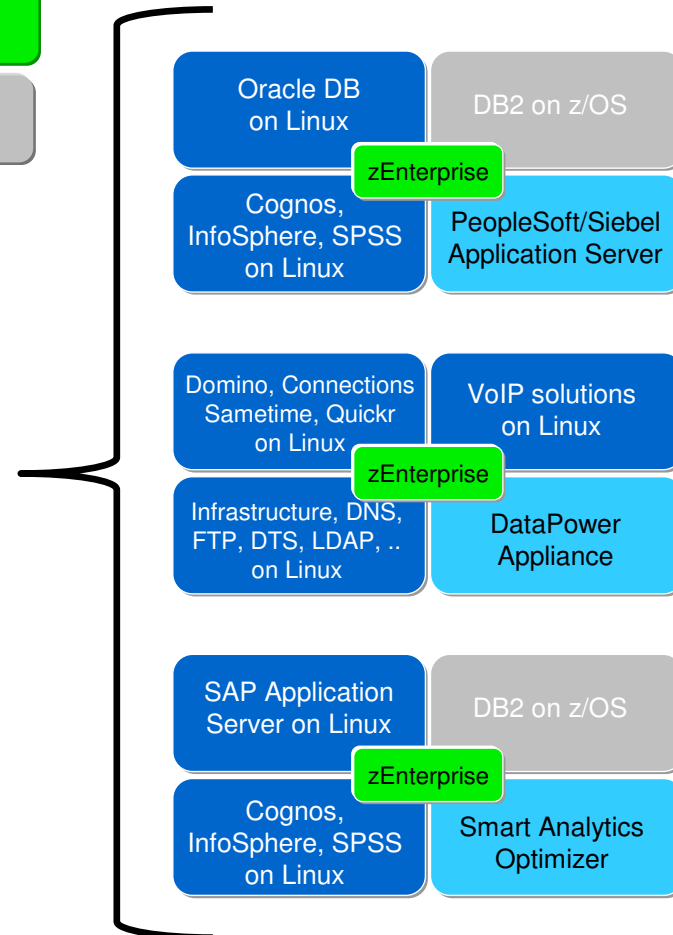
### ***Benefits:***

- Scalability to support over 1 Billion transactions/year
- Ability to support SAP and Business warehouse, enables access to P&L, and daily sales targets
- Low TCO
- Low unit cost /work
- Low staffing costs
- Faster time to market for new offerings in stores

# zEnterprise - Smart Solutions

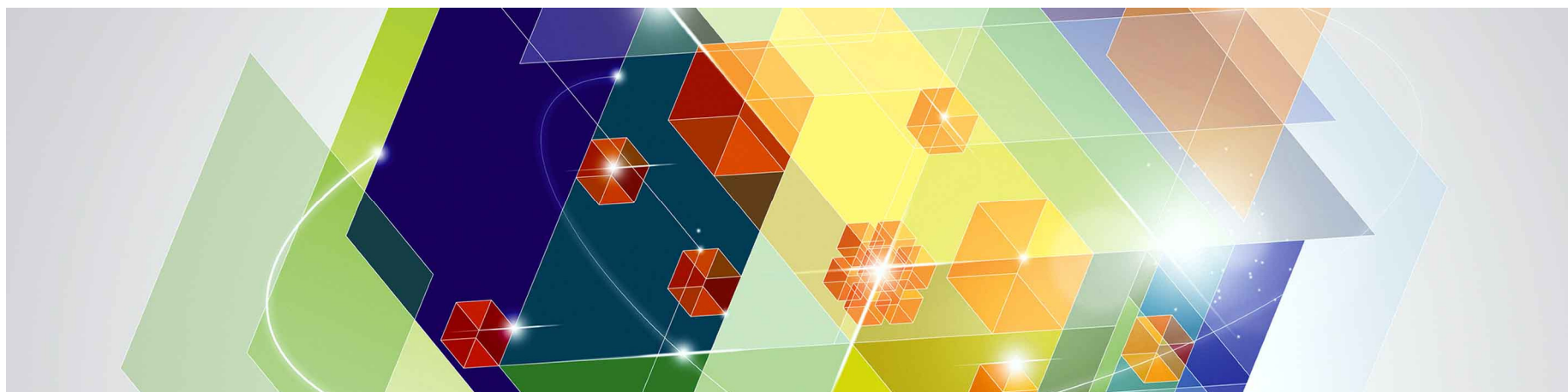


- Build complete end to end solutions with z196 and zBX
- Leverage centralized control of servers with Unified Resource Manager
- Simplify communications with internal and contained networking
- Leverage zEnterprise strong database capabilities and ability to host multiple diverse database workloads
- Leverage close proximity of BI applications to the hosted databases
- Use Fit for Purpose to put solution components on best architecture to optimize solutions



⇒ Build Solutions to match Business Units requirements

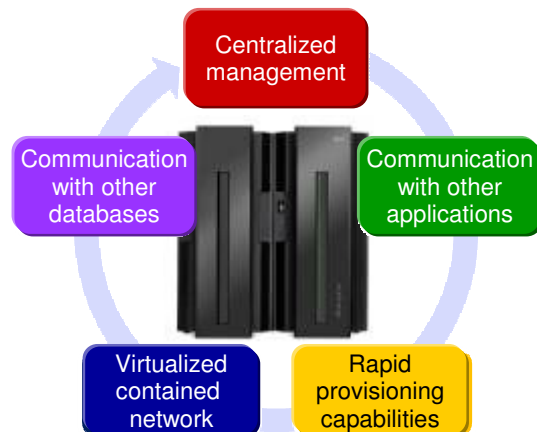
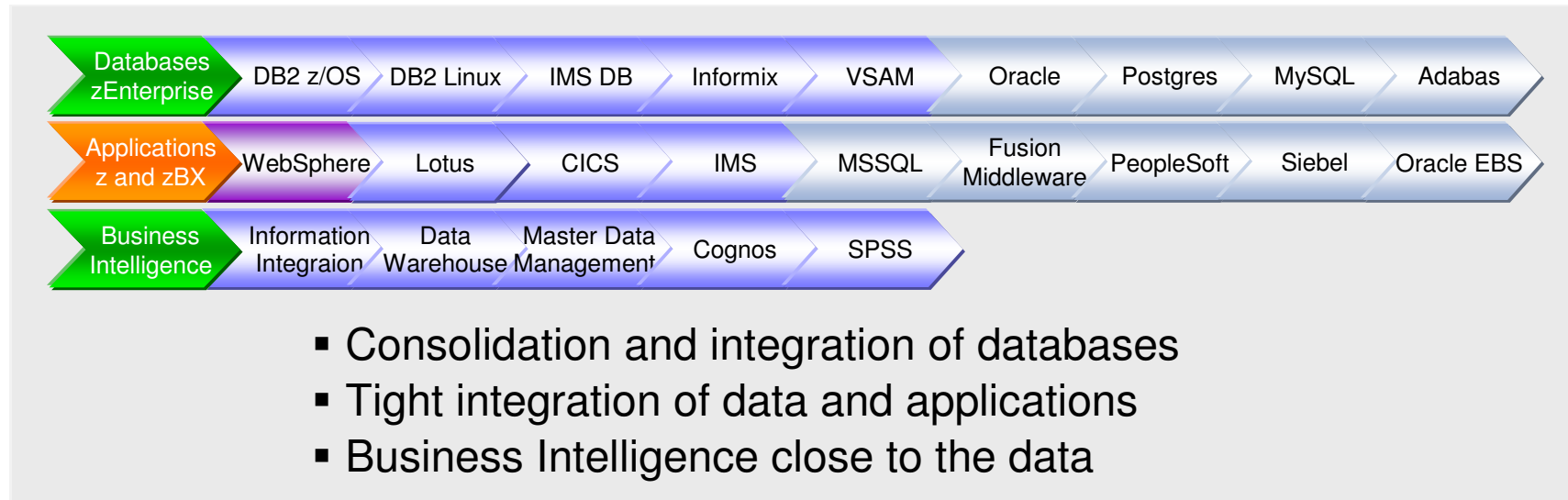
# Data Warehouse and Business Analytics on zEnterprise





# Foundation for Data, Analytic and Applications

Supports and Integrates Data Like No Other Platform



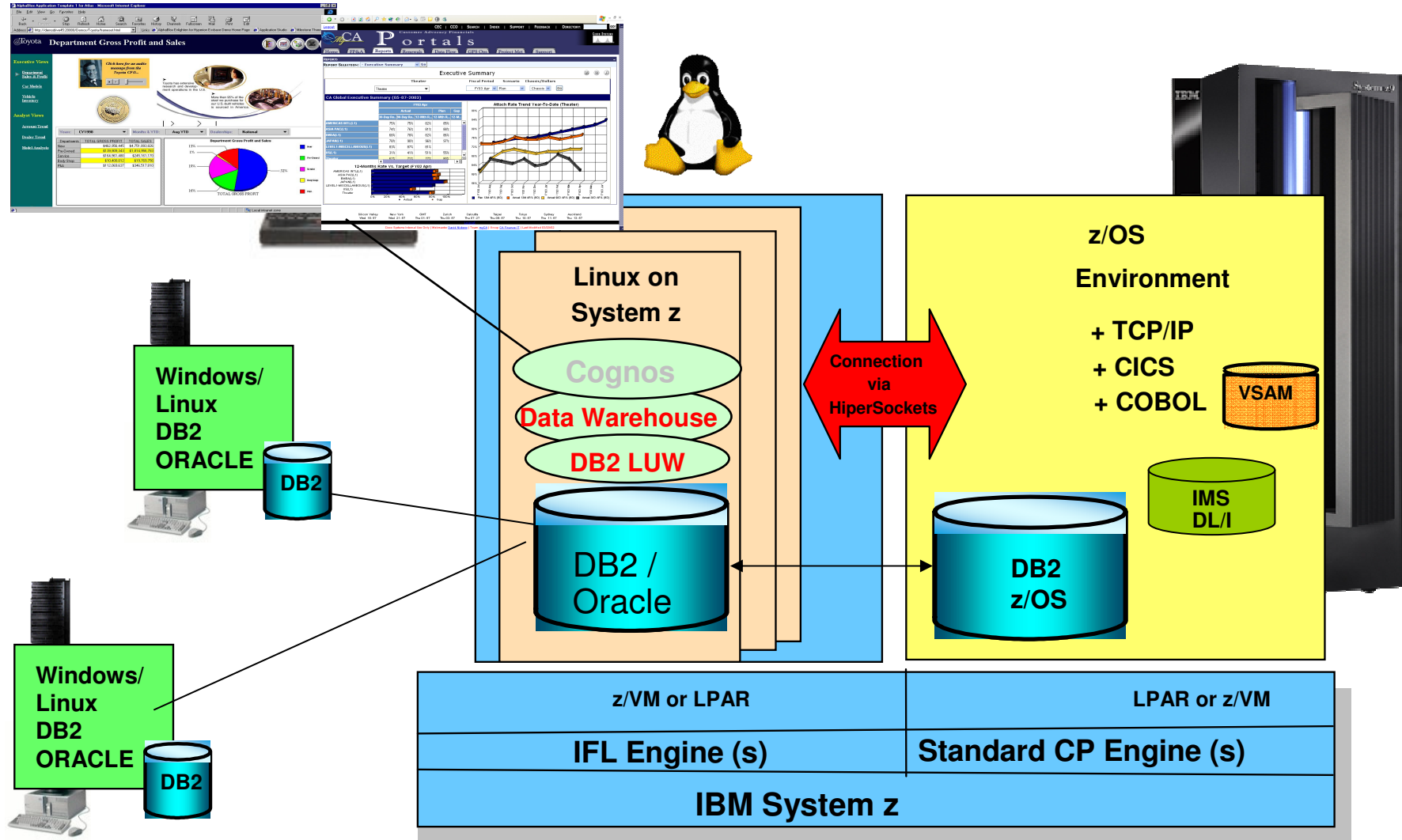
- The only platform that can run nine commercial databases, supported at the same time
- Better align and synchronize data, for data integrity. Use the internal architecture to consolidate database communications
- Leverage internal networking between databases and applications
- Centralize management across entire enterprise

