Back to Basics

What can virtualization do for you?

June 22nd 2005, 12:00 Noon CDT

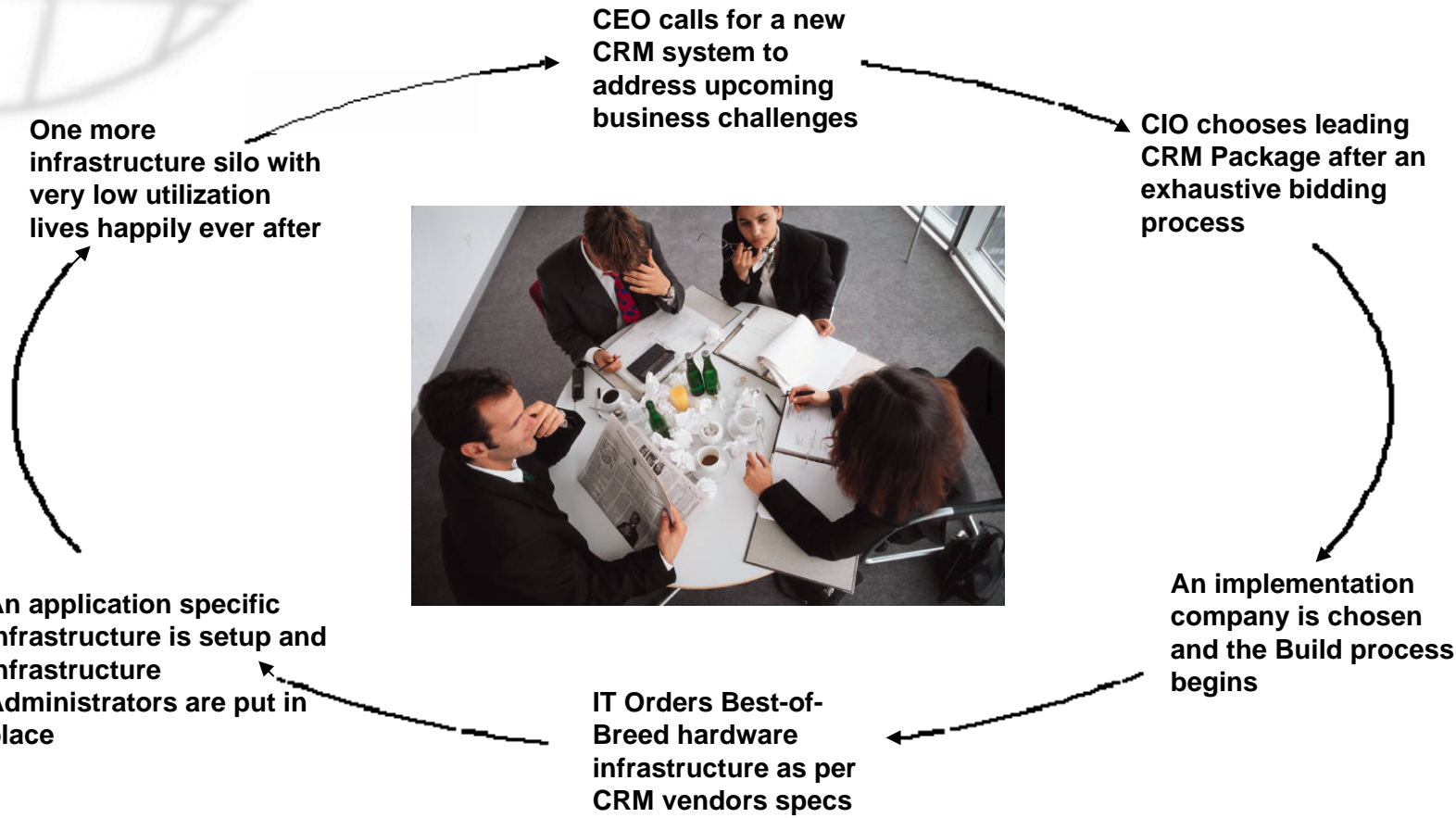LANTERN™

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What will we talk about today?

- Infrastructure as it is handled today: The Status Quo

- Analyst Speak

- Common Solutions

- Virtualization and what it can do for you

- Navigating the Virtualization Marketplace

- Best practices in leveraging the power of Virtualization

- How it all works, Case Study

- Summary

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Once upon a time in CIO Land…

CEO calls for a new CRM system to address upcoming business challenges

CIO chooses leading CRM Package after an exhaustive bidding process

One more infrastructure silo with very low utilization lives happily ever after

An implementation company is chosen and the Build process begins

An application specific infrastructure is setup and Infrastructure Administrators are put in place

IT Orders Best-of-Breed hardware infrastructure as per CRM vendors specs

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The Status Quo

- "Best of Breed" separate infrastructure for each function

- Very low server usage across the data center

- Inability to respond to business and competitive needs

- Business needs constrained by high costs of labor and IT capital

- Inability to predict demand & adapt

- Creation of islands of computing power and server maze

- Painful and unpredictable change process

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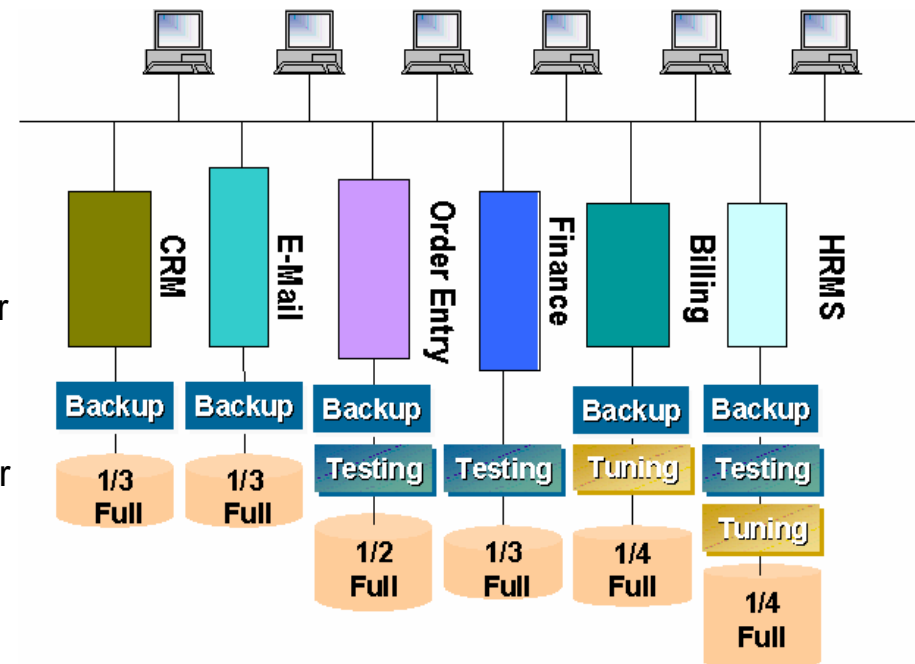
Did you know?

