應用程式基礎設備虛擬化 —
WebSphere Virtual Enterprise

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WebSphere software
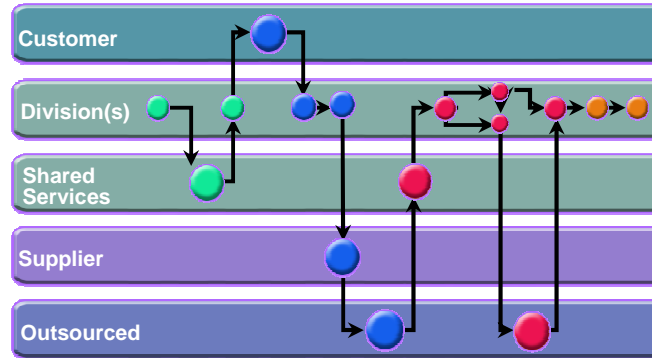
Agenda

▸ 什麼是 "應用程式基礎設備虛擬化**(Application Infrastructure Virtualization)**"?

▸ **WebSphere Virtual Enterprise**

    ▸ **WebSphere Extended Deployment(WXD)**的一部分**(**可獨立安裝**)**

    ▸ 目前市面上唯一完整呈現**Application Infrastructure Virtualization**特色的軟體

    ▸ 基礎建設最佳化與工作量虛擬化 **(Infrastructure Optimization & Workload Virtualization)**

    ▸ 自動感知與回饋管理 **(Automatic Sense & Respond Management)**

▸ 系統展示
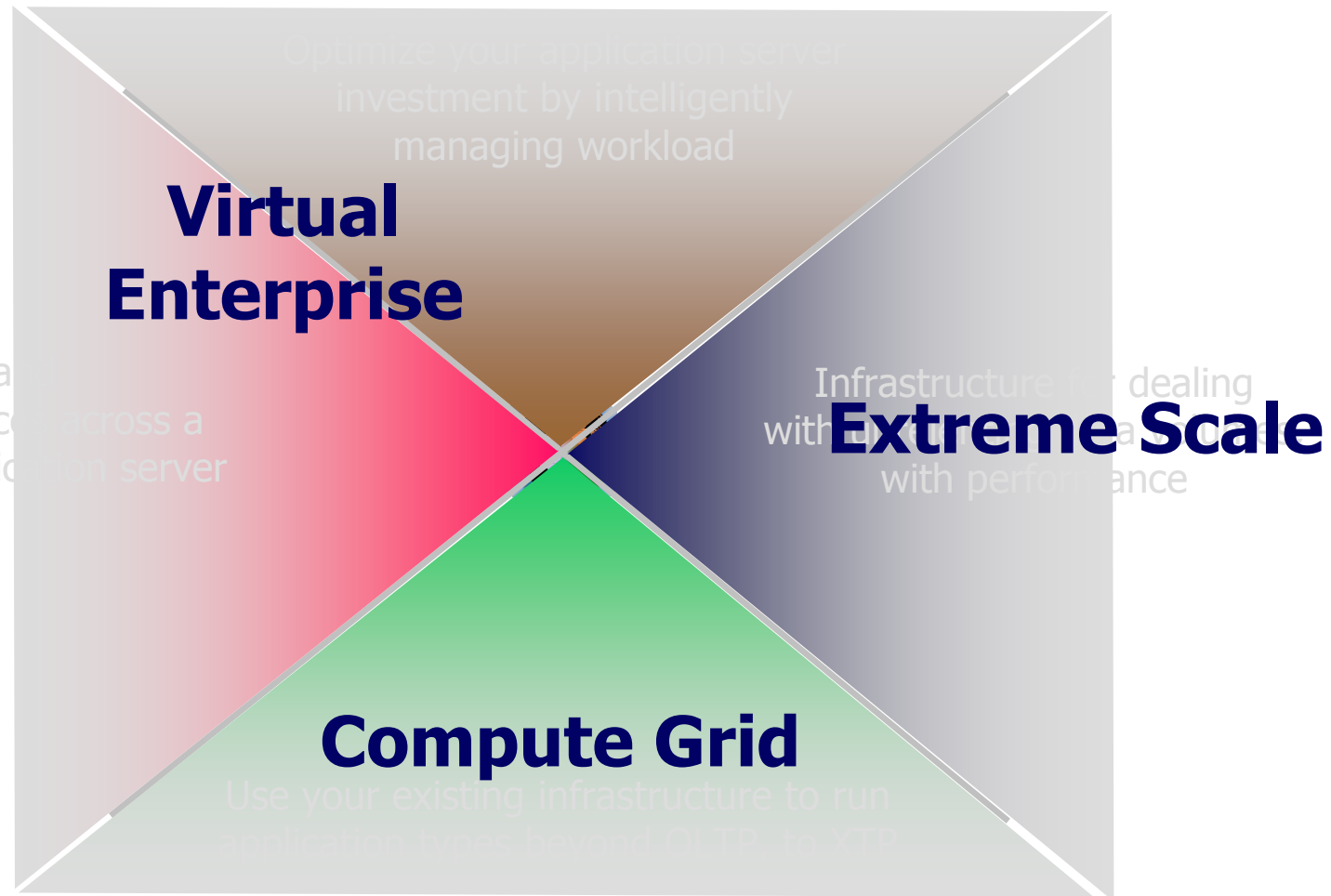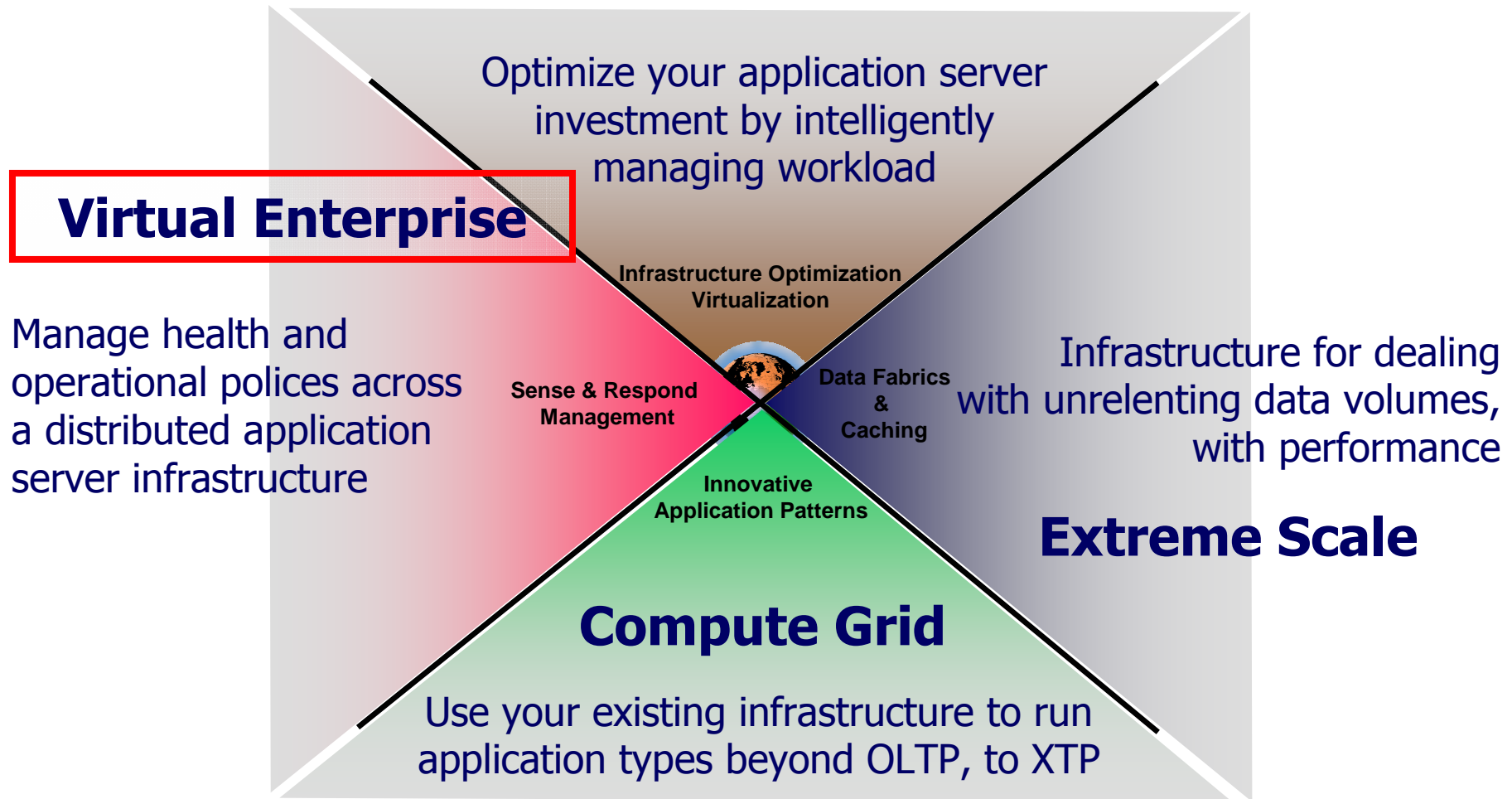
Virtualization

