Delivering a private cloud and cloud-based services

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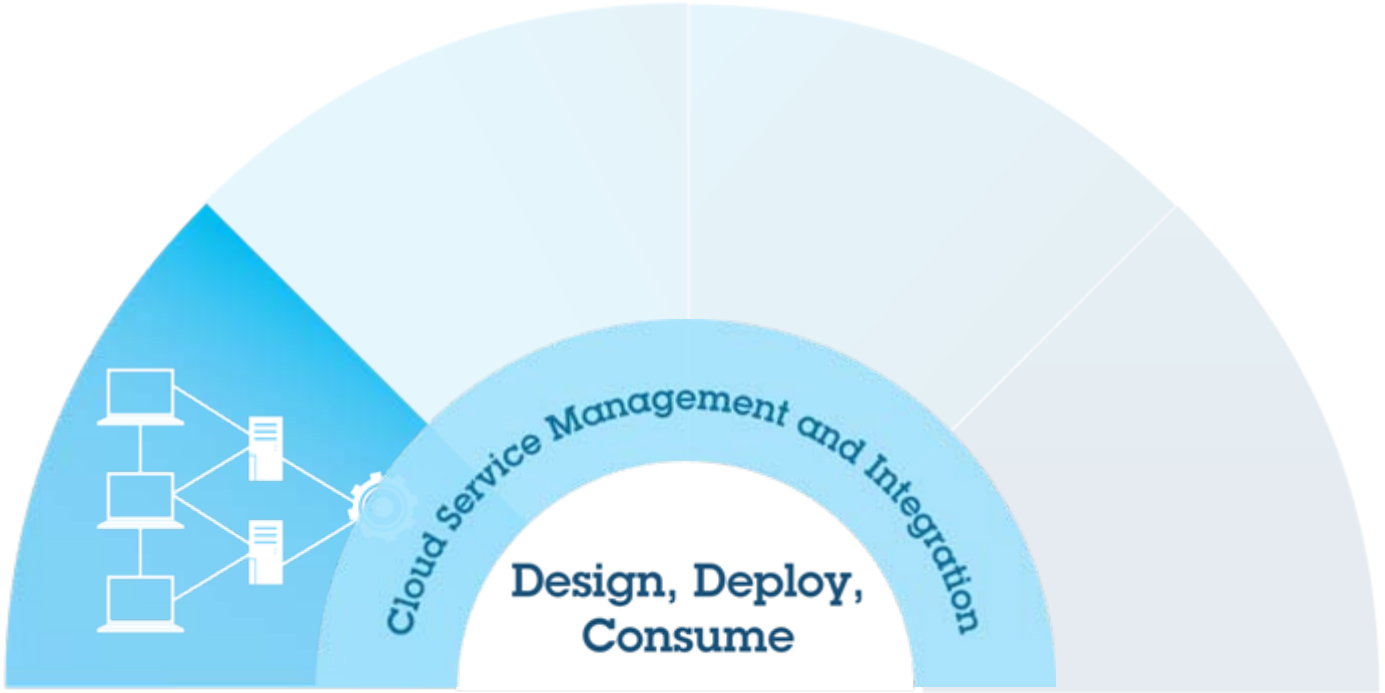
Cloud Enabled Data Center

Integrated service management, automation, provisioning, and self service



Consequences of Lack of Action on Cloud

- Pressure from IT's internal customers to deploy services quicker and a lower costs as Cloud moves into the mainstream
  - One UK Bank had a LOB deploy a Public Cloud offering from Google without consultation with the IT dept…
- Without Cloud type offerings deployed, the businesses competition will be quicker to react when launching new applications or systems, leading to loss of 1st mover advantage.
- Without an internal scalable, elastic, easily provisioned, simply charged-back infrastructure the case for either outsourcing or Cloud increases
- Cloud computing offers the promise of starting new businesses relatively easier, without the high burden of IT capital expenditure of the past. This opens up many industries to new breeds of "IT asset light" competitors.

Why deploy clouds on larger, scale-up servers like System z?

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 supplying business flexibility for years

System z supplies all components necessary to deliver cloud today

Workload Management

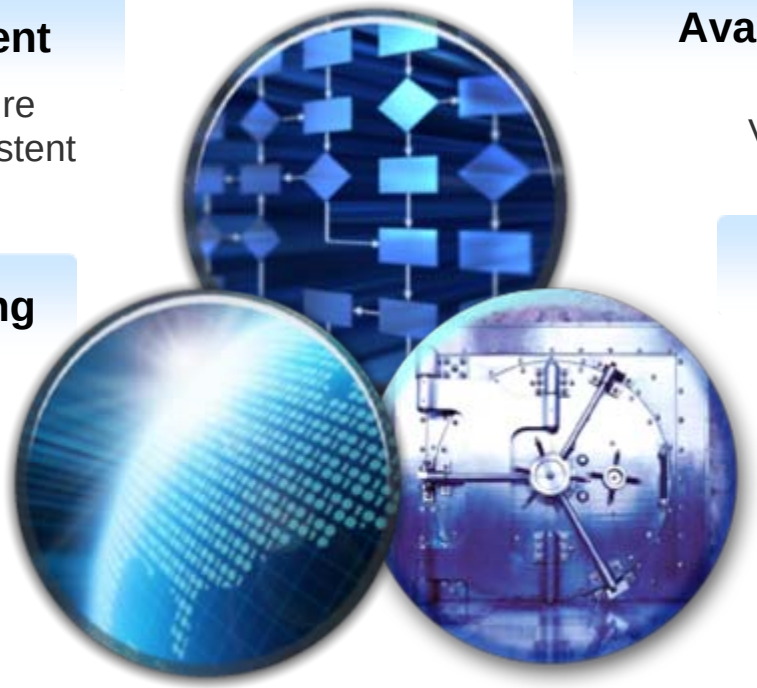
Manage cloud infrastructure capacity requirements consistent with business policies

Transaction Processing

Support integration of cloud with mission critical OLTP applications

Scalability

Scale vertically with z/OS and LPAR and horizontally with Linux on System z and z/VM 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

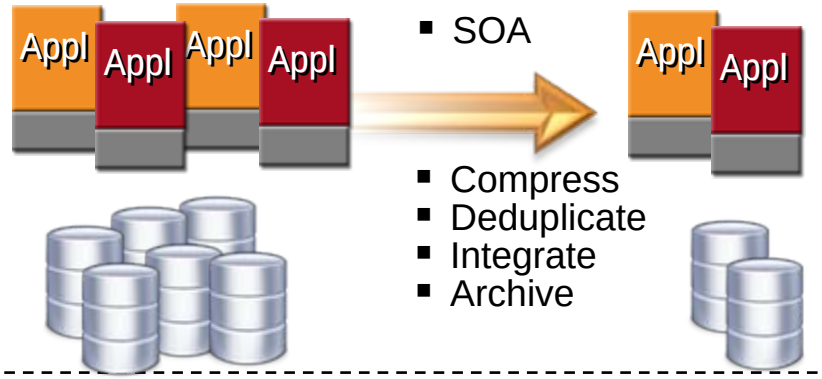
Workload based accounting and metering to support capacity planning and chargeback to LOB

