

Smarter Computing: What Could Be Smarter Than zEnterprise!

Mike Kott
IBM
mkott@us.ibm.com

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Agenda

- Smarter Planet & Computing
- Cloud, Tasks & Data
- Smarter Computing & zEnterprise
- Managing Data
- Tuned to the Task
- Cloud Computing & zEnterprise
- Summary & Information

As our planet becomes smarter

We are seeing dramatic shifts that are changing the way the world works ... both business and society

 3 million new blog posts a day

 10 billion tweets a year

 3.5 billion pieces of content per week

Nothing is changing more than IT ...

The way it's accessed ...
Ubiquitously

The way it's applied ...
for insight

The way it's architected ...
Integrated & flexible

People, systems and objects can communicate and interact with each other in entirely new ways.

2 billion

There will be an estimated 2 billion people on the internet by 2011.

4 billion

There are an estimated 4 billion mobile phone subscribers worldwide.

1 trillion

Soon, there will be 1 trillion connected devices in the world, constituting an “internet of things.”



Instrum Intercon Intelli



The Demands Placed on the Data Center Have Never Been Greater



32.6 million servers worldwide

- **85% idle** computer capacity



1.2 Zetabytes (1.2 trillion gigabytes) exist in the “digital universe”

- **50%** YTY growth



Between 2000 and 2010

- servers grew **6x** ('00-'10)
- storage grew **69x** ('00-'10)



Data centers have **doubled their energy use** in the past five years

- **18%** increase in data center energy costs projected



Internet connected devices growing **42% per year**



Since 2000 security vulnerabilities grew **eightfold**

... while IT budgets are growing less than 1% per year.

This has created an IT conundrum—meeting exploding demand for service on a flat budget

Inflexible IT: Reactive

Inflexibility of infrastructure limits integration across silos and responsiveness to customer demands.