什麼是應用程式基礎設備虛擬化?

Application Infrastructure Virtualization (AIV) – 讓應用程式與底層執行的平台不再一定要綁在一起,程式架構可以智慧動態調整, 對使用者需求作優先排序, 並根據當時的使用狀況,彈性調度應用伺服器的資源,對於最重要的應用程式與使用者優先回應

WebSphere Extended Deployment (WXD)

Optimize your application server
investment by intelligently
managing workload

Virtual Enterprise

Manage health a
operational polic across a
distributed applic ion server
infrastructure

Infrastructure dealing
with Extreme Scale
with perfor ance

Compute Grid

Use your existing infrastructure to run
application types beyond OLTP, transpa

WebSphere XD功能

Optimize your application server investment by intelligently managing workload

Virtual Enterprise

Infrastructure Optimization
Virtualization

Manage health and operational polices across a distributed application server infrastructure

Sense & Respond
Management

Data Fabrics
&
Caching

Infrastructure for dealing with unrelenting data volumes, with performance

Innovative
Application Patterns

Extreme Scale

Compute Grid

Use your existing infrastructure to run application types beyond OLTP, to XTP

WebSphere Virtual Enterprise特色

Infrastructure Optimization

Workload Management

Virtualization

Virtual Enterprise

Automatic Sense & Respond Management
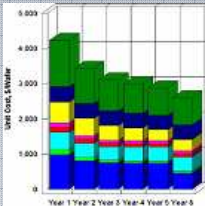
Data Fabrics & Caching

