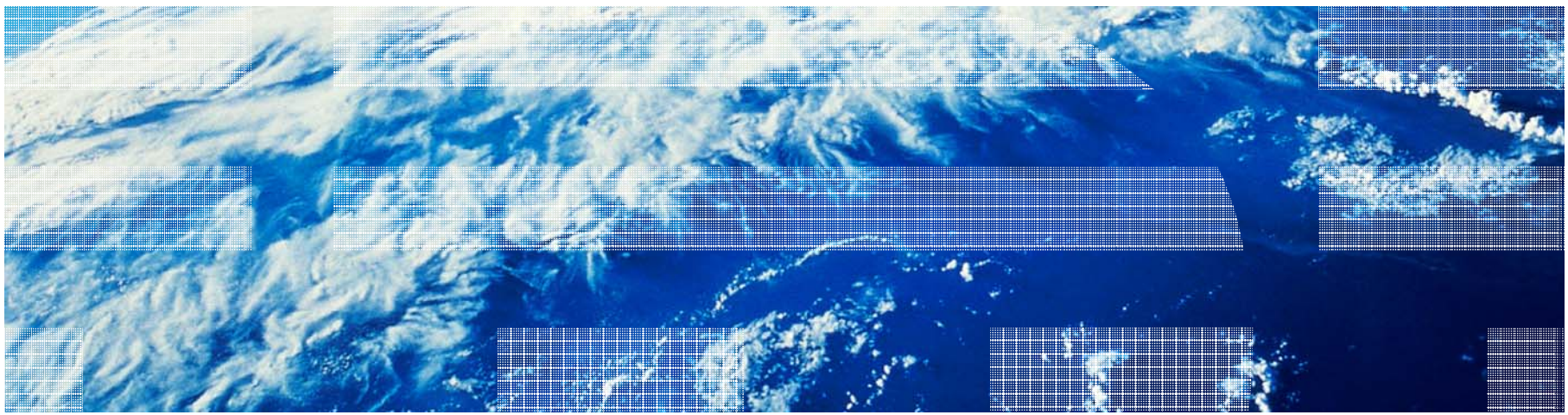
Cloud Computing on System z®



Agenda

- What is all the excitement about Cloud Computing?
- How are IBM's customers adopting Cloud Computing?
- What makes System z the ideal platform for cloud computing?
- What solutions support cloud computing on System z?
- How do I develop a cloud strategy for my organization?
- Where do I go to I learn more?

What is all the excitement about Cloud Computing?

Market Forces at Work

Three key market forces are causing a re-evaluation of business technology:

Expectations

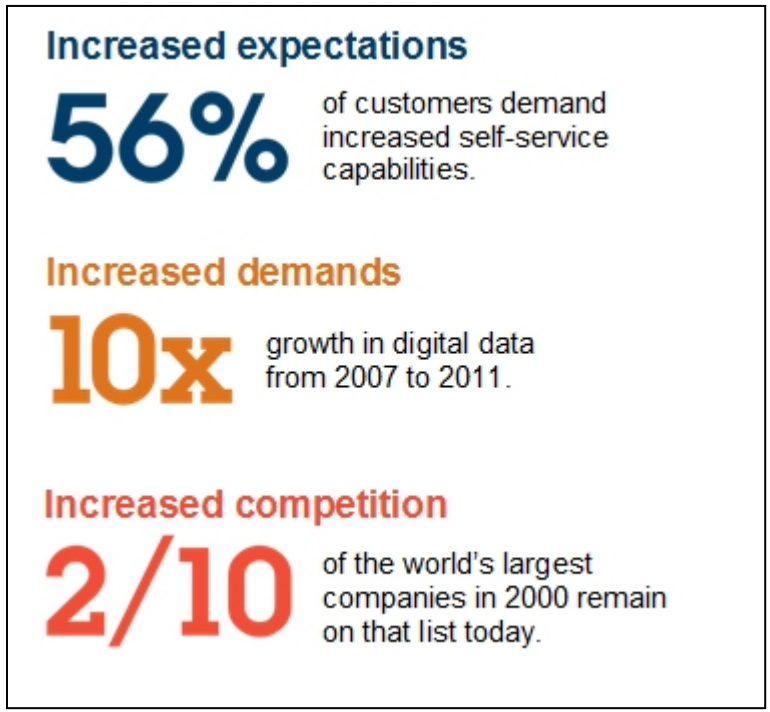
- **Escalating customer, employee and partner expectations** around self-service, personalization, access to real time information, and service innovation

Demands

- An exponential increase in data, users, speed requirements, and the number and variety of connected devices

Competition

- The imperative to deliver higher value products and services more rapidly than ever before in order to remain competitive in a crowded, global market



Cloud Computing Basics

- Computing has changed greatly over the last 20 years. We have moved from storing files, images, data, and even programs on the computer to the Internet.
- Our personal e-mail is likely to be accessible from the Web rather than on our hard drives. Instead of watching a video stored on a DVD, we can view thousands of videos and television programs directly over the Internet from providers such as YouTube, Netflix, and Hulu.
- If you do your taxes online, all your tax data is stored online, available when you need it to file your taxes next year. Myriads of options are now available 24/7 on the Internet, from online bank accounts to Facebook.
- These new options or services fall within the concept of cloud computing.

