

The New zEnterprise – A Cost-Busting Platform

Reduce Costs with a System z Private Cloud



System z is ideal for private cloud computing

Two major cost reducing strategies...

**Reduce Hardware
and Software Costs**

**Consolidate
and Virtualize**

**IBM zEnterprise
with Linux on z/VM**

**Reduce Labor Costs
and Improve Agility**

**SmartCloud
Provisioning**

**Automate
Operations**

System z with IFL processors delivers unmatched capacity



zEC12

IFLs have same performance characteristics as general purpose processors



IFLs take advantage of System z dedicated I/O subsystem



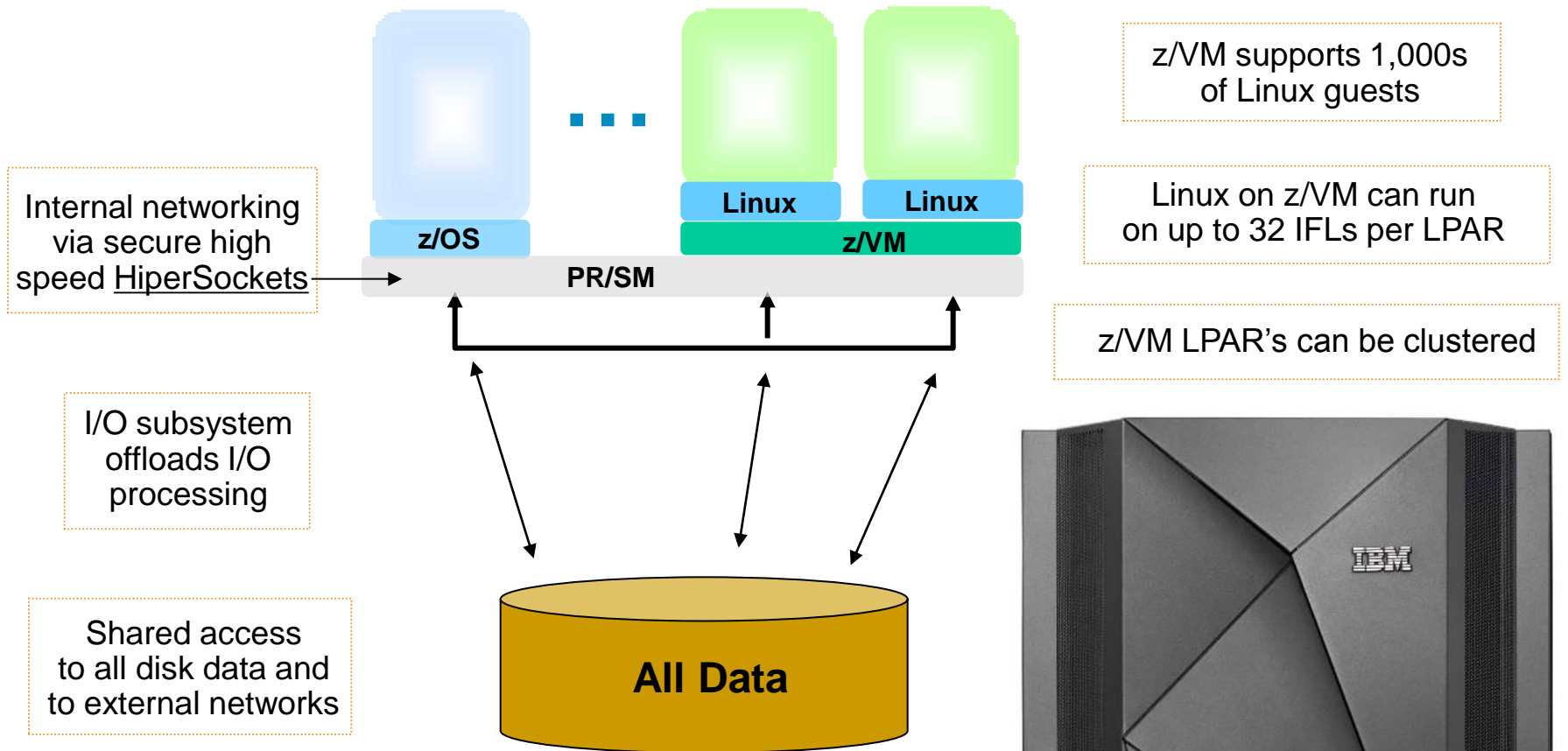
Software running on IFLs is licensed same as distributed architecture (by PVU, not MLC)



zBC12

101	Maximum number of processors configurable as IFLs	13
5.5 GHz	IFL clock speed (same as general processors)	4.2 GHz
78,426 MIPS	Maximum IFL capacity	8,733 MIPS

Linux virtual machines run as guests on z/VM



Examples of workloads best suited to consolidate on Linux on z/VM

Workloads with high I/O demand



Smaller scale transaction processing workloads

Workloads with co-location requirements



Systems of engagement workloads

Workloads requiring high availability and qualities of service



Applications critical to business revenue

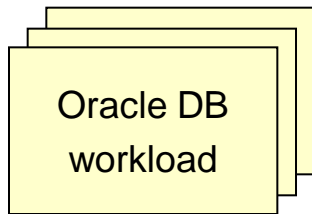
Consolidation of large numbers of low utilization servers



Mixed utility workloads

Workloads with higher I/O bandwidth requirements benefit from System z architecture

Which platform provides the lowest TCA over 3 years?



3 Database Workloads
Oracle Enterprise Edition
Oracle Real Application Cluster



3 Oracle RAC clusters
4 server nodes per cluster
12 total Oracle T3-4 servers
(768 cores)
\$28.7M (3 yr. TCA)



3 Oracle RAC clusters
4 nodes per cluster
Each node is a Linux on z guest
zEC12 with 27 IFLs

\$5.7M (3 yr. TCA)

80% less cost!

TCA includes hardware, software, maintenance, support and subscription. Workload Equivalence derived from a proof-of-concept study conducted at a large Cooperative Bank and projecting to T3-4 servers using published TPC-C Results normalizing them to Relative Performance Units as available from Ideas International

City and County of Honolulu benefit from System z architecture

Business challenge:

The City and County of Honolulu wanted to increase government transparency and provide more information, such as the city's financial data, to its citizens.

Solution:

Honolulu deployed an Integrated Facility for Linux (IFL) engine running Linux on IBM System z. This provided the necessary platform to provide the city's data to citizens, and it enabled the city to create a custom cloud environment to deploy applications.

Benefits:

- *Reduced database licensing costs by **68** percent*
- Reduced time to deploy applications from 1 week to only hours
- Increased property tax revenue by \$1.4M



“Working with IBM enabled us to take an innovative approach... we were able to get things up and running quickly.”

—Gordon J. Bruce, director and CIO of the Department of Information Technology

Solution components

Optimized systems:

- IBM System z with IFL engine running Linux
- IBM XIV Storage System
- IBM Tivoli software

SAP applications benefit from co-location

Business challenge:

Baldor needed to **cut costs** while simultaneously enhancing customer service with very **rapid** order processing, responsive manufacturing and swift delivery.

Solution:

Migrated its mission-critical SAP and DB2-based applications to an IBM System z running Linux, z/OS and z/VM operating systems, eliminating several large Sun servers in the process.

