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zEnterprise – A System Of Systems

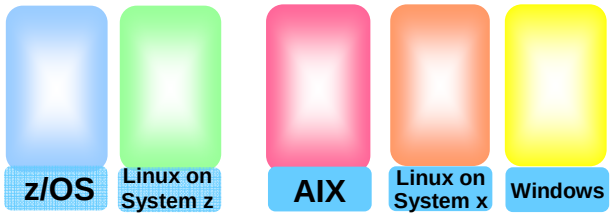
Why zBX Is Better Than Do It Yourself

Learning objectives

- After completing this Web lecture, you will be able to:
  - Contrast a zBX based solution to a Do It Yourself based solution
  - Understand zBX performance management
  - Quantify types of labor savings provided by the Unified Resource Manager

Smarter computing with zEnterprise delivers breakthrough economics

Platforms Optimized For Different Workloads



Best fit for workload

Consistent Structured Management

Lowest labor costs

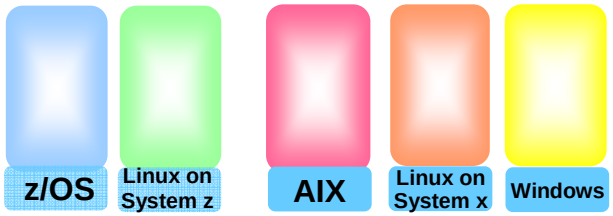
Lowest Cost Of Acquisition Per Workload

Lowest Cost Of Operation Per Workload

Lowest Cost Per Workload

Why zBX is better than a Do It Yourself solution

Platforms Optimized For Different Workloads



Best fit for workload
Lowest acquisition cost

Consistent Structured Management

Lowest labor costs
Lowest cost of operation

Why zBX is better than a Do-It-Yourself (DIY) Solution

- Reduce network latency
- Benefits of workload management
- zManager labor savings

zBX inherits BladeCenter advantages

- BladeCenters offer significant advantages
  - Denser packing reduces space requirements
  - Built in backplane switching provides redundant connectivity, reduces wiring and increases resiliency
    - Ethernet, Fiber channel
    - I/O and networking virtualization
  - Shared power supplies reduce power consumption and increase resiliency
  - Hot swapping and failure prediction improves serviceability

zBX provides additional significant advantages over other blade systems

- Multiple server architectures support best fit workload assignments
  - zBX supports power blades, x86 blades, and special purpose optimizers
  - Competition is typically limited to a single architecture

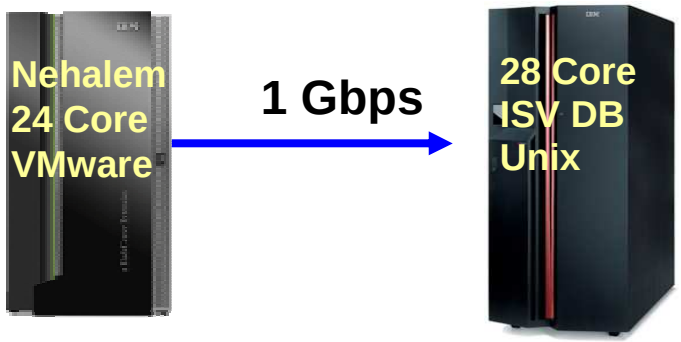
- Dual power domains and dual DC supply lines
  - zBX offers higher levels of availability
  - Competition typically provides single power and DC supply

- Performance management dynamically adjusts resources as needed

- Automated Unified Resource Manager facilities reduce labor

European utility company SAP experience shows zEnterprise is 71% more cost effective