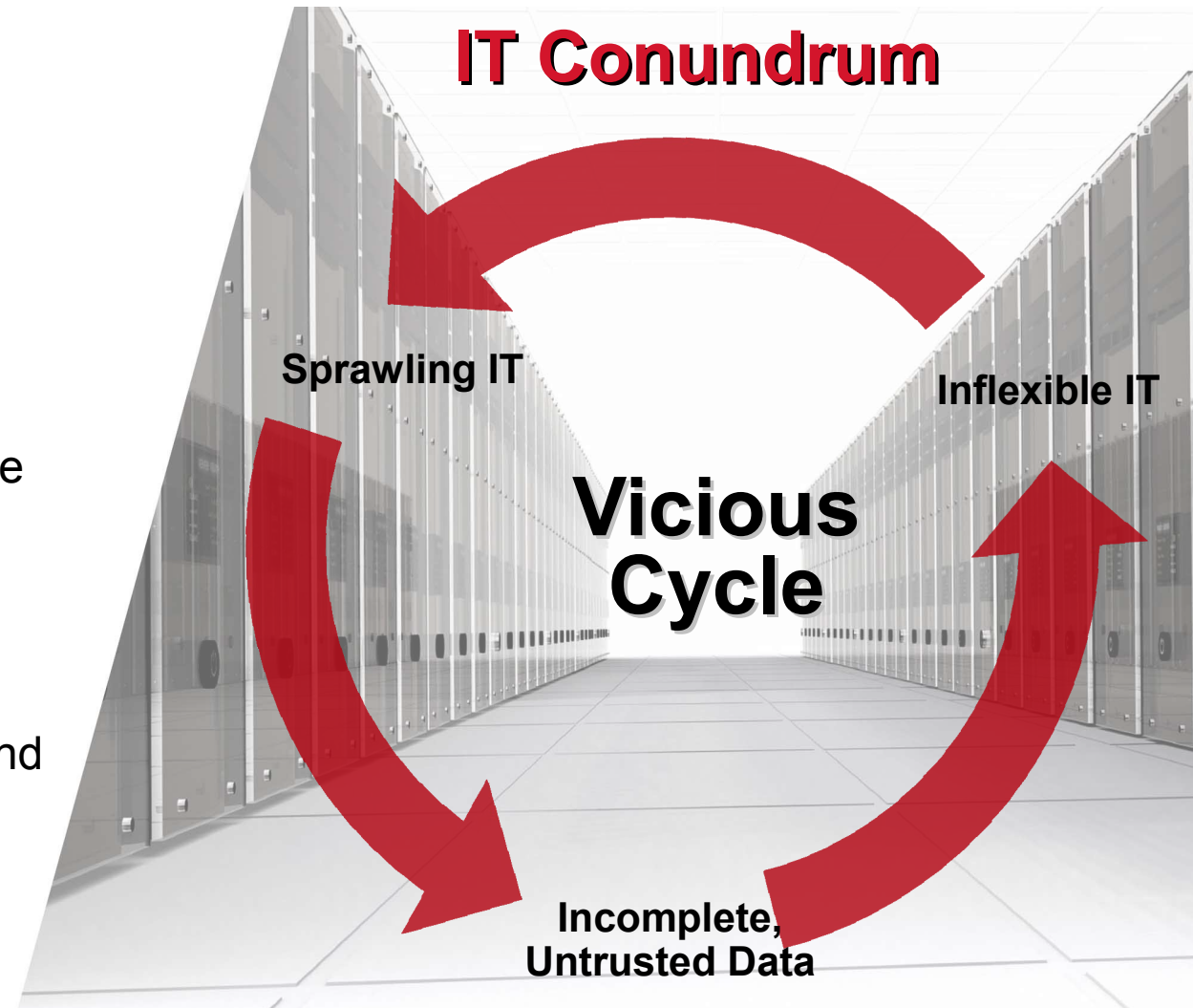
Sprawling IT: More Cost

Every IT investment leads to more sprawl which drives up infrastructure and management costs.

Incomplete, Untrusted Data:

Always Guessing

Decisions are made on incomplete data, big ideas are seen as risky, and small decisions aren't optimized.