Benefits:

- Reduced IT costs as proportion of sales by **50%**
- Consolidation cuts power by **40%** and reduces data center floor space from 6,000 to 1,000 sq ft
- Cut system administration and maintenance costs



SAP	DB2
Linux	z/OS

SAP applications
co-located on System z

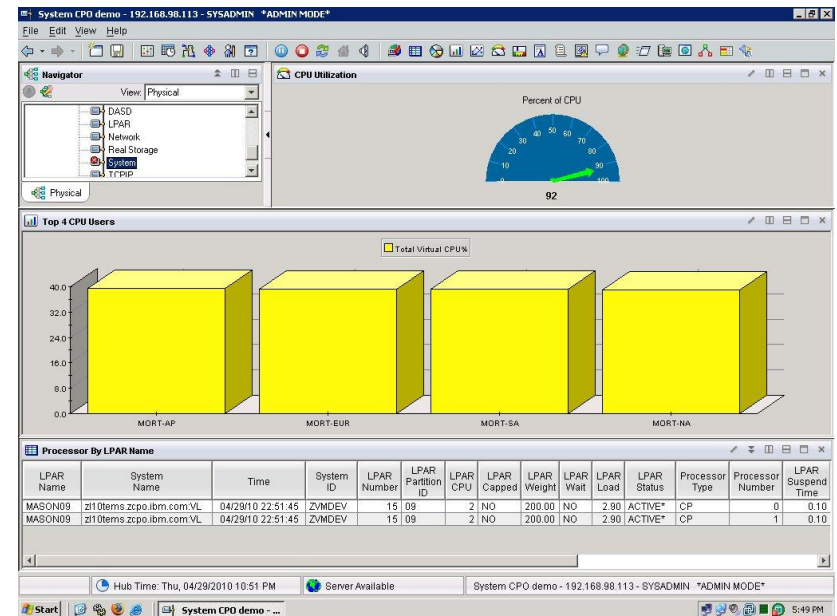
Linux on z/VM workloads inherit System z qualities of service

- Add processing capacity to Linux environment without disruption
- Capacity on demand upgrades
- Reliability, availability, serviceability
- Site failover for disaster recovery



DEMO: Dynamically add processing capacity to z/VM LPAR to handle increased workload without disruption

1. A customer has in-house Risk Analysis program running on Linux on System z
2. Increased workload to all 4 Linux guests is causing z/VM LPAR utilization of 90%+
3. Customer determines this is a long term trend - additional physical capacity needed
4. New capacity made available to LPAR as new Logical CPU, available for work
 - Without disruption in service

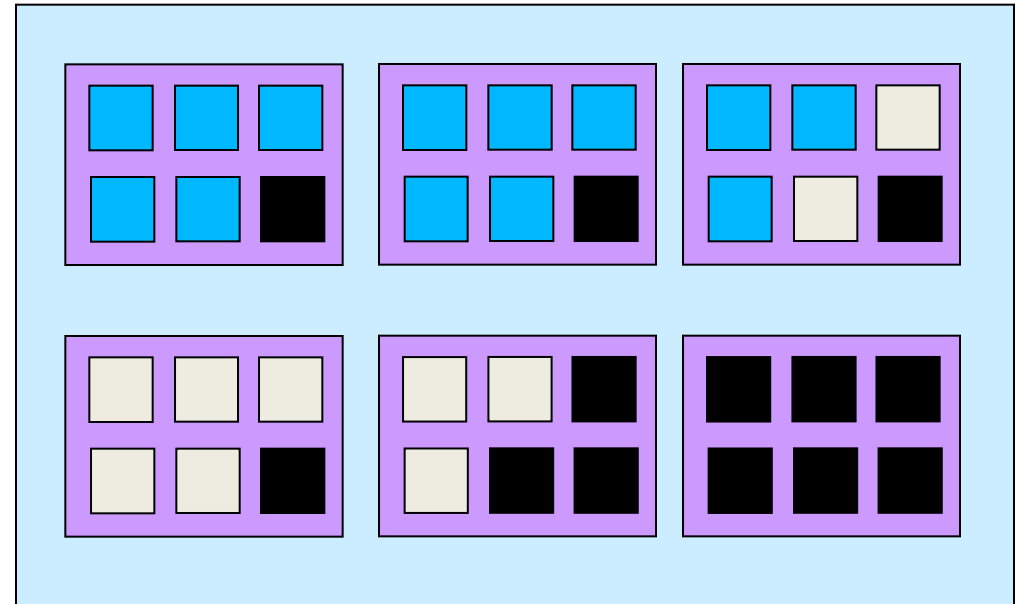





Note: Assumes available processors on installed books

System z Capacity on Demand provides physical processors to handle unexpected peaks

- Capacity on Demand
 - “Books” are shipped fully populated
 - Activate dormant processors as needed
 - Use for temporary or permanent capacity
 - Self-managed on/off
- New capacity is immediately available for work without service disruption

OnezEC12 book with 36 processors



-  Active processors – pay full price
-  Inactive processors (On/Off CoD) – pay only 2% of full price
-  Dark processors (unused) – no charge

Transzap benefits from high reliability

Business challenge:

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 triple digit **growth** within their software as a service business model.

Solution:

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 to 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.”*

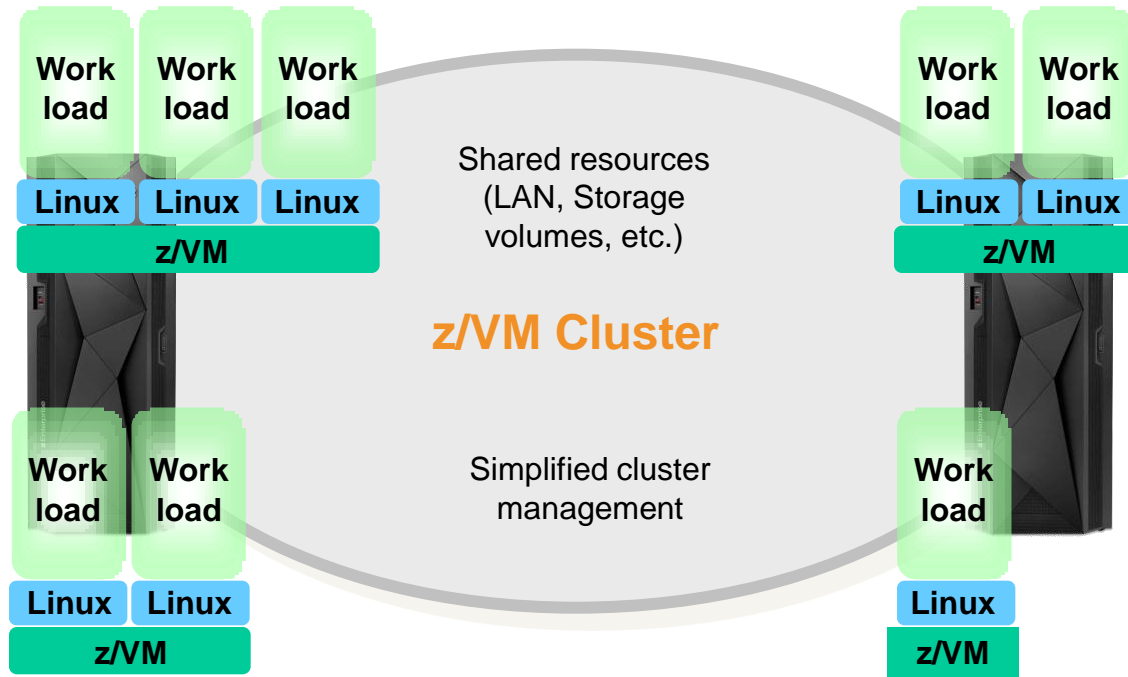
— Peter Flanagan, CEO of Transzap, Inc.

Solution components:

- IBM System z
- Linux on System z
- IBM z/VM

z/VM now has multi-system clustering and virtual server mobility

z/VM Clustering – Up to 4 z/VM instances on separate LPARs or other mainframes can be clustered as a single system image



Live Guest Mobility – Move virtual servers non-disruptively to another LPAR on the same or another mainframe server in the single system image

z/VM 6.3 – Now supports 1TB of real memory, 4 times more virtual servers, and offers increased performance for large VMs

IBM consolidated thousands of distributed servers onto Linux for System z

Before

~15,000 distributed servers
in data centers worldwide



After



42% of servers
discarded outright



~3,900 servers
consolidated
onto mainframes
running Linux
(ratio 130:1)



Remaining servers consolidated
onto high end Power and System x

- Number of software licenses reduced by 93%
- Labor requirements reduced by 50% through consolidation on System z
- System z Linux relative operating costs less than 50% of distributed servers
- **Today, every IBMer runs on Linux on System z multiple times each day**

US manufacturing customer consolidates low utilization servers on System z

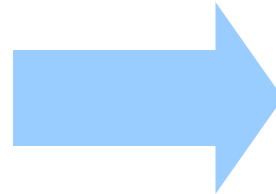
Before:



Factory automation workload
Average utilization = 2%

200 Sun x4100 servers
(800 cores)

\$4.48M (5 yr. TCO)

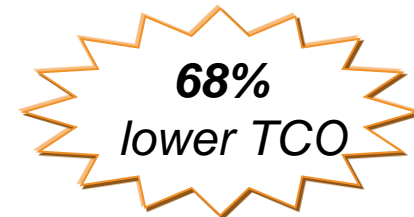


After:



2 z114 servers
(2 IFLs per server)

\$1.45M (5 yr. TCO)



TCO includes hardware, software, maintenance, support and subscription, labor power, space and 2 years migration costs. DR not included.