Strategies to Reduce Costs and Improve Value

Optimize the Overall IT Environment

Consolidate Hardware Infrastructure

Eliminate Redundant Software and Data



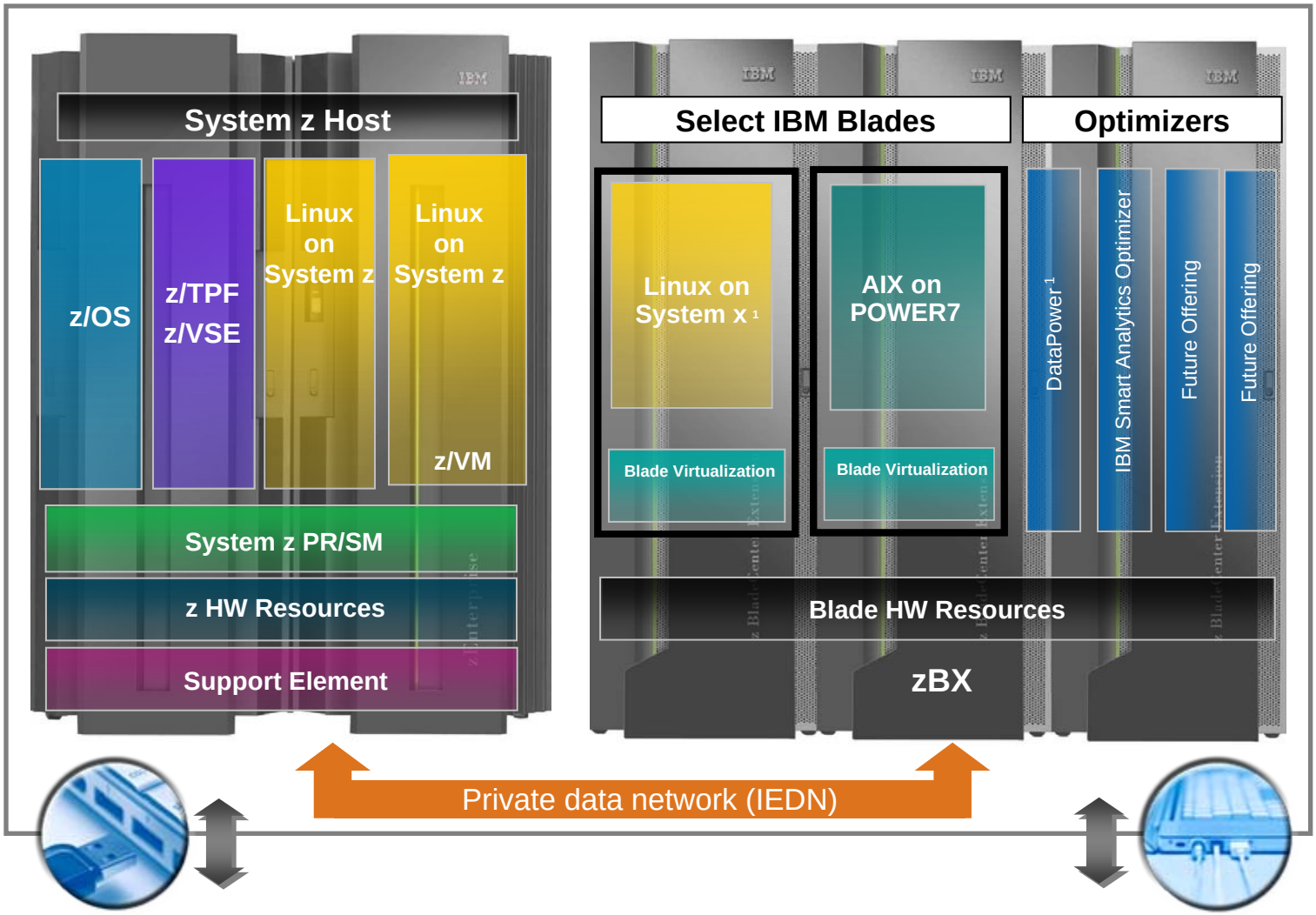
Improve Service Delivery

Integrated Service Management

Visibility Control Automation Cloud Computing

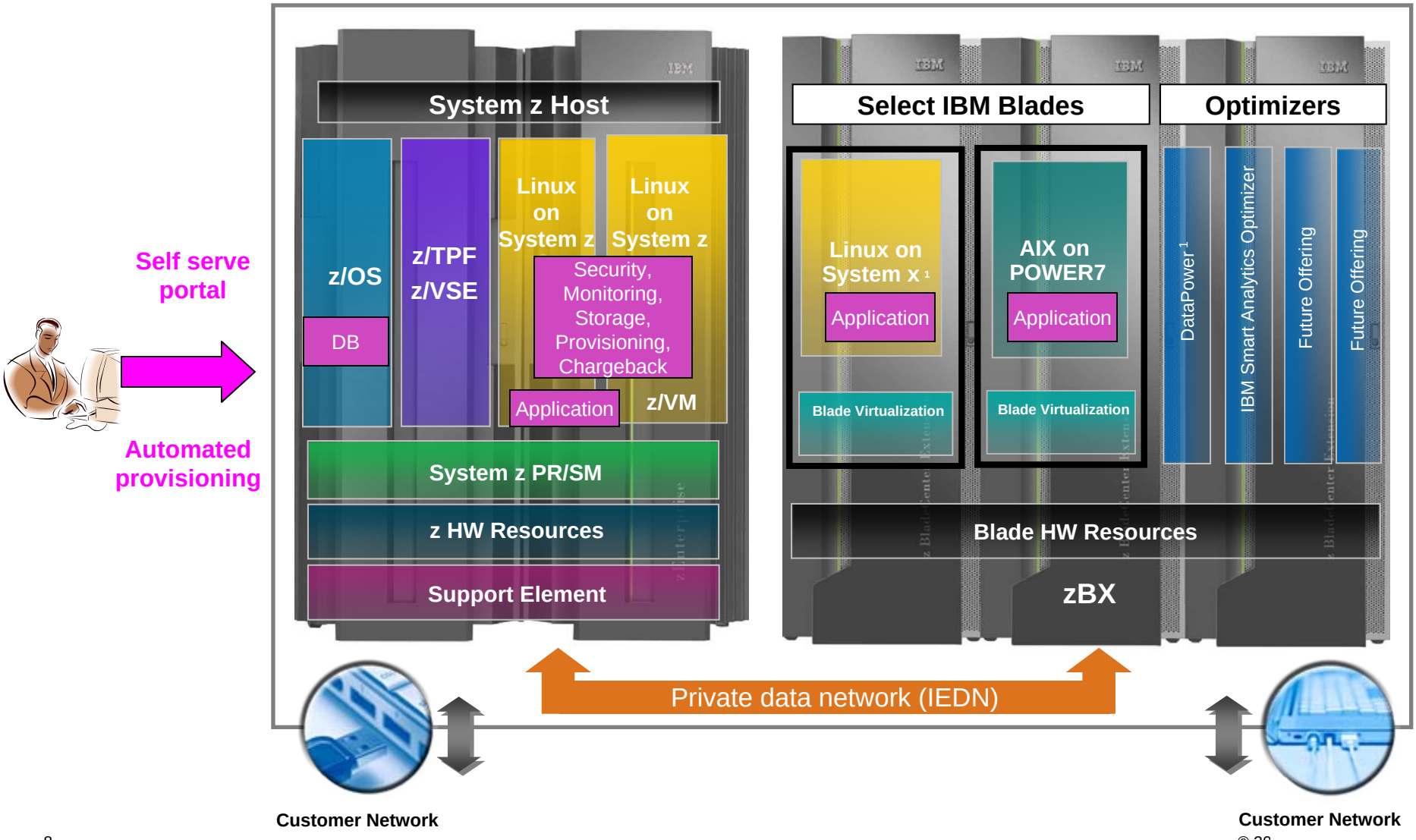
Putting zEnterprise System to the task

Optimized environment for critical workloads



Putting zEnterprise System to the task - Example

Use the smarter solution to improve your application design

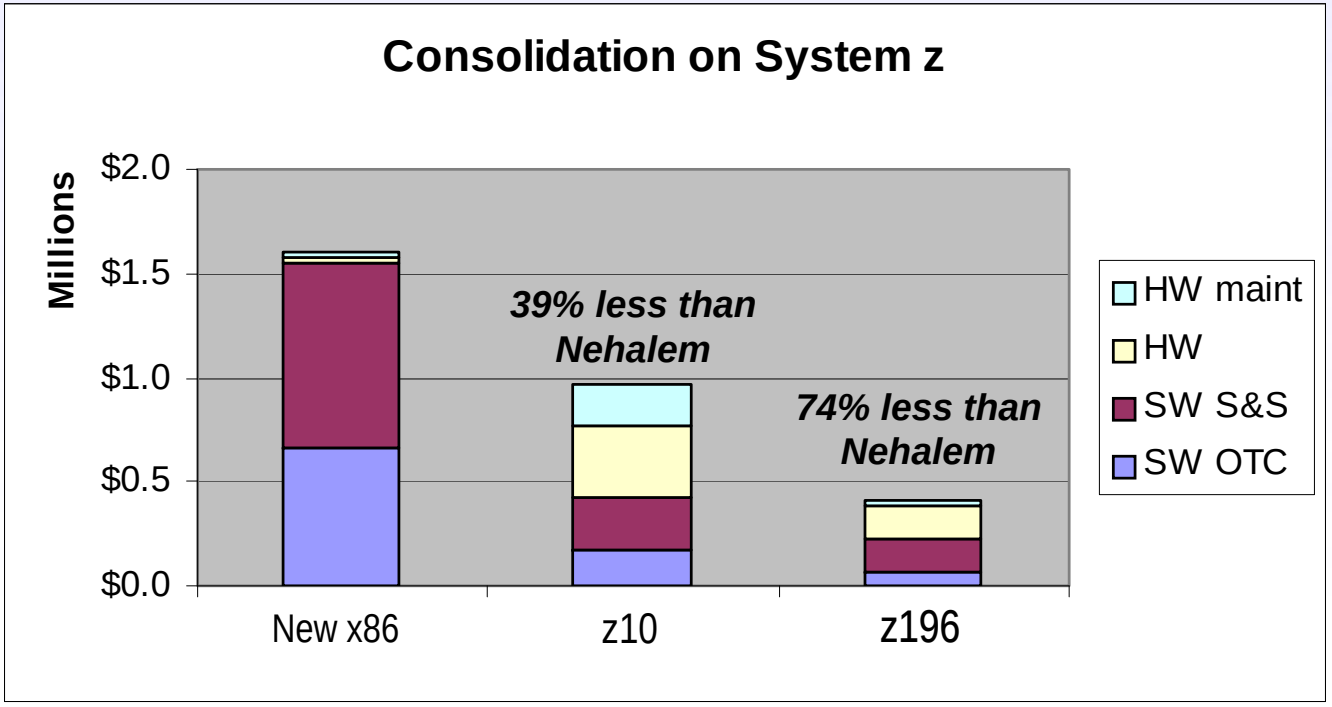


The Most Efficient Platform for Large Scale Consolidation