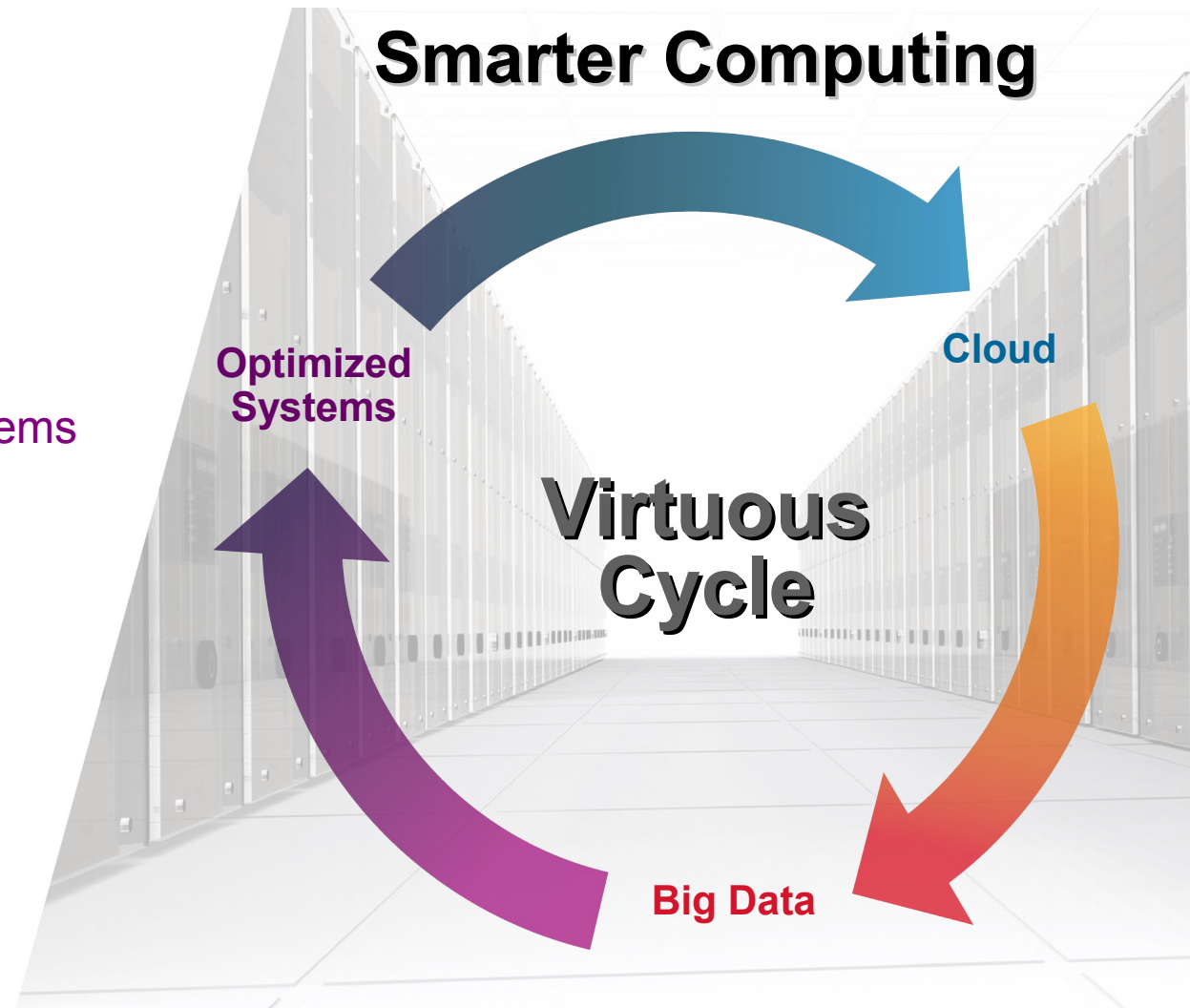


Smarter Computing is an IT infrastructure that is designed for data, tuned to the task and managed in the cloud

Managed in the Cloud: Cloud
Remove barriers to rapid delivery of new services and reinvent business processes to drive innovation.

Tuned to the task: Optimized Systems
Remove financial barriers by driving greater performance and efficiency for each workload.

Designed for data: Big Data
Remove barriers to harnessing all available information and unlock insights to make informed choices.



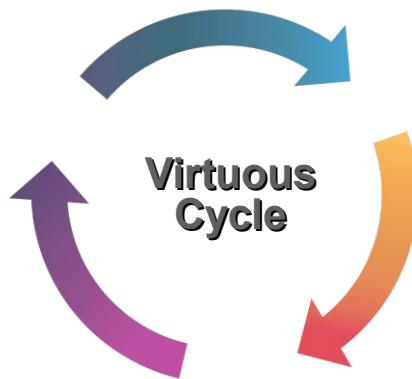
Delivering on the Promise of Smarter Computing



IBM zEnterprise™ System: Freedom by design

The integration of a shared pool of virtualized heterogeneous resources, managed as a single system, that is:

Optimized across the infrastructure and tuned for every task



Managed, end-to-end for the flexible delivery of high value services

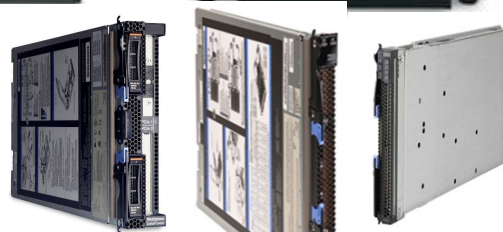
Designed for enterprise wide real time data modelling to create new business opportunities

Clients are using the strengths of System z®; security, availability, resiliency, scalability, virtualization and management as part of their infrastructure transformation for **better business outcomes**



The Complete System of Systems

The IBM zEnterprise System Family



IBM DataPower XI50z IBM BladeCenter HX5 (7873)
IBM BladeCenter PS701

IBM DB2
Analytics
Accelerator
V2.1

IBM zEnterprise System is ...



Designed for data

- IBM Smart Analytics 9700/9710 for near real-time analytics
- ISAS 9700 + IDAA delivers 5X performance at one fourth the unit cost vs. a competitive warehouse solution



“The IBM DB2 Analytics Accelerator delivers the speed to create the insights we need to work smarter. Putting the right answers into the hands of decision makers across our business enables us to quickly adapt and grow.”

