

# Linux without limits: IT without compromise



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## Smart

Freedom through design.  
Consolidation for a smarter  
more flexible, IT infrastructure

2

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## Flexible

Meet today's business  
needs and prepare for  
the unpredictable future

3

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## Simple

Reduce the number of servers  
to make management easier  
and reduce costs

4

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## Efficient

Get the most out of your IT  
investment with the possibility  
of near 100 percent utilization

## Consolidate for a more flexible, smarter IT infrastructure

Is your IT infrastructure holding you back?  
Are you:

- Spending more and more on operations, process and people costs to manage your IT environment?
- Battling complexity, inefficiency and security vulnerabilities associated with x86 systems?
- Facing high energy consumption and lack of available floor space, but still need to achieve the same or higher output?
- Spending too much time on the physical management of network, storage and server resources, rather than focusing on strategic projects?
- Unable to respond to stakeholder needs at the speed they expect?

In today's business environment, you need to **manage for value, position for the future** and **effect change**. The challenge for IT is clear: improve responsiveness, reduce costs and boost productivity. To meet these challenges, you need to be prepared to respond to the emerging trends that are placing tremendous pressure on IT shops.

**Less sprawl, more speed.** Many IT managers are investigating consolidation and virtualization as a way to reduce costs, increase server utilization, simplify infrastructure and increase organizational agility. Consolidating a sprawling network of distributed infrastructures into a single platform reduces complexity, improves performance and lowers costs.

**Consolidation** is much more than just a way to save on resources or maximize the use of underutilized systems. Consolidation is a way today's data centers can shift from siloed, proprietary environments to a simplified infrastructure, using whatever applications are required, whether customized or off-the-shelf. Consolidating a sprawling network of distributed infrastructures into a single platform reduces complexity, lowers costs and improves performance.

**Linux** workloads are prime candidates for consolidation because they can be deployed on a diverse range of systems and are open to multivendor hardware solutions. In addition, Linux is supported on almost every virtualization technology, which allows for consolidating Linux workloads to the best fit-for-purpose platform environment.



## Why are consolidation and virtualization hot topics today?

Organizations are facing enormous challenges in the data center environment today, particularly around the ability to keep up with exploding IT growth. In the last ten years the average IBM customer has added six times their server capacity, 69 times their storage capacity and they're finding it challenging to keep up. New ways of acquiring and accessing data are adding to the challenge because data centers are not designed to handle the data explosion and new demands placed on them everyday.

Years of incremental technology deployments—often department-by-department or project-by-project—have turned data centers into massive environments with hundreds of dedicated servers running at very low utilization rates. These servers consume ever increasing amounts of power and floor space, and create management complexity. This past approach to IT is not sustainable and current budgets do not support it.

Consolidation and virtualization of distributed applications to a centralized server causes the distribution of IT costs and resources to change. Fewer servers, fewer networks, fewer connections and fewer software licenses can mean big cost savings in terms of software licenses, administration, maintenance and power. At the same time centralization can offer better availability, greater reliability and increased security.

Consolidation and virtualization of the data center is also the foundation step on the journey to implementing an enterprise cloud.

Read how [Dundee City Council](#) improved performance and capacity without increasing its data center footprint.

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*“Running Linux on the System z platform is a cost-efficient approach .....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 taxpayers’ money, without increasing the IT budget.”*

—Tim Simpson, IT Support Manager,  
Dundee City Council

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## Smarter computing

To realize the promise of a Smarter Planet, enterprises must transform their IT Infrastructures to:

- Deploy breakthrough new services like real-time analytics.
- Address challenges related to the explosion of data, flexible IT silos and sprawling server and storage footprints.
- Overcome constraints like a flat budget.

Smarter computing can help organizations transform IT economics and create an infrastructure that exhibits three fundamental characteristics:

- Designed for data: delivers insights in seconds through systems built to process a variety of data at scale.
- Tuned to the task: optimizes performance and economics by matching workloads to the best platform to meet specific workload requirements.

- Managed with cloud technologies: incorporates cloud technologies to improve service quality, speed of delivery and efficiency.

### Benefits:

- Double the capacity of your existing datacenter.
- Lower total cost of ownership through a standardized environment.
- Meet today's capacity needs, scale to meet tomorrows.
- Drive innovation through an agile, flexible, streamlined infrastructure that enables rapid implementation of new business services.

