The IBM Enterprise Linux Server

An ideal platform for optimized workload deployment

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What is a Enterprise Linux Server (ELS)*

alias

- **Large highly-scalable enterprise class server** running Linux

- Linux on System z server

- Solution Edition for Linux on System z

- zEnterprise and Linux on System z

- Linux on a highly virtualized server based on System z architecture

- Linux on the mainframe
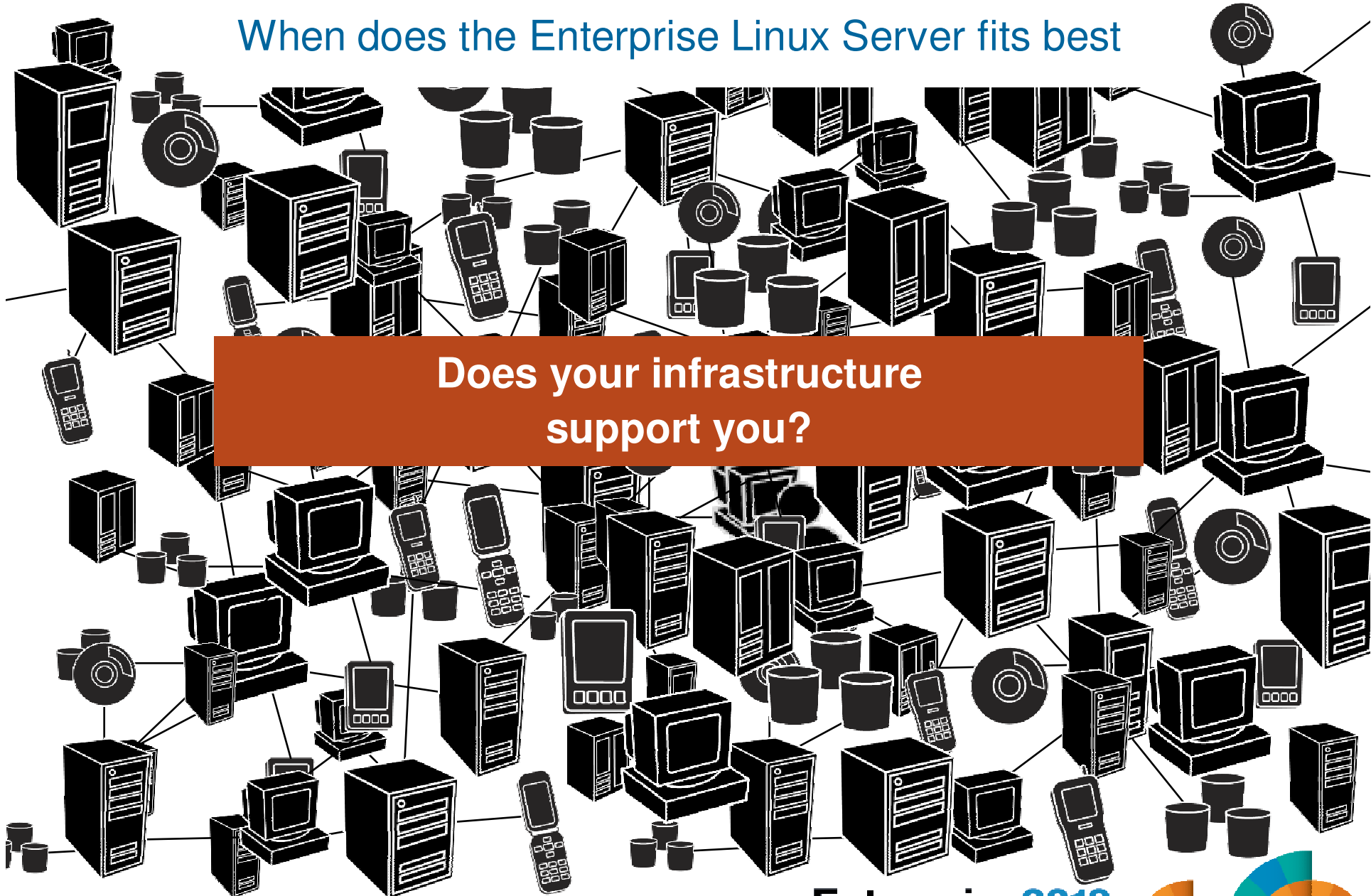
zEnterprise EC12   zEnterprise zBC12

*) Originally ELS was a pre-configured IBM System z10 BC including z/VM
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When does the Enterprise Linux Server fits best

Does your infrastructure support you?

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Solving top IT challenges is a key imperative
What will you do differently?

IDC

"The largest threat that many companies and organizations now face is not ... a virus...

The new enemy is sprawl.

The vastness of infrastructures now in place represents a danger in and of itself."[1]

Robert Frances Group

"IT executives want to transform their operations from spending 70-80% of their budgets on operations." [2]