– Reto Estermann, Director, Information Technology, SwissRe

Managed with Cloud Technologies

- zEnterprise Starter Edition for Cloud with highest RAS, security
- z/VM with Live Guest Relocation (LGR)
- 72 percent lower overall TCO vs. competitive cloud offering



The Marist/IBM academic cloud has helped unite disciplines, students, faculty and different campuses throughout the world. ... It enables an online space where students and researchers can share and develop ideas, adding depth to the educational process.

Tuned to the task

- Workload-optimized zEnterprise 196 and zEnterprise 114
- Hybrid: Linux, Windows, AIX
- Improved SAP banking solution processing by 3X



IBM's fit-for-purpose / workload optimized strategy provides the Intelligent Transportation project with a robust design, improving manageability and performance, while allowing resources to be dynamically allocated.

IBM's Journey to Smarter Computing



Designed for data

Managing huge data growth at flat cost and delivering new insights to the business

~85 PB of operational data

+25% growth per year

Managed with cloud technologies

Rapid and flexible deployment of resources for accelerated and efficient service delivery

50% IT labor cost reduction

Up to 40% reduction in end-user IT support costs

~300 information sources

Tuned to the task

Dramatic TCO reductions to significantly reduce the cost of new and existing IT operations

6,500+ servers consolidated

47,000 sq. ft. floor space reduced

>30k MWh energy savings

Managing this scale of data and analytics requires an infrastructure tuned to the task



DB2 Analytics Accelerator

Accelerating decisions to the speed of business



Blending System z and Netezza technologies to deliver unparalleled, mixed workload performance for complex analytic business needs.

DB2 Queries run significantly faster on IDAA



Query	Total Rows Reviewed	Total Rows Returned	DB2 Only		DB2 with IDAA		Times Faster
			Hours	Sec(s)	Hours	Sec(s)	
Query 1	2,813,571	858,320	2:39	9,540	0.0	5	1,908
Query 2	2,813,571	585,780	2:15	8,220	0.0	5	1,644
Query 3	8,260,214	274	1:16	4,560	0.0	6	760
Query 4	2,813,571	601,197	1:08	4,080	0.0	5	816
Query 5	3,422,755	508	0:57	4,080	0.0	70	58
Query 6	4,290,648	150	0:53	3,180	0.0	6	530
Query 7	361,521	58,236	0:51	3,120	0.0	4	780
Query 8	3,425,28	734	0:44	2,640	0.0	2	1,320
Query 9	4,130,107	137	0:42	2,520	0.1	189	13

Performance Testing

- DB2 Analytics Accelerator: “we had this up and running in days with queries that ran over 1000 times faster”
- DB2 Analytics Accelerator: “we expect ROI in less than 4 months”

Flexible Deployment Options with System z



Smart Analytics System 9700

- *Integrated solution of HW, SW and services based on zEnterprise 196 platform*
- *Enables customers to rapidly deploy cost effective game changing analytics across their business.*



Smart Analytics System 9710

- *Integrated solution of HW, SW and services based upon the new zEnterprise 114 platform*
- *Delivers the quality of service of System z at an entry level cost*