Innovative Application Patterns
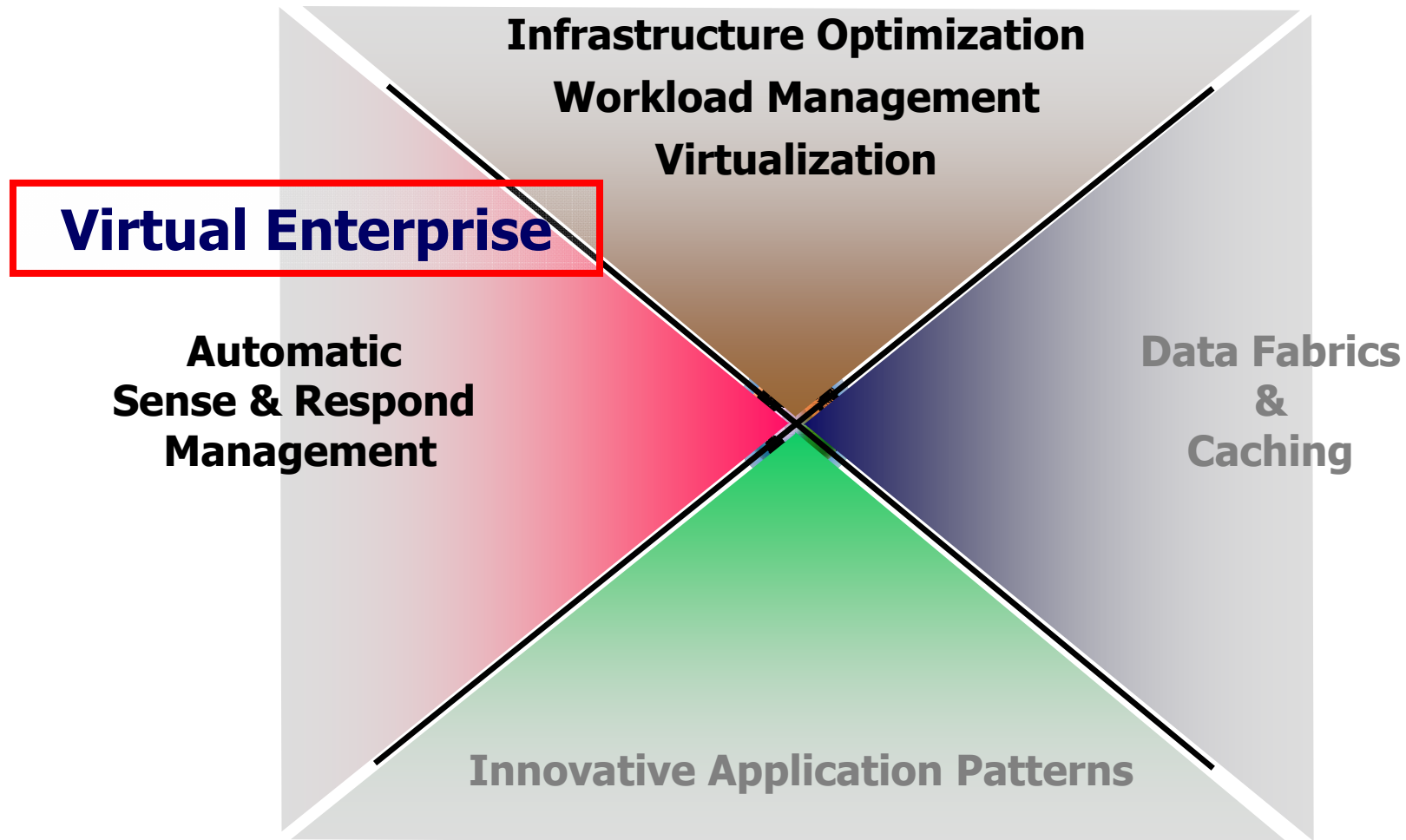
Infrastructure Optimization & Workload Virtualization

IT挑戰:
◇提升伺服器的使用率， 進而提高投資效益，降低管理成本
◇能夠根據企業的營運目標與IT政策，確保最重要的應用系統與使用者能優先處理
◇彈性反應非預期的工作量
◇企業重要營運系統必須提供高可用性與備援機制