- US Spending on Server Hardware for 2004 was $46 Billion

- The average server utilization is around 10-15%

- With simple math that translates to $39 - $42 Billion in unused capacity

- If average utilization is improved to 60%, the annual saving would be around $22Billion

Source: Forrester Research Inc., Gartner Group

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What the analysts say

- By year-end 2005, 25 percent of Fortune 1000 enterprises will be using virtualization technologies (hardware or software) for server deployments

- By year-end 2007, more than 40 percent will be using virtualization technologies (hardware or software) for server deployment

- By 2008, enterprises that do not leverage virtualization technologies will spend 25 percent more annually for hardware, software, labor and space for Intel servers, and 15 percent more on the same for RISC servers

Source: Forrester Research Inc., Gartner Group

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That's why they came out with…

Server Consolidation

Stack applications on larger boxes to drive up utilization and bring down management costs

Grid Computing

To have a grid-like computing architecture so that applications could utilize resources available anywhere on the grid

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That's why they came out with…

Clustering/High Availability

A cluster is a collection of servers connected together in order to provide failover functionality to the application(s) that execute on those servers.
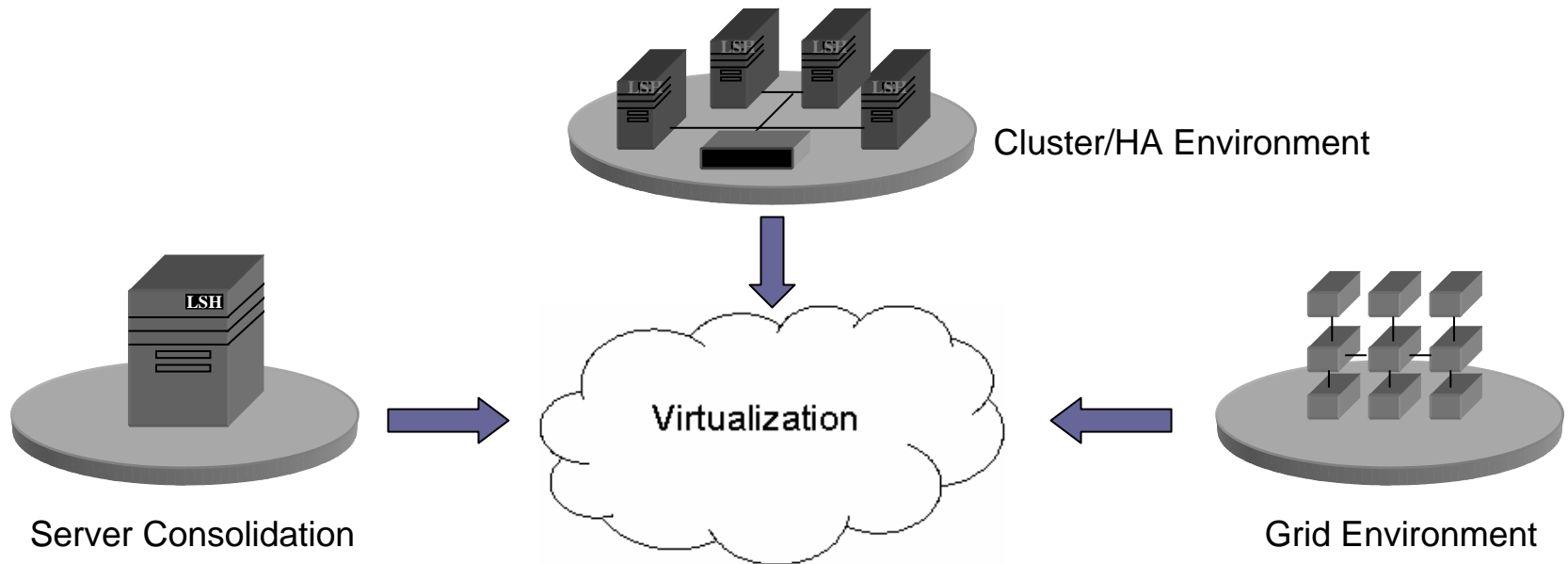
Containerization   NEW!

Is the process of isolating the elemental components or combinations thereof, of an application that are self-sufficient, mobile and "clone"able.

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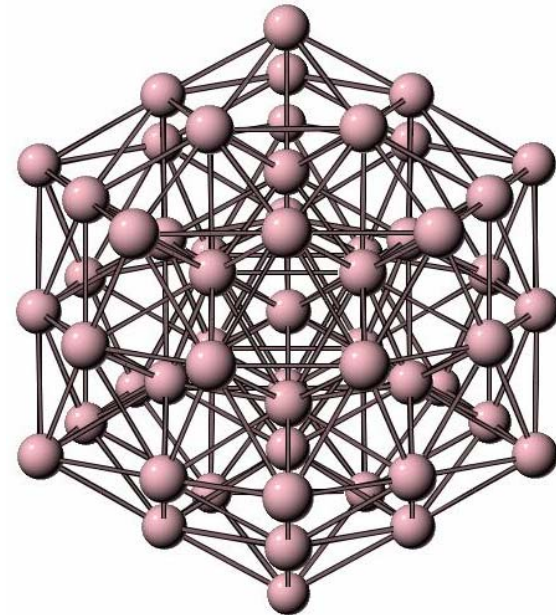
Virtualization

The sole purpose of virtualization is to maximize the utilization of existing computing resources while easing maintenance of applications.

Virtualization is flexible to adapt to your business and computing environments

Cluster/HA Environment

Virtualization

Server Consolidation

Grid Environment

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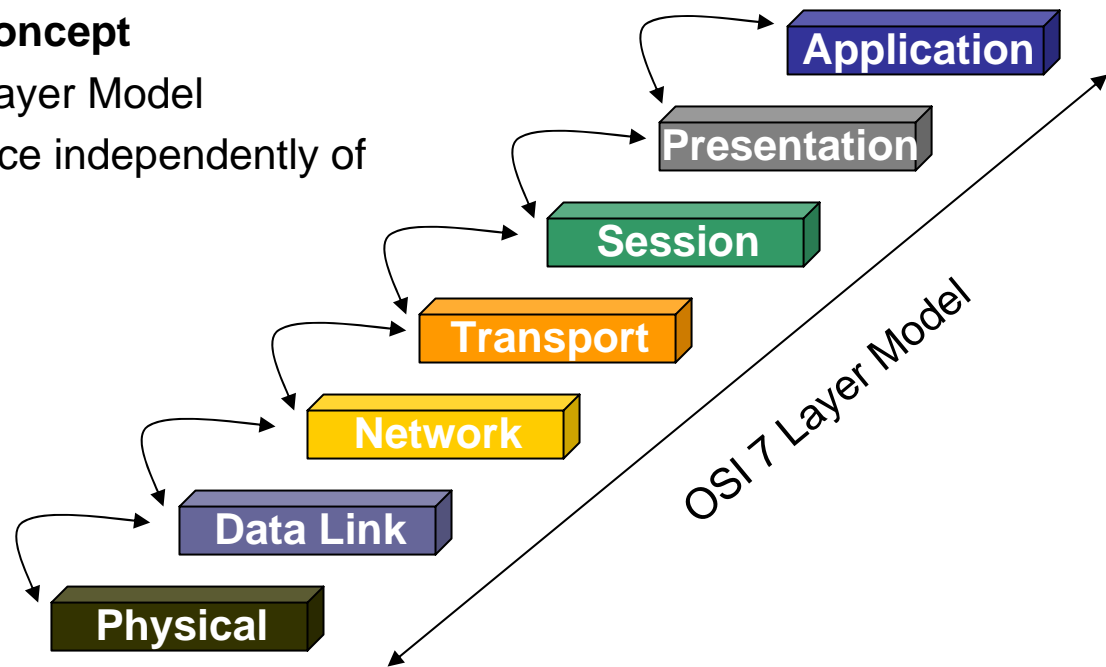**LANTERN**

