



7 Kasım 2012 - Çırağan Palace Kempinski

IBM Connected 2012 Istanbul

Learn. Collaborate. Innovate.

Private Cloud on PureSystems

Jim Williams
IBM



Introducing PureSystems - A New Family Of Expert Integrated Systems

- Built-in expertise to address complex business and operational tasks automatically
- Integration by design to accelerate system setup and application management
- Simplified experience from purchase to maintenance

PureFlex System

- Pre-integrated and optimized infrastructure
- Management integration across compute, storage and networking – both physical and virtual
- No compromise design with system level upgradeability
- Designed for cloud with flexibility and simplicity



PureApplication System

- Optimized for performance and virtualized for efficiency
- Designed for transactional web applications and enabled for cloud
- Application-aware workload management



IBM PureFlex System Simplifies Set-Up And Management

Building Blocks: IBM Flex System™ components

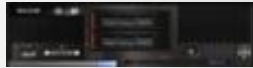
Chassis

14 half-wide bays for nodes



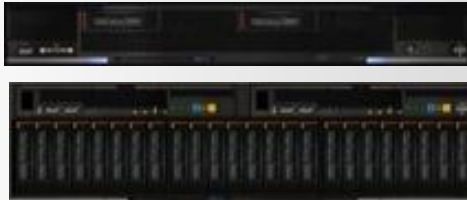
Compute Nodes

Power 2S/4S
x86 2S/4S



Storage Node

V7000



Management Appliance



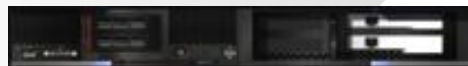
Networking

10/40GbE,
FCoE, IB
8/16Gb FC



Expansion

PCIe
Storage



PureFlex System



- Flexible choice
- Integrated design
- Pre-assembled hardware
- On-site set up services

Build to Order

Express, Standard and Enterprise Configurations

PureFlex System Starts With Choice Of Compute Nodes And Operating Systems

IBM POWER7

8 cores per socket
4 threads per core

p260



2-socket
16 cores
64 threads

p460



4-socket
32 cores
128 threads



Intel Sandy Bridge EP/EN

8 cores per socket
2 threads per core

x220



2-socket
16 cores
32 threads

x240



4-socket
32 cores
64 threads



Linux = Both SUSE and RHEL

PureFlex System Integrates More Choices For Hypervisors, Networking And Storage

- Multiple Hypervisors supported
 - VMWare, KVM, Hyper-V, PowerVM



- Advanced Networking Choices

- Ethernet
 - Scalable 10Gb Switch / 40Gb Uplinks & Scalable 1Gb Switch 10Gb Uplinks
 - 1/10Gb Pass Thru
- Fibre Channel (16Gb, 8Gb and FCoE)
- Infiniband (QDR and FDR)



- Enterprise Class Block Storage (Storwize V7000)

- Enterprise class storage virtualization and copy services
- Solid state storage optimized with Easy Tier
 - SSD and HDD support



- Direct attach PCI storage expansion

- Attaches directly to compute nodes
- Expand storage capacity available to nodes



FCoE = Fibre Channel over Ethernet QDR = Infiniband Quad Data Rate FDR = Infiniband Fourteen Data Rate

PureFlex Delivers A Simplified Experience By Integrating All The Components

PureFlex Building Blocks

Chassis



14 half-wide bays for nodes

Compute Nodes



x86 2S/4S
Power 2S/4S

Storage Nodes



V7000 Expansion
in/out of chassis

Management Appliance



Flex System
Manager (FSM)