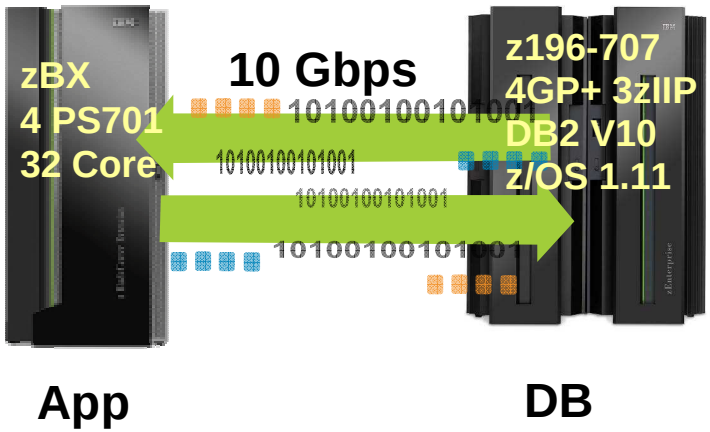
x Blades / ISV DB on Unix



Unit Cost (3yr TCA) **$16.15/BPH**

Hardware	$1,537,822
Software	$1,689,348
Bills/Hour	200K

zEnterprise



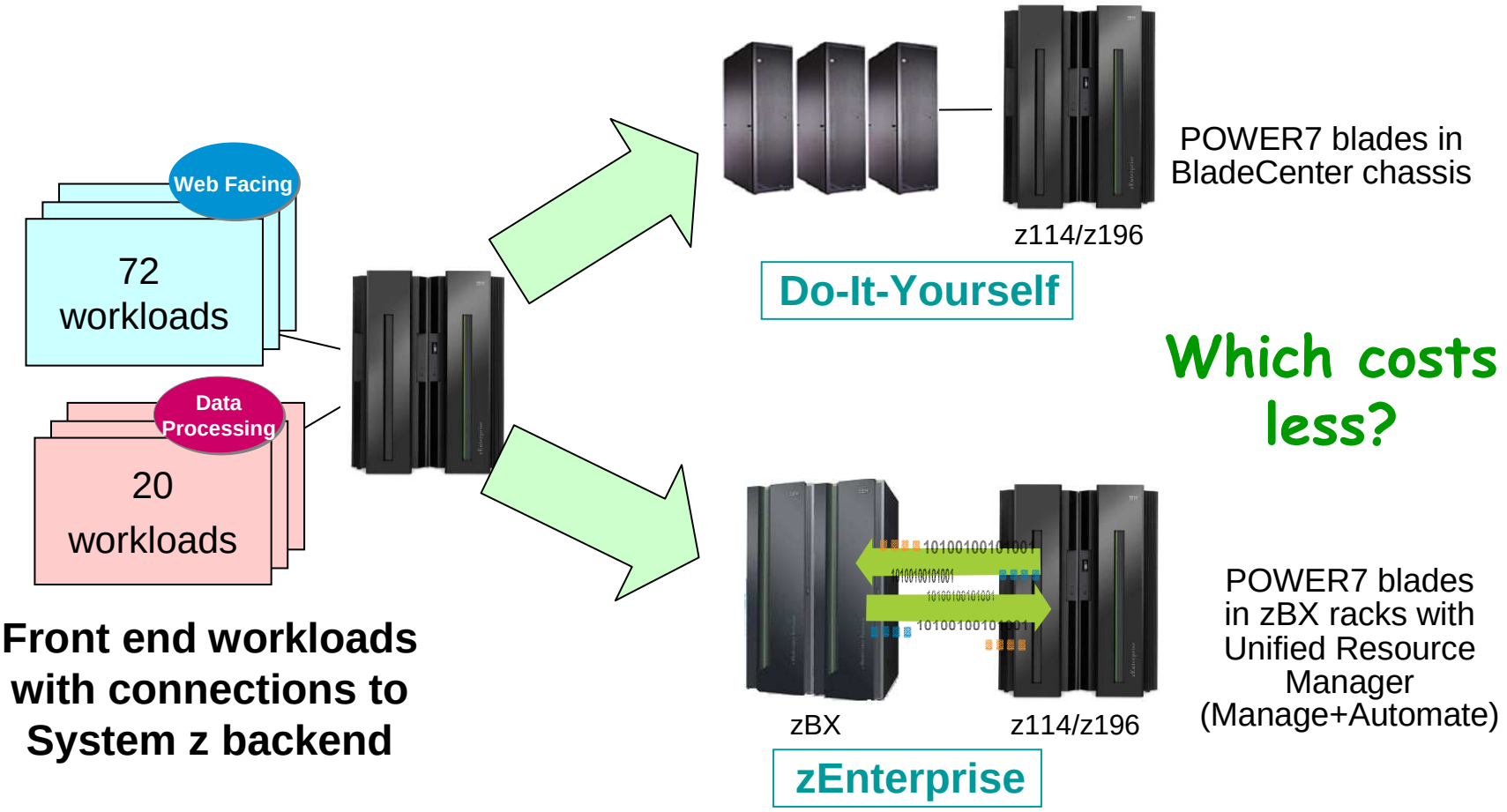
71% less

Unit Cost (3yr TCA) **$4.59/BPH**

Hardware	$844,432
Software	$352,536
Bills/Hour	261K

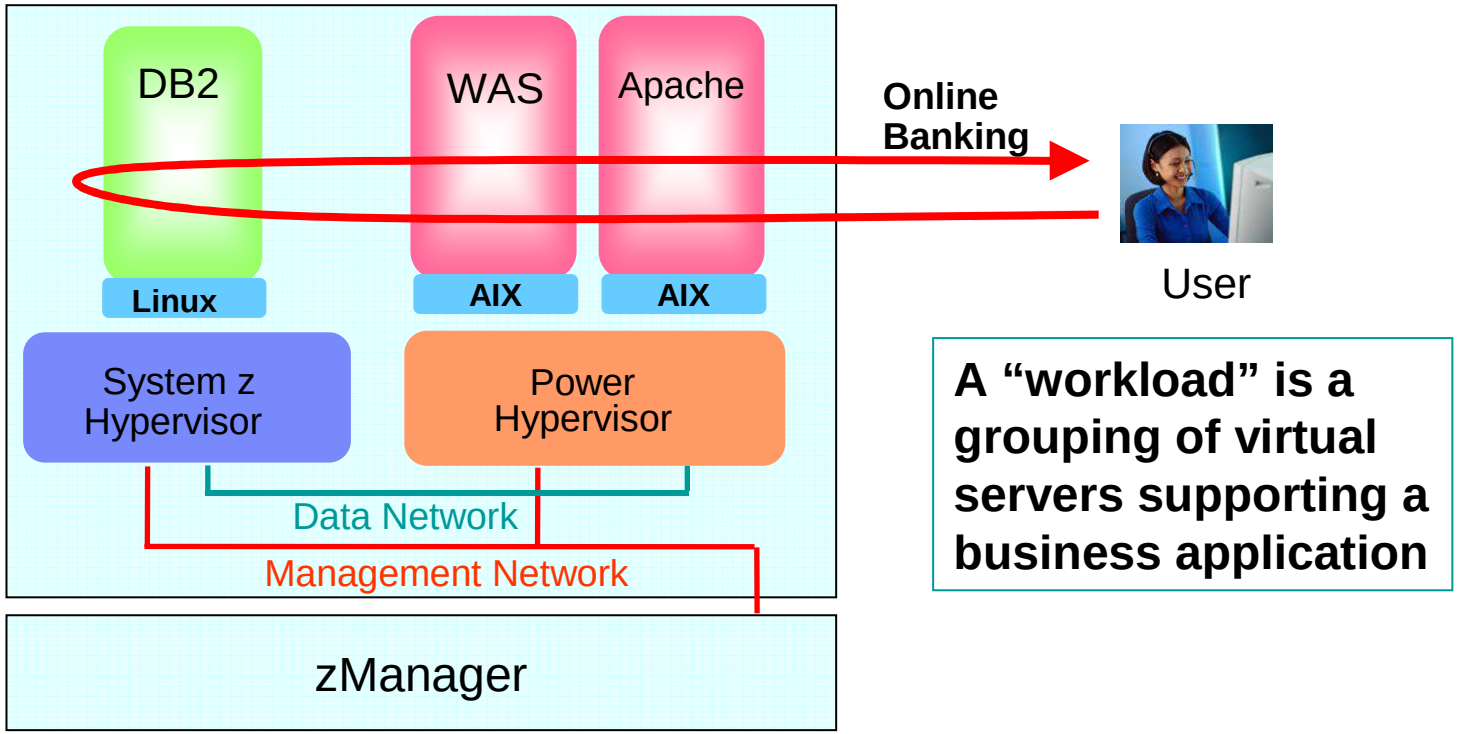
Based on customer data. 3Yr TCA calculation includes hardware acquisition, maintenance, application and database software acquisition and S&S. U.S. list prices prices, prices will vary by country. Cost of packaged application (SAP) not included.

A case study with 92 hybrid workloads



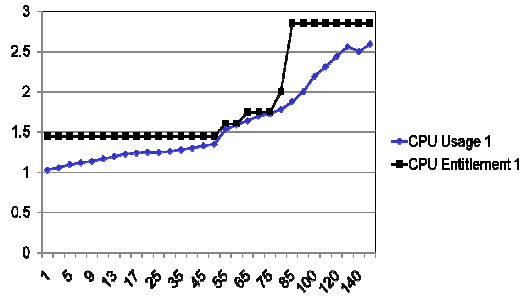
Unified Resource Manager workload management

- Enables definition of workload performance goals
- Tracks transaction performance end-to-end and isolates bottlenecks
- Can dynamically adjust virtual server entitlements on a particular hypervisor to achieve performance goals

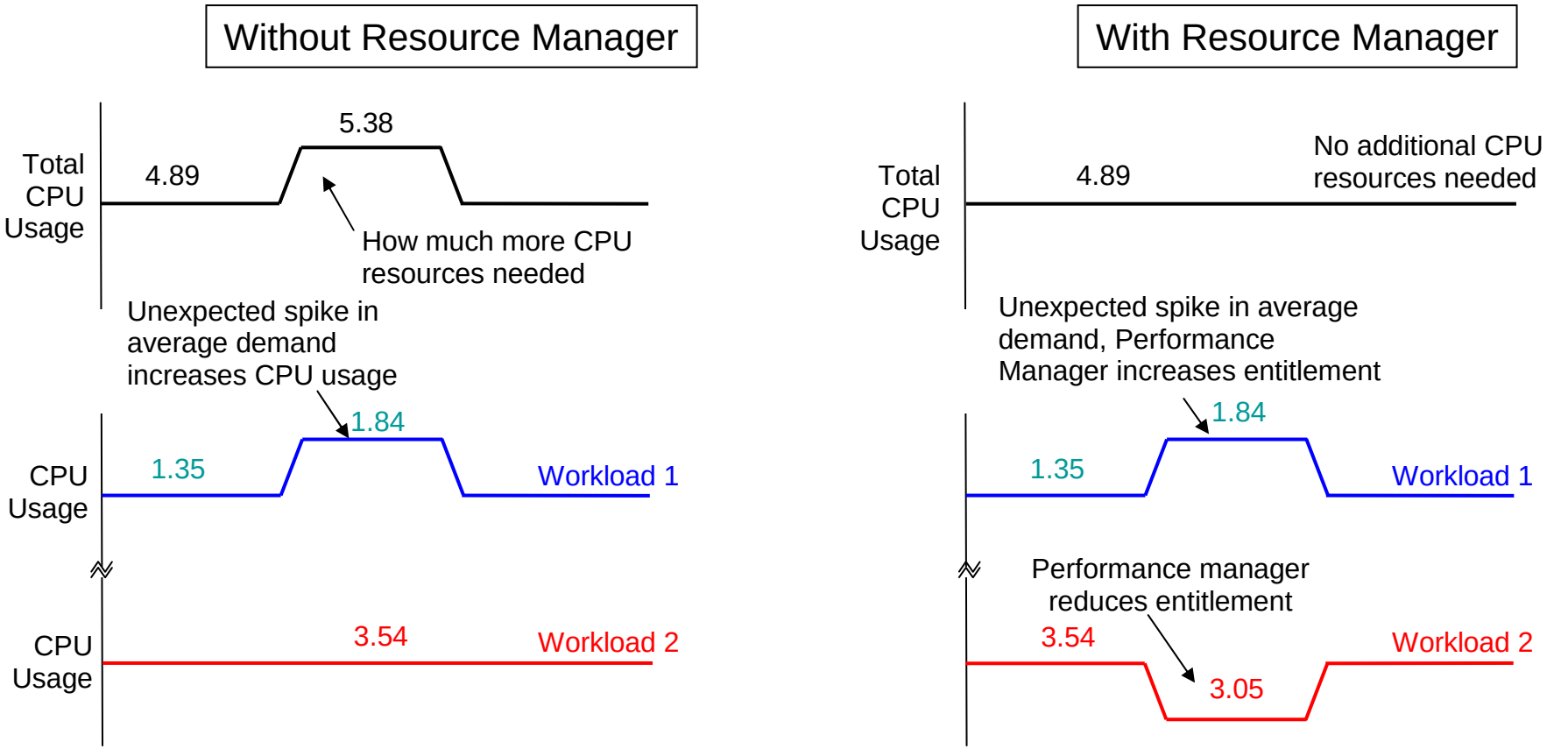


Unified Resource Manager workload management

- Unified Resource Manager collects performance data for each virtual server
  - Historical data used to change workload CPU entitlements
- Unified Resource Manager adjusts virtual server to meet service goals
  - Power and x blades - adjusts processor entitlements
  - z/VM guests - adjusts CPU allocation across guests with relative CPU shares
  - Adjustments are done among virtual servers under the same hypervisor