Many customers are realizing the benefits of consolidating on Linux on z/VM

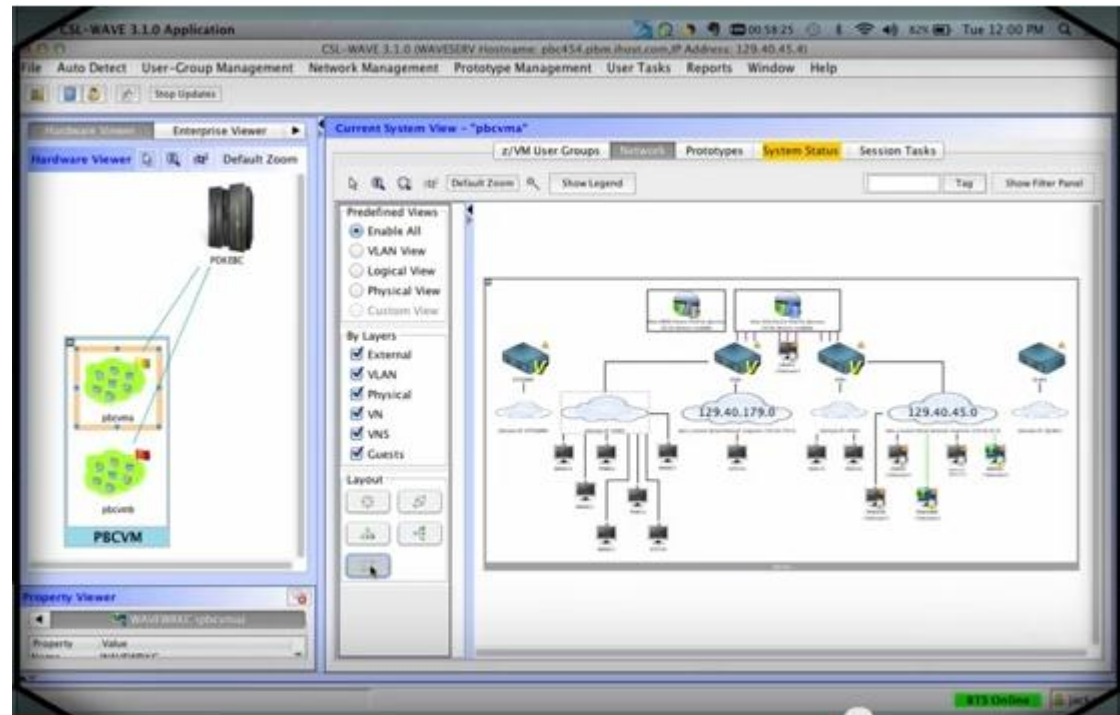
- Atos Origin
- AutoData Norg AS
- Baldor
- Banco Pastor
- Bank of New Zealand
- Bankia
- BG-Phoenics
- BSBC Minnesota
- Business Connexion
- City of Honolulu
- Colacem S.p.A.
- Computacentre
- Dundee City
- Efis EDI Finance
- El Corte Ingles
- Embasa
- Endress+Houser
- EuroControl MUAC
- gkd-el
- IBM Blue Insight
- Liberty Mutual
- Marist
- Marsh
- Miami Dade County
- National Registration Dept
- Nationwide
- NWK
- Procempa
- RCBC
- RENFE
- Salt River Project
- Shelter Mutual Insurance
- Shikoku Electric
- Sparda Datenverarbeitung eG
- Svenska Handelsbanken
- Swiss Re
- Transzap
- University of Bari
- University of Arkansas
- University of NC
- VietinBank

Over 11,000 IFL processors installed worldwide (BC and EC)

Recent acquisition strengthens zEnterprise private cloud capabilities by offering simplified management of the z/VM virtualization layer

CSL-WAVE virtualization management software for z/VM and Linux on System z environments

- Provides automation, management, provisioning and simplification capabilities
- Automatically detects all resources in the environment
 - Spans partitions, servers, sites, geographies
 - Supports SSI clustering and Live Guest Mobility
- Abstracts the z/VM layer into a rich, intuitive graphical workspace with powerful drag-and-drop capability
- **Significantly reduces administration requirements and costs**



System z is ideal for private cloud computing

Two major cost reducing strategies...

**Reduce Hardware
and Software Costs**

**Consolidate
and Virtualize**

**IBM zEnterprise
with Linux on z/VM**

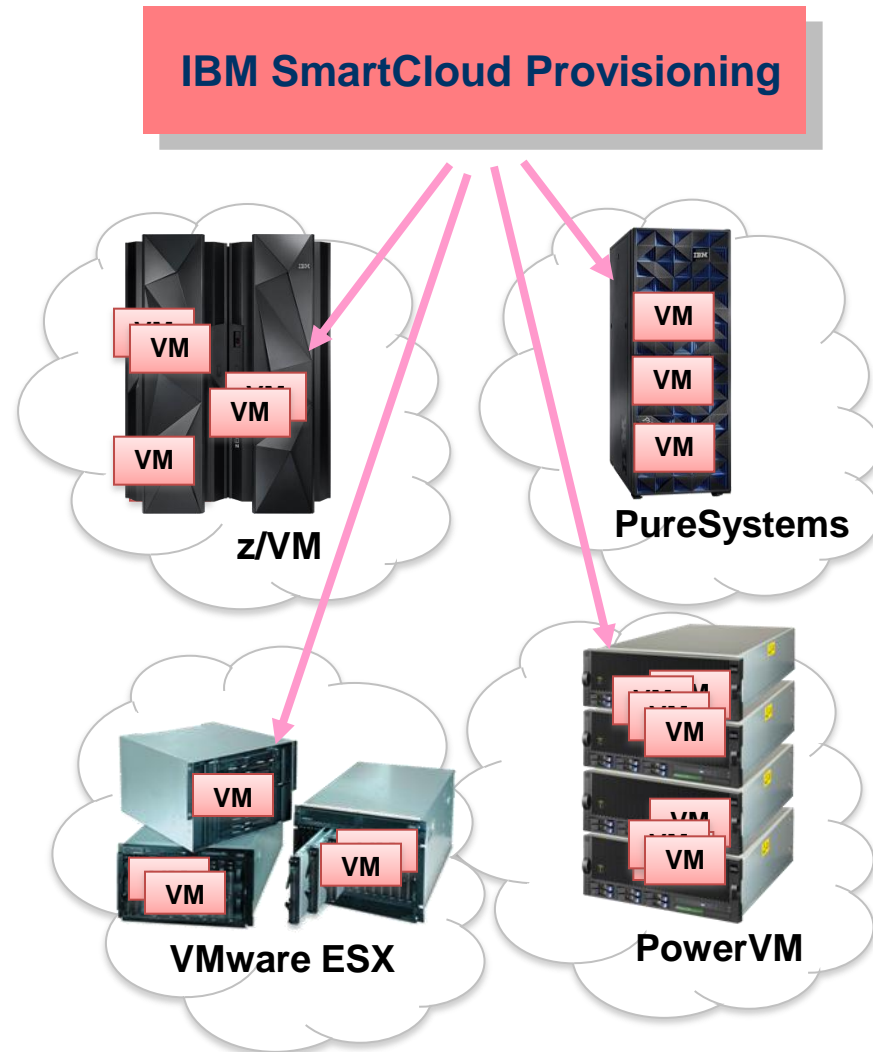
**Reduce Labor Costs
and Improve Agility**