Networking

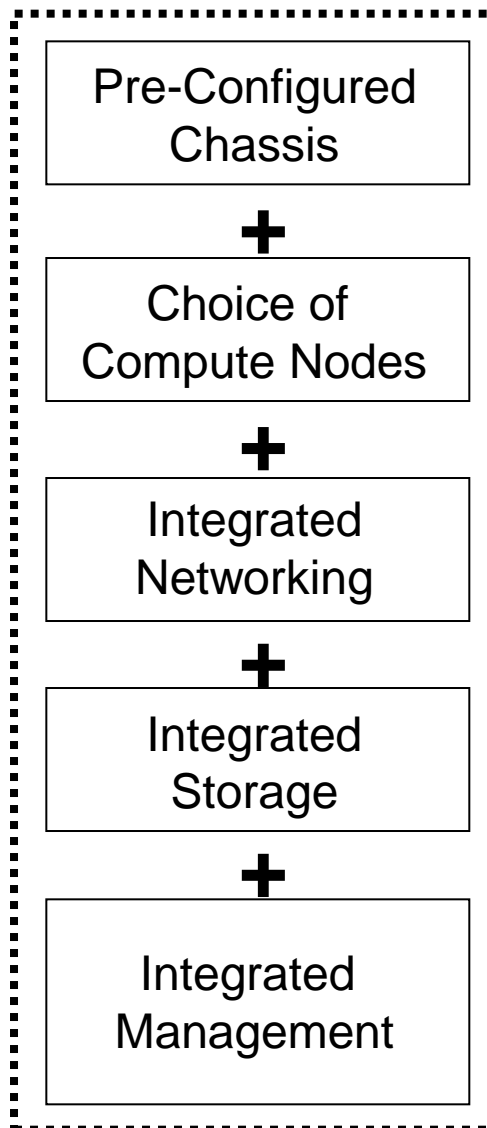


10/40GbE,
FCoE,
IB 8/16Gb FC

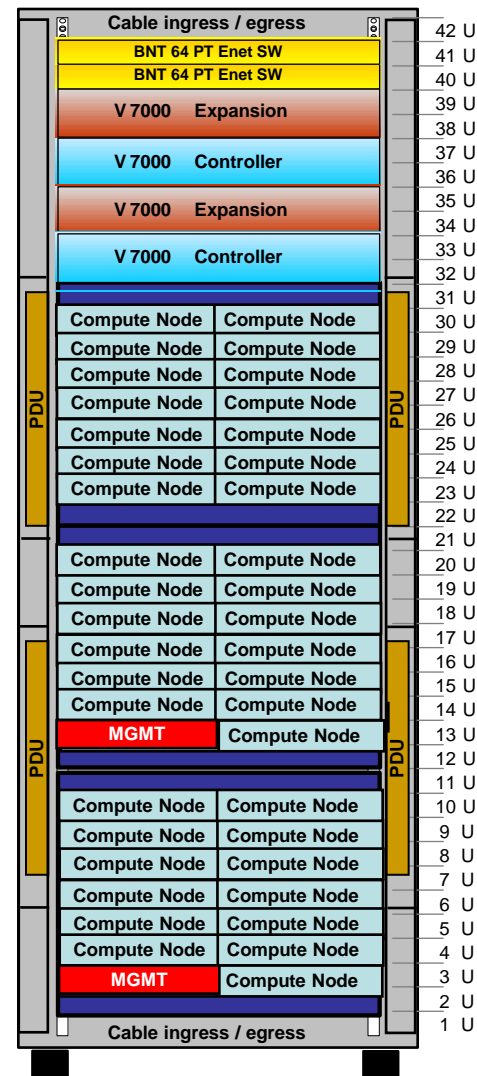
Expansion



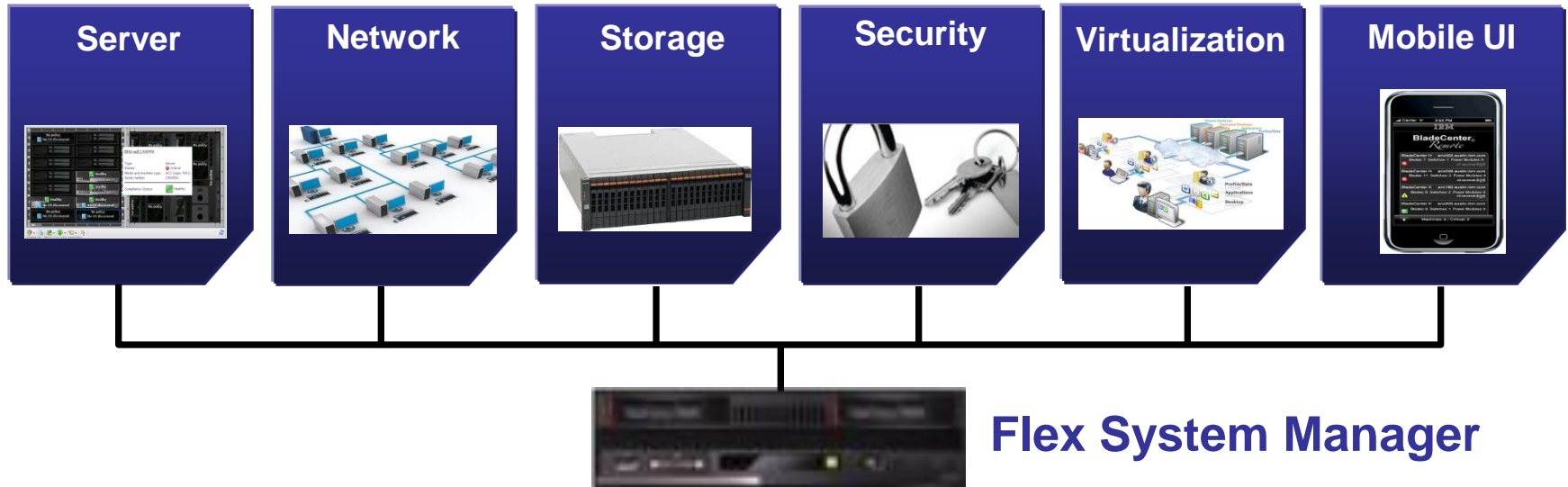
PCIe,
Dedicated
Storage



Up to 640 Cores



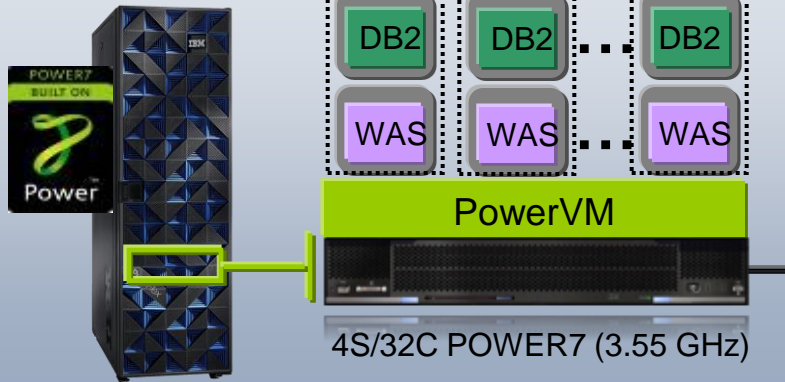
Integrated Flex System Manager – “Single Pane of Glass” System Management



- Integrated appliance supports “single pane-of-glass” for managing all physical and virtual resources
- Auto-discovery and inventory of hardware
- Photo-realistic chassis map shows integrated view of all health information
- Dynamic provisioning of virtualized resources (via VMcontrol or vCenter)
- Policy-driven, automated virtual machine placement due to utilization, energy, or failure conditions
- Centrally perform non-disruptive system updates

IBM Software Optimizations Give PureFlex Power A Competitive Advantage

PureFlex System (Power)



1 Blade
 7 WAS LPARs
 7 DB2 LPARs
 2 VIOS LPARs

 16 Total LPARs

7X Better
 Price/Performance

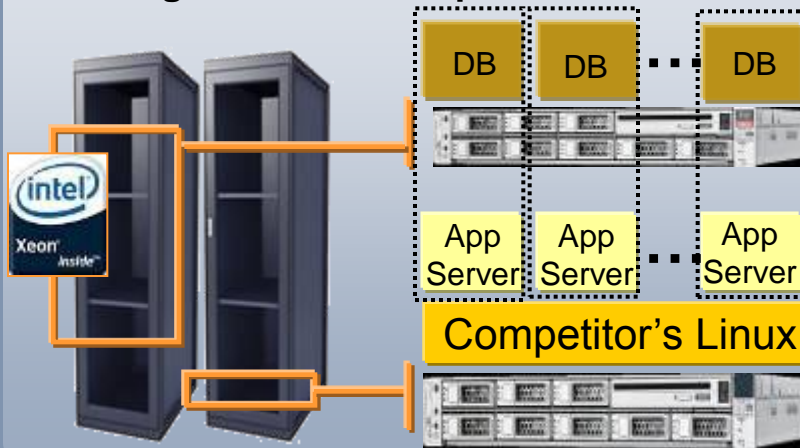
31,594 Pages per sec

978 Pages per sec per core

\$27 Per page element/sec

7 Pairs WAS+DB2 on platform

Pre-integrated Database Competitor Pre-integrated Web Competitor



6 Nodes
 2 Pre-integrated Database Competitor compute nodes
 +
 3 Pre-integrated Database Competitor storage nodes

 Pre-integrated Web Competitor node

17,237 Page elements per sec

331 Page elements per sec per core

\$207 per page element/sec

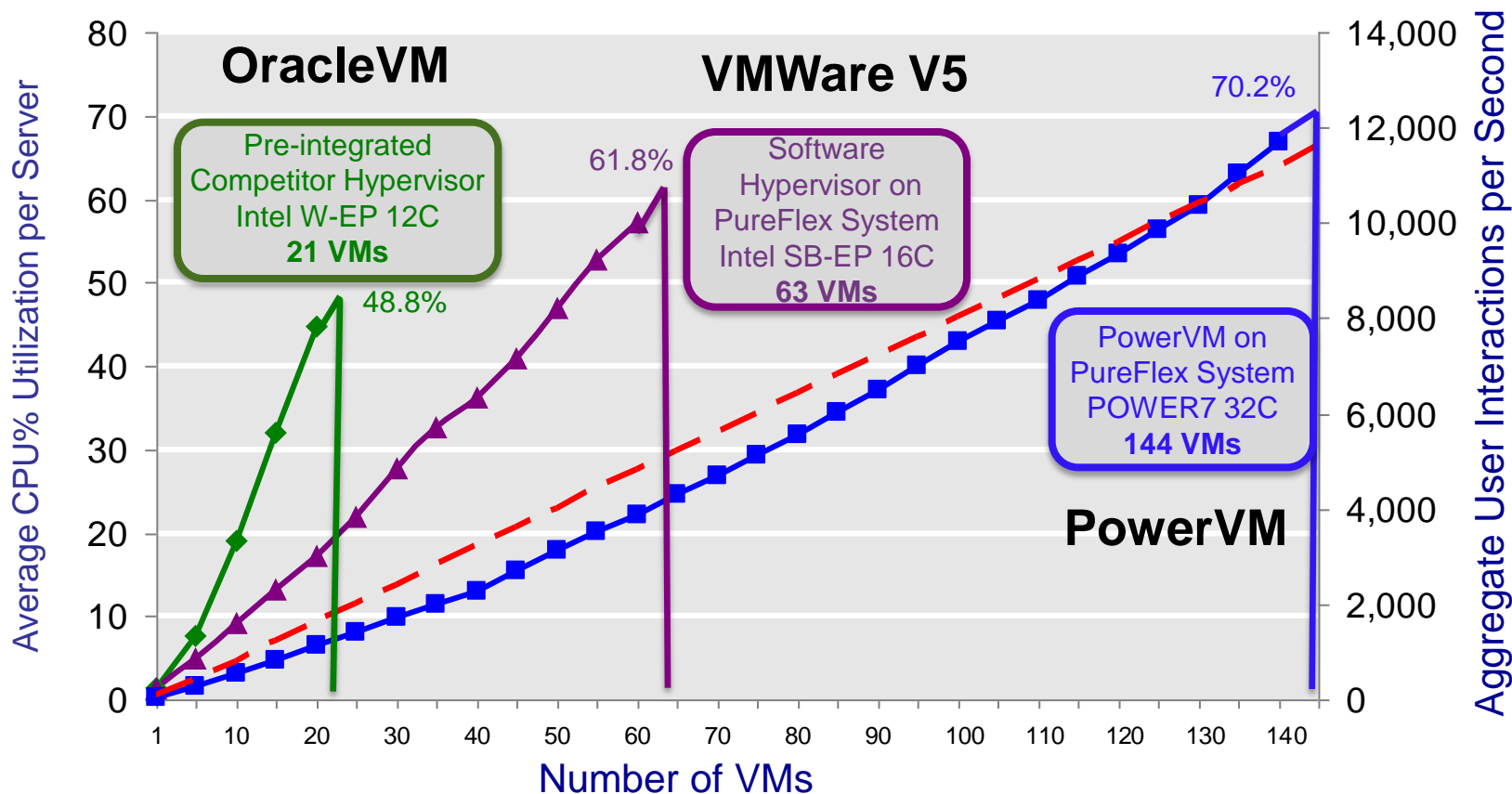
12 Pairs App Server on Pre-integrated Web Competitor and DB on Pre-integrated Database Competitor