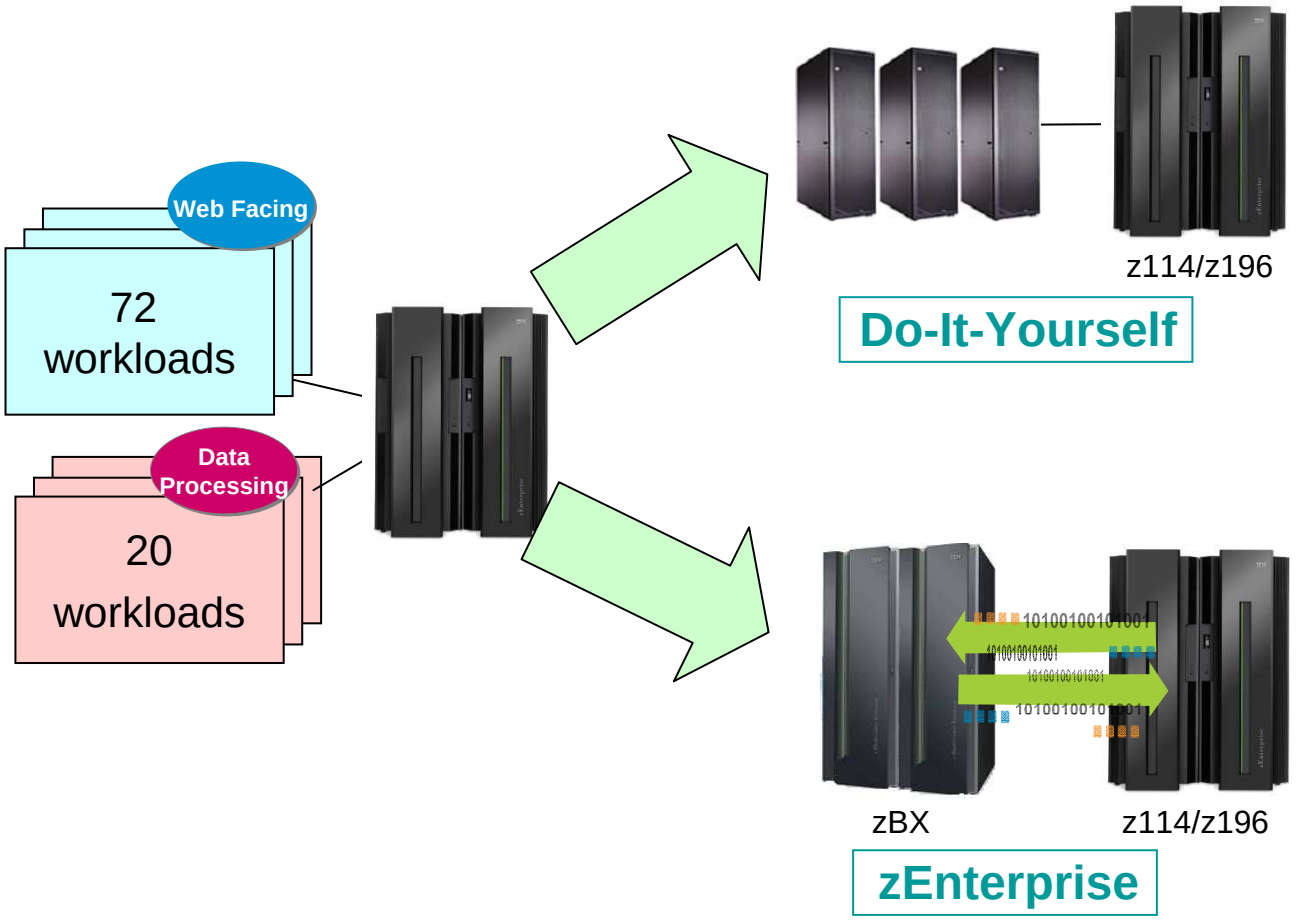
Performance management reduces need to overprovision CPU resource



Must over provision CPU resource by 10% to handle unexpected 64% spike in demand from workload 1

Performance manager enables trading off resource from lower priority workload 2 avoiding the need to overprovision

Avoid over provisioning with performance manager



62 blades
in 3 BladeCenter racks

(Overprovision by 10% more blade capacity)

56 blades
in 2 zBX racks

Resource Manager provides structured management for all zEnterprise virtual environments

Process	Typical Distributed Management Practices	zManager
Deployment Management	▪ Manually configure hypervisor and physically set up and configure networks	▪ Automated deployment of hypervisor and out-of-the box physically isolated networks
Capacity and Performance Management	▪ Passive monitoring ▪ No end-to-end transaction monitoring ▪ Manually monitor virtual machine performance and adjust resources to meet performance goals	▪ Active and continuous monitoring to fix problems quickly ▪ End-to-end transaction monitoring to isolate and fix issues ▪ Automatic resource adjustments for workloads to meet performance goals
Asset Management	▪ Discover assets with ad hoc manual methods ▪ Manual entitlement management	▪ Automated discovery and management of entitlement of assets
Security Management	▪ Multiple, disparate user access management	▪ Centralized, fine-grain user access management
Change Management	▪ No visibility into impact of changes. No standardized procedure to retrieve and apply firmware changes	▪ Visibility into impact of changes. Retrieve and apply firmware changes in a standardized fashion

A labor cost model is needed to assess benefits

- Field data metrics typically stated in “servers per FTE”
- Allocate hours to
  - Tasks for each physical server
  - Tasks for each software image
- Further allocate hours to key ITIL processes
  - Hardware and software
- Assess how Unified Resource Manager will reduce task hours required
- Labor model is a best fit to data from customers, analyst surveys, lab studies, and Alinean tool

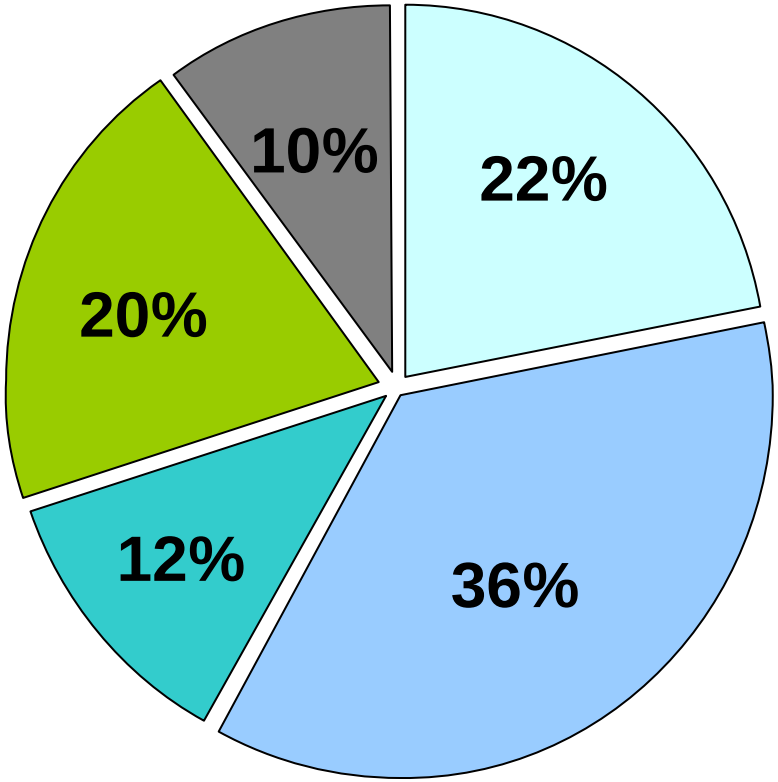
Accumulated field data for labor costs

- Average of quoted infrastructure labor costs
  - **30.7** servers per FTE (dedicated Intel servers)
    - **67.8** hours per year per server for hardware and software tasks
  - **52.5** Virtual Machines per FTE (virtualized Intel servers)
    - **39.6** hours per year per Virtual Machine for software tasks and amortized hardware tasks
    - Typical 8 Virtual Machines per physical server

- Best fit data indicates
  - Hardware tasks are **32** hours per physical server per year
    - Assume this applies to Intel or Power servers
    - Internal IBM studies estimate 320 hours per IFL for zLinux scenarios
  - Software tasks are **36** hours per software image per year
    - Assume this applies to all distributed and zLinux software images

Labor model based on customer data from IBM studies

Five key IT processes for infrastructure administration



Deployment Management
– *Hardware set-up and software deployment*

Incident/Capacity Management
– *Monitor and respond automatically*

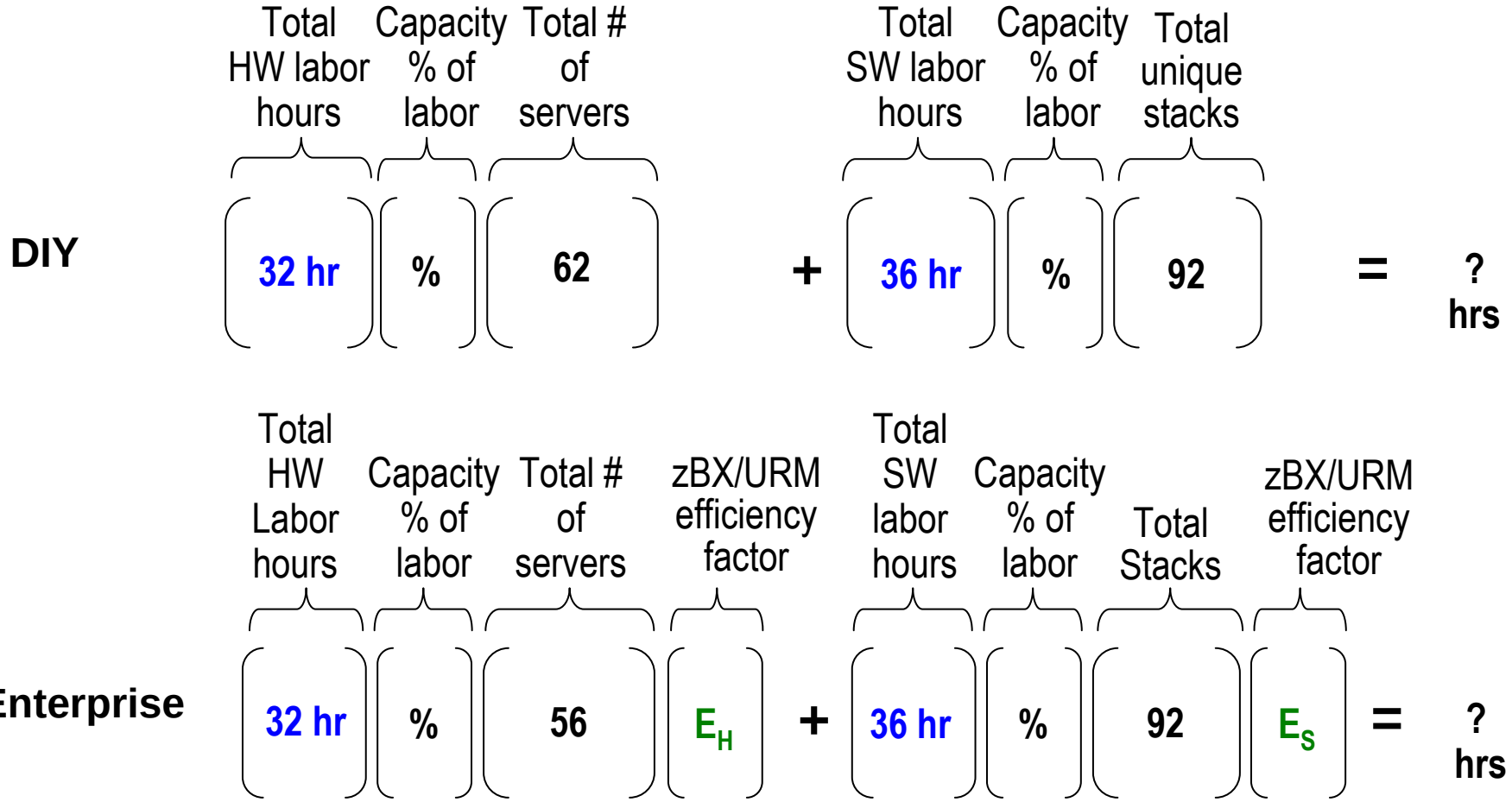
Asset Management
– *Hardware and software asset tracking*