[1] http://idc-cema.com/eng/events/49631-idc-it-security-and-datacenter-transformation-roadshow-2013
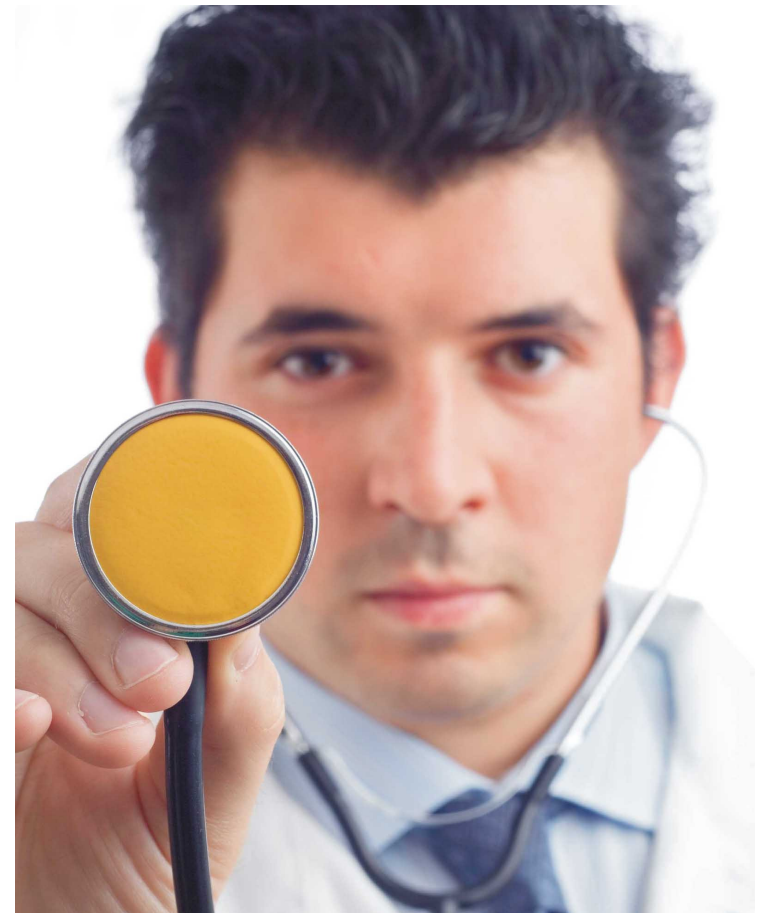[2] Robert Frances Group, "Data Center Optimization Planning – Dashboard Metrics," December 2012

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Key drivers of sprawl and cost of maintaining your infrastructure

- **Rising software costs**

- **Operational inefficiency**

- **Growing energy and space requirements**

- **Recovery from unplanned disruption**

- **Security threats**

What can you do differently?

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The Game Changer for Enterprise Linux
New: Enterprise Linux Server – based on IBM zEnterprise® BC12 (zBC12)

Facts	Linux Server Solution	Values
Deploy up to 40 virtual servers per core		As low as $1.00/day per virtual server[1]
Up to 520 virtual servers in a single ELS footprint	**Linux Server Solution** including hardware, hypervisor and maintenance	Save up to 55% on TCO over 5 years[2]
Secure isolation of logical partitions with highest level of security certification		More than 3,000 Linux ISVs apps supported
Support for Red Hat, SUSE and OpenStack® Cloud		Still starting as low as $75K USD[3]

[1] IBM calculations of zEnterprise limits across maximum zBC12 configuration. Results may vary. 3-Year cost for hardware, hardware maintenance, and z/VM.
[2] Based on preliminary measurements and projections comparing Oracle DB on x86 2 chip 8 core 2.13GHz blades vs. zBC12 and ELS solution edition pricing. Subject to change and results may vary based on numerous factors.
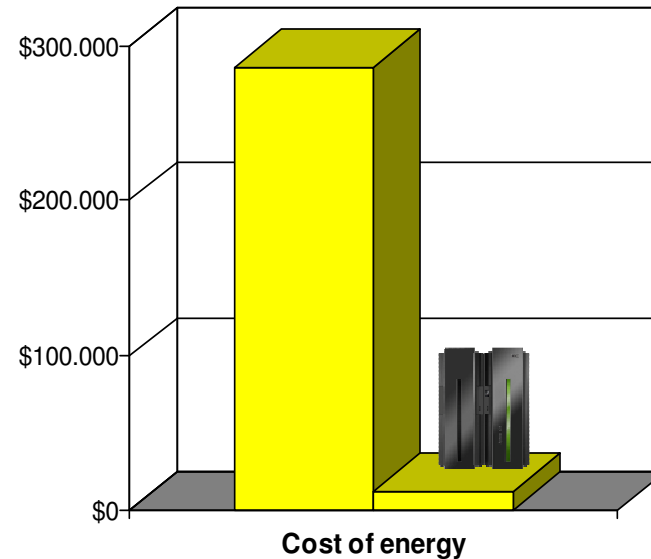[3] Based on US market and will vary by country.

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Insurance Company Reduced Energy Requirements 95% by Consolidating 292 Servers to a z10
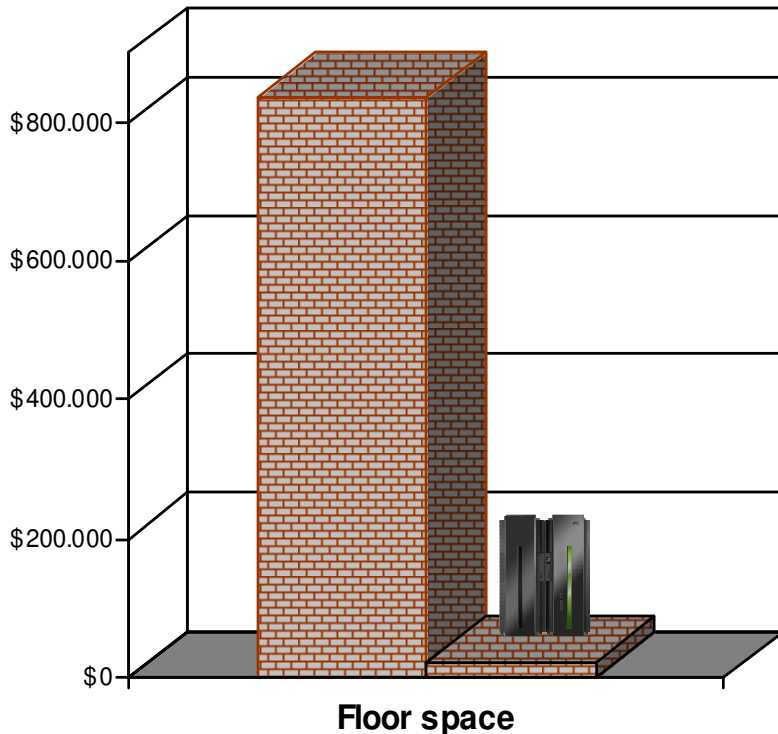
OEM Server environmentals are derived
from IDEAS International.