Linux on z196

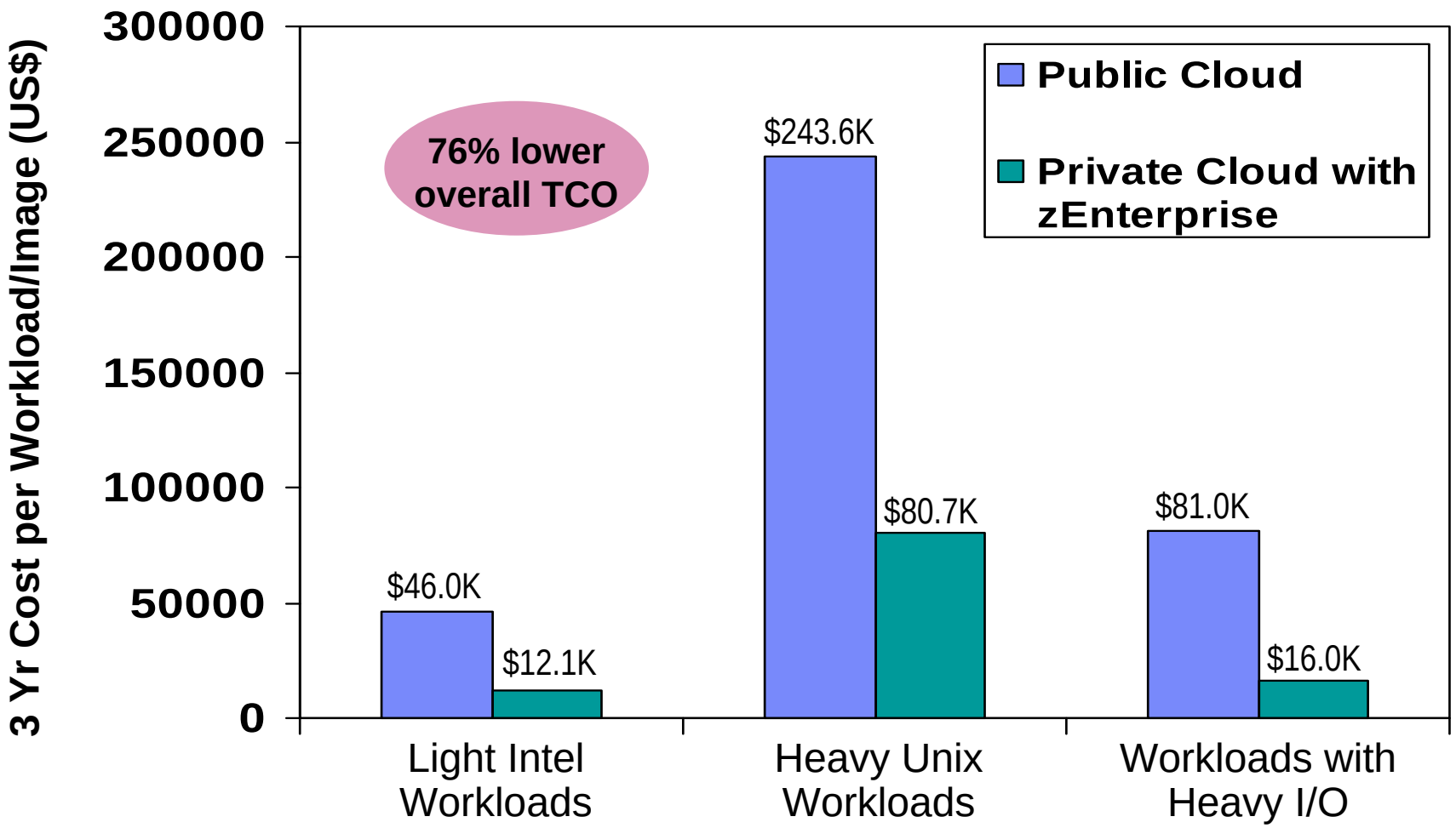
- ***Lower acquisition costs of hardware and software vs distributed servers****
- ***Less than $1.00 per day per virtual server (TCA)****
- ***Reduce floor space by up to 90% compared to distributed servers****
- ***Reduce energy consumption by up to 80% compared to distributed servers****

Consolidate 40 Oracle server cores onto 2 Linux cores on zEnterprise



* 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.

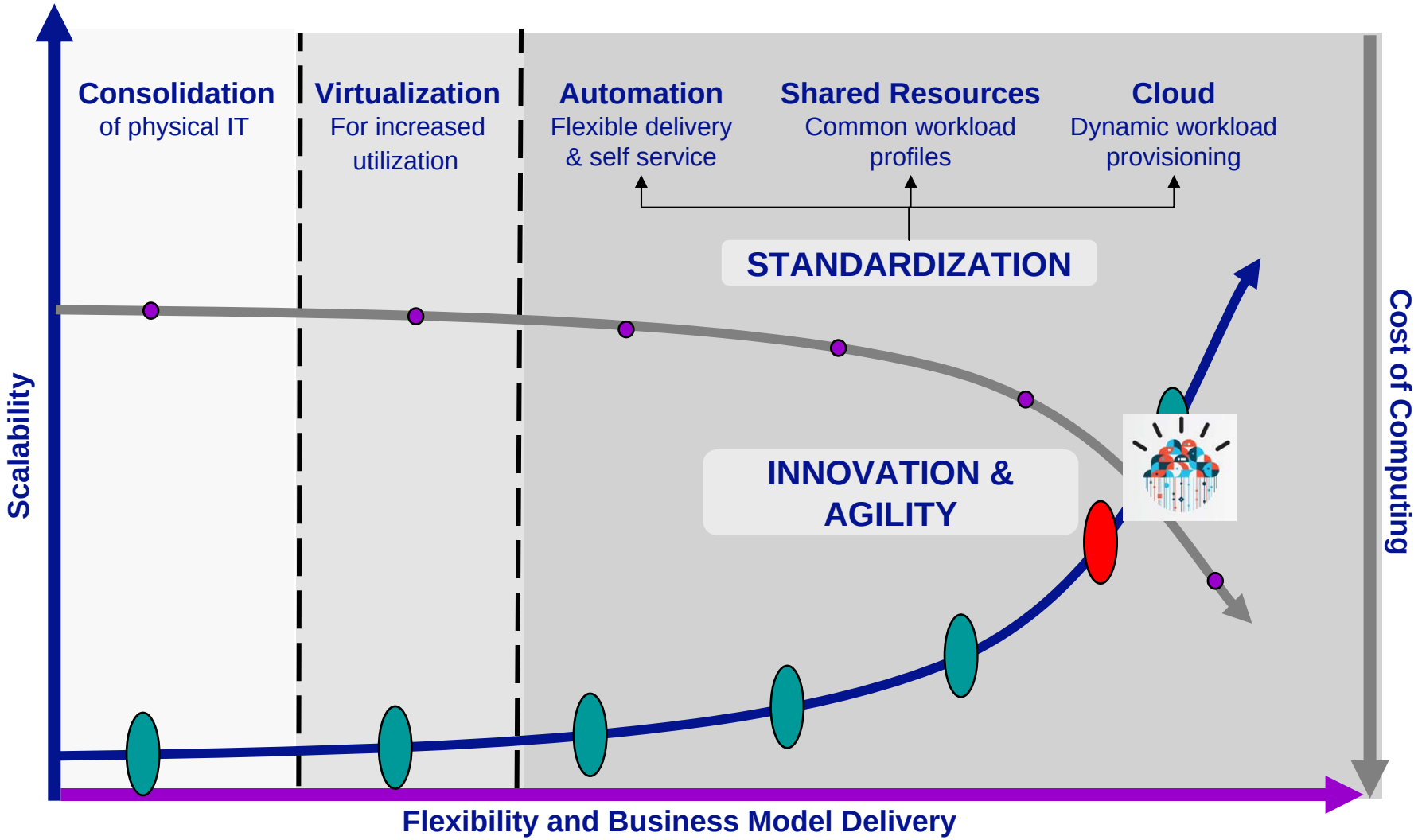
Private Cloud On zEnterprise Reduces Costs



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.