### Enterprise Linux Server as a smarter Linux consolidation platform

Consolidation of Linux workloads onto IBM zEnterprise™ servers and software is an excellent foundation for smarter computing solutions because they are capable of precisely meeting today's demanding business requirements. The IBM zEnterprise platform—and in particular, the Enterprise Linux Server (ELS)—offers a compelling option that offers both the highest levels of availability and extraordinary cost-efficiency.

# Nationwide saves millions through a strategic consolidation decision

## Overview

Nationwide Insurance, has a mixed IT environment that includes both traditional, mission-critical mainframe-based applications and enterprise applications running on distributed servers.

## Business need:

Faced with the need to build a new, multimillion-dollar data center to cope with server proliferation and seeking to streamline application development and daily operations overall, Nationwide Insurance made a strategic decision to move to a flexible, virtualized IT environment.

## Solution:

Nationwide deployed two IBM System z® mainframes running Linux. The solution is a cornerstone of Nationwide’s strategy of moving all new development to virtualization and Java 2 Platform, Enterprise Edition (J2EE) as a means of "future-proofing" its IT environment.

## Benefits:

US\$15 million cost savings anticipated over three years, including 85 to 90 percent server utilization; 80 percent reduction in environmental costs; and web hosting costs lowered by 50 percent.

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*“The ability to flexibly add capacity wherever we need it changes the whole mindset of the developers. It promotes out-of-the-box thinking, because the risk cost is so low. What virtualization really gives us is a strong foundation for innovation.”*

—Buzz Woeckener, manager of Linux, Nationwide

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[Link to case study](#)

# Optimization is in the DNA

zEnterprise is designed at all levels to drive performance, from the semi-conductor level up through the operating systems, then again up through to optimized middleware. The relationship between the components is not unidirectional. Deep collaboration happens across the stack to provide insight into optimization opportunities and to drive design from workload characteristics.

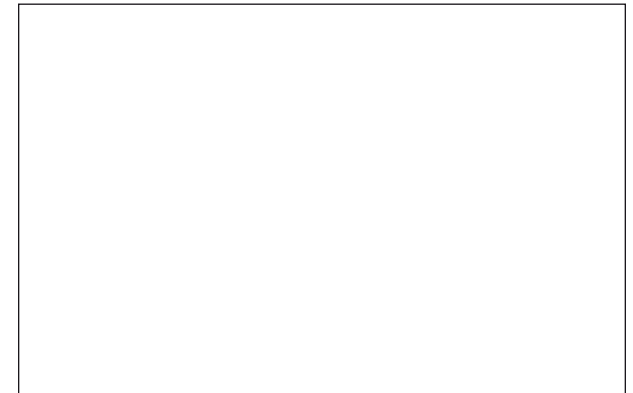
- A shared-everything architecture results in the highest utilization, especially with heterogeneous workloads, and allows for extreme virtualization.
- A two-tier approach for superior virtualization supports native Linux.
- Optimized I/O pathways and subsystems with massive scale for industry-best virtual I/O bandwidth and reliability.

- Security is built in at every level— cryptographic coprocessors and accelerators are individually specialized to address various encryption needs.
- Some of the highest security rankings in the industry for a commercially available server— Evaluation Assurance Level 5 (EAL5) and Federal Information Processing Standards (FIPS).

### What does this mean for business?

- Supports hundreds of thousands of concurrent users on a single trusted and robust source of data.
- Dynamic workload balancing so compute power goes where it is needed.
- Broad based support for modern workloads on industry standard Linux distributions, Red Hat and SUSE, including Java, XML, LAMP Stack, SAP, Oracle, and many others.

- Extreme virtualization without sacrificing database performance.
- Industry-best virtual I/O bandwidth and reliability.
- Data and system security.



[Hear users talk about the benefits System z design and Linux](#)

## Reduce the cost of doing business

The Enterprise Linux Server (ELS) is a standalone System z computer that includes all of the required components to create a centralized and virtualized foundation for consolidating today's enterprise workloads. The Enterprise Linux Server offers the core foundation for businesses that are beginning the transformation to cloud computing, while providing the extensibility into cross enterprise cloud services.