This is an IBM internal study of IBM Troy NGP solution designed to replicate a typical IBM customer workload usage in the marketplace. The results were obtained under laboratory conditions, and not in an actual customer environment. IBM's internal workload studies are not benchmark applications, nor are they based on any benchmark standard. As such, customer applications, differences in the stack deployed, and other systems variations or testing conditions may produce different results and may vary based on actual configuration, applications, specific queries and other variables in a production environment. Prices, where applicable, are based on published US list prices for both IBM and competitor, and the cost calculation compares the cost per request for the 3yr life of the machine. 3 year total cost of acquisition comparisons are based on similar expected hardware, software, service & support offerings

PureFlex System with Power Delivers Better Workload Density For Virtualized Workloads

Compare the Number of Virtual Machine Workloads Supported

Online Banking Workload: Average Rate of **80 User Interactions per Second**



This is an IBM internal study of PureFlex System solution designed to replicate a typical IBM customer workload usage in the marketplace. The results were obtained under laboratory conditions, and not in an actual customer environment. IBM's internal workload studies are not benchmark applications, nor are they based on any benchmark standard. As such, customer applications, differences in the stack deployed, and other systems variations or testing conditions may produce different results and may vary based on actual configuration, applications, specific queries and other variables in a production environment.

Private Cloud On Pure Systems

Cost Per Workload On Power Is Less Than VMWare On Intel

728 User Interactions per Second

PowerVM / POWER7

WAS 8



4 Socket /32 Core POWER7
(3.55 GHz)



17 workloads
\$42,436 per workload

✓ Greater workload density yields **32%** lower cost per workload

VMware / Intel Sandy Bridge

WAS 8



2 Socket /16 Core
(2.70 GHz)



5 workloads
\$62,623 per workload

Source: IBM CPO internal studies

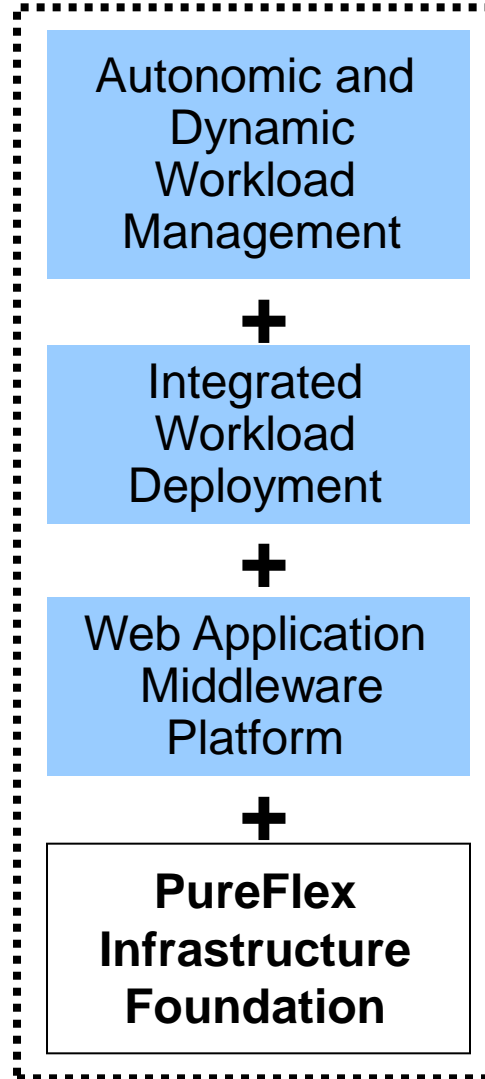
IBM PureApplication System Adds Built In Expertise To Drive Labor Costs Down Even More



IBM PureApplication System



Deep integration and optimization



Autonomic and Dynamic Workload Management

Built-in workload elasticity using pre-defined scaling policies

+

Integrated Workload Deployment

Built-in expertise via web workload patterns; Self-service, automated provisioning of workloads

+

Web Application Middleware Platform

Pre-entitled licenses included

+

PureFlex Infrastructure Foundation

Compute + Network + Storage + Management

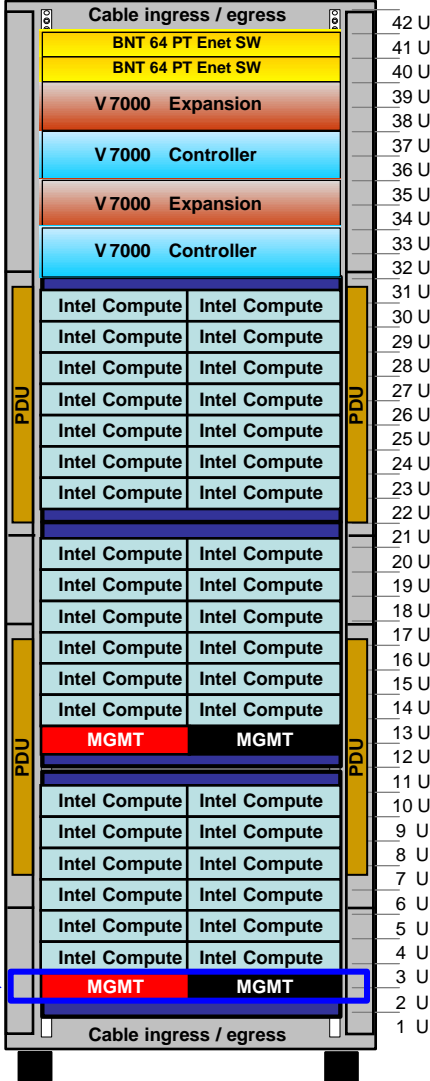
PureApplication – Reduce Hardware And Management Deployment



- IBM PEP Team sets up hardware and hypervisors in less than 4 hours
- No additional cost

PureApplication Manager

Pre-installed, pre-integrated management appliance
 Single pane-of-glass management



PureApplication Integrated System Management Set Up Time

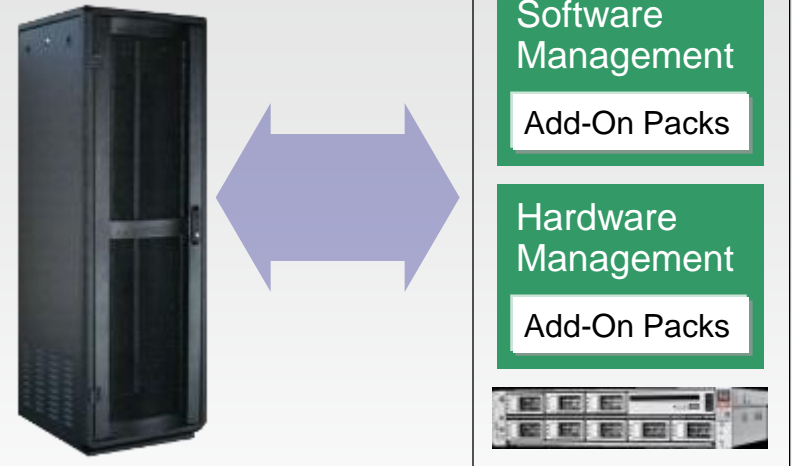
IBM PureApplication System



No set-up time

- Pre-installed, pre-integrated management stack
- Single pane-of-glass management