Obtaining the full benefits of cloud

Movement to standardized infrastructure is driving greater automation and optimization



Cloud computing services from IBM are delivering measurable results and addressing IT infrastructure challenges

Value delivered	From traditional	To cloud
Change management	Months	Days or hours
Test provisioning	Weeks	20 minutes
Install database	1 day	12 minutes
Install of operating system	1 day	30–60 minutes
Provisioning environment	-	51% cost savings
Design & deploy business applications	Months	Days/Weeks

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

However, Cloud is not without its challenges…

After all, IT has been trying to automate service delivery from the start...

Bottom Line:

- Virtualization good starting point but not sufficient
- x86 Server Virtualization has not been the nirvana it was promised to be:
  - VM Stall - Still hundreds of server OS images to manage
  - VM sprawl – Hundreds of VM's deployed as it is easy to deploy a VM
- Requires intelligent platform and QOS that z provides

Cloud Requires

- ✓ Full **service lifecycle management**, not just provisioning of resources
- ✓ Seamless collaboration & workflow **across Service Design and Service Operations**.
- ✓ Interoperability of infrastructure, tools & delivery models as **automated system**.

Integrated Service Management delivers the value of Cloud

- Maximize utilization from automating and deploying workloads in a cloud
- Achieve greater efficiency with standardized, simplified resource allocation and monitoring
- Increase availability based on analytics for improved customer satisfaction
- Operate workloads securely across Enterprise Businesses
- Improve ROI with tracking and billing based on workload usage


Discovery


Monitoring

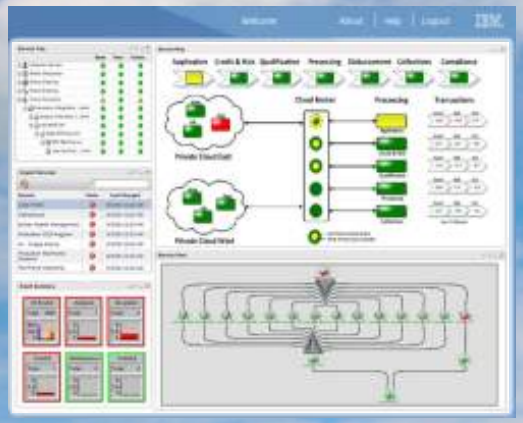

Security


Provisioning


Accounting

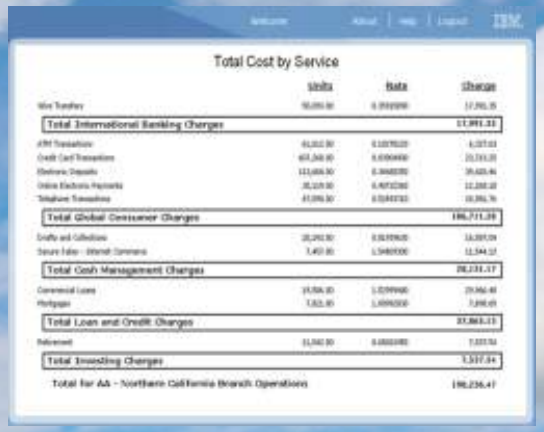
IBM's Cloud Service Delivery Platform gives organizations the Visibility, Control, Automation™ needed for cloud…

VISIBILITY



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

CONTROL

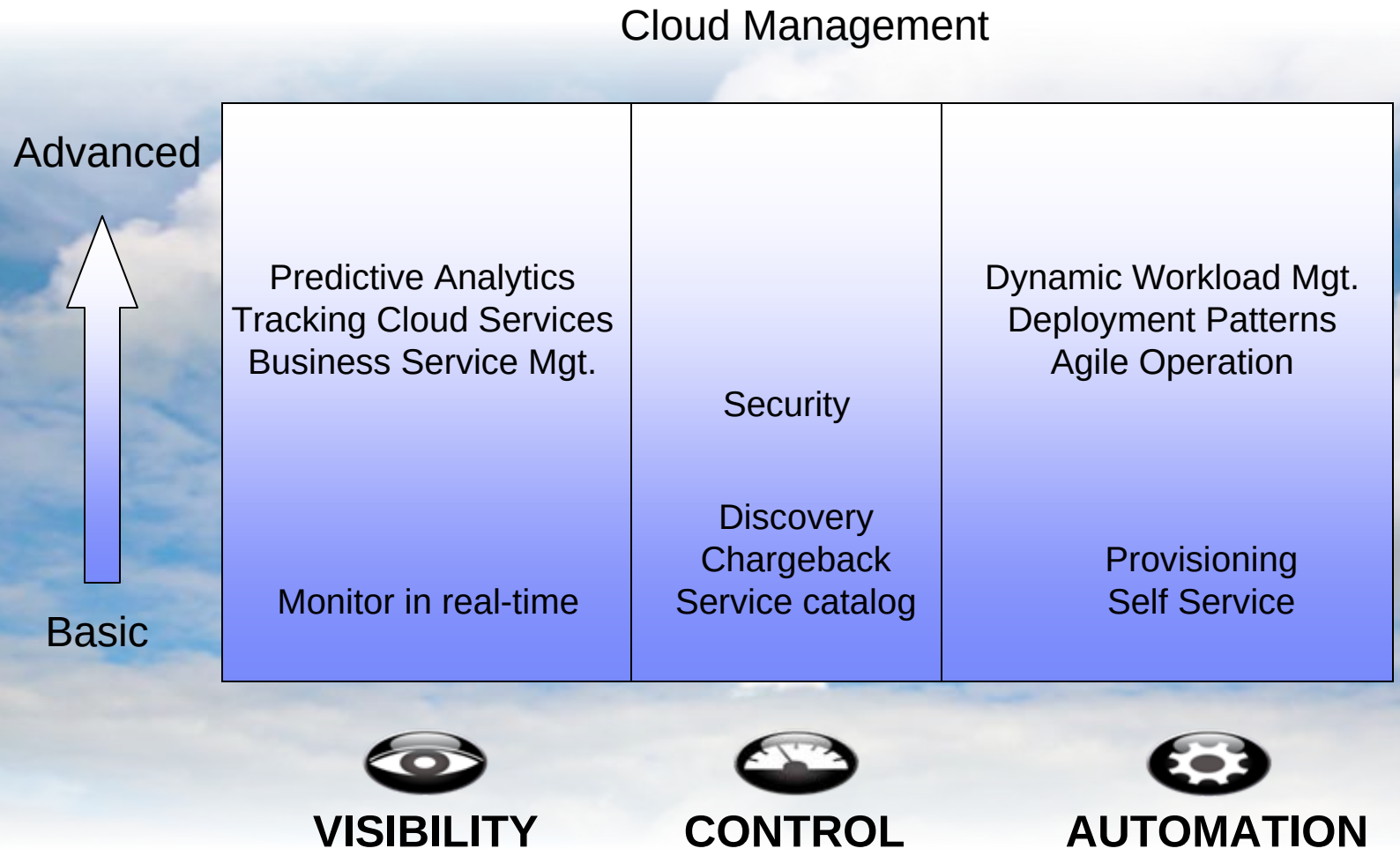


***Control**: Manage compliance and costs through effective cloud policy enforcement and service reporting.*

AUTOMATION

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

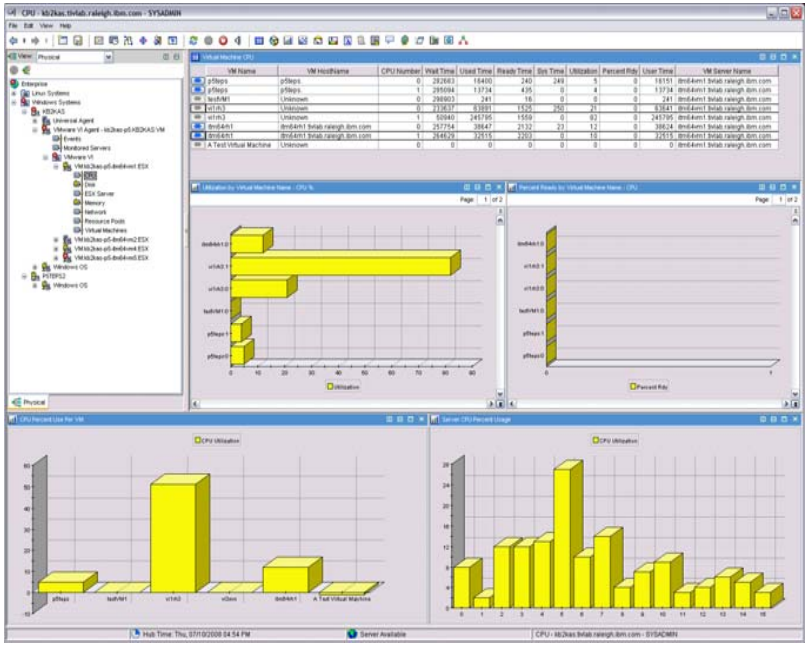
Driving cloud ROI using advanced cloud management capabilities