**SmartCloud
Provisioning**

**Automate
Operations**

Automate workload deployment with IBM SmartCloud Provisioning

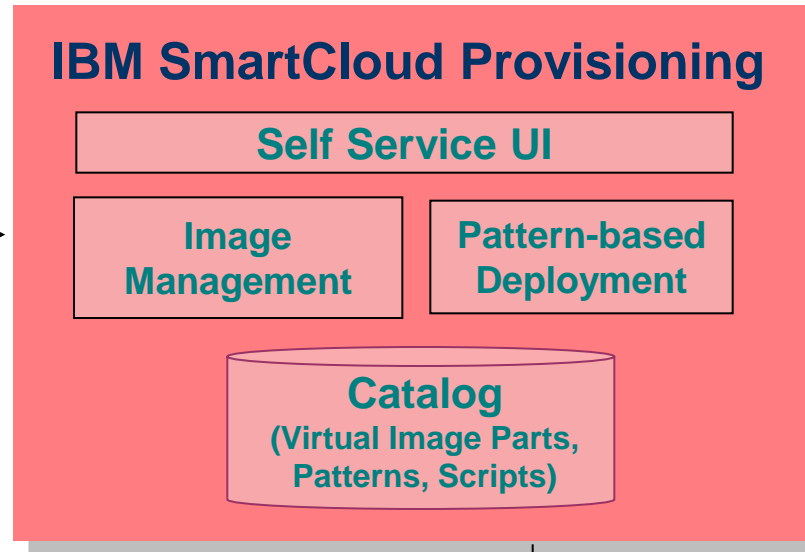
- Self-service automated provisioning of virtual machine images...
- ...into pools/clouds on external virtualized hardware
 - Can deploy to various virtualized platforms
 - Supports zVM, PowerVM, VMware ESX hypervisors
- Supports IBM patterns
 - Deploy multiple virtual machines in a single operation
 - Images can include middleware and applications



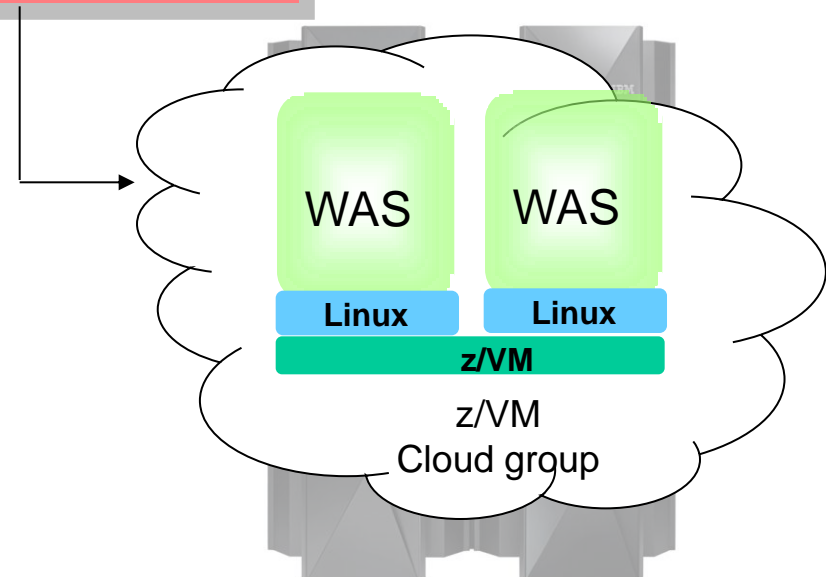
Automation with IBM SmartCloud Provisioning can further reduce costs



User selects and deploys a pattern



- Self-service console for users
- Virtual images and patterns for quick-starts
- Drag and drop tooling for creating and deploying virtual applications using catalog
- Intelligent placement algorithm optimize resource utilization based on cloud activity



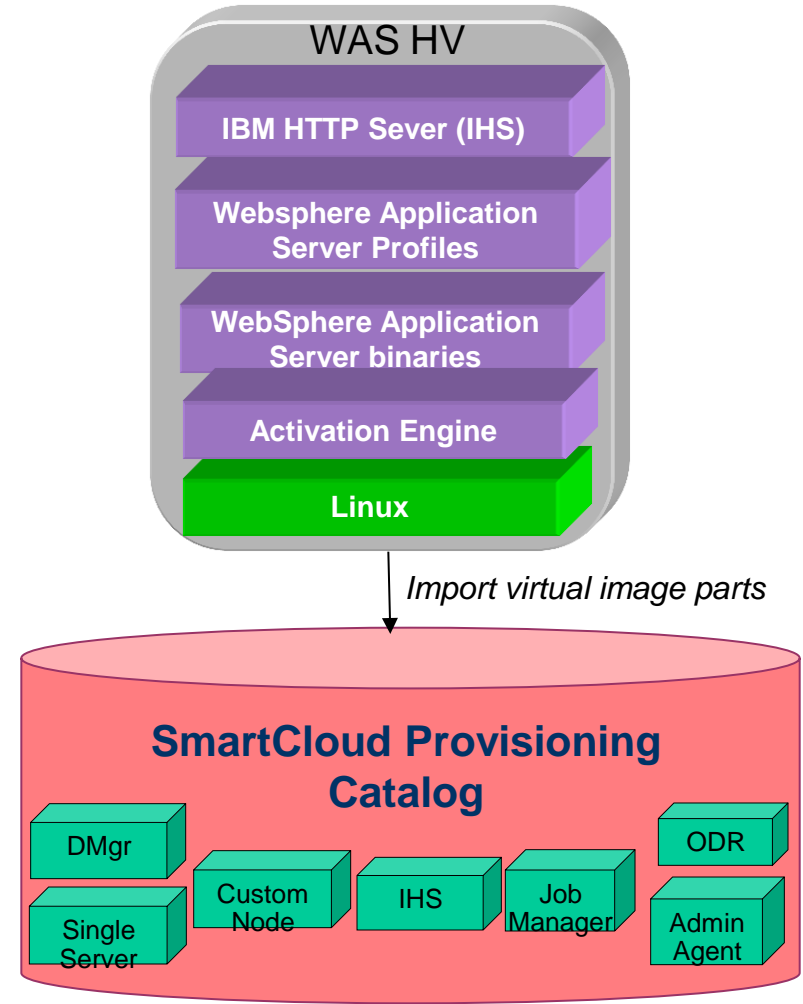
IBM SmartCloud Provisioning makes it easier to get started with virtualized images

- IBM middleware packaged as Hypervisor Editions (.OVF virtual images), ready to run on a hypervisor
 - Includes pre-installed and pre-configured image, image-specific tuning/configuration and fast deploy-time activation capabilities

- Hypervisor Editions (HV) offered for z/VM include:
 - WebSphere Application Server
 - WebSphere Process Server
 - WebSphere Portal Server

- Hypervisor Editions imported into SmartCloud Provisioning catalog as virtual image parts that represent topology components
 - Example: deployment manager, custom node, etc.

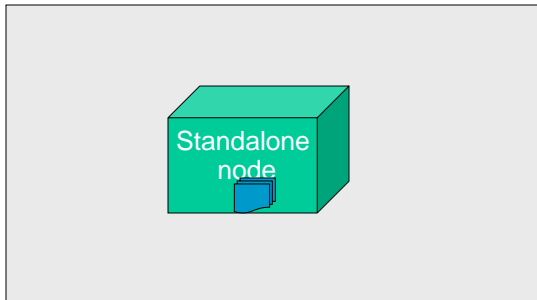
- Virtual image parts can be used to create virtual system patterns



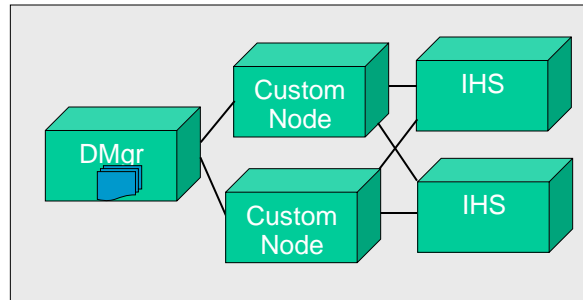
IBM SmartCloud Provisioning deploys standardized virtual system patterns

A Virtual System Pattern is one or more virtual images and script packages to satisfy a certain deployment topology