Security Management
– *Access control*

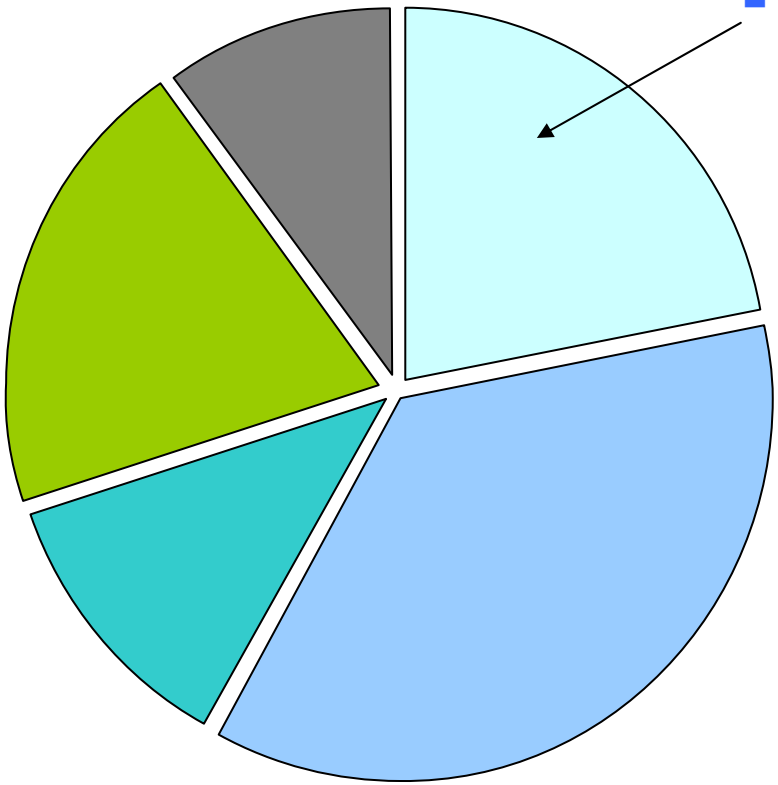
Change Management
– *Hardware and software changes*

Allocation based on customer data from IBM study

Labor cost model for DIY and zEnterprise



Example – zManager labor cost reduction



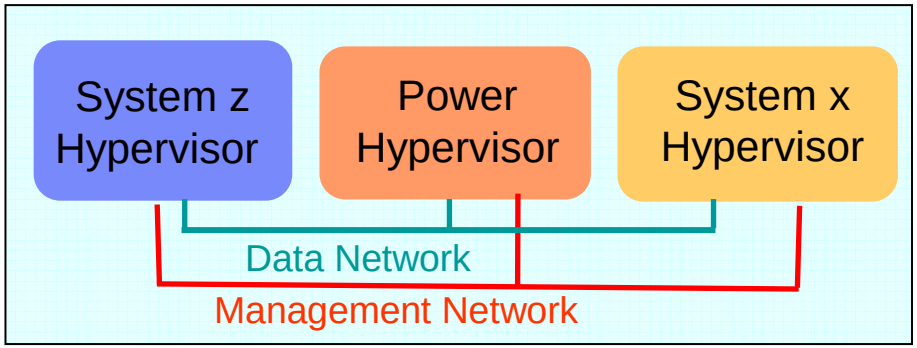
- **Reduce Deployment Management costs**
  - Unified Resource Manager automates hardware deployment tasks
    - Hypervisor setup and configuration
    - Preconfigured networks

Based on IBM internal study.
Labor model based on customer provided data from IBM studies

zEnterprise minimizes labor associated with virtualization hypervisor and network set-up

- Hypervisors are shipped, serviced, and deployed as System z Licensed Internal Code
  - Booted automatically at power on reset
- Pre-configured private and physically isolated internal management network
  - 1 Gbps that connects all resources for management purposes
- Private and secure data network
  - 10 Gbps that connects all resources
  - Access-controlled using integrated virtual LAN provisioning
  - Requires no external switches or routers
  - Full redundancy for high availability

Centralized and Secure Virtualization Platform

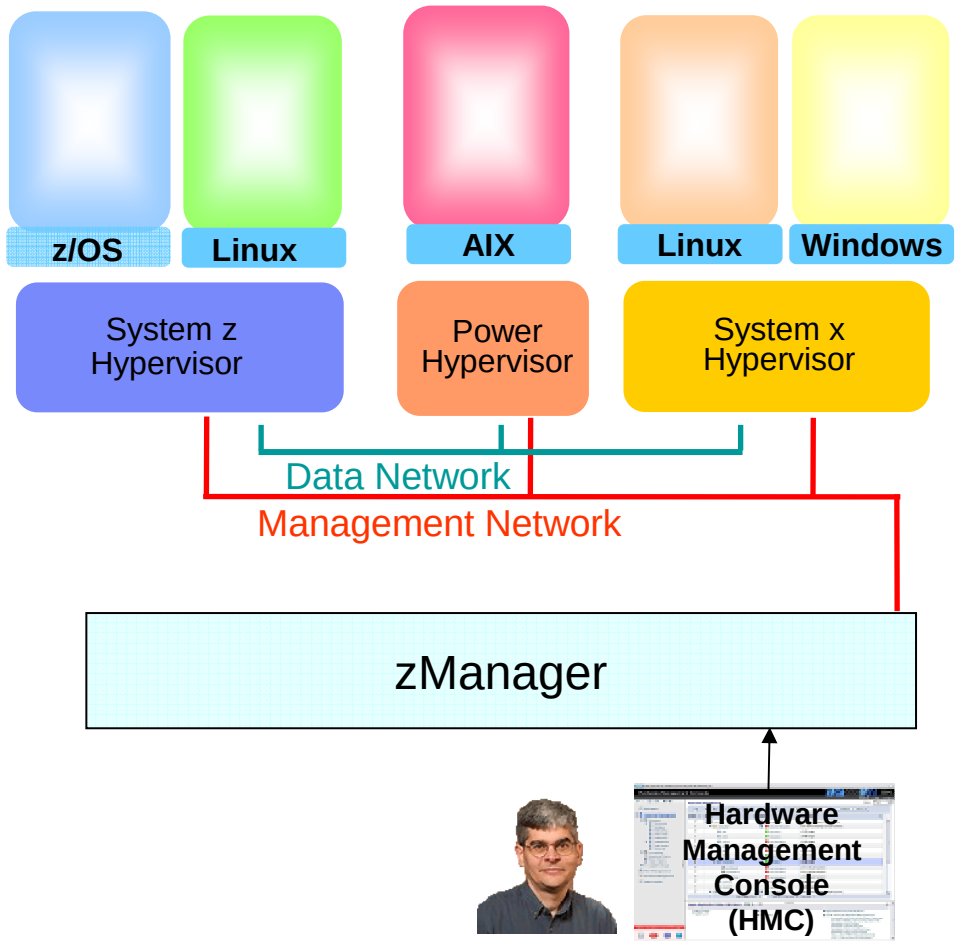


zBX z114/z196

zEnterprise

Manage virtual servers with Unified Resource Manager

- From one console, create virtual machines in z/VM and in zBX hypervisors
- Start / stop / delete virtual machines under Unified Resource Manager control
- Create virtual networks



Hypervisor setup and configuration lab test – Do-It-Yourself vs. Unified Resource Manager

DIY Tasks (per Blade)	Elapsed Time	Labor Time
Initial communication setup & education	6 min 26 sec	6 min 26 sec
Boot VIOS disc & install (creates LPAR for VIOS automatically)	37 min 59 sec	36 min
Configure VIOS networking	2 min 49 sec	2 min 49 sec
Create new storage pool for LPARs	35 sec	35 sec
Install VIOS service fix packs	61 min 5 sec	20 sec
TOTAL TIME	**1 hr 48 min 52 sec**	**46 min 10 sec**

Resource Manager Tasks (per Blade)	Elapsed Time	Labor Time
Add entitlement for a blade	90 min	92 sec
TOTAL TIME	**1 hr 30 min**	**1 min 32 sec**