**Data Growth is Exploding !**

# Linux on System z as Data Warehouse and BI



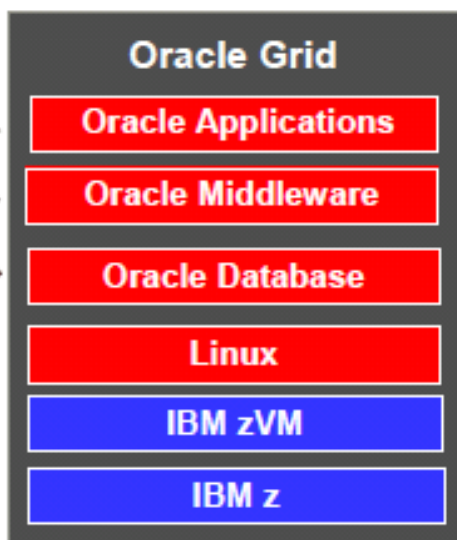
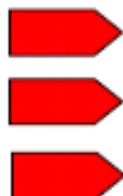
**Integrate, Consolidate, Evaluate, Decide,  
Explore Business Intelligence (BI)**



# Oracle and Linux on System z – IBM & Oracle working together

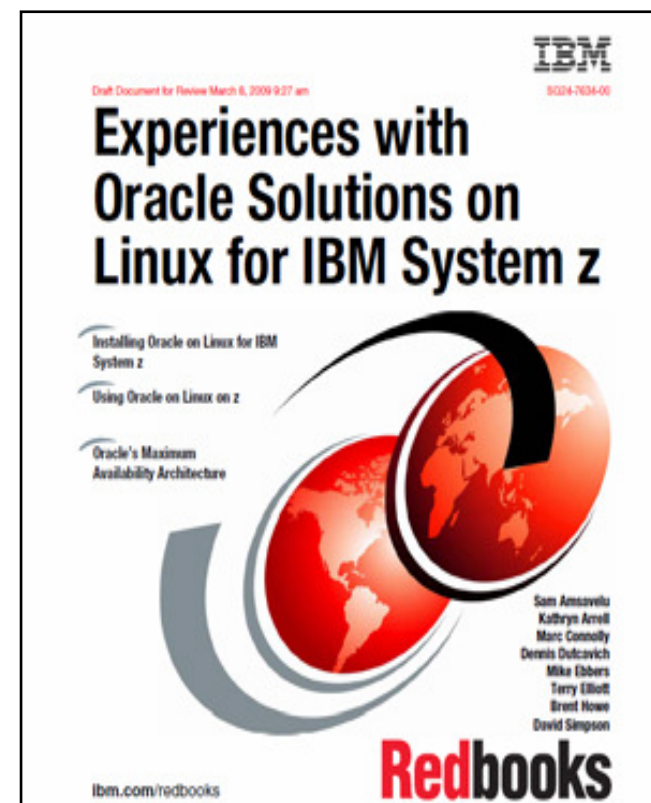
- Linux on System z is Oracle’s platform for the mainframe
- Oracle database 11g R2 available on Linux on System z (since 1Q2011)

Strategic porting investments fortify solutions strategy.



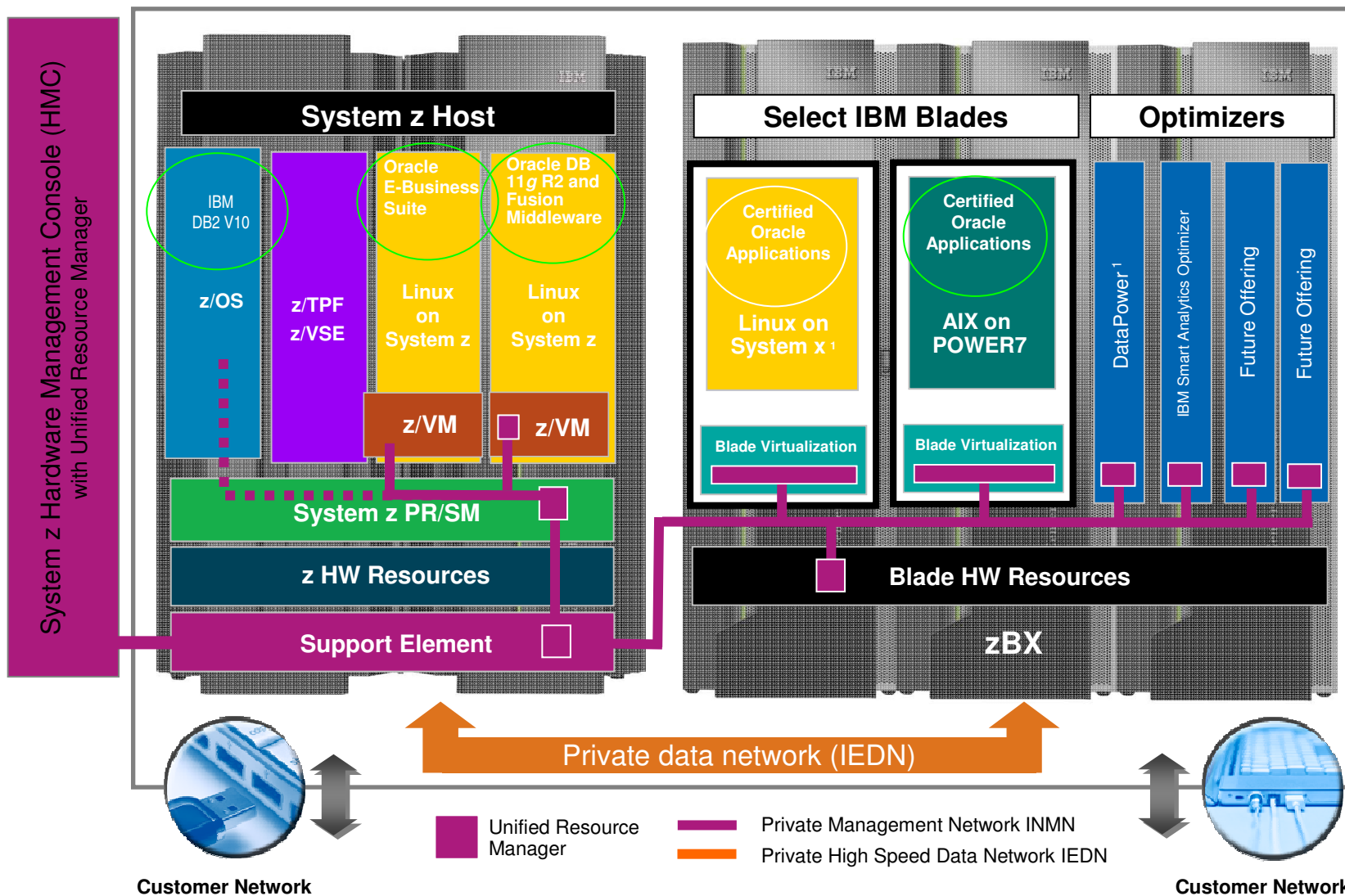
**★ New in 2011**  
**E-Business Suite Native on Oracle Database 11g Release 2 Version 11.2.0.2**

**Note:** Other Oracle solutions that are sometimes associated with E-Business Suite but are NOT supported on Linux for System z: Oracle Retail Suite, Retek, ProfitLogic, 360Commerce, Demantra, Oracle Transportation Management (G-Log), Oracle Pharmaceuticals (Clinical), Oracle iLearning



<http://www.redbooks.ibm.com/abstracts/sg247191.html>

# Examples of Oracle Solutions on IBM System zEnterprise



## Dundee City Council ...

### *Creating a cost-effective IT architecture with IBM System z and IBM XIV Storage System technologies*

#### **Business need:**

Like all UK local authorities, Dundee City Council needs to handle increasing demand for IT and eGovernment services, while also reducing costs in line with central government targets. When the lease on its server and storage hardware needed to be renewed, the Council saw an opportunity to enhance its capabilities and increase value for money.

#### **Solution:**

Dundee worked with IBM to upgrade its mainframe environment with two powerful IBM System z10 servers, and introduced the IBM XIV® Storage System to replace a mixed storage environment. [The new infrastructure runs a range of Linux applications and Oracle databases – supporting key systems such as social services 24x7.](#)

#### **Benefits:**

- Improves performance by more than 50 percent
- Providing capacity for growth without increasing IT costs.
- Enables very rapid provisioning of virtualised server and storage resources.
- Provides excellent availability and disaster recovery capabilities: all systems can be restored within 20 minutes.

*"The combination of the z10 processors and the XIV grid architecture gives us 50 percent better performance than our previous infrastructure – which means we can run 50 percent more workload for the same price. As a result, we can deliver more, faster online services and better value for tax-payers' money, without increasing the IT budget."*

*- Tim Simpson, IT Support Manager,  
Dundee City Council*

# Province of Québec, Canada



## Improves citizens' services while saving money and improving operation



- *Government of the province of Québec, Canada*
  - Relies heavily on large Web-based application environment to serve the needs of its citizens
  - DGTI (Direction generale des technologie de l'information) supports applications and underlying infrastructure
- *Situation:*
  - Fast growth of applications and infrastructure (150+) distributed servers, staffing pressures
- *Problems:*
  - Slow deployment of new applications, limited general manageability (including backup/recovery)
  - Rising software licensing costs, especially for the Oracle environment
- *Solution:*
  - IBM System z9™ Enterprise Class (z9 EC) was ideal choice: robust virtualization capabilities, proven high availability and ease of management
  - **Consolidated approximately 60 hard-to-manage distributed server environment (UNIX® servers) to single z9 EC server with 5 IFLs** and 96GB of memory running SUSE Linux® Enterprise Server (SLES) operating system under z/VM®
    - **80+ Oracle 9i and 10g database instances consolidated to the z9**
    - Consolidation from 60 servers down to 1 server resulted in significant reduction in Oracle licenses
    - Plan to move WebSphere Application Server and Domino instances as well

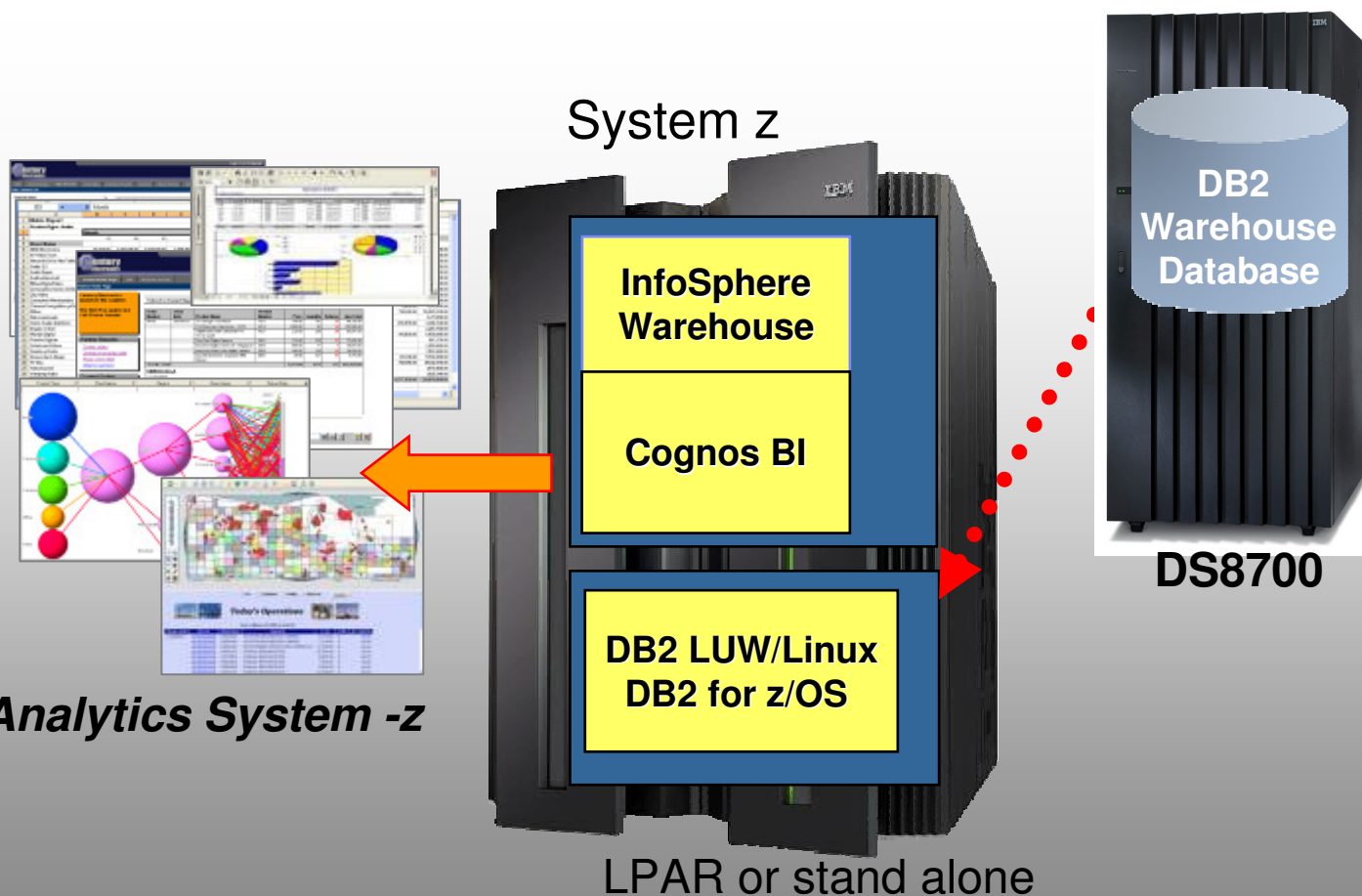


### Results:

New application deployment time fell from several weeks to days  
**Saved CA\$1.2M** (software licensing) & reduction in management cost  
Drastic improvement in backup and recovery operations