Resource Optimization

Application Prioritization

High Availability

Utilization

Importance

Assurance

Resource Optimization: Bank Scenario

Cluster 1

Cluster 2

Cluster 3

20% Utilized Servers

15% Utilized Servers

10% Utilized Servers

房貸系統

信用卡系統

存提系統

Resource Optimization: An Example

Cluster 1

100%
50%
0%

75% Utilized Servers and 100%
Promotion results in 100%
Utilized Servers

Cluster 2

100%
50%
0%

15% Utilized Servers

Cluster 3

100%
50%
0%
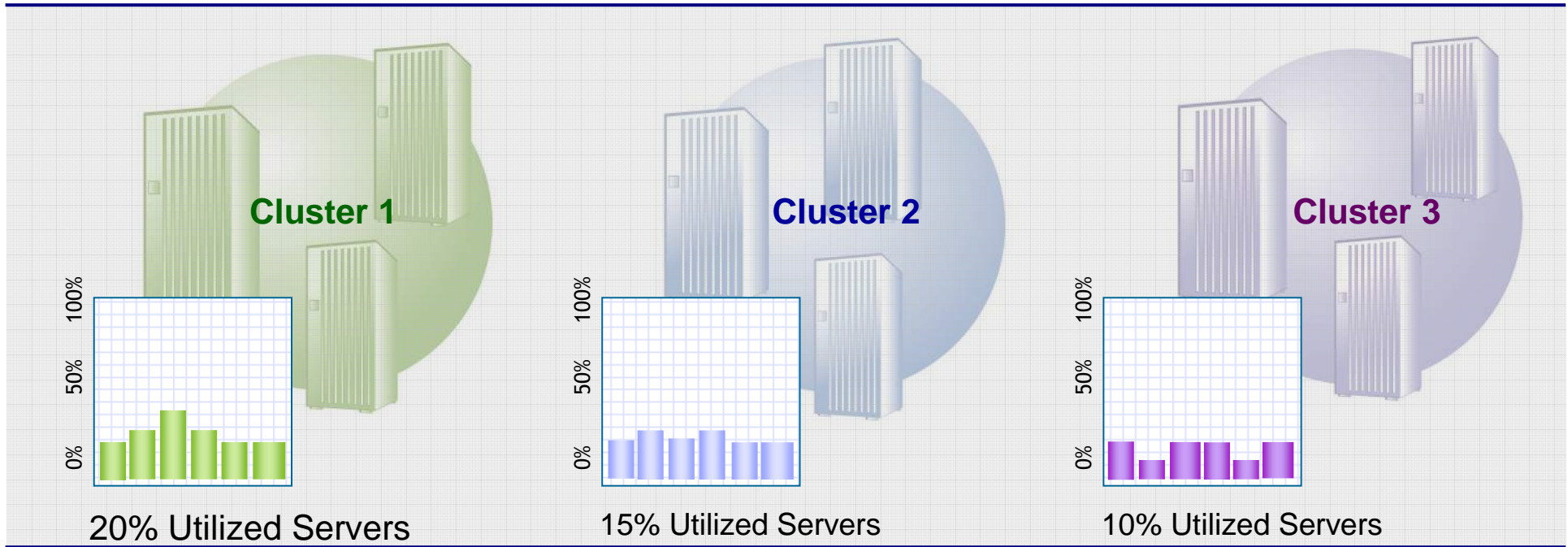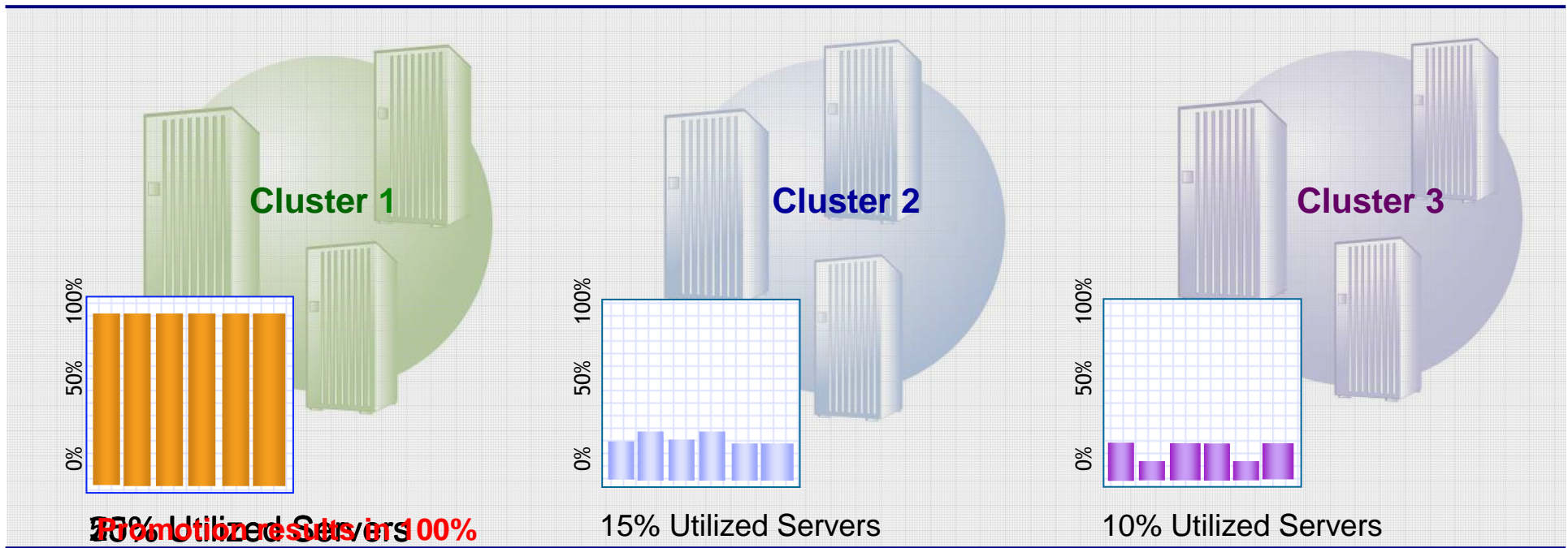
10% Utilized Servers

房貸系統

信用卡系統

存提系統

房貸處理時間KPI: 15% over target
客訴數量KPI: 25% over target
案件處理效率KPI: 30% below target

Resource Optimization: An Example

Cluster 1

Cluster 2

Cluster 3

~~50% Utilized Servers~~ **Promotion results in 100% Utilized Servers**
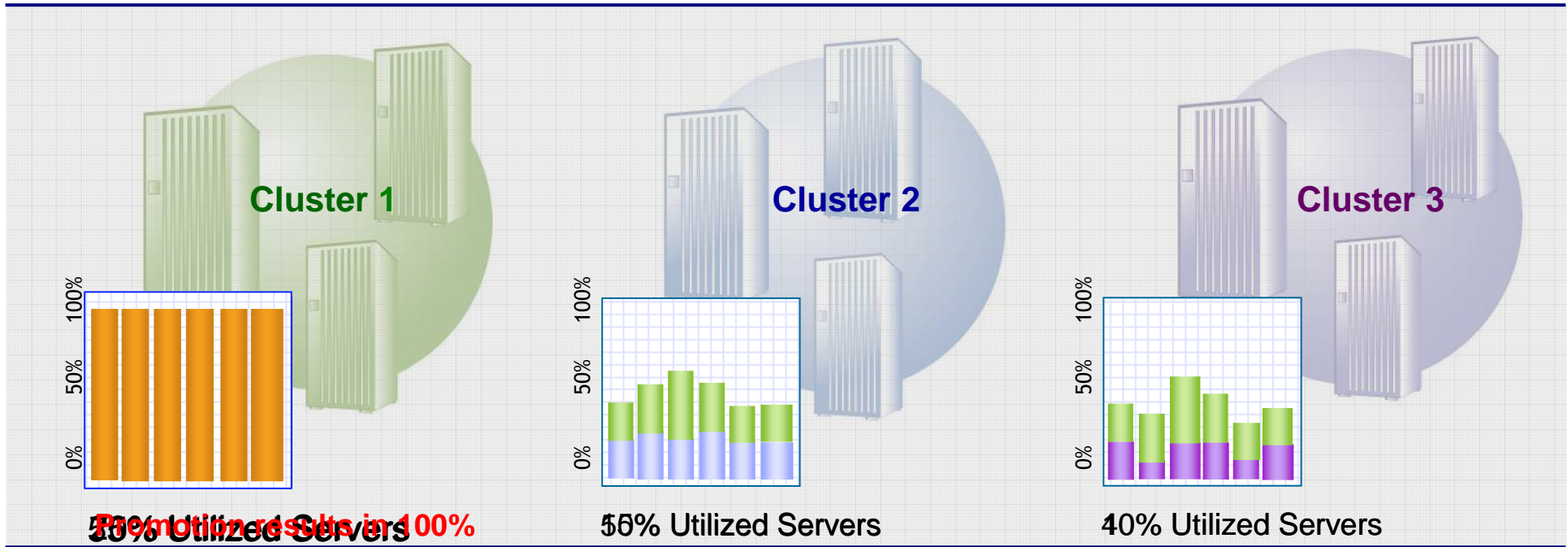
55% Utilized Servers