Visibility to cloud servers through real-time monitoring

VISIBILITY
Basic

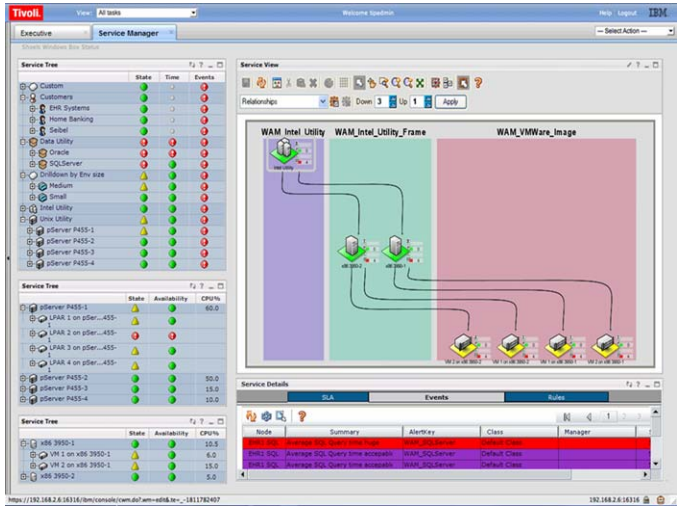
- Collect key performance and availability metrics.
  - Application, VM, virtual network, virtual storage I/O and other metrics
- Receive real-time proactive & predictive alerts
  - Side-by-side and historical data to identify problems quickly
- Warehouse data and report on current and future trends
  - Identify resource bottlenecks, plan for future capacity needs, and optimize resource performance



Visibility at the business level leveraging detailed views

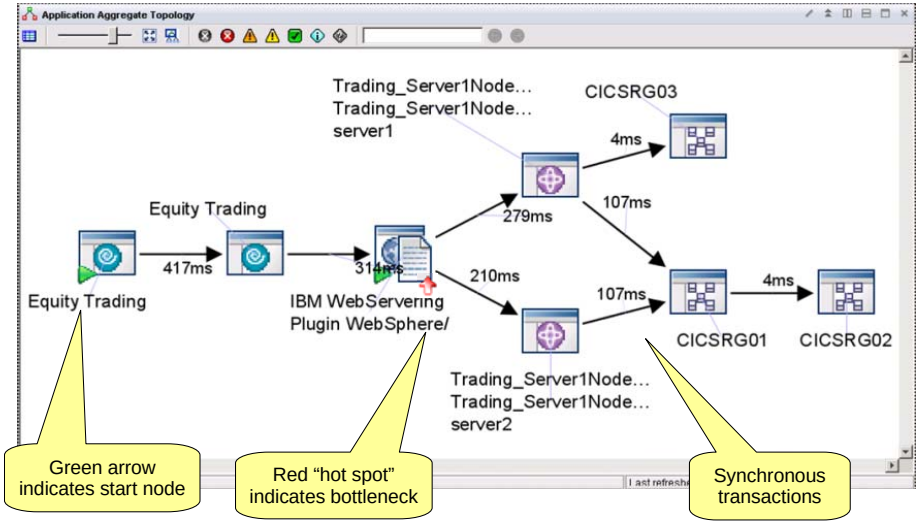
VISIBILITY
Advanced

Business Service Management



- Visualize physical & logical partitions and physical & virtual machines
- See service-impacting root cause events for prioritized response

Detailed transaction view

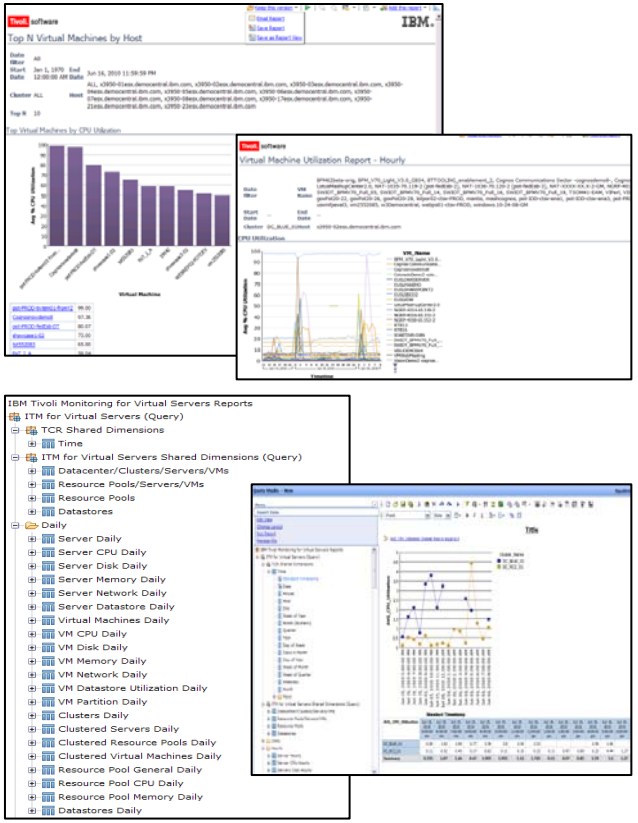


- Agentless tracking for public and hybrid clouds, Linux on System z agent for clouds on z
- Ability to monitor and alert on SOA SLA policies defined in WebSphere
- Integrated response time and tracking

Visibility through analytics to enable capacity planning and optimization of cloud & virtual environments

VISIBILITY
Advanced

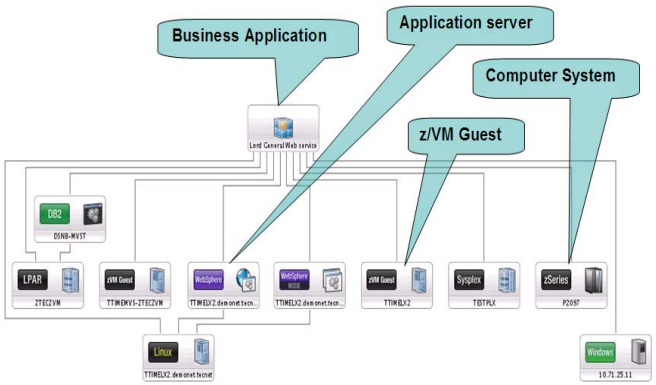
- Perform virtual machine right sizing - adjust the allocated computing resources to levels needed for the virtual machine by understanding real usage of computing resources over time
- Determine how many more customers or virtual machines can be serviced with existing resources
- Predict physical and virtual resource capacity bottlenecks
- Performance trending and resource forecasting



Control the cloud environment and services

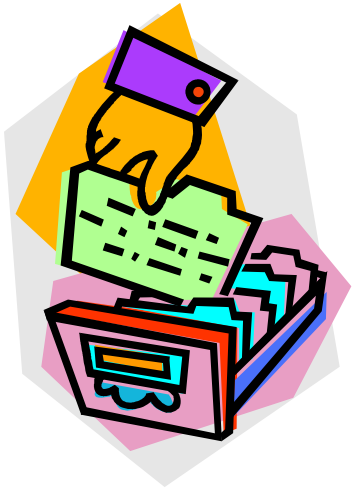
CONTROL
Basic

Discover



- Understand what you have
- Discovery application relationships/dependencies
- Determine if it is compliant

Service Catalog



- Single repository for all cloud services
- Insure delivery of standard services to avoid virtual server sprawl

Chargeback

- Control supply by charging for services
- Determine service rates based on service costs and real usage
- Provide service usage and enable billing

Control cloud security

CONTROL
Basic- Adv.

- Deploy a security strategy that smoothly integrates into the fabric of the cloud
- Consider… one size does not fit all, different cloud workloads have different risk profiles

Access and Identity

Need to leverage a combination of extensive internal policies

Data and Information

Apply data protection to information when possible

Release Management

Implement strong polices for management of virtual images and software within it's environment

Security Event Information Management

Provide the functions for security event and information management

Physical Security

Need to apply security to data centers such as CCTV, 24/7 physical security biometrics, etc.