Oracle



8 hour* set-up time

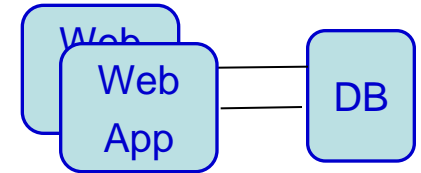
- Management stack requires separate purchase, install and configuration
- Different user interfaces for software and hardware management

* Source : Actual times reported by customer working with competitor setup team

Setting Up A Production Environment Can Be A Time Consuming Laborious Process

Typical Manual Process Steps – Small Cluster of Two Application Servers and DB

1. Install Operating System with fixes and test
2. Install Application Servers and required fixes and test
3. Configure the HTTP server and security settings
4. Configure HTTP servers for high availability
5. Create an application cluster with session replication to support failover
6. Install a database and required fixes and test
7. Install the DB schema and populate the DB
8. Configure DB for high availability (cluster)
9. Connect the Application Server with the DB with JDBC drivers and test
10. Deploy the application to the cluster and test
11. Set up the access rights for the cluster, log files and test
12. Final test and performance tuning



This process can easily take 15 hours or more *

Automated deployment of patterns automates these steps

PureApplication System - Workload Deployment Methods

Virtual Appliance

- Single virtual machine image with software
- IBM supplies Hypervisor Editions
- Automated deployment

Virtual System Patterns

- Multiple virtual machines with software
- Explicit topologies
- IBM supplies pre-defined, best practice patterns
- Automated deployment of pattern

Virtual Application Patterns

- Define workload policies
- Implicit topologies are automatically generated and deployed based on defined policies
- Container-like services at run time

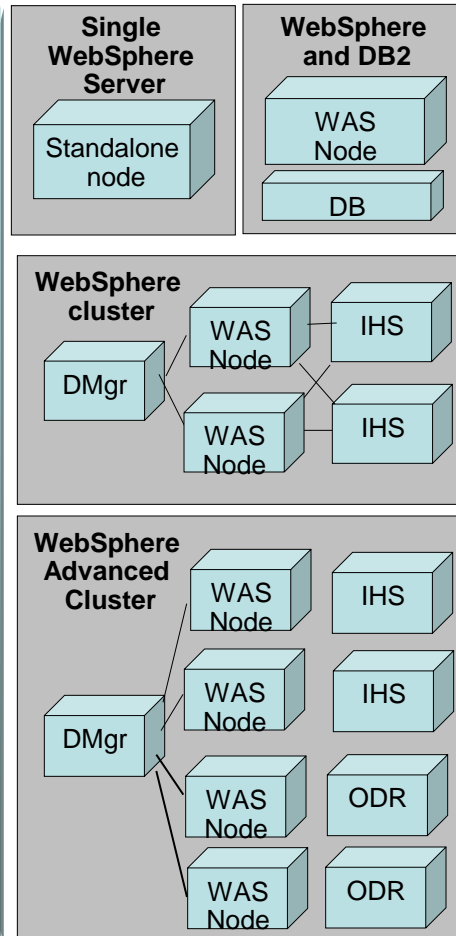
Configuration flexibility
Skills required
More labor

Easiest to use
Less skills required
Administrator productivity

PureApplication System **Virtual System Patterns** Define Explicit System Topologies

A Virtual System Pattern (VSP) is one or more virtual images with script packages ready to automatically deploy as a collection of virtual machines

Virtual System Pattern Examples



Hypervisor Edition virtual images preloaded in software catalog repository

Pre-entitled Images:

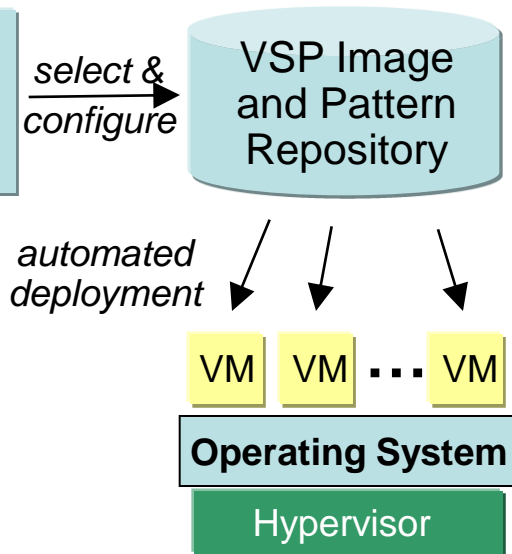
- Red Hat Linux OS
- WebSphere Application Server
- DB2
- Automation Framework HV (for migrating applications)

Optional Images:

- WebSphere MQ
- WebSphere Message Broker
- Business Process Management
- Cast Iron
- SOA Policy Managed Gate
- Portal Hypervisor Edition
- Informix Ultimate Hypervisor Edition

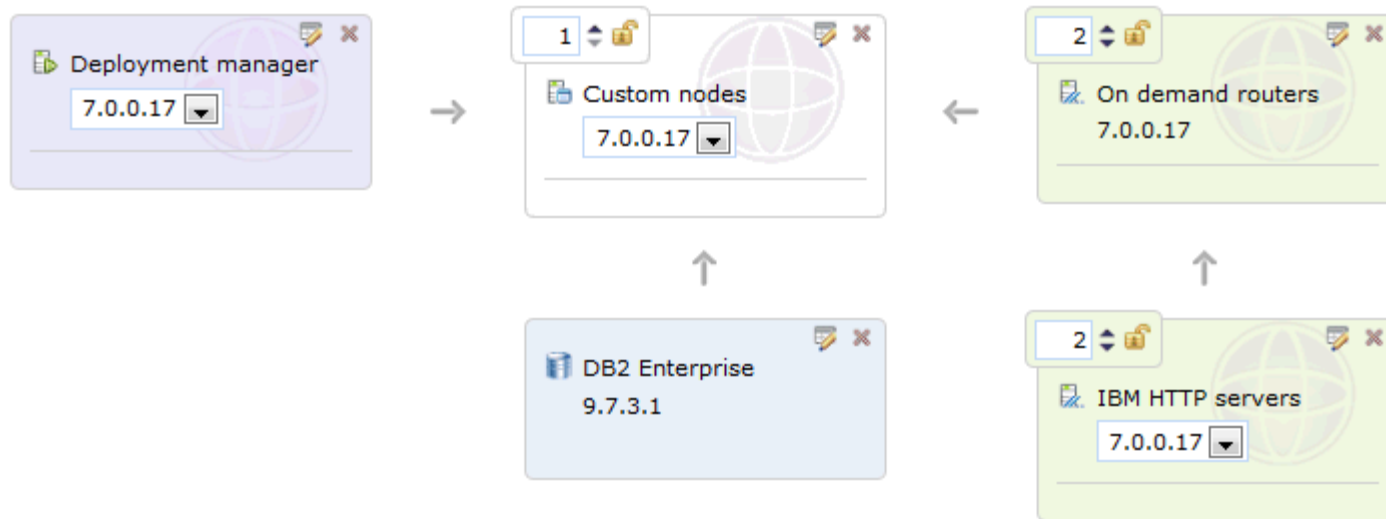
Business Partner/ISV:

- 55 ISV partners with 100+ applications



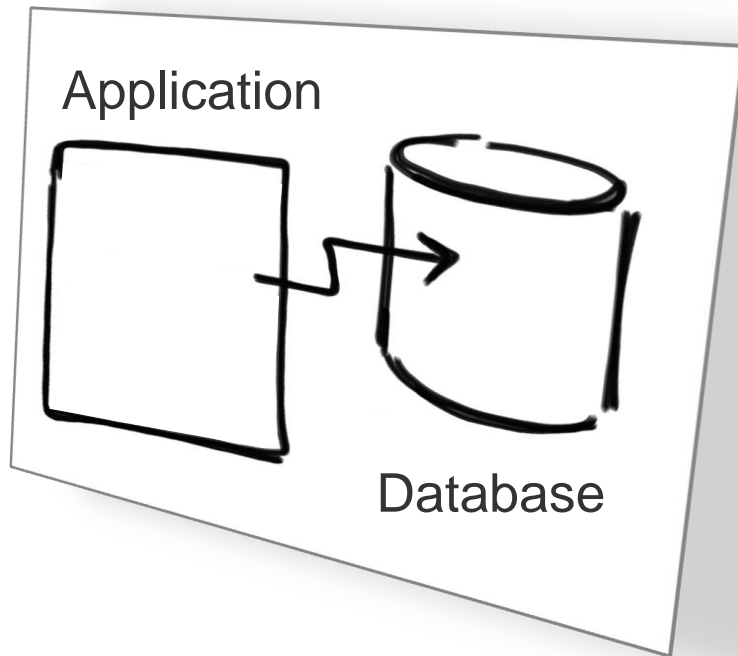
DEMO: Using PureApplication **Virtual System Patterns** To Build And Deploy A Web Application

- A full production Web Application is quickly built by dragging and dropping components on to the pattern editor
- A Virtual System pattern is created and deployed in less than **10 minutes**



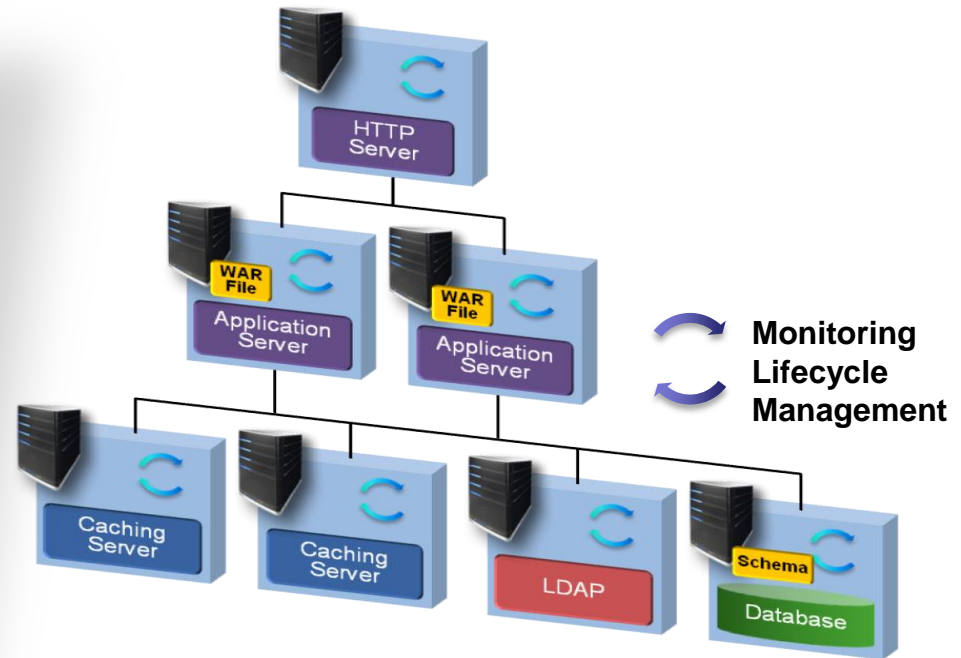
Virtual Application Patterns Further Simplify Workload Management

What the business wants...



Just provide application code, DDL,
and specify policies

What's required...



PureApplication Manager constructs and
deploys this pattern

PureApplication **Virtual Application Pattern** – Fastest Way To Economic Breakthrough And Life Cycle Management

A Virtual Application Pattern defines workload policies. PureApplication automatically deploys a specific pattern of virtual machines designed to satisfy those policies

Virtual Web Application Pattern

Simply define your application

Application (.ear)

DB2 (.ddl)

Define scaling and routing policies

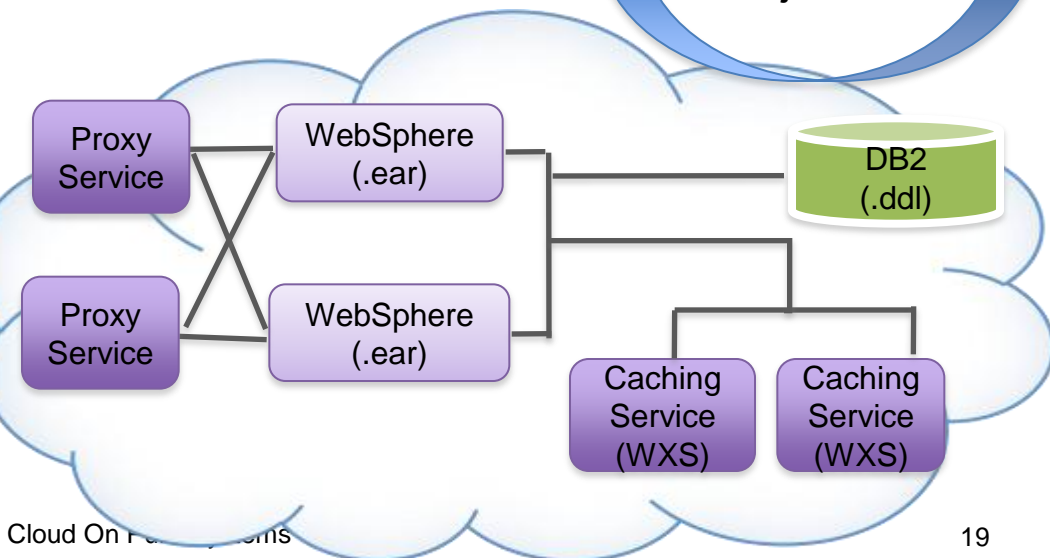
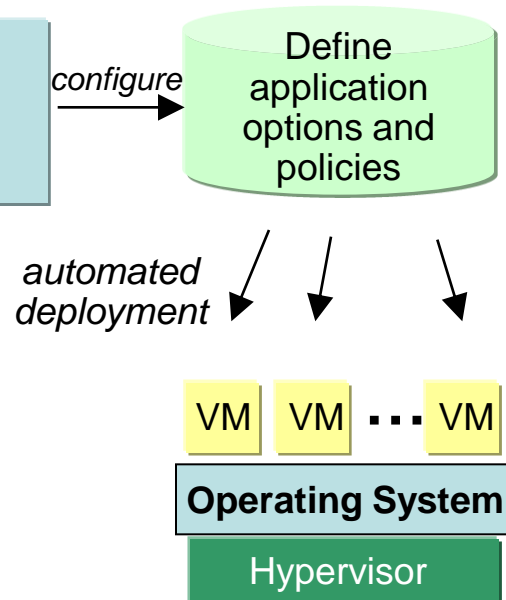
Scaling Policy

Routing Policy

PureApplication automatically provides all the components necessary to deploy an instance of the pattern

Infrastructure automatically created

Run time Monitoring, Automatic resource adjustment



Virtual Application Pattern Includes Automated Management Functions

Full Functions Proxy service, Web cluster with failover, database, data grid, external connections