40% Utilized Servers

房貸系統

信用卡系統

存提系統

Resource Optimization —Maximizes Utilization and Improves Responsiveness

Cluster 1

One Resource Pool

Cluster 3

100%

50%

0%

Satisfied Utilization Rate

房貸系統 Gold 信用卡系統 Silver 存提系統 Bronze

Application Prioritization: Doing What's Important to You

- **Service policies** are used to define application service level goals

- Allow workloads to be classified, prioritized and intelligently routed

- Enables application performance monitoring

- Resource adjustments are made if needed to consistently achieve service policies

XD easily allows an administrator to specify the relative importance and response time goals of applications; XD then manages to it
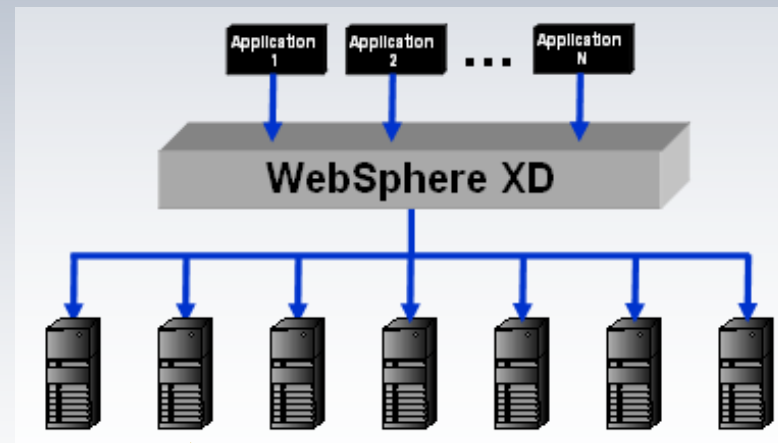
High Availability

By running applications across a pool of resources, applications become inherently highly available; if a server fails, XD moves the work to other servers

許多獨立的小型Cluster孤島

一個完整的Resource Pool
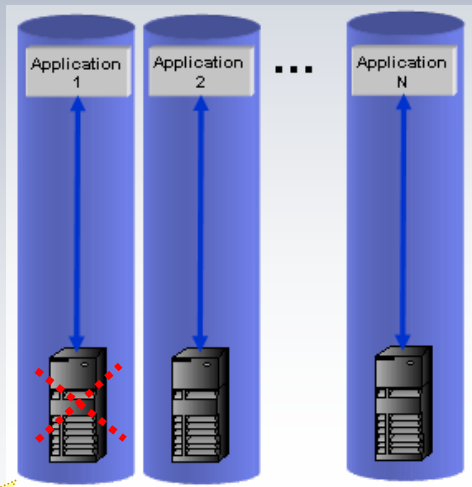
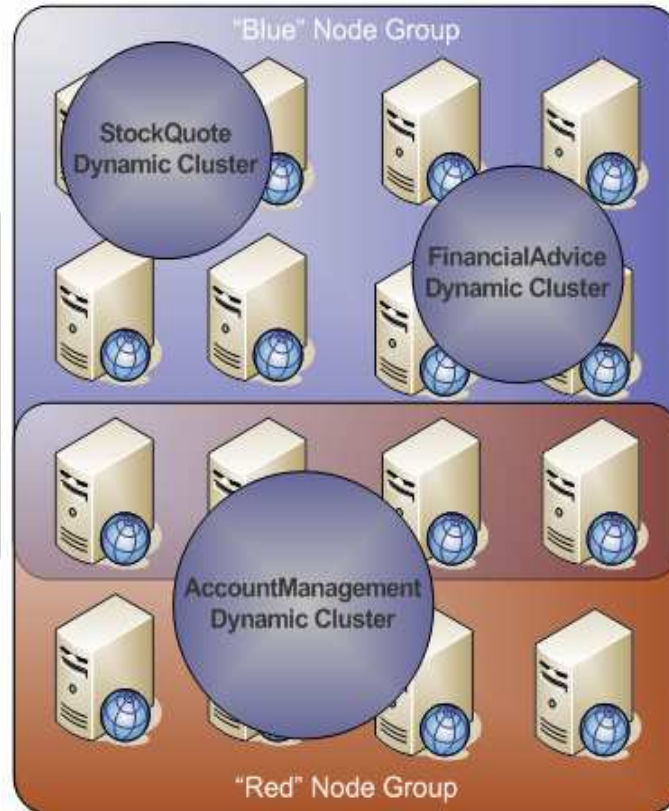By tying applications to a small set of servers, application availability can be compromised!

Applications can run anywhere; add more servers, applications can run on them.

Virtualization: How does it work?

XD provides a **resource pooling** concept called **Node Groups**

- A collection of machines that will host the application
- Represents a set of machines that are available to run an application assigned to that group
- Multiple overlapping node groups can exist at the same time
- XD automatically determines membership in node groups based on machine capabilities

"Blue" Node Group

StockQuote Dynamic Cluster

FinancialAdvice Dynamic Cluster

AccountManagement Dynamic Cluster

"Red" Node Group

A **Dynamic Cluster** is a virtual cluster of servers (JVMs) hosting the application that lives on the **Node Group**

- Membership is managed automatically
- The active size is managed automatically based on **service policy** and current conditions
- Limits can be placed on the size of the dynamic cluster (min-max from 0-n)
- Applications are assigned to Dynamic Clusters
- Multiple Dynamic Clusters live on a single Node Group and compete for resources

The combination of Node Groups and Dynamic Clusters provides the virtualization construct in XD