Freedom of Technology Choice

One of the key benefits that virtualization can bring you is freedom of technology choice. You could move to a consolidated environment or a pure grid environment or even somewhere in between
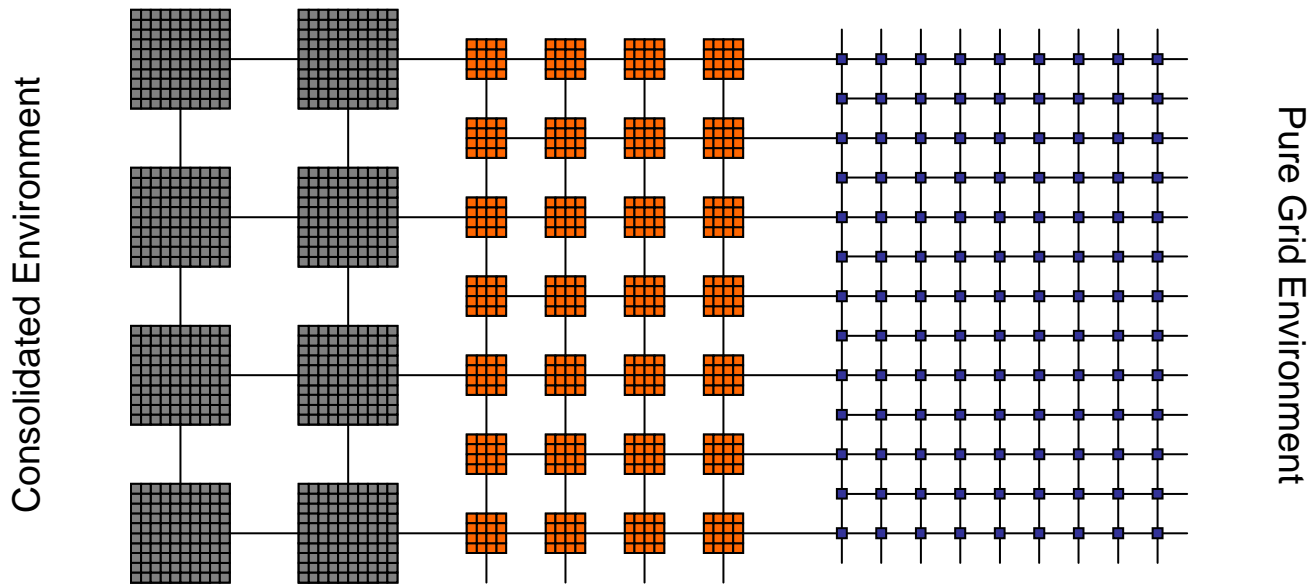
Consolidated Environment

Pure Grid Environment

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What exactly is it?

Virtualization is not a new concept

- Analogous to OSI 7 Layer Model
- Each layer can advance independently of other

Application

Presentation

Session

Transport

Network

Data Link

Physical

OSI 7 Layer Model

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What exactly is it?

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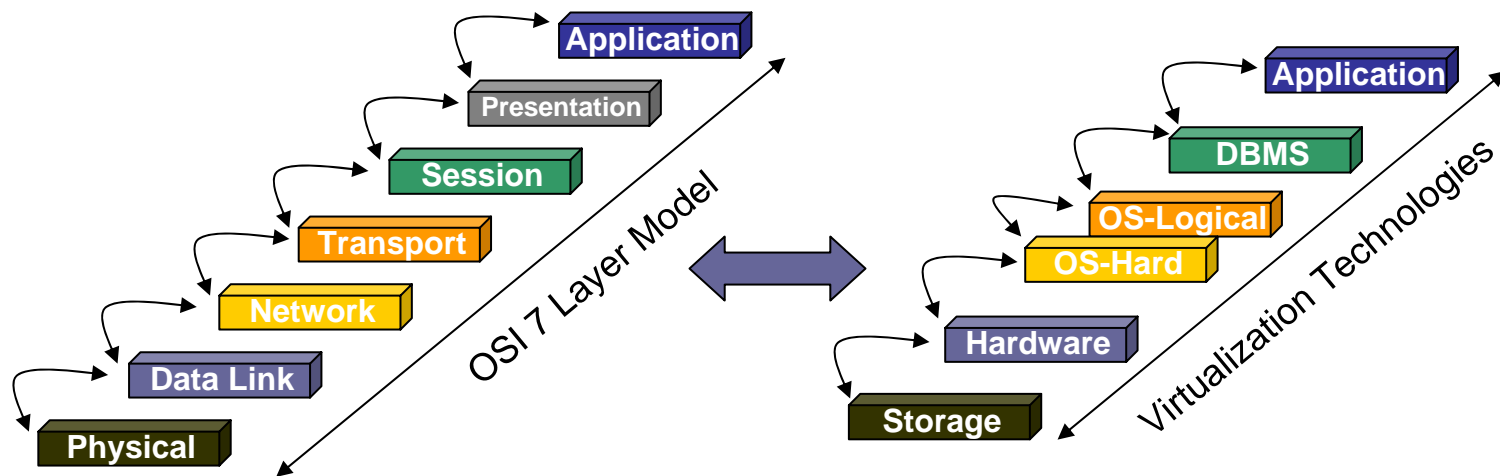
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What exactly is it?

CORBA – Another popular analogy

- Distributed computing using CORBA and DCOM
- Modularized approach providing flexibility in deployment

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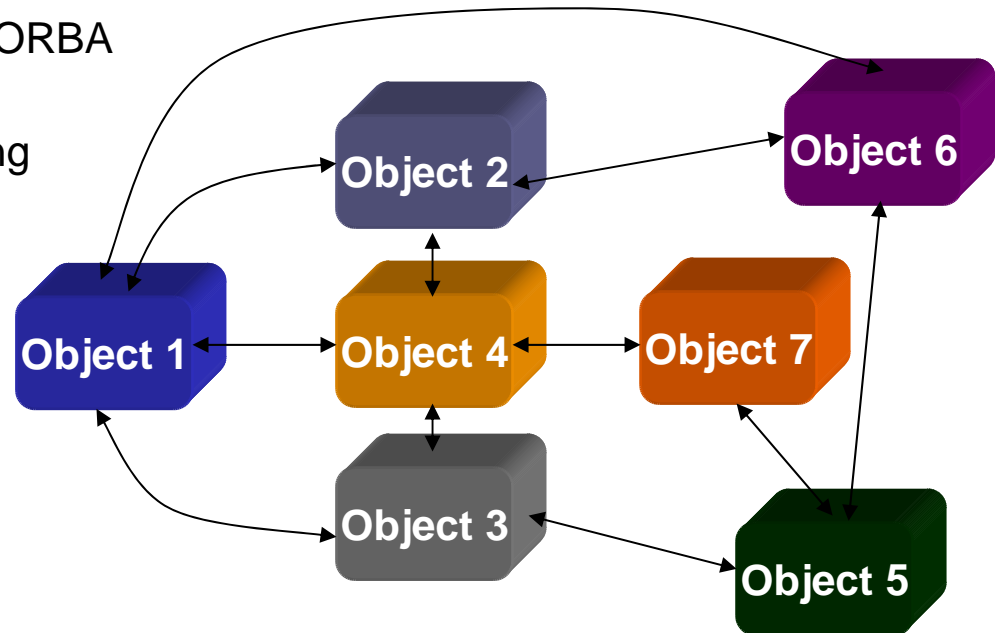
Types of Virtualization Market Overview

|	
Application	**Lantern VAC™**
RDBMS	**Oracle 10g Grid**
OS – Logical Partition	**Sun Containers, Microsoft Virtual Server, VM Ware, IBM LPAR, Xen VM**
OS – Hard Partition	**Sun Domains, HP nPartitions, IBM LPAR etc.**
Hardware	**Sun Blades, Intel Hyperthreading, AMD Multi Core**
Storage	**EMC Invista, Hitachi TagmaStore, NetApp V-Series**

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Virtualization
What are your peers doing?