Cloud Appeal

IT and Business are attracted to cloud for different reasons

- Too often cloud's vast potential is unmet because cloud is being used primarily to make IT easier, cheaper and faster. While these goals are hard to argue with, those results have become are a commodity.

IT is drawn to cloud's cost, efficiency and control

- Consolidation, data center efficiency and lower costs are just the start.

Business is drawn to cloud's simplified, self-service experience and new service capabilities.

- Sixty percent of CIOs plan to use the cloud—up from 33% two years ago. Fifty-five percent of business executives believe cloud enables business transformation and leaner, faster, more agile processes.

Cloud is not just about rethinking IT; it is also about reinventing the business.

Moving Your Business to the Cloud

Improved security and compliance control posture

- Embrace new business opportunities while maintaining control and mitigating risk.

Deliver IT without boundaries

- Implement new systems and management processes that simplify access to information in order to deliver better business outcomes.

Improve speed and dexterity

- Speed the delivery of new offerings and services by creating new models of self-service and deployment

Create new business value

- Empower internal and external communities to define and create new offerings and services.

What Our Customers Have Told Us

Improve IT delivery speed and agility • **Deliver IT without boundaries** • **Create new business value**

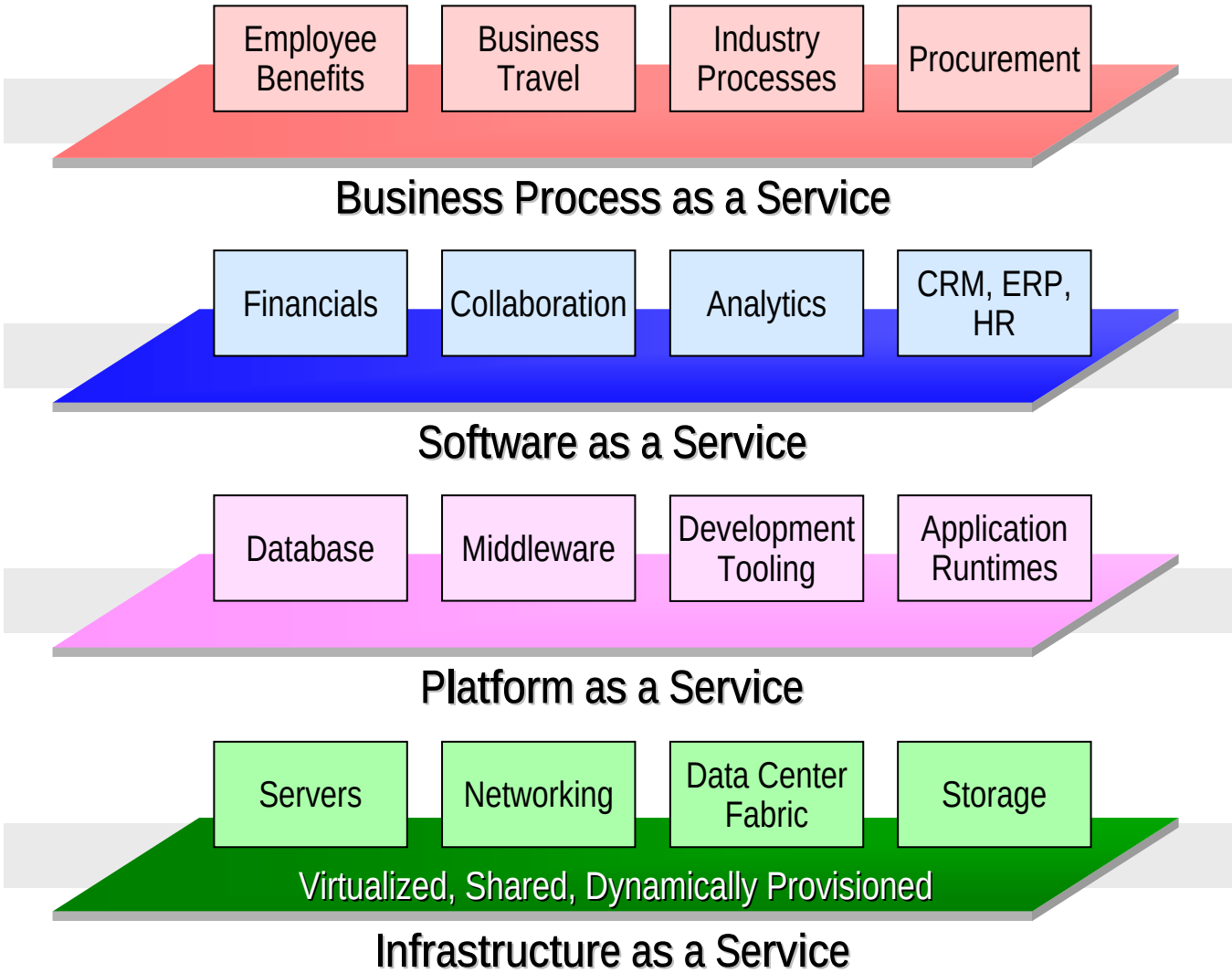
Cloud Types

Public Cloud
Amazon, Salesforce.com, IBM Blueworks Live!

