IBM System z

Technical University 2011

zEnterprise and integration solutions of Linux and traditional workload

zLG04

Wilhelm Mild

wilhelm.mild@de.ibm.com

Trademarks

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

AIX*	IBM*	PR/SM	WebSphere*	z/OS*
BladeCenter*	IBM (logo)*	System Storage*	XIV*	z/VM*
DataPower*	NetWeaver*	System x*	z9*	z/VSE
DB2*	Parallel Sysplex*	System z*	z10 EC	
FICON*	POWER*	System z9*	zEnterprise	
FlashCopy*	POWER7*	System z10*		
GDPS*	Power Systems			

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.
Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license there from.
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
InfiniBand is a trademark and service mark of the InfiniBand Trade Association.
Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.
IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

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

Notes:

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

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

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

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

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

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

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

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.

IBM zEnterprise System

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

Explosive systems and data growth inhibit responsiveness to client needs, and market opportunities

zEnterprise

1. Enables mixed workload business processes to be deployed and centrally managed
2. Allows optimized single system integration of data, applications, and web serving
3. Delivers dynamically responsive IT
4. Meets the need of heterogeneous data centers

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

IBM zEnterprise System

The broadest systems architecture

Enabling integration and centralized management of multi-platform systems, applications, and data

zEnterprise z196 and z114

- Industry's most robust design for systems and data continuously availability
- Optimized to host large-scale database, transaction, and mission critical applications
- The most efficient platform for large-scale Linux® consolidation
- Massive scale up

Unified Resource Manager

- Unifies management of resources, extending IBM System z® qualities of service end-to-end across workloads
- Provides platform, hardware and workload management

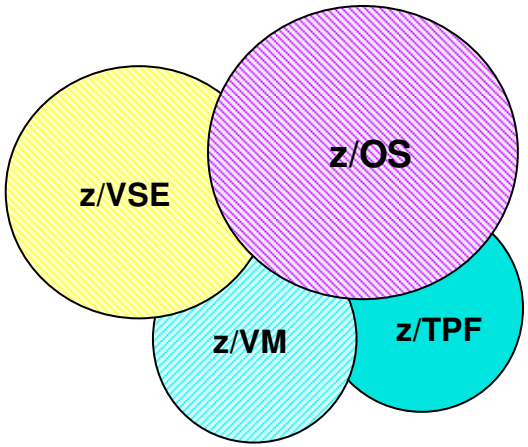
BladeCenter Extension (zBX)

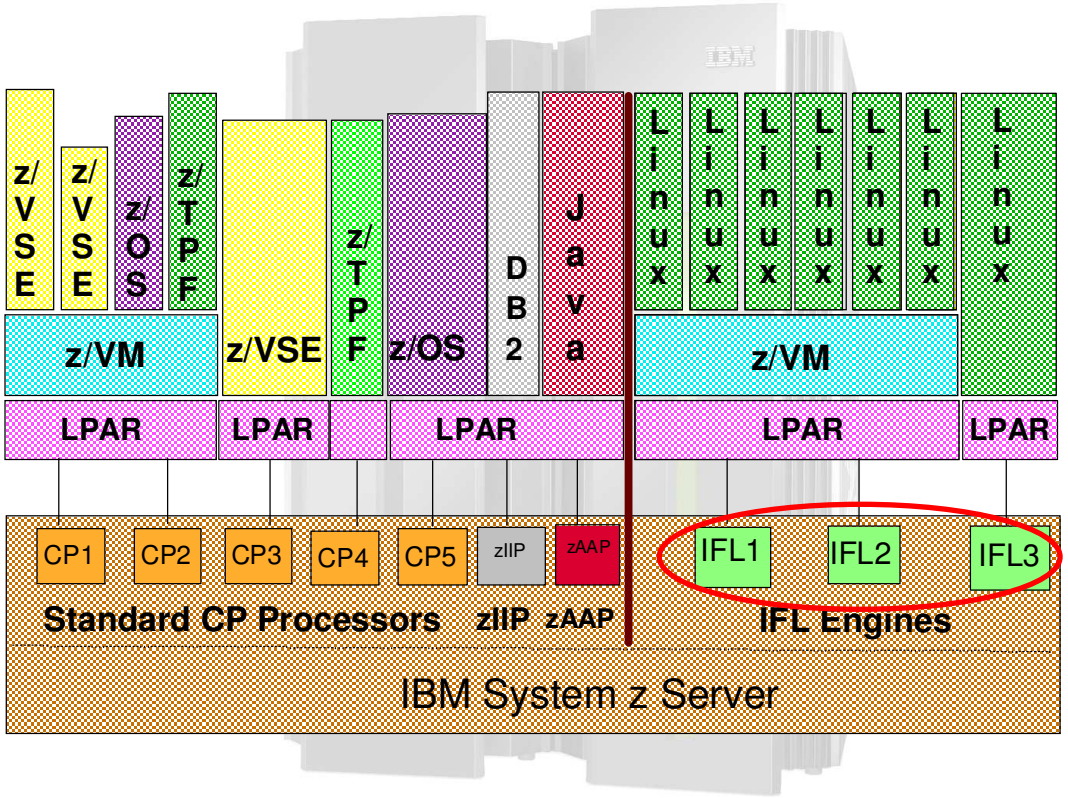
- AIX®, Linux®, and Microsoft® Windows®* applications
- Appliance Blades - Smart analytics, DataPower®
- Dedicated high-performance private network
- Massive scale out

*(Statement of Direction) on S

Major Operating Systems on IBM System z

Traditional Mainframe Operating Systems





Standard Processors

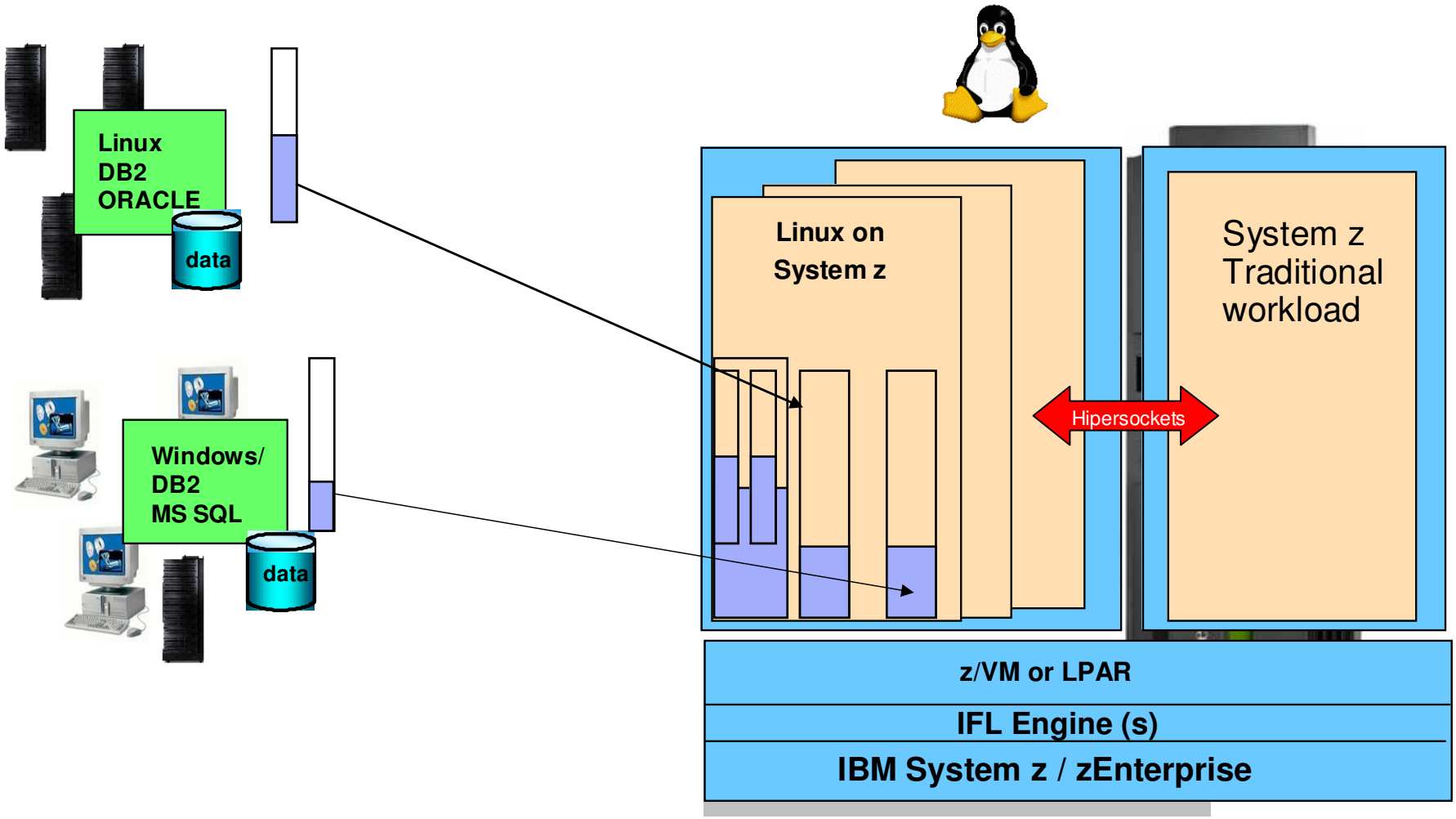
- CP
  - For z/OS, z/VSE, TPF, z/VM workloads

Specialty Processors

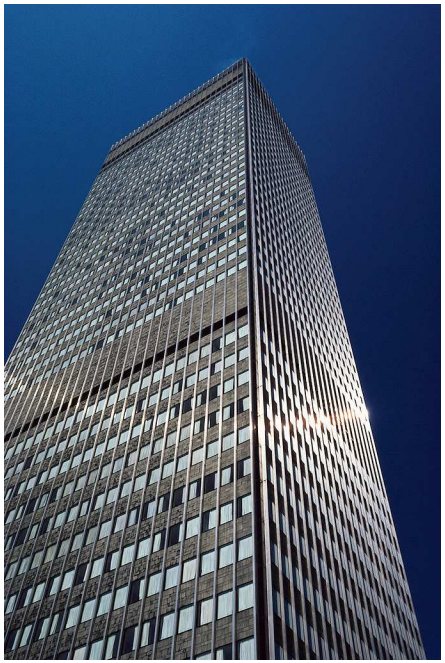
- CF (Coupling Facility)
  - For Parallel Sysplex with z/OS
- IFL (Integrated Facility for Linux)
  - For Linux and Linux applications
- zAAP (zSeries Application Assist Processor)
  - For offload of Java applications from z/OS
- zIIP (System z9 Integrated Information Processor)
  - For z/OS offload of DB2 distributed requests

Linux on System z as workload concentrator

Virtualize, Consolidate, Integrate



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



- **z/VM Virtualization**
  - **Vertical virtualization** - Grow workloads without linearly growing number of virtual guest machines
    - one guest can be increased by allocating more resources (CPUs, memory)
  - **Horizontal virtualization** – for isolation between servers
    - isolation of guests in a network
    - Redundancy for application high availability
  - **Dynamically** add, remove and shift physical resources to optimize business results

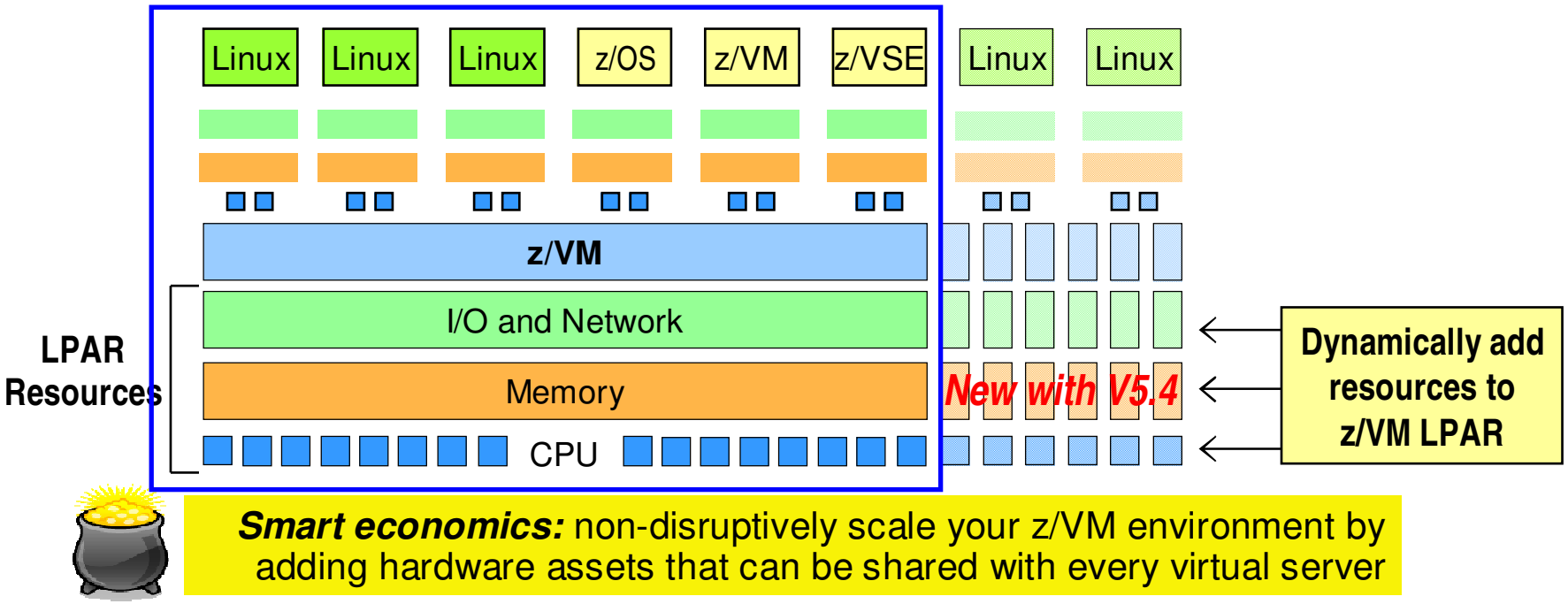
- **LPAR Virtualization**
  - High Isolation with fixed resources
  - Direct attached I/O devices for max bandwidth

Virtualization – platform integration

Virtualization for different workloads on the same layer

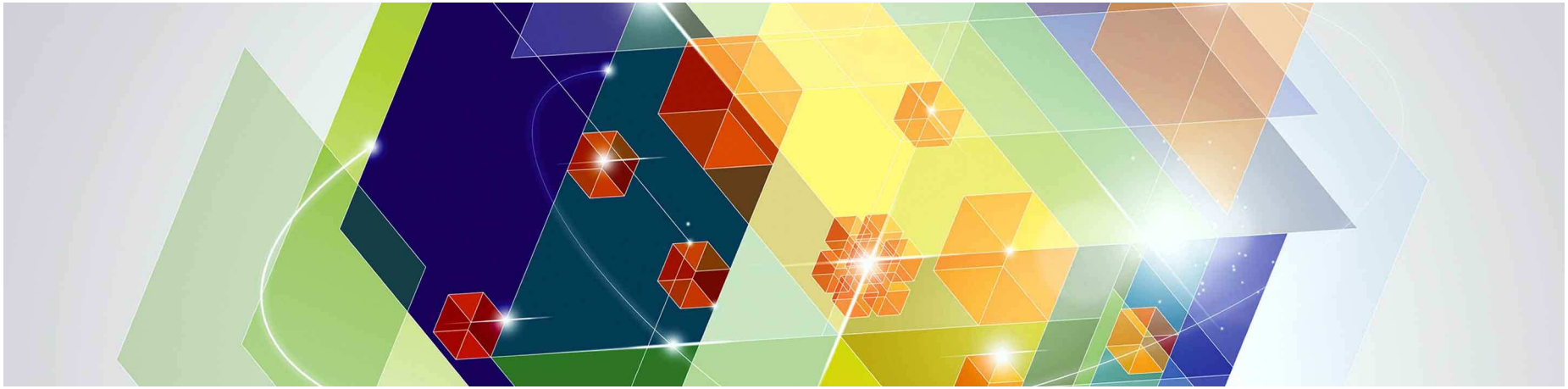
z/VM V5.4 and 6.1 Function Enhances System Availability

