Effective IT Optimization with IBM System z

From Large to Small IT Infrastructures

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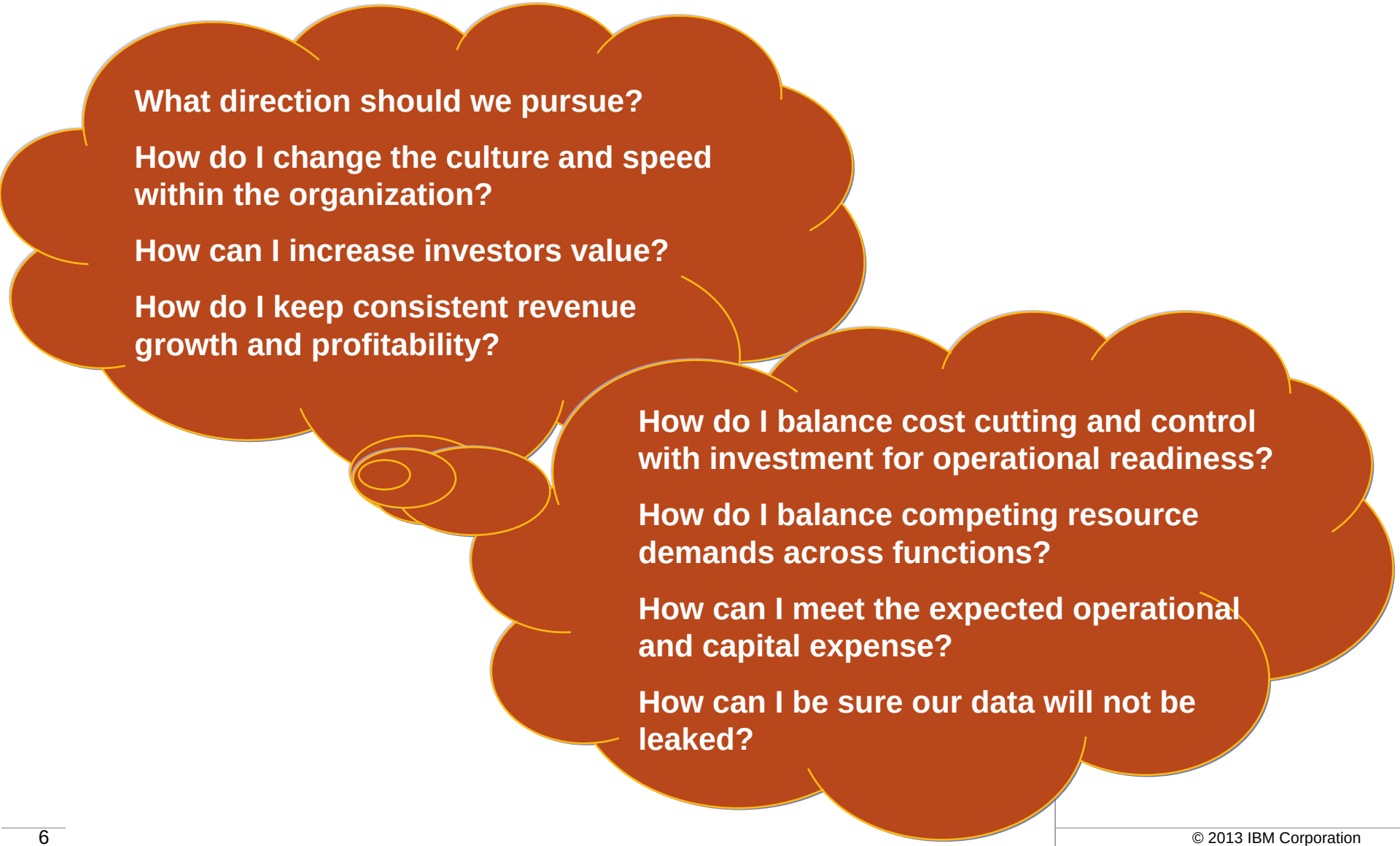
What Keeps IT Managers Up At Night?



Is your IT infrastructure based on x86/RISC servers, running UNIX® /Linux® or Microsoft® Windows®?

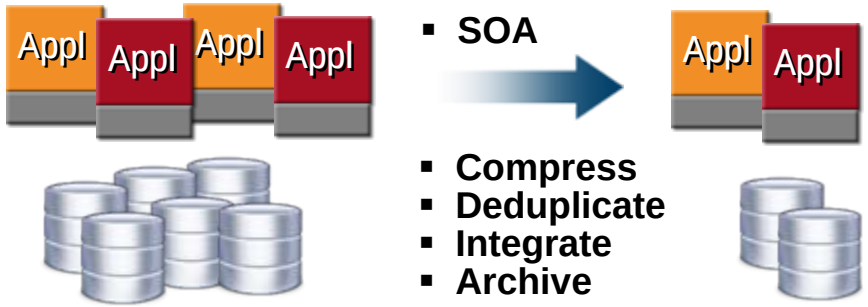
- How many x86/UNIX® servers are deployed every quarter?
- How much data center space is available?
- How big is the energy consumption growing?
- How many people are required to maintain the (growing) servers?
- How does the software license costs move on, even when using virtualization software?
- How is IT availability ensured, what happens in the case of a disaster?