"Will your company likely undertake a virtualization project in the next 12 months?"
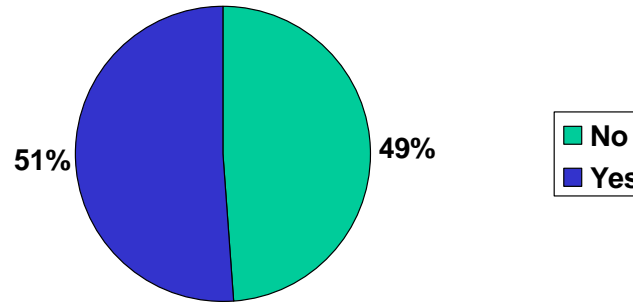
51%   **49%**

■ **No**
■ **Yes**

Base: Infrastructure decision-makers at North American companies

Source: Forrester Research Inc.

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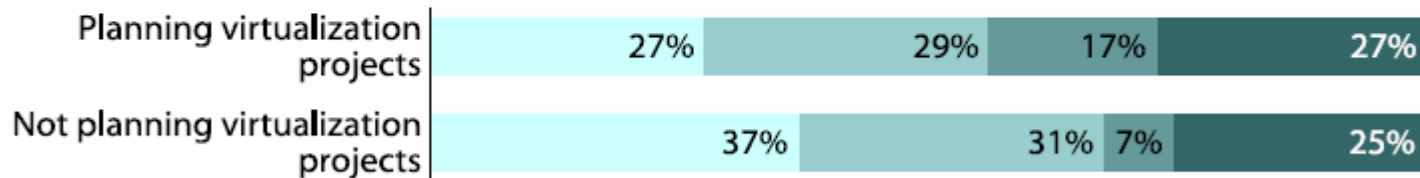**LANTERN**

Virtualization
What your peers are doing?

Firms partaking in virtualization spend more of their IT budget on new investments

"What percent of your IT budget is spent on new IT investments?"

	Lowest (0%–10%)	Below average (11%–20%)	Above average (21%–29%)	Highest (30% or more)

Planning virtualization projects	27%	29%	17%	27%
Not planning virtualization projects	37%	31%	7%	25%

Base: infrastructure decision-makers at North American companies

Source: Forrester Research Inc.

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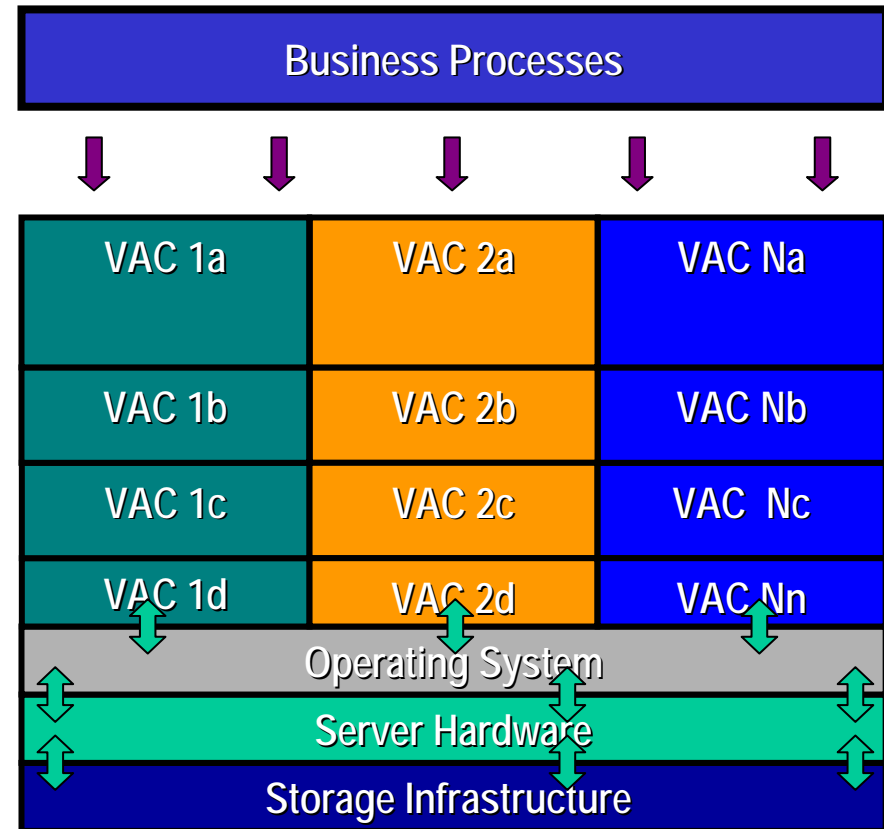But which one is right for you?

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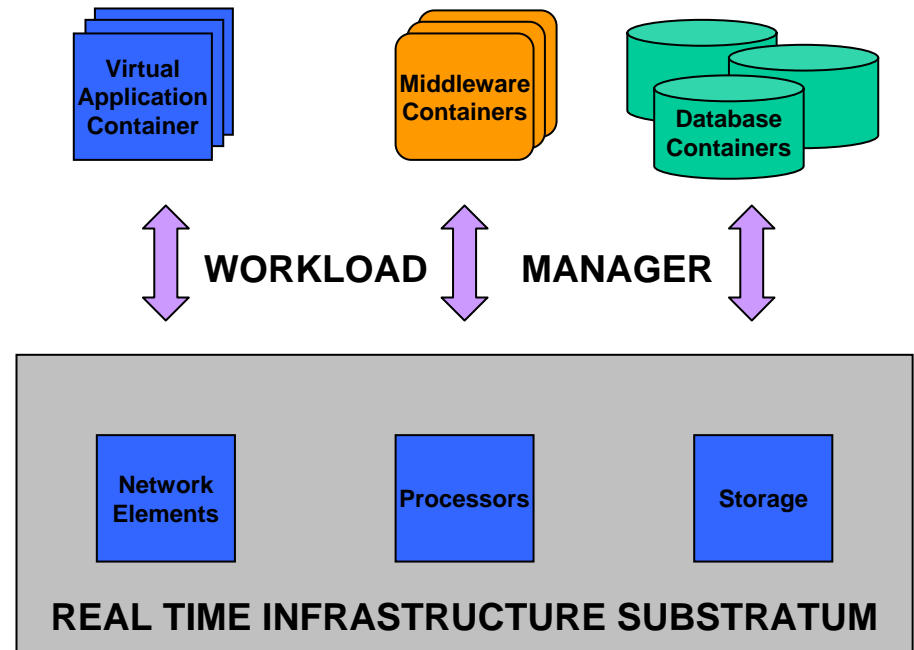
The Top-Down Approach

- Focus on the application space: The space the business sees first

- Treat and deploy the underlying infrastructure as a common substratum for all applications to reside on rather than as tied to a particular application

Business Processes

VAC 1a	VAC 2a	VAC Na
VAC 1b	VAC 2b	VAC Nb
VAC 1c	VAC 2c	VAC Nc
VAC 1d	VAC 2d	VAC Nn