# IBM Smart Analytics System

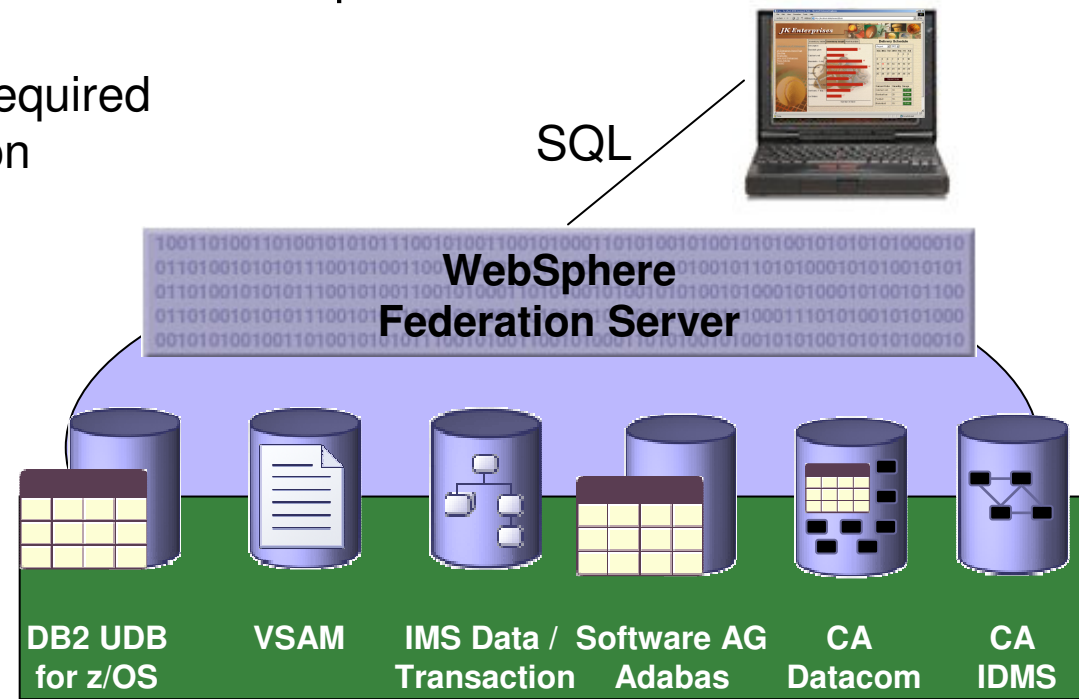
*Building an  
end-to-end  
BI environment  
on System z*



**IBM Smart Analytics System -z**

# InfoSphere Federation Server for Linux on System z InfoSphere Classic Federation for z/OS

- Integrating at the data layer – Federation of data
  - Read from and write to federated data sources using a single SQL
  - Standards-based access via JDBC, ODBC, or Call Level Interface
    - Including for VSAM and foreign databases!
  - Multithreaded with native drivers for scalable performance
  - Metadata-driven means...
    - No mainframe programming required
    - Fast installation & configuration
    - Ease of maintenance
  - Works with existing and new...
    - Mainframe infrastructure
    - Application infrastructure
    - Toolsets





## 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](http://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 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."

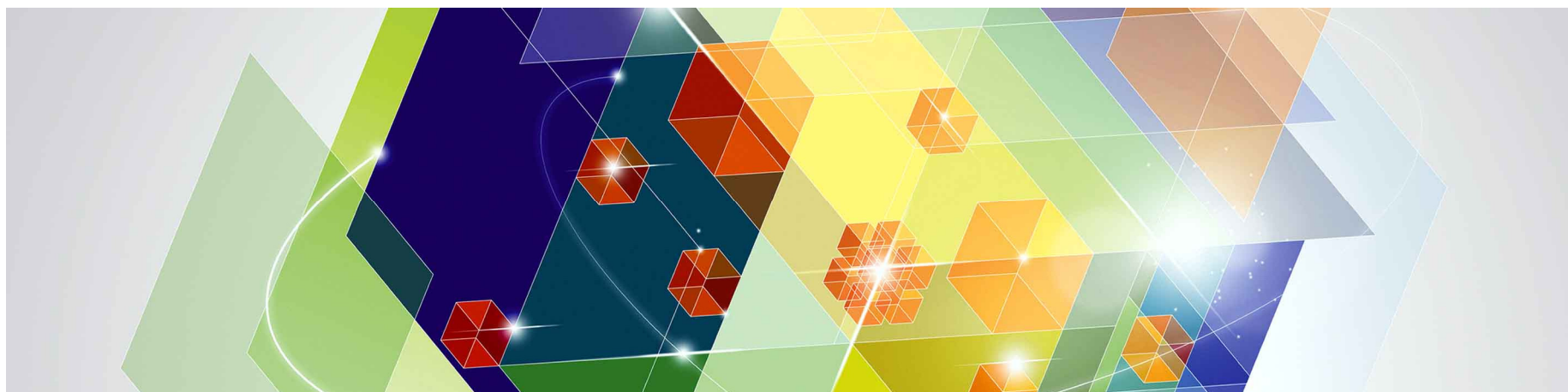
*Hermann Schelling, Head of Database Engineering, Zürcher Kantonalbank*

"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*

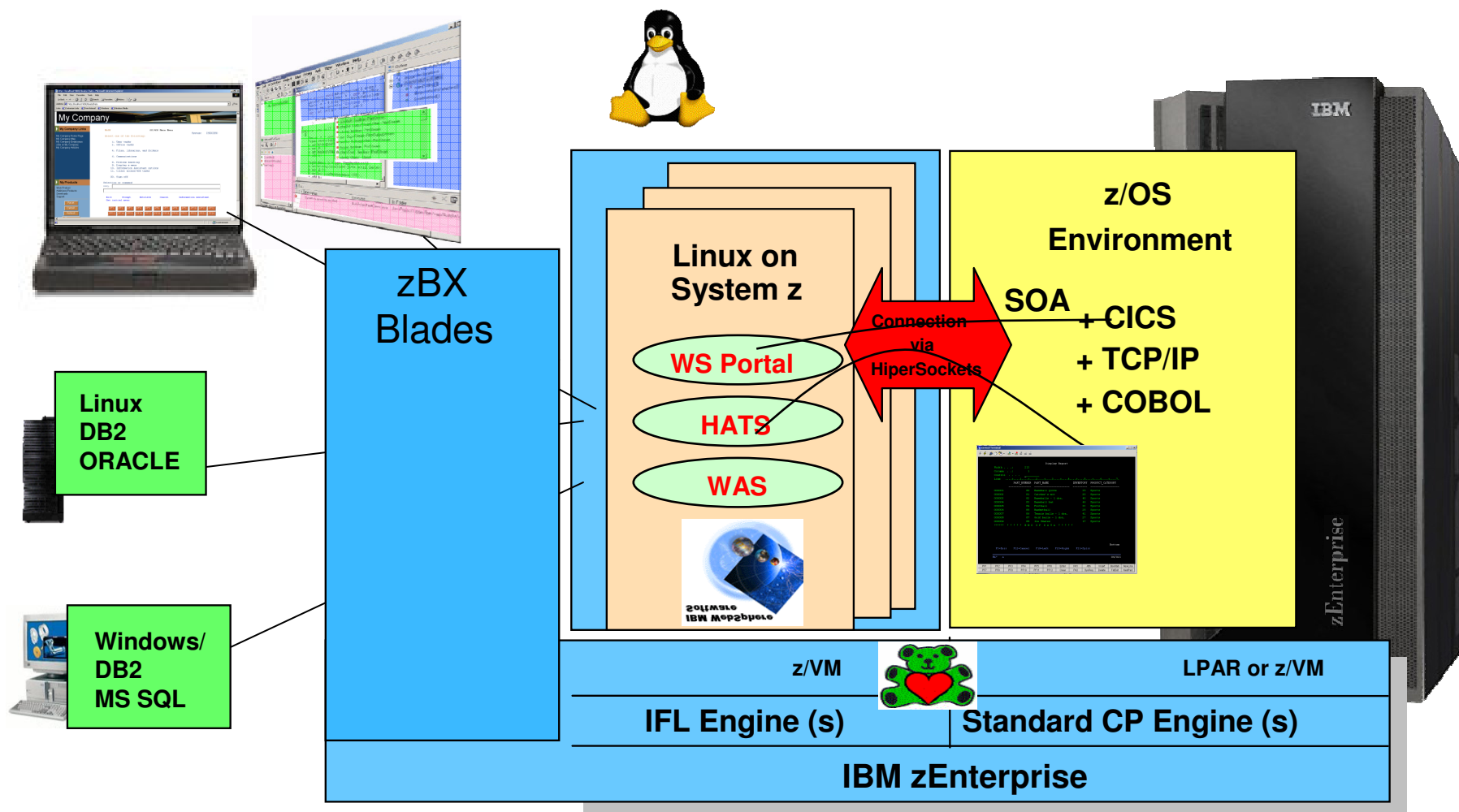


# Integration solutions with IBM System zEnterprise



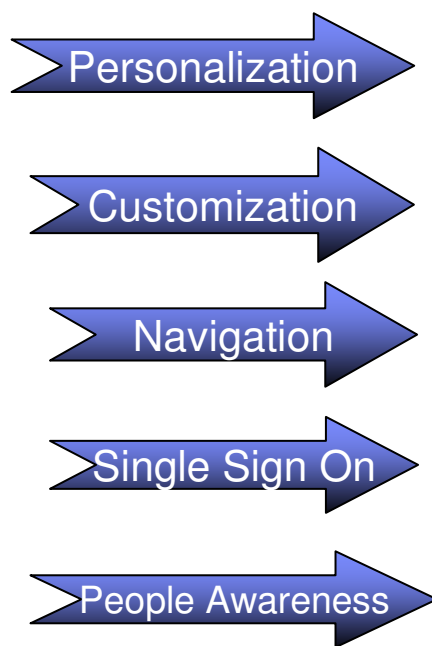
# Linux on System z as Central Access Point

