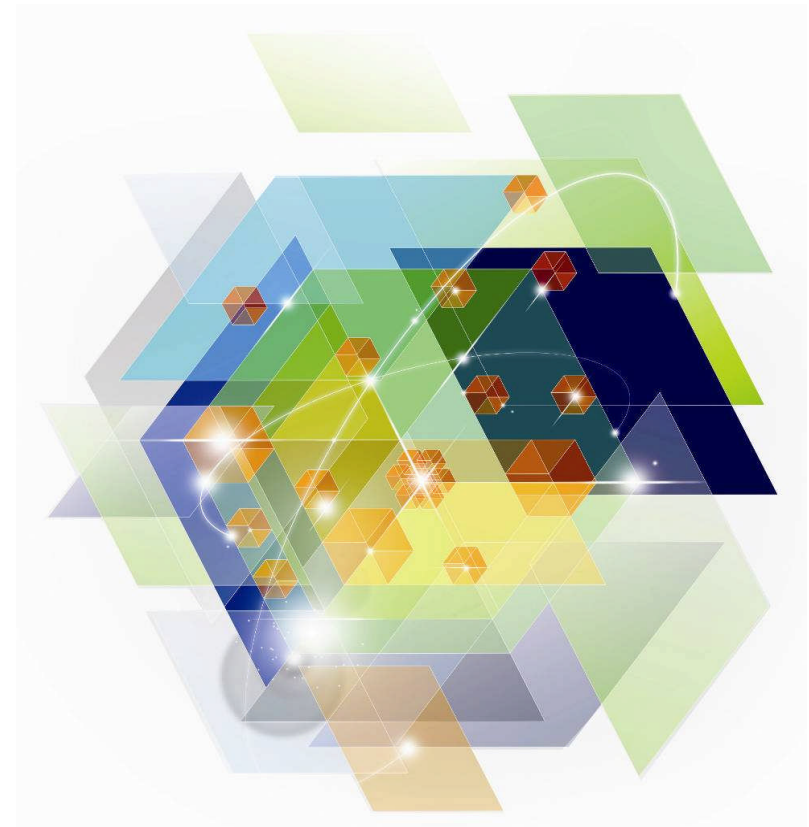




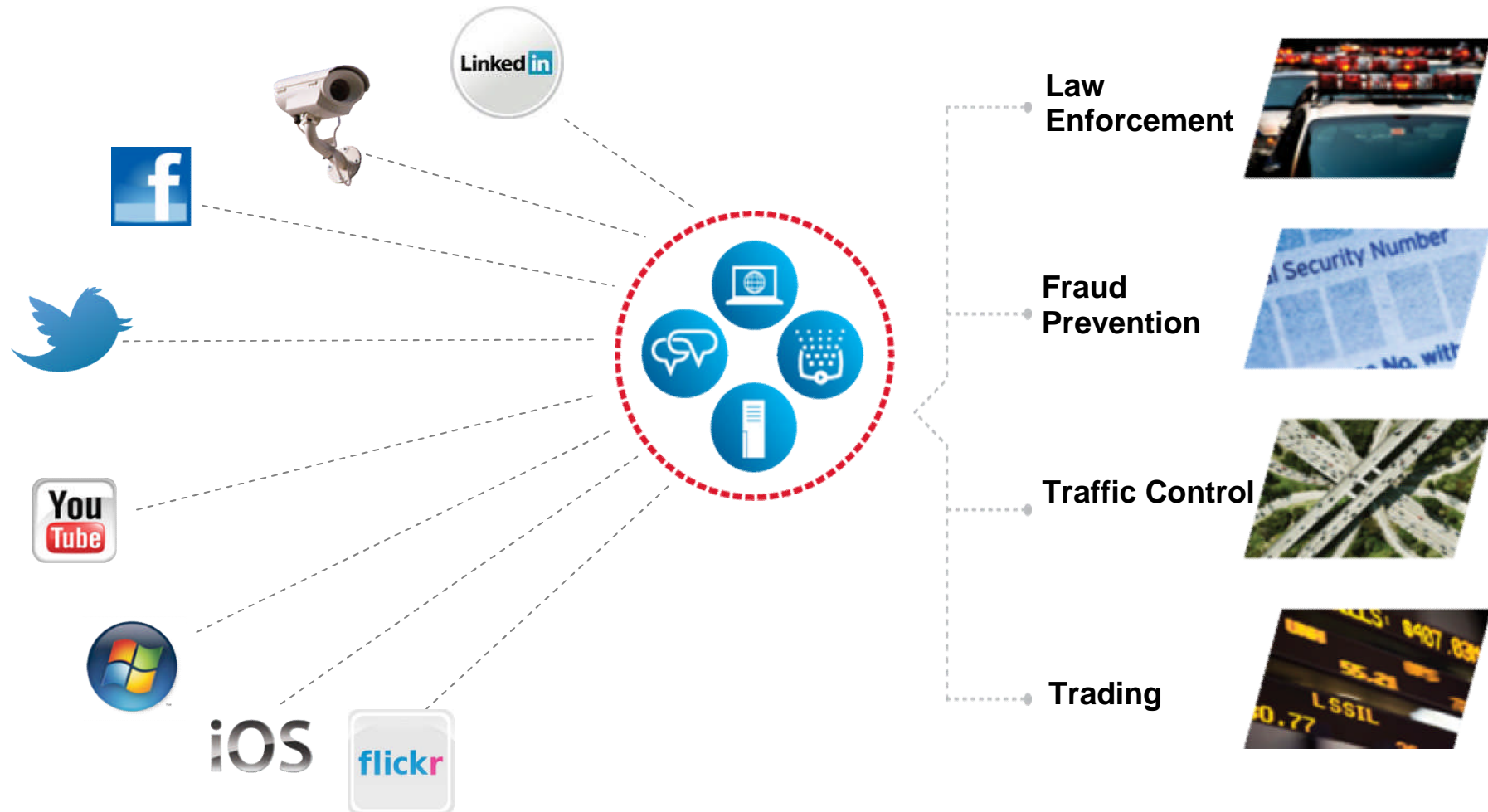
Leveraging zEnterprise for new workloads

Greg Lotko, VP & Business Line Executive,
IBM System z

June 5, 2012



On a smarter planet, the ability to process unlimited volumes and types of data redefines entire industries...