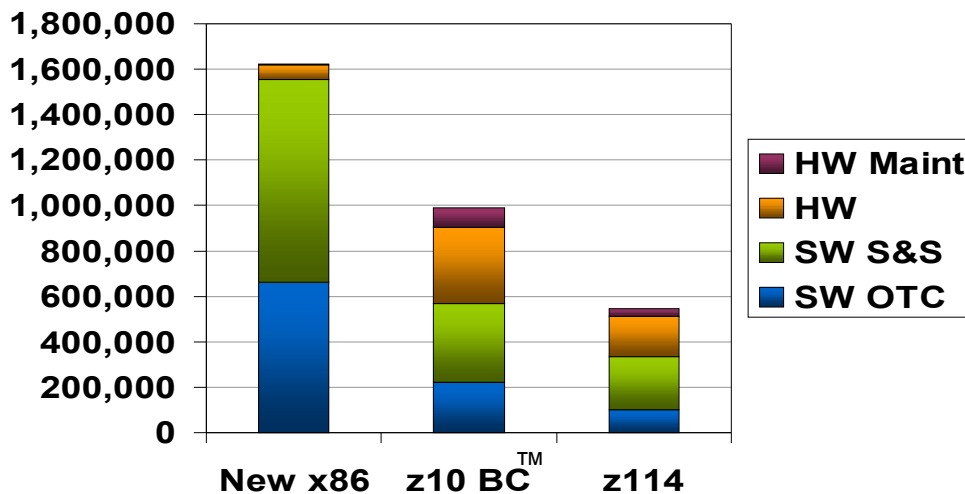
IBM Smart Analytics Cloud

- *IBM Smart Business - services with industry leading hardware & software*
- *A private cloud computing solution for business intelligence (BI) & analytics*

Linux on z for Consolidation to Reduce Cost

- Lower acquisition costs of hardware and software vs. distributed servers
–60% less than Nehalem*
- ~ \$500 per year per virtual server (TCA)*
- Reduce floor space by up to 90% compared to distributed servers*
- Reduce labor costs by up to 70% compared to distributed servers

Consolidate 40 Oracle server cores onto 3 Linux cores on z114



“Even without factoring in the maintenance and support costs - which would be considerable for a large estate of physical servers - we found that running a virtualized Linux environment on **System z would be somewhere between 30 and 50 percent less expensive than a distributed architecture.**”

-- Ted Mansk, IT Director, BCBSM

*NOTE ALL PRICING AND PERFORMANCE DATA IS PRELIMINARY AND FOR GUIDANCE ONLY
Distributed server comparison is based on IBM cost modeling of Linux on zEnterprise vs. alternative distributed servers. Given there are multiple factors in this analysis such as utilization rates, application type, local pricing, etc., savings may vary by user.

zEnterprise System is optimized for consolidating a range of workloads



Consolidate workloads to optimize infrastructure

- Single point of control across system with Unified Resource Manager
 - Web front ends cost up to 58% less
 - Reduce blade infrastructure costs by up to 35%
- Reduce software license costs by up to 90% with Linux on System z

Create secure and efficient private clouds

- The only platform that can host heterogeneous enterprise clouds with security and availability for enterprise applications
- Advanced provisioning on System z can help dramatically reduce overall costs by 30 to 35%

Grow revenue with real time data analytics

- Consolidate data and integrate operational data and analytics to drive business insight
- Parallel query processing delivers responses <1 second 99% of the time¹
- Model customer data within the transaction



IBM zEnterprise System and zBladeCenter Extension (zBX)

z/OS

Linux on
System z

AIX on Power Blades

Linux & Windows System x Blades

IBM DB2 Analytics Accelerator

IBM Smart Analytics System 9700



Bank of New Zealand implemented a new internet banking platform and consolidated 200 Sun servers to 1 IBM System z

Sample Projects & Capabilities

- Moved from distributed Intel and Sun SPARC servers to Red Hat Enterprise Linux 5 running under z/VM on IBM z9 and z10 mainframes to address environmental and space issues.
- Large scale server consolidation from Sun servers.
- Integrated mission-critical front-end IT environment, including Internet banking and bank teller functions through core back-end data on a single system.

Potential Benefits

- Reduced data center footprint by 30%, heat output by 33% and power consumption by close to 40%.
- Only 1 admin needed per 100 virtual servers.
- 20% ROI over the life of the platform.
- Simplified, more efficient deployment.

*Now one of New Zealand's largest carbon neutral companies.
Implemented an Internet banking platform that reduced costs and increased the velocity of deployment times from days to minutes.*

— BANK OF NEW ZEALAND



System z: the Ideal Platform for Cloud Computing



Advantages to Deploying Clouds on Larger, Scale-up Servers



Higher Utilization

- Up to 100% CPU utilization
- “Shared everything” architecture
- Host thousands of mixed workloads



More Efficient Data Center

- Less power and cooling
- Less floor space
- Fewer parts to manage



Increased Productivity

- Efficient, rapid provisioning
- Superior workload management
- Fewer parts to manage



Greater Reliability, Availability

- Built-in hardware redundancy
- Decades of RAS innovation
- Capacity and Backup on Demand

System z has had Cloud Computing Capability and Supplying Business Flexibility for Years