Web enable, improve interface, simplify, extend existing applications

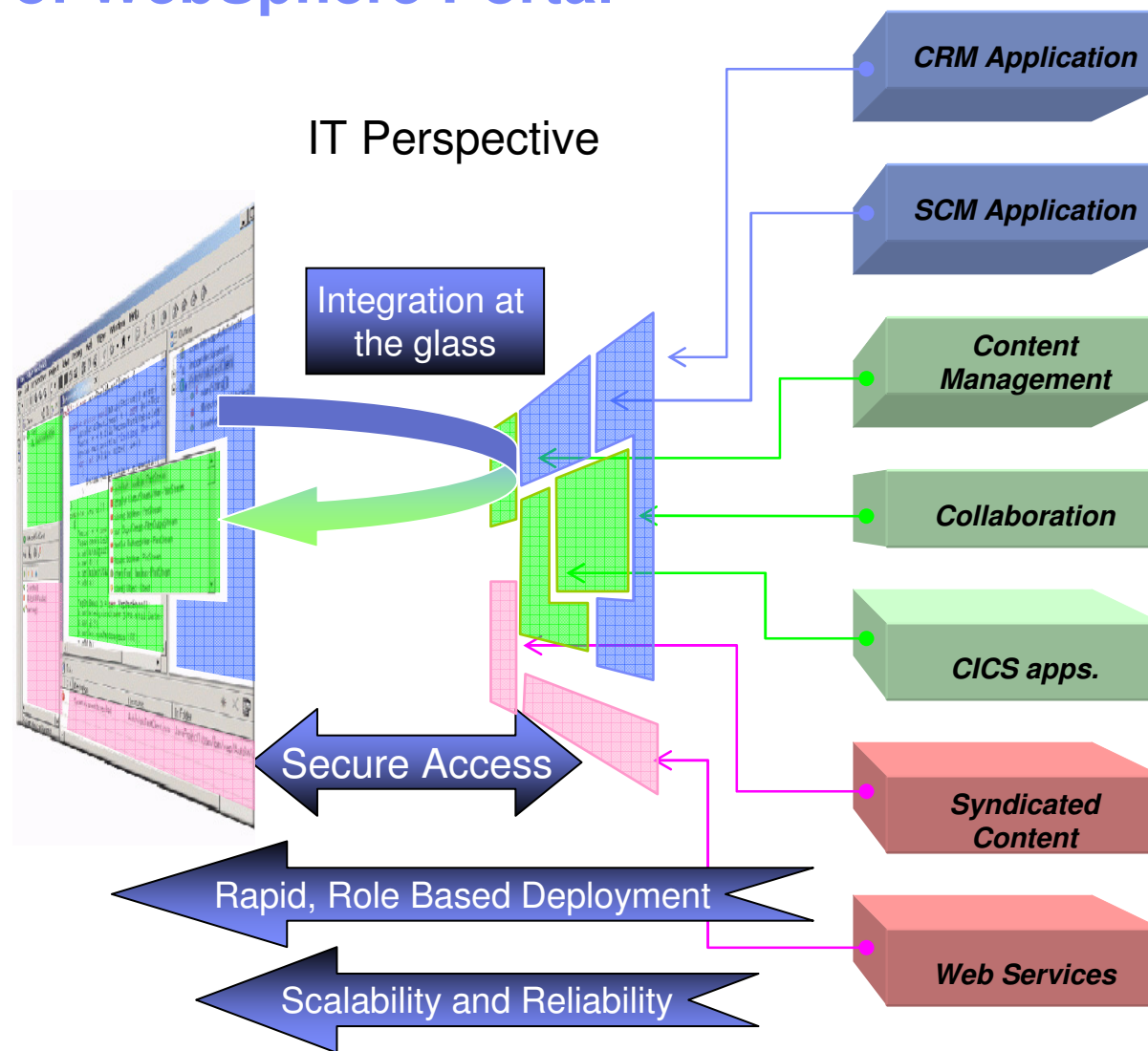


# Integration variety of WebSphere Portal

User Perspective



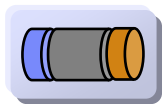
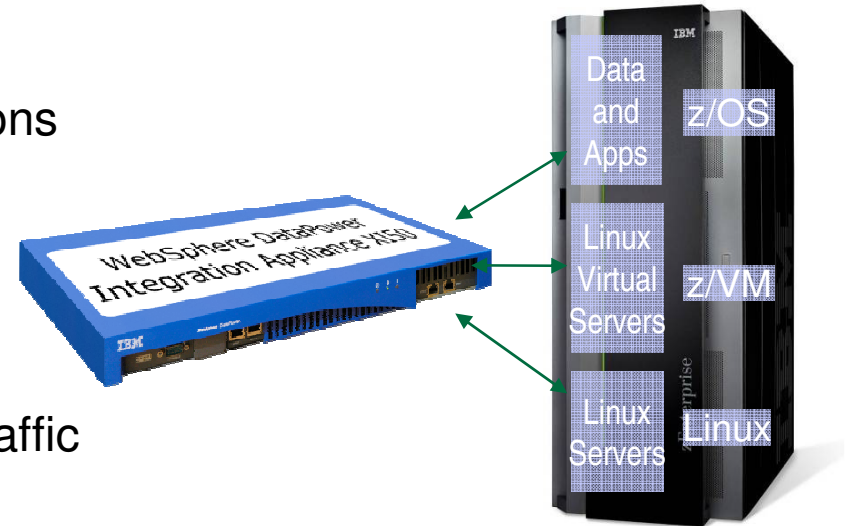
IT Perspective



# WebSphere DataPower XI50z for zBX on zEnterprise

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

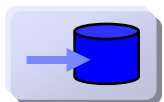
- SOA Integration / ESB Message Enrichment / Web Service virtualization for legacy applications
- Enforce high levels of security independent of protocol or payload format
- Integrate with enterprise monitoring systems
- Service level management options to shape traffic



- 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

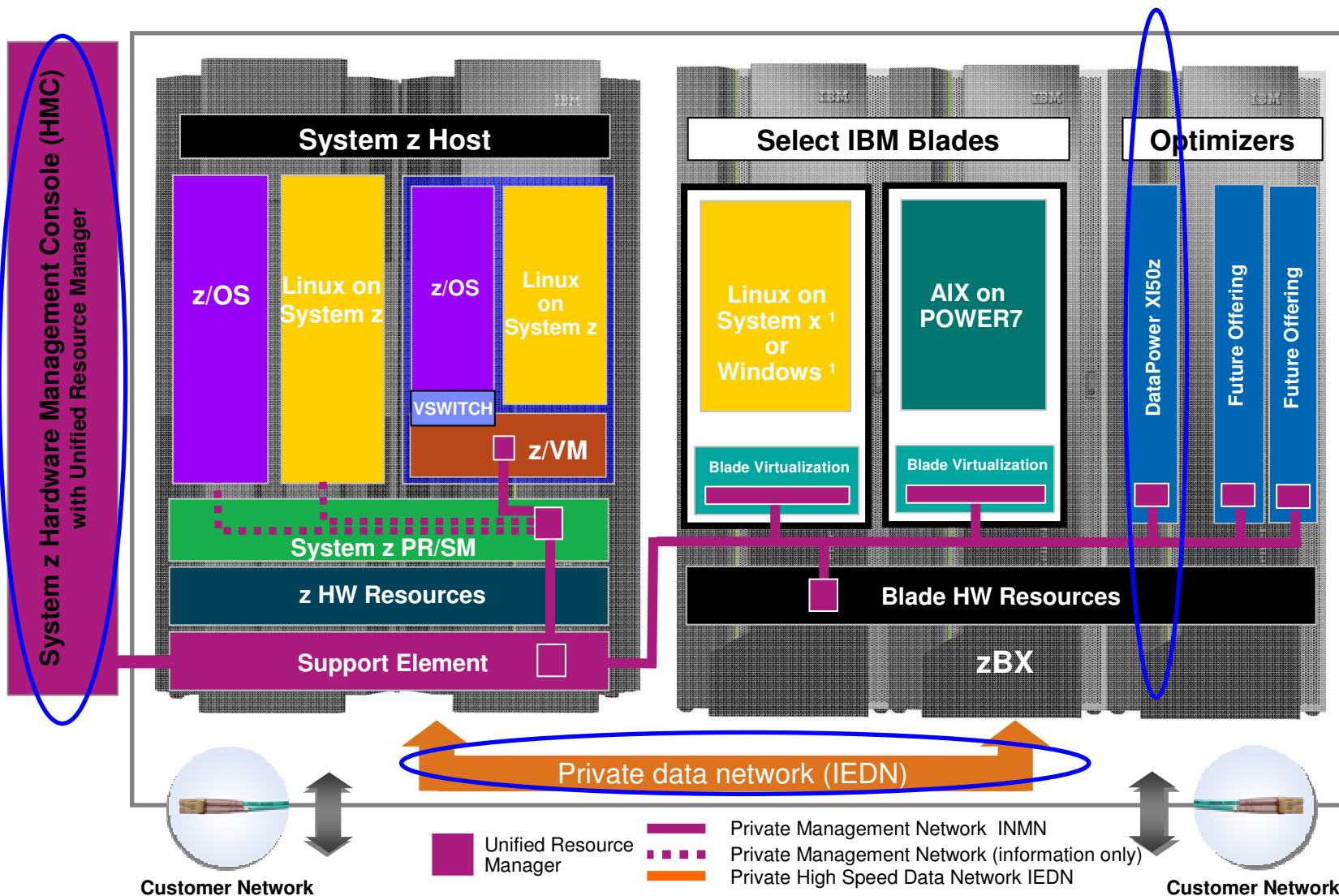


- Direct database access enables message-enrichment and data-as-a-service messaging patterns (DB2, Oracle, MS-SQL, Sybase)



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

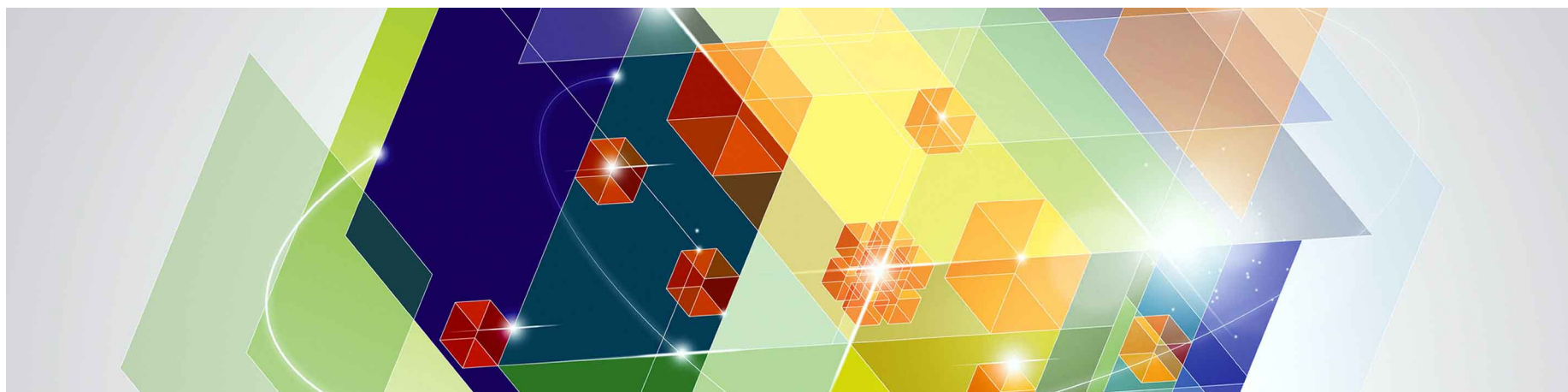
# The zEnterprise designed for workload integration



<sup>1</sup> All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

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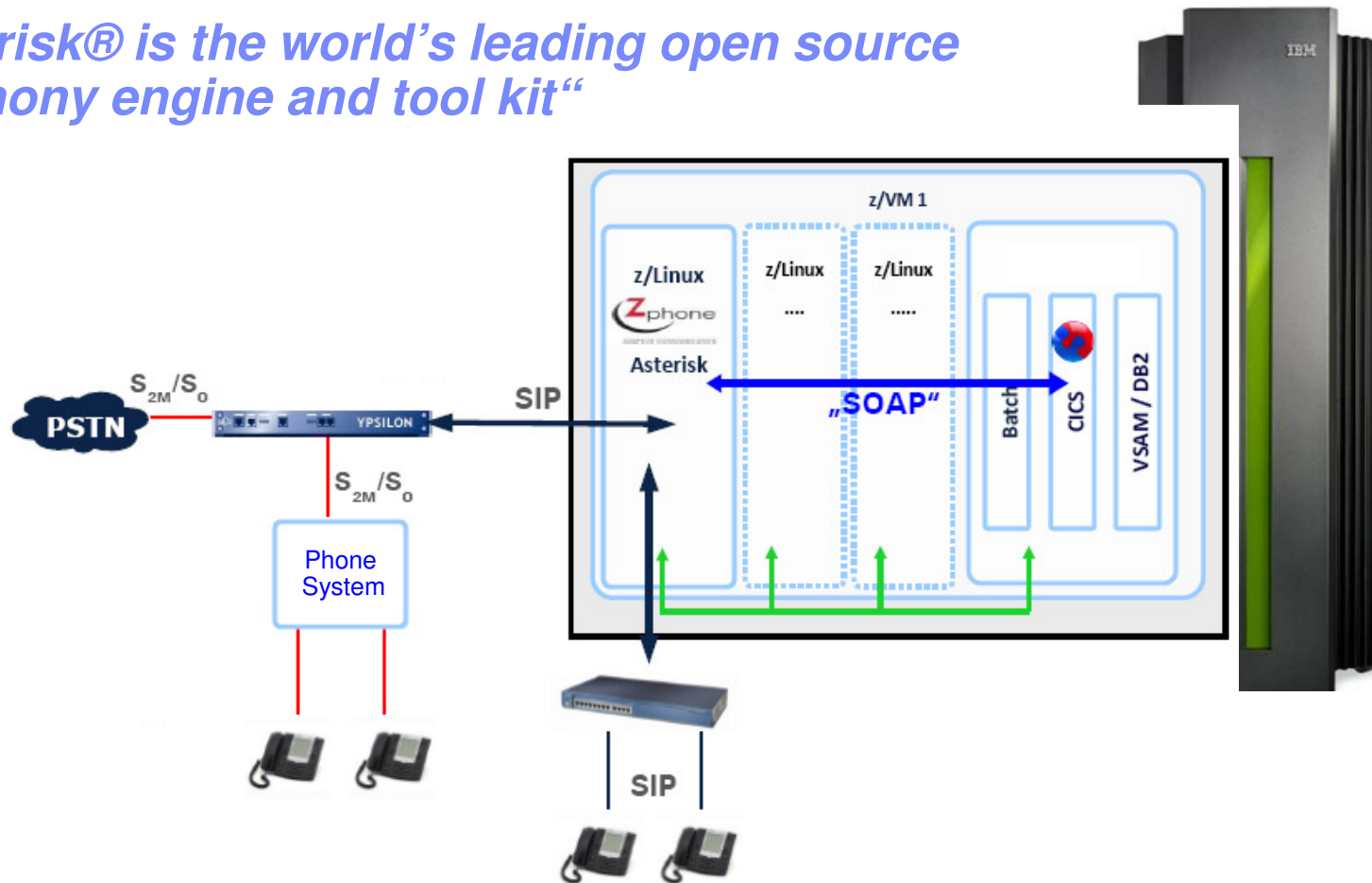
## Collaboration – Call Centers on Linux on System z and interaction with distributed or CICS workload