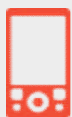
Clients must address unprecedented IT challenges



31.9 million servers worldwide



Digital content volume up 48% in 2011; expected to reach 2.7 ZB (1ZB = 1B TB) in 2012 and 8ZB by 2015



Internet connected devices: 22B in 2020 (24.0% CAGR)



Collaborative software workloads growing 10% CAGR

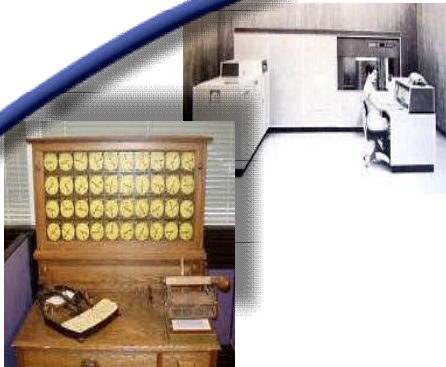


Security vulnerabilities grew eightfold since 2000

We are entering a new era of Information Technology

Computer Intelligence

Tabulating Systems Era



Programmable Systems Era

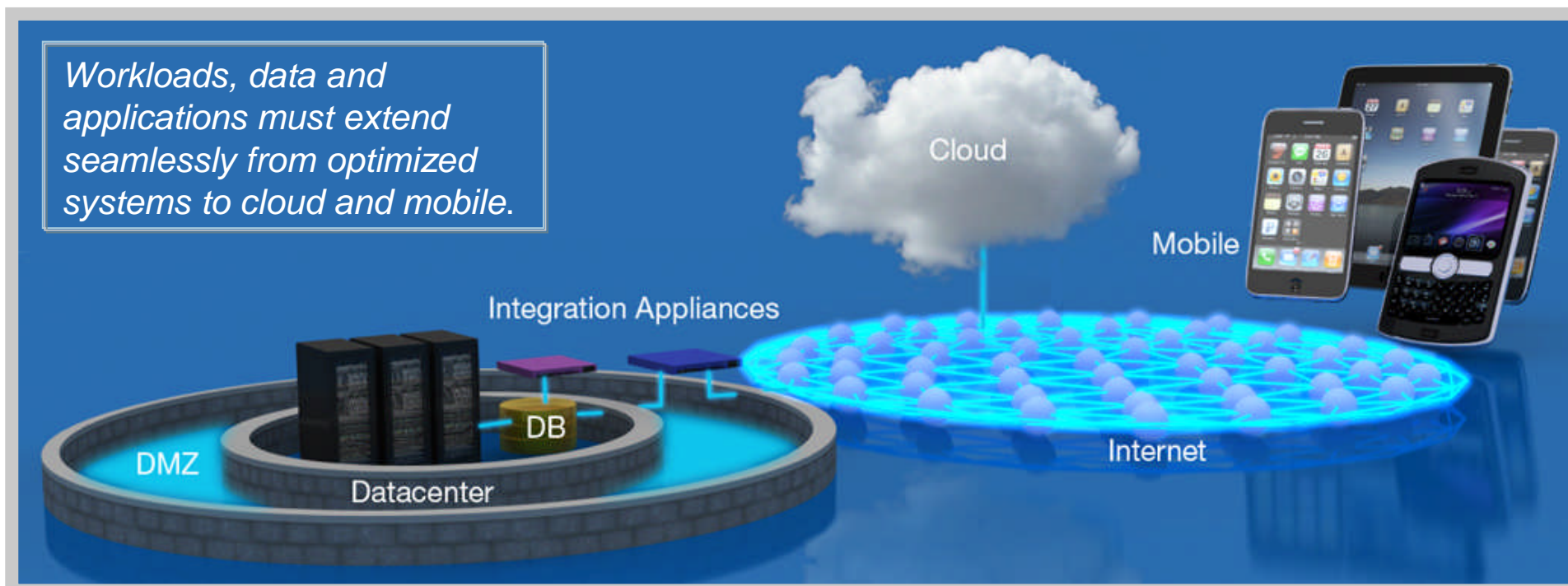


Cognitive Systems Era



Time

New workloads must be designed for data, tuned to the task and managed with cloud technologies



Designed for data
89% of CEOs want better insight via BI and analytics

Tuned to the task
Optimized systems can reduce total cost per workload up to 55%

Managed with cloud technologies
55% of business execs believe cloud enables transformation

Matching workloads to the right system can deliver superior performance and economics



System z

Superior system management & lifecycle cost



Power Systems

Unmatched performance & optimization



System x

Industry standard extended through innovation



Systems Storage

Leading data efficiency & protection



PureSystems

Integrated with built-in expert patterns



Appliances

Single purpose for most simplicity

...meeting the diverse needs of enterprise clients

The complete system of systems

The IBM zEnterprise System Family

z/OS
z/VM
z/VSE
z/TPF
Linux

AIX
Linux
Windows Server 2008

IBM DataPower XI50z

IBM BladeCenter PS701

IBM BladeCenter HX5 (7873)

IBM DB2 Analytics Accelerator V2.1

zEnterprise with zBX or zEnterprise with PureSystems

Additional flexibility with new possibilities

Hybrid computing with zEnterprise

- Redefining IT frameworks to bring change to operational silos and extend IBM System z® governance to POWER7® and IBM System x blades
- Fast and flexible application integration including Microsoft Windows support
- Improving agility to compete with consolidation and simplification
- Delivering consistent business controls across applications and platforms
- Focused on integration and collaboration to fuel business growth
- zEnterprise is the industry's only heterogeneous cloud platform



High Speed Private Data Network

10GbE connection

zEnterprise Unified Resource Manager

Flex System Manager (FSM)







Use existing 10 GbE to attach PureSystems to zEnterprise for additional flexibility

- To support greater scale and capacity servers for POWER and x86 applications
- For investment protection in your existing virtualization infrastructure (i.e. VMware or HyperV)
- For image management – the ability to move images and applications from one physical blade resource to another with zero downtime
- If you need integrated storage for your distributed environments
- For more connectivity options

Tivoli Enterprise Service Management

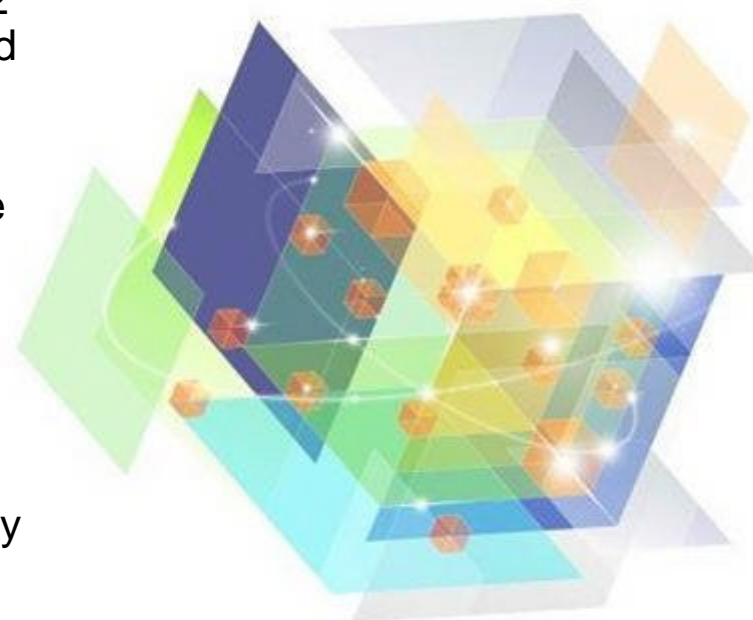
- Leverage Tivoli for Systems Integration