97% reduction in labor time

Source: IBM CPO Internal Study

Network setup and configuration lab test – Do-It-Yourself vs. Unified Resource Manager

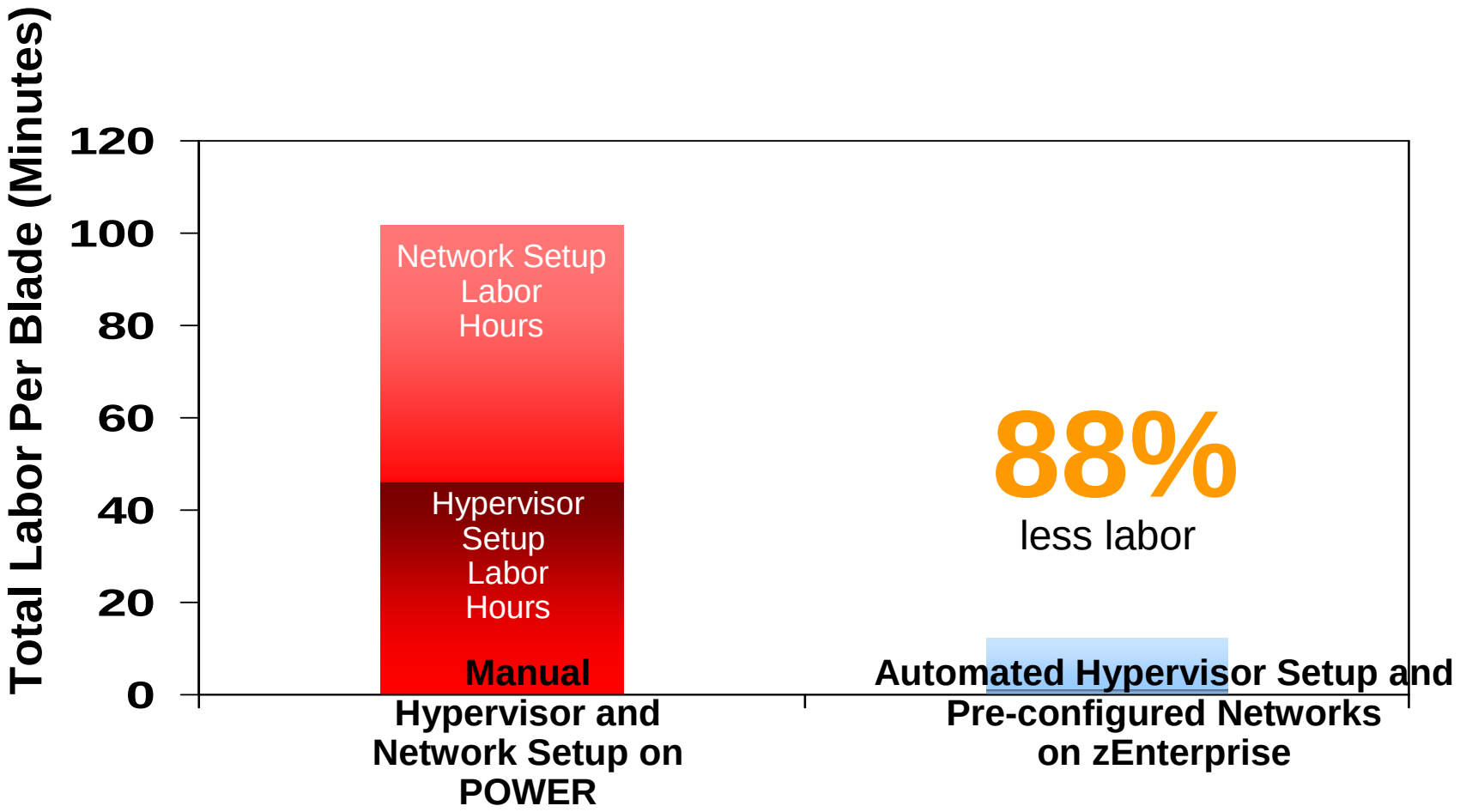
Do-It-Yourself Tasks (for 28 blades)	Elapsed/Labor Time
Planning (includes time to go over docs, etc)	5 hrs
Cabling	2 hrs
AMM Configuration	2 hrs
Logical Configuration (L2)	8 hrs
Blades network configuration	4 hrs
Testing	2 hrs
Documenting the configuration	3 hrs
TOTAL TIME	**26 hrs**

Resource Manager Tasks (for 28 blades)	Elapsed/Labor Time
Planning	3 hrs
Cabling (pre-cabled in zBX)	0 hrs
AMM Configuration (done in zBX)	0 hrs
Logical configuration (L2)	30 mins
Blades network configuration	1 hr 30 mins
Testing (pre-tested)	0 hrs
Documenting the configuration (all part of zManager)	0 hrs
TOTAL TIME	**5 hrs**

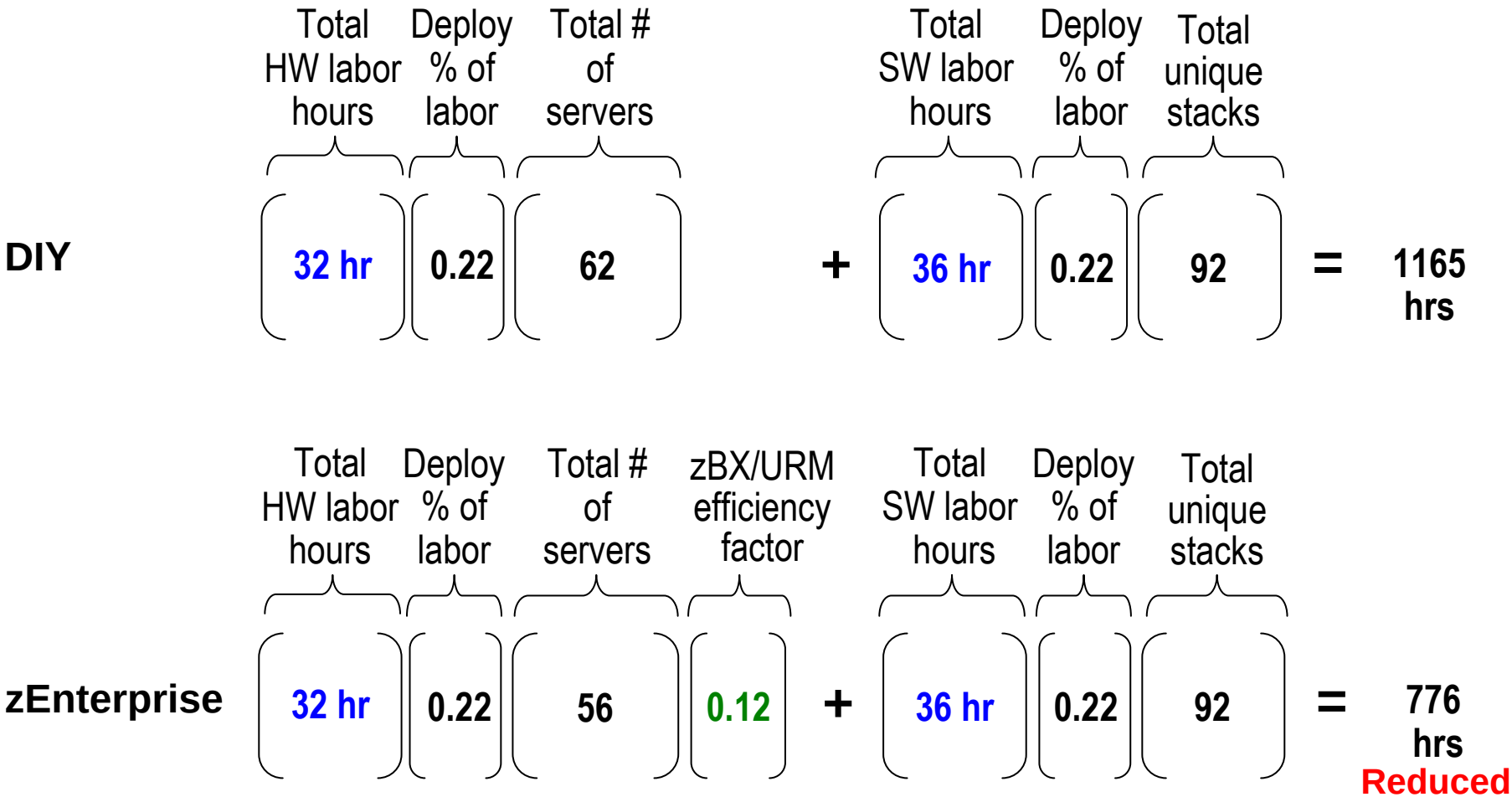
81% reduction in labor time

Source: IBM CPO Internal Study

Combined benefits of automated hypervisor setup and pre-configured network on labor