Private Cloud
Behind the firewall for internal and partner use. Private Clouds are suitable for many workloads including core business workloads.
Variations include: Managed Private Cloud, Hosted Private Cloud

Hybrid Cloud
A cloud with both Public and Private characteristics, this can be an integrated public/private cloud or community cloud

Cloud Computing Models



How are IBM's customers adopting Cloud Computing?

Patterns of Adoption

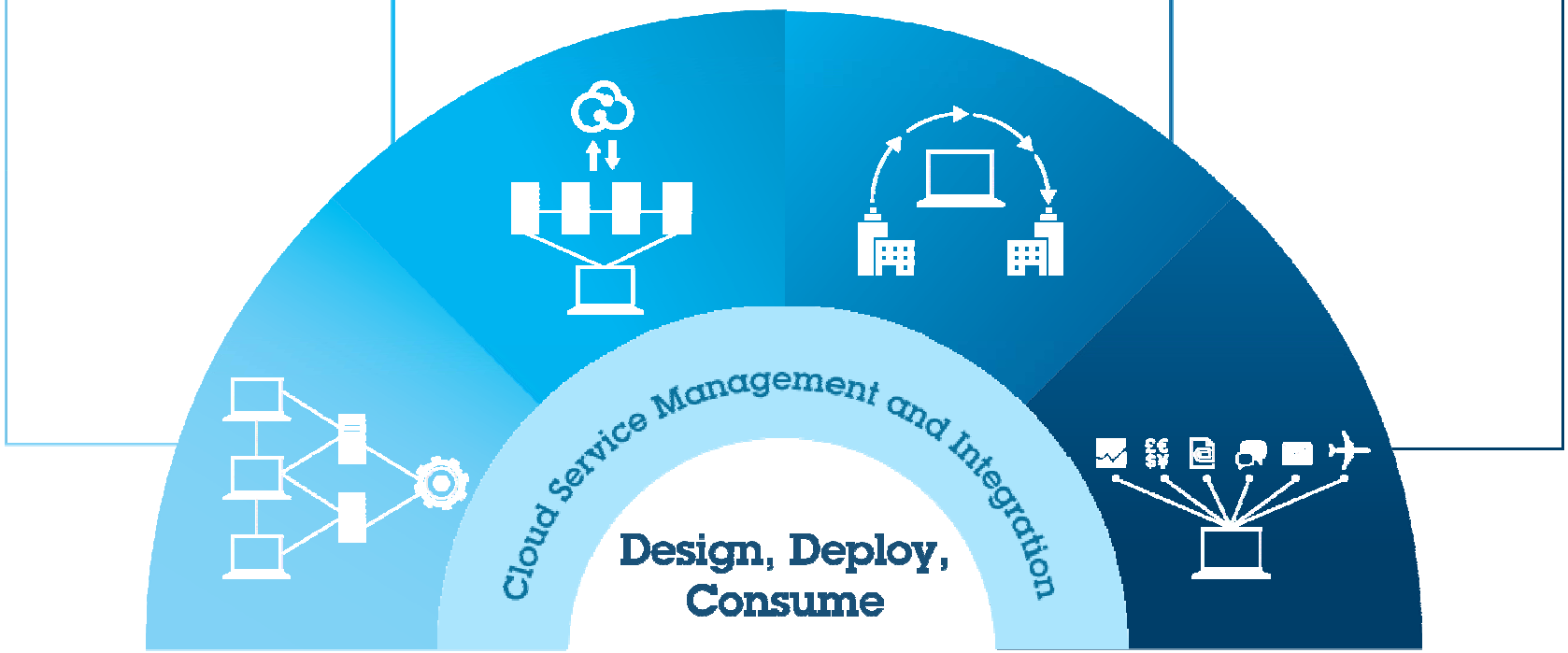
As cloud computing becomes pervasive, clear and well-defined approaches that consistently deliver tangible results are emerging.