Floor space

Cost of energy

Annual cost calculation

- Floor space cost calculated with a rate of $29 per square foot per month
- Energy cost calculated with a rate of $0.12 per Kilowatt

Prices are in USD. Prices may vary in other countries.
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.

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Why should you evaluate the Enterprise Linux Server

An Enterprise Linux Server provides

- **Single server simplicity**

- **Efficiency at scale - high flexibility, scalability and resource utilization**

- **High server capacity with up to 13 cores running at 4.2 GHz**

- **Non-disruptive growth within one physical server**

- **Ultimate security**

- **Economics**

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What is Different about an Enterprise Linux Server (ELS)

- **Economics: Maximizing Resource Utilization**

- **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**

## Extreme Virtualization and Consolidation!

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IBM Virtualization on System z, with Linux on System z -Scalable to thousands of Linux guests

41,400
separate instances of Linux

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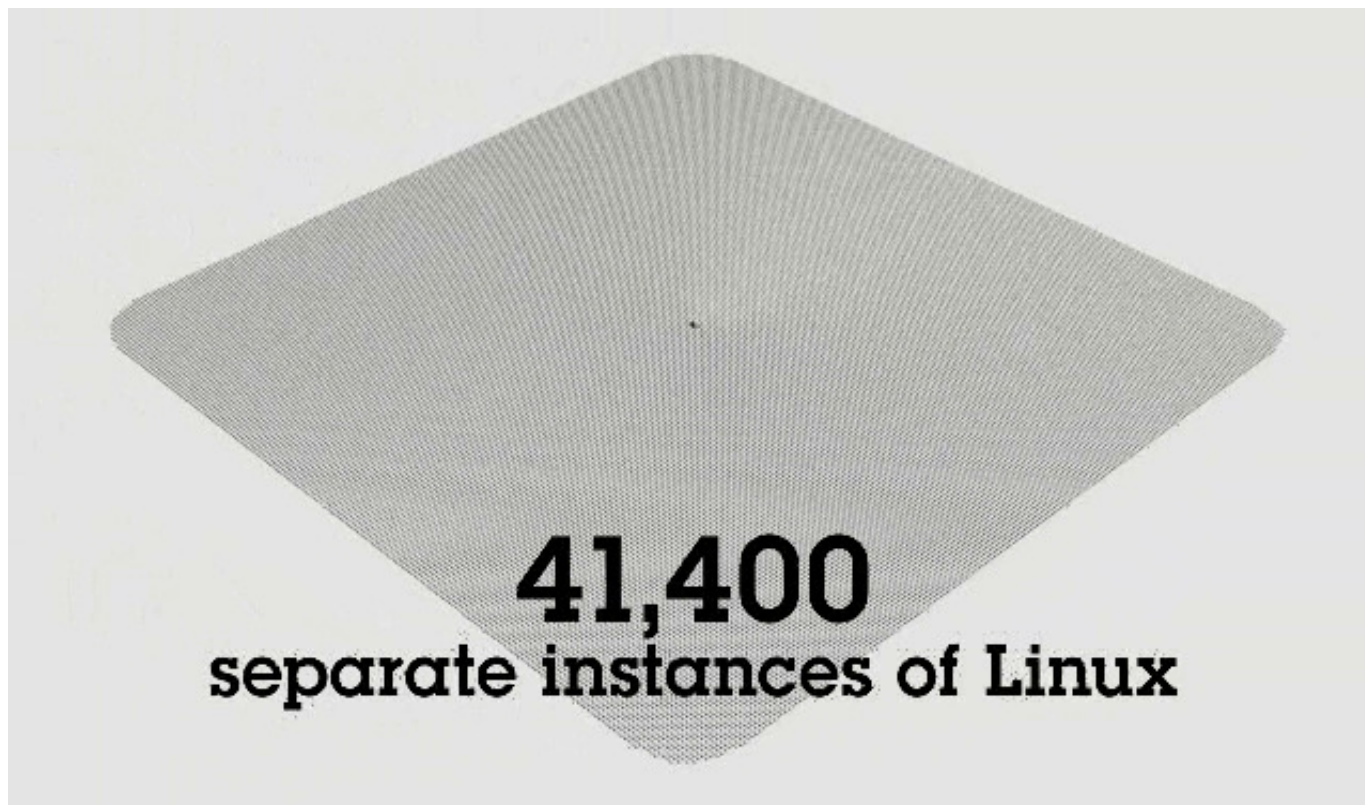
Consolidation allows for enomous saving in Software Costs

44% expect software budgets to increase over the next 18 to 24 months.[1]

Pay less,
use a few very good utilized software licenses instead.
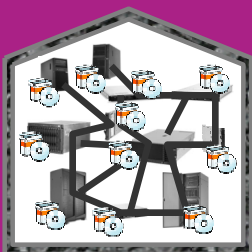
Nationwide Insurance

*"By moving workload from thousands of distributed processors to a very small number of powerful mainframe processors, we have made **enormous savings in software licensing costs**."*

Brian Callaghan,
Associate Vice President of middleware and emerging technologies at Nationwide

[1] according to IDC survey, http://www.zdnet.com/youre-wasting-up-to-half-of-your-software-budget-but-which-half-700...