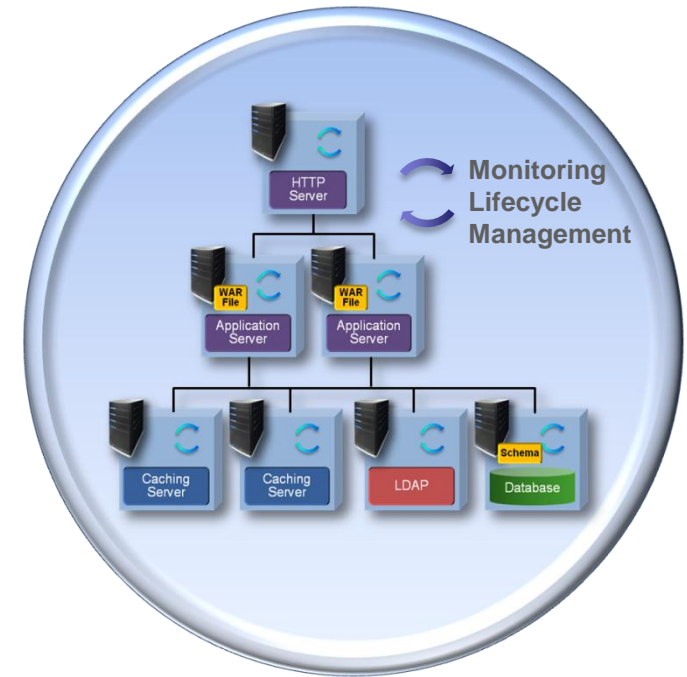
Load Balancing Web requests are automatically load balanced across multiple virtual application servers

Monitoring All components of virtual application environments are monitored by PureApplication System

Auto Scaling Managed environments scale up and down based upon business policies you specify

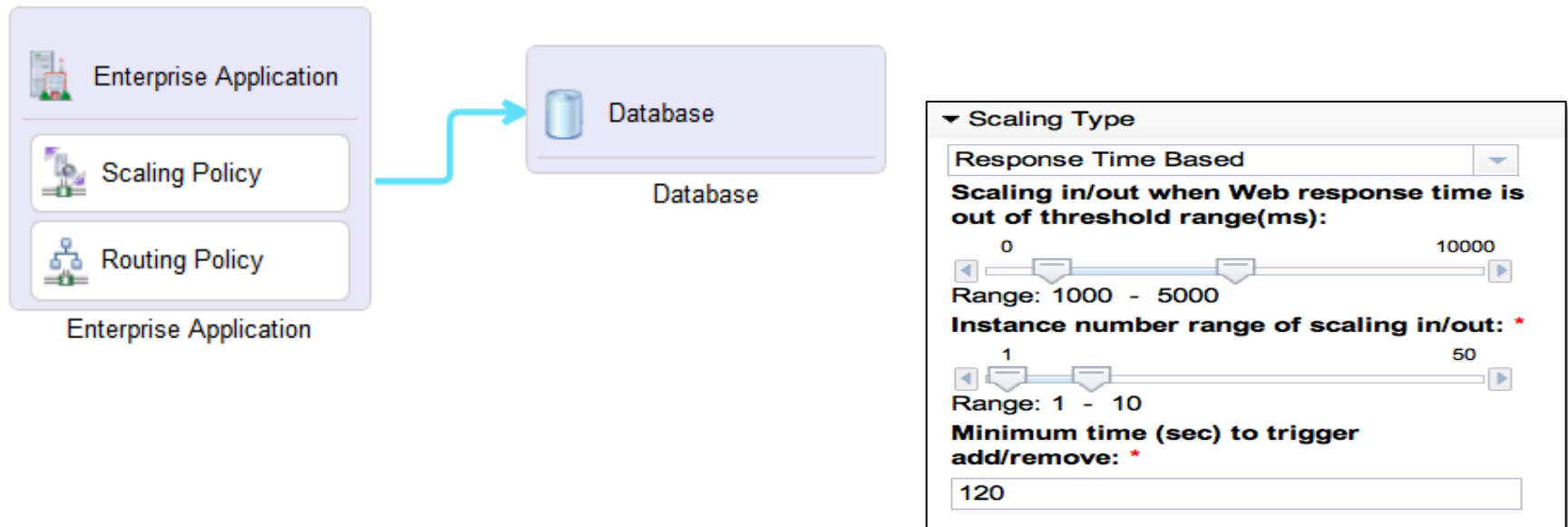
Resiliency Failed virtual machines are replaced with new VMs which are configured with the old VM's identity

Security ACL's for application sharing and management access; LDAP integration for application security

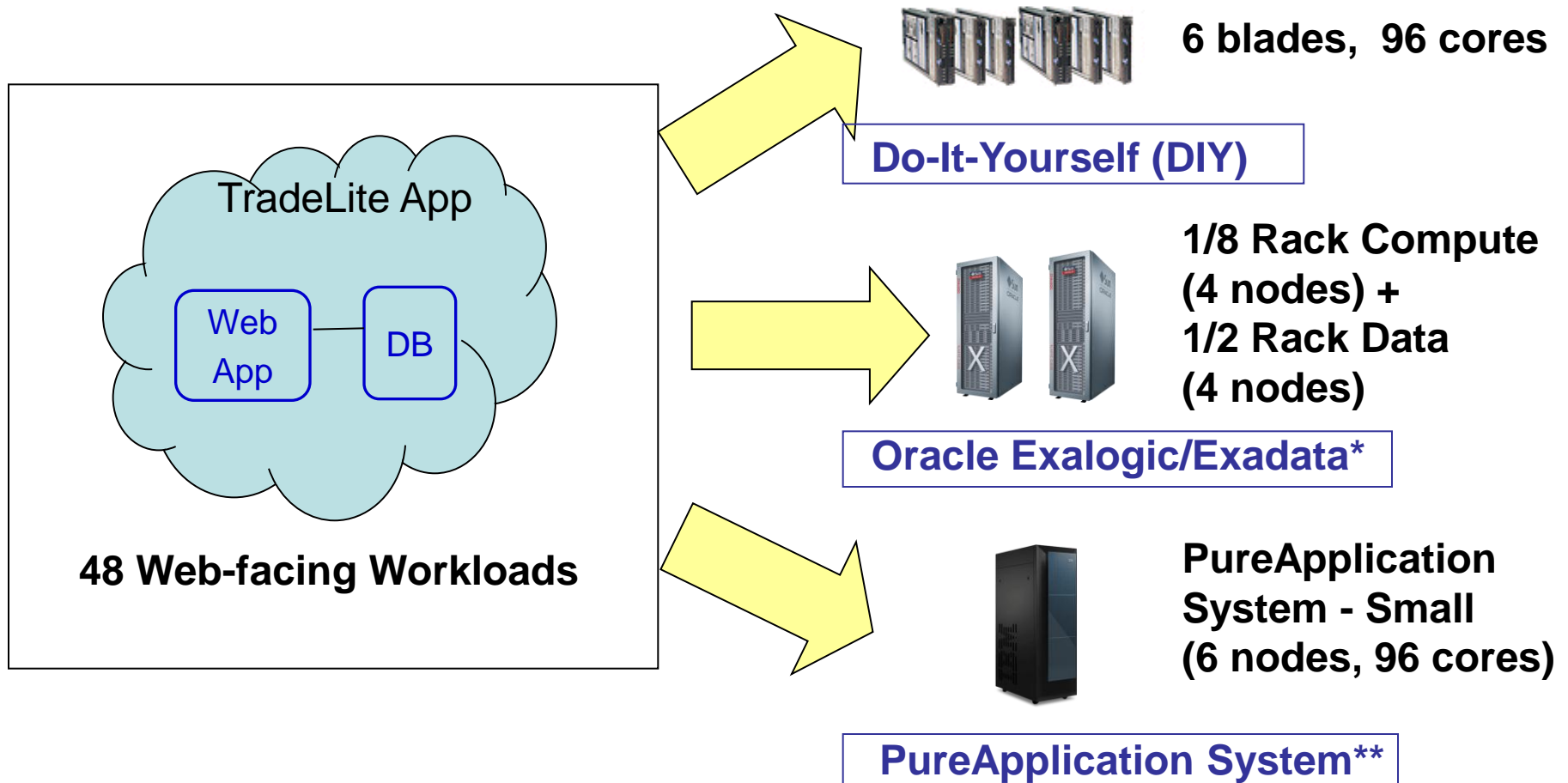


DEMO: Using PureApplication Virtual Application Patterns To Quickly Deploy With A Service Policy

1. Build a Virtual Application Pattern using PureApplication Expertise
2. Assign a service policy (scaling) to assure your image will maintain Service Level Agreements (SLA)



Case Study - Compare The Customer Labor To Manage 48 Web-Facing Workloads



Which option requires the least labor?