Strategies to Reduce Costs and Improve Value

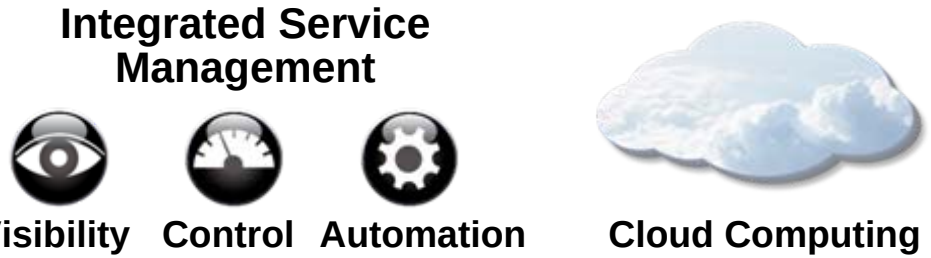
Optimize the Overall IT Environment

Consolidate Hardware Infrastructure

Consolidate Redundant Software and Data



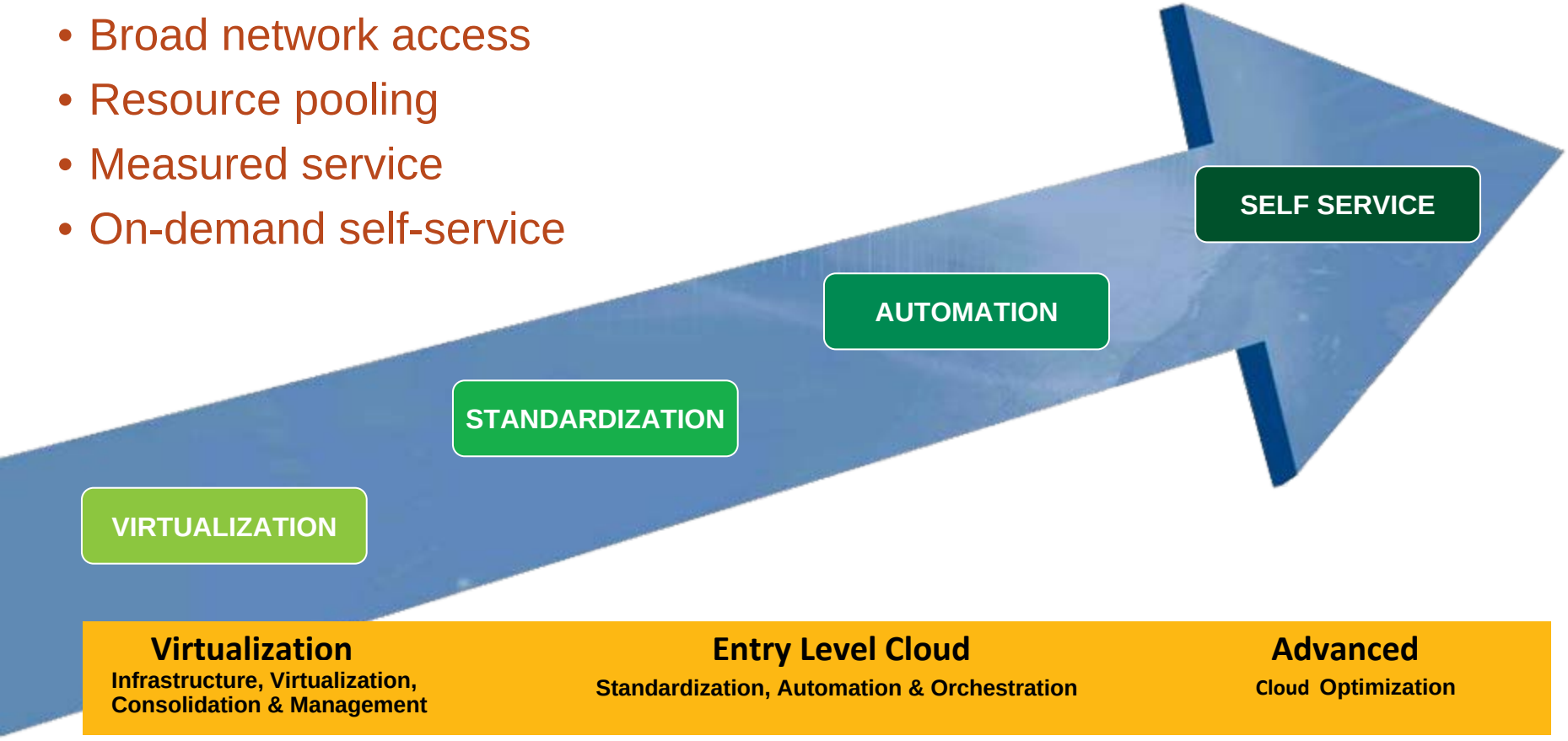
Improve Service Delivery



Cloud Computing - Based on Virtualization and Standardization

Cloud Computing – Characteristics *:

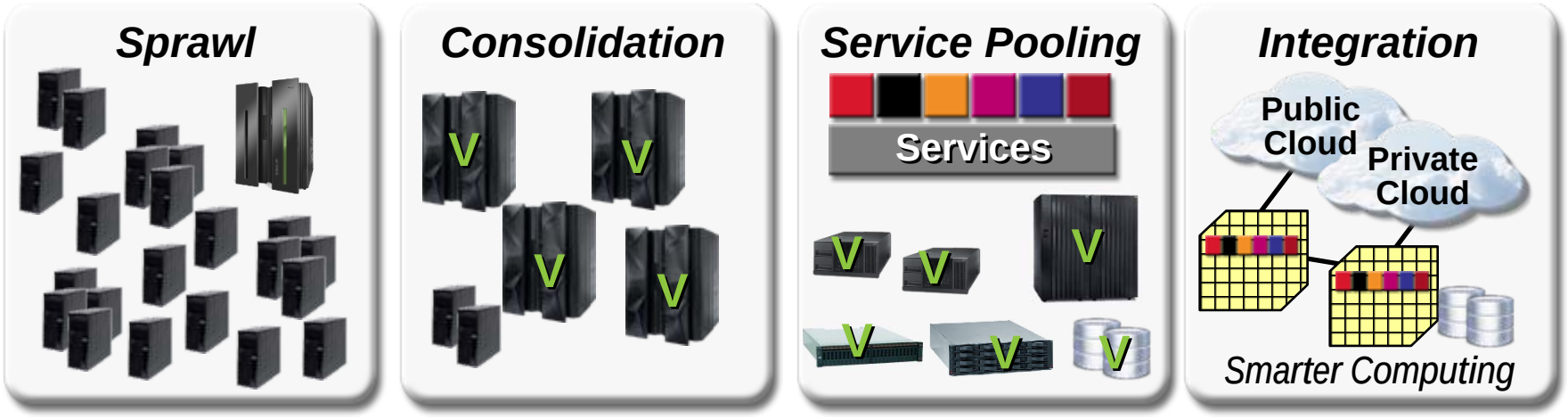
- Rapid elasticity
- Broad network access
- Resource pooling
- Measured service
- On-demand self-service



* Source: National Institute of Standards and Technology (NIST)

IBM's Smarter Computing Transformation

IT Optimization



Key Technologies

- Comprehensive virtualization
- Ensembles and scalable servers
- Converged networks
- Service Oriented Architecture
- End-to-end service management
- Cloud computing services

IBM's Smarter Computing Transformation

System z plays a critical role in optimizing workload deployment

- Average utilization increased from **<10% to ~60%**
- Average reduction in TCO of **70%**
- Total cost take-out across 6,500 migrations is **~$50M**
- Total cumulative savings project to date **~$100M**
- **Highest average TCO savings achieved with migrations from UNIX to Linux on z**

Nearly $10,000 per server per year

- Average utilization of System z production servers is **>70%**
- System z delivers the **highest ROI** and **biggest reduction in TCO** of any target platform
- Migrations to System z reduce labor requirements by **50%**, freeing up resources for new services

Migrations to System z servers have delivered almost 60% of the project's total cumulative savings to date

The New Evolution of the IT Infrastructure

LARGE Infrastructure

SMALL Infrastructure

Less Space
Less Power
Less Admins
More Efficient

x86 RACK Systems	x86 Blade Center Systems	IBM zEnterprise
15 kw/m²	Energy Use[1]	1.5 kw/m²
20x more Expensive	Software Licenses[2]	95% Less Cost
38%	Executive Satisfaction[3] Survey	90%

[1] Montpellier PSSC Green Data Center Benchmark; [2] Baldor Case Study; [3] Solitaire Interglobal: Comparing Virtualization Alternatives

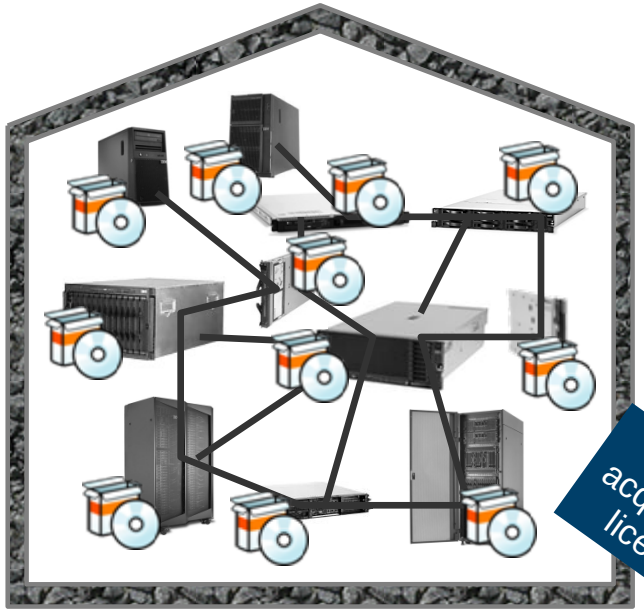
What System z hardware can do that x86 cannot