Operating System

Server Hardware

Storage Infrastructure

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Enter Lantern's VAC
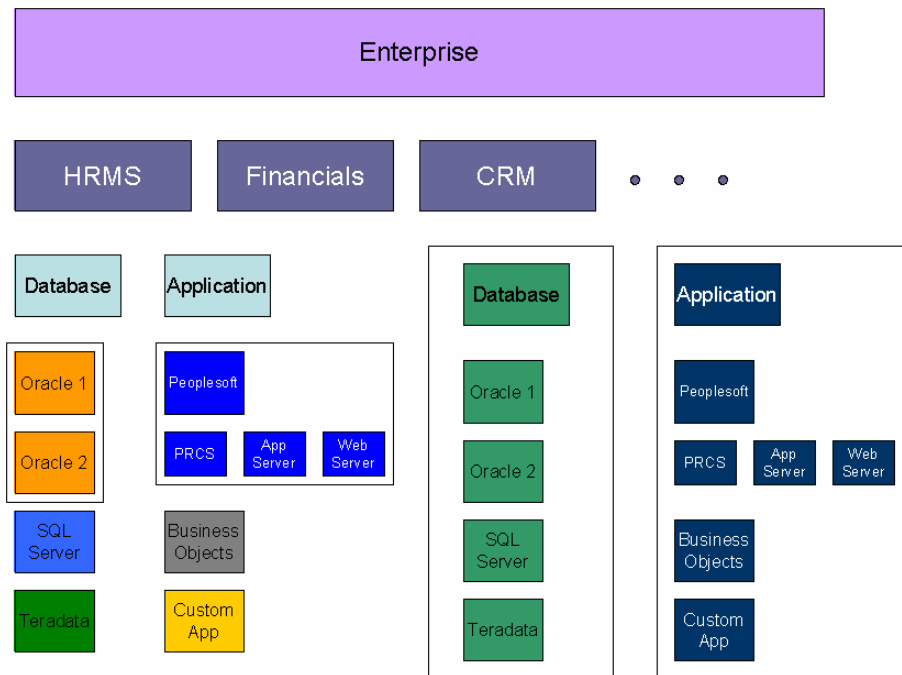
Virtual Application Container – Characteristics

• A framework for decoupling application, middleware and database components from the infrastructure

• A standards based model that views every application as a combination of elemental components
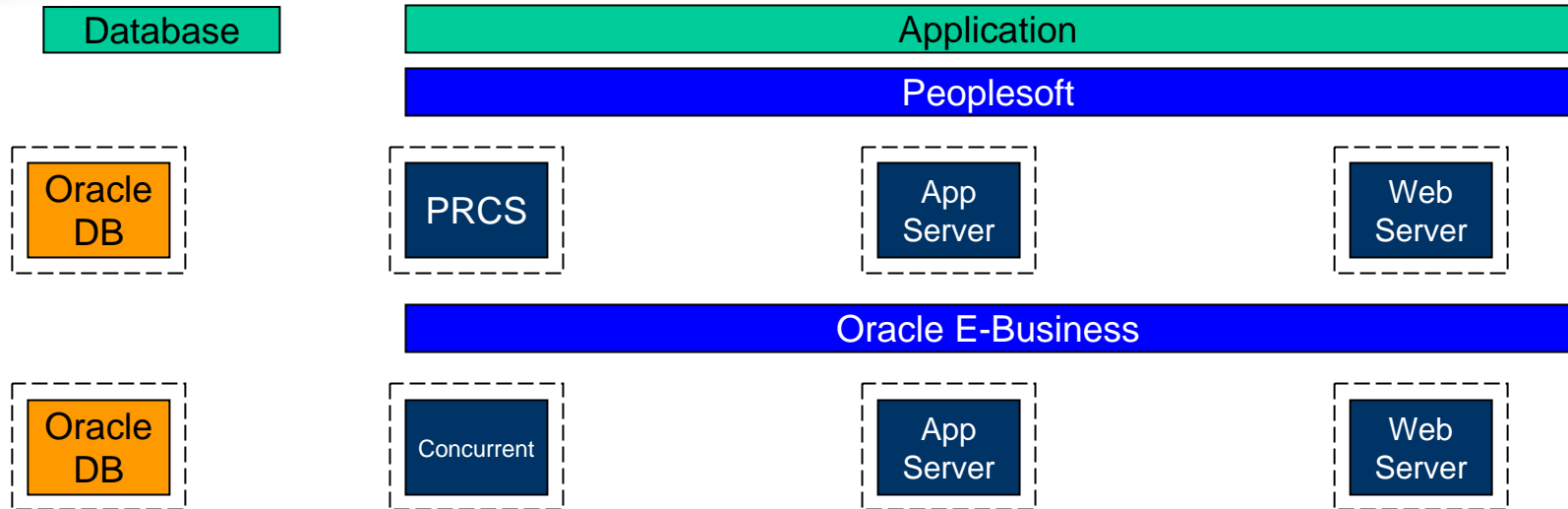
Virtual Application Container

Middleware Containers

Database Containers

WORKLOAD **MANAGER**

Network Elements

Processors

Storage

REAL TIME INFRASTRUCTURE SUBSTRATUM

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How does it work?

Breaking it down to the elements

- Elemental components are the lowest level to which an application can be broken down.

- For example a typical J2EE application consists of application logic deployed as Java archive files, HTTP server, application server, SSO components, RDBMS and storage. VAC™ provides a virtual container for each of these components

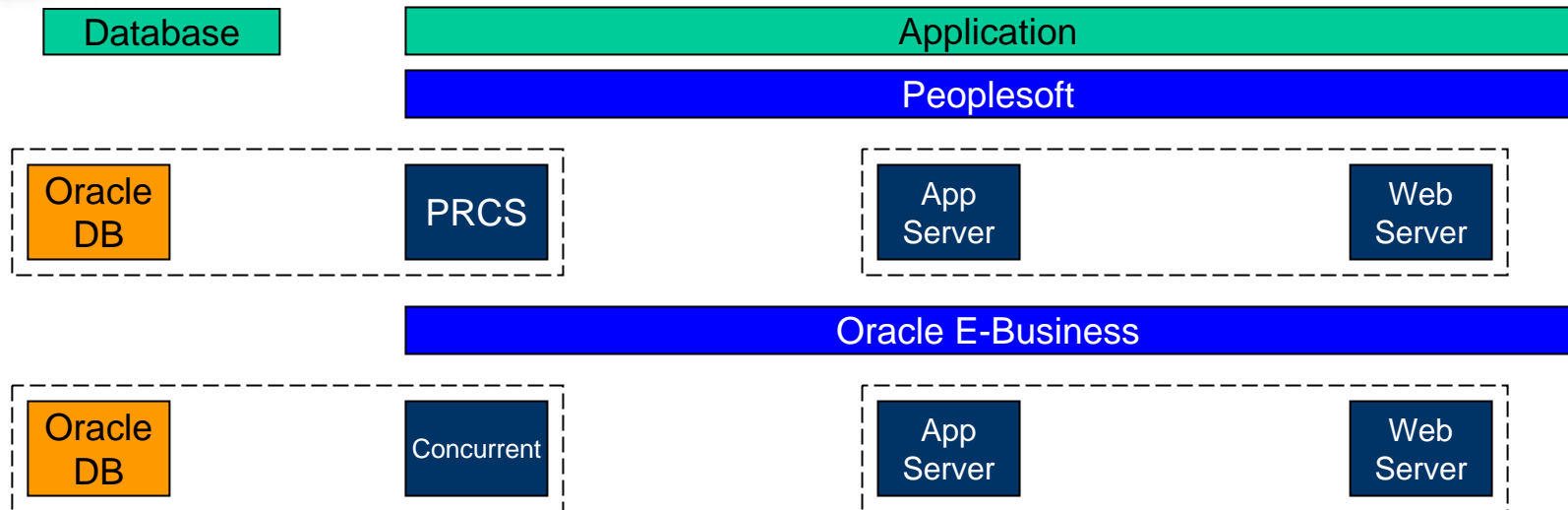- These components can be deployed on any machine that participates in a cluster