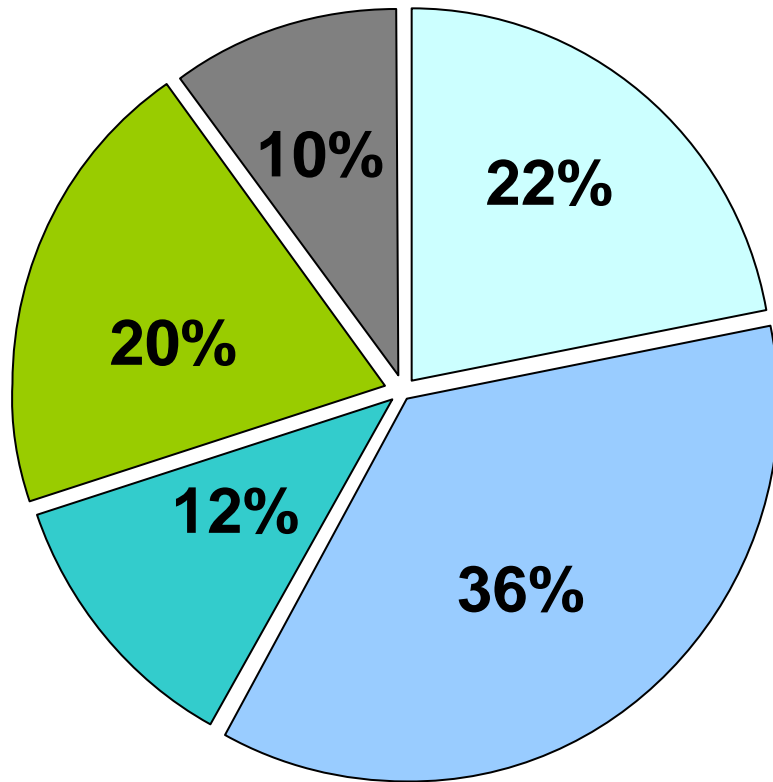
* Performance ratio used based on experiments - Nodes required PureAS: Exalogic :Exadata = 5.28:2:4

* Oracle minimum 1/8 rack with 4 compute nodes (only 2 needed); db instances on 1/2 rack database machine with 4 nodes

**PureApplication System – 1/4 rack with 96 cores Intel

Case Study - Five Key IT Processes For Infrastructure Administration

Based on ITIL Industry best practice for life cycle management



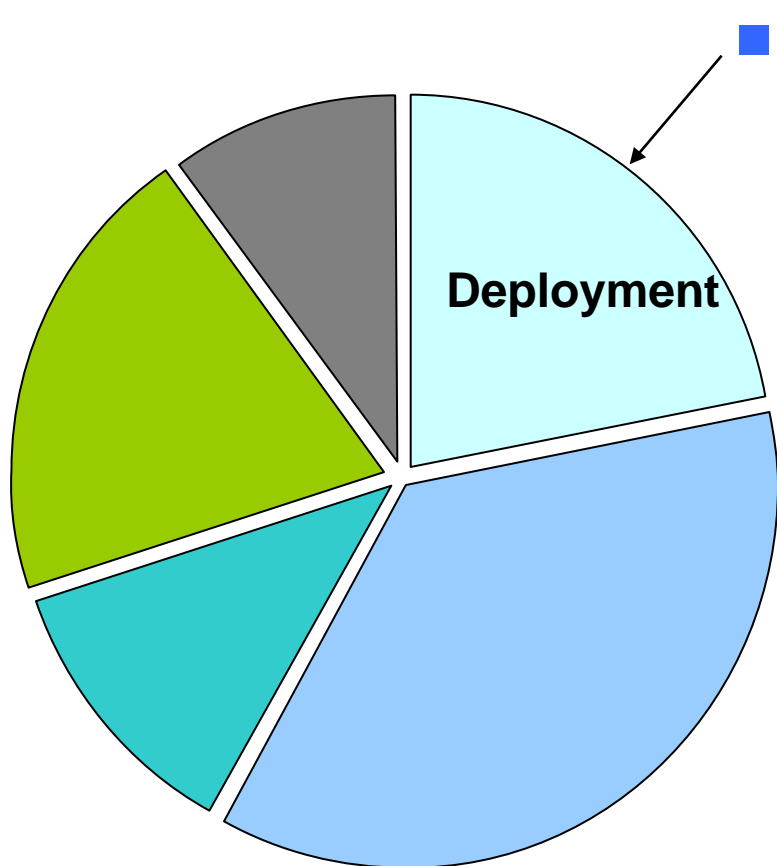
Typical percentage of time spent on each task category



% Allocation based on customer data from IBM study

ITIL = Information Technology Infrastructure Library

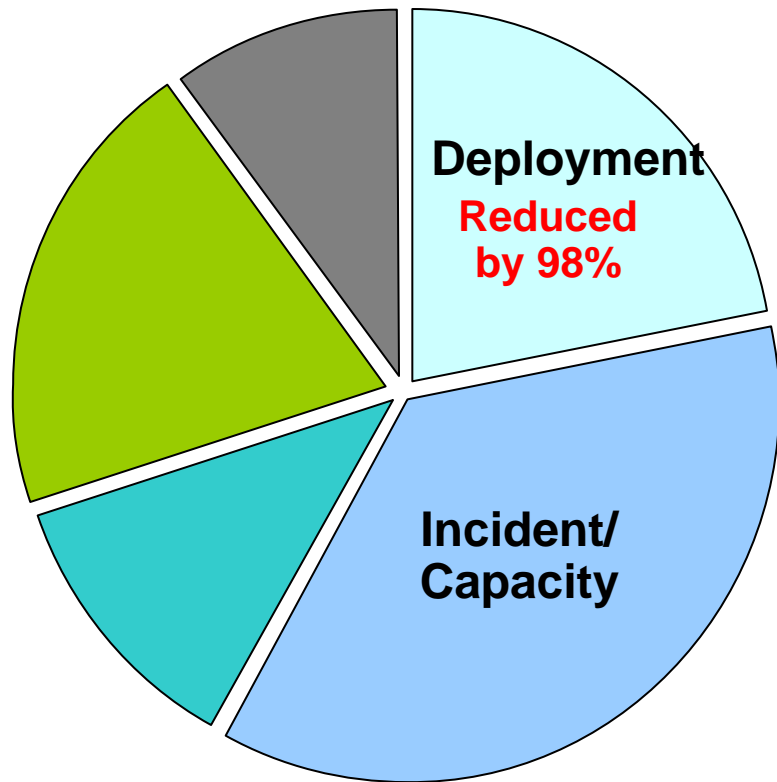
PureApplication Deployment Cost Reduction



■ Reduce Virtual Machine And Software Deployment Costs

- System hardware already set-up
- Pre-loaded best practice images and patterns for quick-starts
- Automated deployment of patterns via self service console
- Intelligent placement algorithm to map workloads to physical servers based on policies
- Drag and drop tooling to create new images or patterns