# IBM System z – the next generation **voice** Hub! – more than a simple Phone Server

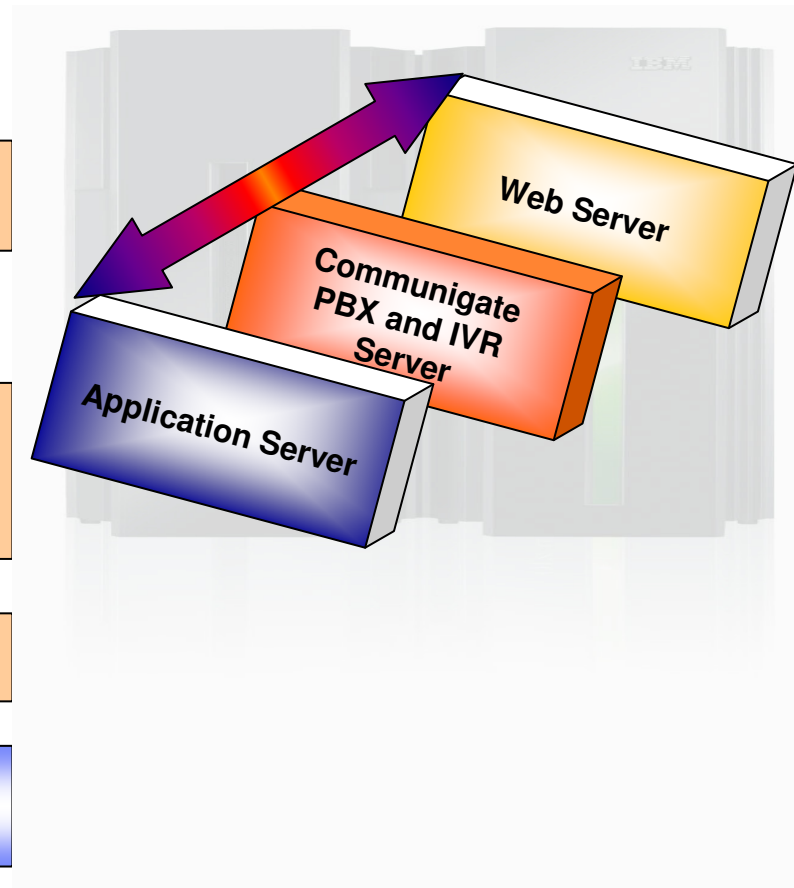
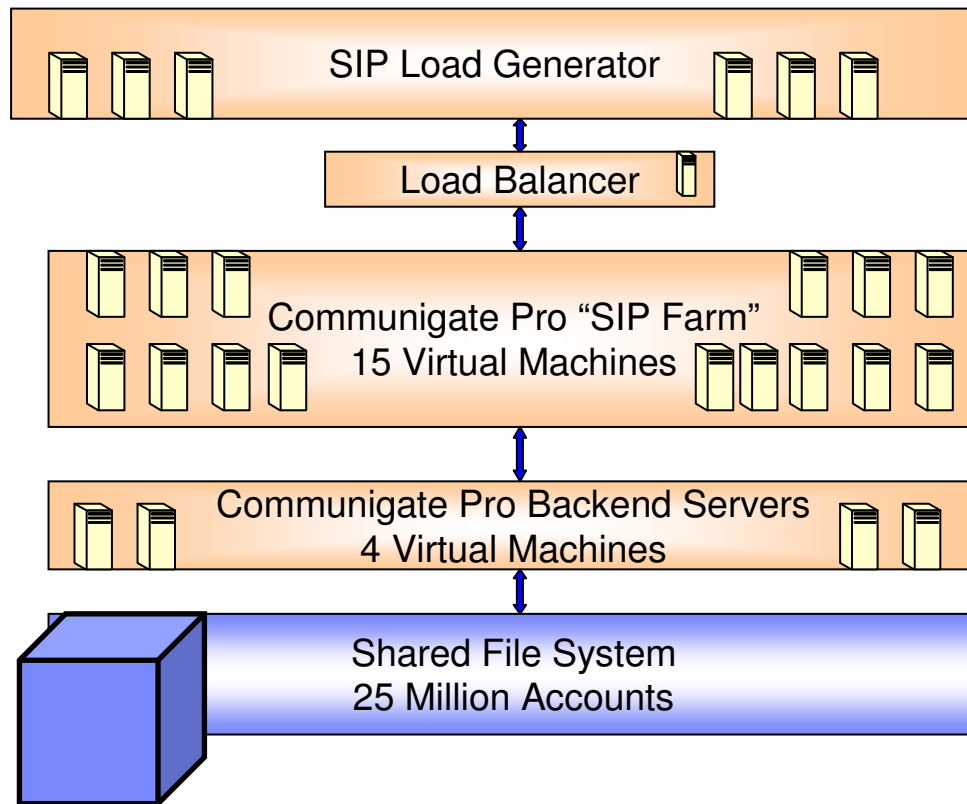
*„Asterisk® is the world’s leading open source telephony engine and tool kit“*



(<http://www.asterisk.org/support/about>)

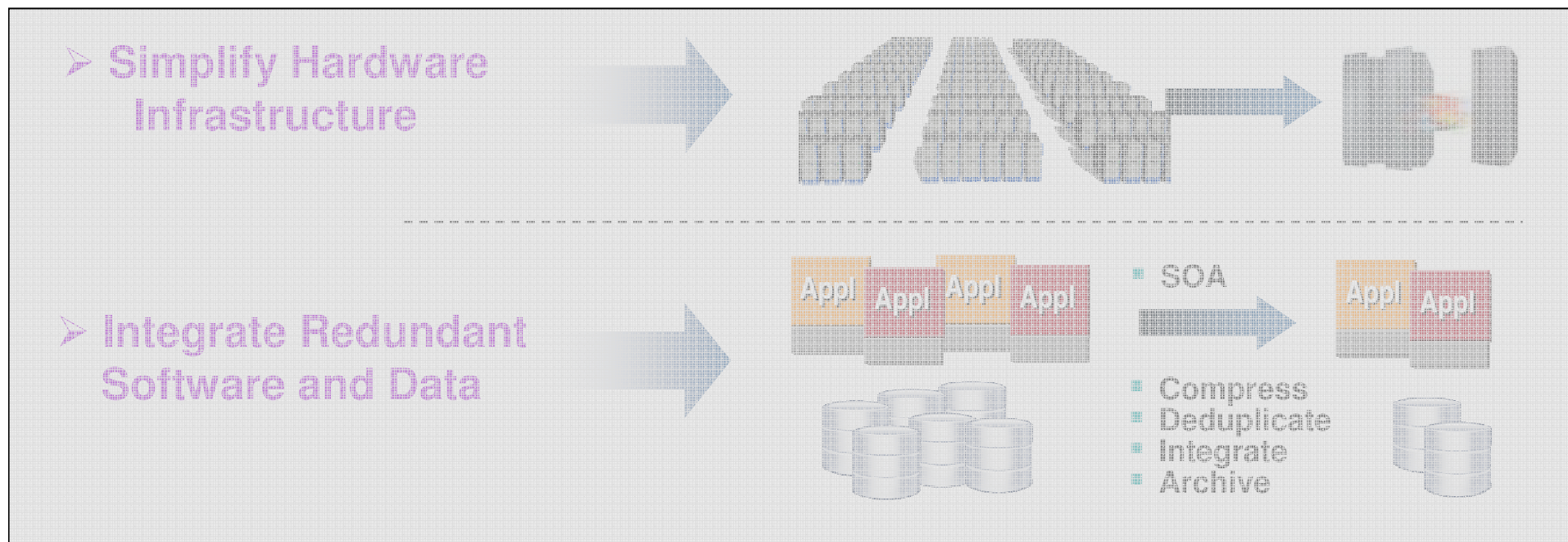
# VoIP, CommuniGate Pro Running on Linux System z

- Server Test **25 Million Subscribers**
- Largest VoIP Benchmark in Industry
- Brand New Customer to System z