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Reconfigurable Containers

Database	Application

Peoplesoft

Oracle DB	PRCS	App Server	Web Server

Oracle E-Business

Oracle DB	Concurrent	App Server	Web Server

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Reconfigurable Containers

Database	Application

Peoplesoft

| Oracle DB | PRCS | | App Server | Web Server |

Oracle E-Business

| Oracle DB | Concurrent | | App Server | Web Server |

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VAC™ - The Goal

- The primary goal of the VAC philosophy is to configure/translate as many variables as possible into VAC variables and leave very few variables tied to the server resulting in decoupling of the application from the underlying infrastructure

  - The VAC variables are stored in a vac_config.xml file in the server locally and can be accessed by a centralized control console

  - Golden images for every enterprise application in use are maintained in a DSL (Definitive Software Library) in line with ITIL Guidelines

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VAC™ - The Description

- **The VAC™ comprises of**
    - A set of VAC™ Variables which can be re-located along with its components
        - IP addresses
        - Application file systems
        - Database file systems
        - Configuration information
    - A set of hard variables which cannot be re-located along with VAC, but will have to be dealt with during the post-install phase such as
        - Hostname
        - Host ID
        - Application License
        - Drivers

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VAC™ - The Structure

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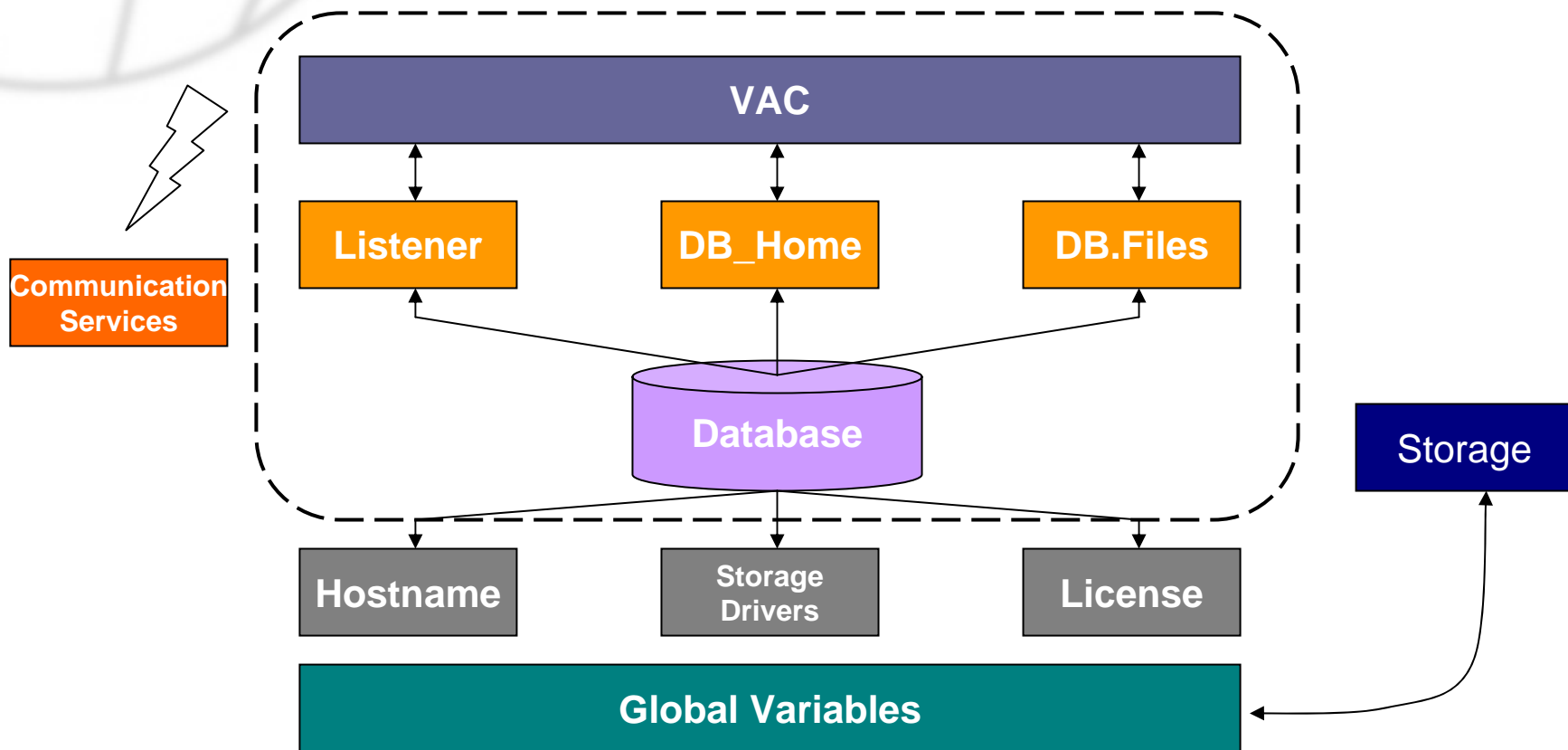
VAC™ - The Deployment

Install

Re-deploy

Load Global Config Template
Gather User Inputs
Prepare pre/post install steps

VAC Preinstall

Read Local Config files
Gather User Inputs
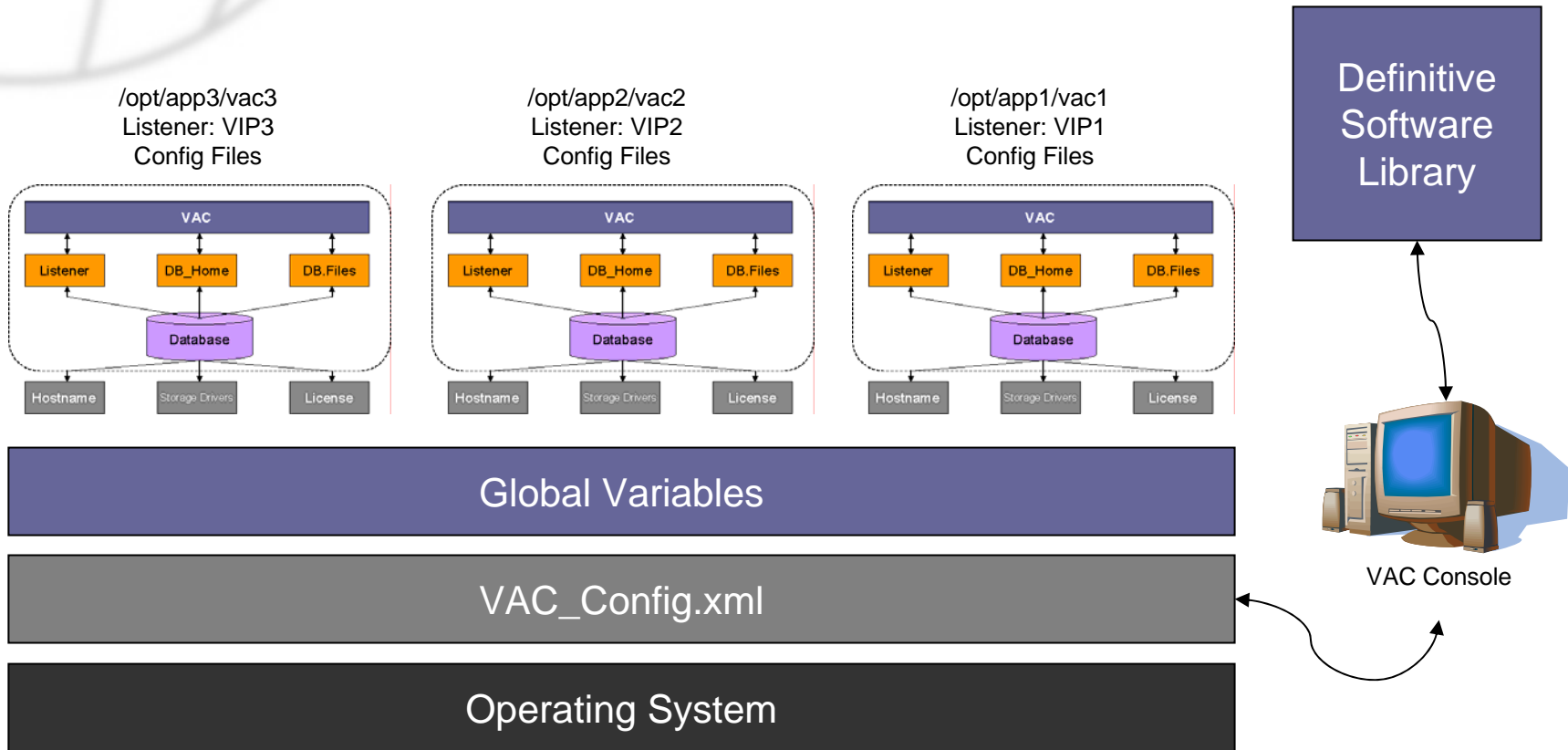Prepare Pre/Post install steps