The foundation for cloud computing begins with a highly virtualized and efficient platform. By using the Enterprise Linux Server, you can deploy System z server technology to add existing capacity to the mainframe or purchase a complete hardware and software solution package. With this solution offering, IBM provides a highly virtualized

Linux foundation to support data center consolidations onto efficient, centralized platforms. The System z platform is built on a shared platform with security as a central design point.

### Significant savings instantly

Linux can help reduce energy consumption through server consolidation, virtualization, IT optimization, load balancing, cloud computing and more efficient resources management.

- Reduce licensing costs up to 97 percent by switching to Linux.<sup>1</sup>
- Reduce power and cooling costs up to 90 percent by reducing your hardware footprint.<sup>1</sup>

### Understand the potential and how to achieve the savings

- An integrated system of multiple technologies for optimizing the deployment of multitier workloads.
- A single point of control for management and administration.
- Reduced operational overheads—power and facilities, labor and software licenses—by up to 80 percent<sup>1</sup>.
- Reduce total cost of ownership up to 44 percent over five years even if already virtualized on x86<sup>2</sup>.



## A centralized approach for modern workloads

Suitable workloads can run in a modern environment but with the traditional benefits expected from a mainframe—unmatched reliability, scalability and security. Centralized resource management is also inherent in the platform. Many x86 workloads are excellent candidates for consolidation into a centralized virtual environment.

### Recommended “best fit” workloads

- Business critical applications: IBM WebSphere®, SAP, Oracle E-Business Suite
- Development and test of WebSphere and Java applications

- Data services: IBM Cognos®, IBM DB2®, IBM InfoSphere®, Oracle, Informix®, Builders WebFOCUS
- Email and collaboration: IBM Lotus®, Domino®, Lotus Collaboration products, Web 2.0
- Network Infrastructure: FTP, NFS and DNS; Business connectors: WebSphere MQSeries®, DB2 Connect™, CICS® Transaction Gateway
- Security Services: Firewall, proxy and more.

Watch and listen to [Sparda Bank](#)



“Over the years the mainframe has transformed from traditional workloads to, quite simply, a universal platform for new workloads as well.

*The zEnterprise platform is perfect for consolidation Linux workloads”*

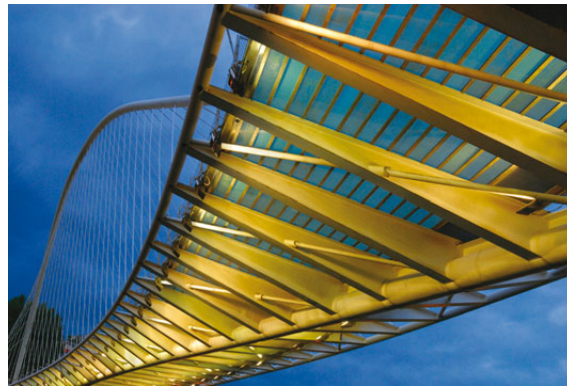
—Bernd Bohne, Sparda-Datenverarbeitung e.G.,  
Manager, Central Systems

## Flexible

Naturally, your system is configured to suit today's business priorities. But what about tomorrow? Enterprise Linux Server (ELS) responds and adapts instantly to constantly changing demands. With ELS you can reconfigure in minutes. There's no physical disassembly or unplugging of machines. It's all done virtually through software.

You're not limited by the physical infrastructure. So there's no need for extra wiring, new routers or additional disk subsystems. And if it's a short term configuration, you can quickly and easily revert back to your original settings for business as usual.

Because ELS responds to changing demands fast, downtime is dramatically reduced while availability increases.



The faster you can reconfigure, the less time you spend managing your IT systems, leaving you free to focus on other important aspects of your business.

ELS is equipped with Linux, supporting open source solutions for a broad range of applications and workloads such as Web 2.0 development. With this industry recognized operating system installed as standard, there's no need for any additional staff training.