IaaS: Cut IT expense and complexity through a cloud enabled data center

PaaS: Accelerate time to market with cloud platform services

Innovate business models by becoming a cloud service provider

SaaS: Gain immediate access with business solutions on cloud



Common Cloud Adoption Strategies

Cloud Enabled Data Center

Integrated service management, automation, provisioning, and self service

Cloud Platform Services

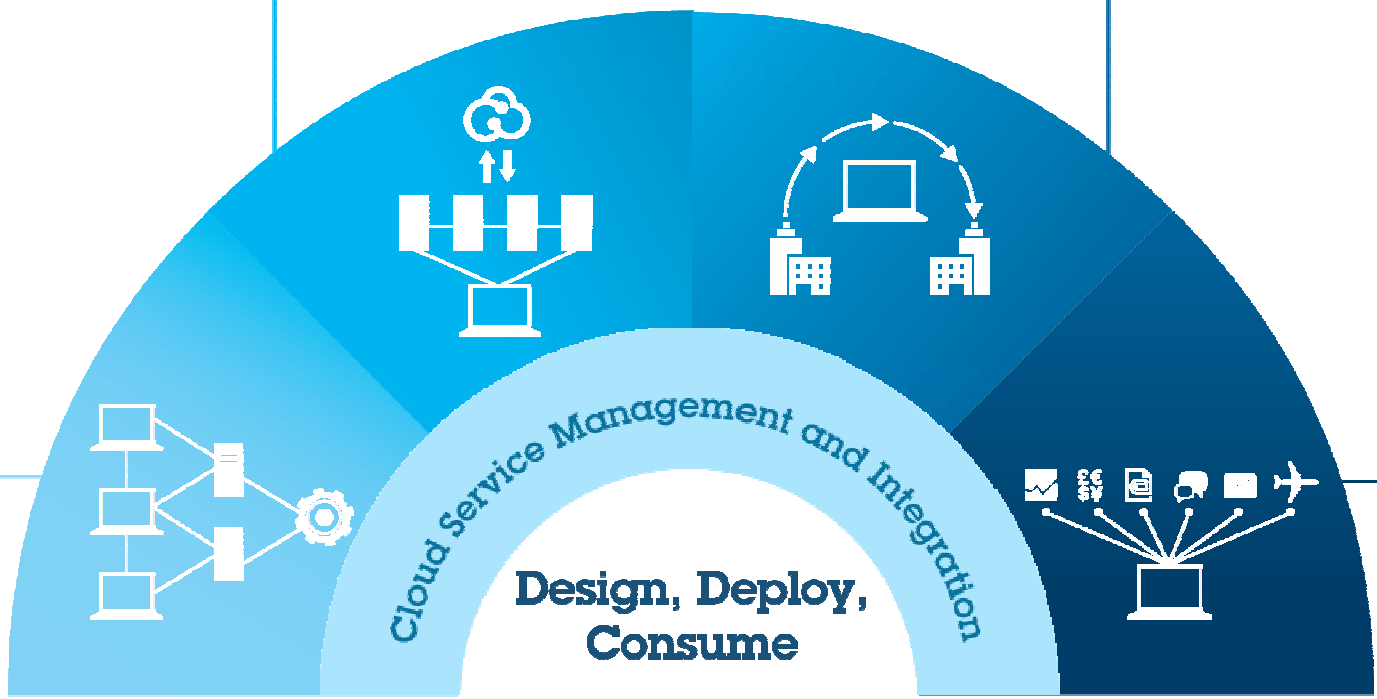
Integrated, dynamically adjusting stack of middleware optimized to build, deploy and manage heterogeneous workloads

Cloud Service Provider

Advanced, reliable, highly secure and scalable platform for creating, managing, and monetizing cloud services

Business Solutions on Cloud

Software-as-a-Service delivering IT and process orchestration within and across enterprises



Finding the Most Cost-Effective Option

Blue Cross Blue Shield of Minnesota

Advantages of virtualization

First, the lead time for server provisioning has been reduced by more than 99 percent. When the business requires a new test or development environment, the IT team can deploy a new Linux virtual server within 20 minutes. There is no longer any need to source a new physical server, wait for delivery, then install and configure it—a process which could take six to eight weeks.

Availability and disaster recovery

In fact, since the new infrastructure went into production, BCBSM has not experienced a single incidence of unplanned downtime or underperformance. Equally, the company's disaster recovery capability has been improved dramatically by the new solution.

Realizing the cost savings

Finally, BCBSM expects the new infrastructure to deliver cost savings over and above the predicted TCO savings in the initial cost-benefit analysis.

"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," says Ted Mansk, Director of Infrastructure Engineering and Databasesat BCBSM

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.

"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

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

IBM's Real World Experience with Cloud Computing

2,000
successful private cloud engagements in 2010.

4.5M
daily transactions processed through IBM Cloud.

1M
managed virtual machines.

"IBM has one of the most comprehensive cloud portfolios, with the cloud integrated throughout its many lines of business. Moreover, IBM's consulting arm has put them in touch with numerous early adopters and special use cases—all of which helps the company stay ahead of competitors."

– Jeff Vance, Datamation

80%
of Fortune 500 companies are using IBM cloud capabilities.

What Makes 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

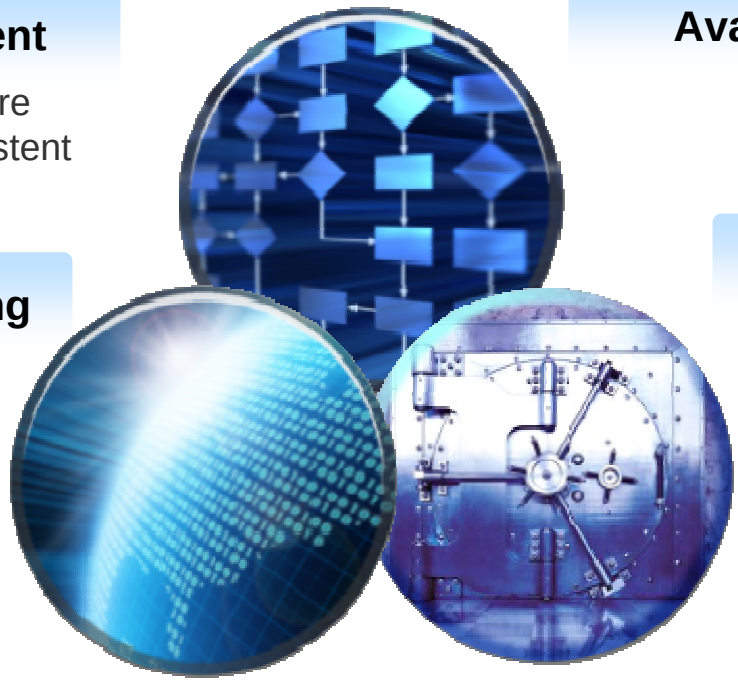
Manage cloud infrastructure capacity requirements consistent with business policies