Threat and Vulnerability Management

Leverage managed services and tolling for best of breed solutions

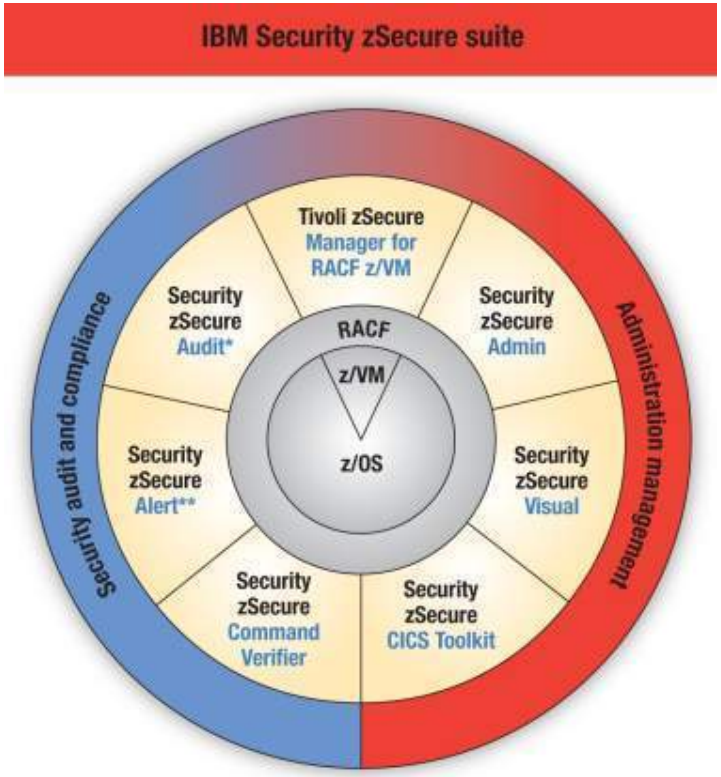
Control in cloud will require security to address reliability and compliance

CONTROL
Advanced

- Enforce security policy compliance and reduce security vulnerabilities
- Centrally manage and protect access to applications, business services, infrastructure, and data across server, storage and network
- Leverage the mainframe as your Enterprise Security Hub for cross-platform security

Comprehensive security control
- Cost-effective security administration, security policy enforcement, automated auditing and compliance to detect threats and reduce risk

Advanced security key management
- Protect data encrypted on server and storage
- Supports all latest System z centric storage
- Supports all System z hardware crypto

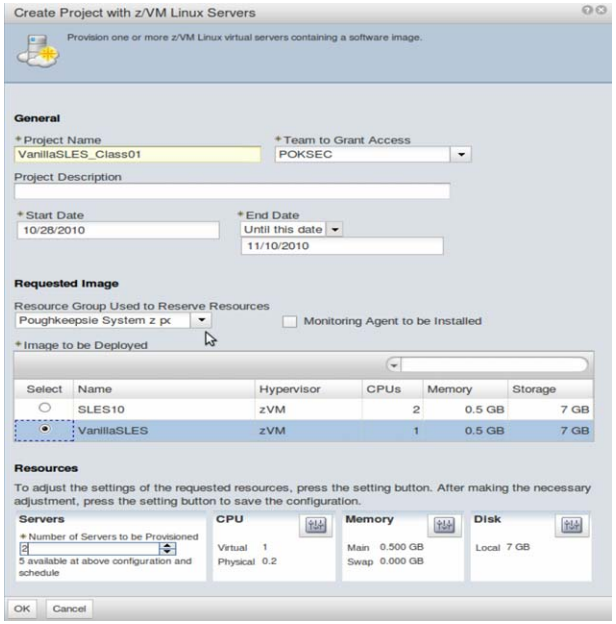


on

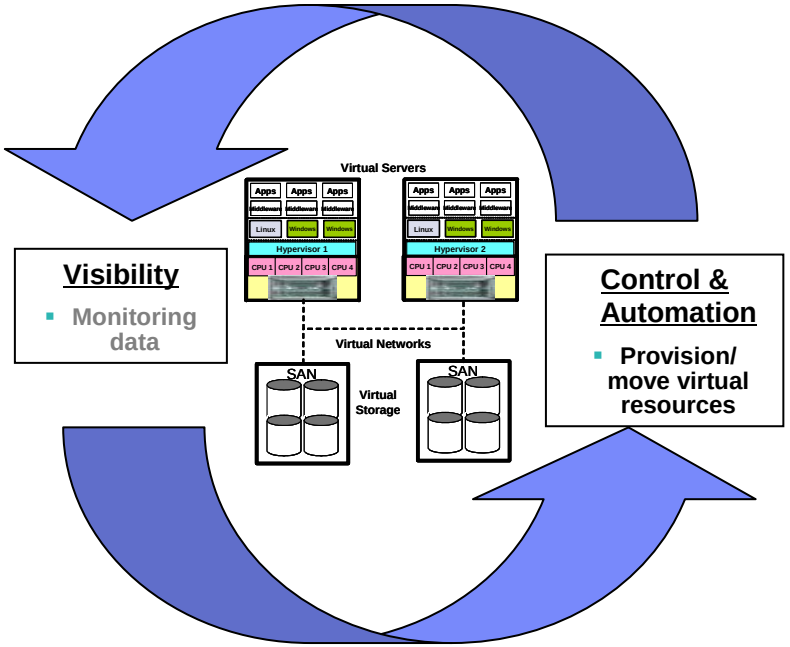
Automation of service provisioning and enable self service

AUTOMATION
Basic

Self Serve Portal



Automated Provisioning



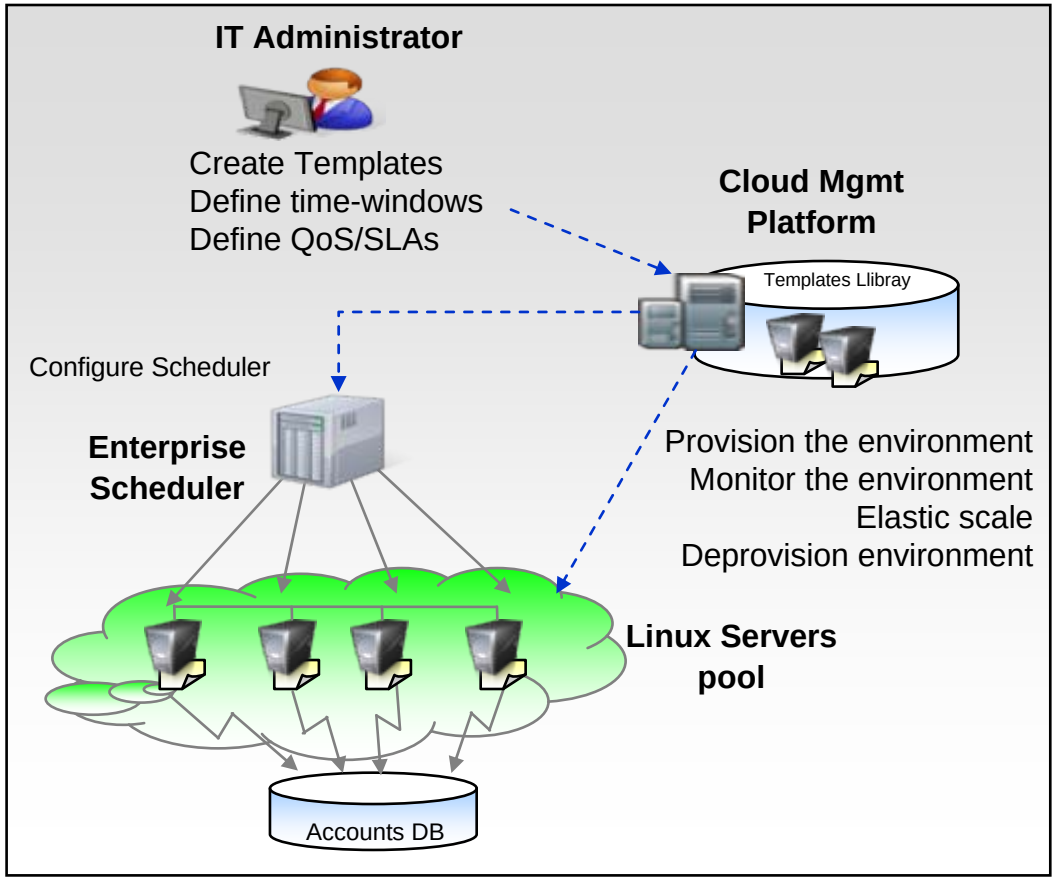
- Self serve web portal allows users to request services from a service catalog
- Automate approval workflows and provide visibility to status
- When service no longer needed de-provision resources and return to pool

- Coordinate and manage virtual resource provisioning from a centralized manager
- Increased HW utilization and decreased energy consumption