*“ The IBM ELS has the potential to provide the best of both worlds for our clients – combining the traditional reliability, availability and serviceability of System z with the openness and flexibility of Linux. Consolidating on the ELS platform gives us and our clients a way to cut costs while increasing agility and contributing significantly to Green IT objectives”*

—Paul Casey, Datacentre Platforms Practice Leader, Computacenter



# Flexible

## Consolidation of IT environment into virtual hybrid datacenter

Eurocontrol is an intergovernmental organization established in 1960 to ensure safe, efficient and environmentally-friendly European air traffic operations.

The Maastricht Upper Area Control Centre (MUAC) unit has many different platforms for its applications. Due to the growing number and diversity of required applications there is a regular need for more server capacity resulting in a rapidly growing data-center, at the expense of the manageability and efficiency of IT systems.

Because of its responsibility, reliability is of paramount importance including protection from unplanned outages

and the ability to execute preventive maintenance tasks without downtime.

An in-depth study determined that a heterogeneous and fully virtual environment would best fit MUAC’s needs and meet its requirements for reliability, flexibility, management and total cost of ownership.

The new smart datacenter has IBM zEnsemble (IBM zEnterprise with zBX) as its core component, with a separate set up of servers for specific, tailor-made applications. Eurocontrol MUAC now has a much better view on operations, more flexibility, faster response times, greater capacity, higher availability of the infrastructure and considerable cost savings on maintenance support, LAN and WAN connectivity, supervision, licenses, floor space and energy. It also matches Eurocontrol MUAC’s ultimate goal of establishing a private cloud in which to run all applications.

The success of this project has been the trigger for a new IT strategy for the complete data centre of consolidating applications onto a minimum number of servers and to make Linux the standard operating system,

“ *IBM’s virtualization technology in zEnsemble completely meets our expectations for a heterogeneous virtual environment that demands a high level of availability, flexibility, scalability and sustainable performance, as well as environmental friendliness and manageable, low costs*”

—Huub Meertens, Head of the SUP Engineering Section, Eurocontrol MUAC

[Link to case study](#)



## Simple

### Fewer servers, simpler management, reduced costs

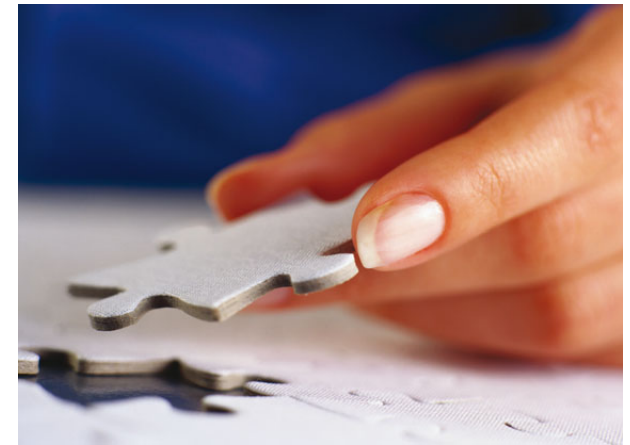
Consolidation of distributed physical servers with IBM ELS means fewer components, which can result in less complexity, less management time, less licensing requirements and less expenditure.

Because ELS provides a truly centralized environment, it's much more economical and resourceful compared with traditional server systems. And because it's an IBM mainframe it can handle the most challenging workloads.

Increasing capacity is almost effortless. Instead of buying additional disk storage you can simply add another IP address on the network.

The ELS offers huge capacity to enable large scale consolidation that can drive up to an 80 percent reduction in energy consumption and costs, floor space, management<sup>1</sup>, and up to a 44 percent reduction in TCO even if already virtualized on x86<sup>2</sup>.

ELS solutions are all about transforming data centers into more efficient places that are easier to manage—and supporting cost savings of up to 89 percent over five years<sup>1</sup>.



*“With a traditional distributed approach—even using the latest virtualization-enabled x86 processors—you end up with a lot of unreliable boxes to manage.”*

—Colin Clews, Technologies Manager, Atos Origin



# Simple

## **EFiS EDI Finance Service AG consolidates IT environment with ELS**

EFiS EDI Finance Service AG successfully consolidated its environment while deploying hundreds of Linux instances to support its performance requirements.

The consolidated IBM System z successfully streamlined the data center to optimize maintenance and management processes and effectively reduce costs. By retiring unnecessary and underperforming hardware, the company was able to double processing speeds and optimize its IT operations.