- **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**

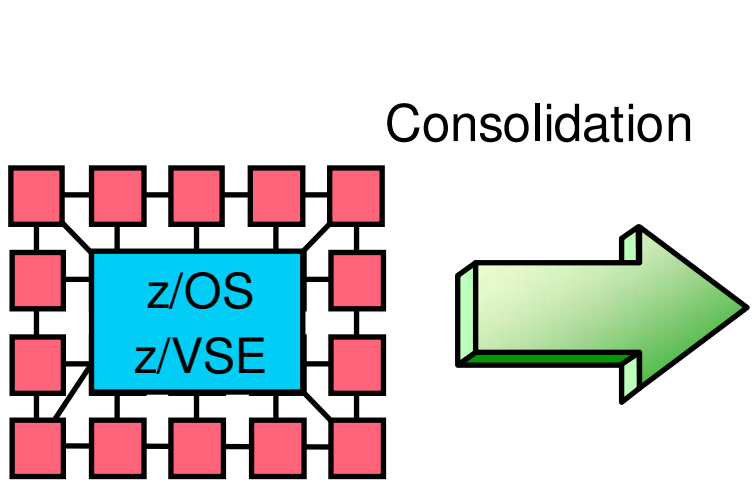


Smart economics: non-disruptively scale your z/VM environment by adding hardware assets that can be shared with every virtual server

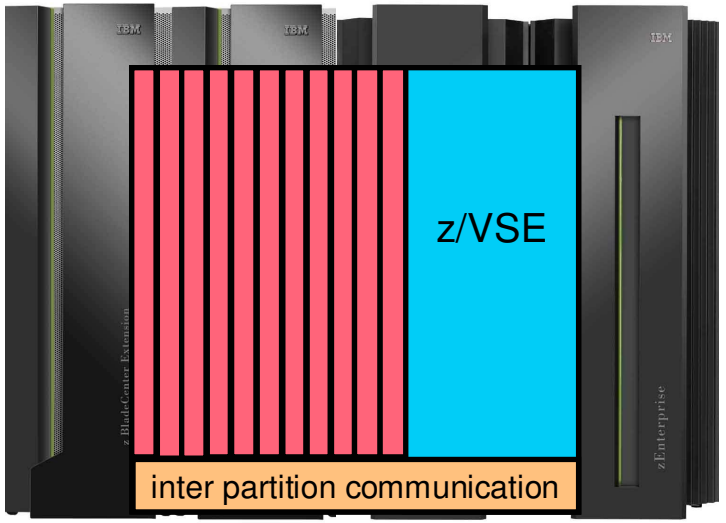
Mixed workload consolidation with zEnterprise



Mixed Workload consolidation on zEnterprise



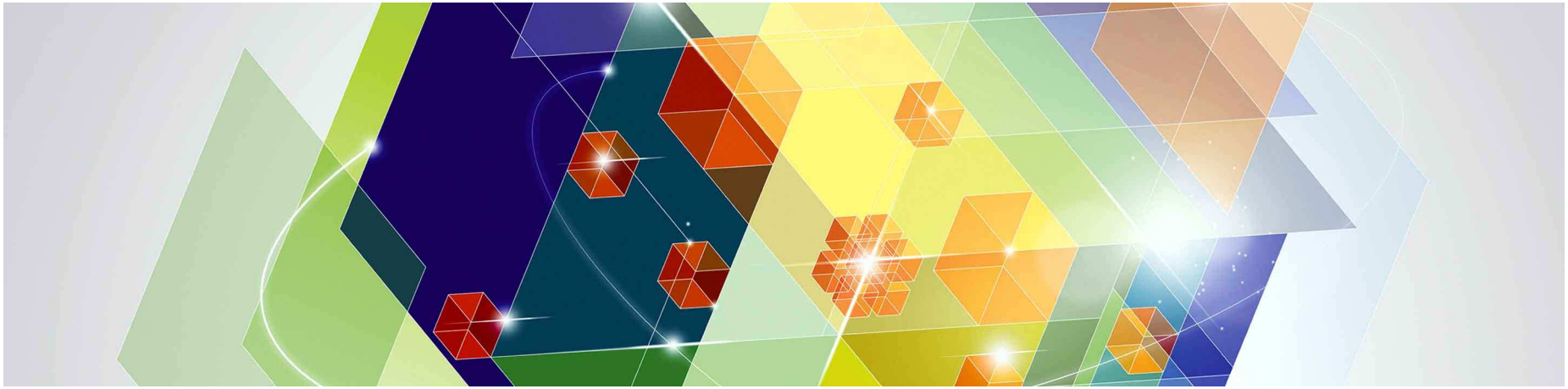
zBX + Linux on z + zEnterprise



For System z customers, zEnterprise opens new horizons:

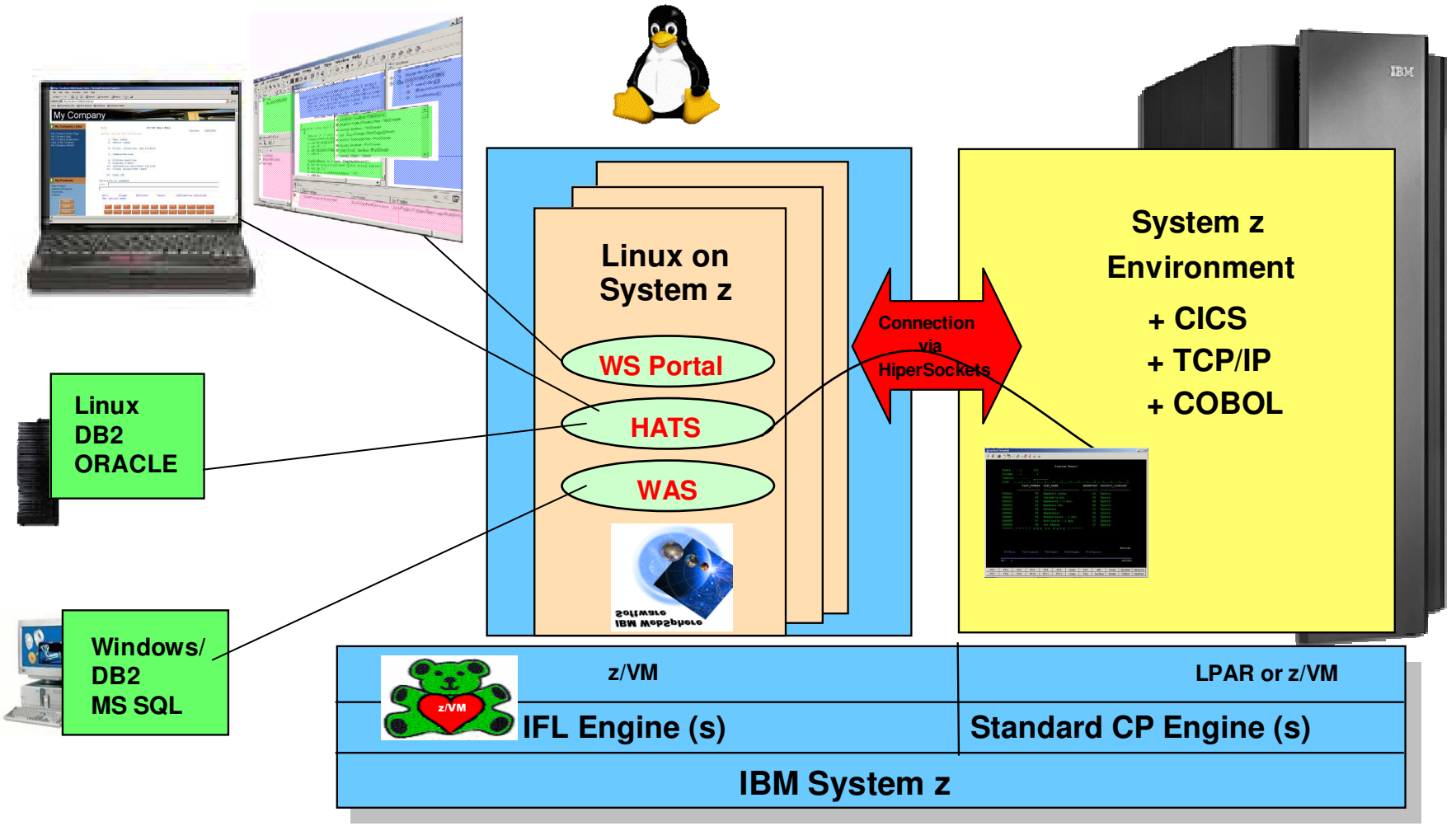
- Integration of multiple platforms of the Enterprise
- The integration of existing applications and data using Connector components
- Reduction of network components (Router,switch)
- Maintain isolation in an fully integrated environment
- Centralized Management of the entire Ensemble

Web integration with Linux and traditional

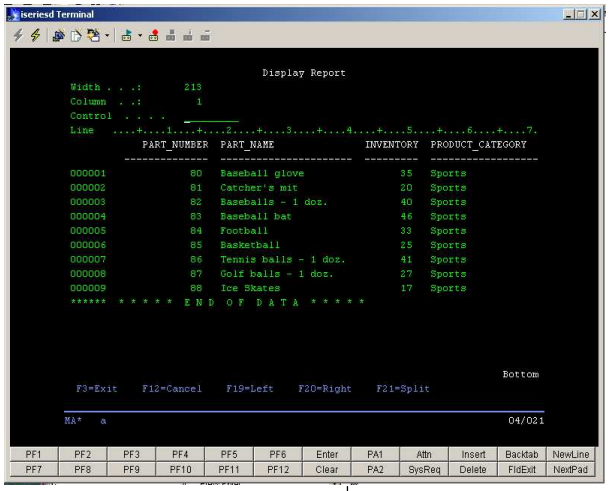


Linux on System z as Central Access Point

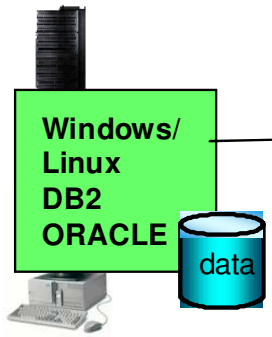
Web enable, improve interface, simplify, extend existing applications

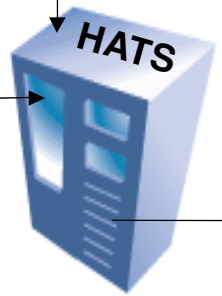


Application Integration with Host Access Transformation Services (HATS)



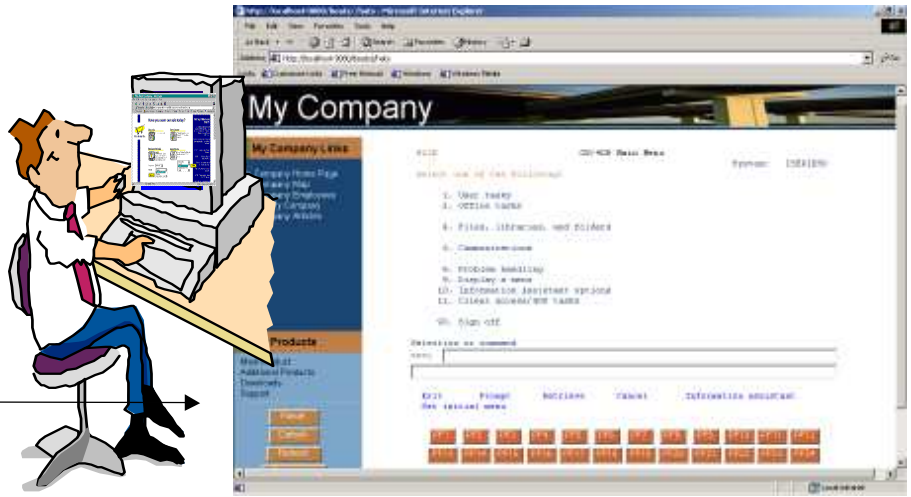
3270 or 5250
data stream





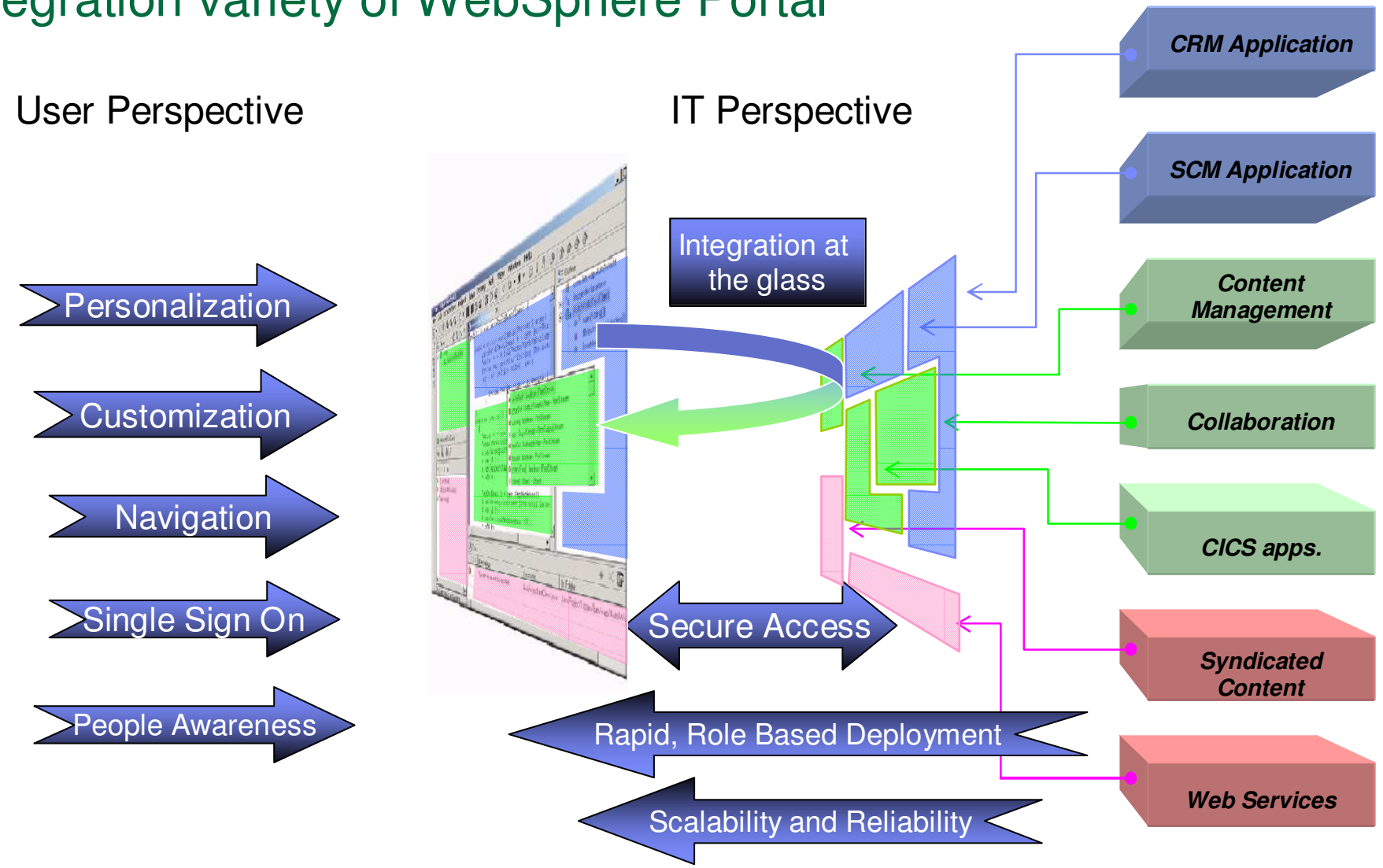
Screen transformation rules running on
WebSphere Application Server

- No software download to the client
- Converts green screens to GUI
- Integration with distributed applications
- improves ease of use of host applications
- Web Service on the fly