System z for workloads

	Client need	System z provides:	Generates most value when ...
 <p>Accelerate with Cloud</p>	Reduce cost and improve service delivery	The ideal private enterprise cloud, bringing together the qualities of service of the enterprise data center with the flexibility of cloud computing.	Client needs highest levels of utilization, multi-tenancy, fine-grained usage and accounting, workload automation and security.
 <p>Consolidate</p>	Reduce cost and complexity of existing IT operations	The ability to dramatically reduce operating costs through the large scale consolidation of multiple workloads.	The client desires a Linux platform, savings from environmental and 3rd party SW license cost reductions to achieve the best total economics with a consolidation ratio of 6 to 1 or greater.
 <p>SAP or Industry Business Applications (Innovate)</p>	Deploy new business applications	A cost effective deployment platform with unmatched scale, availability, and security and enables integration of complex multi-module applications.	<ul style="list-style-type: none"> ▪ Need to support 1000+ users or 1000s of transactions or high intensity batch processing ▪ Need the highest level / continuous application availability ▪ Manage multi-tier application across a single system
 <p>Business Analytics (Optimize)</p>	Deliver insight and create new business opportunities	A comprehensive portfolio of data serving, data warehousing and business intelligence solutions that can be integrated in a single system.	<ul style="list-style-type: none"> ▪ 50% of data being analyzed is on System z ▪ Need to analyze real-time operational data ▪ Need to centrally manage very large quantities of data

Examples of typical client profiles for the zEnterprise hybrid computing environment

- Clients with multi-tier business applications such as SAP or Core Banking where the data base tier is DB2 for z/OS and the application servers are on distributed platforms such as UNIX for the application tier and x86 for the presentation tier
- Clients with multi-tier business applications where the data base runs on Linux for System z and the application servers are on distributed platforms
- Clients with a mainframe as well as a sprawl of older UNIX and NT servers running on competitive platforms
- Clients with a data base on DB2 for z/OS and possibly data marts on distributed platforms who need to accelerate query performance
- Clients extending their mainframe applications to support web serving
- Clients implementing a Service-Oriented Architecture to extend or re-use existing mainframe assets



zBX client snapshot

**p7 and
x86**



Dept of Defence - Canada

p7



x86



**Analytics
accelerator**



Swiss Re

DataPower

Handelsbanken



System z industry solutions for smarter computing

Government

IBM Intelligent Operations Center on zEnterprise with zBX

IOC provides a centralized, real-time collaborative dashboard for planning, organizing, monitoring and sharing information across city departments and agencies

Fraud for Healthcare, Insurance and Government

Smarter Analytics: Anti-Fraud, Waste, Abuse Solution for Healthcare, P&C Insurance, Government on zEnterprise

Clients can avoid the 'pay & chase' model by reducing risk by preventing payment on suspicious claims by triggering early investigations through predictive modeling

Banking

Core Banking Transformation zEnterprise Hybrid Integration System

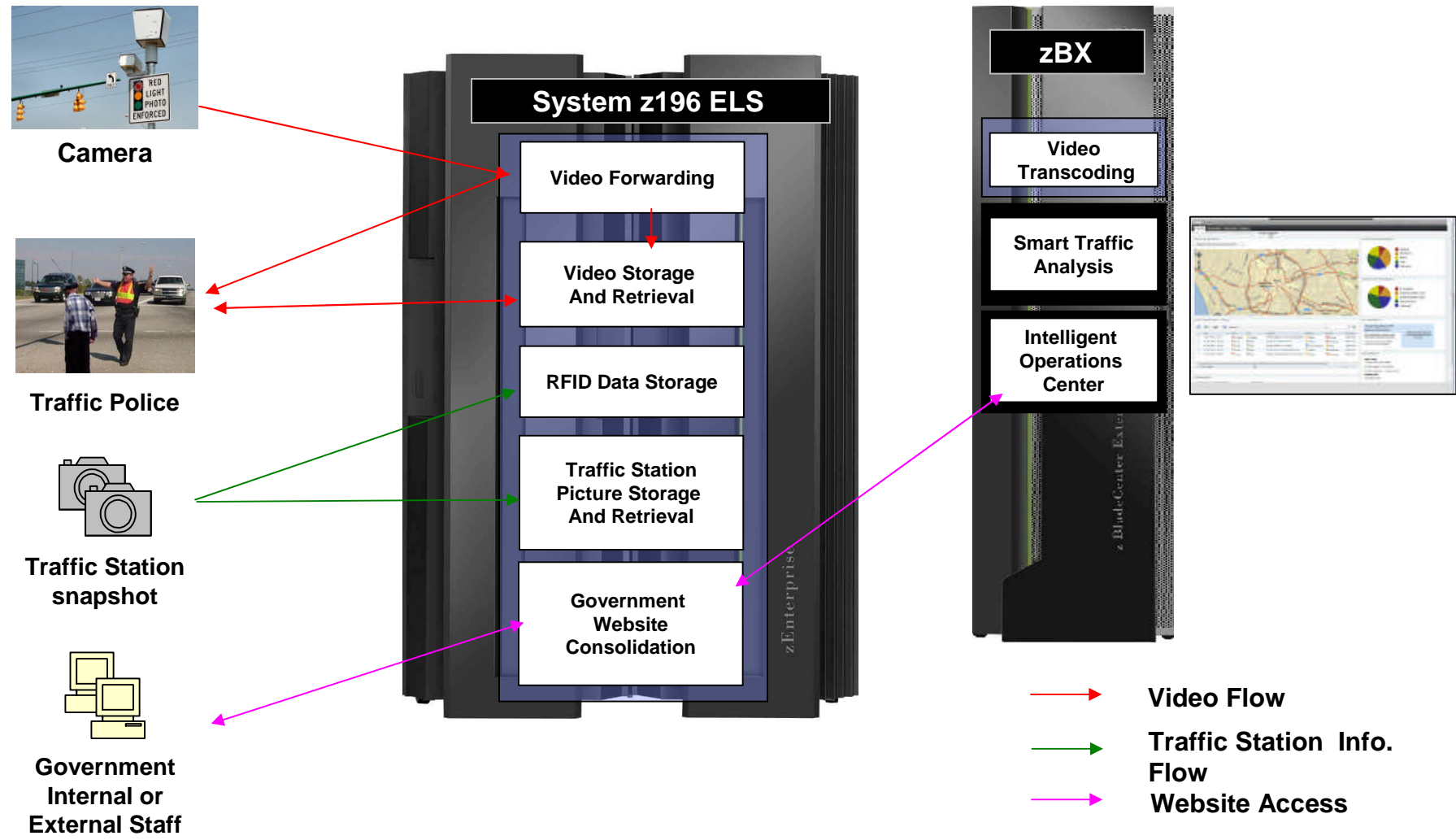
Clients can now integrate their banking applications across a bank's IT infrastructure with this solution. It combines scalable computing power with a new architecture to manage the integration of core banking heterogeneous workloads from a single point of control

HealthCare

Health Plan Integration Hub on zEnterprise

Healthcare Insurers are dealing with regulatory compliance on policy transition for ICD-10 compliance. This solution allows insurers to extend existing claims processing to comply with ICD-10 and allows them to transform their analytics with richer data

Traffic & Transportation: Monitoring the city



Smarter Planet: zEnterprise helps reduce traffic

The need

Government Center needed to simplify and streamline the IT infrastructure to support pace of innovation and scale to accommodate the rate of growth.