- System z hardware System z is designed to run multiple workloads concurrently
- System z hardware has unique workload management capabilities
- System z hardware qualities of service are superior to typical x86 solutions

Virtualization

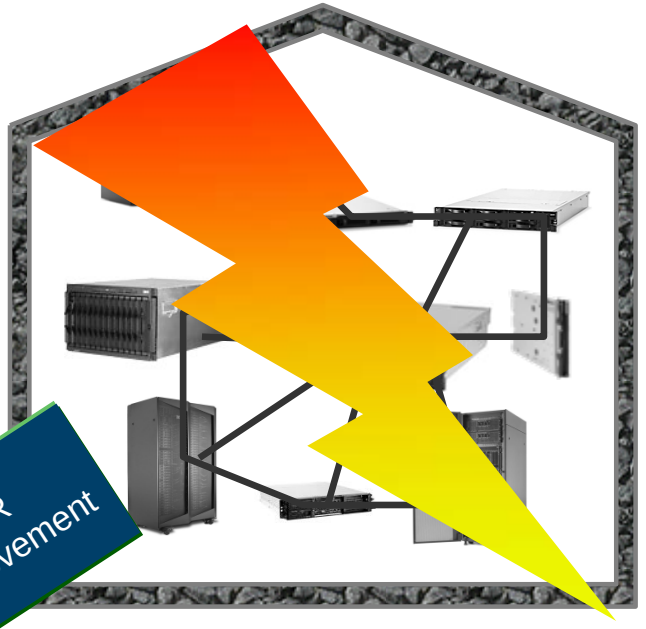
- **Do more with less**
- **Reduce costs on a bigger scale**
- **Manage growth and complexity**
- **More flexibility, minimize lead time for new projects**

Examples: ***Software Costs and Disaster Recovery***



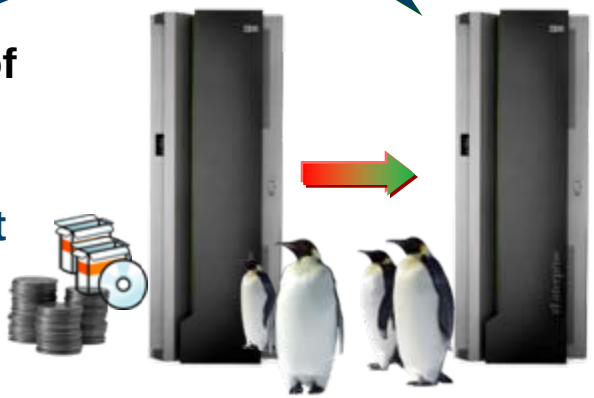
Less SW acquisition & licensing

DR improvement



Linux software is often priced by the number of processor cores.

On System z, one processor is equivalent to one core!



Coordinated near-continuous availability and DR solution for workloads

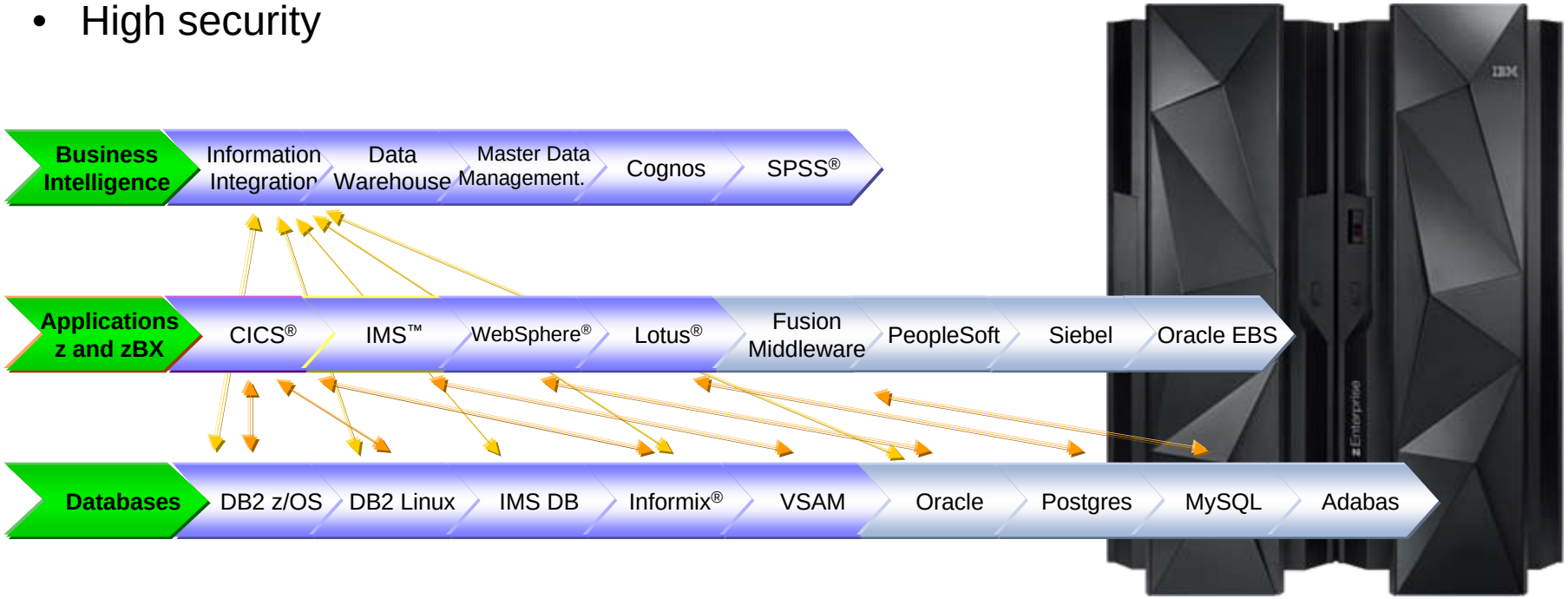
Maximizing Resource Utilization

- **Software hypervisor tightly integrated with hardware**
- **Shared everything infrastructure through hardware allows for maximum utilization of resources**
- **Designed to support diverse mixed workloads – not just more of the same**
- **Handles peak workload utilization of 100% without service level degradation**