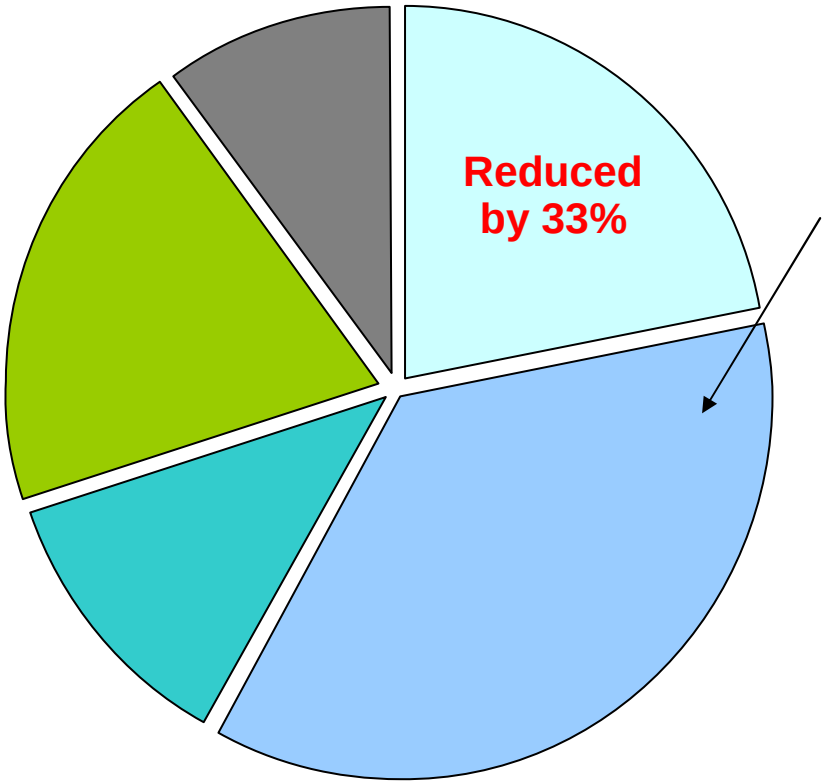


Deployment labor cost model



Productivity savings of 88% is applied to hardware labor hours for deployment based on hands-on lab studies

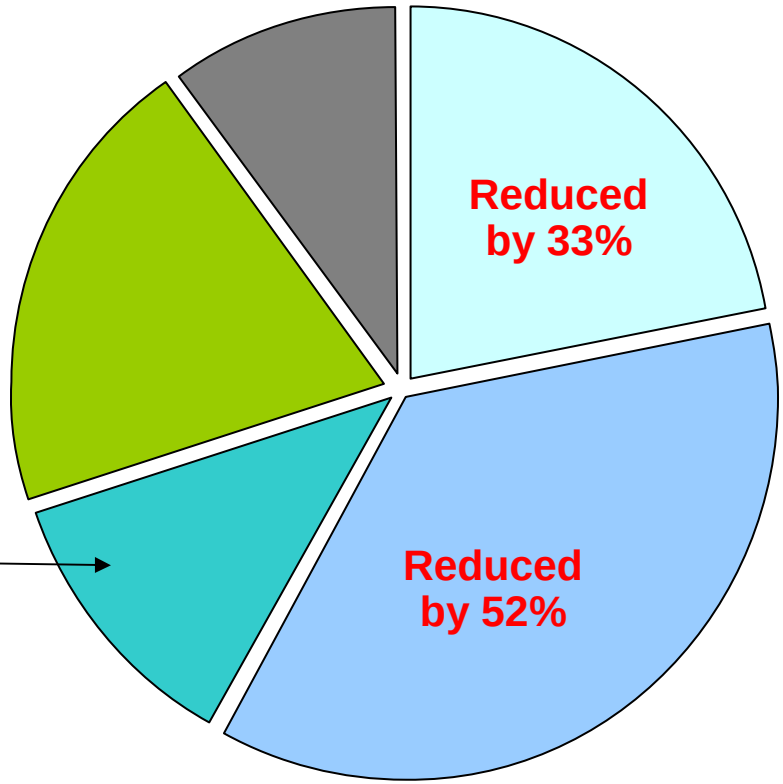
Example – Unified Resource Manager labor cost reduction



- **Reduce Incident/Capacity Management costs**
  - Unified Resource Manager improves productivity
    - End-to-end transaction monitoring
    - Problem analysis and call home reporting
    - Automatic error logging and first-failure data capture (FFDC)
    - Guided repair and verification
    - Automatic resource adjustments

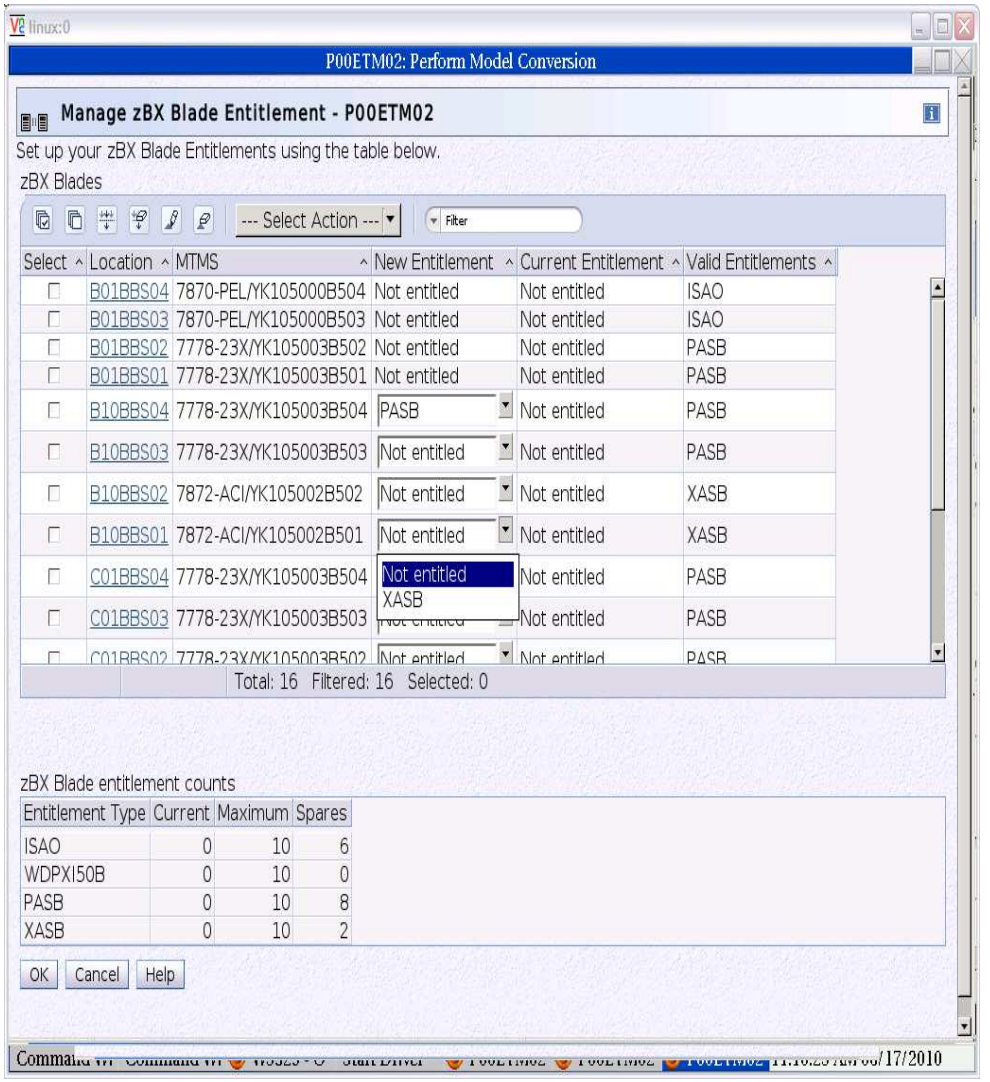
Example – Unified Resource Manager labor cost reduction

- **Reduce Asset Management costs**
  - **Automatic** discovery and management of hardware resources and entitlements



Auto-Discovery and entitlement management with Unified Resource Manager

- Unified Resource Manager reads the entitlements for resources
- Auto-discover and inventory for all elements
  - No need to install and configure libraries or sensors
- Customer can manage discovered hardware from Unified Resource Manager panels
  - Power on and manage entitled resources
  - Display layout of blade frame



Asset management lab test – Do-It-Yourself vs. Unified Resource Manager

Do-It-Yourself Tasks (for 28 blades)	Elapsed/Labor Time
Discovery and recording	
Access IVM; collect data	336 sec
Cut and paste to spreadsheet	224 sec
Access AMM*; collect data*	12 sec
Cut and paste to spreadsheet*	4 sec
Manually add machine model and type	84 sec
Compare with original order/entitlement	84 sec
TOTAL TIME	**12 min 12 sec**

Resource Manager Tasks (for 28 blades)	Elapsed/Labor Time
Discovery and recording	
Access HMC Ensemble Display**	8 sec
TOTAL TIME	**8 sec**