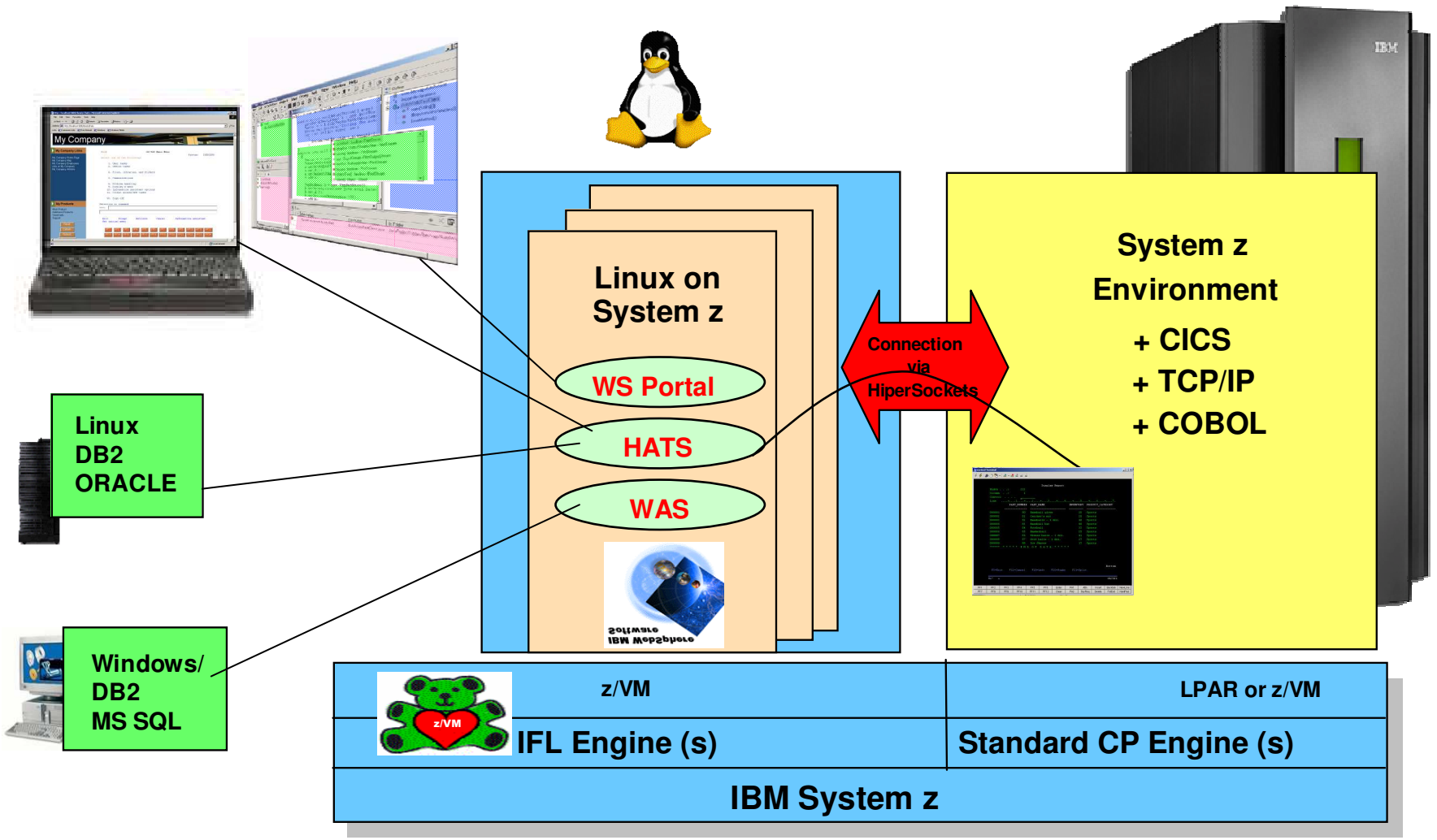
HTML in a Browser

Integration variety of WebSphere Portal

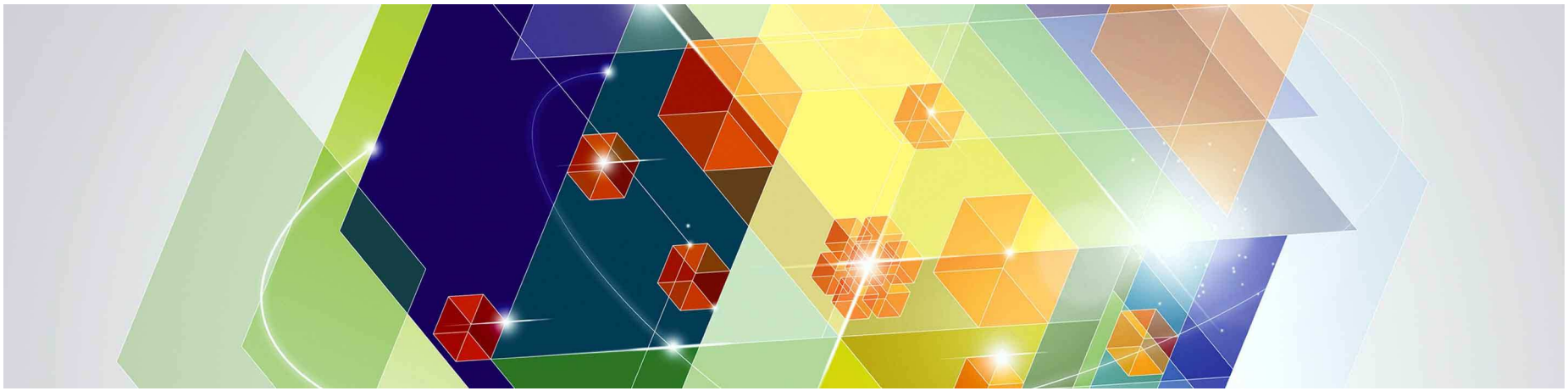


Linux on System z as Central Access Point

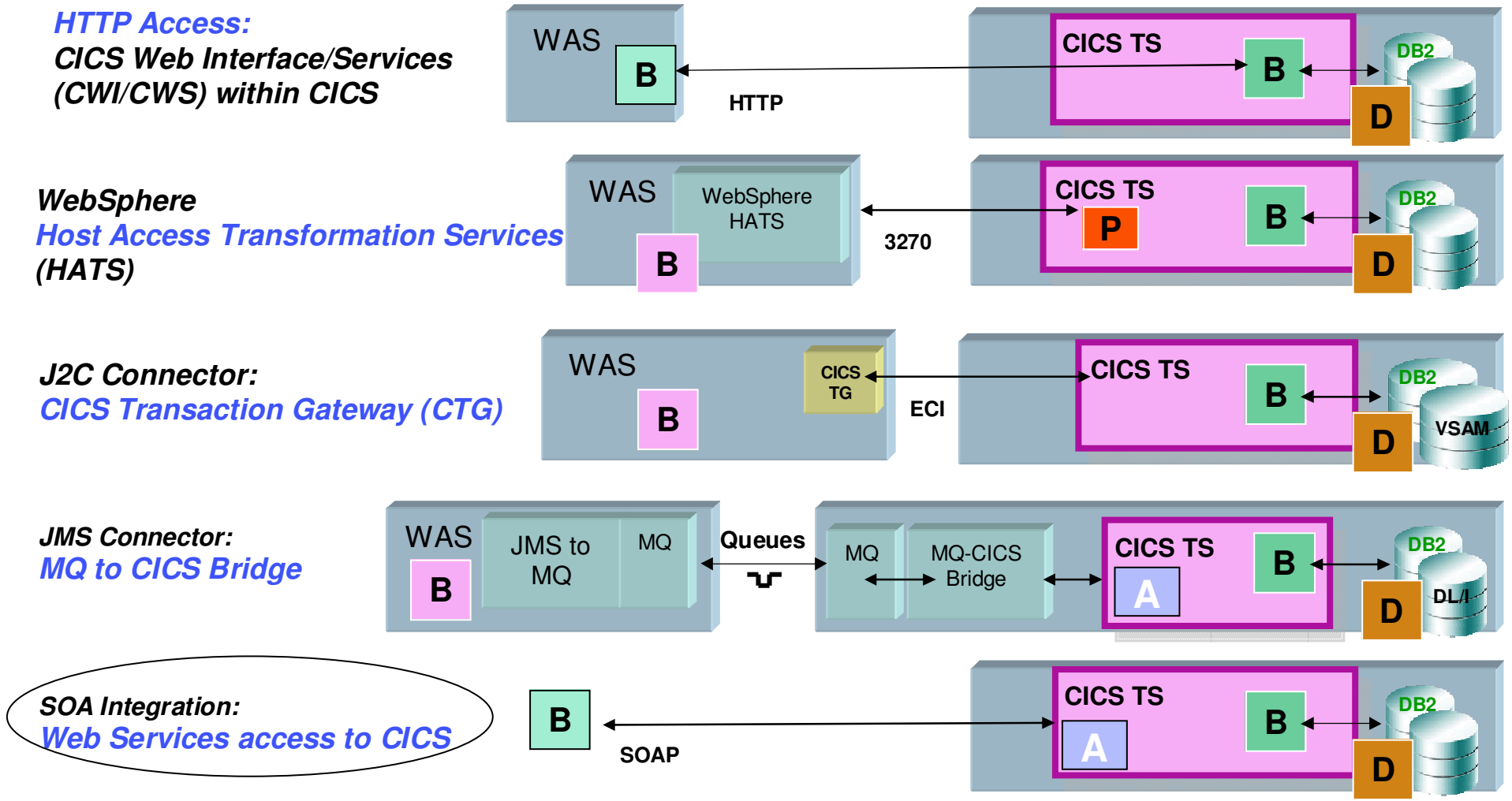
Web enable, improve interface, simplify, extend existing applications



CICS workload integration with Linux on System z

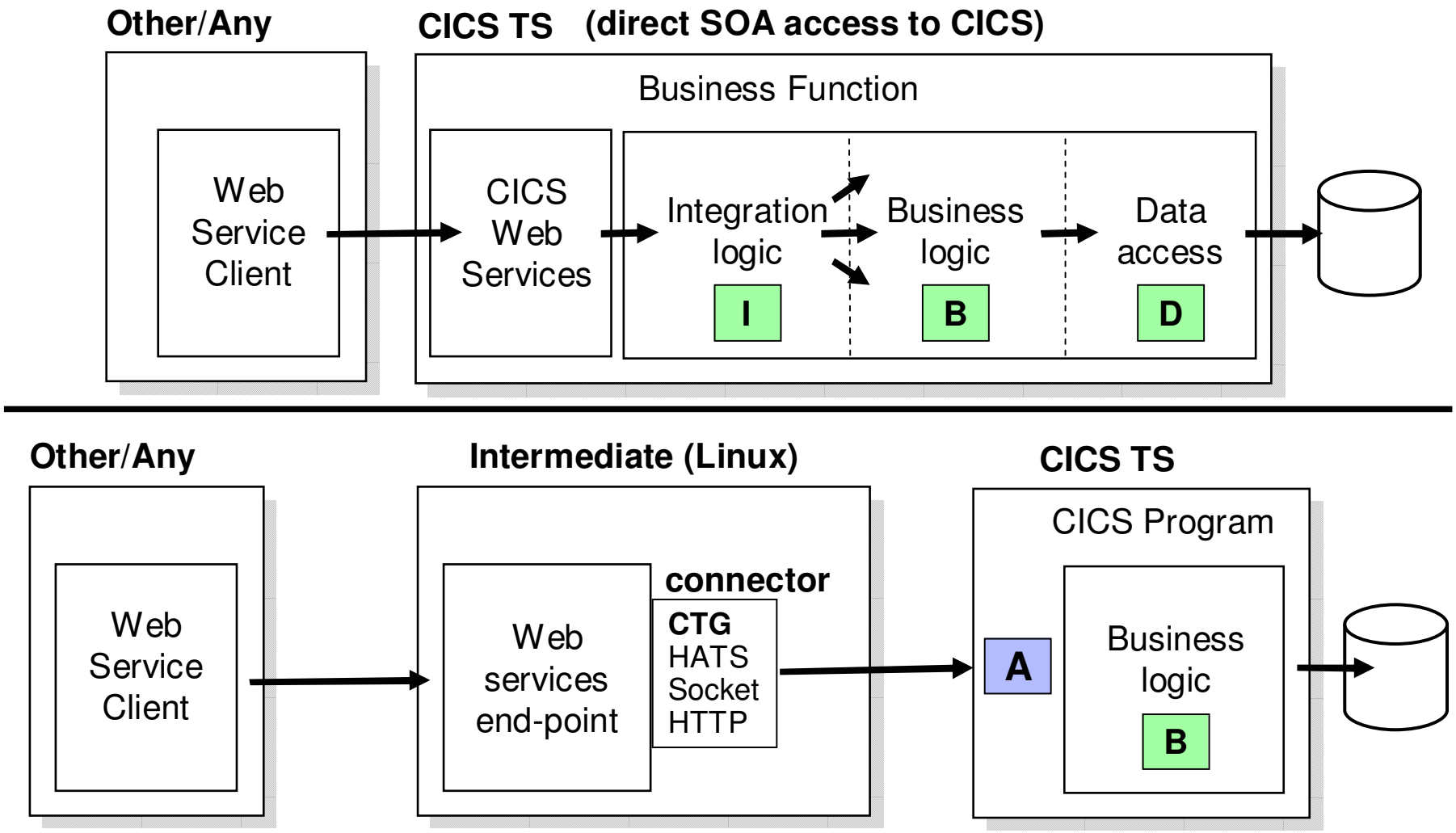


Connectivity to CICS transactions



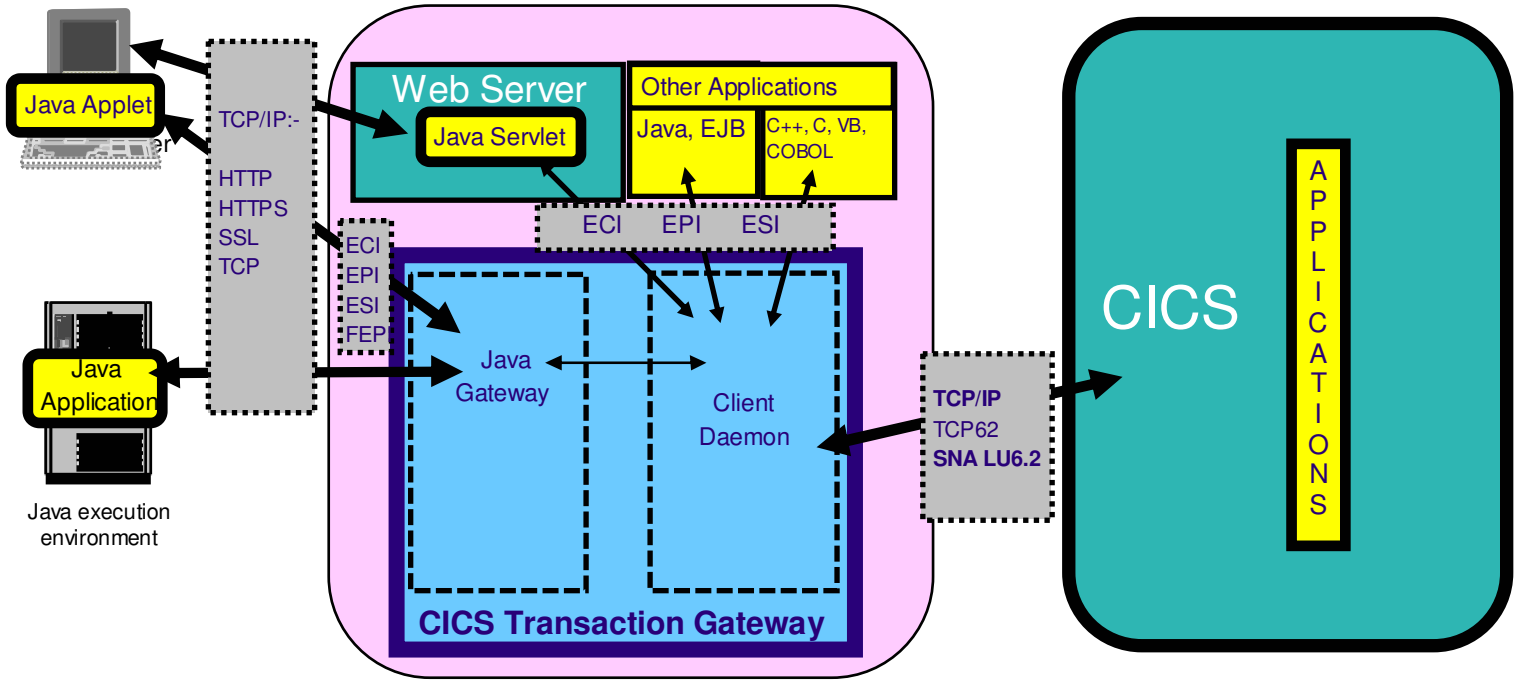
WAS can be on Linux on z or on another distributed platform. Qualities of Services will vary.