Virtualized Workload Management
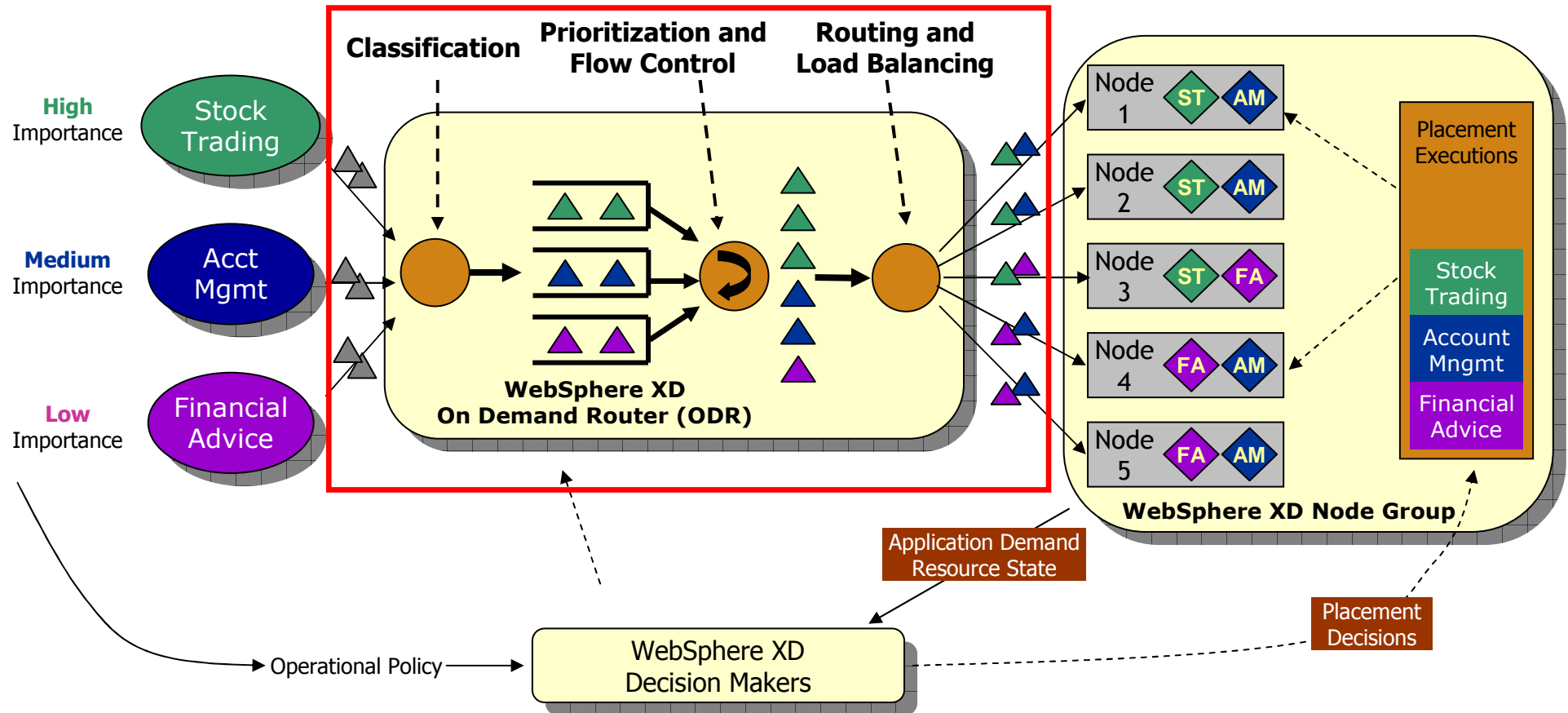
And it's Not Just for WebSphere Application Server…

WebSphere XD virtualizes, optimizes and manages the most application servers & environments in the industry

bea WebLogic

JBoss

Tomcat

APACHE GERONIMO

WebSphere Community Edition

WebSphere Application Server

php
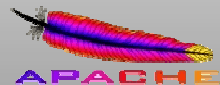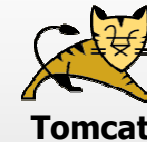
First Class Support for Non-WebSphere Platforms

Complete Lifecycle Management

- Create/remove server instances
- Govern all aspects of server configuration
- Provide operational control
- Deploy applications
- Server health and performance is monitored and visualized.

WebSphere
Application Server

php

Assisted Lifecycle Management

- Provides specific templates for creating representations of existing servers and applications
- Servers can be controlled operationally
- Administrative utilities are provided to manage the external configuration and runtime
- Server health and performance is monitored and visualized.

bea WebLogic

JBoss

Tomcat

APACHE GERONIMO

APACHE

WebSphere
Community Edition

Generic Lifecycle Management

- Provides generic templates for the user to manually define servers and operational commands.
- Control server operations and monitor health and performance

Microsoft .net

SAP NetWeaver™

…

Automatic Sense & Respond Management

IT挑戰：
◇提供應用伺服器平台操作管理功能，IT作業人員可以更容易管理異質環境
◇在異質性或是分散式應用伺服器的環境，能夠獲得如應用程式與伺服器效能或運作等相關數據
◇在發生IT或營運影響前，能夠預先偵測甚至更正問題
◇保留相關資訊以產生歷史性分析，容量規劃以及資源使用等報告
◇降低營運管理與操作成本

Operational Management

Health Management

Data Logging

Memory Leaks

Excessive Response Times

Insight

Proactive

Analysis

Operational Management: Reporting

A reporting summary view provides operators with the ability to **configure sets of in-depth charts** into groups that **can be viewed at any time for a real-time snapshot** of the environment's performance

Health Management – Health Policies

- Health policies can be defined for common server health conditions

- Health conditions are monitored and corrective actions taken automatically
  - ‣ Notify administrator
  - ‣ Capture diagnostics
  - ‣ Restart server