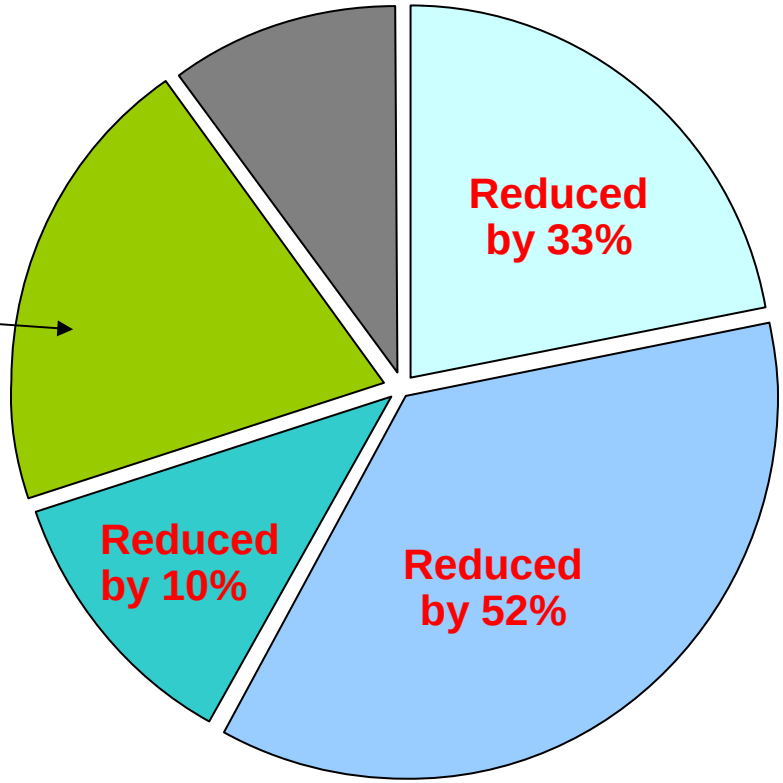
99% reduction in labor time

*AMM displays information for all blades in a chassis; IVM displays information for one blade
**zManager displays information for all blades at once

Source: IBM CPO Internal Study

Example – Unified Resource Manager labor cost reduction

- **Reduce Security Management costs**
  - Centralized management of administrator access to resources via customized user profiles



Centralized management of access control reduces security administrative burden

- Fine grained control of administrator access via defined task and resource roles
- Task roles control access to each management discipline
  - Ensemble
  - Virtual Networks and Servers
  - Storage Resources
  - Workloads
  - Performance Management
  - Energy Management
- Resource roles control access to managed resources
  - Ensembles, virtual servers, storage, networks, workloads, zBX, and Blades
- Create customized user profiles for unique user IDs and multiple user roles

Security management lab test – Do-It-Yourself vs. Unified Resource Manager

Do-It-Yourself Tasks (for 28 blades)	Elapsed/Labor Time
Grant user access to resources*	
Log into AMM	34 sec
Navigate to login profiles	14 sec
Create user, add access to blades	144 sec
Log into IVM	364 sec
Navigate to user accounts	140 sec
Create user and role to access virtual machines	728 sec
TOTAL TIME	**23 min 44 sec**

Resource Manager Tasks (for 28 blades)	Elapsed/Labor Time
Grant user access to resources	
Log into Unified Resource Manager	13 sec
Navigate to user profiles	20 sec
Create user	31 sec
Add roles for zBX	68 sec
TOTAL TIME	**2 min 12 sec**

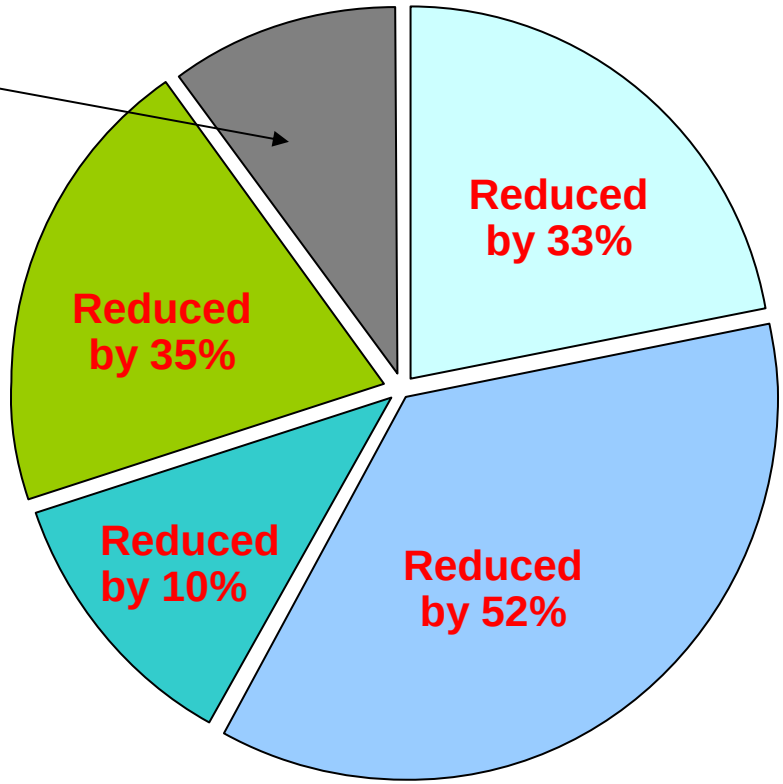
92% reduction in labor time*

*comparable labor savings to modify and delete user access to resources

Source: IBM CPO Internal Study

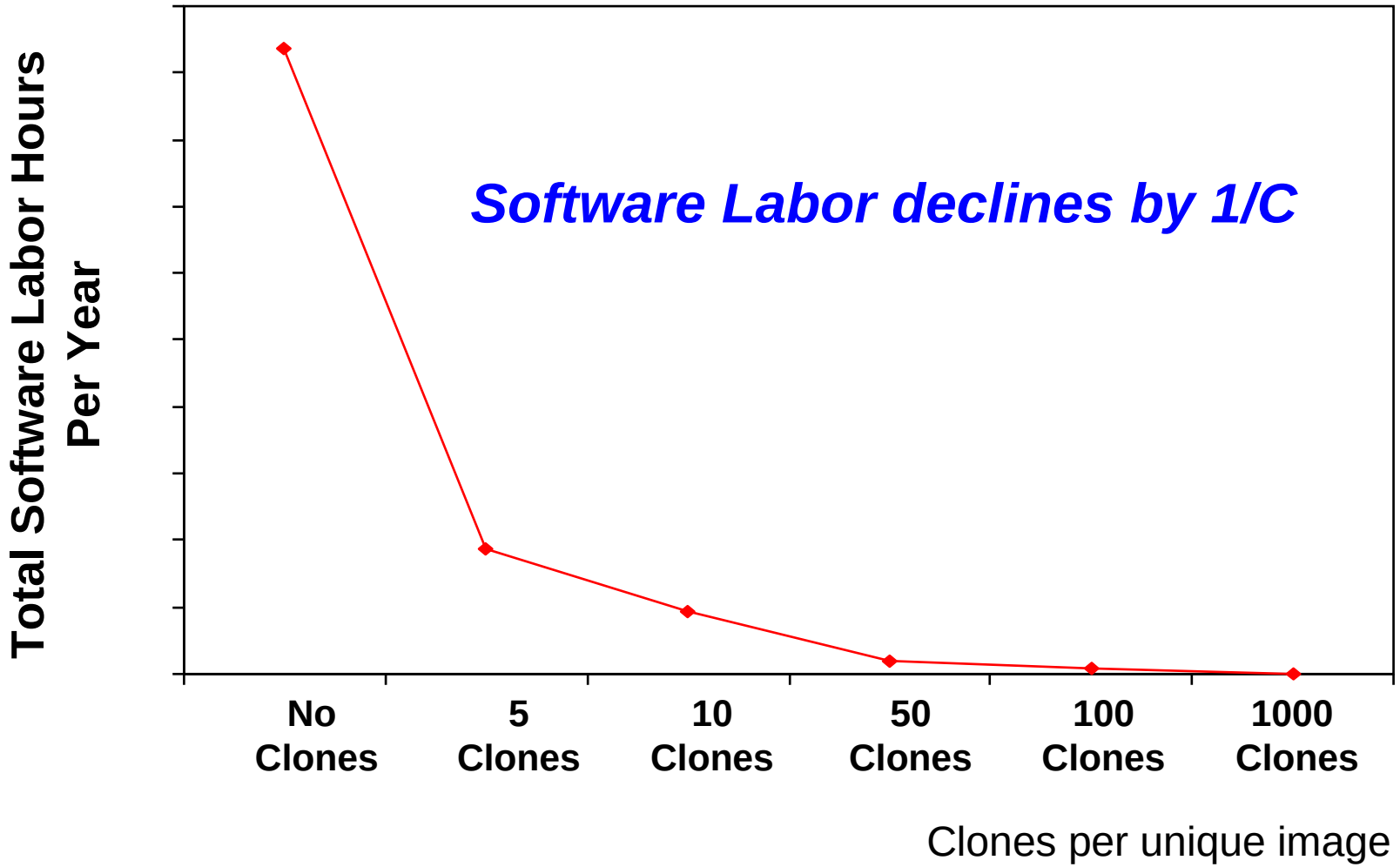
Example – Unified Resource Manager labor cost reduction

- **Reduce Change Management costs**
  - **Standardization** of deployed images
  - **Visibility** into relationships of resources in an ensemble



Based on IBM internal study.
Labor model based on customer provided data from IBM studies