The virtualized IBM System z environment offers much higher than average processor utilization levels, so a single Integrated Facility for Linux (IFL) processor is able to handle workloads equivalent to a large number of x86 servers. This is particularly significant for software which is licensed on a per processor basis, as is the case for many of the company's business-critical applications. As a result, the company was able to enjoy instant savings by moving these applications to the SUSE Linux Enterprise Server solution.

In addition, the implementation enabled the company to optimize its fully realized disaster recovery plan.

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*“ We have decided to adopt System z because of its high scalability, guaranteed high security and that it ultimately will be cheaper to manage only one machine instead of many distributed servers.”*

—Armin Gerhardt, Chairman, EFiS Corporation

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[Link to case study](#)



## Efficient

### Unparalleled utilization

The IBM Enterprise Linux Server is highly efficient, especially compared with traditional distributed systems. The typical utilization rate for an Intel server is less than ten percent and even when virtualized utilization is less than forty percent. ELS is capable of supporting nearly 100 percent utilization. Built on proven zEnterprise technology ELS is built for maximum utilization, making it the perfect system for a shared cloud environment.

Virtualization is inherent in ELS design. Not just an added feature. It's in the machine's DNA. This powerful virtualization enables unparalleled consolidation on a massive scale. Imagine having the capacity to

consolidate hundreds of servers onto one. The reductions in space used, management complexity, and even the amount of copper cabling required are significant.

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*“ ELS runs Linux environments approximately twice as fast as the previous generation and offers around 40 percent more capacity, enabling us to expand our Linux footprint, without increasing costs.”*

*With the ELS, we can run hundreds of environments within a single physical footprint, and easily deliver the 24x7 availability our customers demand.”*

—Colin Clews, Technologies Manager, Atos Origin

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Increased efficiency, less waste. Eliminating unnecessary power and cooling requirements, and spend less time managing your IT systems. Dynamic load balancing help ensure resources are available at any time. In a virtualized environment, automation and provisioning are fast and easy. With ELS, you can increase efficiency and spend more time concentrating on your business.



## Efficient

### Facing business challenges in the software as a service segment

Founded in 1999, Transzap, Inc., offers its customers in the global oil and gas industry 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.

Transzap knew that they wanted to implement virtualization to improve their scalability and business flexibility, and started investigating IBM System z offerings. They were particularly excited to

discover the Linux on System z platform, as they had previous experience running their business applications on Linux operating systems.

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.

Even as a small business, Transzap reaps big benefits from IBM System z. The IBM System z solution helps Transzap to serve more than 69,000 users across 6,800 companies, providing higher levels of uptime for their customers, while offering peace of mind through 24x7 world-class hardware support.

*“ We were certainly aware of the reputation for the Fortune 500 traditional customer base for IBM mainframes. We were also highly doubtful that we could ever fit within the price portion. To Transzap’s surprise, after conducting a TCO study and reviewing the roadmap, they realized that System z would enable them to gain competitive advantage in terms of system availability, security and scalability, and enable long term cost savings through the virtualization of Oracle licenses.”*

—Peter Flanagan, CEO of Transzap, Inc.

[Link to case study](#)



## For more information

To learn more about the Enterprise Linux Server, please contact your IBM representative or IBM Business Partner, or visit the following website:

[ibm.com/systems/z/os/linux/els.html](http://ibm.com/systems/z/os/linux/els.html)

Additionally, IBM Global Financing can help you acquire the IT solutions that your business needs in the most cost-effective and strategic way possible. We'll partner with credit-qualified clients to customize an IT financing solution to suit your business goals, enable effective cash management, and improve your total cost of ownership. IBM Global Financing is your smartest choice to fund critical IT investments and propel your business forward. For more information, visit: [ibm.com/financing](http://ibm.com/financing)



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<sup>1</sup> Distributed server comparison is based on IBM cost modeling of Linux on zEnterprise versus alternative distributed servers. Given there are multiple factors in this analysis such as utilization rates, application type and local pricing, savings may vary by user.

<sup>2</sup> Distributed server comparison is based IBM Eagle Team analysis and real customer data of Linux on zEnterprise vs. alternative distributed servers over five years. Given there are multiple factors in this analysis such as utilization rates, application type, local pricing, etc., savings may vary by user



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