The Two Models of SOA CICS Integration via Web Services



Integration of transactions

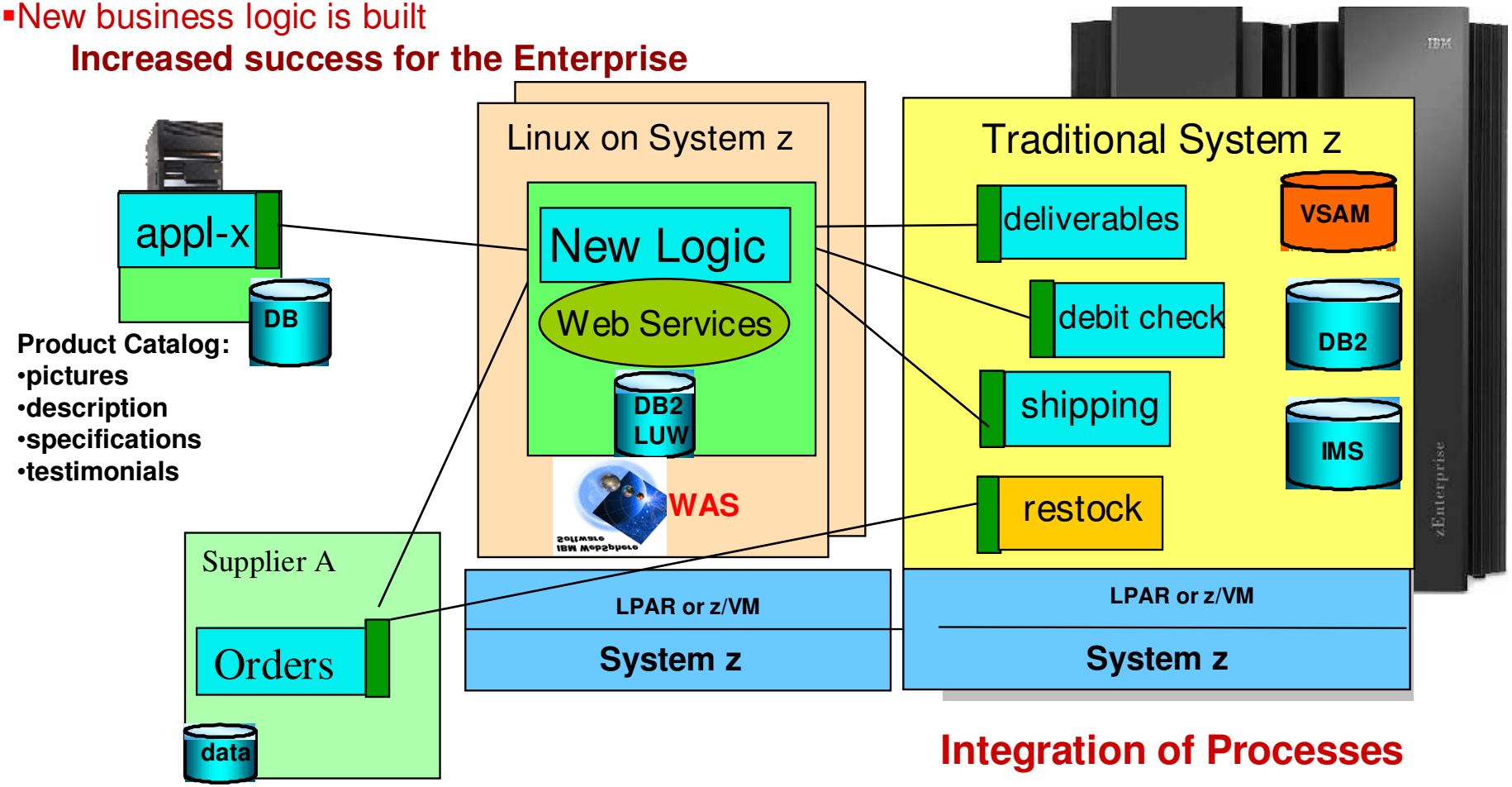
CICS Transaction Gateway (CTG) - Components



Service Oriented Architecture (SOA) – the way to new processes

- Applications look the same for all users
- Core applications can be enhanced with an interface
  (independent of their language, COBOL, ASM, PL/I, Java, C#)
- New business logic is built

Increased success for the Enterprise



Integration of Processes

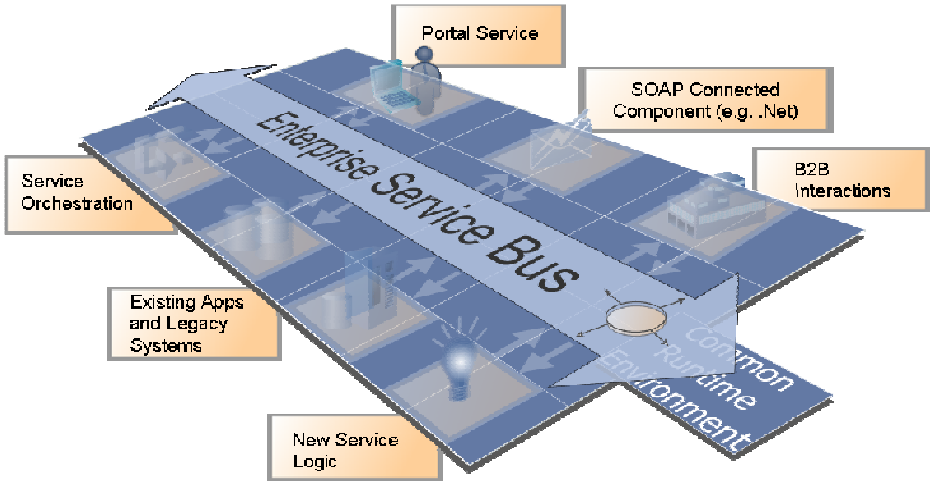
What is an Enterprise Service Bus?

An Enterprise Service Bus (ESB) is a flexible Infrastructure for services and application integration

An ESB reduces the number, size and complexity of your interfaces in a SOA solution.

An ESB realizes following tasks between requestor und service

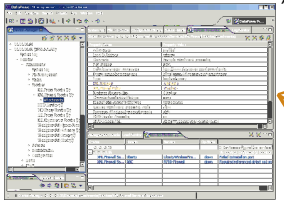
- **ROUTING of messages between Services**
- **CONVERTING the transport protocol between requestor and service**
- **TRANSFORMING message formats between requestor and service**
- **HANDLING of business events between different types of services**



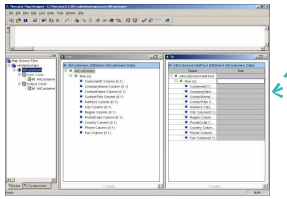
Integrated SOA Tooling Across ESB Runtime

All 3 ESBs integrate with Eclipse, WTX, ITCAM for SOA and WSRR

Legacy Mapping Tool:
WebSphere TX
(Transformation Extender)

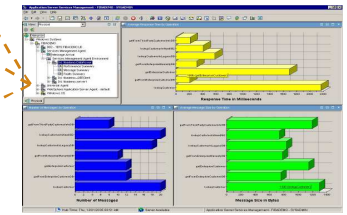


Development Tools:
Eclipse/RAD/RDz

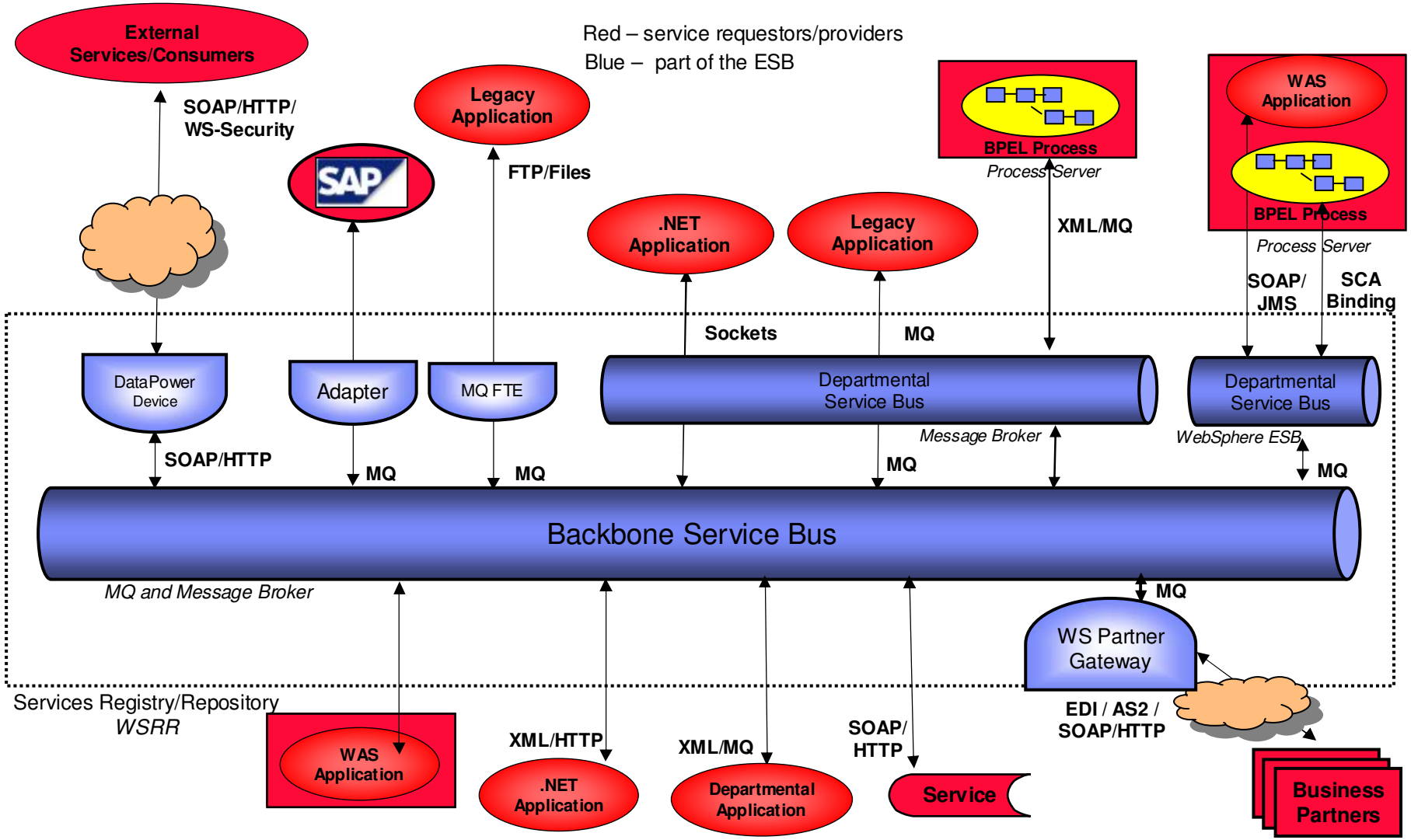


SOA Registry:
WSRR

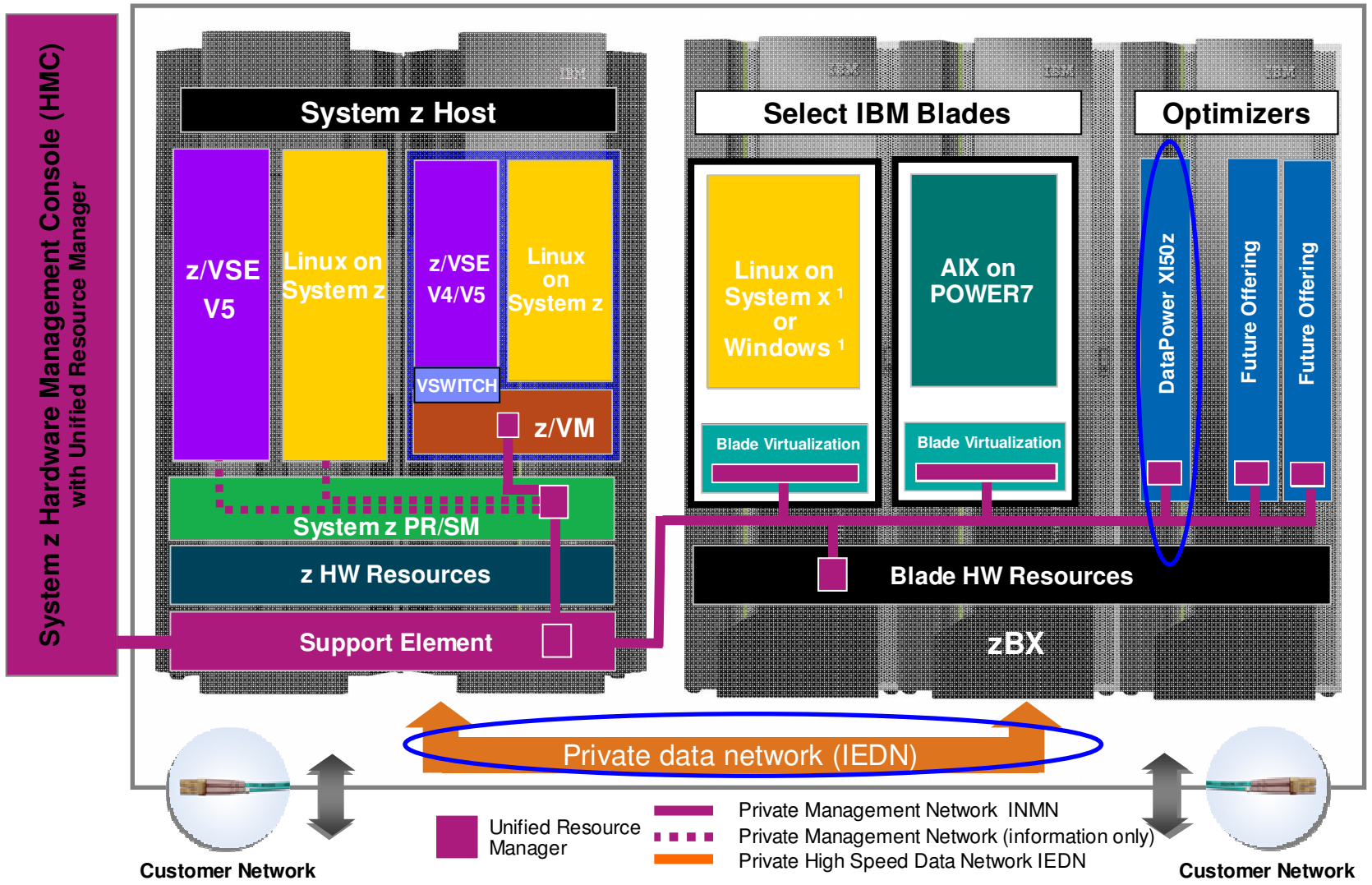
SOA Management:
ITCAM for SOA



Example of Federated ESB

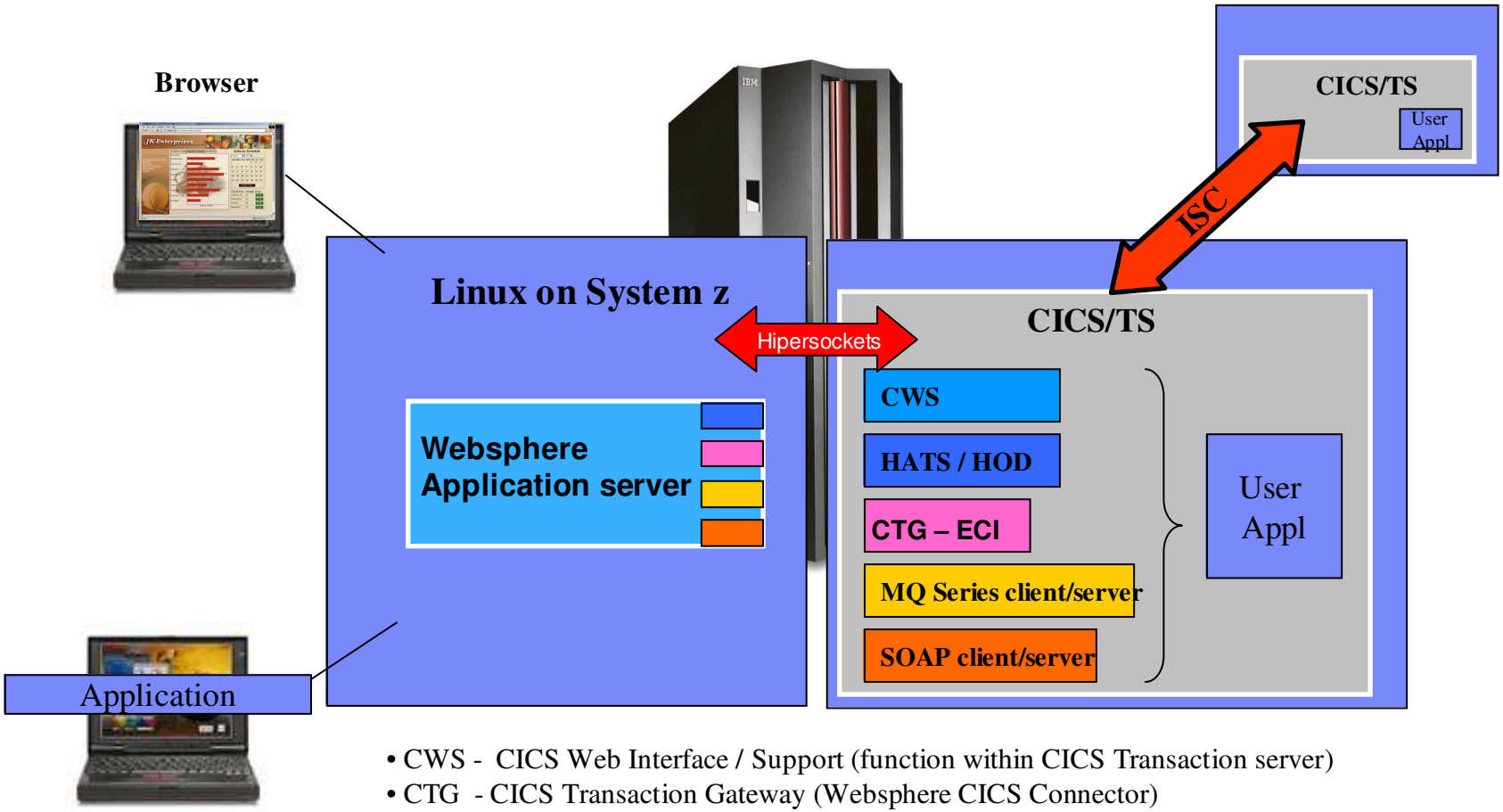


The SOA ESB with Datapower in zEnterprise connecting via IEDN to z/VSE



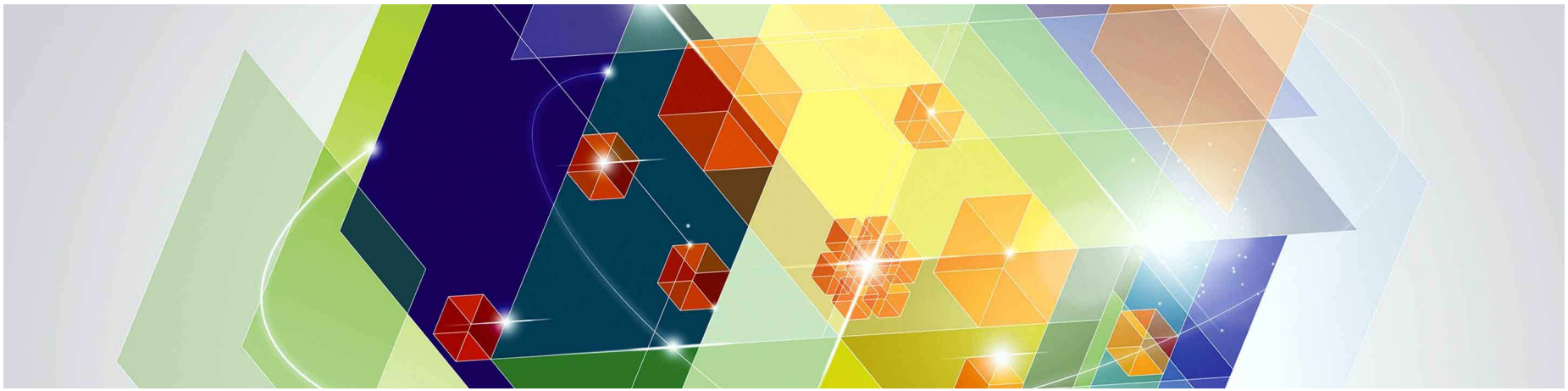
1 All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