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When is an Oracle Consolidation paying out

- starting with 2 Server (RAC) installation

- Real customer situation
- For an Installation of Oracle (RAC) starting with 2 servers
  - Severs with 6 Cores - 2 X 6 = 12 Cores
  - Oracle Enterprise Licenses
  - RAC Feature
- Replacement with z114 - much cheaper and effective
  - workload could be handled with 2 IFLs

- General Price reduction over 3 years:
  - almost one million Euro savings

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Confronto spesa triennale
Oracle Enterprise Edition

ORACLE

Su x86:
1°   Anno: € 814.656,65
2°   Anno: € 146.904,60
3°   Anno: € 146.904,60

Totale Triennale
€ 1.108.465,85

ORACLE

Su System Z114 IFL:
1°   Anno: € 135.776,10
2°   Anno: €   24.484,10
3°   Anno: €   24.484,10

Totale Triennale
€ 184.744,3

Risparmio **ORACLE** su System Z114
- € 923.721,55

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IT Optimization with IBM Enterprise Linux Server
Infrastructure consolidation and virtualization

- ✓ **Operational and management reduction**

- ✓ **Software acquisition and licensing cost reduction**

- ✓ **Maximizing utilization**

- ✓ **Network reduction**

- ✓ **Collocation of data and applications**

- ✓ **Floor-space and energy reduction**

- ✓ **Disaster recovery cost reduction**

- ✓ **Improving security**
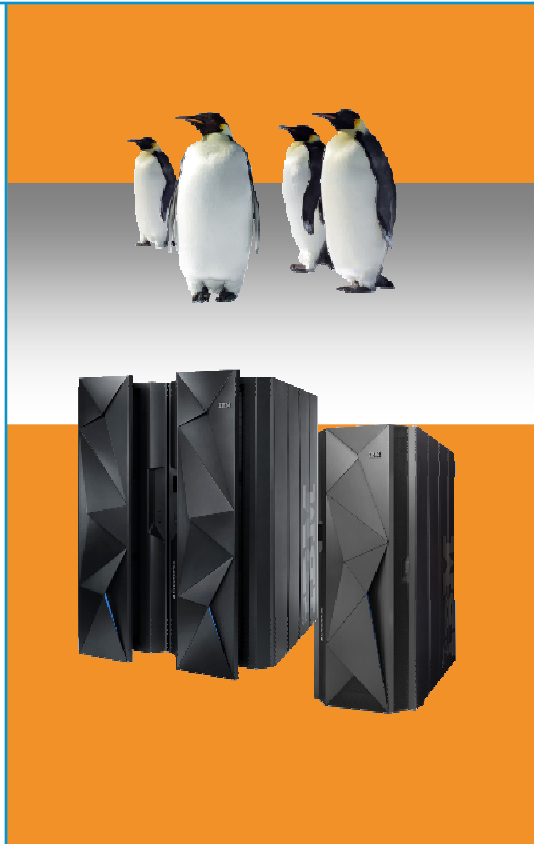
Baldor Electric

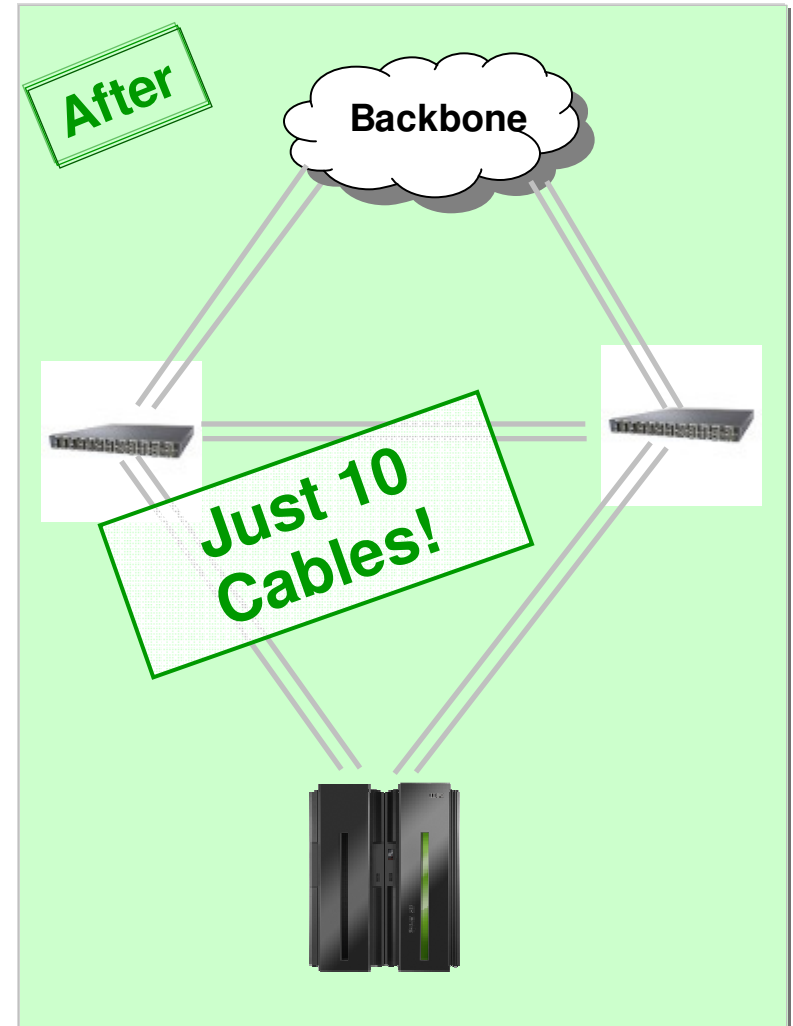*"One of the great things about System z is its ability to reduce costs.*

All of our Linux environments run on IFLs, which again deliver a very considerable cost saving."

Mark Shackelford,
Vice President of Information
Services, Baldor Electric

Run a really large number of workloads in parallel in an highly efficient and economical way.