- Application server restarts are done in a way that prevent outages and service policy violations
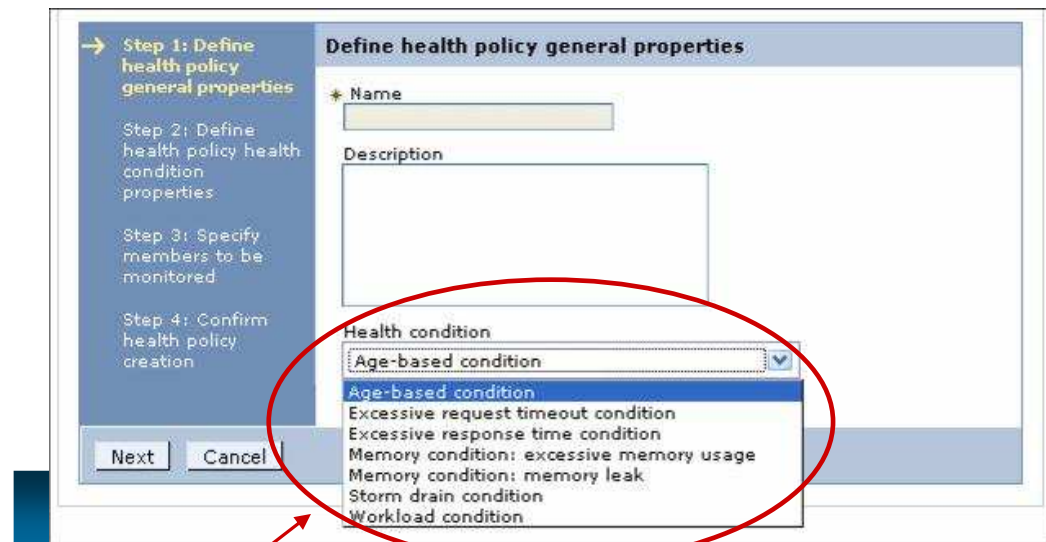
Health Conditions
- **Age-based:** *amount of time server has been running*
- **Excessive requests:** *% of timed out requests*
- **Excessive response time:** *average response time*
- **Excessive memory:** *% of maximum JVM heap size*
- **Memory leak:** *JVM heap size after garbage collection*
- **Storm drain:** *significant drop in response time*
- **Workload:** *total number of requests*

Health Management – Custom Health Actions

New and Enhanced!

Provides flexibility by allowing the definition of custom actions allowing administrators to define an action plan to be carried out when the unhealthy situation detected.

Health management monitor reaction

Reaction mode
Supervise

Take the Following Actions When the Health Condition Breaches

| Add Step | Delete Step | Move Up | Move Down |

Select	Step	Action	Target Server	Target Node
☐	1	Place Server Into Maintenance Mode	Sick Server	Node hosting Sick Server
☐	2	Dump Application State	Sick Server	Node hosting Sick Server
☐	3	Restart Server	Sick Server	Node hosting Sick Server
☐	4	Place Server outof Maintenance Mode	Sick Server	Node hosting Sick Server

Custom Health Actions

Health Policy Custom Health Actions

Add, delete, and edit custom operations

⊞ Preferences

| New | Delete |

| Select	Name	Supported OS	Action	Description
☐	Enable Application Trace	windows	C:\myScripts\enableAppTrace.bat -serverName ${WAS_SERVER_NAME}	
☐	Enable Application Trace	linux, aix, hp-ux, solaris	/usr/local/bin/enableAppTrace.sh -serverName ${WAS_SERVER_NAME}	
☐	Collect Logs	windows	C:\myScripts\collectAllLogs.bat	
☐	Collect Logs	linux, aix, hp-ux, solaris	/usr/local/bin/collectAllLogs.sh	
☐	Dump Application State	all	java -jar DumpAppState.jar	

Total 5

Data Logging

New and Enhanced!

挑戰：
◇我需要把log紀錄下來，可以就目前架構運作狀況作歷史資料分析
◇許多應用程式與使用者共享應用伺服器架構，我需要一個簡單的方式，
以方便把使用量charge回使用者或部門

XD contains comprehensive data logging of applications, users and resources; in XD 6.1 content in logs is now configurable and aggregated for easily integrating with accounting and chargeback products

- **Comprehensive logging** of application, resource and workload information across XD's systems

- **Historical trend analysis** using either pre-packaged or customized reports with innovative visualization techniques

- **Integration with accounting and chargeback systems** such as Tivoli Usage and Accounting Manager

data collection
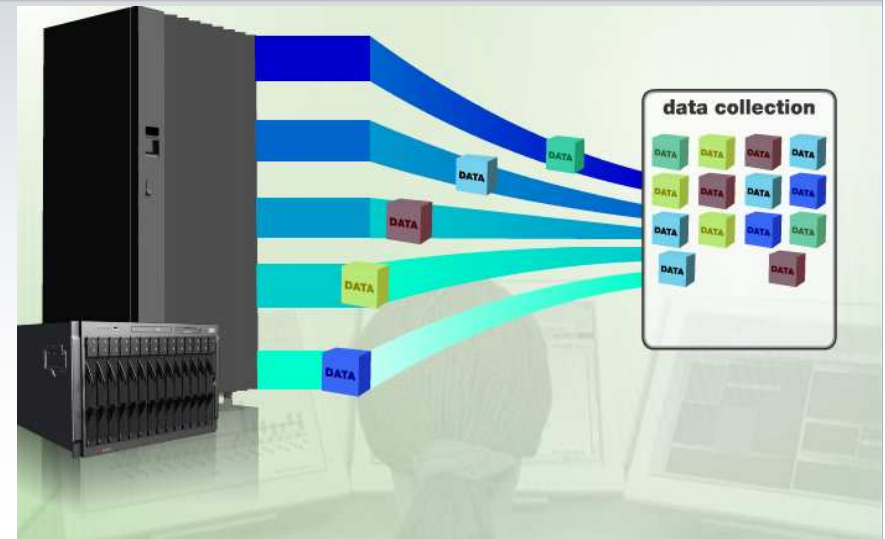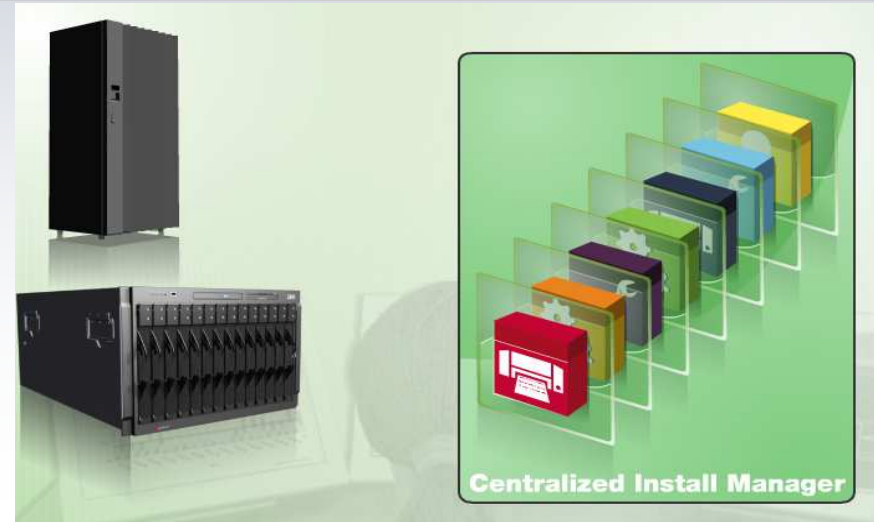
Simplifying Installation & Deployment