Example: ***Leverage Proximity of Data and Applications***

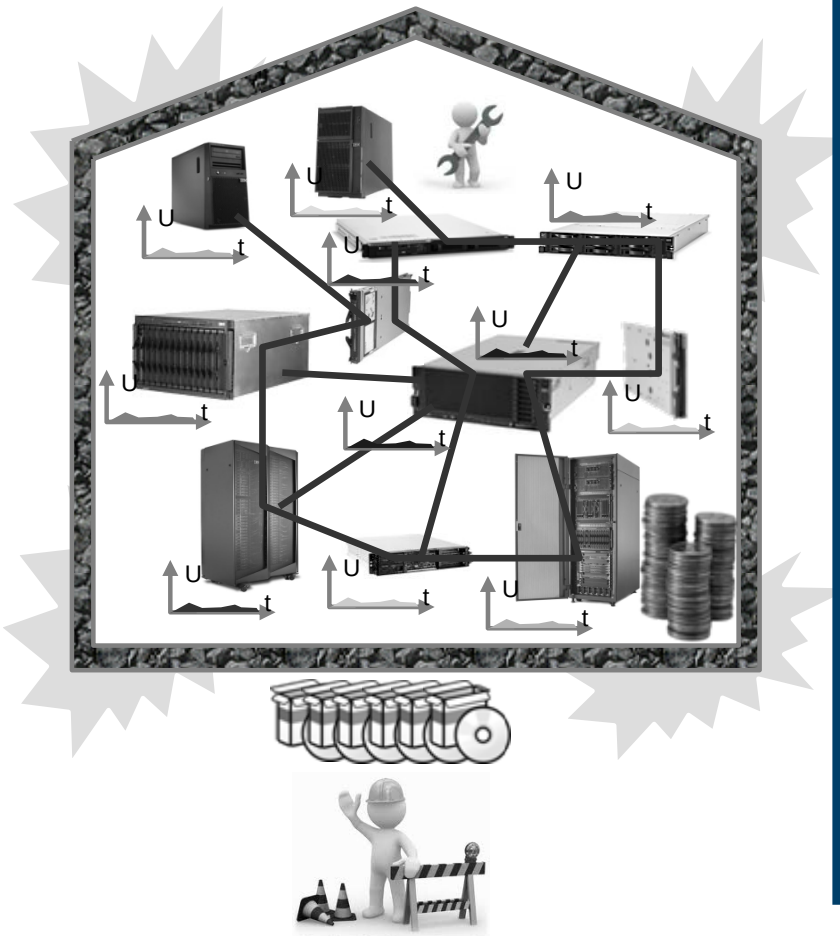
Proximity of existing & new applications / data on the same physical System z server allows to „Get the Best from Your Investements“

- Access from All applications to All data
- Centralized management
- High performance
- High security



What is Different about IBM System z

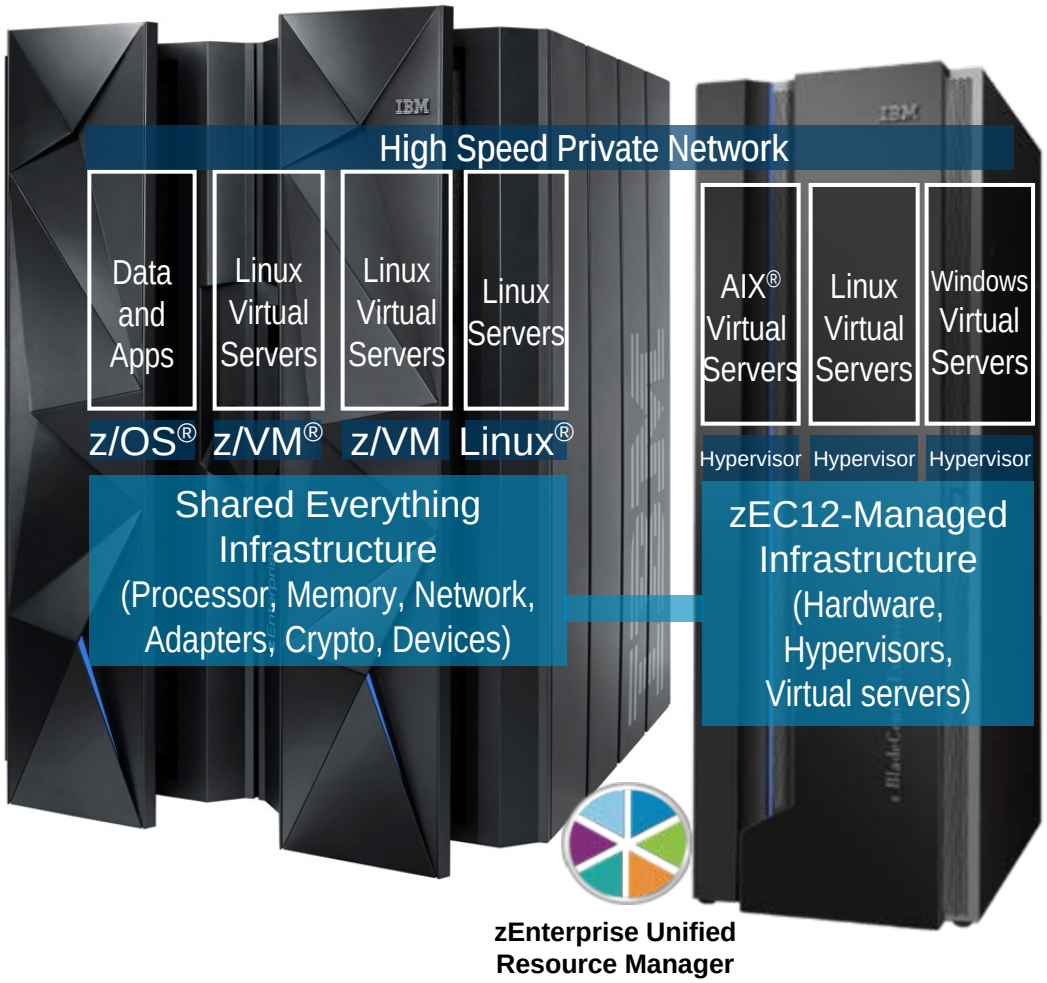
Improved IT Efficiency and Reduced Costs



- Software cost reduction
- Operational and management reduction
- Floor-space and energy reduction
- Network reduction
- Maximizing utilization
- Proximity of data and applications
- Technology refresh effort reduction
- Growth inside a server
- Disaster recovery cost reduction
- Improving security

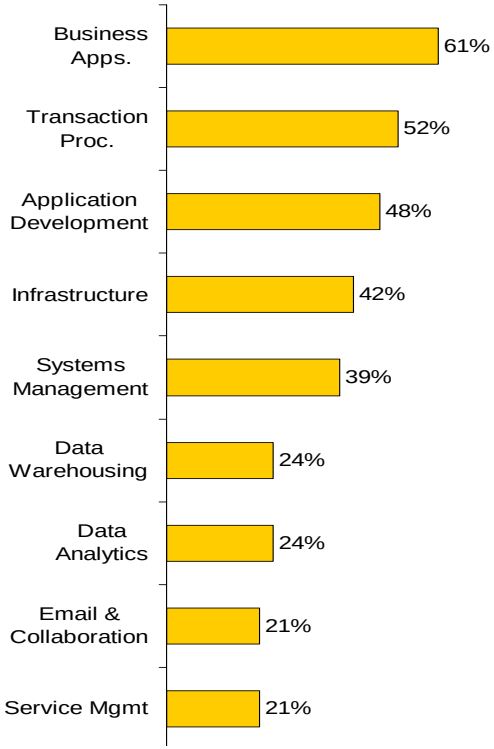
Best Fit Usage Scenarios for IT Optimization with IBM System z

- **Virtualization and server management**
- **Security services for entire enterprise**
- **Database and warehouse services**
- **Cloud and cloud management**
- **Application development and test**