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Insurance Company Consolidated 292 Servers to an ELS

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

Before

Over 600 Cables

Backbone

Network

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

After

Backbone

Just 10 Cables!
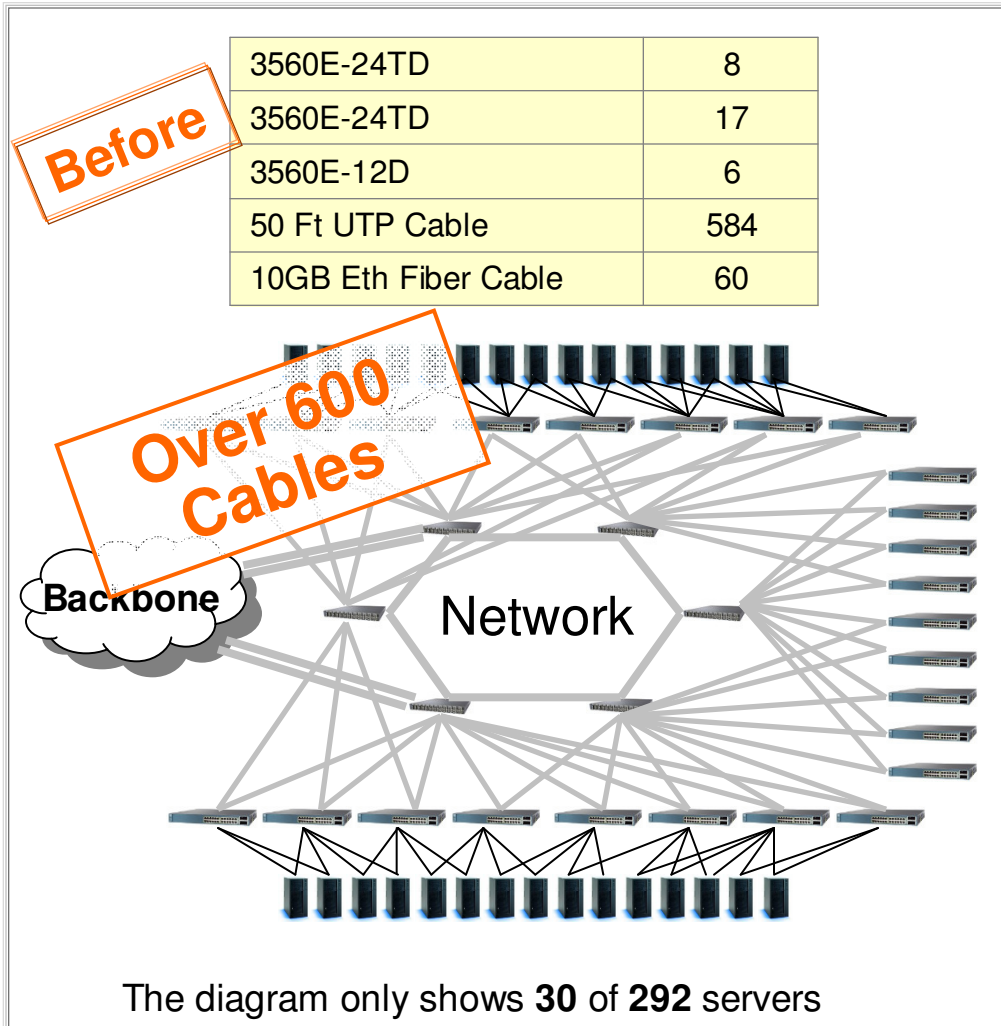
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New accounts to IBM Enterprise Linux Server to benefit from Operational Efficiency

90% of virtual machines are only running at **25%** utilization.[1]

66% of federal managers see achieving operational efficiency as the most pressing … issue …in 2013.[2]

Virtualization – **from simple multitasking to logical partitions to complete simulation of virtual hardware and operating environments.**

Algar Telecom

"We have completely transformed our infrastructure …

We estimate that our **operational efficiency** *has* **increased** *by at least* **30%** *as a result."*

Rogério Okada,
IT Manager,
Algar Telecom

[1] according to Gartner survey, http://www.computerworld.com.au/article/417420/gartner_shares_nine_it_infrastructure_cost_saving_tips
[2] according to survey conducted by Excellence in Government

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Solving environmental—energy and space—problems

Energy consumption per server is growing by 9% per year globally.[1]

Reduce the equipment footprint and maximize its efficiency.

Sicoob

"… we are spending 400% less on power than if we had a distributed environment instead, avoiding around R$ 3 million [USD 1.5 million] of electricity costs each year."
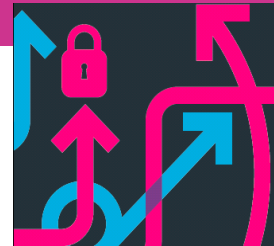
Ricardo Antonio,
CIO at Sicoob

[1] according to IDC, http://www.datacenterknowledge.com/archives/2013/06/06/the-importance-of-energy-optimization-within-the-modern-data-center, Jun 2013

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Enforce security and reduce security administration

Malicious or criminal attacks are the most costly, at an average of $157 per compromised record.[1]

87% of research participants recognized the IBM Systems z as their most available, scalable, and secure platform.[2]

EFiS EDI Finance Service AG

Running the Linux operating system on IBM Enterprise Linux Server has provided **a highly secure environment, greatly improving business resiliency**.

This is a key selling point, as the finance industry has very high demands for data security and integrity.

[1] 2013 Cost of a Data Breach: Global Analysis, Ponemon Institute and Symantec, June 2013
[2] Forrester: Secure The Enterprise With Confidence Using A Mainframe Infrastructure, March 2013