System z supplies all components necessary to deliver cloud today

Workload Management

Manage cloud infrastructure capacity requirements consistent with business policies

Transaction Processing

Support integration of cloud with mission critical OLTP applications

Scalability

Scale vertically with z/OS and LPAR and horizontally with zLinux and zVM coupled with Workload Manager

Availability and Provisioning

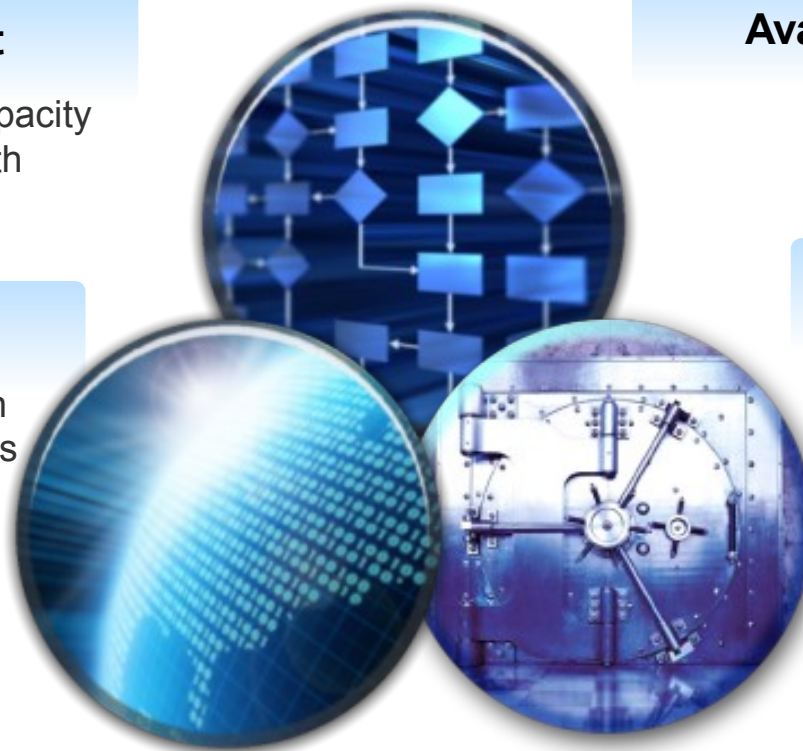
Automation for deploying Virtual Machines and recovery applications including DR

Security and Compliance

System Z Security provides fine grained controls with hardware encryption and isolation

Auditing and Metrics

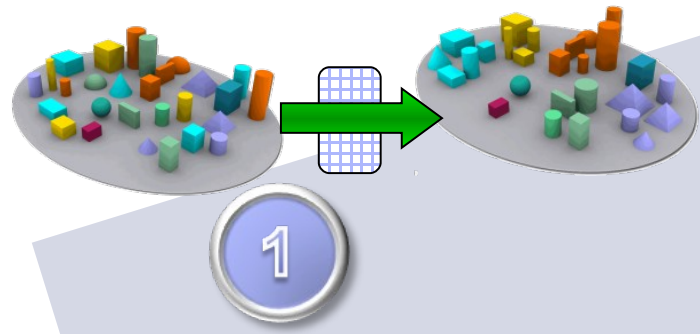
Workload based accounting and metering to support capacity planning and chargeback to LOB



A Step-by-Step Approach for Growing Cloud on zEnterprise

Take Out Cost

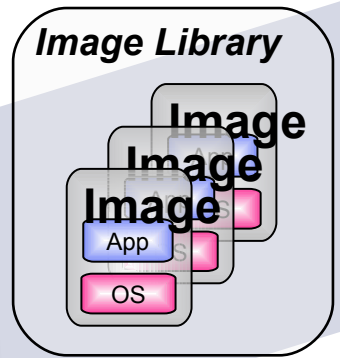
STEP 1
Consolidate and Virtualize



- Exploit the extreme **virtualization** capabilities of System z and z/VM
- Use basic z/VM features and functions to manage virtual Linux servers

Simplify

STEP 2
Automate and Manage Better



- Use advanced z/VM features and functions for **automated operations and service delivery**
- Add Tivoli technologies for greater levels of service management