The solution

A Linux on zEnterprise Linux private cloud environment with zEnterprise BladeCenter Extension (Linux and Windows) and IBM Storage

The benefits

State-of-the-art intelligent traffic and transportation system that hosts the government's website and RFID data. It will also host video collection, transcoding, storage, picture management and smart traffic analysis.

100K

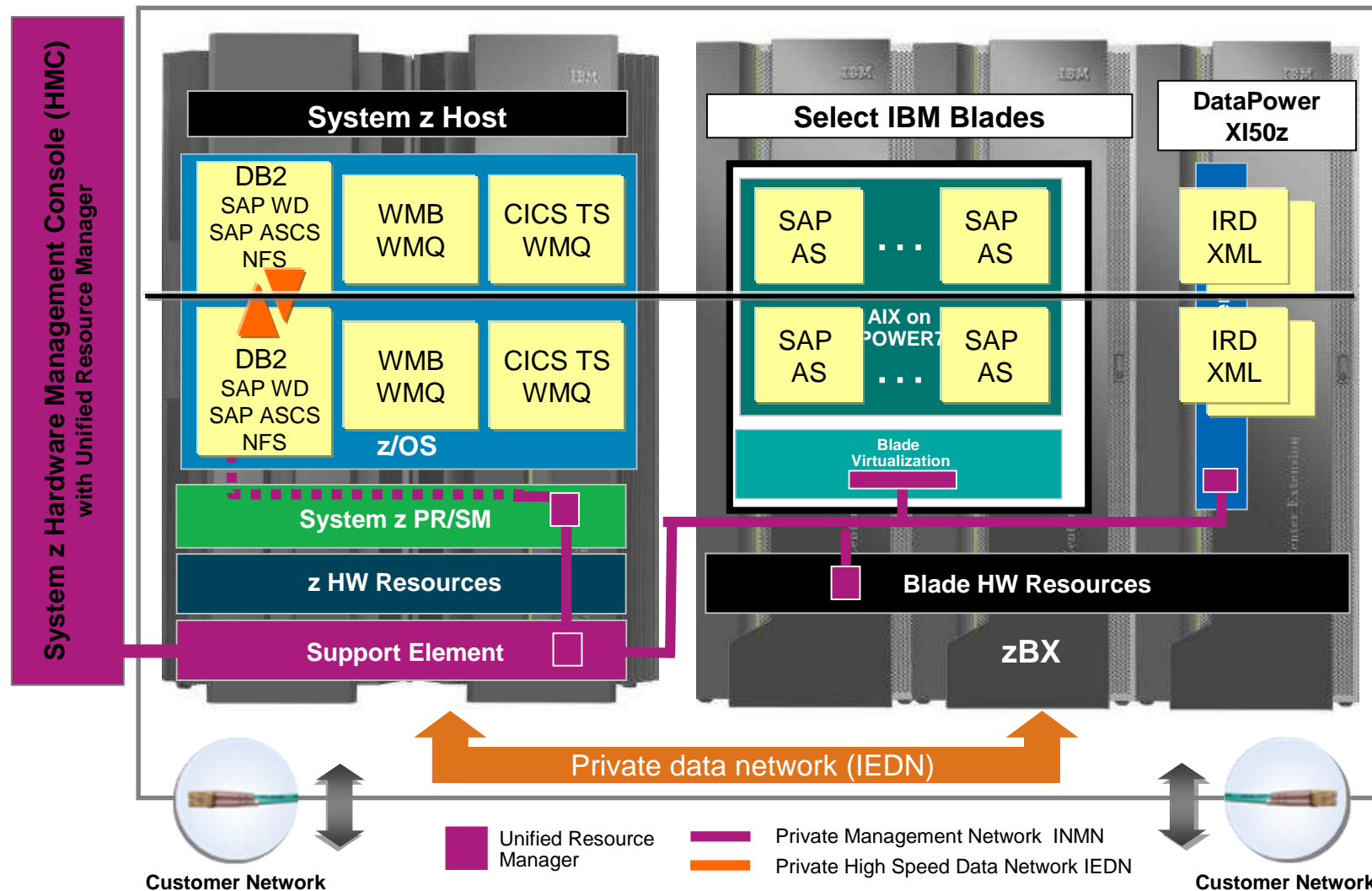
Cameras will send traffic data to zEnterprise



1

Single point of control over service levels, significantly simplifying IT administration

Integration of SAP and legacy applications in a zEnterprise hybrid model



SAP and legacy applications scenario for a large banking client

Environment prior to zEnterprise

- SAP and legacy application access DB2 for z/OS
- SAP accessed through SOA services invocation
- Production volumes exceeding available capacity

The need

- Migrate legacy applications to SAP
- Increase capacity by 5 – 10 X
- Reduce infrastructure complexity

The solution

- z196 with zBX, DataPower X150z and POWER7 Blades
- Latest functionality in DB2 for z/OS V10
- CICS TS, WebSphere Message Broker, WebSphere MQ
- Fully redundant architecture