# Strategies to Improve Value and reduce Complexity and Costs

## Optimize the Overall IT Environment



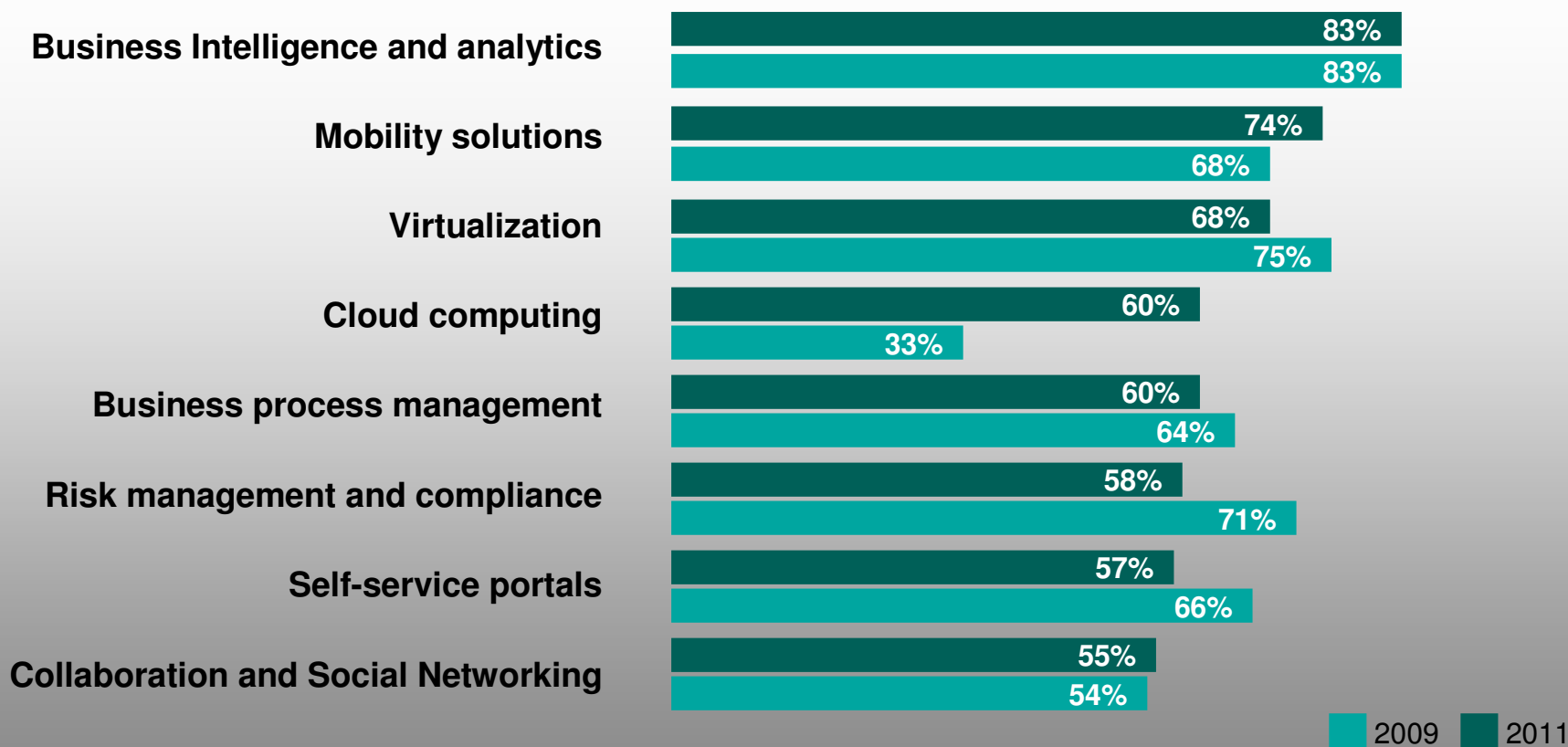
### ➤ Improve Service Delivery



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

## Most important visionary plan elements

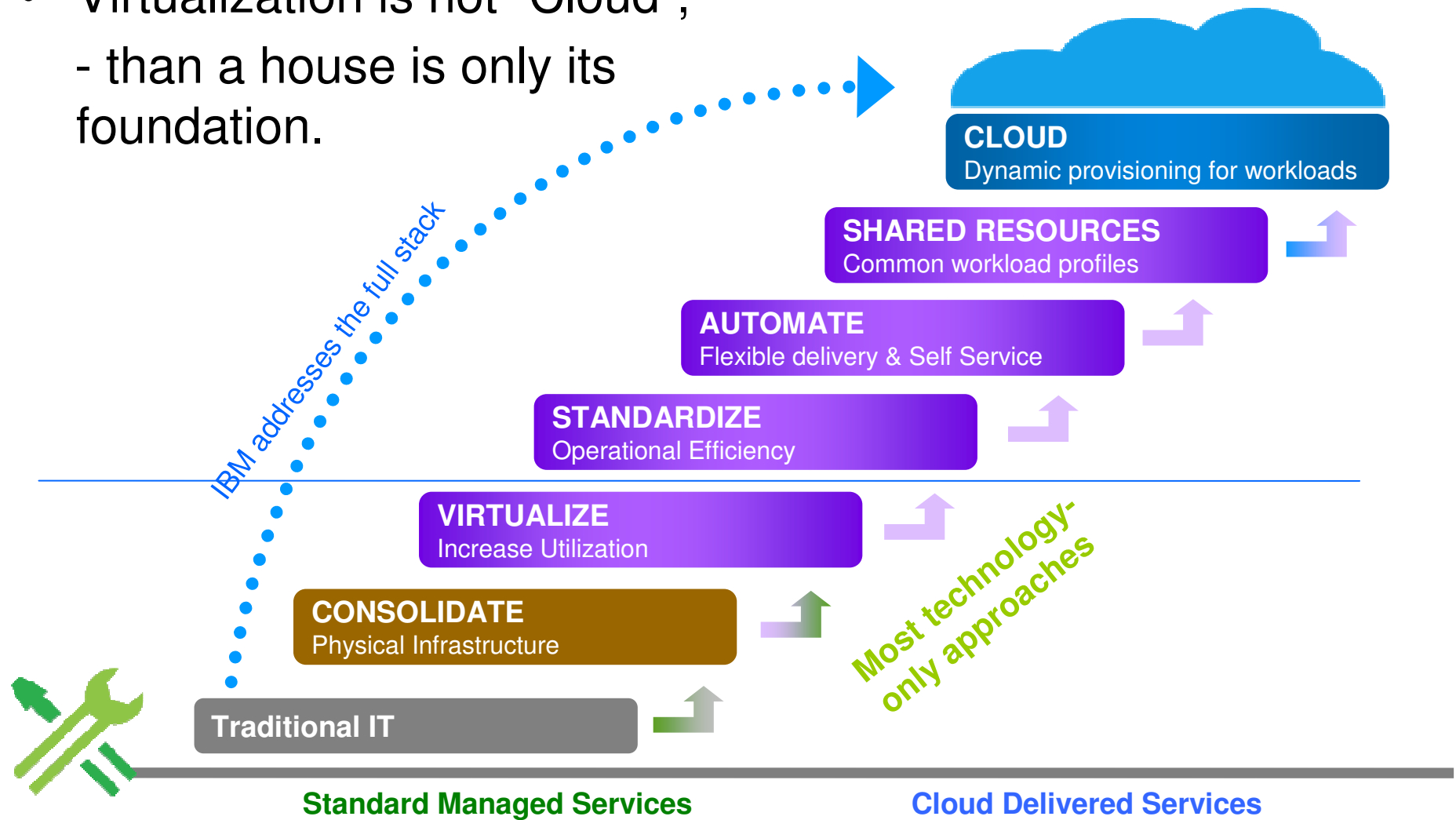
*(Interviewed CIOs could select as many as they wanted)*



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...

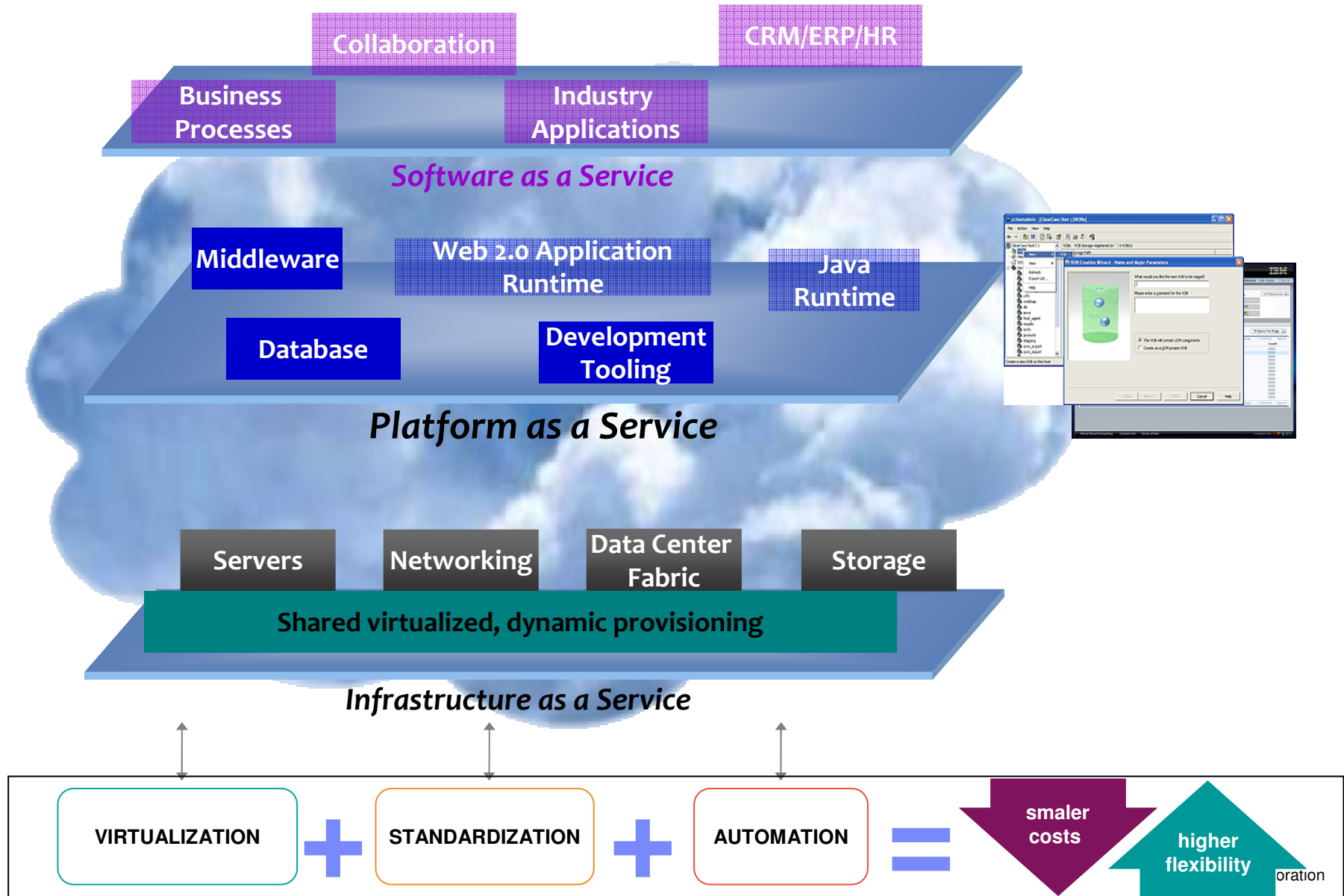
- Virtualization is not “Cloud”,  
- than a house is only its foundation.



# Cloud Computing environments



## Infrastructure, Platform or Software as a Service



# TSAM – The Cloud Management Control-Point



## Workloads

- Service measurement
- Service reporting
- Usage accounting
- Auditing and controls

### Web, Collaboration and Infrastructure

**Technology**  
 Highly Threaded  
 Throughput-oriented  
 Scale Out Capable  
 Lower Quality of Service

### Analytics and High Performance Computing

**Technology**  
 Compute intensive  
 High I/O Bandwidth  
 High Memory Bandwidth  
 Floating point  
 Scale out Capable

### Transaction Processing and Database

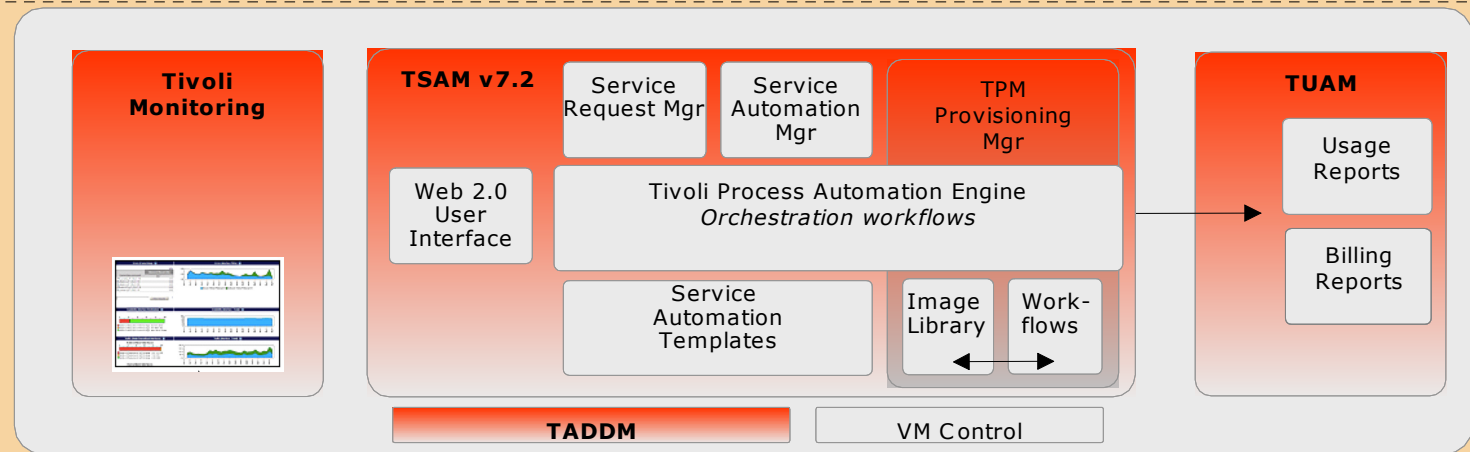
**Technology**  
 Scale  
 High Transaction Rates  
 High Quality of Service  
 Handle Peak Workloads  
 Resiliency and Security

### Business Applications

**Technology**  
 Scale  
 High Quality of Service  
 Large Memory Footprint  
 Responsive Infrastructure

## Tivoli Service Automation Layer

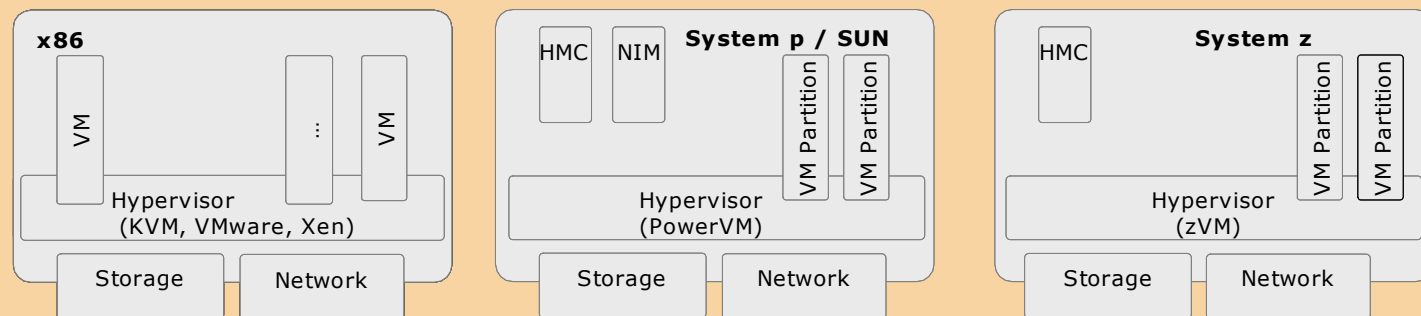
- Automate process of instantiating and managing a distributed IT environment.