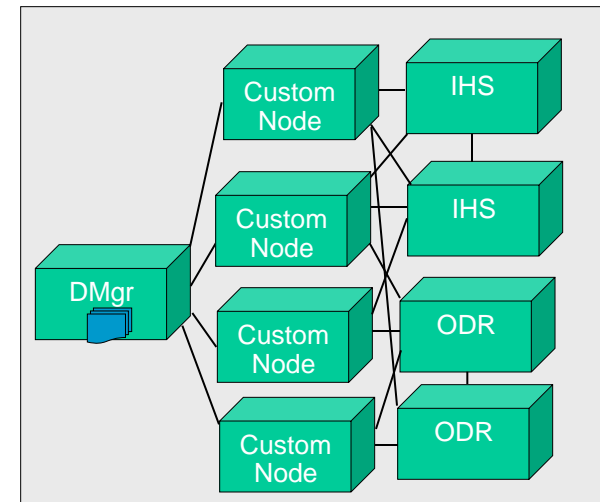
Single Server



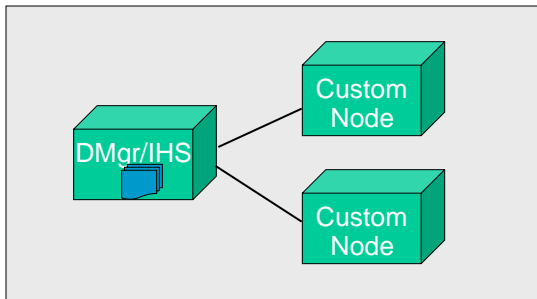
WebSphere cluster



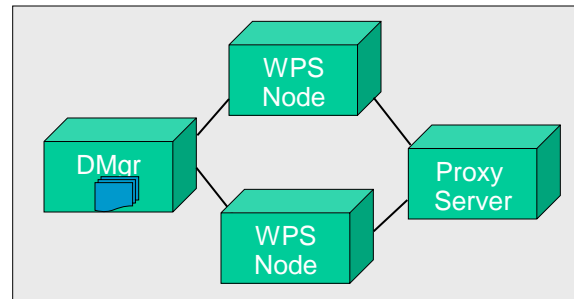
WebSphere Advanced Cluster



WebSphere cluster (dev)



WebSphere Process Server (Scalable)



DMgr = Deployment Manager
 IHS = IBM http Server
 ODR=On Demand Router
 22

Example: Use a pattern for automated deployment of single WAS server



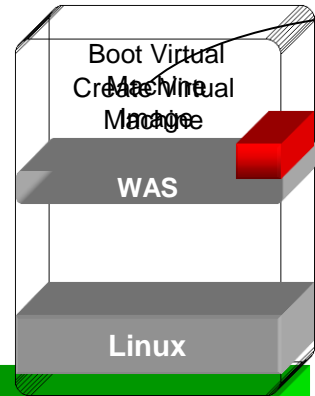
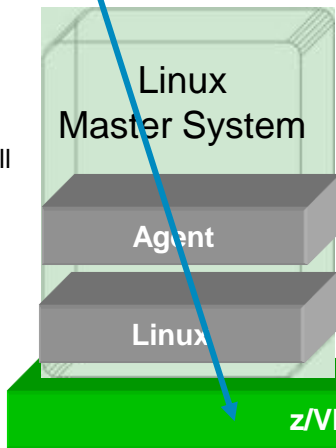
Create and Deploy Pattern