10x

Increase in capacity



2-3x

Online response time improvement

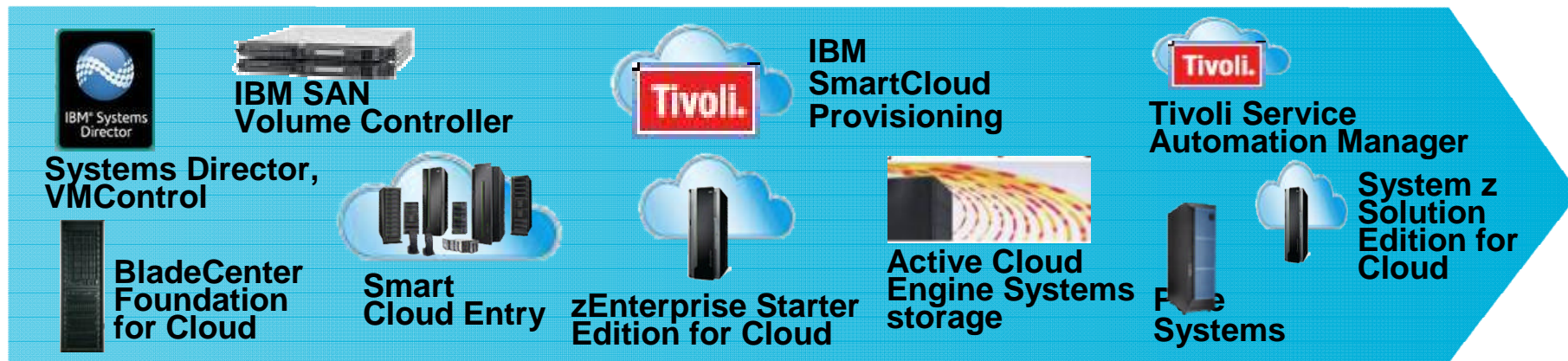
Managed with cloud technologies

How to manage inflexible, siloed systems to improve business agility

1 Integrate
Build an efficient IT infrastructure

2 Automate
Improve speed and dexterity

3 Orchestrate
Deliver IT without boundaries



IBM zEnterprise Starter Edition for cloud in government

Establishing private cloud IaaS delivery model

Government IT Challenges

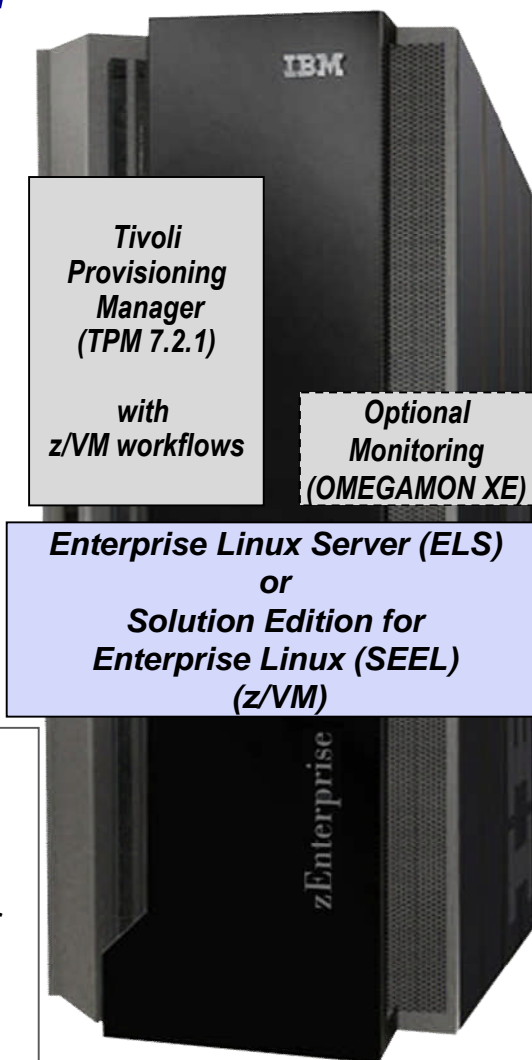
- Shared services and centralization initiatives
- Do more with less
- Multiple IT departments supporting the same set of agency applications

Solution

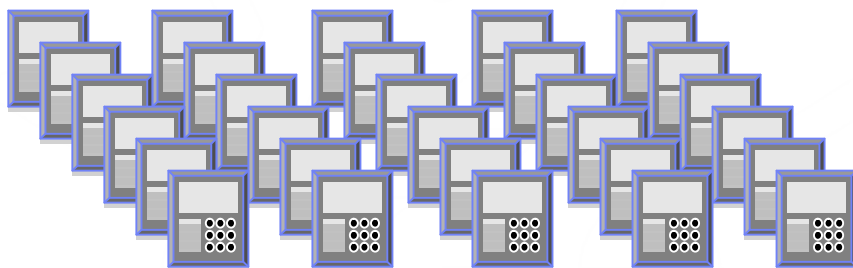
An entry-level offering that extends Linux on System z into a highly available and secure private cloud

Built on top of Enterprise Linux Server or Solution Edition for Enterprise Linux

- Allows customers to create a Cloud IaaS environment
- Integrates into customer's self-service UI
- z/VM workflows simplify installation
- Resource monitoring provided by OMEGAMON XE for z/VM and Linux (Optional)
- STG Lab Services can provide rapid provisioning with newly created z/VM workflows (Optional)

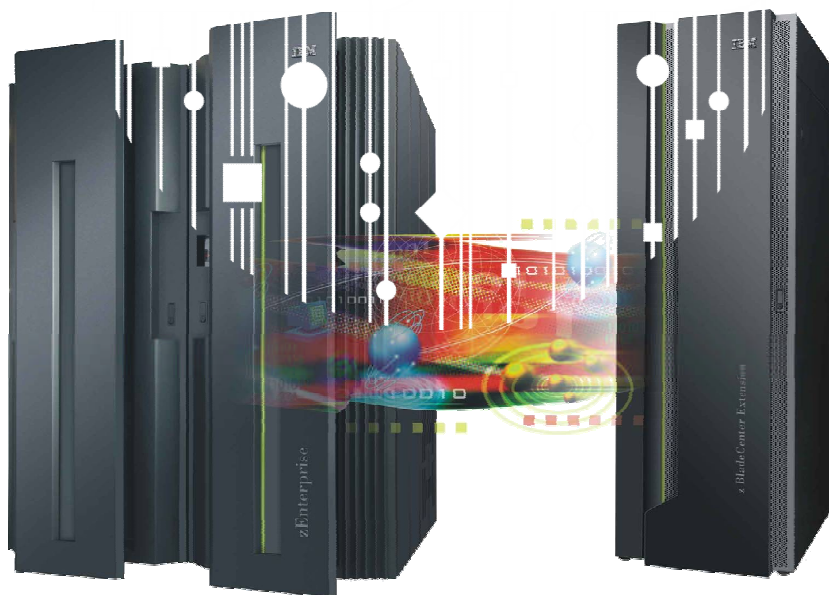


How this translates into a government solution



One online portal

for citizens to: make payments, manage medical benefits, access farming subsidies, receive education-related services



Service Automation Cloud for SAP Apps on zEnterprise

Transforming traditional services into automated cloud services

Business Challenges

- Explosive growth in the number of SAP systems
- Dependence on labor intensive processes
- SAP operational budgets are draining valuable resources
- Need for improved productivity of teams to implement and manage

Solution

A cloud enablement offering, that combines technology and services to automate, standardize, and speed up day-to-day operations of SAP on System z environment resulting in reduced operational costs and faster time to value.

Pilot underway



Planned delivery times based on actual administrator experience. Individual results may vary.

Clients are deploying infrastructures that are managed with cloud technologies



A System z on Linux cloud solution helps a government agency in China create a scalable and intelligent traffic and transportation system.