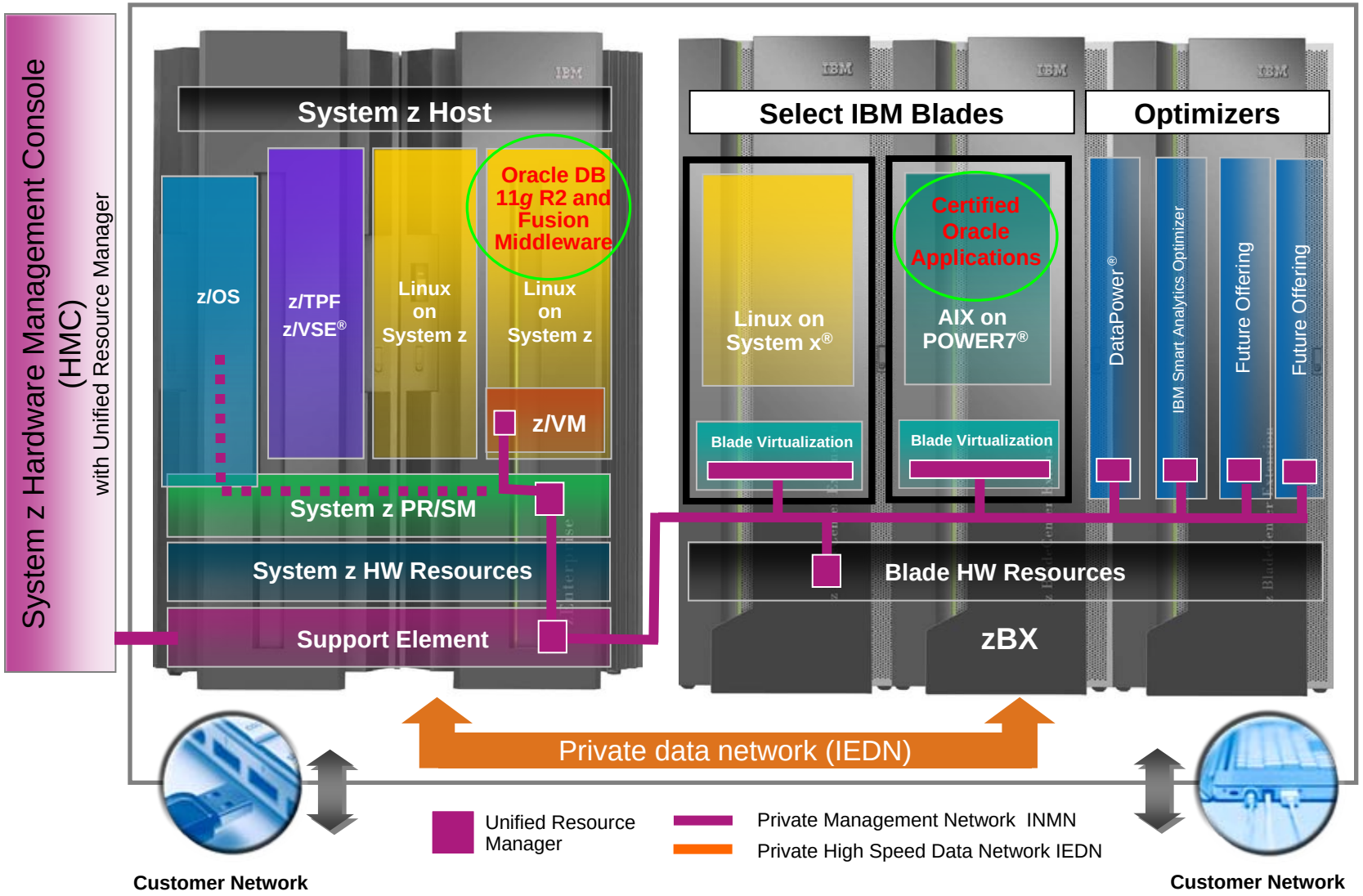
Recommended Workloads for Linux on System z

- **Data services**: Cognos®, SPSS®, DB2®, InfoSphere™, Informix®, Oracle Database, Builders WebFOCUS, …
- **Business applications**: WebSphere Application Server, WebSphere Process Server, WebSphere Commerce, …
- **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 System z, Maximo® Asset Management, …



Source: IBM Market Intelligence 2012
Percentage of survey respondents

Examples of Oracle Solutions on zEnterprise System



IT Optimization with IBM System z provides

- **Single server simplicity**
- **Efficiency at scale - high flexibility, scalability and resource utilization**
- **High server capacity with up to 101 processors running at 5.5 GHz**
- **Non-disruptive growth within one physical server**
- **Ultimate security**
- **Economics**

[1] Processors, memory, I/O connectivity can be added without disruption.