Transaction Processing

Support integration of cloud with mission critical OLTP applications

Scalability

Scale vertically with zOS 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

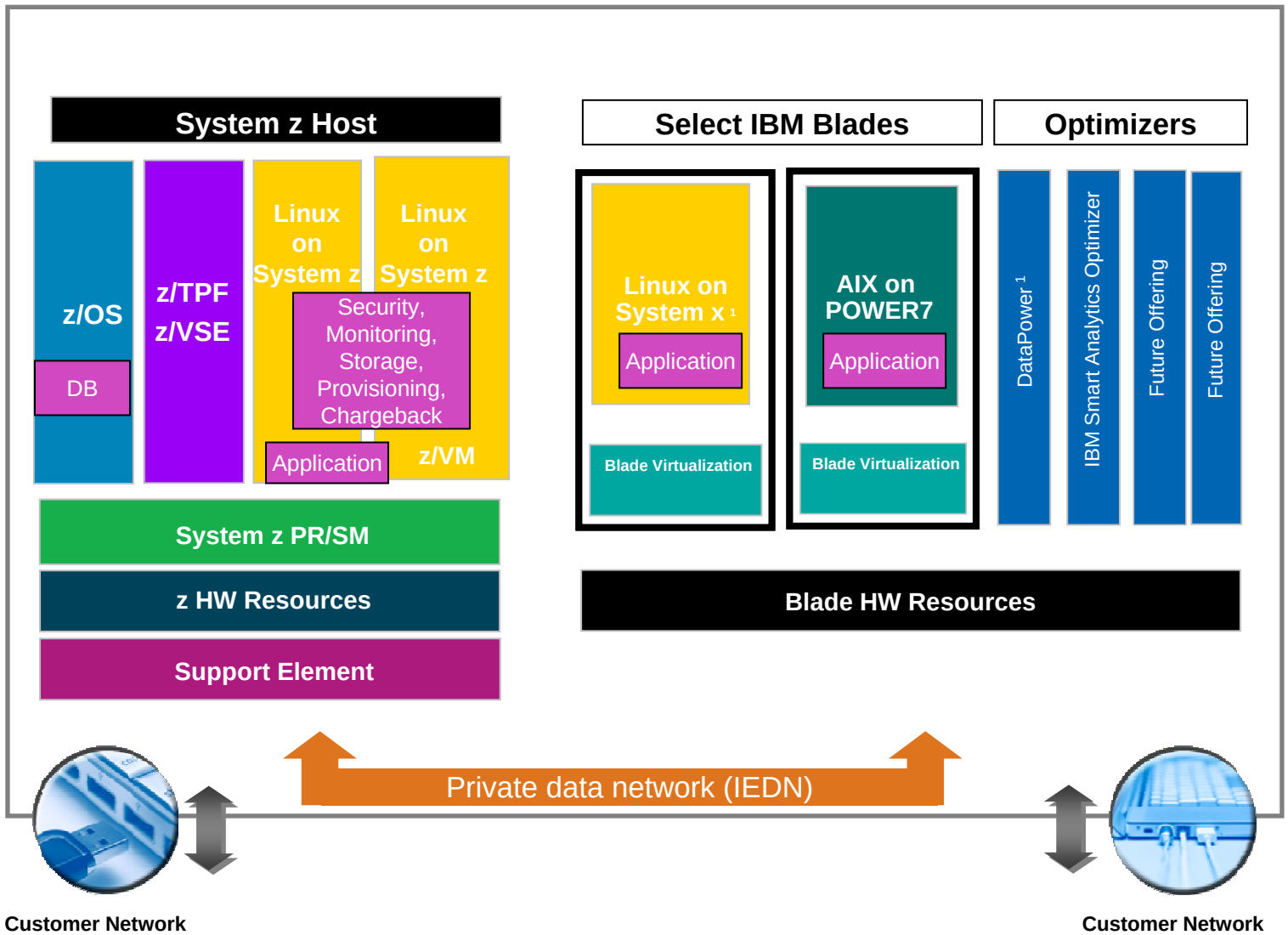
Security and Compliance

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

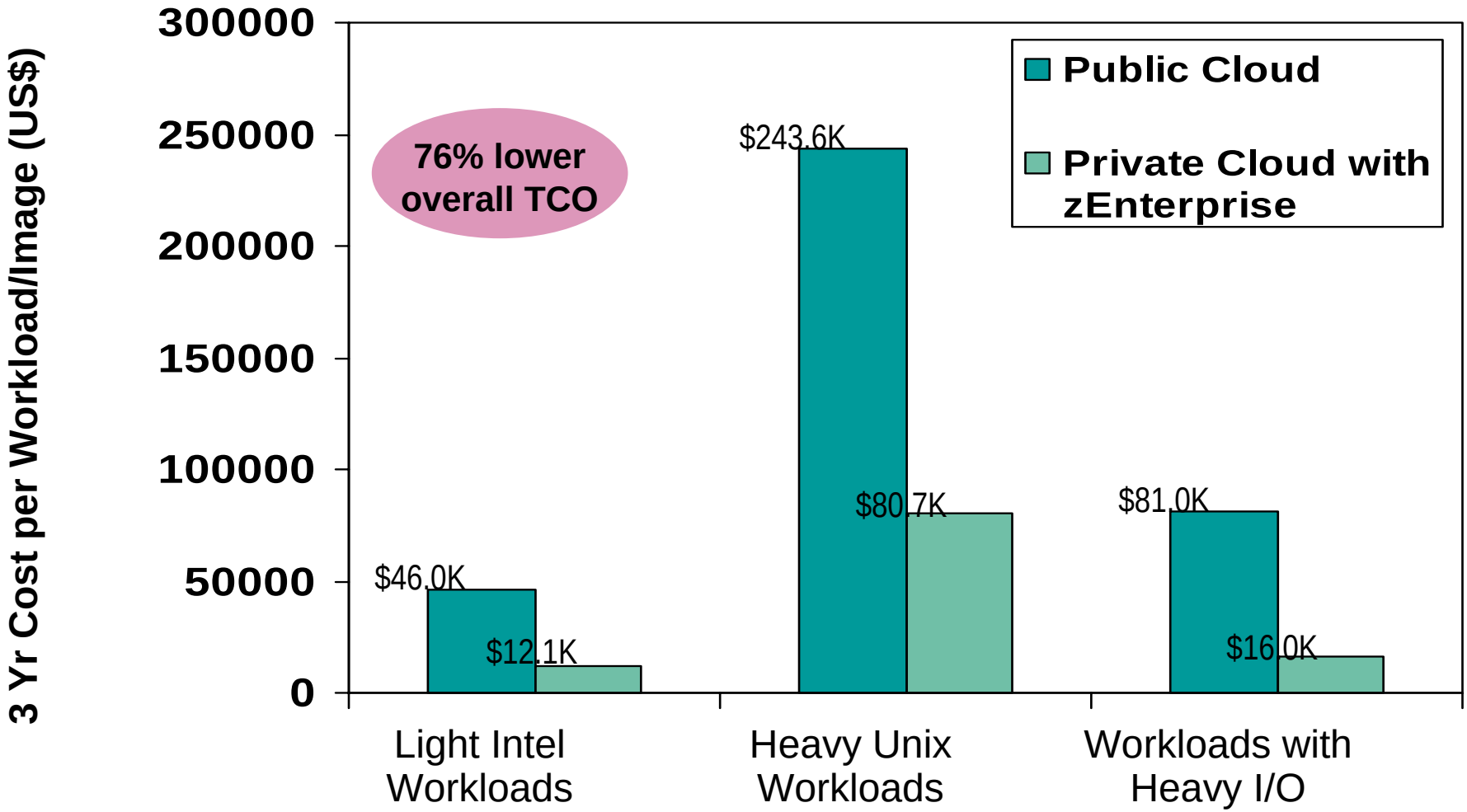
Auditing and Metrics

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

The zEnterprise System – A New Dimension in Cloud Computing



Private Cloud Advantage

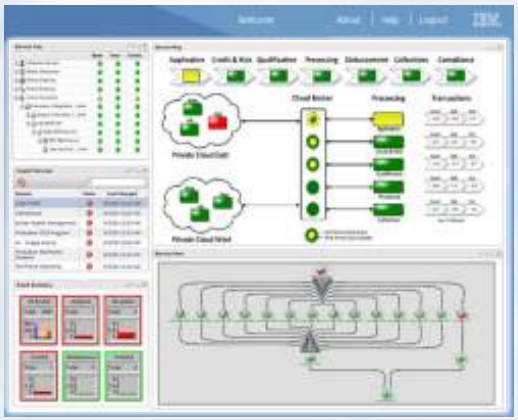


Source: IBM internal study. zEnterprise configurations needed to support the three workload types were derived from IBM benchmarks. Public cloud sizing needed to support the three workload types was calculated based on compute capacity of public cloud services. 3 yr TCO for public cloud based on pricing info available by the service provider. 3 yr TCO for zEnterprise includes hardware acquisition, maintenance, software acquisition, S&S and labor. US pricing and will vary by country.

What Solutions Support Cloud Computing on System z?