挑戰：

◇我還有很多Server等著我去安裝、設定以及部署。是否有什麼軟體可以幫助我們簡化這種瑣碎的工作

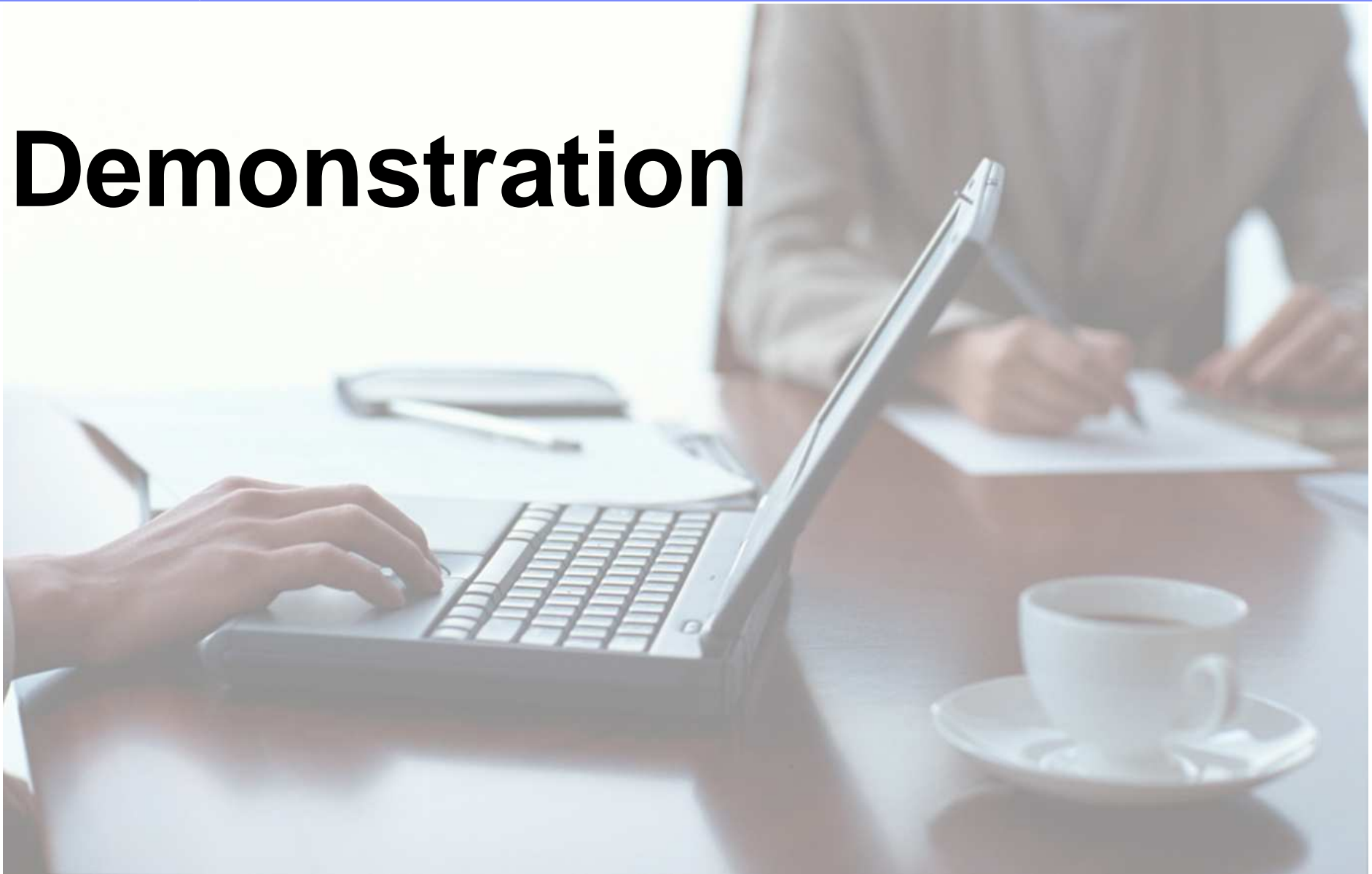◇WebSphere application servers (WAS, ND) Patch程式安裝實在很花時間，是不是有什麼更好的方式可以幫幫我

Solution ➡ **Centralized Installation Manager**

Centralization of XD configuration and deployment XD across all application servers; centralization of patch management for WebSphere Application Server

- **Supports centralized installation** from the Deployment Manager to Nodes in the cell
- **Single install** to the Deployment Manager
- **Push install package from DMGR to endpoints**
    - Select a set of hosts and push XD to those endpoints
    - Installs appropriate endpoint code based on type of endpoint
    - Agent-less
- **Centralization of patch management**

Centralized Install Manager

Demonstration

Questions

Thank You