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What is Different about an Enterprise Linux Server (ELS)
Examples: Software Costs and Disaster Recovery
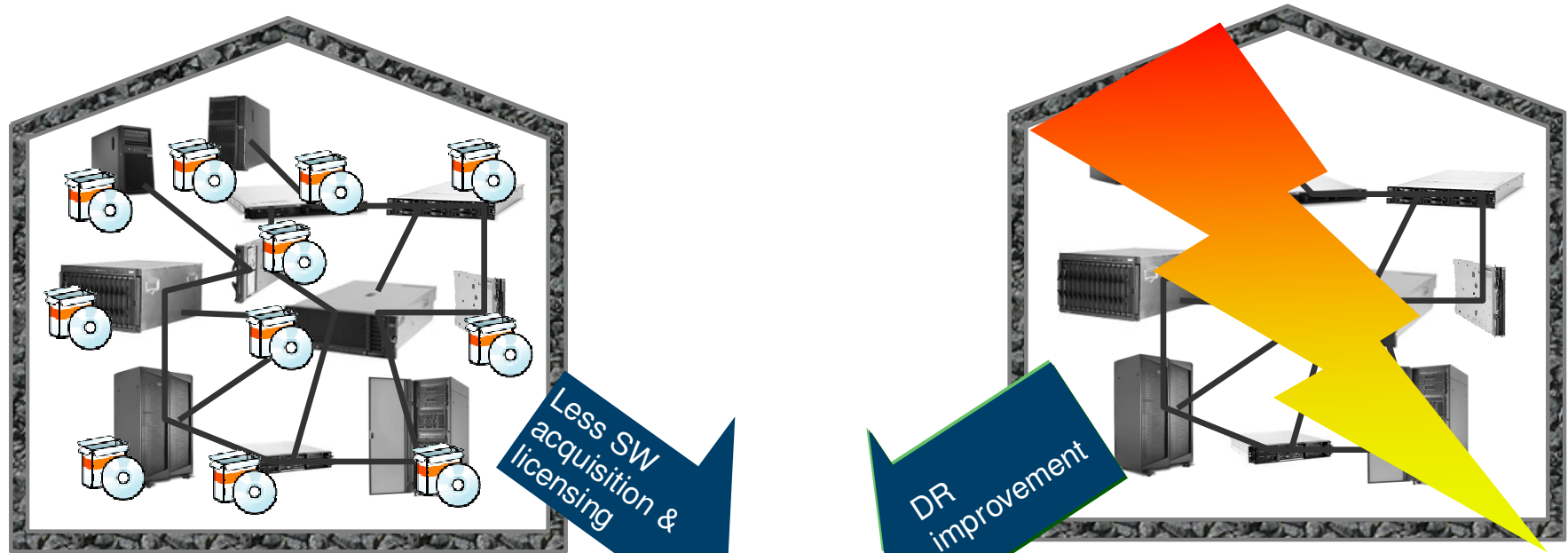
Less SW acquisition & licensing

DR improvement

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

On ELS, one processor is equivalent to one core!

Coordinated near-continuous availability and DR solution for Linux workloads

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Meet stringent IT service delivery requirements

53% **of clients never recoup the losses incurred by a disaster.**[1]

Use automated failover and rapid recovery of business-critical applications and data – *including Linux® environment.*

ZIVIT **(Zentrum für Informationsverarbeitung und Informationstechnik**)

„IBM provided a superior business continuity solution [with System z] that helps us efficiently protect and manage our infrastructure to meet customer availability demands."

Manager system management IBM System z server, ZIVIT
(Center for Information Processing and Information Technology of the German Government)

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[1] according to Forrester Research 2012, http://www.tulsaworld.com/site/printerfriendlystory.aspx?articleid=20111006_49_0_Sinreg660

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High Availability scenario as Active/Passive with System z
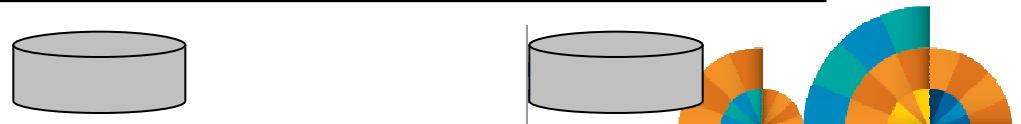
- **Active / Passive Deployment**.
  - Workload normally contained at Site 1, standby server capability at Site 2
  - Primary and secondary disk configurations active at both sites.
  - During fail over, Capacity Upgrade on Demand (CUoD) adds resources to operational site, and standby servers are started. Helps save hardware and software costs, but requires higher recovery time.

- **Hot / Cold scenario**
  - Workload is not split.
  - Each site is configured to handle all operations
  - Cold environment needs longer to get active – often used in DR

- **Hot / Warm scenario**
  - Workload is not split
  - Each site is configured to handle all operations
  - Warm environment is idling.

Network

LPAR 1

LPAR 2

z/VM (SSI)

IBM System z / zEnterprise
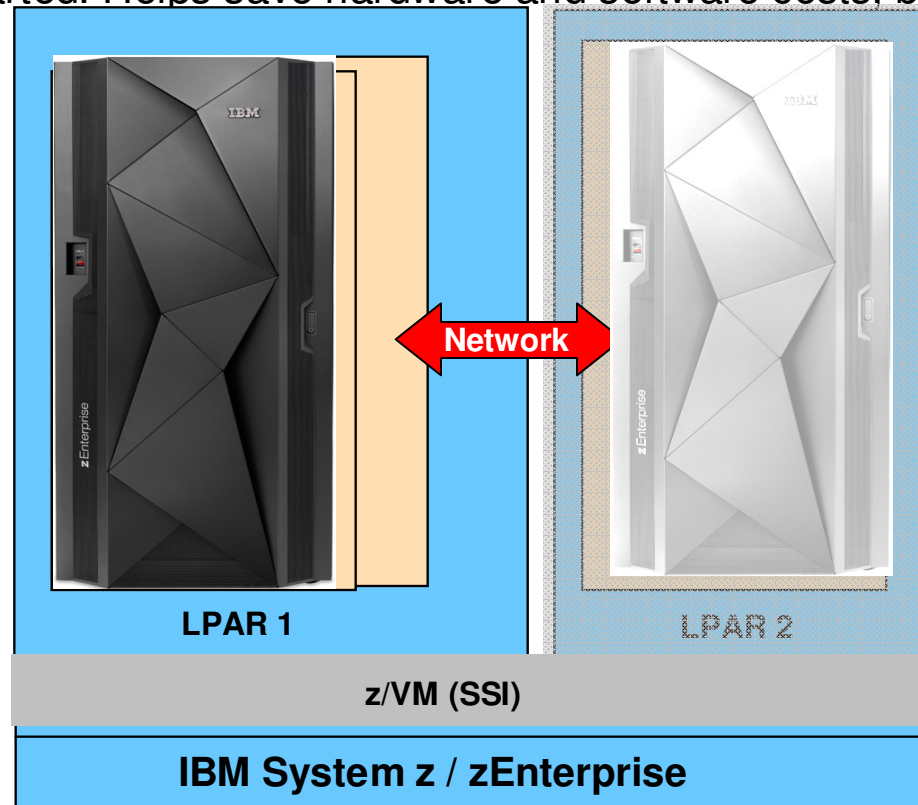
High Availability with an active/active environment on System z