IBM Tivoli Integrated Systems Management for System z

VISIBILITY

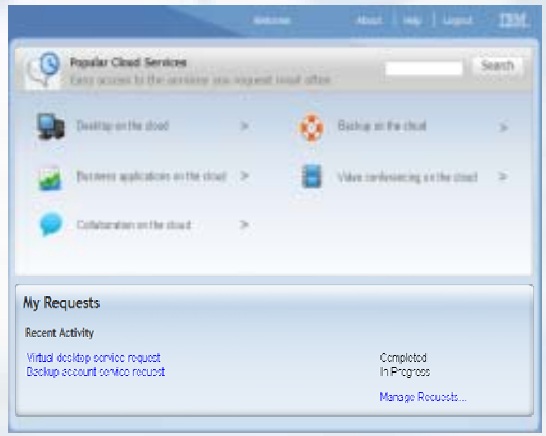


***Visibility**: Track cloud service levels & performance, and predict cloud problems before clients are impacted.*

CONTROL

***Control**: Manage compliance and costs through effective cloud policy enforcement and service reporting.*

AUTOMATION



***Automation**: Enable user self service while improving productivity and time to market for cloud services.*

Integrated Service Management - for Service Lifecycle Management of Cloud workloads on IBM zEnterprise

Deploy Service
- Request Driven Provisioning
- Management Agents and Best Practices
- Application / Service On Boarding
- Self-service interface

Subscribe to Service
- Request a service
- "Sign" Contract

Manage Operation of Service
- Visualize all aggregated information about situations and affected services
- Control operations and changes
- Event handling
- Automate activities to execute changes
- Include charge-back

Offer Service
- Register Services and Resources
- Add to Service Catalog

Service Creation
- Scope of Service
- SLAs
- Topologies, Best Practices Management Templates

Terminate Service
- Controlled Clean-up

IBM Tivoli Provisioning Manager

Supports z/VM and Linux

zEnterprise Starter Edition for Cloud

An entry level Infrastructure as a Service delivery model for Linux on System z with Tivoli Provisioning Manager (TPM).

Features:

- Provisioning an easy to deploy, highly scalable, highly secure, highly resilient turnkey cloud-in-a-box!
- Extends existing Enterprise Linux Server or Solution Edition for Enterprise Linux with Tivoli Provisioning Manager and OMEGAMON XE (for monitoring), and STG Lab Services
- Speeds new service provisioning (measured in minutes) with advanced automation and optional monitoring which dramatically reduces data center operations costs
- Ensures multi-tenancy cloud deployments are continuously available with high RAS and efficient virtualization
- Protects customer and corporate data in a shared cloud infrastructure by providing the highest level of security (EAL 5)
- Offers instant cloud-capacity growth on-demand with a pay-as-you-grow model

IBM zEnterprise Solution Edition for Cloud Computing

IBM z Enterprise Solution Edition for Cloud Computing creates a framework for clients to get started with cloud computing. It is offered at an aggressive and competitive price point, and combines our industry-leading System z hardware, Tivoli software and IBM services.

Create a self-managed platform with IBM Tivoli

- Delivers a competitively priced solution, consisting of hardware, software and services for getting started with cloud computing quickly
- Tivoli software automates requesting, deployment, monitoring and management of cloud computing services
- Systems z server capacity supports platform efficiency for centralized and virtualized cloud workloads,
- IBM services implements and optimizes the Solution Edition for Cloud Computing. Provides a cloud computing service automation and management frame-work for cloud computing workloads

Smart Analytics Cloud for System z

Our commitment to informed decision making led us to consider private cloud delivery of Cognos via System z, which is the enabling foundation that makes possible ***more than $20M savings over 5 years****.*

– IBM CIO Office

The Smart Analytics Cloud:

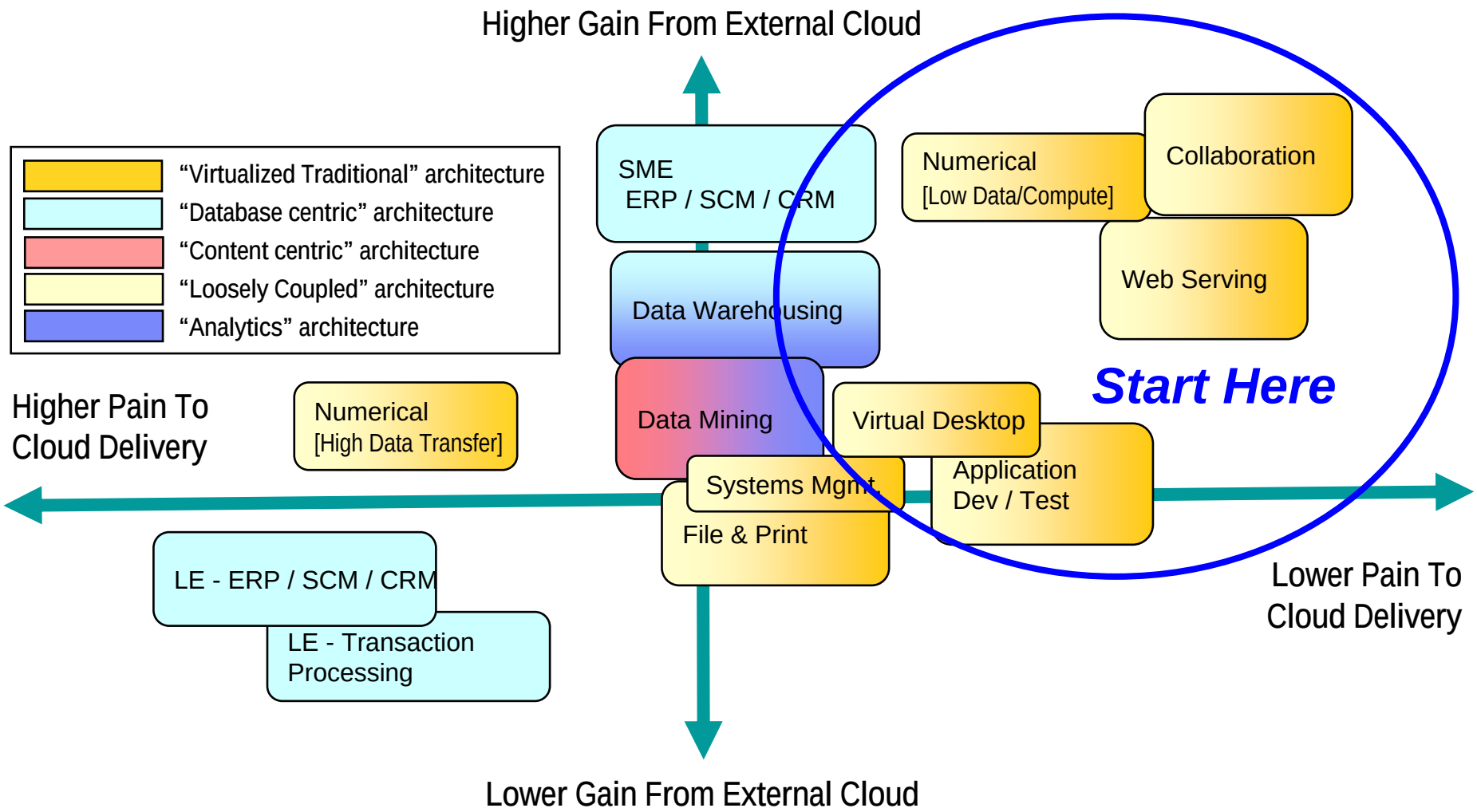
- Drastically reduces the number of departmental solutions to a single BI environment capable of supporting vast numbers of users across the lines of business.
- Introduces a single point of control for meeting departmental business processes, corporate security and compliance standards for easier enforcement of standardization.
- More effectively uses skilled BI resources to support a common BI delivery tool which can be made available across the enterprise.
- Reduces the capital and operating expenses needed to support enterprise wide BI services.
- Supports a self service approach to dispensing BI services that reduces the time, resources and costs for delivering BI services to new divisions, departments and users
- Supports critical thinking in the enterprise with BI Competency Center education

"What IBM has done is come up with a perfect application for a private cloud."

– John Webster, CNET, Nov. 18, 2009

How Do I Develop a Cloud Strategy for My Organization?

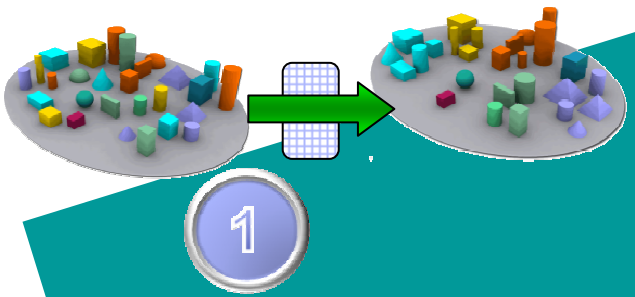
Adopting to Cloud Computing Based on Workload Affinity



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

Take Out Cost

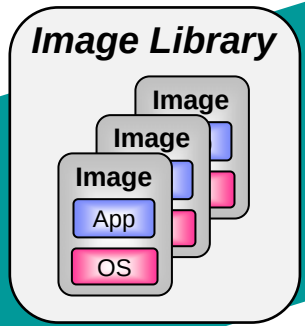
STEP 1
Consolidate and Virtualize



- 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

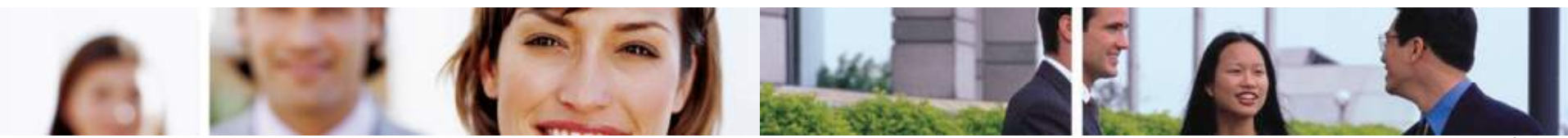
- zEnterprise is the industry's only multi-architecture cloud solution
- Use a cloud deployment model to host multi-tier solutions across System z, POWER and System x resources
- Use the Unified Resource Manager and Tivoli ISM for optimal workload placement

Cloud Offerings and Products		
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

Where Do I Go to Learn More?

Where Do I Go to Learn More?

- *Join IBM Academic Initiative to enhance staff productivity:*
  - *Training on Integrated Service Management and System z*
- *Receive ISM for zEnterprise information updates on a regular basis:*
  - *IBM Software Newsletter*
- *Leverage Integrated Service Management information:*
  - *Integrated Service Management for System z*
  - *Service Management Strategy & Design*
- *Get started with Cloud design services*
  - *Strategy and design services for a cloud infrastructure*
- *Take advantage our of FREE self-assessment tool:*
  - *Integrated Service Management Self-Assessment*



Questions?