SmartCloud Provisioning

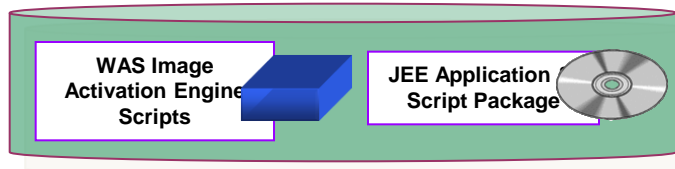
Ready

System Ready

Execute Script Package to Install JEE Application

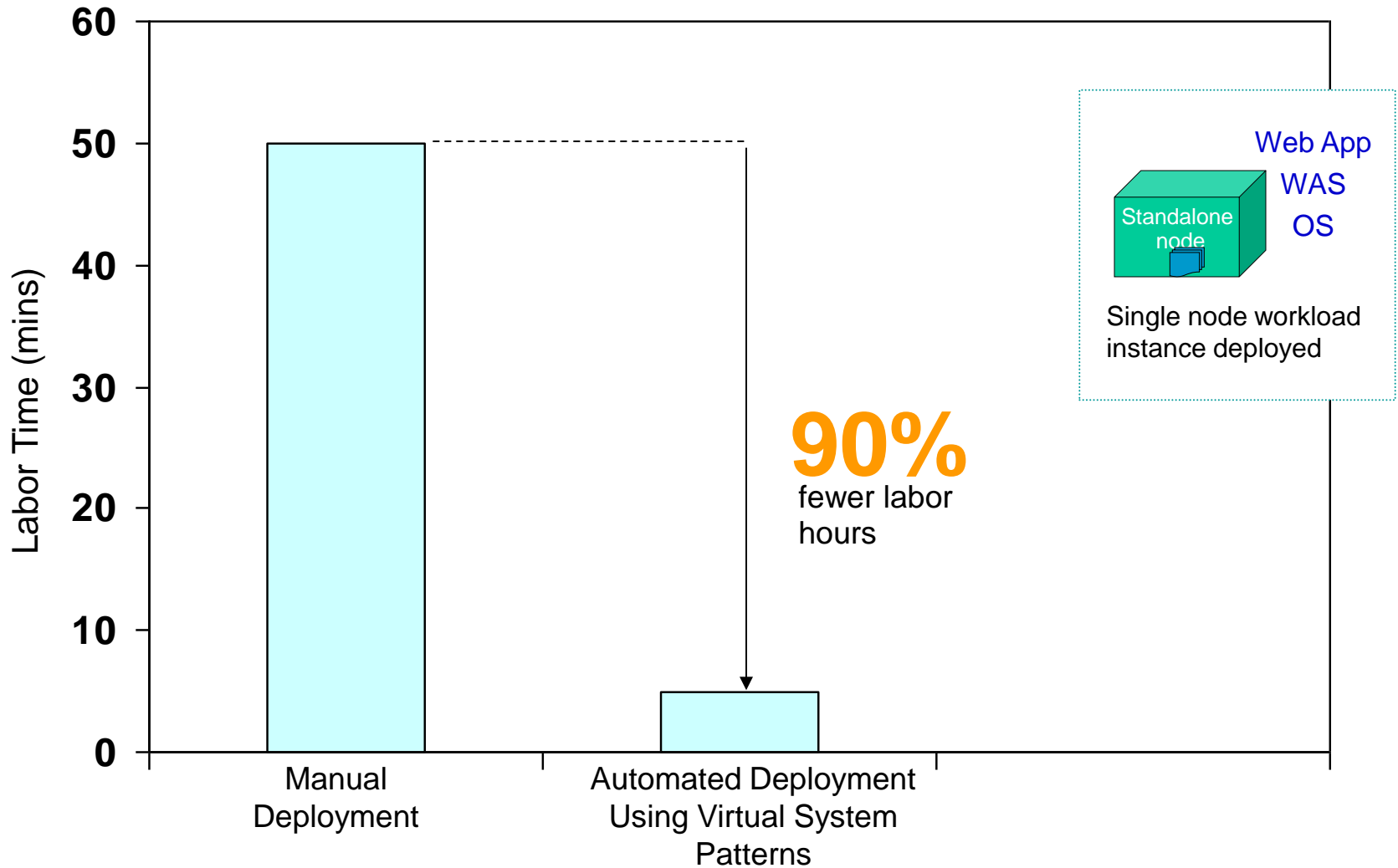


Activation Engine Completes Initialization



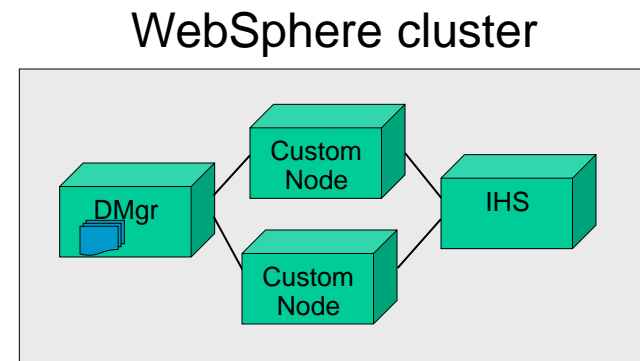
z/VM Cloud Group

IBM SmartCloud Provisioning automated pattern-based deployment is fast



Normal deployment steps for WAS high available clustered environment

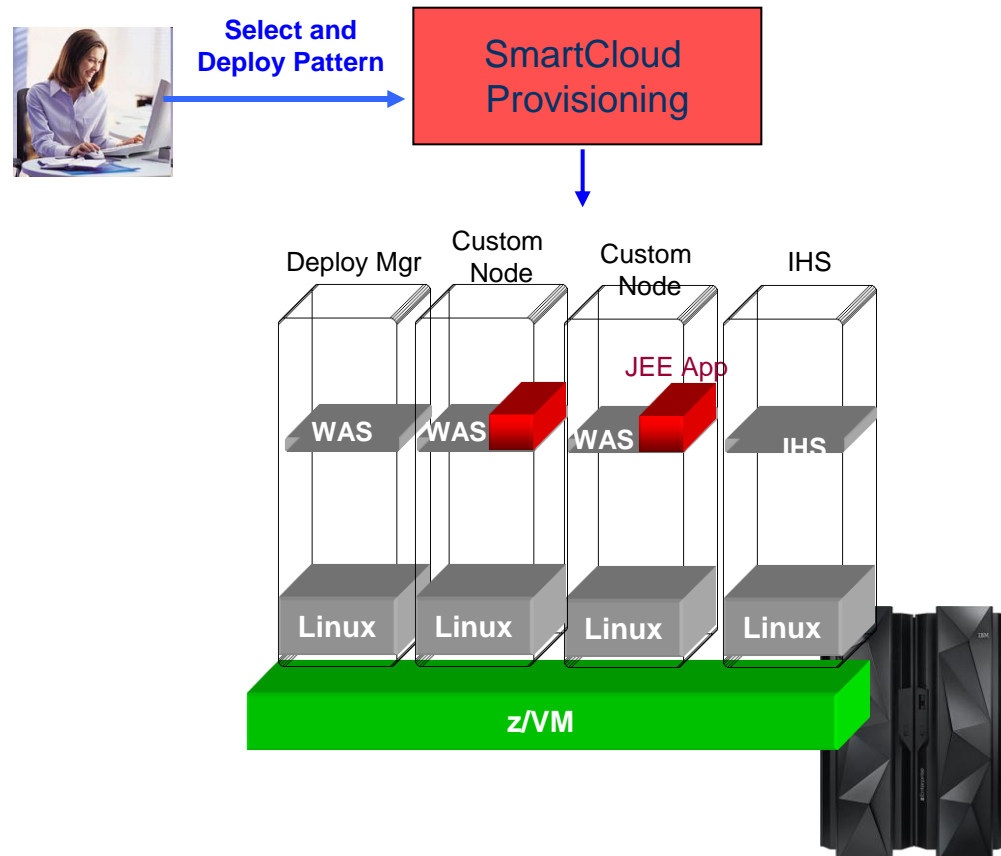
1. Involves creating 4 virtual servers
 - 1 WebSphere deployment manager
 - 2 WebSphere Node
 - 1 IBM HTTP Server
2. Install the WAS Update Installer and install the required iFixs
3. Create WebSphere Cluster with 2 members
4. Configure the HTTP Server
5. Configure Session replication on servers to support Failover
6. Deploy the Application to the WebSphere Cluster



All of these steps are done automatically with IBM SmartCloud Provisioning

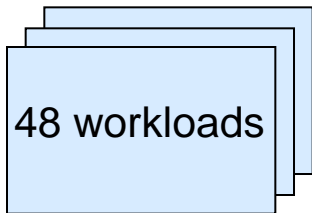
DEMO: Fast deployment of WAS cluster with IBM SmartCloud Provisioning

- Self-service console
- Drag and drop pattern editor to create a WAS cluster pattern
- Automated provisioning of the cluster



Which option requires the least amount of labor?

Which platform provides the lowest labor costs over 3 years?

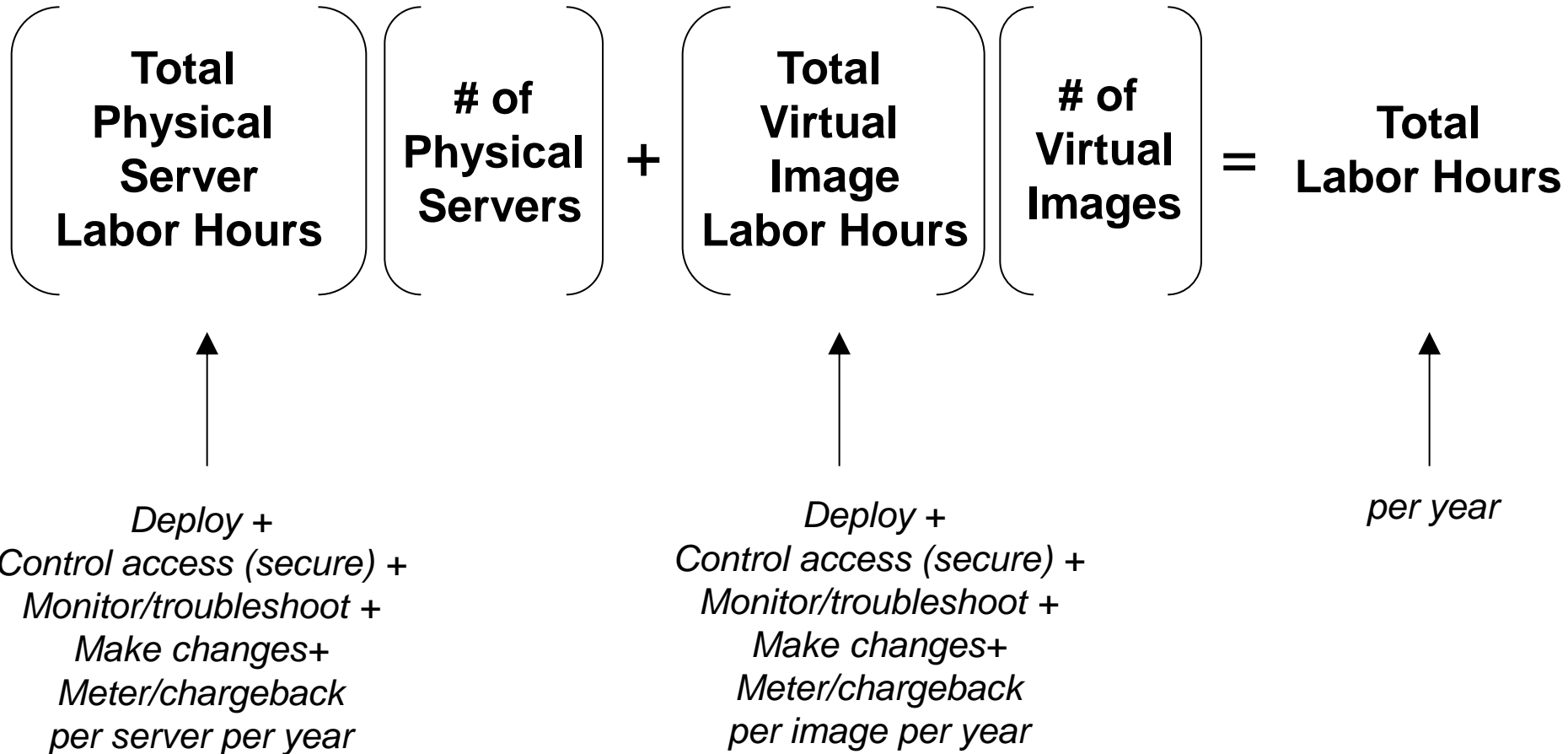


Online banking workloads, each driving **22** transactions per second, with **1 MB I/O per transaction**