End to End Service Management

## Virtualized Infrastructure Layer

- Virtualized resources
- Virtualized aggregation
- Physical infrastructure



## IBM System z – Cloud Computing Offerings

### **Virtualization Offering – Systems Director, Unified Resource Manager Technology**

- IBM Systems Director VMControl – Director GUI initiated z/VM virtual server deployment
- Unified Resource Manager (URM) – zEnterprise HMC initiated virtual server deployment (z/VM-Linux, kvm-Linux/Intel, AIX) on zBX

### **Entry Offering - Provisioning Manager Technology**

- IBM Offering ‘zEnterprise Starter Edition for Cloud’ - Tivoli Provisioning Manager (TPM) as cloud service deployment instance

### **Advanced Offering - Service Automation Manager Technology**

- IBM Offering ‘IBM System z Solution Edition for Cloud Computing’ – covers Tivoli Service Automation Manager (TSAM) as cloud life-cycle instance, including service catalogue, orchestration of requests and TPM as deployment component



# IBM Smart Analytics Cloud for System z

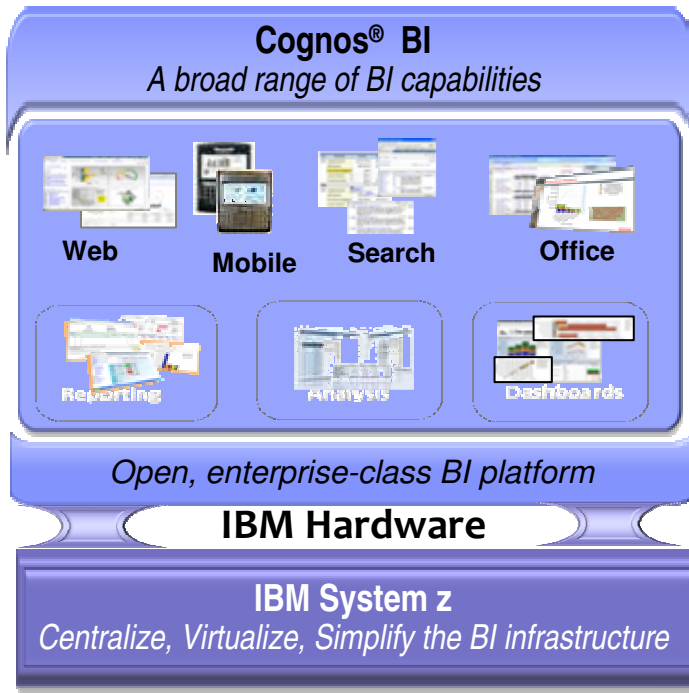
Creates...

That delivers ...

Smart Analytics Cloud	A private cloud within the enterprise	A solution for delivering business intelligence to the entire organization
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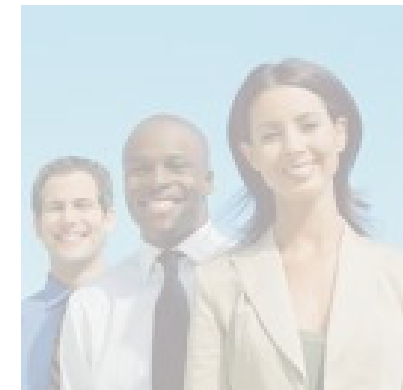
## The solution components...

### IBM Software



### IBM Services

- Phase 1: Create awareness of, a strategy for, and a governance foundation for BI across the organization
- Phase 2: Preparation for the Smart Analytics Cloud
- Phase 3: Install the base cloud, integrate into the corporate enterprise, and test the cloud use cases
- Phase 4: Educate the enterprise for on-going success with the Smart Analytics Cloud



Learn more at: [www.ibm.com/systems/z/solutions/cloud/smart.html](http://www.ibm.com/systems/z/solutions/cloud/smart.html)

# Transzap Boosts Software-as-a-Service Uptime with IBM System z

Transzap, Inc.

## Business challenge:

Transzap offers its customers a comprehensive suite of financial software tools. As a small business with tens of billions of dollars in client transactions flowing through their systems each year, Transzap needed an economical, reliable platform to provide clients with high availability, while enabling the capacity to accommodate growth within their software-as-a-service business model.

## Solution:

Transzap decided to consolidate on an IBM System z platform to provide the stability and scalability needed to accommodate triple digit volume growth, enabling them to focus on the business of software innovation. Transzap migrated to System z and virtualized its critical applications on Linux on System z, a platform that supports Transzap's dynamic Java and Oracle environments.

## Benefits:

- Helps Transzap serve more than 69,000 users across 6,800 companies
- Provides higher levels of uptime for their customers
- Offers peace of mind through 24x7 world-class hardware support

*“We intend to deliver a 99.9% application uptime guarantee to our customer base, thanks to the availability characteristics of System z.”*