100K

Cameras will send traffic data to zEnterprise



1

Single point of control over service levels, significantly simplifying IT administration

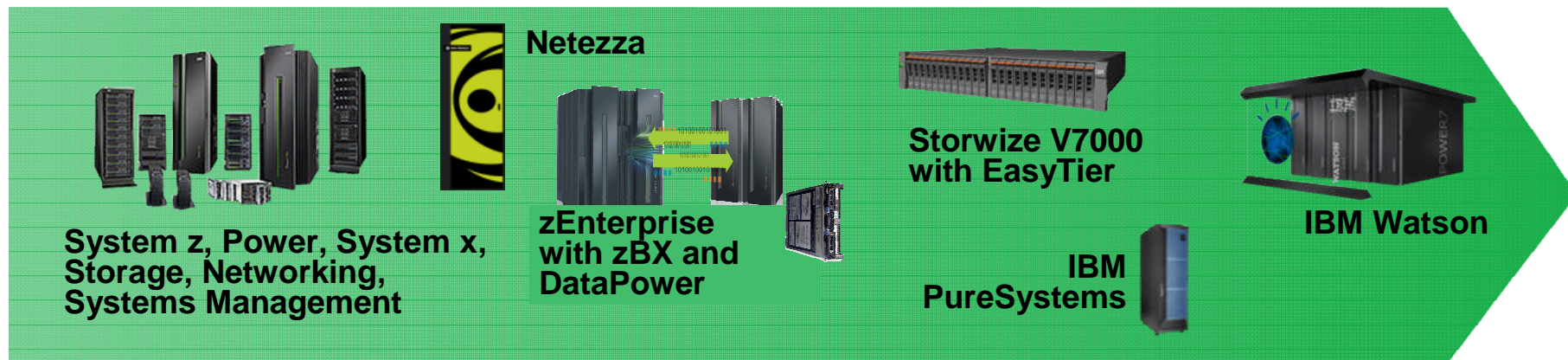
Tuned to the task

How to manage IT costs and complexity while speeding time-to-market for new services

1 Consolidate
Build an efficient IT infrastructure

2 Optimize
Optimize existing workloads to improve performance

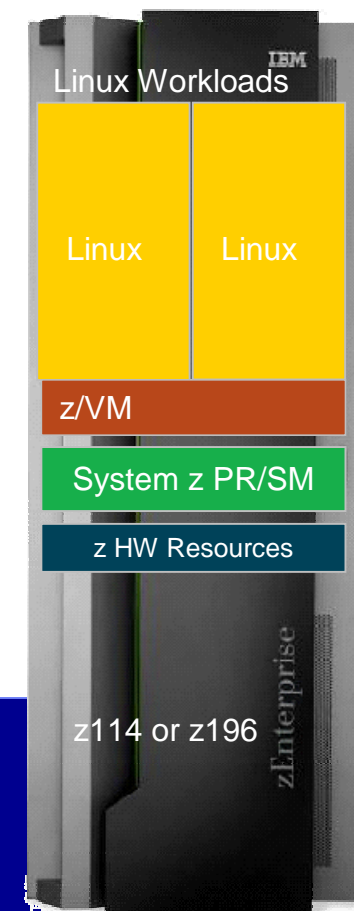
3 Innovate
Innovate and deploy new workloads



Linux on zEnterprise takes advantage of best-in-industry hardware

- HiperSockets for ultra-high speed communication between Linux images on the same machine
- OSA-Express3 and OSA-Express4S for very high speed communication between systems
- Traditional mainframe and Open I/O subsystems
 - IBM DS8000 Enterprise Storage Systems
 - IBM XIV Storage System and Storwize V7000
 - SAN Volume Controller for other storage
- Crypto support – CPACF, CryptoExpress3

Only zEnterprise can boast the combination of EAL5+, an EAL4+ certified hypervisor, FIPS 140-2 Level 4 and related security certifications

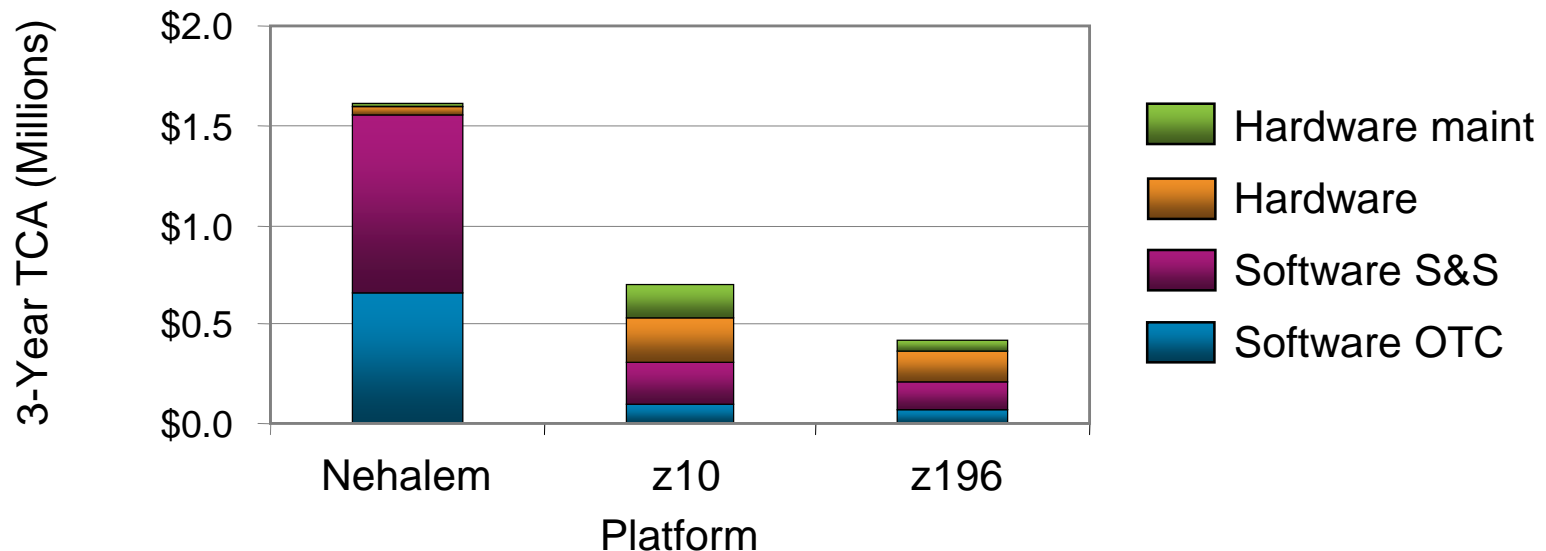


The most efficient platform for large-scale consolidation

Linux on zEnterprise

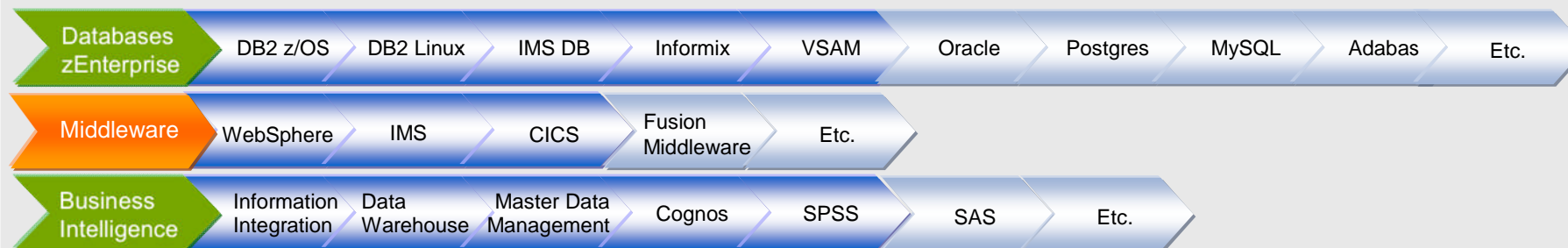
- Lower acquisition costs of hardware and software vs. distributed servers*
- Less than **\$1.00/day** per virtual server (TCA)*
- Reduce floor space by up to **90%** compared to distributed servers*
- Reduce energy consumption by up to **80%** compared to distributed servers*