- **Active / Active Deployment -Expendable work.**
  - Workload is normally split between 2 or more sites
  - Each site is (over) configured to be able to instantly cover the workload if needed.
  - During normal operation, excess capacity at each site is consumed by lower priority, work like development or test activities
  - In a failover situation, low priority work is stopped to free up resources for the production site's incoming work.

- **Capacity Upgrade on Demand (Active / Active)**
  - Workload is normally split between sites.
  - Each site is configured with capacity to handle normal operations
  - Special setup with Capacity Upgrade on Demand (CUoD).
  - In a failover situation, additional CPUs are enabled at the operational site.

Network

z/VM (SSI)

IBM System z / zEnterprise
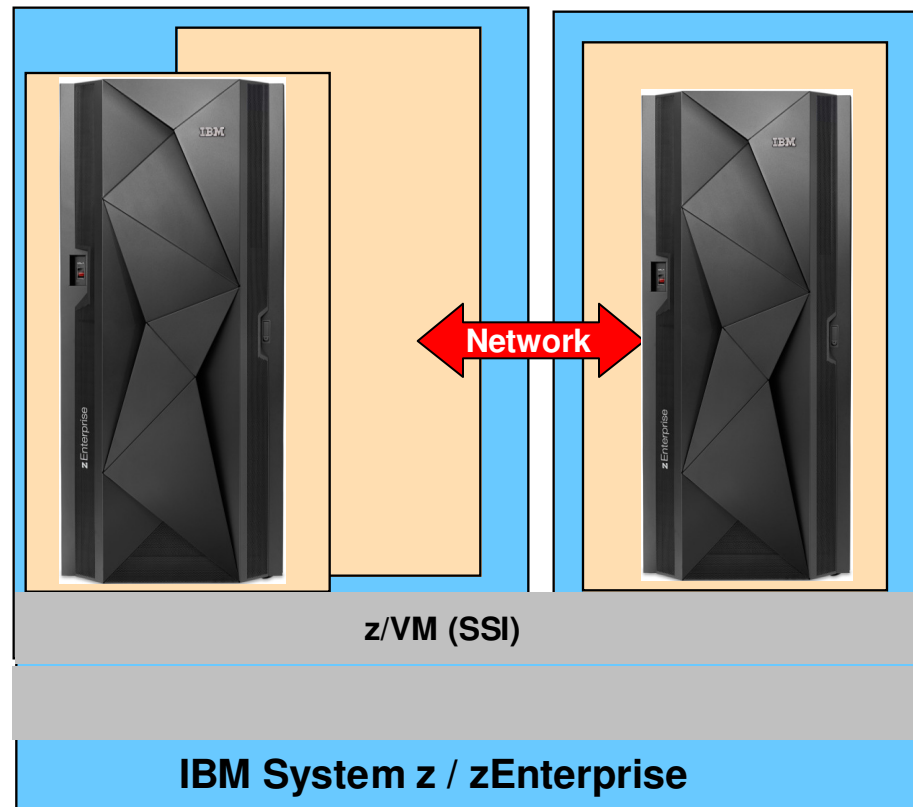
IBM Enterprise Linux Server is open for all solutions
Capitalize from transformative technologies

- Data services

- Business applications

- Mobile applications

- Security & Infrastructure services

- Email & collaboration services

- Business Process Management

- Enterprise Content Management

- Development & test

- Industry Solutions

- All managed in a Cloud

Cloud ready | Data ready | Mobile ready | Security ready

IBM Enterprise Linux Server

Enterprise Linux Server – the efficient and economic infrastruture for consolidation and new Linux workload deplyoments

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Enterprises are seeking to capitalize on transformative technologies to improve the customer experience

Cloud
Effective administration of services and rapid development of new offerings at lower costs.

Analytics
Turn information into actionable insights to personalize and expand customer offerings and services

Mobile
Provide real-time access to information with anytime, anywhere service delivery.

Security
Strengthen customer trust by ensuring protection and availability of client data

- **Build new services**
- **Reach new markets**
- **Drive new business opportunities**
- **Mitigate risks**
- **Distinguish yourself from the competition**

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Recommended workloads for an Enterprise Linux Server

- **Business applications**: WebSphere Application Server, WebSphere Process Server, WebSphere Commerce, …

- **Data services**: Cognos®, SPSS®, DB2®, InfoSphere™, Informix®, Oracle Database, Builders WebFOCUS, …

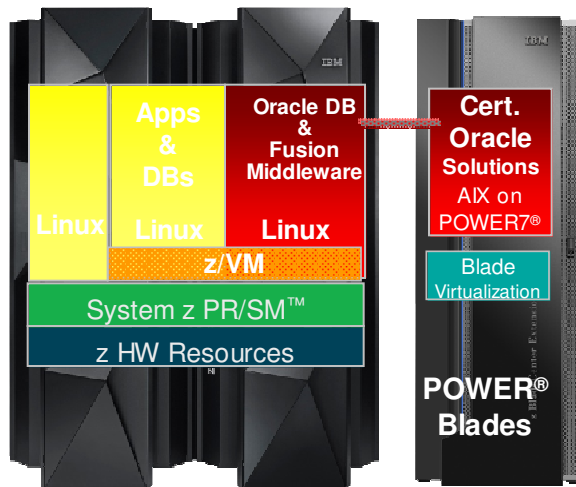- **Development & test**: e.g. of WebSphere®/Java applications – Rational® Asset Manager, Build Forge®, ClearCase®, Quality Manager