Integrate and Optimize

STEP 3
Cross-architecture Workload Optimization



- zEnterprise is the industry's only multi-architecture cloud solution
- Use a **cloud deployment model to host multi-tier solutions across System z, POWER and System x resources**
- Use the Unified Resource Manager and Tivoli ISM for optimal workload placement

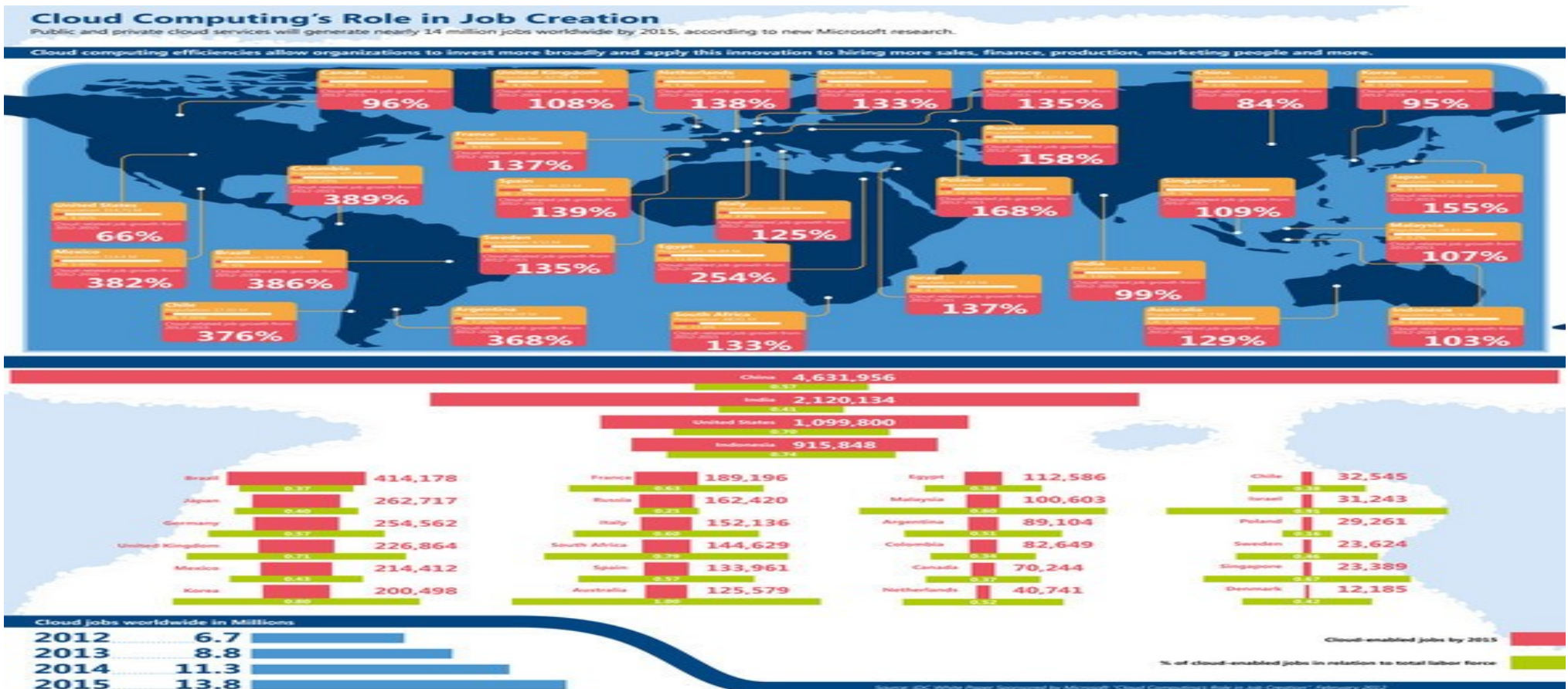
Enterprise Linux Server (z10, z196, z114)
Solution Edition for Enterprise Linux