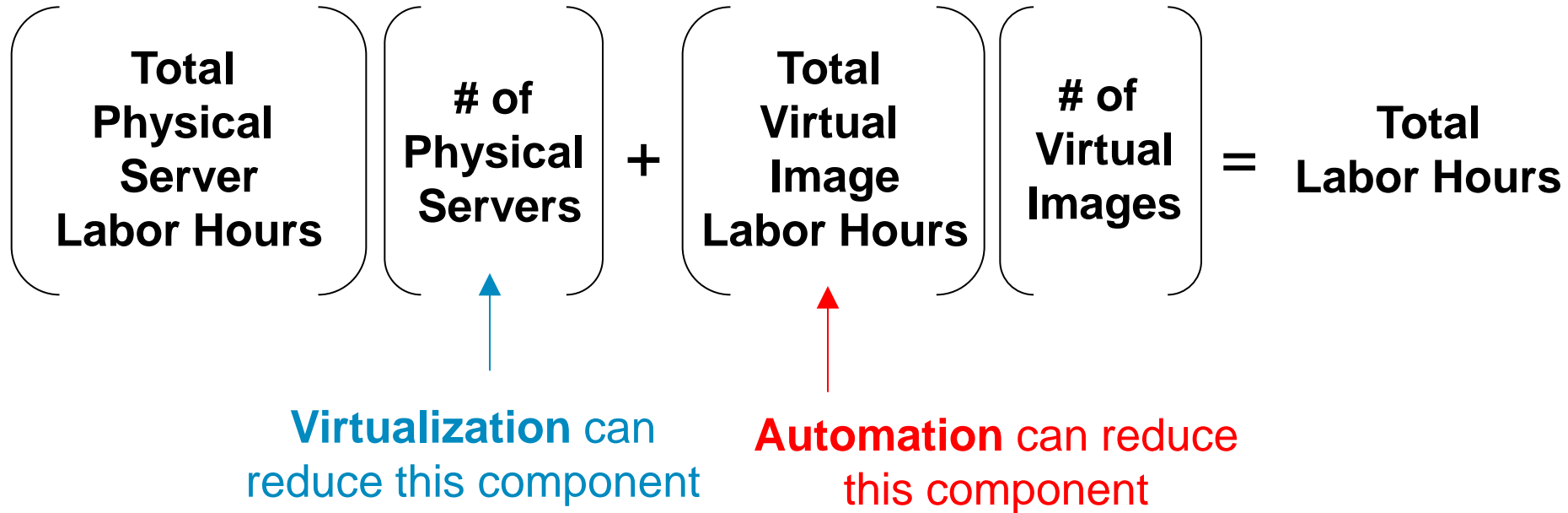
1
z/VM on zEC12
32 IFLs

A high-level view of the labor model



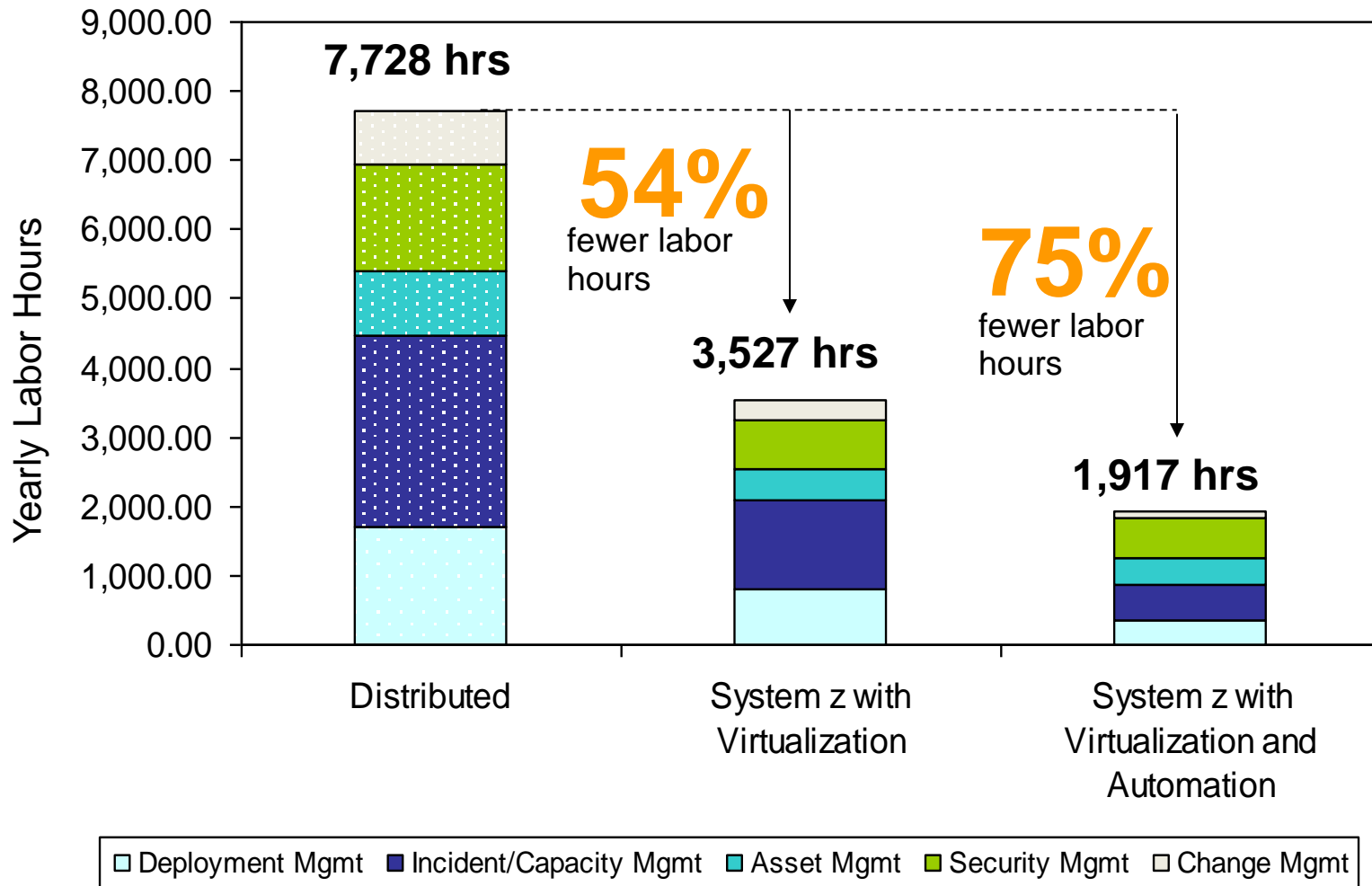
Note: Labor model best fit to field data

A high-level view of the labor model



IBM SmartCloud Provisioning cuts labor costs

Case Study With 48 Workloads



IBM SmartCloud Provisioning cuts labor costs

Change Mgmt –

- Visibility into relationships of virtual images in a workload
- Automatically apply changes to desired virtual servers