- **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 – Integrated Service Management for System z, Maximo® Asset Management, …

Category	Percentage
Business Apps.	61%
Transaction Proc.	52%
Application Development	48%
Infrastructure	42%
Systems Management	39%
Data Warehousing	24%
Data Analytics	24%
Email & Collaboration	21%
Service Mgmt	21%
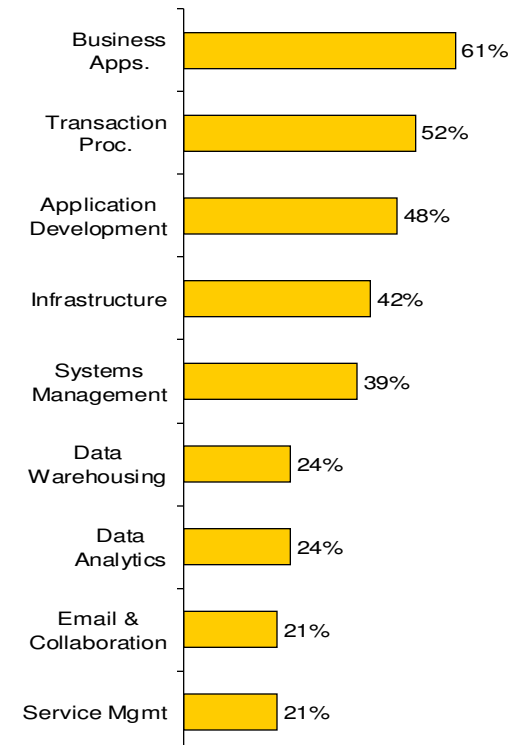
Source: IBM Market Intelligence Mar2012
Percentage of survey respondents

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Deploy Oracle Software to the "Best Fit" Technology

Apps & DBs	Oracle DB & Fusion Middleware	Cert. Oracle Solutions AIX on POWER7®
Linux	Linux	Linux	Blade Virtualization

z/VM

System z PR/SM™

z HW Resources

POWER® Blades

Oracle software deployments (incl. consolidations) **with an Enterprise Linux Server (ELS) provides an excellent price performance.**

- From an Oracle licensing perspective 1 ELS core = 1 core from 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

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Business Intelligence and Predictive Analytics
IBM Cognos BI and SPSS

InfoSphere Warehouse

Cognos, SPSS

Linux

DB2

Oracle

Linux
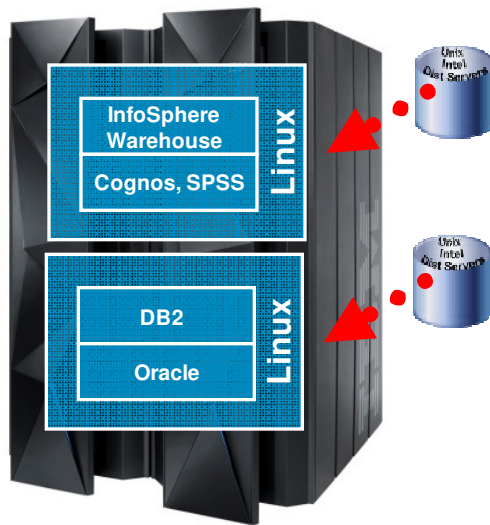
Integrated Stack creates compelling value for the Business Users

- Makes Predictive Analytics accessible to the Business User
- Cognos node: Outcome of Predictive Analytics accessed through Cognos reports, KPI, Dashboards

Integrated stack creates compelling value for IT

- Predictive Analytics, BI, DW on highly scalable, secure and available IBM Enterprise Linux Server
- Low cost, easy to manage

Integrated technology stack maximizes performance, regulatory compliance and lowers costs

- No need to move data to a different platform
- No need to manage a different platform

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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.

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New Solutions available for the Enterprise Linux Server

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.

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ISV Ecosystem

- **Over 240 new or upgraded Linux applications in 1H2012**

- **More than 3,000 total Linux applications**

Find ISV software available for the Enterprise Linux Server:
http://www.ibm.com/partnerworld/gsd/homepage.do
http://www.ibm.com/systems/z/solutions/isv/linuxproduct.html

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ZSP03248-USEN-08

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Summary: Why an Enterprise Linux Server (ELS)?

Why ELS hardware?	**Why ELS virtualization?**	**Why run virtual Linux servers on an ELS?**
▪ Designed to run mixed workloads at very high utilization	▪ IBM's most mature and robust hypervisor	▪ Share CPU, memory, network and security hardware resources
▪ Highest degrees of efficiency, availability, workload management and security	▪ Tightly integrated with ELS hardware support	▪ Server deployment / consolidation saves power, space and management costs
▪ Cost efficient use of floor space, power, cooling	▪ Provides deployment / consolidation of many virtual Linux instances in a single hardware logical partition Enhanced management functions for virtual images	▪ Rapid and agile provisioning and de-provisioning of Linux servers
▪ Designed and implemented for zero downtime	▪ Larger workloads with more scalability	▪ Linux can transparently take advantage of ELS hardware
▪ Mature and tested operational procedures to cope with exceptions	▪ Grow virtual server workloads without linearly growing energy costs	▪ Virtualization provides high performance communication between guest virtual machines and across LPARs
▪ Skilled and experienced staffs		▪ Linux instances can automatically benefit from the disaster recovery solutions that are in place
▪ Comprehensive automation		▪ Potential for dramatic software cost savings - software is licensed at distributed rates
▪ No single points of failure		

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Questions?

Wilhelm Mild

IBM IT Architect

THE *Open* GROUP
**Master
Certified IT Architect** TM

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