Example: Consolidate 40 Oracle server cores to 2 Linux engines on zEnterprise



Foundation for data, analytic and applications

Supports and integrates data like no other platform



- Consolidation and integration of databases
- Tight integration of data and applications
- Business intelligence close to the data



The only platform that can run nine commercial databases, supported at the same time.

Clients are deploying infrastructures that are tuned to the task

System z

- Workload-optimized zEnterprise 196 and zEnterprise 114
- Hybrid: z/OS, Linux, Windows, AIX

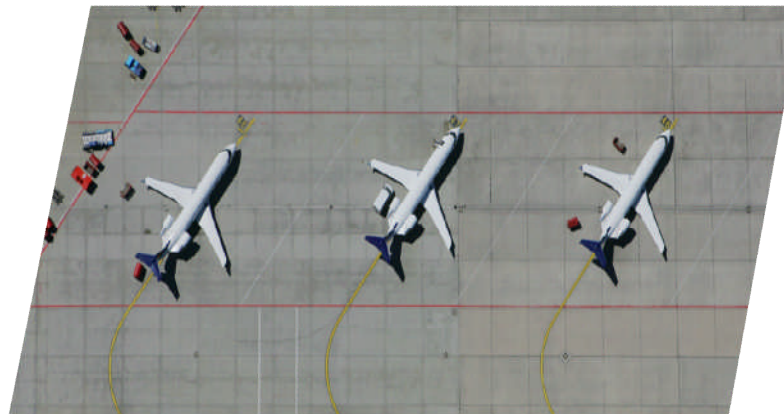


“I want to run each application where we get the lowest cost and the best performance.”

– Huub Meertens, EUROCONTROL

20%

Cost advantage delivered by zBX hybrid environment over fully virtualized x86 environment



20

Servers consolidated down to three Linux on System z servers

Designed for data

How to spot trends, predict outcomes and take meaningful actions

1 Align
Your business around information

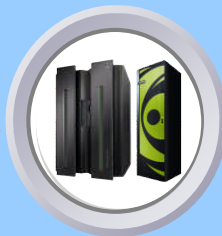
2 Anticipate
Predict and drive business outcomes

3 Act
Take action with confidence in real time



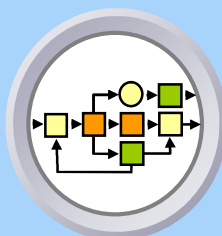
Analytics on System z

Delivers an end-to-end solution on a single platform...



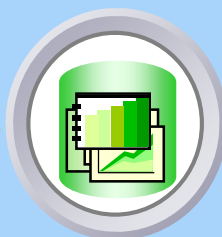
- Data warehousing
- Business intelligence
- Predictive analytics

Combines innovative capabilities & platform strengths to support...



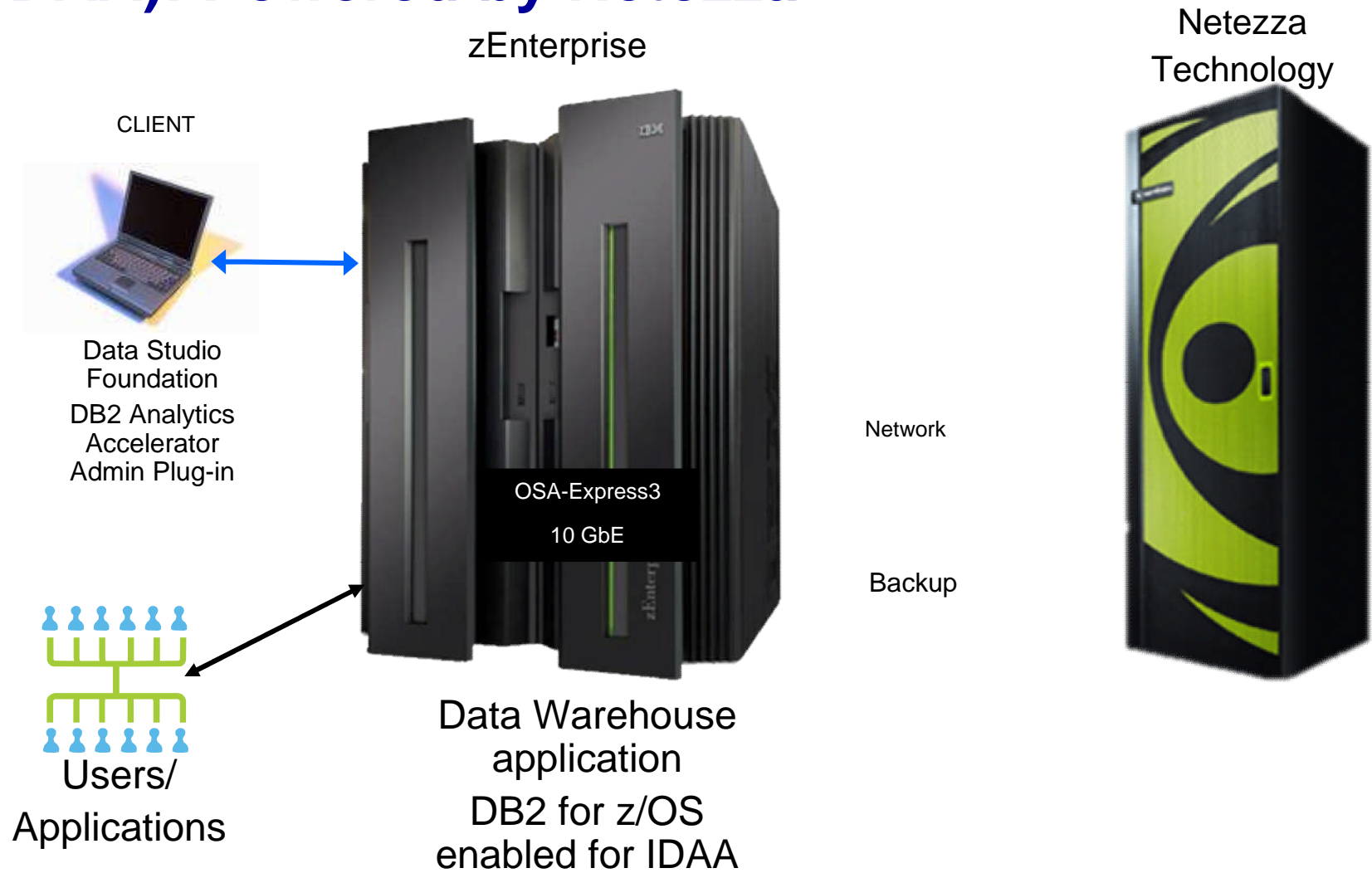
- Timely, accurate and secure information
- Superior availability, scalability and performance
- Reduced costs and complexity
- Rapid deployment and expansion

Evolves with your business...