Web Integration with traditional CICS transactions

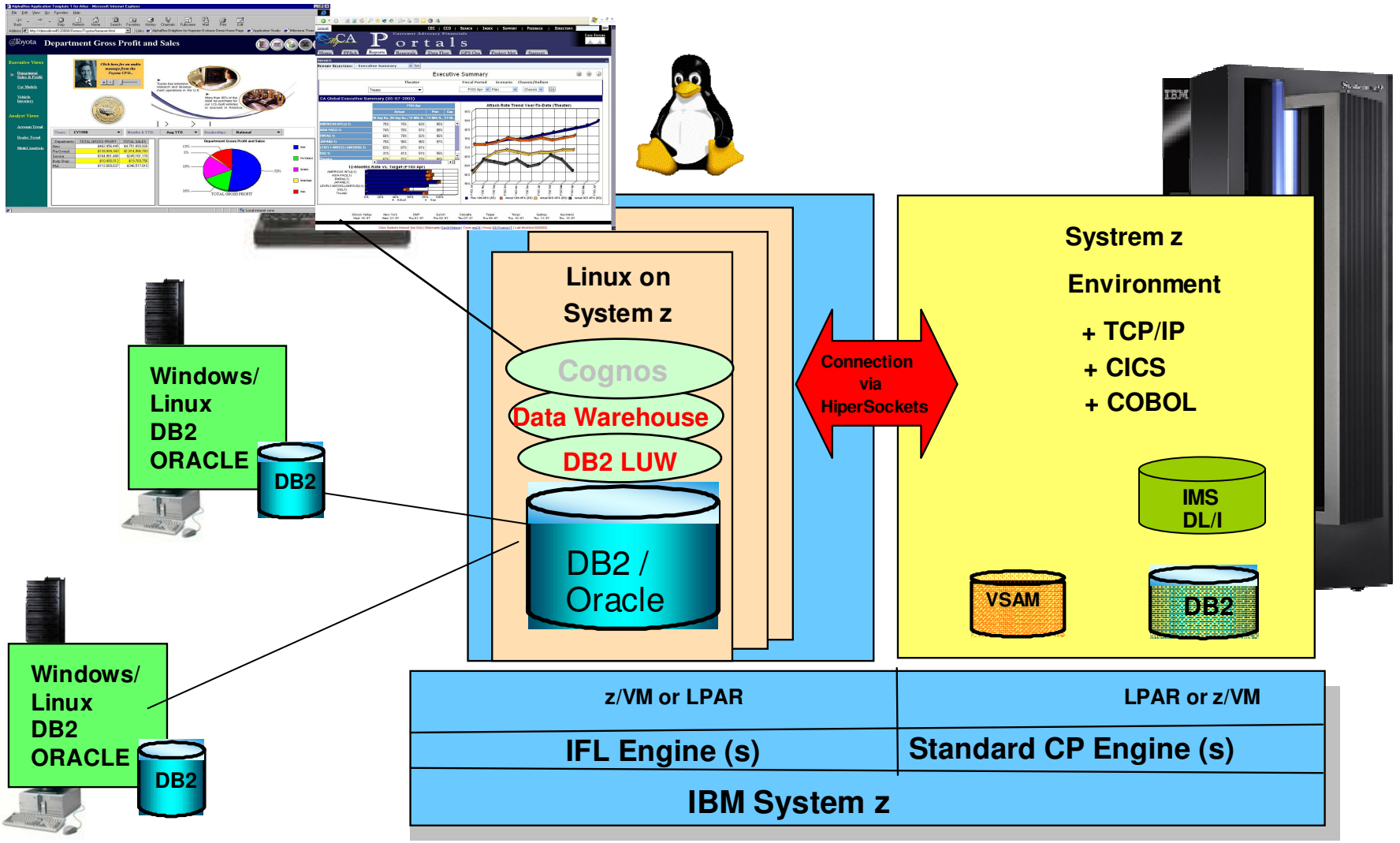


- CWS - CICS Web Interface / Support (function within CICS Transaction server)
- CTG - CICS Transaction Gateway (Websphere CICS Connector)
- HATS – Host Access Transformation Server
- HOD - Host OnDemand (Websphere Host Integrator)
- SOAP - Simple Object Access Protocol (Web Services based with XML data)

Data Warehouse and BI Solutions with Linux on System z

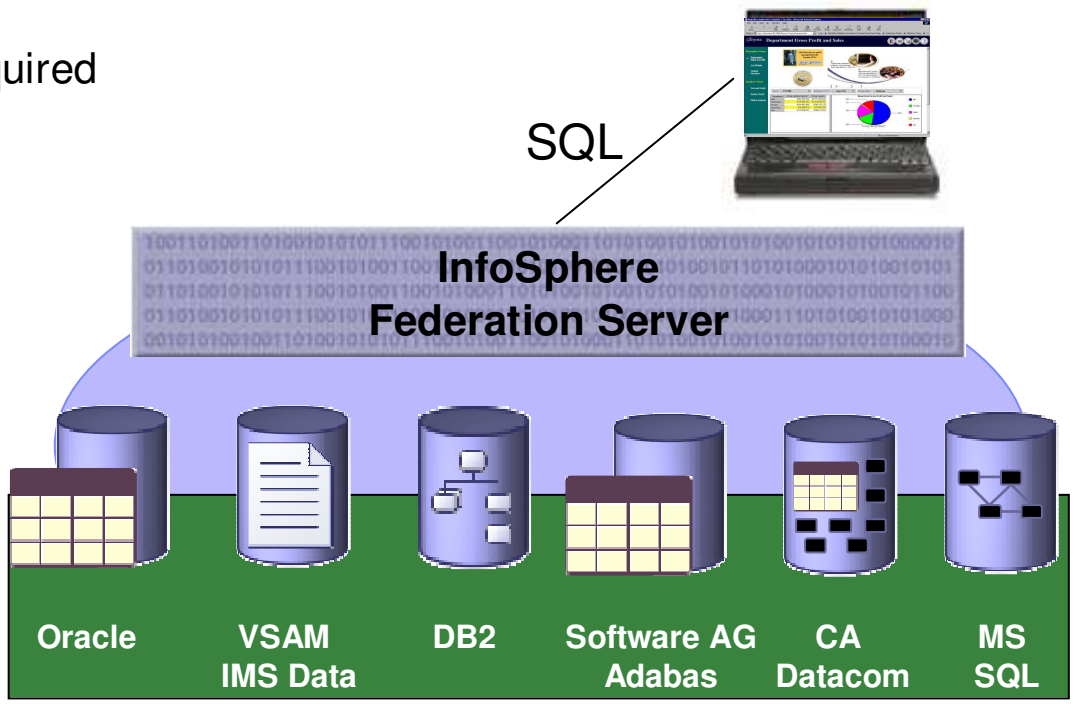


Integrate, Consolidate, Evaluate, Decide,
Explore Business Intelligence (BI)

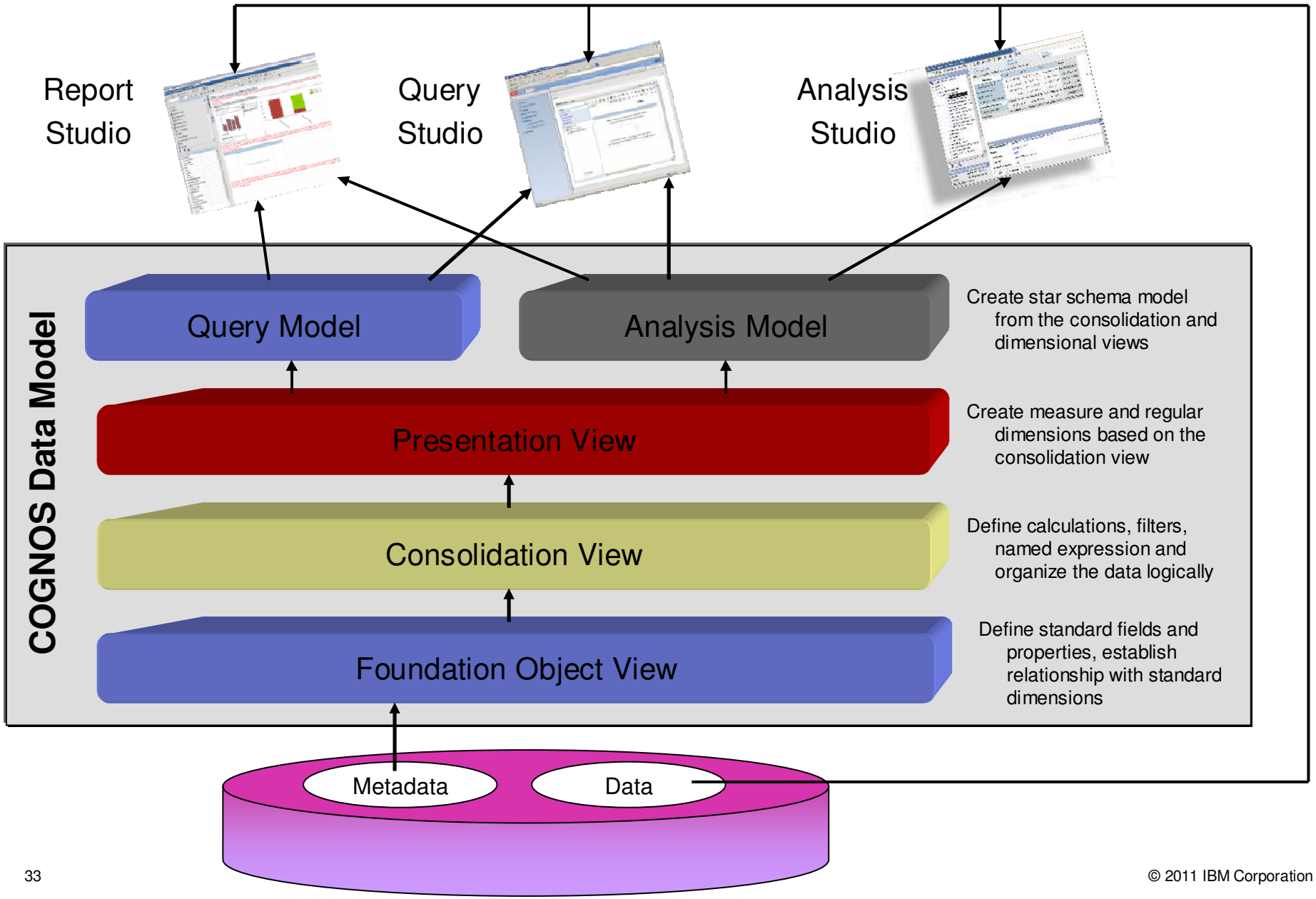


InfoSphere Federation Server on Linux on System z

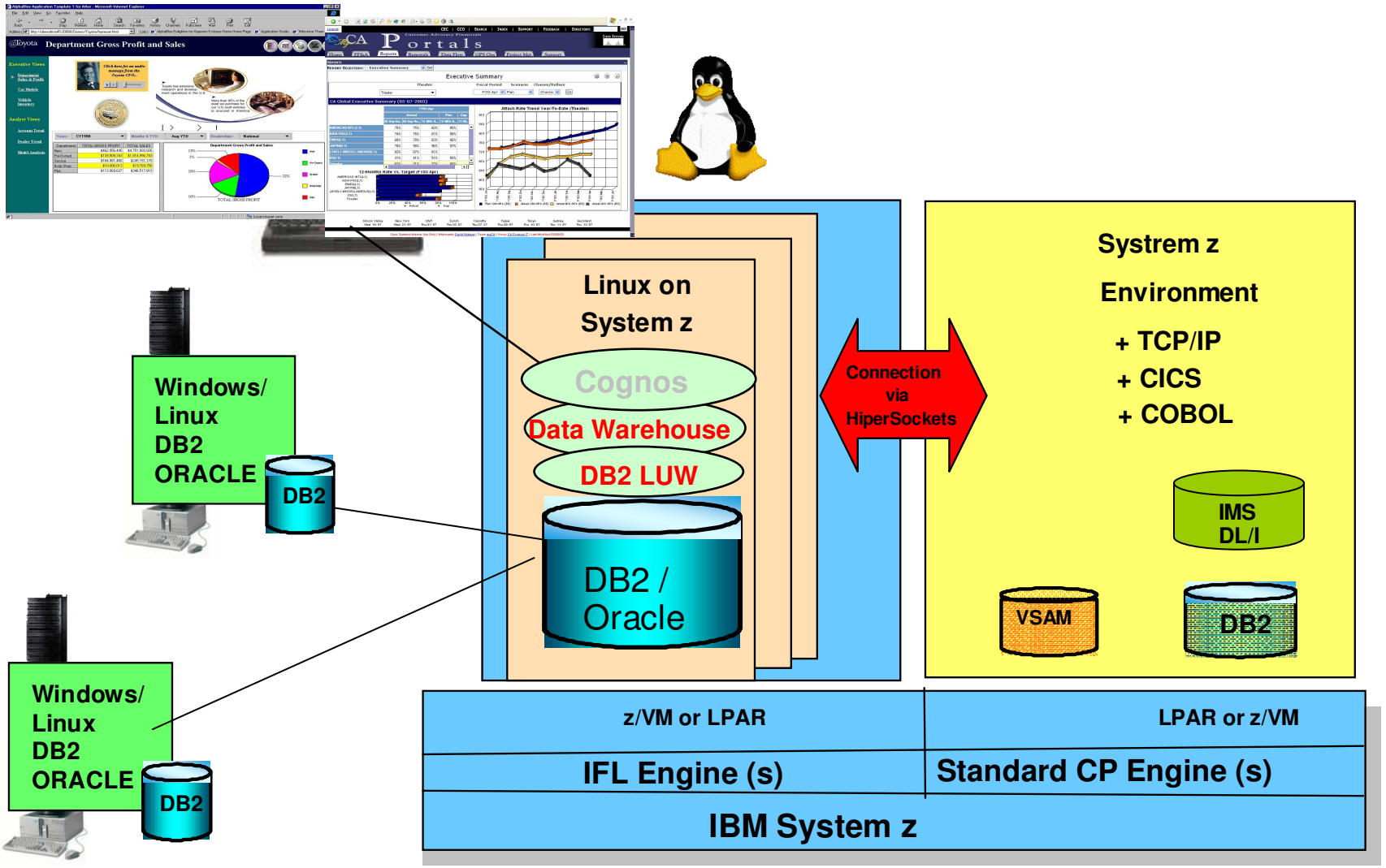
- **Integrating at the data layer – Federation of data**
  - Read from and write to federated mainframe data sources using SQL
  - Standards-based access via JDBC, ODBC, or Call Level Interface
    - Including for mainframe VSAM data and flat files
  - Multithreaded with native drivers for scalable performance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