Benefit of cloning factor on software labor costs in A virtualized environment

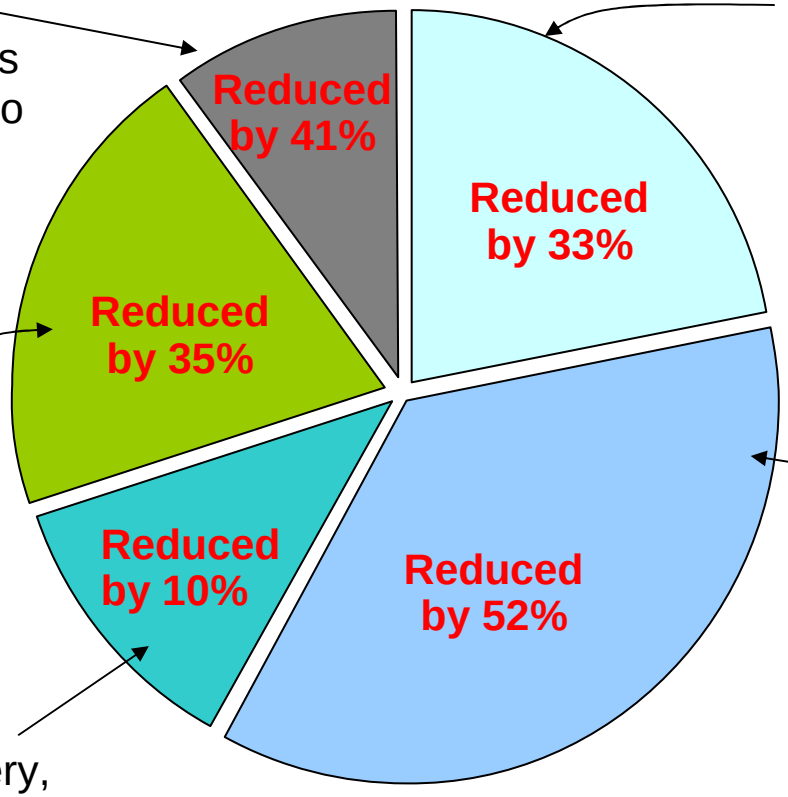


Unified Resource Manager labor cost reduction benefits

5032 total hours per year reduced by 38% to 3111 hours per year

Change Management
Standardization of images and firmware, visibility into relationships among resources

Deployment Management
Automatic setup and configuration of the hypervisor and out-of-the-box networks

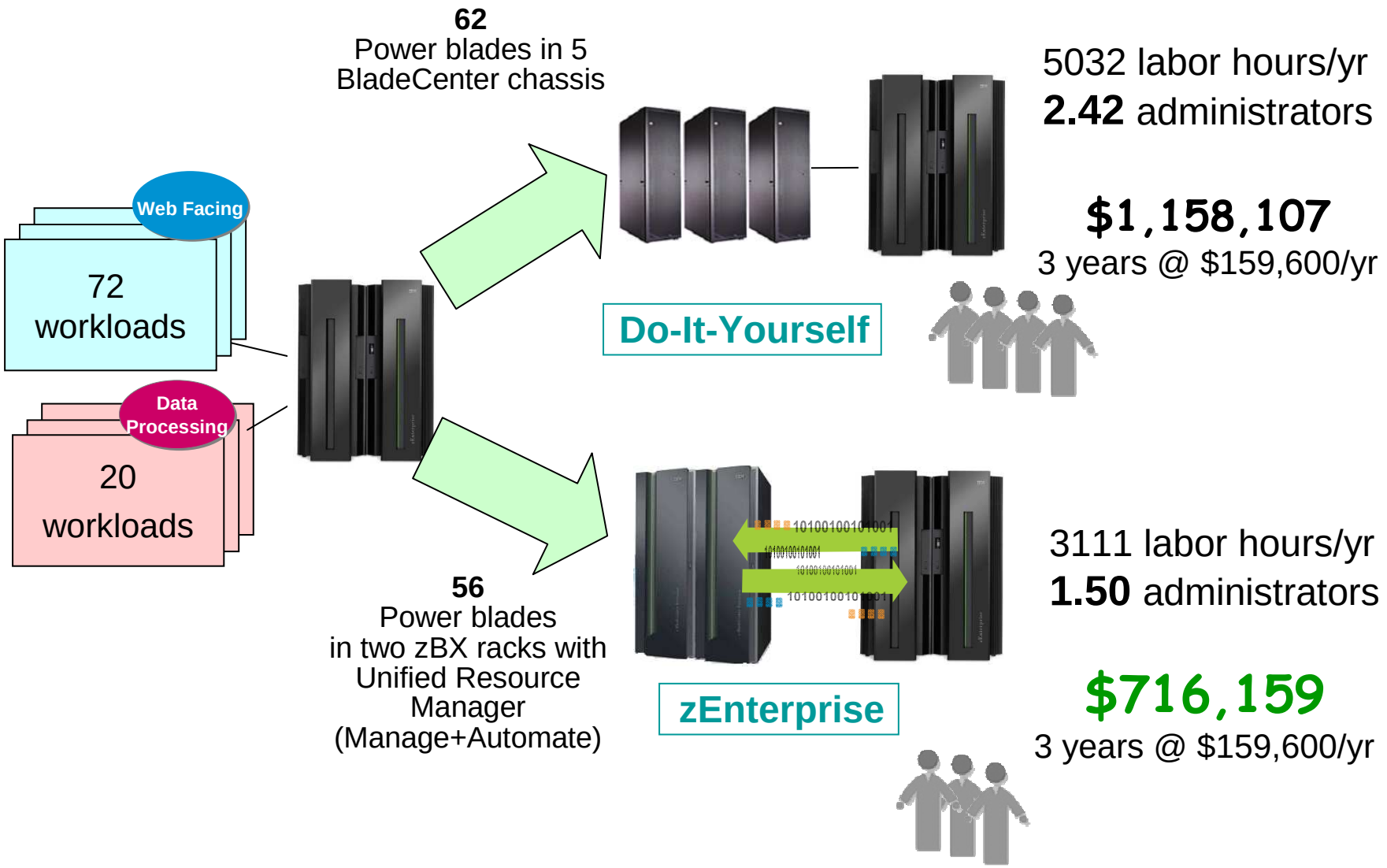


Security Management
Centralized fine-grain administrator access control

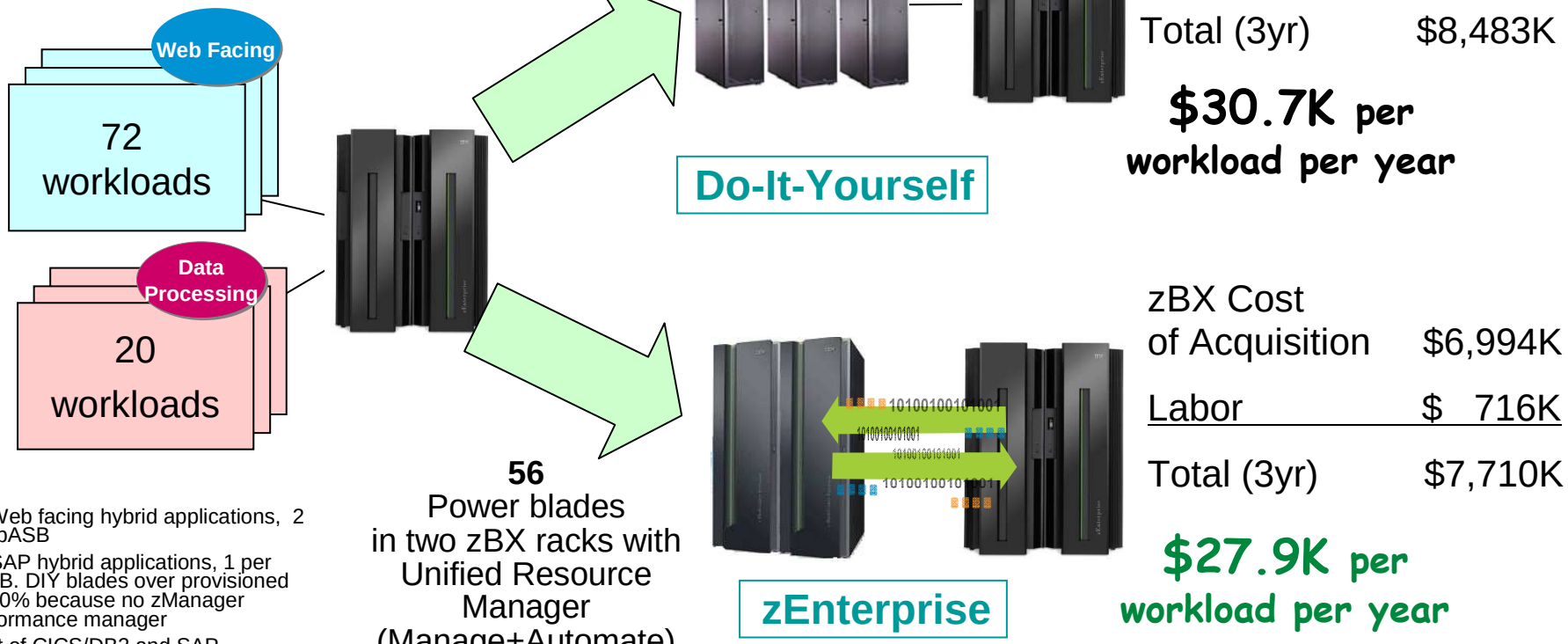
Incident/Capacity Management
Automation to isolate and fix issues

Asset Management
Automated discovery, entitlement management

Compare labor costs for three years



Compare total costs for three years



72 Web facing hybrid applications, 2 per pASB

20 SAP hybrid applications, 1 per pASB. DIY blades over provisioned by 10% because no zManager performance manager

Cost of CICS/DB2 and SAP components of workloads not included

Labor costs are for blade management only

Labor rate $159K per year

38% less labor cost and **9%** less cost per workload

Results may vary based on customer workload profiles/characteristics. Prices will vary by country.

Why zBX is better than DIY

Summary

– zBX based solutions can be more cost effective than Do It Yourself based solutions

– Unified Resource Manager performance management features reduce the need to overprovision hardware

– Unified Resource Manager automation provides signific administrative labor savings

Thank You !