*— Peter Flanagan, CEO,  
Transzap, Inc.*

## Solution components:

- IBM System z
- Linux on System z
- IBM z/VM



## 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.**

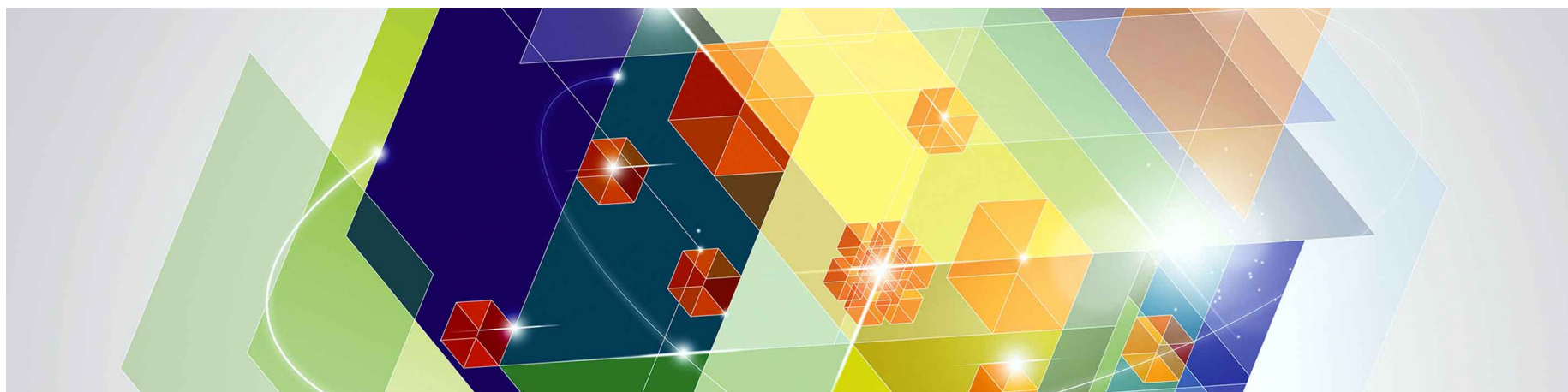


**UNIVERSITÀ  
DEGLI STUDI DI BARI  
ALDO MORO**

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

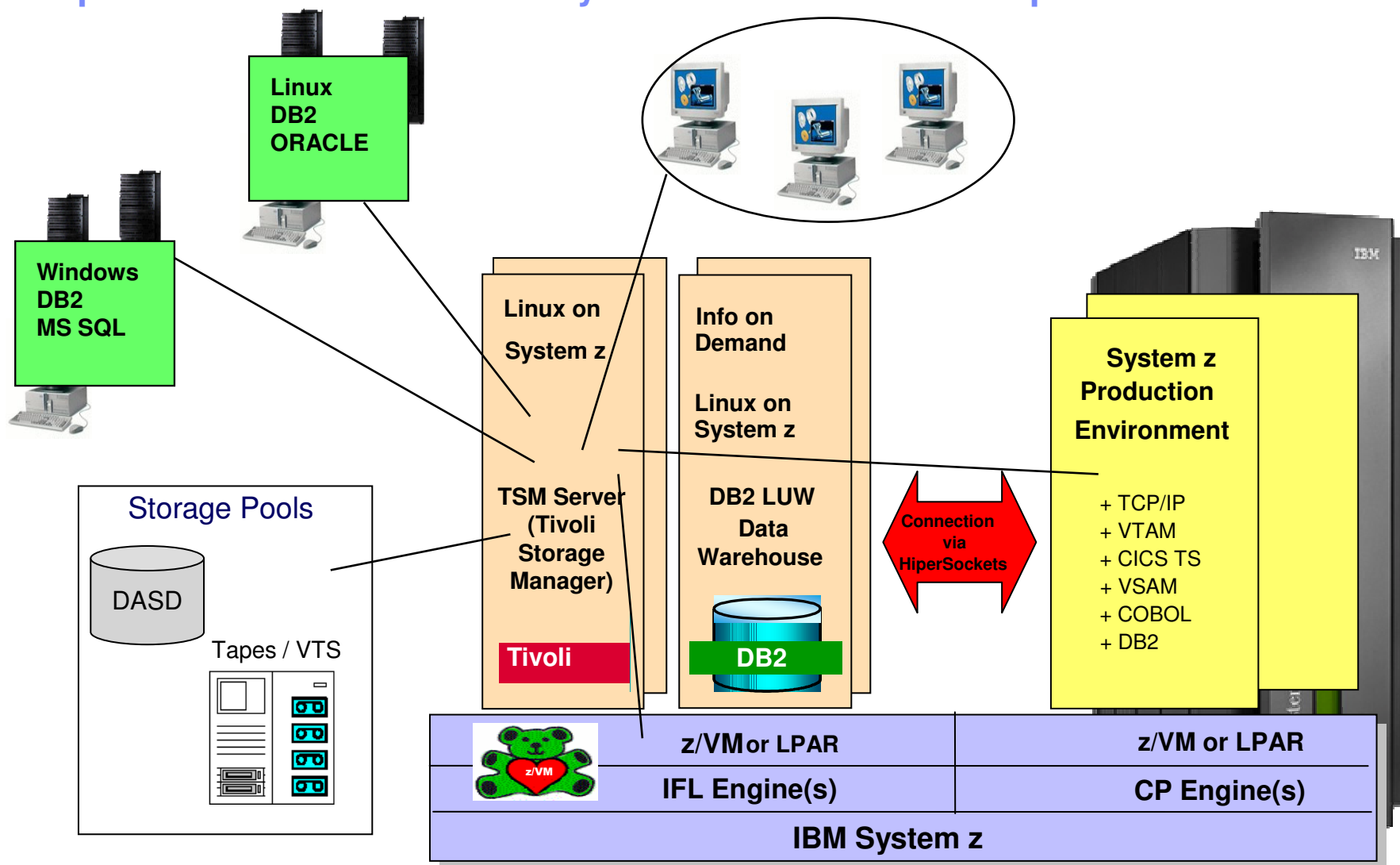


# Centralized Backup and System Storage / Tape support

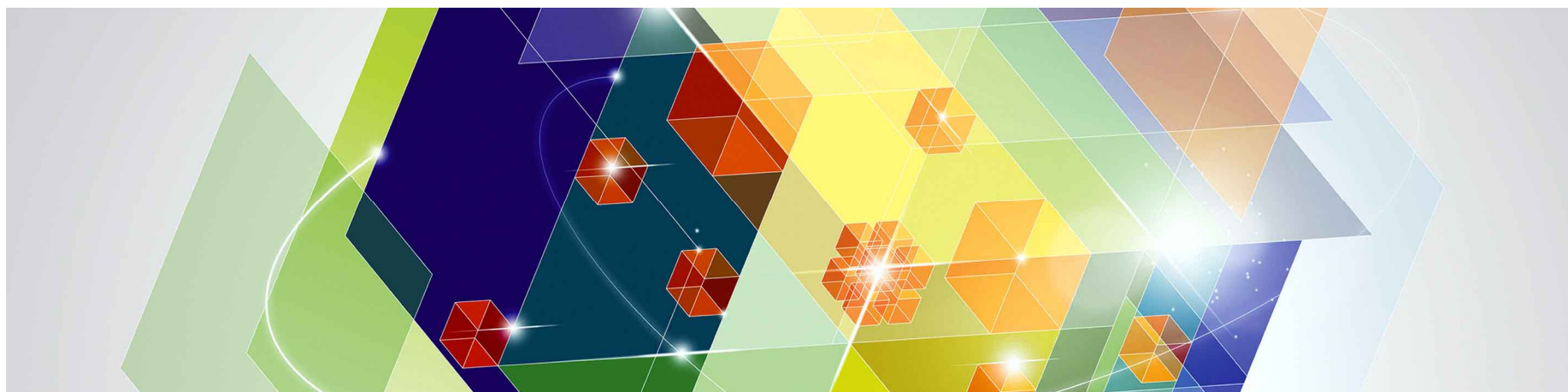


# Enterprise Backup with Linux on System z

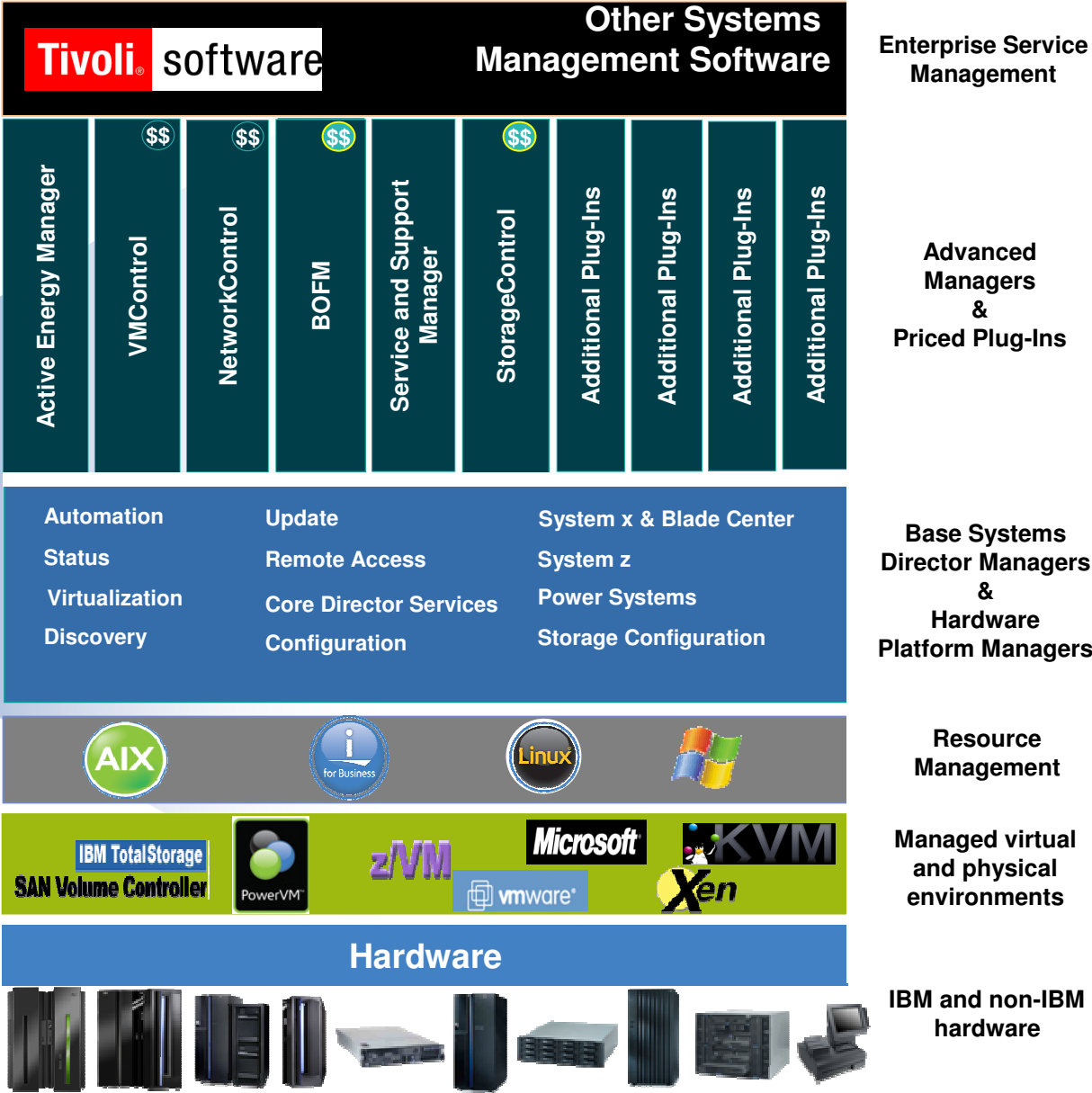
## Implement TSM on Linux on System z as central Backup Hub



# Automate cross platform workload with Linux on System z



# IBM Systems Director





## IBM Systems Director VMControl

*Software that delivers consistent management of single virtual systems or pools of cooperating systems across all IBM enterprise platforms*



**IBM System x  
Power Systems  
System z**

### VMControl features:

- Discover virtual resources
- Display inventory and topology
- Monitor virtual resource health
- Relocate virtual resources
- Create and manage virtual servers
- Deploy and manage workloads
- Provision and manage virtual images
- Manage virtual resource pools

*VMControl encompasses virtual workload lifecycle management, image management and system pool management as an extension to IBM Systems Director.*

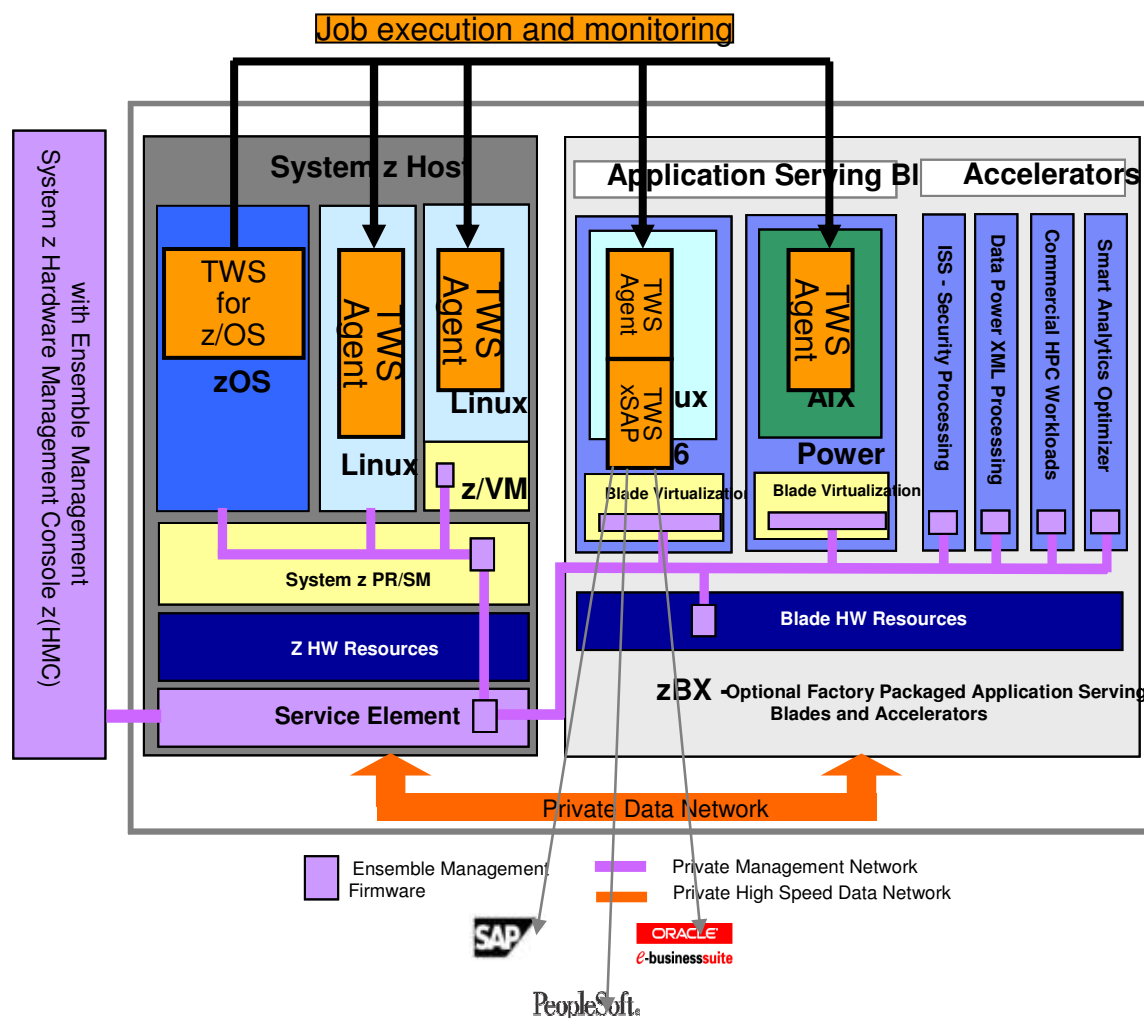


# Tivoli Workload Automation Integration Points



# Workload Automation on zEnterprise

## Fit for purpose workload deployment



- zCentric end-to-end solution ideal to manage heterogeneous workloads across System z and Blade extensions, under a single point of control and management
- Future option to exploit Unified Resource Management interfaces would provide unprecedented workload moving and optimization capabilities

## Business benefits

- ★ *Reduce costs with fit-for-purpose platform, and implement a virtualized and green data center*
- ★ *Realize data-proximity processing with high bandwidth for distributed applications*

## Conclusion:

### What Makes Best Fit for zEnterprise with zBX ?

- 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

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

BANKS	OTHER FINANCIAL INST.	RETAILERS	HEALTHCARE	UTILITIES / ENERGY
<b>Banco Itaú</b>	<b>DTCC</b> The Depository Trust & Clearing Corporation		<b>Aurora Health Care</b>	<b>nationalgrid</b>
<b>Bank of NZ</b>				<b>PETROL</b> [Slovenia]
<b>Bank of Montreal</b>				
<b>BCP</b> [Peru]	<b>Allianz</b>			
<b>Bank of China</b>				
<b>Central Bank of Russia</b>	GOVERNMENTS	TRANSPORTATION	HOSTING PROVIDERS	OTHERS
<b>FNB</b> First National Bank Namibia	<b>CAIXA</b> [Brazil]		<b>BRZ</b> BRZ Deutschland Bauinformationstechnologie	<b>HOPLON</b> [Gaming] [Brazil]
<b>HDFC BANK</b> [India]		<b>БЕЛОРУССКАЯ ЖЕЛЕЗНАЯ ДОРОГА</b> [Belarusian Railways]		
<b>IBK</b> <b>Industrial Bank of Korea</b>	[Kazakhstan]		<b>EFIS</b> FINANCIAL SOLUTIONS	[Russian Hydrometeorological Research Institute]
<b>PSBank</b> <b>Philippines Savings Bank</b>	<b>NBC</b> The National Business Center Government Shared Service Provider [USA]			<b>BALDOR</b> [Manufacturer/USA]
<b>Postbank</b> [Germany]				
<b>VietnBank</b> [Vietnam]				

Users of Linux on System z

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## 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>
- IBM zEnterprise Events Landing Page: <http://www.ibm.com/systems/breakthrough>
- IBM software for zEnterprise: <http://www.ibm.com/software/os/systemz/announcements>
- IBM System Storage: <http://www.ibm.com/systems/storage/product/z.html>
- IBM Global Financing: <http://www.ibm.com/financing/us/lifecycle/acquire/zenterprise/>
- IBM Services for zEnterprise: <http://www.ibm.com/services/us/gts/zenterprise/index.html>
- IBM zEnterprise / System z Redbooks Portal: <http://www.redbooks.ibm.com/portals/systemz>

# Questions?



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