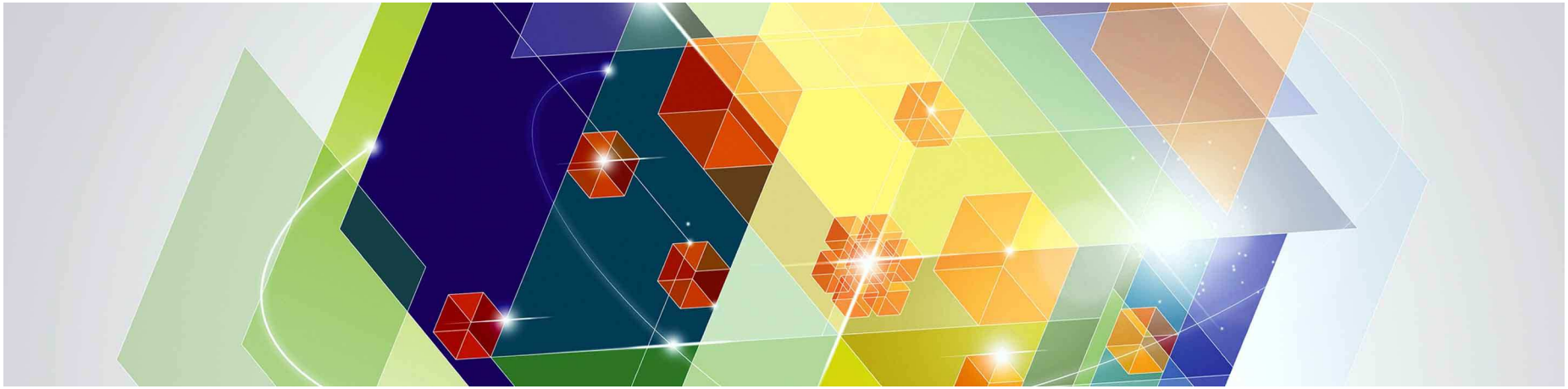
COGNOS Model Elements



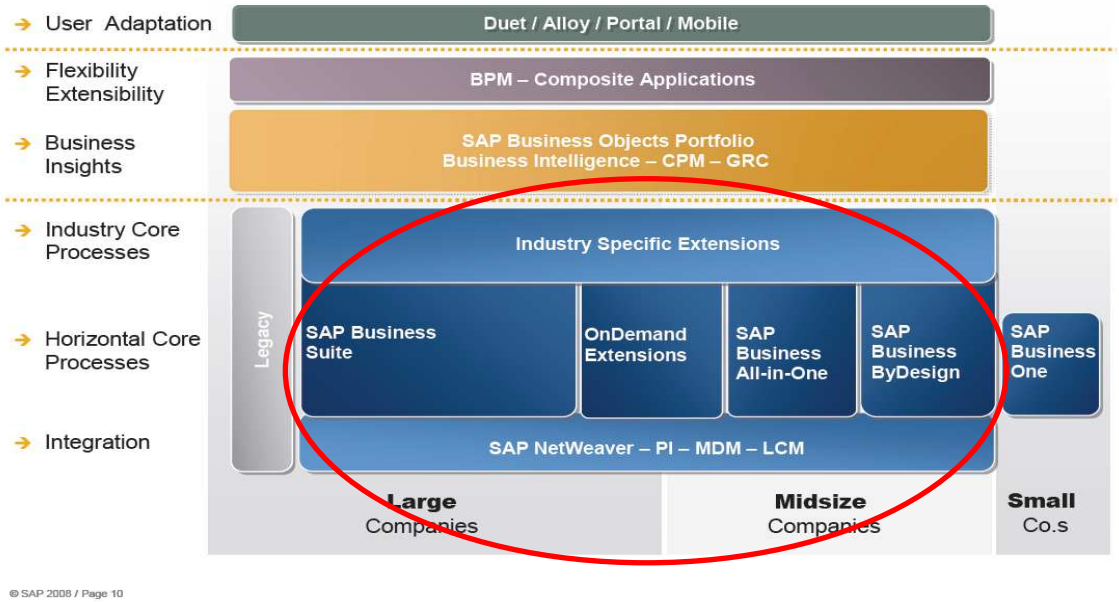
Integrate, Consolidate, Evaluate, Decide,
Explore Business Intelligence (BI)



SAP Solutions on IBM zEnterprise System



SAP solutions remain In high demand to meet client requirements for business insight, improved productivity, and innovation



SAP on System z:

- **ERP financials, HR, CRM/SCM /SRM**
- **Industry solutions, like:**
  - Banking, core banking, Bank Analyzer (reporting), risk and compliance
  - Insurance
  - Retail
  - Automotive

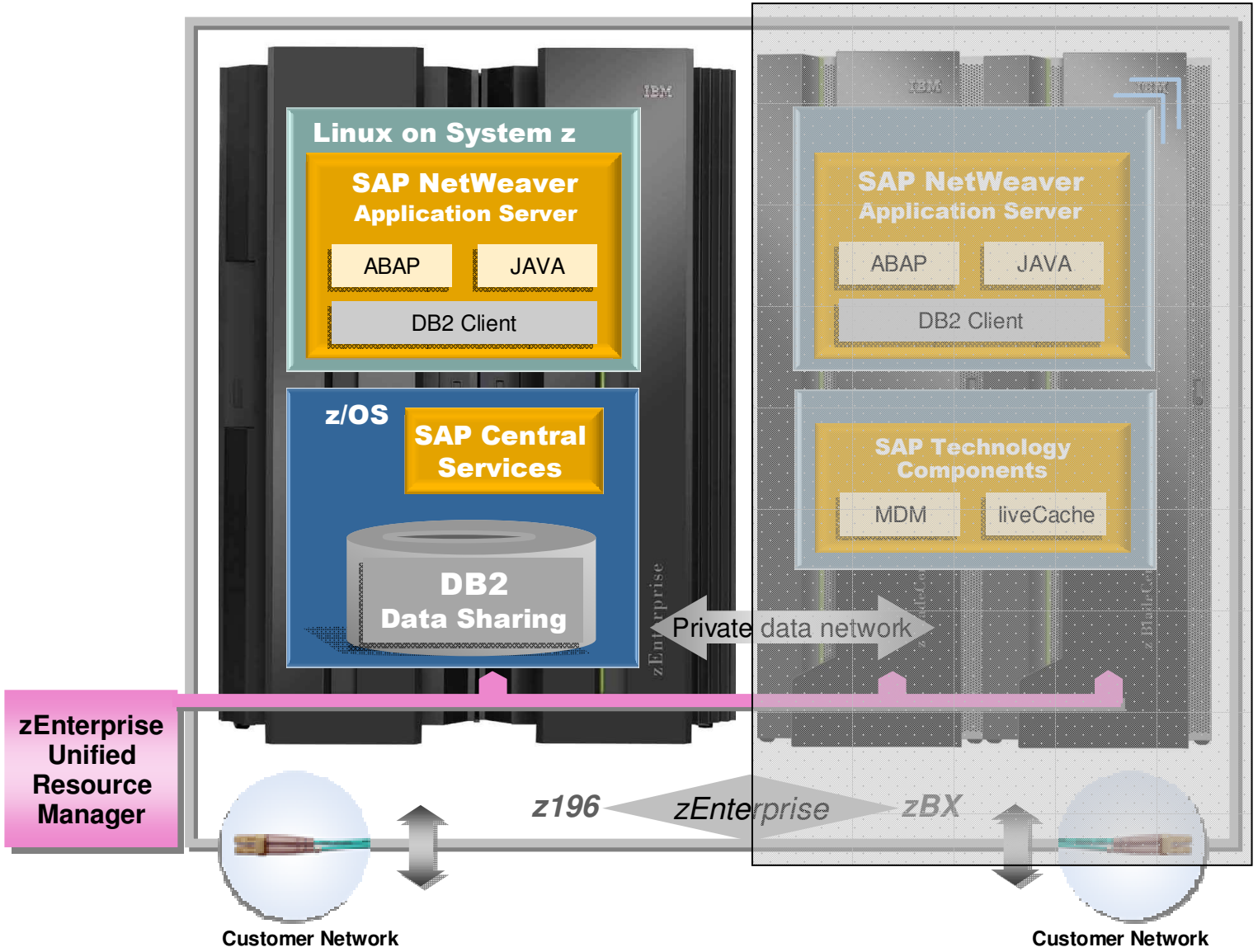
Improve visibility, empower better decision making

Expand and innovate without disruption

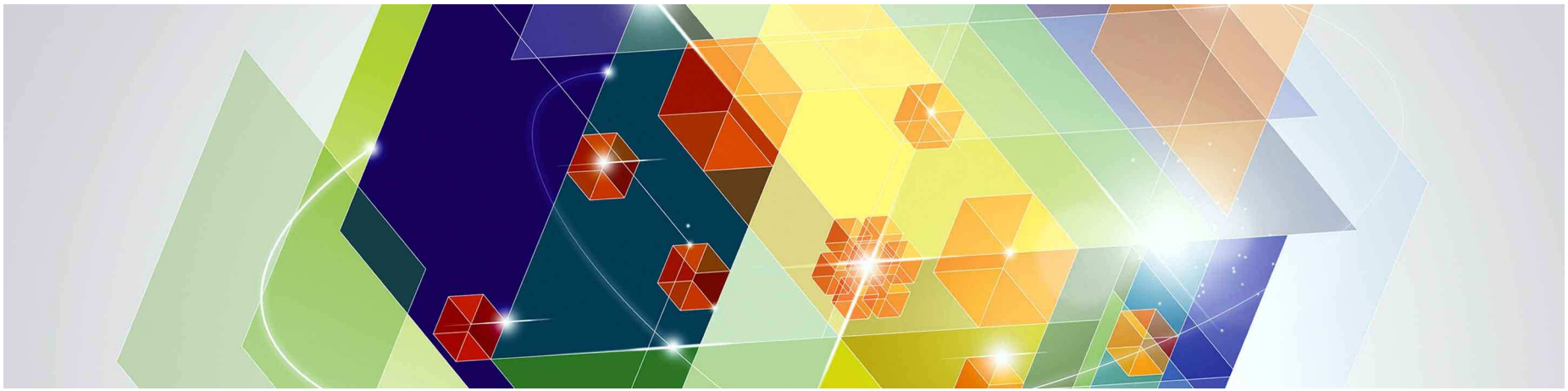
Improve mission critical industry business processes

Today there are over 1500 installations of SAP on System z,
and plenty of IT organizations looking to consolidate their SAP instances.

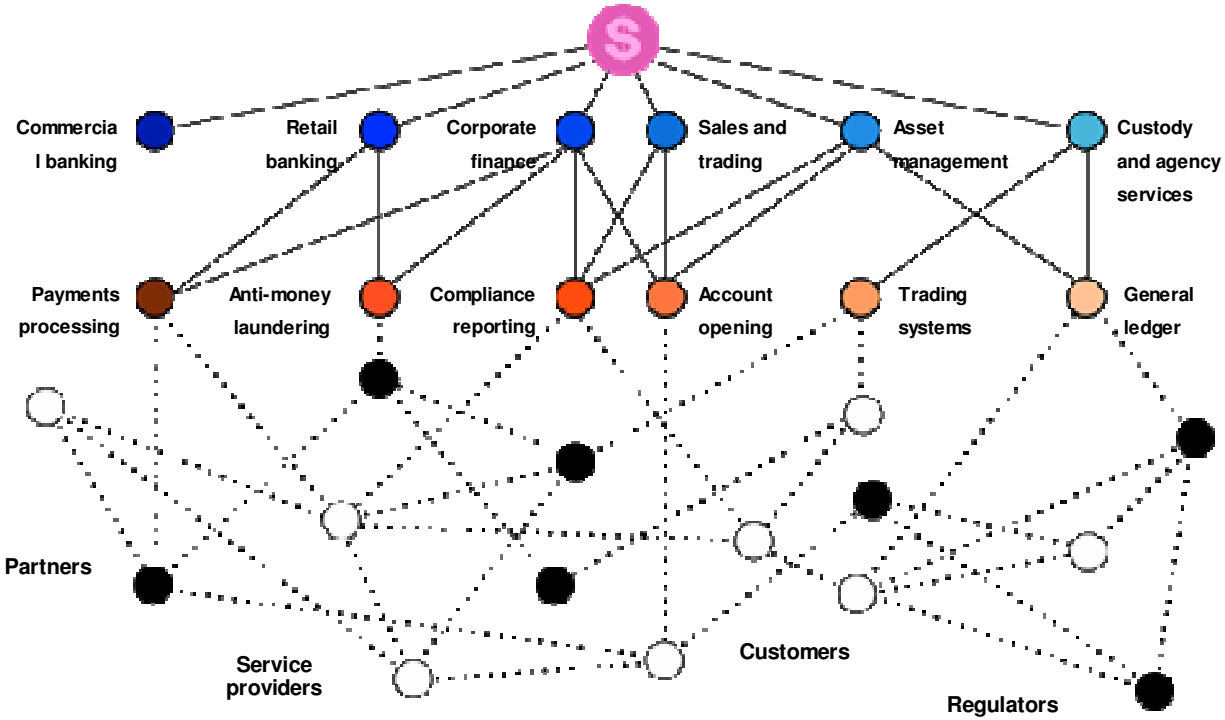
SAP on IBM zEnterprise System



Core Banking on IBM System zEnterprise



Inflexible, Complex Operations and Siloed Data
Prohibits Banks from Focusing on their Clients



*"Agile businesses that actively converge business and technology have **7 percent** higher EPS growth and **45 percent** higher return on investment than their industry peers."*

Source: 2009 Convergence Index, BTM Institute

70 percent-plus of bank IT costs are spent in maintenance of legacy environments and less than 30 percent is spent on true differentiation, innovation and new product offering support.

Financial Institution Business Issues Addressed by IBM zEnterprise System Advantages

CUSTOMER Issues

1

Optimized sales processes
"tune to task"

AGILITY Issues

2

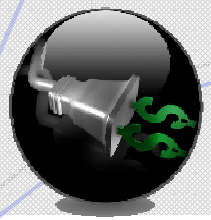
Faster time to value

RISK Issues

3

Achieve compliance objectives

zEnterprise High Value to Business Issues



- Large scale consolidation to **reduce cost** of energy, facilities and software licenses by up to **90 %**
- Deliver **35 to 65 % performance improvement** over System z10

- Turn information into **insight** with **up to 10x improvement** in performance for complex queries
- Create a business aligned infrastructure capable of processing **billions of instructions per second**

- Integrate and centralize management to **reduce labor** overhead by up to **40%**
- Up to **100% resource increase** available to deliver new **innovation**

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

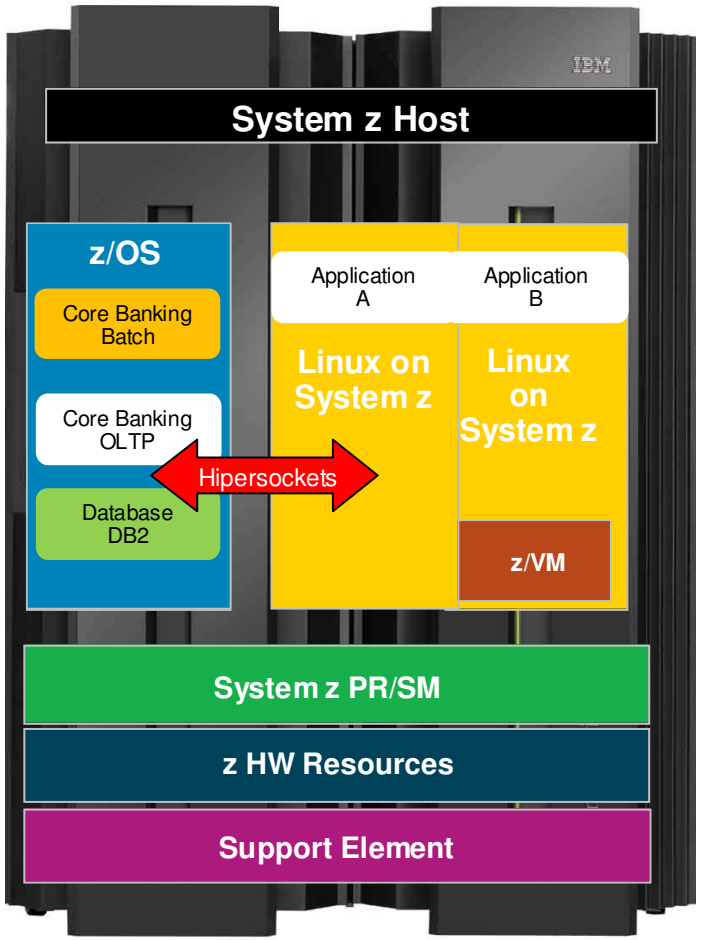
Improved speed to market with integration