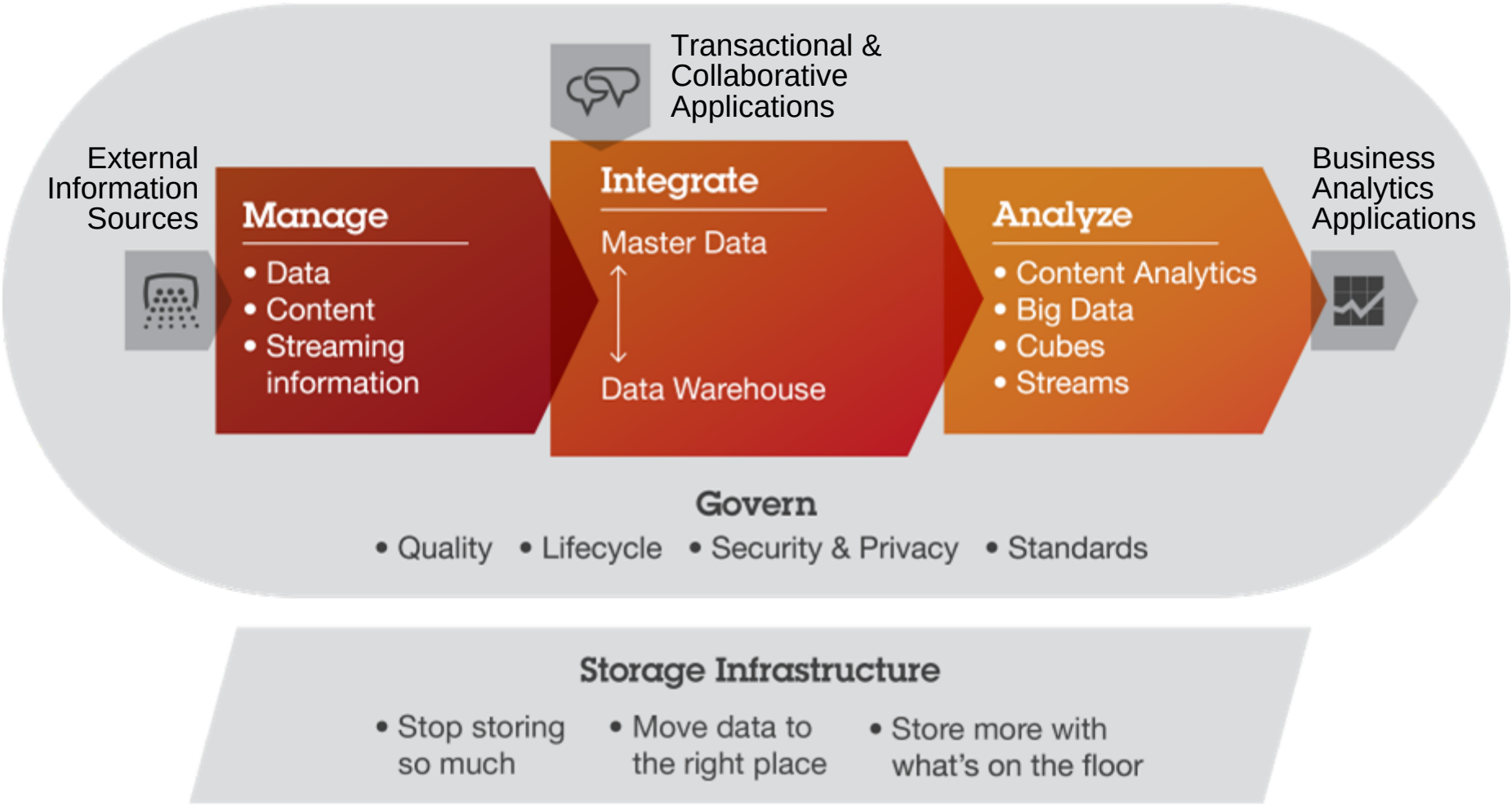
Backup

Effective IT Optimization with IBM System z

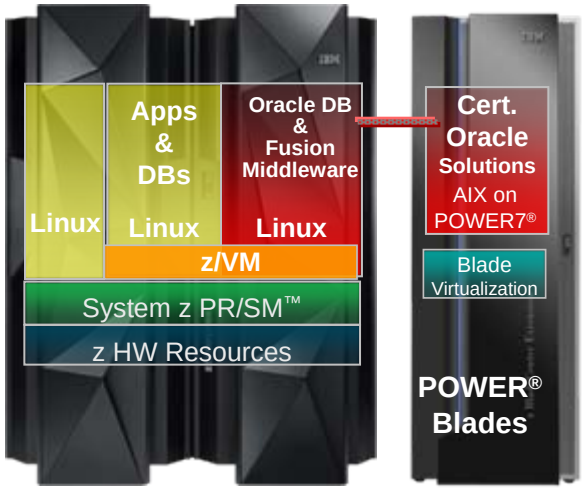
Affordability	Attractive price performance. Offers the lowest TCA for Linux deployment of Oracle database workloads over competition - saving over half the cost[1].
Availability	Near zero downtime/continuous availability, even during maintenance of HW, OS, database and application components. Enhanced disaster recovery responsiveness.
Efficiency	Reduced infrastructure complexity through consolidation, automation and virtualization, saving on energy, labor, SW, and more. Management of the end to end applications, fast private network, fewer hops and points of failure. High resource utilization.
Integration	Capability to handle the largest volumes of data, in a day and age when data is booming. Tight integration and simpler management of data and applications on one system. Homogeneous system environment.
Scalability	Flexibility and near-linear large scalability, unmatched in the IT world, to grow with your business. Superior virtualization. Unprecedented scale.
Security	Comprehensive protection of critical data from all IT security threats. Private server network. Common Criteria Evaluation Assurance Level 5 (EAL5).

[1] Based on measurements at a large bank comparing a production workload running on Oracle RAC DB on distributed versus Oracle RAC DB on Linux a Enterprise Linux Server with cores running at 5.5 GHz.

All Information can be Incorporated into an Enterprise Information System on zEnterprise EC12



Deploy Oracle Software to the “Best Fit” Technology



Oracle software deployments (incl. consolidations) **on a System z server provide an excellent price performance.**

- From an Oracle licensing perspective 1 System z processor = 1 core from a distributed server
- Less operational efforts
- High levels of security and availability

Business Connexion – South Africa

- ICT services to the financial sector, government, … and more
- Approximately 50 virtual Linux servers; flexible environment for hosted services; high performance for Oracle databases
- Enabled competitive pricing for client services

Sparda Datenverarbeitung eG – Germany

- IT provider for approximately 4.2 million customers
- Runs a number of very large Oracle databases, where the virtual Linux server requires 30 GB memory and ~350 GB storage
- Eperienced >99% availability, which proves the Linux reputation

Upgrading your Oracle DB on Linux for z to DB2

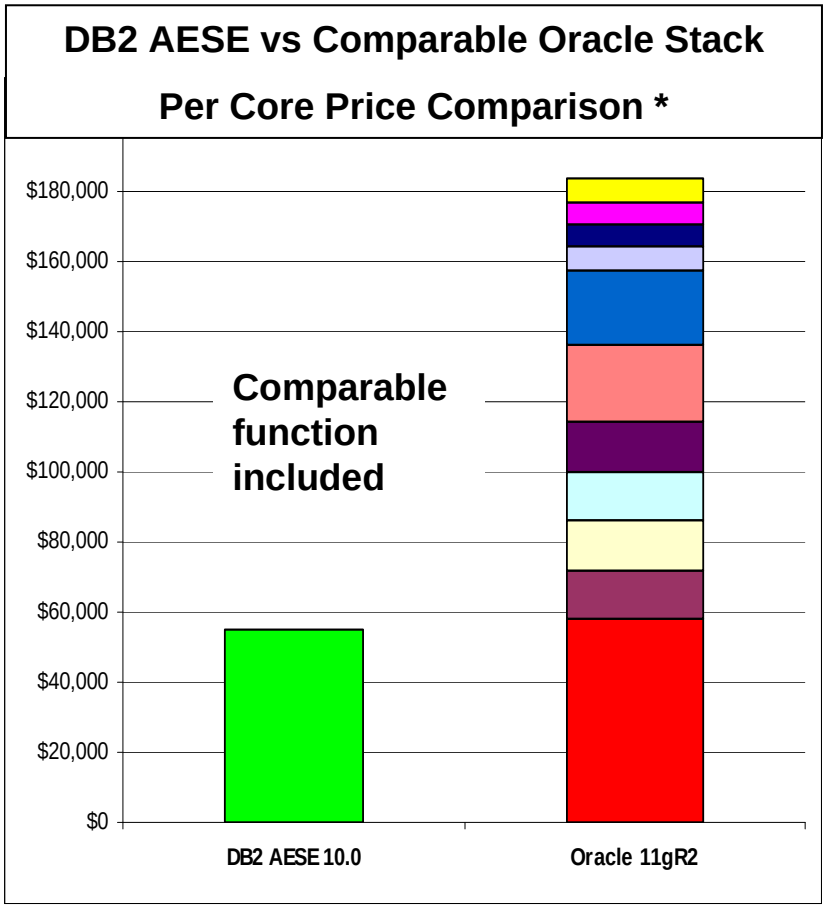
Some Oracle clients are motivated to look at alternatives

"Most Likely to Succeed" migrations include:

- Simple to moderately complex home-grown applications
- Applications the customer wants to reengineer anyway
- Applications on old or at risk hardware like Itanium
- Applications with available subject matter experts
- Packaged applications that already support DB2

Tools and Support to Help You Move Easily:

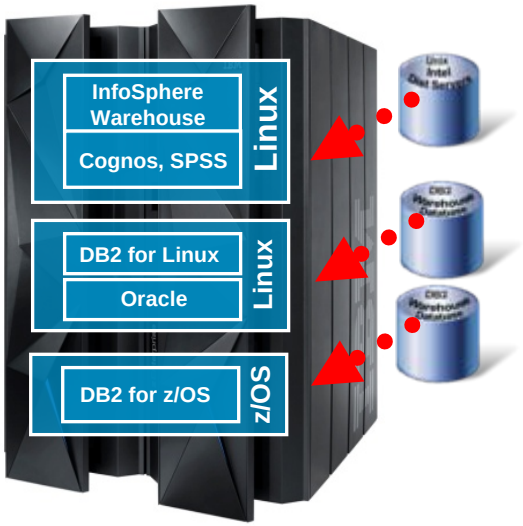
- *Migration Enablement Evaluation Tool (MEET)*
- *IBM Data Movement Tool (IDMT)*
- *DB2 Conversion Assessment Questionnaire*
- *… and much more!*



* Based on publically available US $ list prices as of March 15, 2012 including year 1 S&S. DB2 AESE price assumes 100 PVU / core. Oracle price assumes 1.0 multiplier and is calculated by summing the separately purchasable packages and features highlighted on this chart.