App Install

VAC Post Install

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How they all stack up

/opt/app3/vac3
Listener: VIP3
Config Files

/opt/app2/vac2
Listener: VIP2
Config Files

/opt/app1/vac1
Listener: VIP1
Config Files

Definitive Software Library

VAC Console

Global Variables

VAC_Config.xml

Operating System

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Key Benefits

- **Manageability**
    - By deploying applications in a containerized fashion, the MTTR (Mean Time To Recover) went down by 73% on average since locating and isolating fault was a much simpler
    - Deploying applications with a VAC™ architecture ensures that it becomes easier to "Rebuild than Repair" when problems occur
    - The underlying property of the VAC that allows it to be contained and mobile at the same time enables its use in both grid or consolidated environments

- **Utilization**
    - In our recent implementations, we were able to drive usage from the previous average of 14% to 49% without any loss in QoS
    - By proper VAC design, we were able to group chatty application components within the same VAC or VAC group and reduce network bandwidth utilization
    - Working with standard OS workload managers, we were able to throttle up or down specific processes on-demand to better use system resources

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Case Study

The Environment:

- A large enterprise running PeopleSoft HRMS and Oracle Financials.

The Objective:

- To design/create VAC containers to achieve optimal resource utilization and availability through
    - Increased server resource utilization (with no compromise on peak performance)
    - Server Consolidation with greater manageability and reduced MTTR
    - Application Isolation/Containerization to secure multiple application environments
    - Dynamic Application migration for "on-demand" capacity

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Case Study

The Approach

- Gathered Performance Statistics for a 60 day period on target Production, Development and Test environments

- From the statistics it was decided to redeploy, based on the VAC Architecture

  - PeopleSoft:

    > Individual VACs for Process Scheduler, App-server and Web Server

  - Oracle 11i E-Business

    > Individual Containers for Concurrent Processing Server, App + Web Server
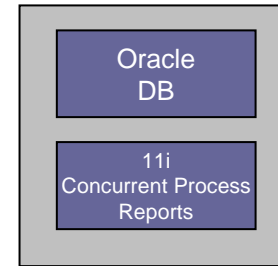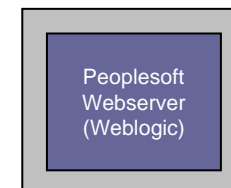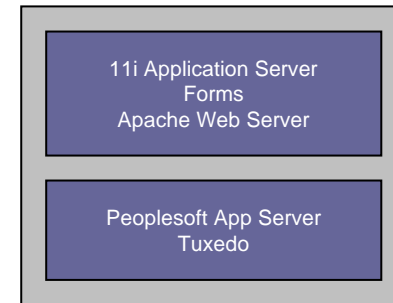
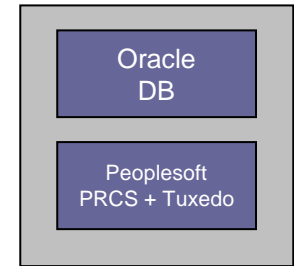**Beacon of the IT World**™

Case Study

Target Activities:

Keep DB and batch process separate

Combine the Application Server hardware and horizontally scale if required
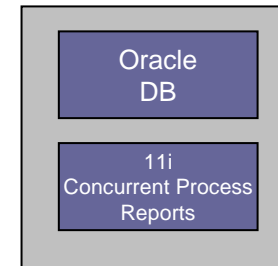
Oracle Financials

Peoplesoft HRMS

Oracle DB

11i Concurrent Process Reports

Oracle DB

Peoplesoft PRCS + Tuxedo

11i Application Server Forms Apache Web Server

Peoplesoft App Server Tuxedo

Peoplesoft Webserver (Weblogic)

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Case Study

Oracle Financials   **Peoplesoft HRMS**

VAC Containers:

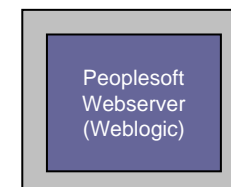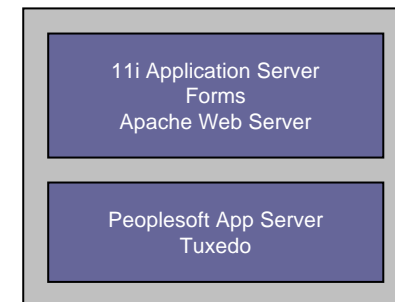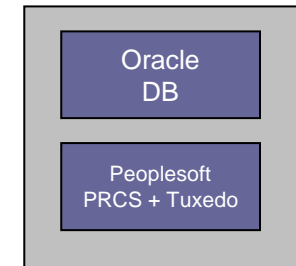Create VAC Containers for Databases

Create VAC Containers for E-Business
Concurrent Processing, App/Web Server.
Use "rapid clone" when required