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:

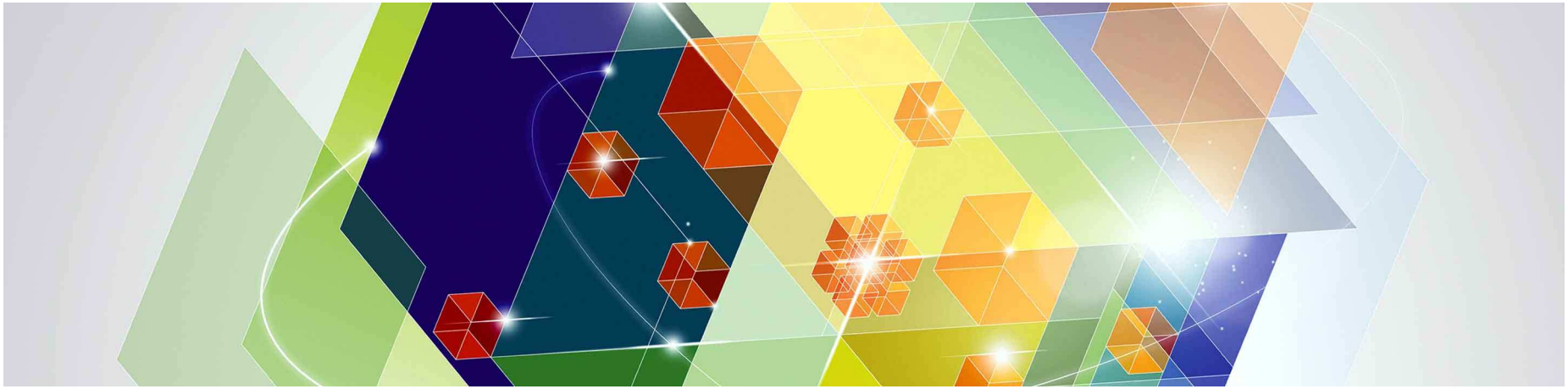
Vietnam: Protecting data from risks, while allowing responsiveness to the high demands of banking

Core Banking Solutions on IBM System zEnterprise



1 All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only. (Statement of Direction) on System x blades in 4th quarter 2011

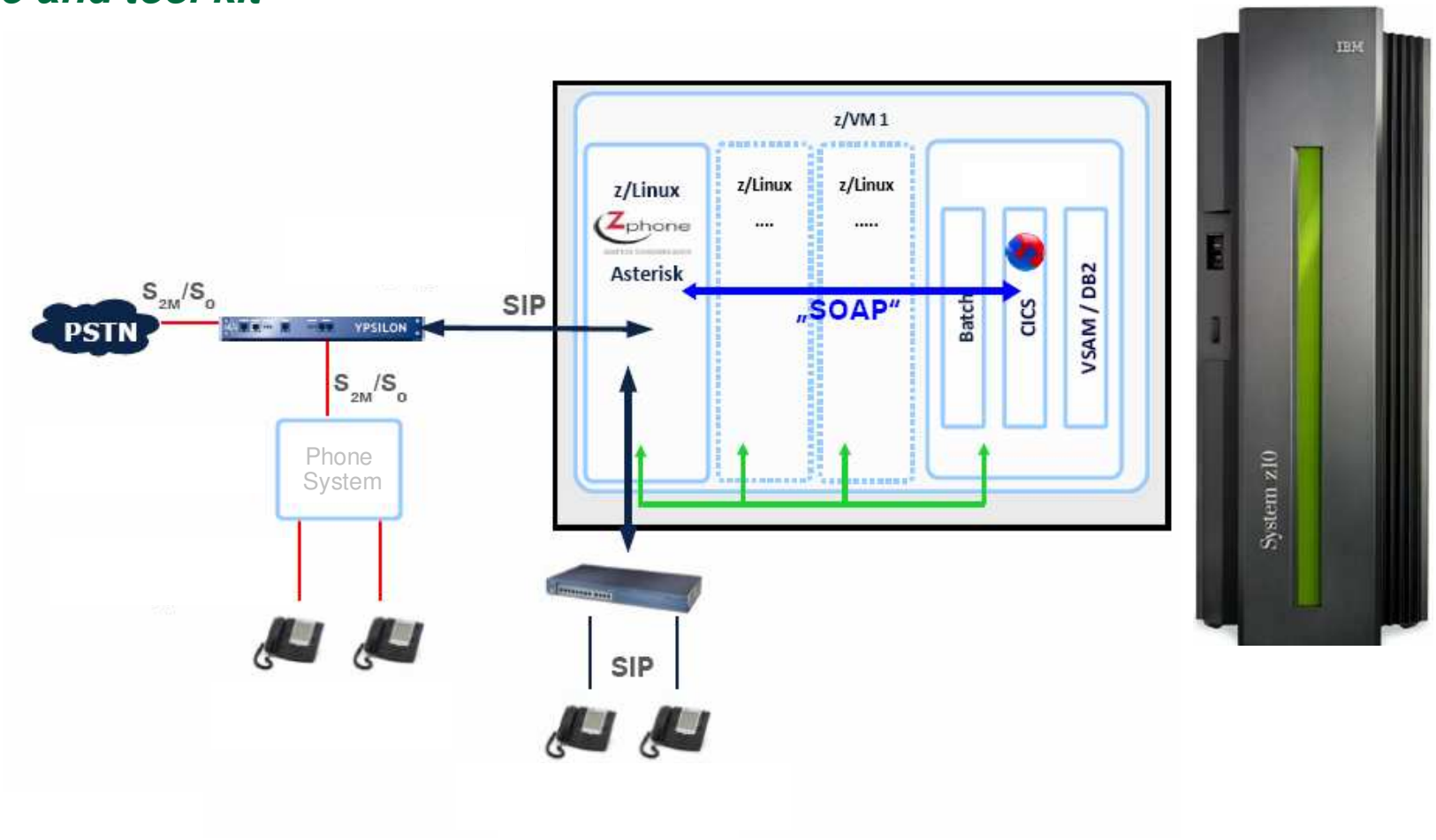
Collaboration – Call Centers on Linux on System z and interaction with CICS workload



IBM System z – the next generation **voice** Hub!

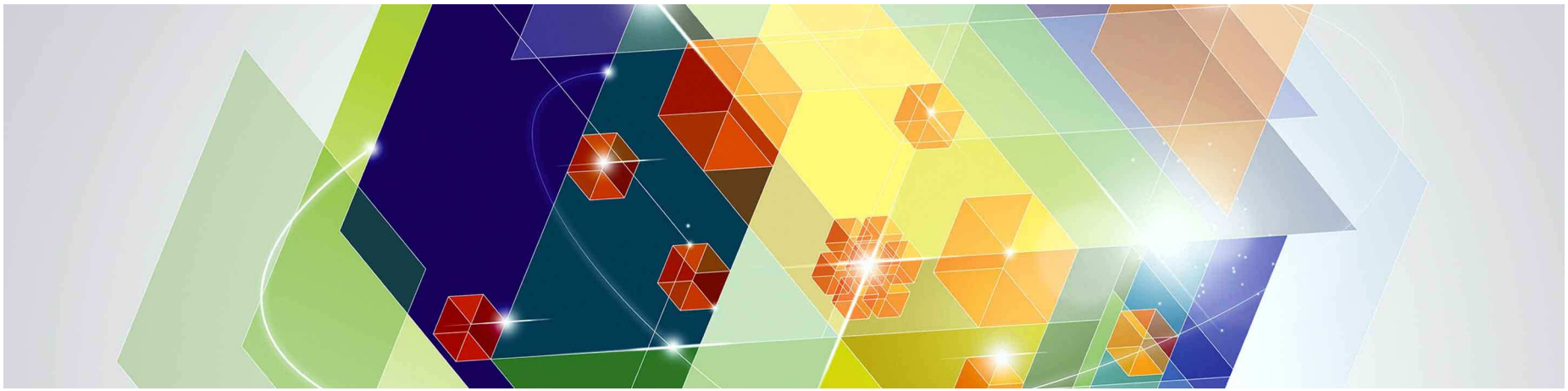
– more than a simple Phone Server

„Asterisk® is the world's leading open source telephony engine and tool kit"



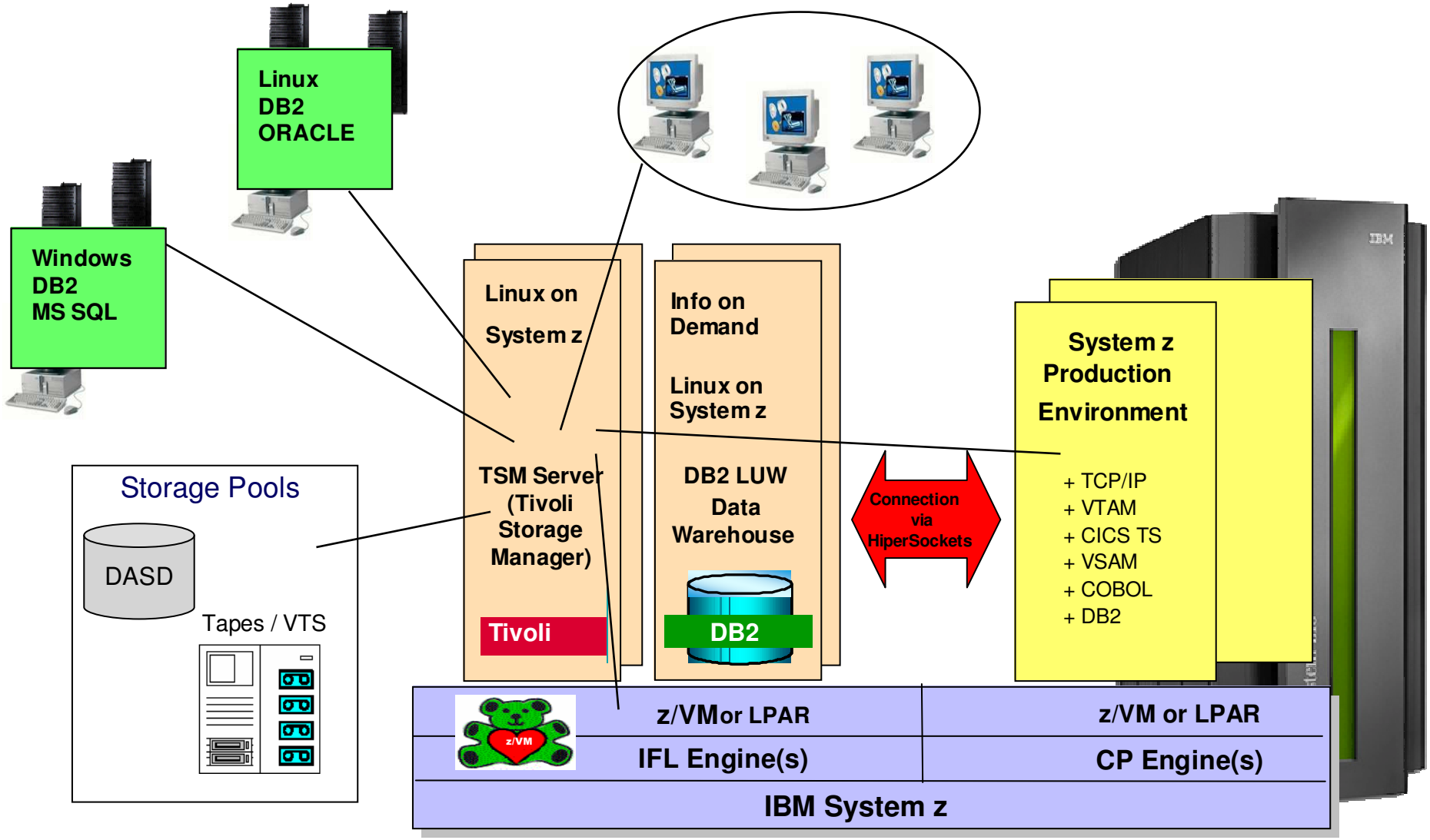
(http://www.asterisk.org/support/about)

Central Backup for the Enterprise with Linux on System z

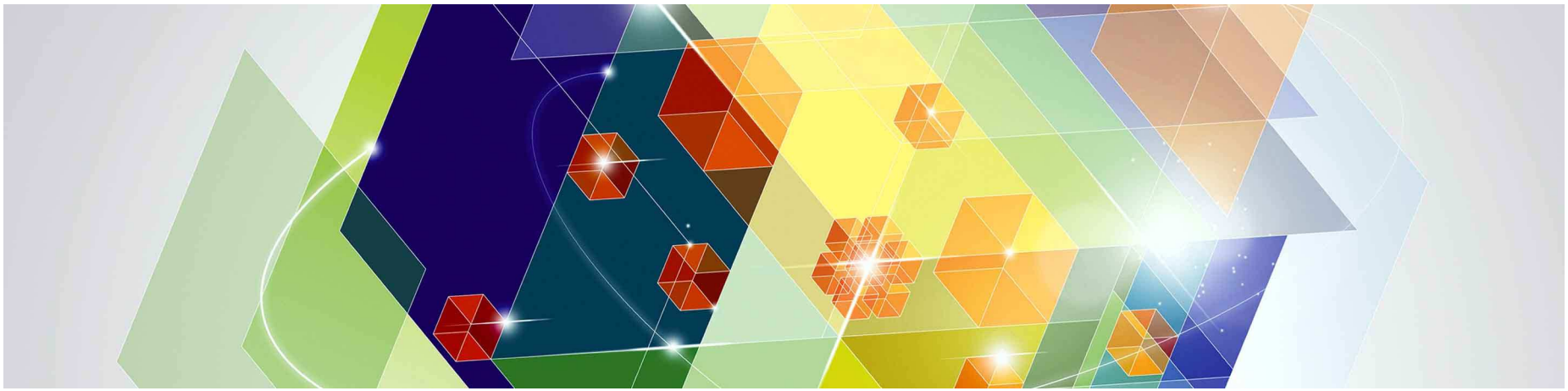


Enterprise Backup with Linux on System z

Implement TSM on Linux on System z as central Backup Hub



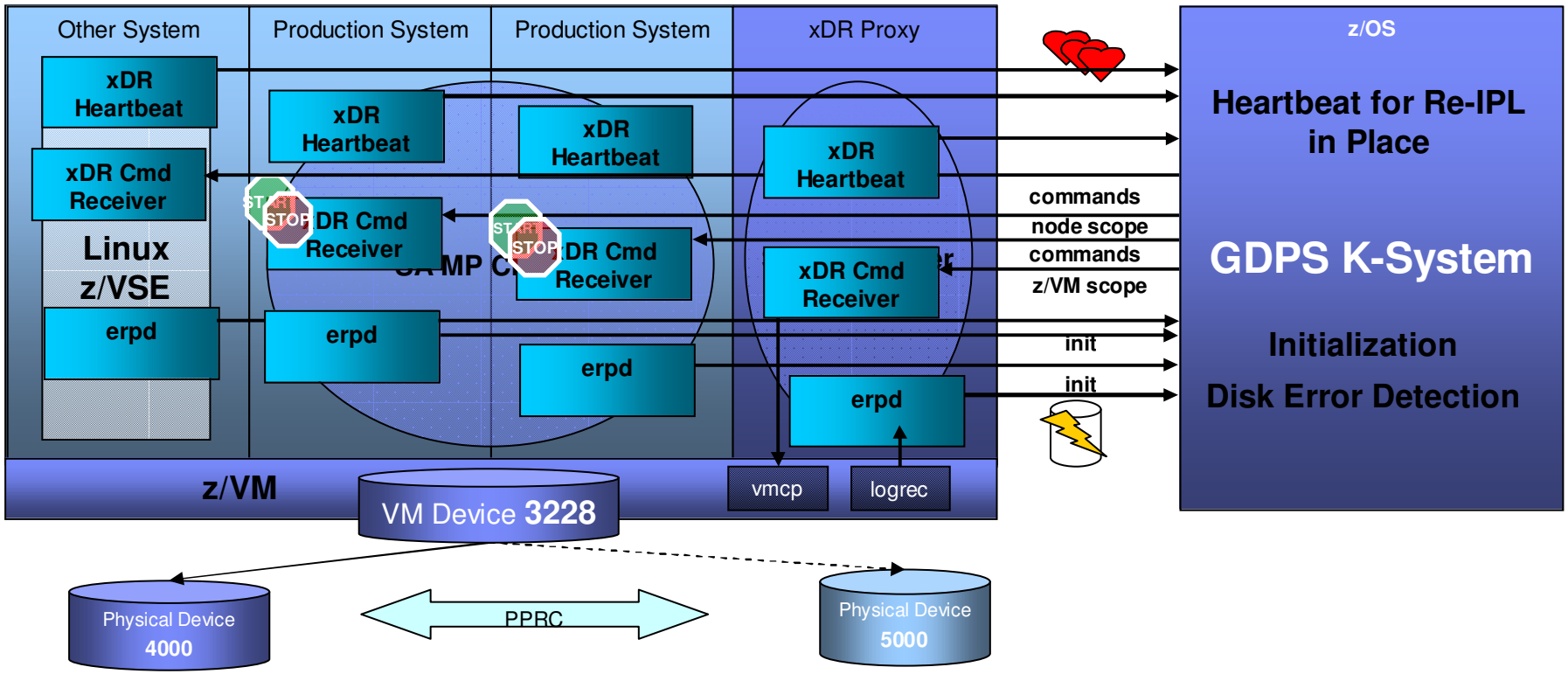
High Availability integration of z/OS and Linux on System z using GDPS