- Start with what you need
(Functionality, Application, Department, Enterprise)
- Deploy the *way you need*
(Turnkey optimized, private cloud, svcs, education)

IBM DB2 Analytics Accelerator (IDAA): Powered by Netezza



Analytics at 5X the performance and one-fourth the unit cost

\$24 / reports per hour

Unit Cost (3yr TCA)

Highest value with ISAS 9700 + IDAA

154,893 RpH (Reports/Hour)

\$97 / reports per hour

Unit Cost (3yr TCA)

The competition

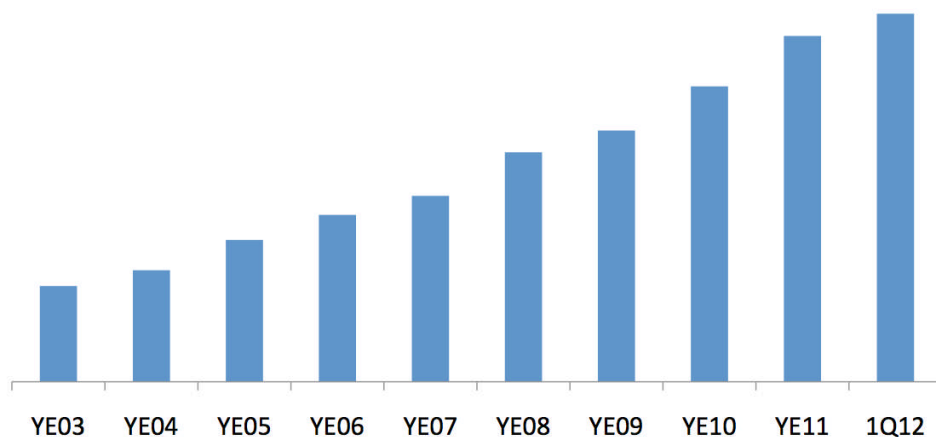
29,572 RpH (Reports/Hour)



Based on IBM internal tests of Smart Analytics 9700 + IDAA solution compared to results of testing of a competitor's configuration (previous version; no longer available) executing an analytics workload in a controlled laboratory environment and a 3 year total cost of acquisition (based on US list prices). The cost calculation compares the average cost per report for 161,166 concurrently executing mixed complex, intermediate and simple report types. Intermediate/Complex reports offloaded to IDAA for serial execution. 9700+IDAA results are a projection based on actual data for simple reports on SA 9700 and complex/intermediate report times run on separate Netezza TwinFin 12. 3 year total cost of acquisition includes expected hardware, software, service & support. Results may not be typical and will vary based on actual configuration, applications, specific queries and other variables in a production environment. Users of this document should verify the applicable data for their specific environment. Contact IBM and see what we can do for you.

System z continues to grow

System z Total Installed Capacity



140+

BladeCenter
Extension units

1100+

blades shipped

[ITD]

36%

of System z clients
have IFLs installed
[1Q12]

100+

new ISV partners
[2011]

Achieved two-year, positive compound growth rate for the **6th consecutive quarter** as of 1Q12.

System z new clients span the globe

120+ new accounts since 3Q10
zEnterprise launch [as of 1Q12]

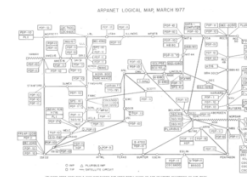
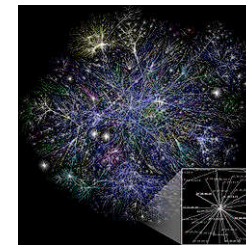
35%+ from the growth markets

49% from general business

19% from public sector

100+ goal of new clients in 2012

Lasting technologies continuously innovate and advance while preserving core values



Thank you.

Trademarks

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

- | | | | |
|---------------|----------------|-------------------|--------------|
| •AIX* | •FICON* | •POWER7* | •System z* |
| •BladeCenter* | •IBM* | •PR/SM | •Tivoli* |
| •CICS* | •IBM (logo)* | •Smarter Banking* | •WebSphere* |
| •Cognos* | •POWER* | •System p* | •zEnterprise |
| •DataPower* | •Power Systems | •System x* | •z/OS* |
| •DB2* | •POWER4 | •System z10* | •z/VM* |

* 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.
- IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.
- 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.
- Linux is a registered trademark of Linus Torvalds 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.
- Windows Server and the Windows logo are trademarks of the Microsoft group of countries.
- 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.
- UNIX is a registered trademark of The Open Group in the United States and other countries.
- Java and all Java based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.
- Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.
- Linear Tape-Open, LTO, the LTO Logo, Ultrium, and the Ultrium logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and other countries.

* Other product and service names might be trademarks of IBM or other 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.

Clients are deploying infrastructures that are designed for data

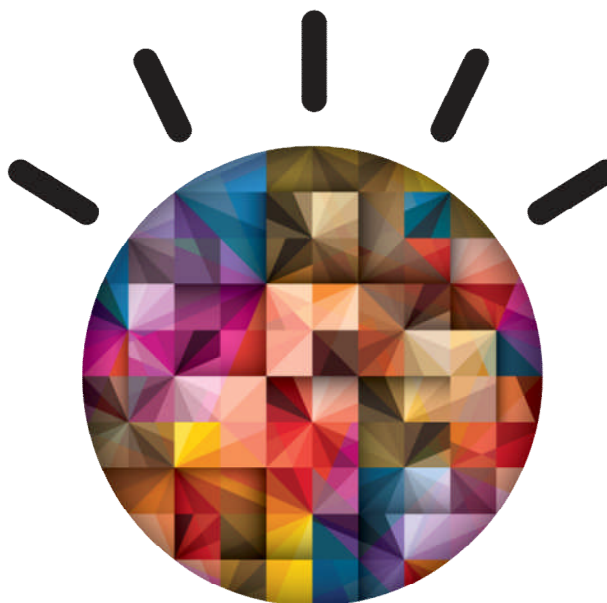


“The goal is to book inventory down to the last room available to maximize yield. We can expeditiously do this from a centralized reservations system...”

– Misha Kravchenko, Marriott International

1,500

Intelligent transactions per second



<1

Second average response time