Automation for cloud based dynamic workload management

AUTOMATION
Advanced

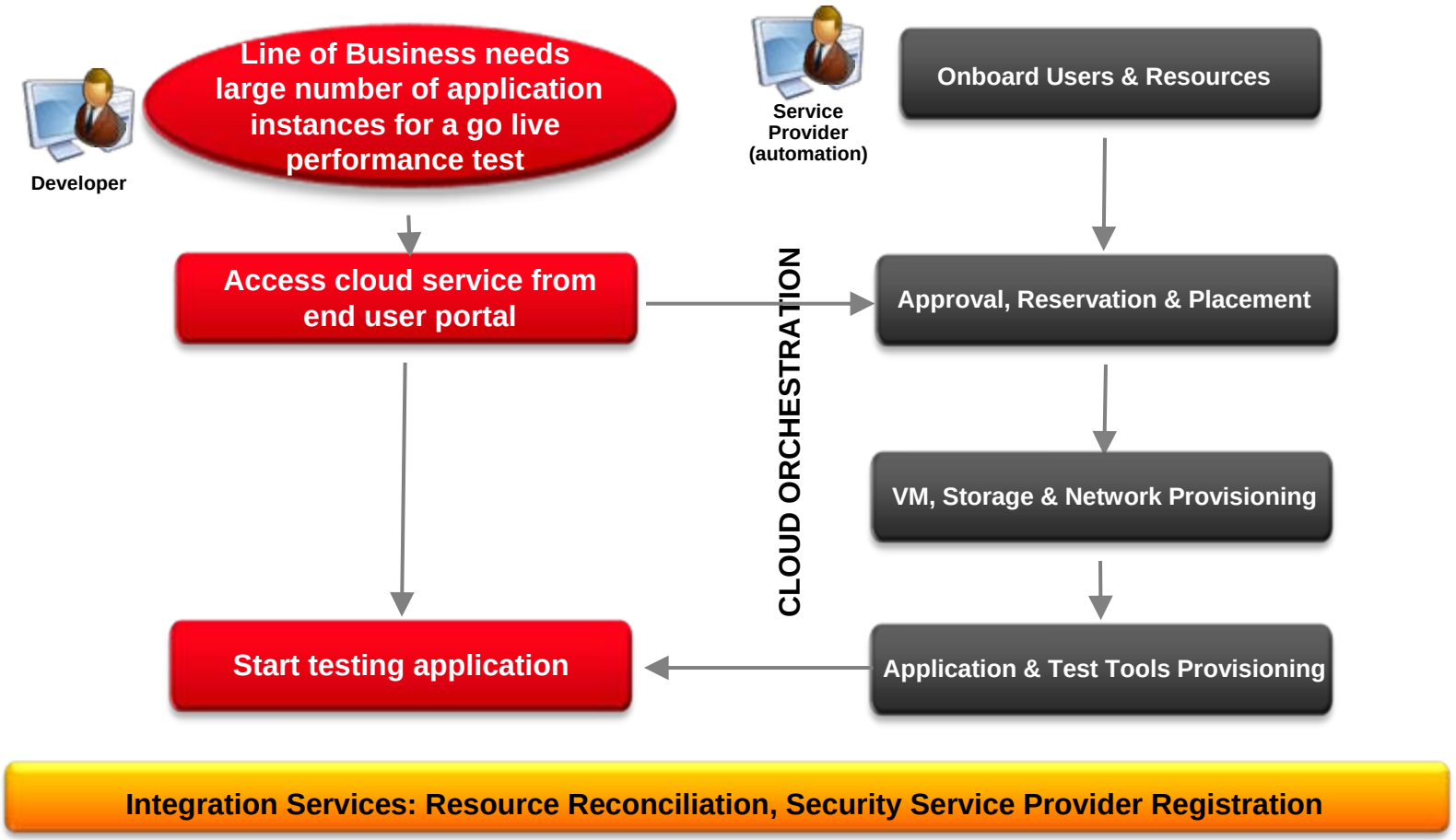
- Dynamically expand resources to meet spikes in demand such as month end processing
- Reduce investments and effort, through simple provisioning and release of workload automation resources
- Simplify the lifecycle management of a “batch-ready” execution environment
- Reduce energy costs



Automation drives agile operations cloud

AUTOMATION
Advanced

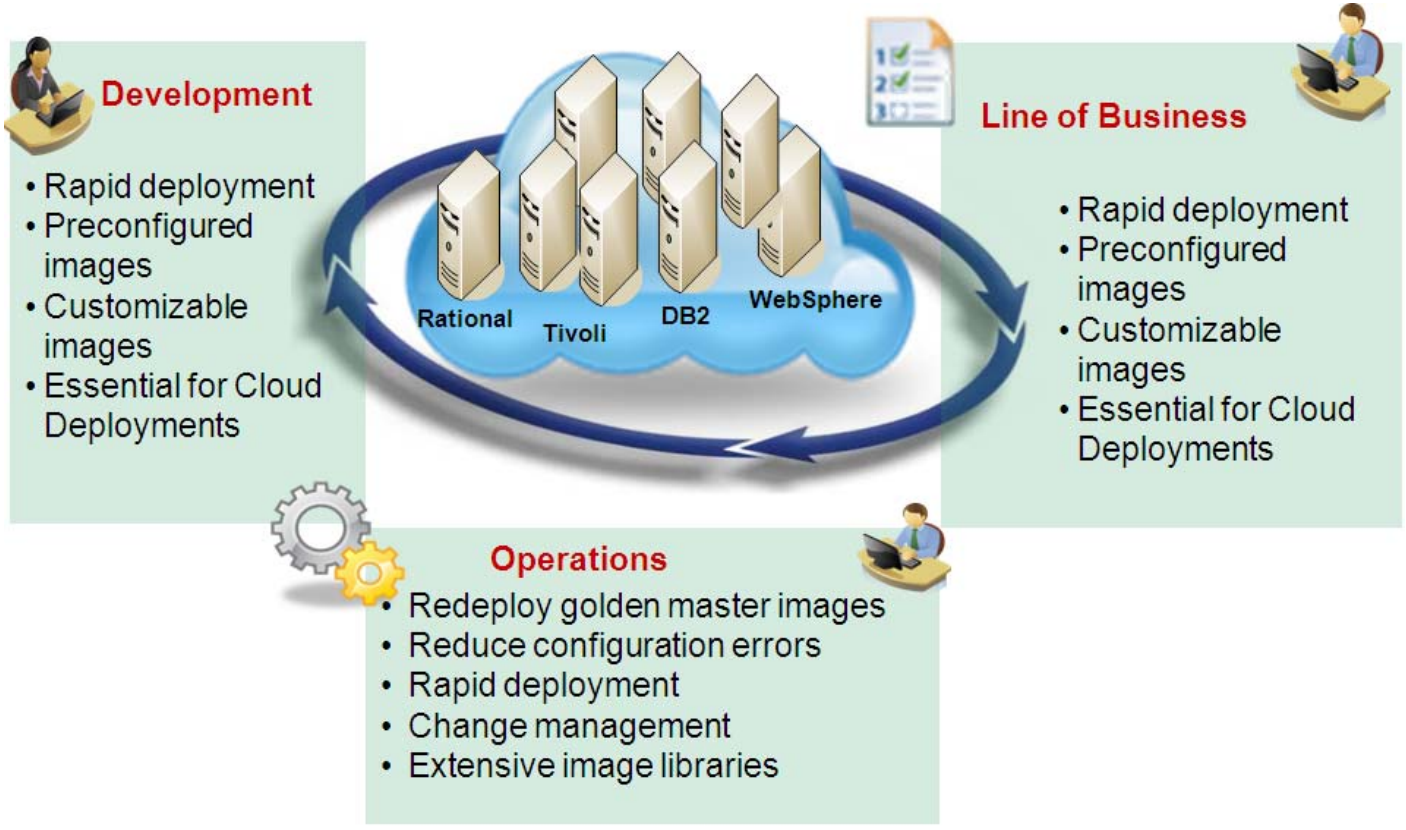
Use Case: Rapid and scalable deployment of an application performance test environment for a critical Line of Business Application



Automation optimizes service delivery through dynamic application pattern deployment

AUTOMATION
Advanced

Use Case: Rapid development of middleware application patterns with accelerated staging across release environments