Business Intelligence and Predictive Analytics

IBM Cognos BI and SPSS



Integrated Stack creates compelling value for the Business Users

- Predictive Analytics, BI, DW on highly scalable, secure and available IBM System z®
- Low cost, easy to manage
- Simplified and faster access to the transactional data

Commercial Bank – China

- Wanted to transition to a more suitable platform to support new core-banking system
- zEnterprise is best platform for their large data center - a nation-wide consolidation
- Eliminating potential procurement delays

IBM Blue Insight - USA

- IBM's strategic analytics platform, designed to empower IBM employees
- Offers services for data warehousing and analytics, all based on System z; all data is analyzed using Cognos® for Linux on System z, which generates reports for distribution
- Delivers $25 million savings over five years; enables further savings

SAP Application Server Deployment and Consolidation on System z

Business Continuity

- DB on z/OS
- Data Sharing in Parallel Sysplex®
- HA with Tivoli® System Automation

Server Consolidation

- Internal near memory-speed communication
- Scale-up and scale-out capabilities
- Fabulous performance throughout

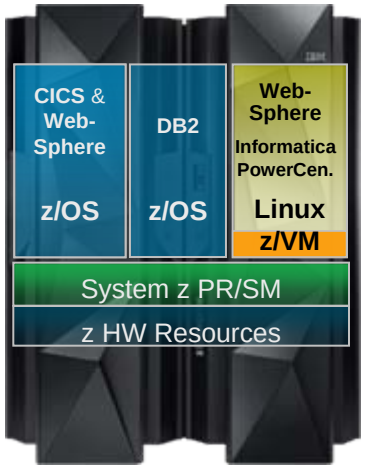
Embasa - Brazil

- Manages one of the largest water treatment services
- Needed a high-performance, cost-effective way to introduce SAP software while continuing with the tried and trusted database solution
- Commercially attractive “Solution Edition” gave confidence to go ahead

Endress+Hauser – Germany

- Specialist in measurement technology; 89 companies across 42 countries
- Detailed cost-benefit analysis compared Linux on System z to Power®/x86 servers. z/OS, z/VM and a total of 80 IFLs,
- Simple and intuitive user management tools make it possible for just 1.5 FTEs to administer the entire Linux landscape

Develop and Deploy New Applications on System z



Banking Client - Switzerland

- Migration of data warehouse from Oracle applications to **DB2 for z/OS**
- Migration of **Informatica PowerCenter software** to new Linux environment on System z
- Developed and deployed new Java™ applications
  - Use of **IBM HTTP server** and **WebSphere Application Server**

- Improved overall batch performance by 50% and data transfer throughput
- HiperSockets™ and virtual networks enable fast communication between Linux and z/OS
- Centralized management helped improve efficiency - reduced operational costs
- Integration of applications within System z made the disaster recovery plan easier
- Only System z is capable of handling a large volume of CICS, DB2 and Java transactions
- “Technical evolution: now we are familiar with Linux on System z and WebSphere for our multiplatform applications in Java.“

Deploy New Applications to Utilize Oracle Database on System z

Build new, modernize and replace old applications utilizing Oracle Database on Linux on System z

- Deploy new applications on System z
- Leverage comprehensive IBM Software portfolio

Government Client - USA

- Rich in Sun servers; rapidly growing database workload; running out of space and power
- Solution: IBM zEnterprise 196 (z196), z/VM, Linux, **WebSphere Application Server Network Deployment**, **Tivoli Proventia® Network**
- Net result: 106 Solaris/Sun cores down to „just 6“ on z196 (17:1)

- Consolidated Oracle database environment with reduced operating costs and improved performance metrics
- Latency between the Oracle and Solaris environments was greatly reduced
- Long running batch jobs that had took 30hours in the Sun environment were running in just 15minutes on the z196
- Server footprint was sharply reduced, giving up valuable floor space while saving energy, maintenance and software licensing costs

Much more Workloads which Benefits from zEC12

Reliable and Scalable Business Collaboration

Lotus Domino
+ TREND MICRO

Lotus Sametime
Lotus Quickr
Lotus Connections

Gruppo API – Italy

The migration of Lotus Domino, the corporate email system, worked extremely well. Over a two week period, 1,200 user email boxes were moved to System z without interruption of service to users.

IBM Enterprise Content Management Solutions

IBM ECM includes one of more of approx. 40 different software products such as **FileNet** and **IBM Content Manager**

Large Healthcare Insurer – USA

FileNet and Content Manager OnDemand are used with DB2, InfoSphere and Cognos to support the business processes for the Integrated Health Management initiatives.

IBM Maximo Asset Management

Maximo Asset Mgmt. unifies comprehensive asset life cycle and maintenance management on a single platform.

City and County of Honolulu – USA

With Maximo Asset Mgmt. software, the city deployed a new work order system that combined citizen-provided data and data from the city's geographic information system to schedule repairs.

Reliable and Scalable Business Collaboration

Imagine the Possibilities on zEC12

Lotus Domino

\+ TREND MICRO

Lotus Sametime

Lotus Quickr

Lotus Connections

Lotus offers solutions to deliver:

- Exceptional web experience
- Social Software
- Collaboration
- Messaging

IBM's Smarter Computing Transformation

Highest average TCO savings achieved – $780 per server per month – with migrations from UNIX to Linux on System z.

Gruppo API – Italy

The migration of Lotus Domino, the corporate email system, worked extremely well. Over a two week period, 1,200 user email boxes were moved to System z without interruption of service to users. Article on Mainframezone.com

BG-Phoenics – Germany

Email is still highly important; using Linux makes it cost−effective to run this service on the ultra-reliable z196 server with the efficiencies of virtualization on System z. IBM case study

IBM Enterprise Content Management Solutions

Enterprise Content Management (ECM) manages unstructured information

– Capture it, index it, store it, and route it electronically through business processes
– Analyzing it and deleting it are new capabilities

IBM ECM includes one of more of approx. 40 different software products

– E.g. FileNet or IBM Content Manager

Most components run on Linux on System z.

IBM is the *only* ECM solution provider who provides an ECM solution for System z.

Russian Hydrometeorological Research Institute - Russia

World Data Center is the world's largest publicly available archive for hydrometeo-rology monitoring data. The solution enables them to collect, process, store and disseminate information digitally. The client can now consolidate different media types and has a simplified data access.