PureApplication Incident And Capacity Cost Reduction

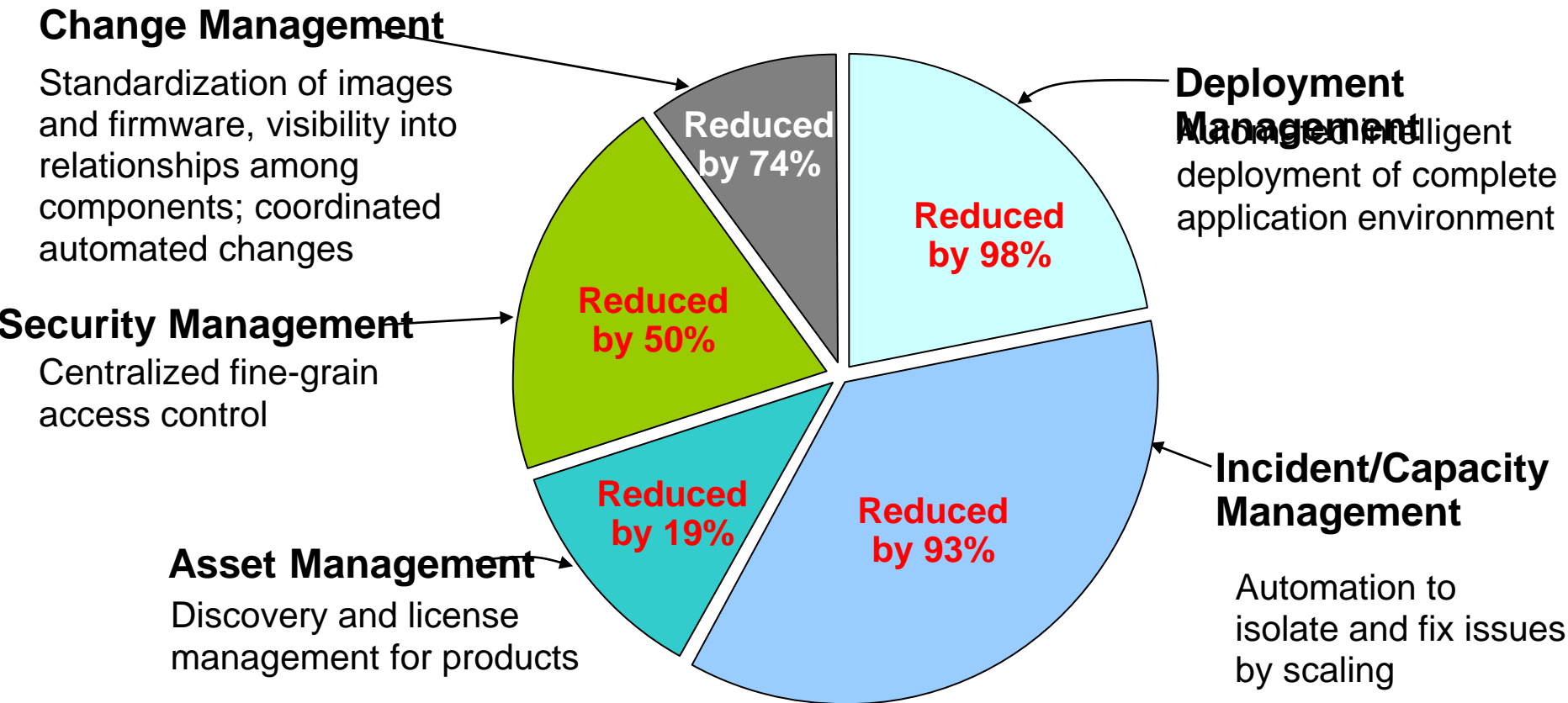


■ Reduce incident/capacity management costs

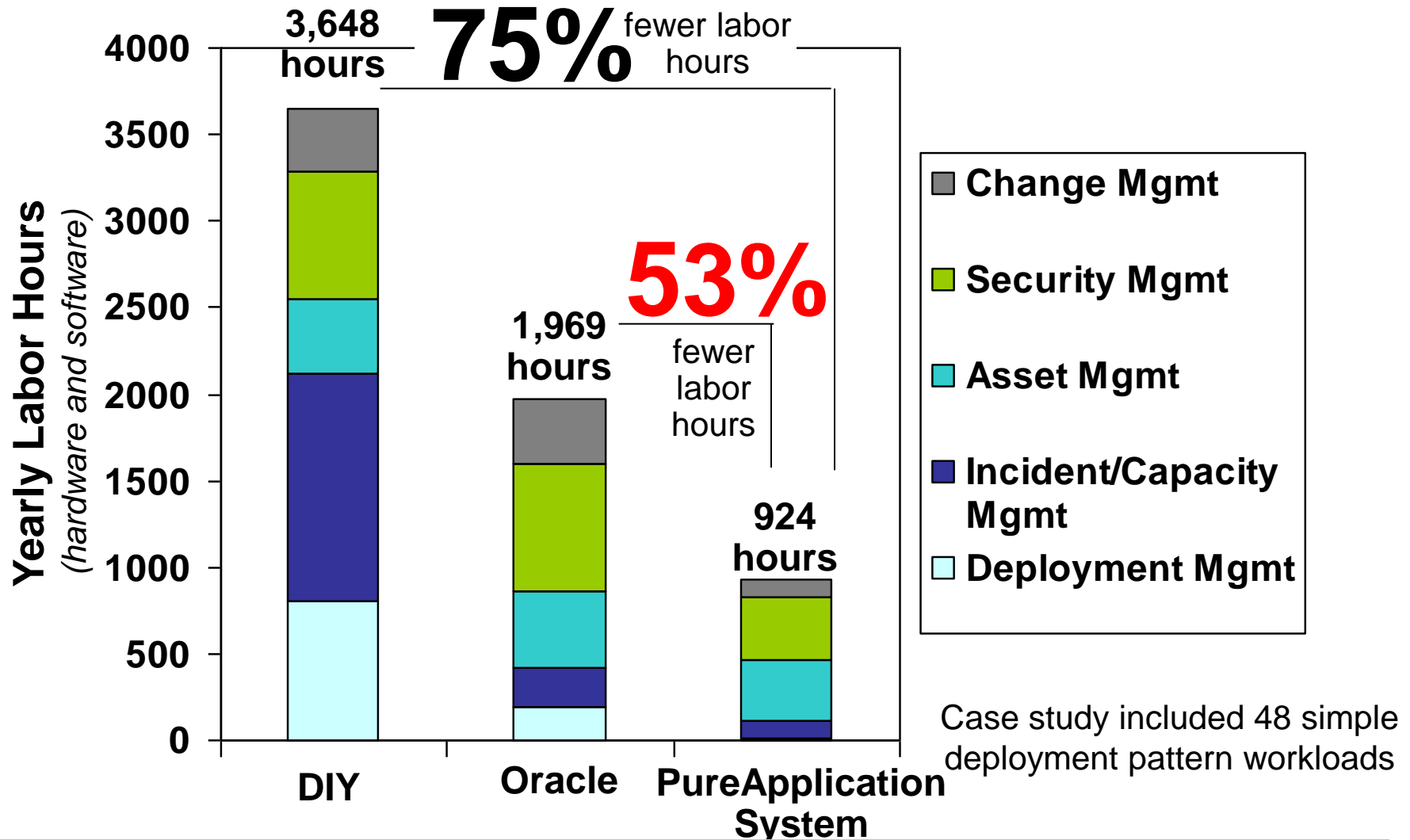
- Monitor from a single-pane of glass to quickly isolate issues with hardware and workloads running on multiple virtual servers
- Automatic resource adjustments for workloads to meet performance goals

PureApplication Delivers Labor Savings And Reduces Overall Administration Costs

3648 total hours per year **reduced by 75%** to 924 hours per year



IBM PureApplication System Significantly Reduces Overall Labor Costs



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