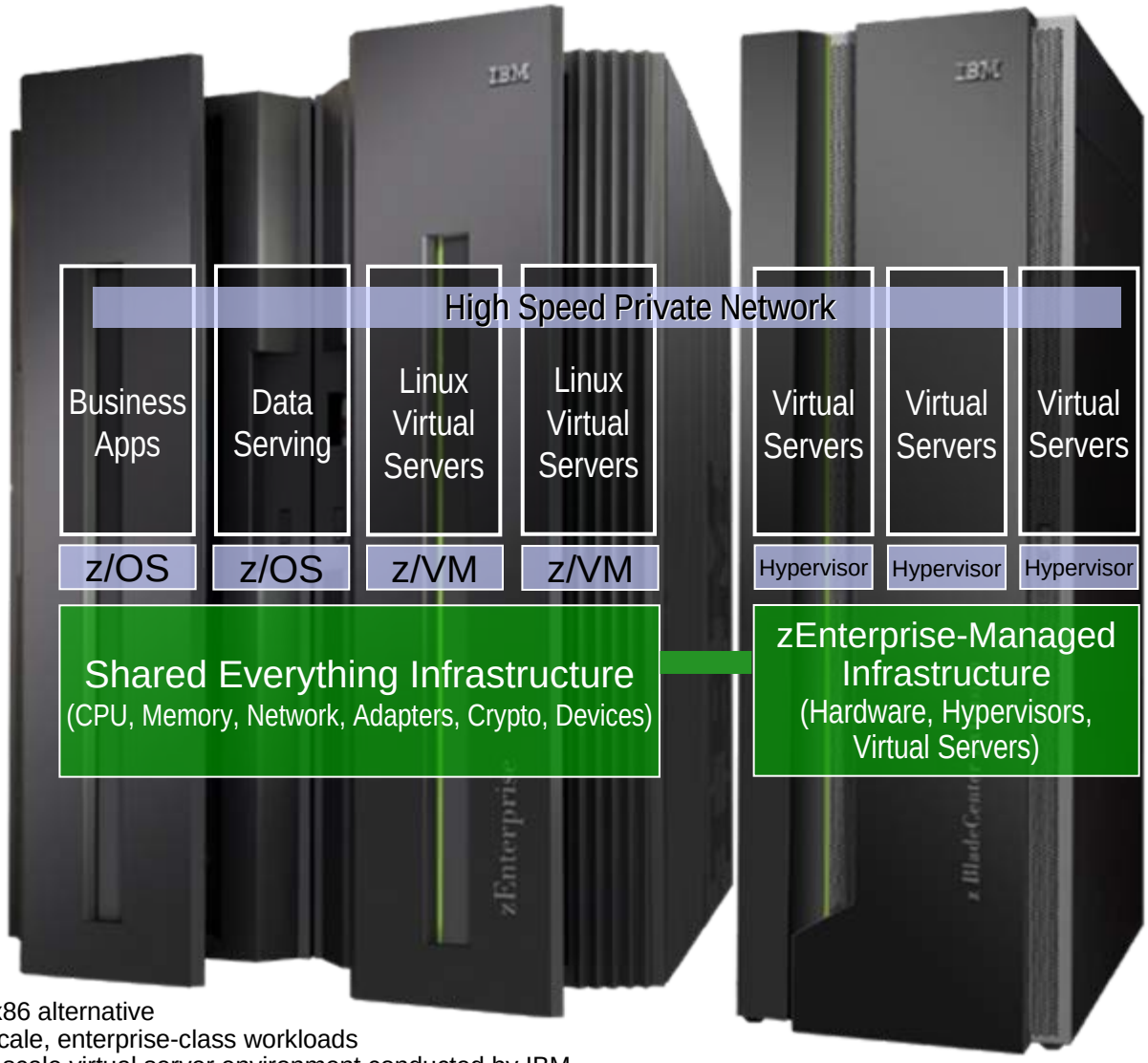


Optimized workload deployment : Integrated Dev/Ops tools, Dynamic Scalability, Resource Elasticity

IBM zEnterprise for IT Optimization, Consolidation, Cloud Computing

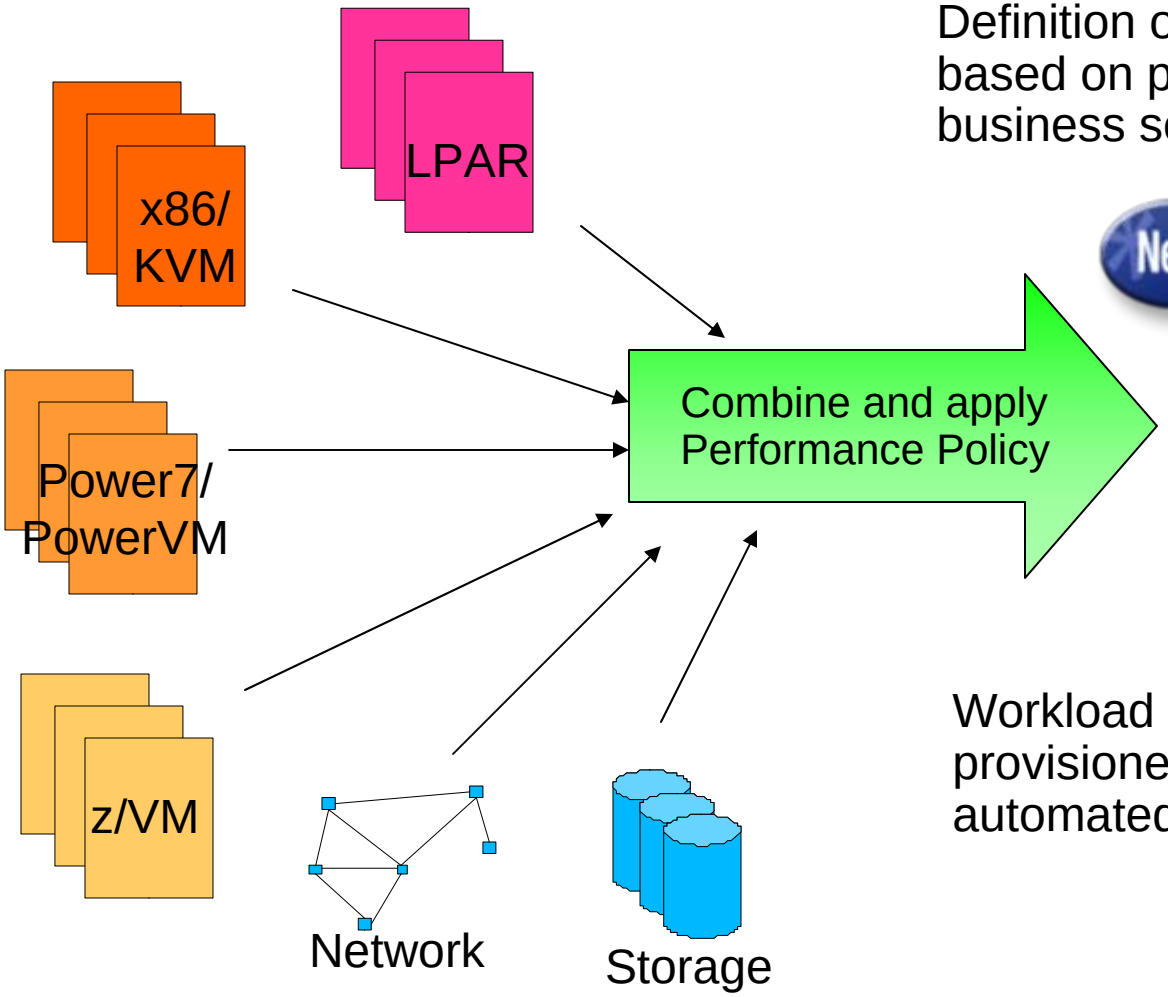
The "graduate" level capabilities in Cloud computing

- Consolidate even more with zEnterprise IFLs: up to 60% faster at 33% lower price
- Increase energy savings as you scale, up to 75% (1)
- Spend up to 70% less on acquisition costs (2) and boost staff productivity by up to 70% (3) compared to virtualized x86 alternatives
- Incorporate IBM POWER® and System x technologies for unparalleled levels of workload optimization
- Manage and govern the integrated environment to deliver superior business results at a lower cost

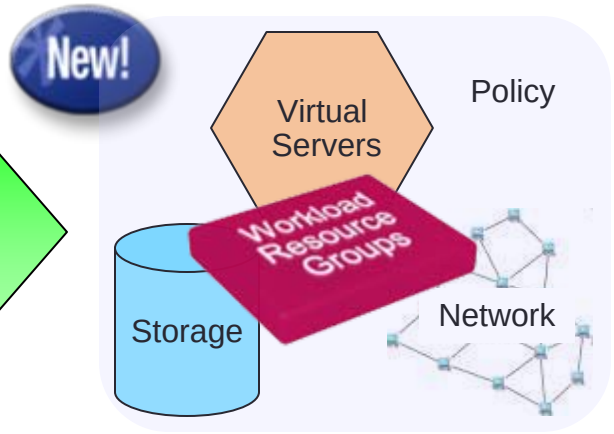


(1) Based on zEnterprise comparison to virtualized x86 alternative
(2) Based on three-year acquisition costs for large-scale, enterprise-class workloads
(3) Based on life-cycle management testing of large-scale virtual server environment conducted by IBM

Workload Resource Groups moves management to the business level versus resources and components



Definition of Workload Resource Groups based on platform requirements to support business services



Workload Resource Groups can be provisioned, monitored, discovered and automated

IBM can help you assess where you are today, and keep up with where industry is going

- *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:*
  - Managing cloud deployments on IBM System z
  - *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*