IBM case study

Large Healthcare Insurer – USA

FileNet and Content Manager OnDemand are used with DB2, InfoSphere and Cognos to support the business processes for the Integrated Health Management initiatives. The solution brings together data from disparate sources and creates an enterprise data warehouse that can be used for data mining and forecasting.

IBM Maximo Asset Management

Key client business issues:

- Cost inefficiencies and operational complexity associated with leveraging the asset infrastructure
- Need to measure and manage the asset availability and risk across *all* strategic assets

Maximo Asset Management unifies comprehensive asset life cycle and maintenance management on a single platform.

Maximo software provides insight for all of enterprise assets, their conditions and work processes, for better planning and control.

City and County of Honolulu – USA

The original offer was for x86 technology with Oracle on System z, but IBM suggested that a Maximo solution that leverages mainframe application and database would be more advantageous to the customer. IBM case study

Technology Solutions Company – Brazil

Maximo software is used as a single point of management for every aspect of a wide range of public services. Using the solution, a city maintains and monitors its public services, assets, water, roads, parks, urban mobility and utilities, thus performing more preventive and corrective maintenance.

IBM Green Data Center – USA

Maximo Asset Management for Energy Optimization transforms data into insights that help staff improve airflow and maximize data center efficiency.

New Solutions available for System z

IBM Health Plan Integration Hub	The IBM Health Plan Integration Hub is strategic code and policy management platform that can carry a Health Plan through all the stages of the ICD-10 transformation and beyond: basic code translation, augment with knowledge of policy and business goals, validate to ensure cost neutrality, leverage the ICD-10 granularity to refine service, and keep pace for the next set of codes.
IBM Intelligent Operations Center for Smarter Cities™	Smarter Operations – across departments and agencies. It leverages information with real-time visibility of key data to drive better decisions, anticipates performance to identify, manage and mitigate incidents that impact operations and coordinates resources and processes to respond to situations rapidly and effectively.
IBM Smarter Analytics: Anti-Fraud, Waste and Abuse Solution	Detect suspicious transactions prior to payment, minimize loss from overpayments, and recommend method of intervention.
IBM Smarter Analytic Signature Solution: Anti-Fraud, Waste and Abuse	Detect suspicious transactions prior to payment, minimize loss from overpayments, and recommend method of intervention. It dramatically reduce costs from fraud and abuse, and the more efficient use of investigative resources reduces costs and increases rate of return.
IBM Genelco® Insurance Administration Solution (IBM GIAS)	Rapidly deploy new policy offerings while improving customer responsiveness. It helps to improve policy servicing and customer responsiveness, accelerate responsiveness to industry and customer change, and to streamline operations through elimination of manual, batch, multi-touch and error prone handling.

Built-in Security for Linux Workloads

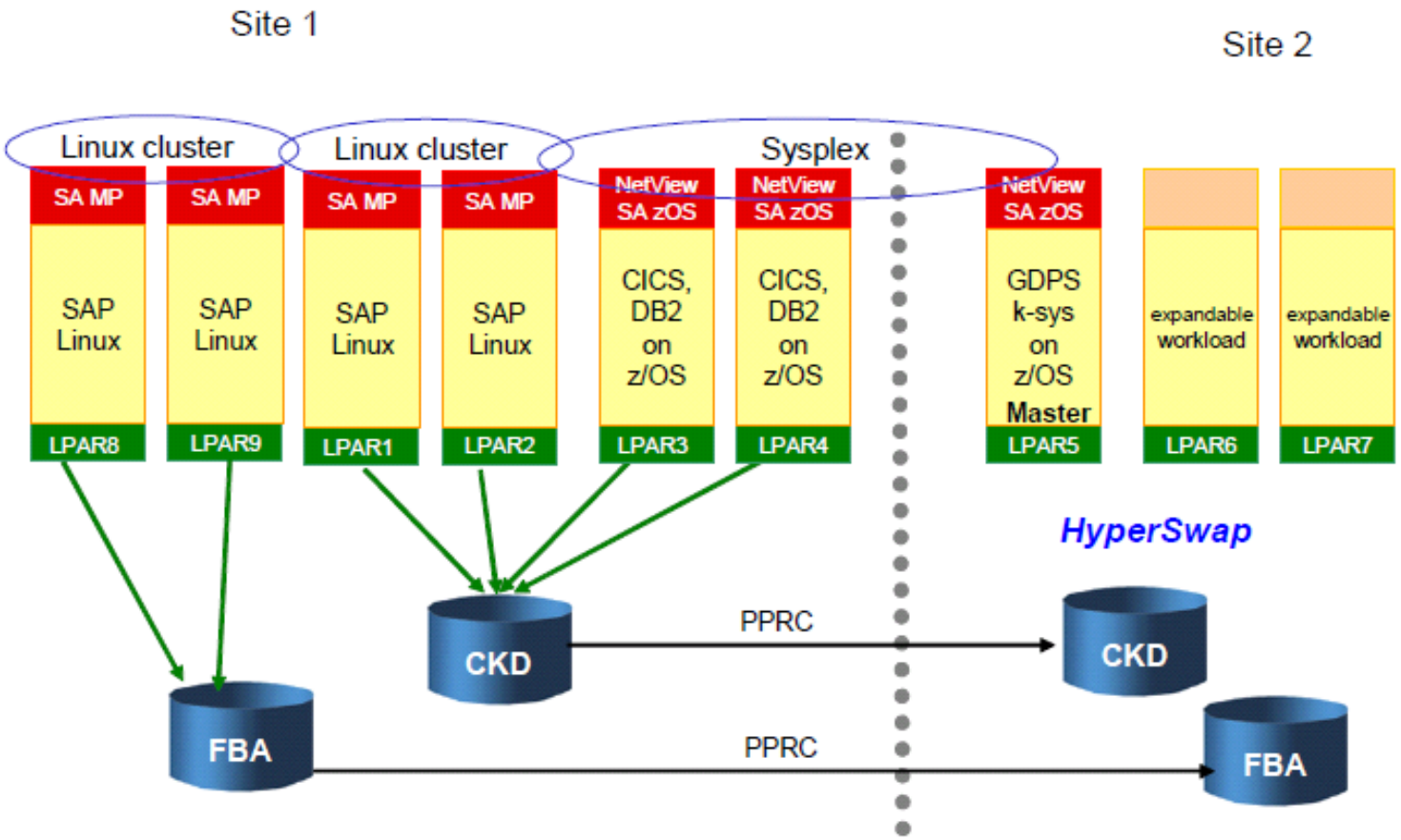
- Industry's top-rated EAL5+ security classification* for hardware Logical Partitions
- EAL4+ security classification on z/VM offering unmatched levels of secure virtualization and consolidation
- Security-rich holistic design to help protect system from malware, viruses, and insider threats
- Granular access controls integrated across the platform
- Network security features to help address outside threats
- Encryption solutions to help secure data from theft or compromise

The IBM advantage …only System z can boast the combination of EAL5+, an EAL4+ certified hypervisor, FIPS 140-2 Level 4 and related security certifications

The Gold Standard for Security

* https://www.bsi.bund.de/ContentBSI/EN/Topics/Certification/newcertificates.html

GDPS/PPRC Multiplatform Resiliency for System z



Configuration example where several Linux nodes are running natively in their own partitions, and all of them are under GDPS® control.

Coordinated near-continuous availability and DR solution for z/OS and Linux