Security Mgmt –

- Centrally access control

Asset Mgmt –

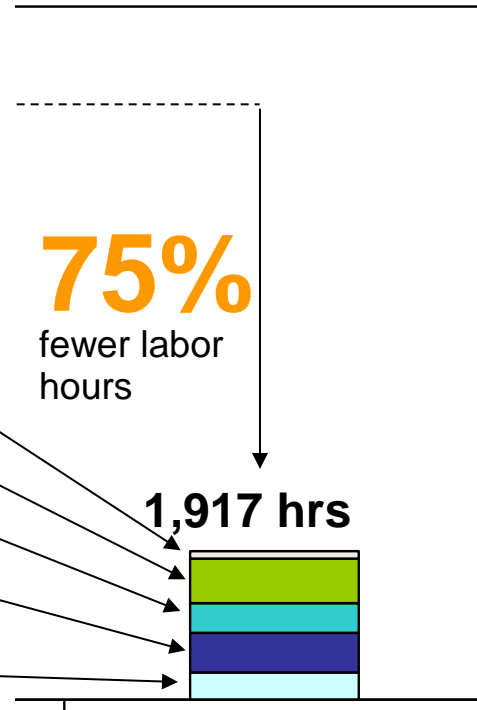
- Track license usage of products

Incident/Capacity Mgmt –

- Centrally monitor and resolve issues

Deployment Mgmt –

- Fast pattern-based deployment

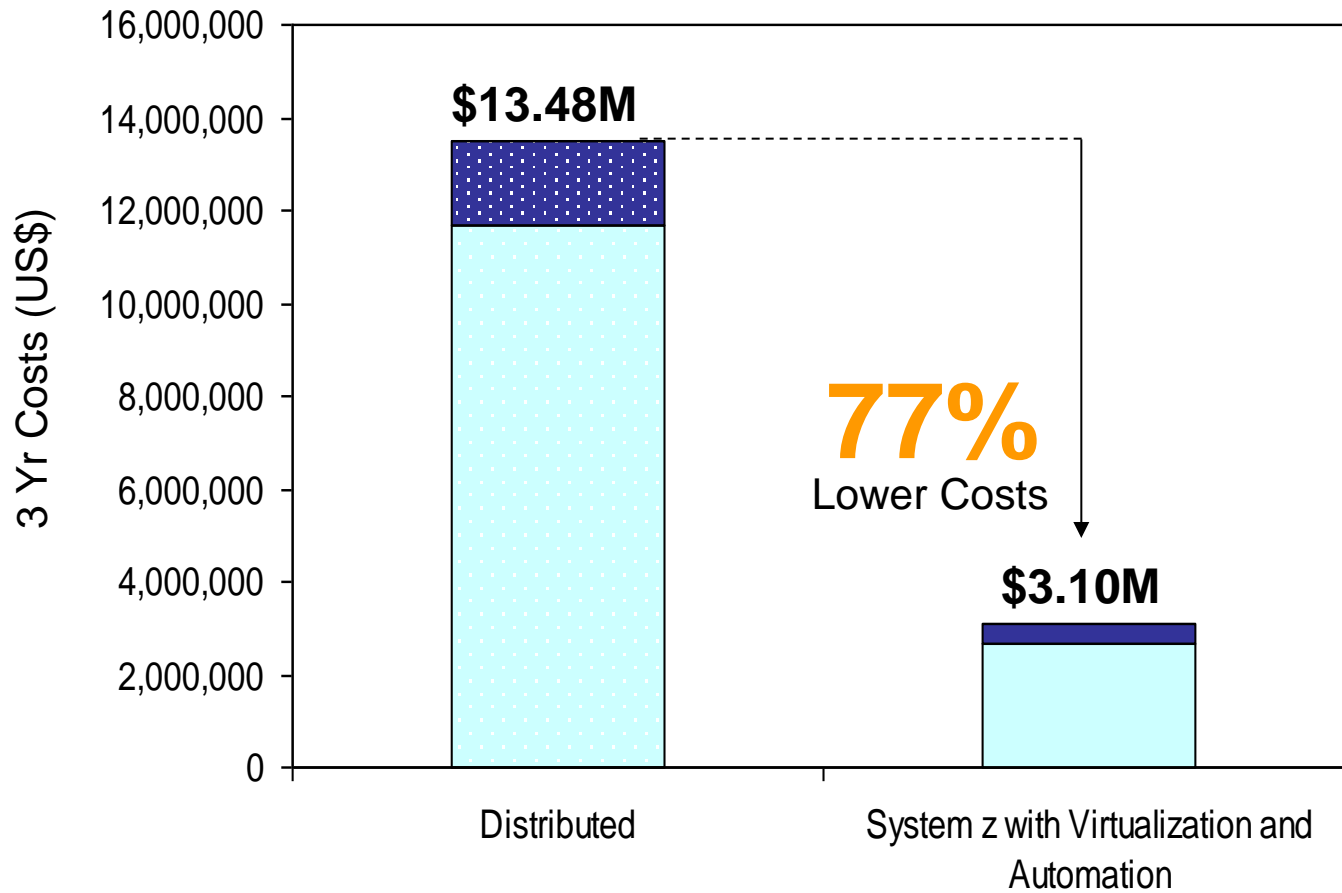


System z with Virtualization and Automation



Reduce costs with a System z private cloud

Example With 48 Workloads



□ Acquisition Costs ■ Labor Costs

Note: 3 year TCO includes hardware acquisition, maintenance, software acquisition, S&S and labor. US pricing - will vary by country.

Installation/Configuration Services for Cloud Ready Solution on Linux on System z



Cloud Monitoring

Service Lifecycle Management

Cloud Backup/Recovery

Automated Provision/De-Provision

Cloud Automation

Installation/Configuration support

Benefits:

- Bring up Cloud on Linux on System z in less than a week
- Quickly begin to see value of Cloud on System z

What's next? Complete cloud service orchestration

**Comprehensive cloud management
and service delivery**

**SmartCloud
Orchestrator**

**Consolidate
and Virtualize**

**SmartCloud
Provisioning**

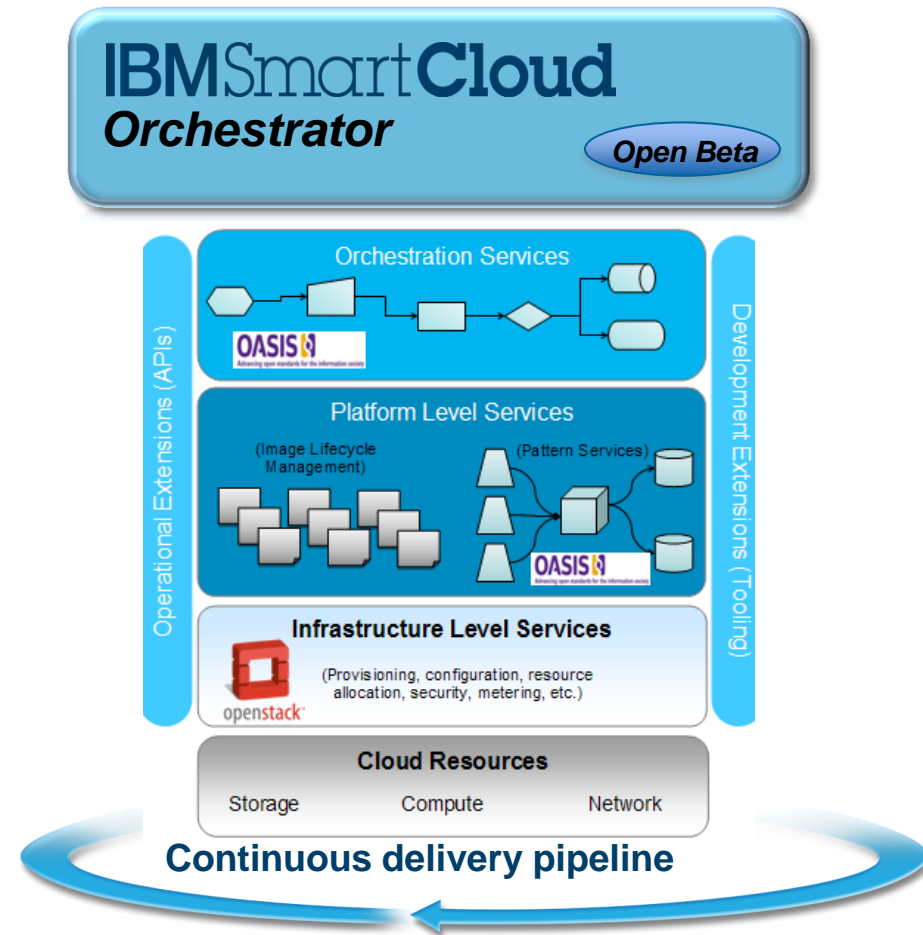
Orchestrate

**IBM zEnterprise
with Linux on z/VM**

**Automate
Operations**

IBM SmartCloud Orchestrator

- New cloud offering based on open standard OpenStack
- Fully automates end-to-end service deployment across infrastructure and platform layers
- Accelerated deployments with reusable workload patterns and orchestration workflows
- Supports deployment to both private and public clouds
- Comprehensive monitoring and cost management



Check out the SmartCloud Orchestrator beta program

Public Community Site:
<http://ibm.co/CPandO>

- Use the hosted beta system**
 Access a hosted system installed and configured with the latest evaluation code.
 → More ...
- Download beta code**
 Download and install the latest beta code for evaluation in your own environment.
 → More ...
- Attend a live session**
 See demos and designs, explore prototype UIs, share your feedback and discuss in live meetings with development.
 → More ...
- Comment and discuss**
 Get engaged in existing discussion threads or start new ones.
 → More ...
- Watch videos and explore capabilities in the works**
 Review brief feature demos at your leisure and provide feedback with a few mouse-clicks.
 → More ...