- zEnterprise Cloud Starter Edition
- System z Solution Edition for Cloud Computing

zEnterprise System and zManager
Tivoli Integrated Service Management

Cloud Will Create 14 Million Jobs by 2015

- Cloud computing is NOT a job eliminator, it will be a job creator--a major one
 - Direct hiring by IT vendors and organizations as they build out cloud technologies and infrastructures
 - Most new cloud jobs will be created in media and communications, manufacturing, and banking.
 - devote fewer resources to maintenance and integration, and more to strategic projects that can grow their businesses



Transzap Boosts Software-as-a-Service Uptime with IBM System z



Transzap offers its customers 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 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. Transzap migrated to System z and virtualized its critical applications on Linux on System z, a platform that supports Transzap's dynamic Java and Oracle environments.

Benefits:

- Helps Transzap serve more than 69,000 users across 6,800 companies
- Provides higher levels of uptime for their customers
- Offers peace of mind through 24x7 world-class hardware support

“We intend to deliver a 99.9% application uptime guarantee to our customer base, thanks to the availability characteristics of System z.”

*— Peter Flanagan, CEO,
Transzap, Inc.*

TRANSZAP

Enabling the flexible delivery of high value services



IBM zEnterprise provides exceptional capabilities for flexible service delivery



Broad Network Access
Very large number of end user access from multiple sources including mobile devices

Rapid Elasticity
A new dimension of Scale. Most efficient platform for Large-scale Linux consolidation



Resource Pooling
1000s of virtualized systems across a heterogeneous resource pool

Measured Service
Meter, monitor, and track workloads for chargebacks and capacity expectations

On Demand Self-Service
Automate provisioning and service requests reducing provisioning cycles from weeks to minutes

IBM zEnterprise applies unsurpassed Quality of Service for the delivery of business critical services



Security

Extending System z Security to a Private network across heterogeneous resources



Availability

Resiliency management and fewer points of failure

Efficiency

1/4 network, 1/25th floor space, 1/20 energy, 1/5 administration

Up to 70% in security audit savings

Up to 52% lower security admin costs

Fewer points of breach than pure UNIX or x86

IBM's Internal Transformation Demonstrates the Potential of Smarter Computing



- Consolidated and virtualized over 5,000 server images
- 80% less energy used
- 85% less floor space ... a 47,000 sq. ft. reduction
- Cumulative benefit yield of

\$ 4.1B over the last 5 yrs



	1997	Today
Host Data Centers	155	7
Web Hosting Centers	80	5
Network	31	1
Applications	15,000	4,700

System z Smarter Computing – 45+ years in the making

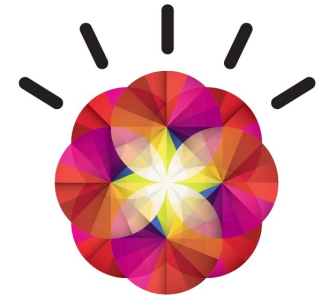
- The world's most trusted transaction processing and data server for business critical applications
- The world's most cost-efficient platform for data center consolidation and virtualization
- The world's most dependable and scalable hardware and middleware platform for new business applications
- A thoroughly modern application environment for traditional and Cloud delivery models



The zEnterprise 196 is the world's fastest and most scalable enterprise system. (50 BIPS)

Summary

- **Smarter Computing: What Can be Smarter than System z!**
- All of the attributes of System z and zEnterprise make it the ideal Smarter Computing platform
 - **Qualities of Service** – Availability, Scalability, Security, Efficiency
 - **Designed for Data** - Big Data, IBM Smart Analytics 9700/9710, IBM DB2 Analytics Accelerator, DB2 z/OS, Cognos for z/OS and Linux on z, SPSS for Linux on z, InfoSphere Optim Performance Manager for z/OS
 - **Managed in the Cloud** - for the past 40+ years! zEnterprise Starter Edition for Cloud, TSRM
 - **Tuned to the Task** – Optimized Systems, Consolidation to Linux on z, Hybrid Computing Model for Best Fit Platforms



Additional Information

- IBM Smarter Computing
- Smarter Computing - What Linux workloads to consolidate on the mainframe
- IBM zEnterprise System
- Enterprise Cloud Computing
- Cloud Computing and the Value of zEnterprise (Redguide)