Create VAC containers for PeopleSoft
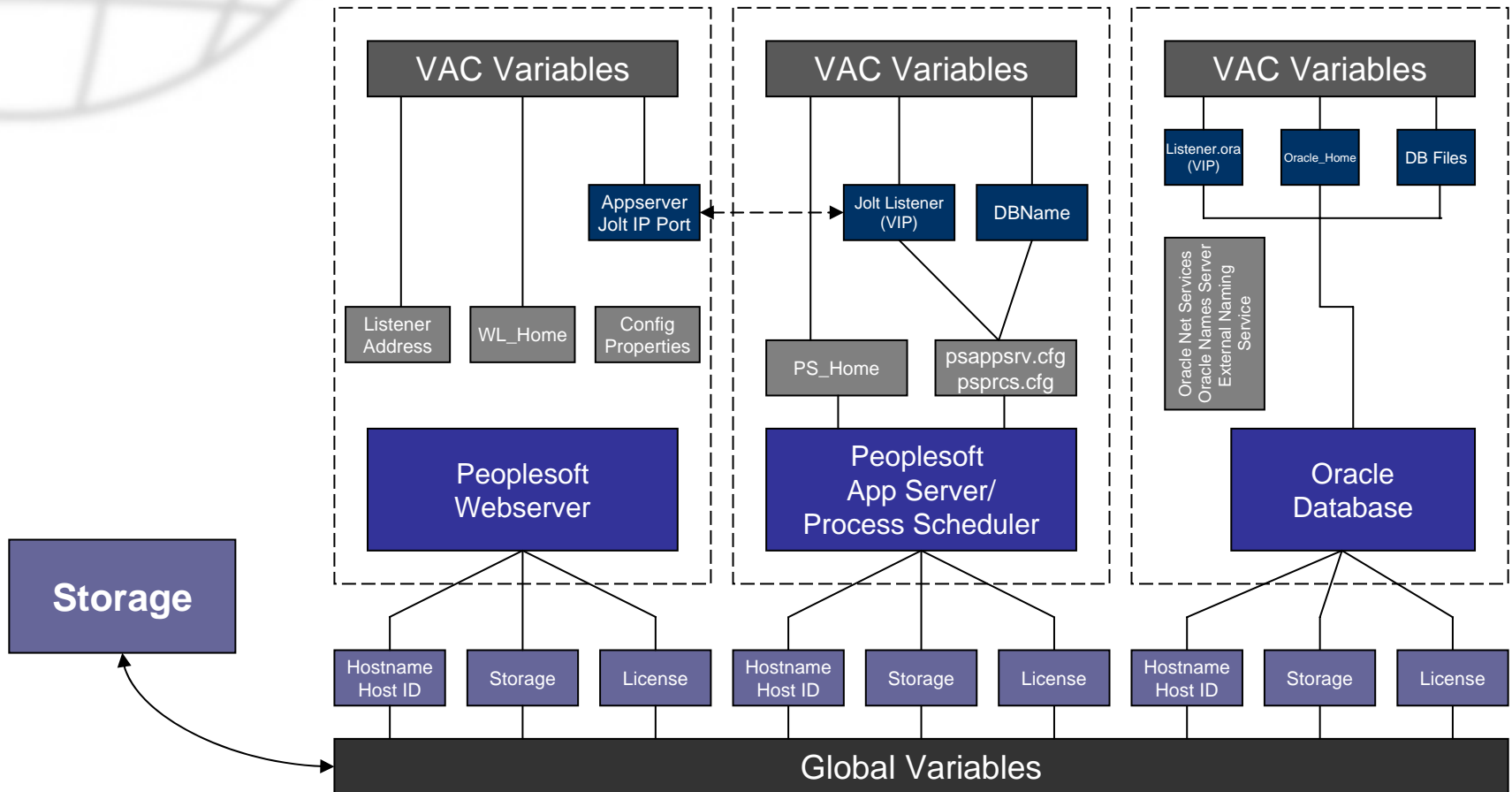Process Scheduler, Application and Web
Server

Oracle
DB

11i
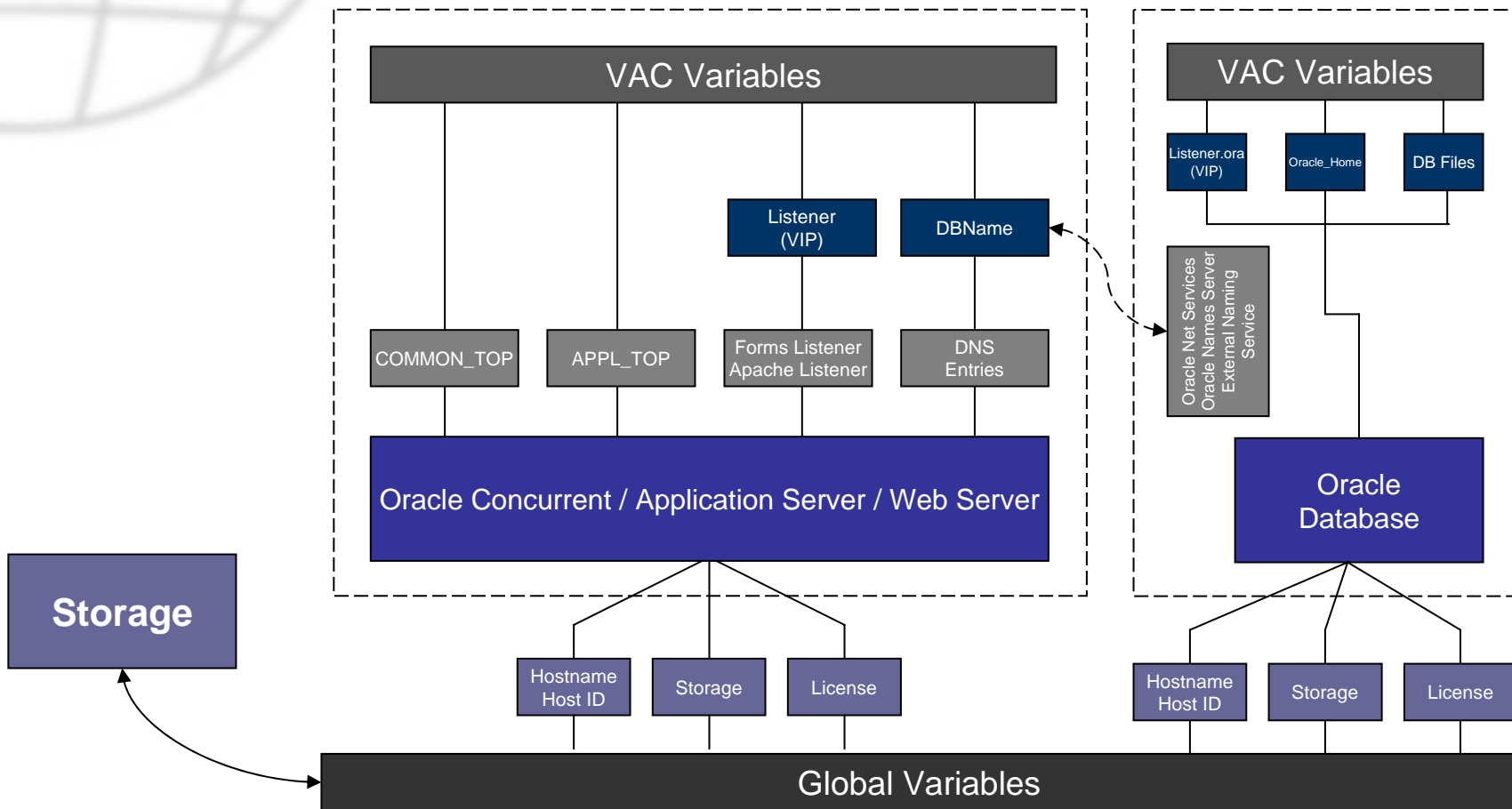Concurrent Process
Reports

Oracle
DB

Peoplesoft
PRCS + Tuxedo

11i Application Server
Forms
Apache Web Server

Peoplesoft App Server
Tuxedo

Peoplesoft
Webserver
(Weblogic)

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Peoplesoft Deployment

Oracle 11i Deployment

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Results

Observations

- Deployed PeopleSoft and Oracle E-Business Suite with VAC™ architecture

- Reduced number of servers from 26 to 11

- Increased average server utilization from 16% to 47%

- Reduced average MTTR by nearly 63%

New Initiatives

- Created a new dedicated DR Environment by re-purposing freed-up hardware

Savings

- The redeployment saves $1.2 Million annually in reduced management, outsourced DR, server lease and downtime costs

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Some Take-Aways

- Virtualization is the strategic direction you need to take in your IT environment

- Your virtualization initiatives need to enable you to choose the enterprise architecture that is right for you. There is no "one-shoe-size-fits-all" architecture in this business

- Start with a top-down approach, focusing on the applications: the part the business sees first (and the layer that is most visible when failures occur)

- Ensure that applications remain decoupled from the underlying infrastructure with a majority of variables tied to the application rather than the infrastructure

- Make sure that your application is broken down into smaller, manageable components and your change management process tracks changes at a component level

- **If you need help doing any of these, don't hesitate to call Lantern!**

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