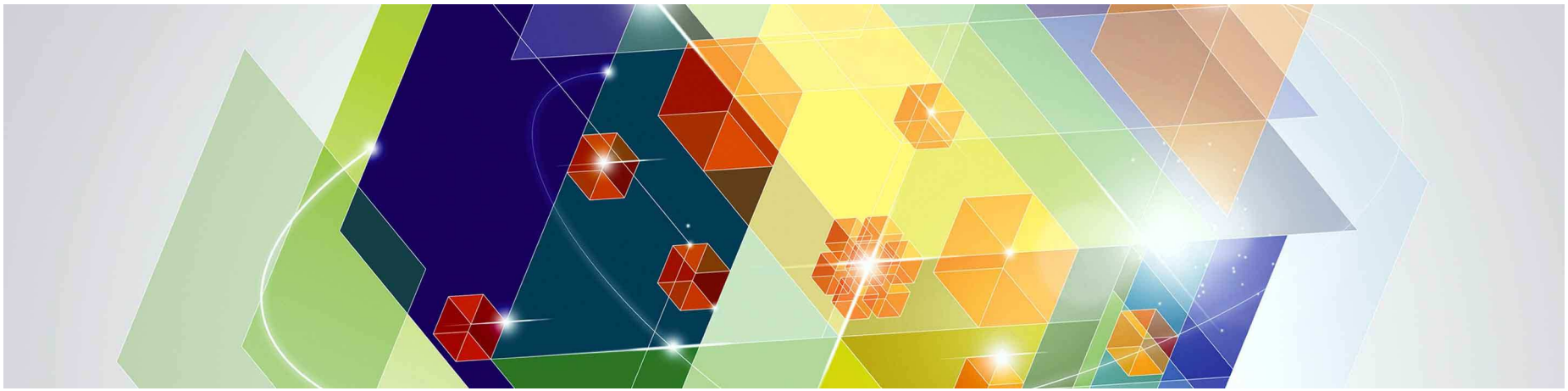
GDPS and xDR with z/VM guests – High availability

- Proxy
  - One linux system is configured as Proxy for GDPS which has special configuration
    - (Memory locked, Access rights to VM, One-Node-Cluster)
  - Is used for tasks that have z/VM scope
    - HyperSwap, shutdown z/VM, IPL z/VM guest

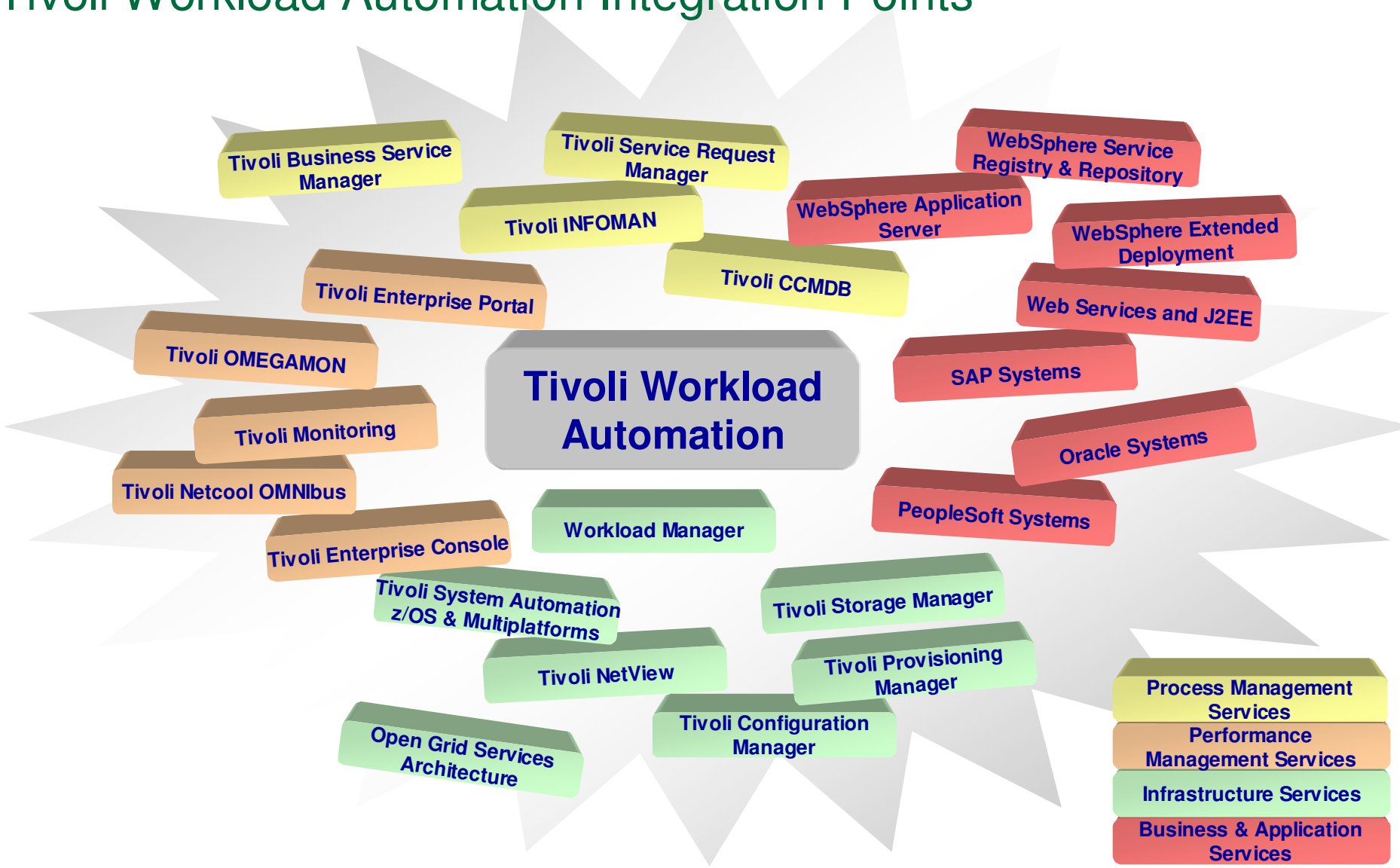
- Production Nodes
  - Run Linux Workload
  - Are used for local actions (Shut down node, Maintenance Mode)
- Other Systems
  - Enabled for HyperSwap via xDR Proxy (Linux, z/VSE)
  - No re-IPL in place, no start/stop via GDPS (init, reipl, maint)



Automate cross platform workload with Linux on System z

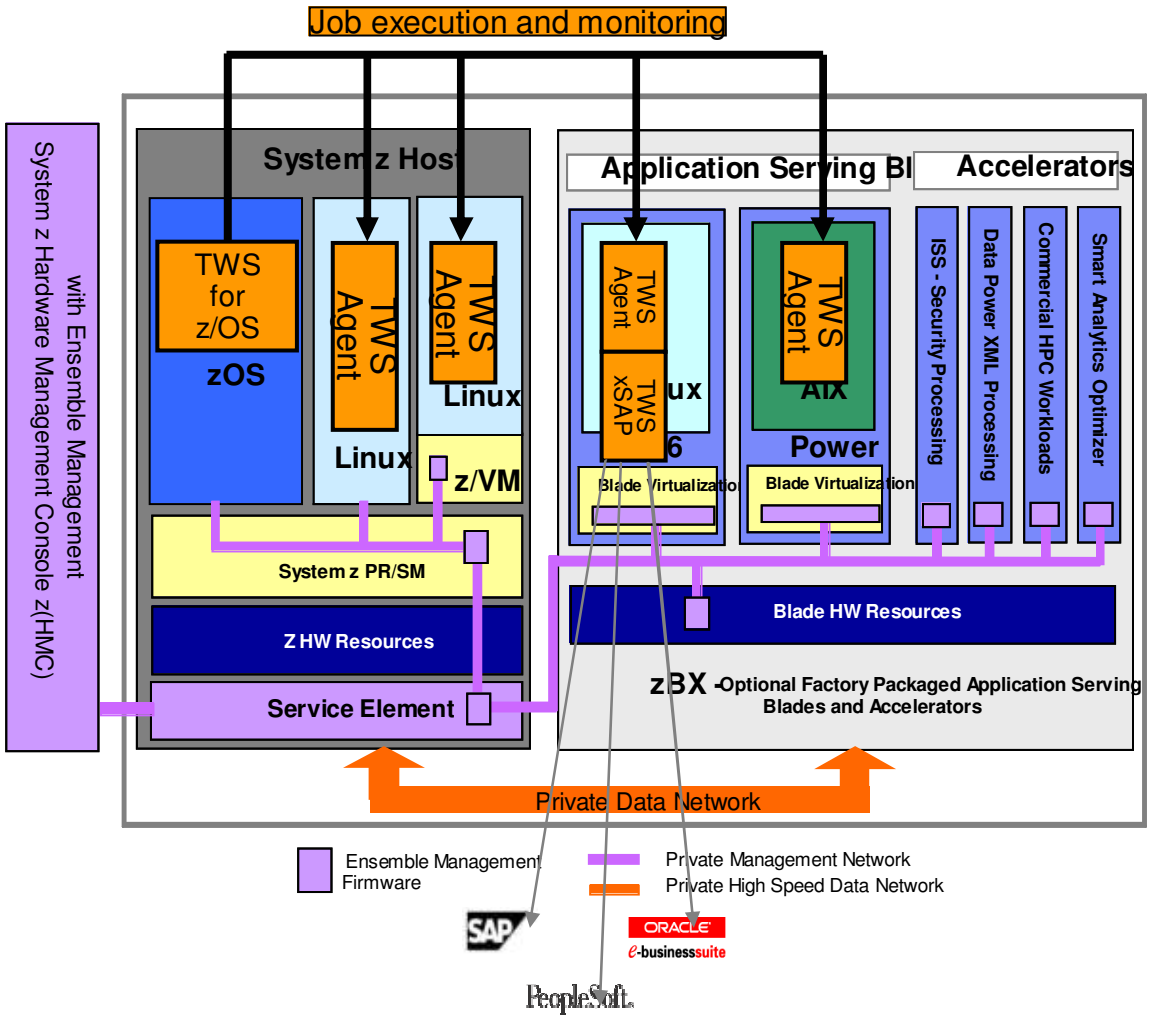


Tivoli Workload Automation Integration Points



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

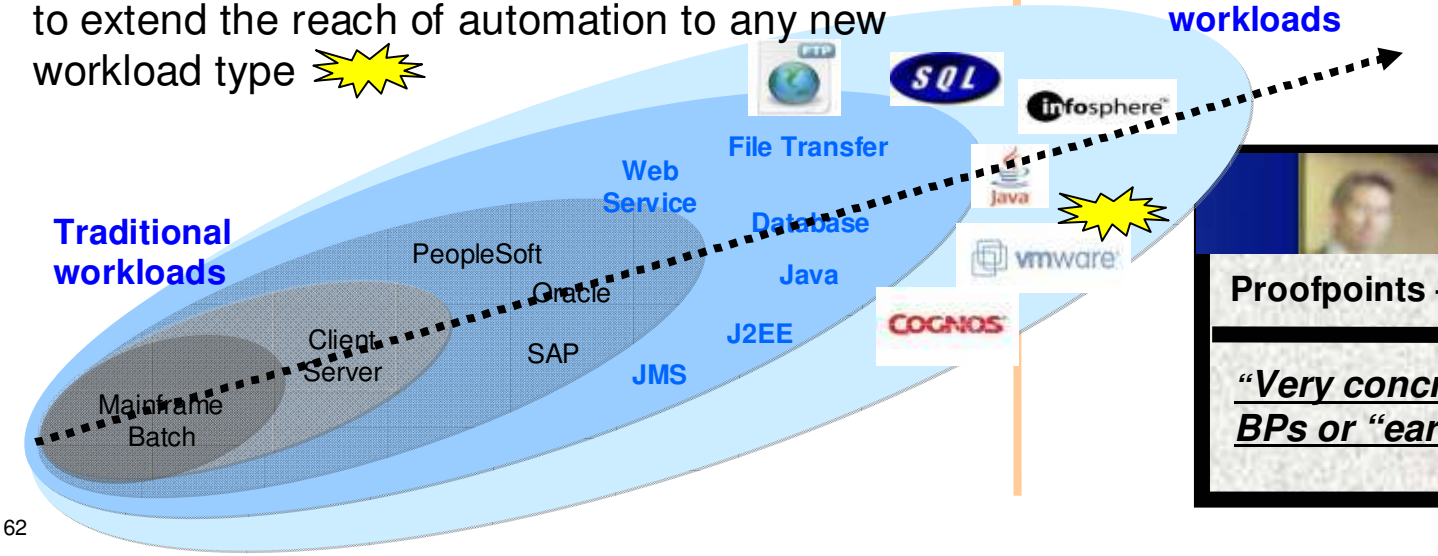
★ ***Reduce costs with fit-for-purpose platform, and implement a virtualized and green data center***

★ ***Realize data-proximity processing with high bandwidth for distributed applications***

Application Extensions allow business users to take advantage of processes in a managed approach

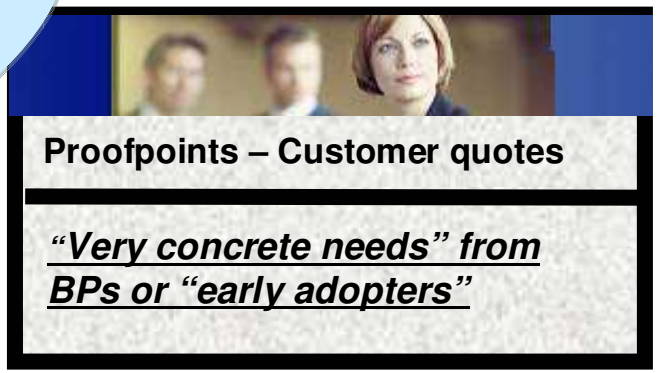
New Tivoli Workload Automation application extensible framework

- Customers shifting from traditional backend transaction focused systems to modern systems running web applications and heterogeneous applications
- Workload Automation role is maintaining a single point of control over workloads
- TWS 8.6 easily build and deploy application plugins to extend the reach of automation to any new workload type



Business benefits

- ★ ***Share infrastructure among applications***
- ★ ***Reduces labor costs, enabling to automate new workloads with the same staff of people***
- ★ ***No request for new skill: re-using of workload automation processes and procedures already in place***



Summary

The demands placed on the data center have never been greater.

IBM System zEnterprise:

1. **Enables** mixed workload Business Processes **to be deployed, and centrally managed**
2. Allows **optimized integration** of data, applications, and web serving
3. Delivers **dynamically responsive IT** with **lower acquisition and operating costs**
4. **Meets the need** of **heterogeneous data centers**

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

Links to Information on System z

IBM System z Data sheets:

IBM System z Solution Edition for Enterprise Linux

Enterprise Linux Server

IBM zEnterprise System

Linux on System z

z/VM virtualization and Linux on IBM zEnterprise System

IBM Offerings:

Financing

Client Case Studies For Oracle On Linux For System Z Servers:

Transzap

Bank of New Zealand

Clabby Analytics Whitepapers:

ELCOT

KMD

Other Client Studies:

Dundee

Ziff Davis Enterprise Whitepaper:

Scaling Your Oracle E-Business Suite with IBM System z and Linux

Video

Oracle on System z Enterprise - YouTube

Oracle Solutions on System z Server Data Sheets:

FAQ Running Oracle Database 11g Release 2 on Linux on IBM System z Servers

Oracle and System z FAQ

- Link is also available on Oracle website

IBM System z running Linux Oracle Database and Middleware Solutions

Oracle E-Business Suite on Linux for IBM System zEnterprise

Siebel on Oracle on Linux for IBM System z Servers

Siebel on DB2 z/OS on IBM System z Servers

PeopleSoft on Oracle on Linux for IBM System z Servers

PeopleSoft on DB2 z/OS on IBM System z Servers