Fundamentos da Arquitetura de Infraestrutura de Aplicações

BLOCO: ARQUITETURA DE INFRAESTRUTURA DE APLICAÇÕES

PROF. RODRIGO EIRAS, M.SC.

[ETAPA 1] AULA 2 – SOFTWARE DEFINED DATACENTER

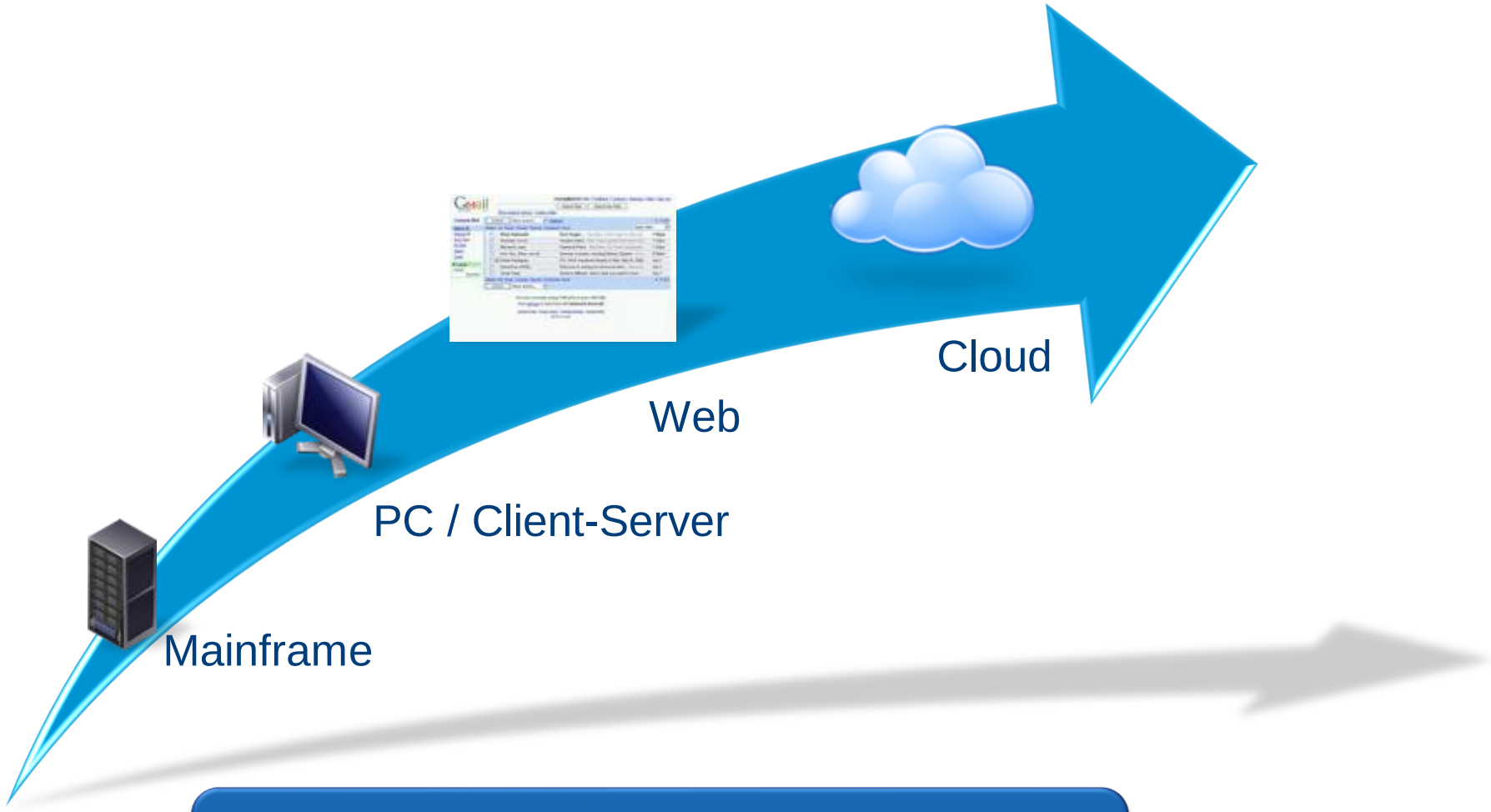
Na última aula...

- Introdução a Cloud Computing
- Motivações

Agenda

- SDDC – Software Defined Data Centrer
- Foco em soluções Vmware
- Gerenciamento de SDDC

The Rise of a New Era in IT



Cloud Computing will transform the delivery of IT services

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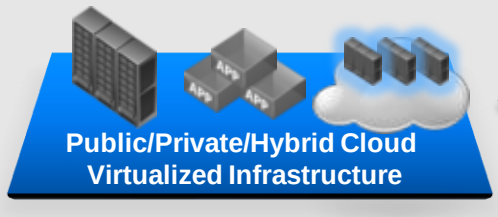
Virtualization & Cloud Management: VMware Approach

End-User Computing Management
- Provision & deploy desktops rapidly
- Manage workstation images simply
- Deliver virtualized applications to desktop

Application Management
- Encapsulate applications into containers with vApps
- Assure application portability & performance
- Establish service contracts with infrastructure



Infrastructure & Operations Management
- Create a zero-touch, compliant infrastructure
- Build automation into platform
- Deliver self-service through policy-driven control

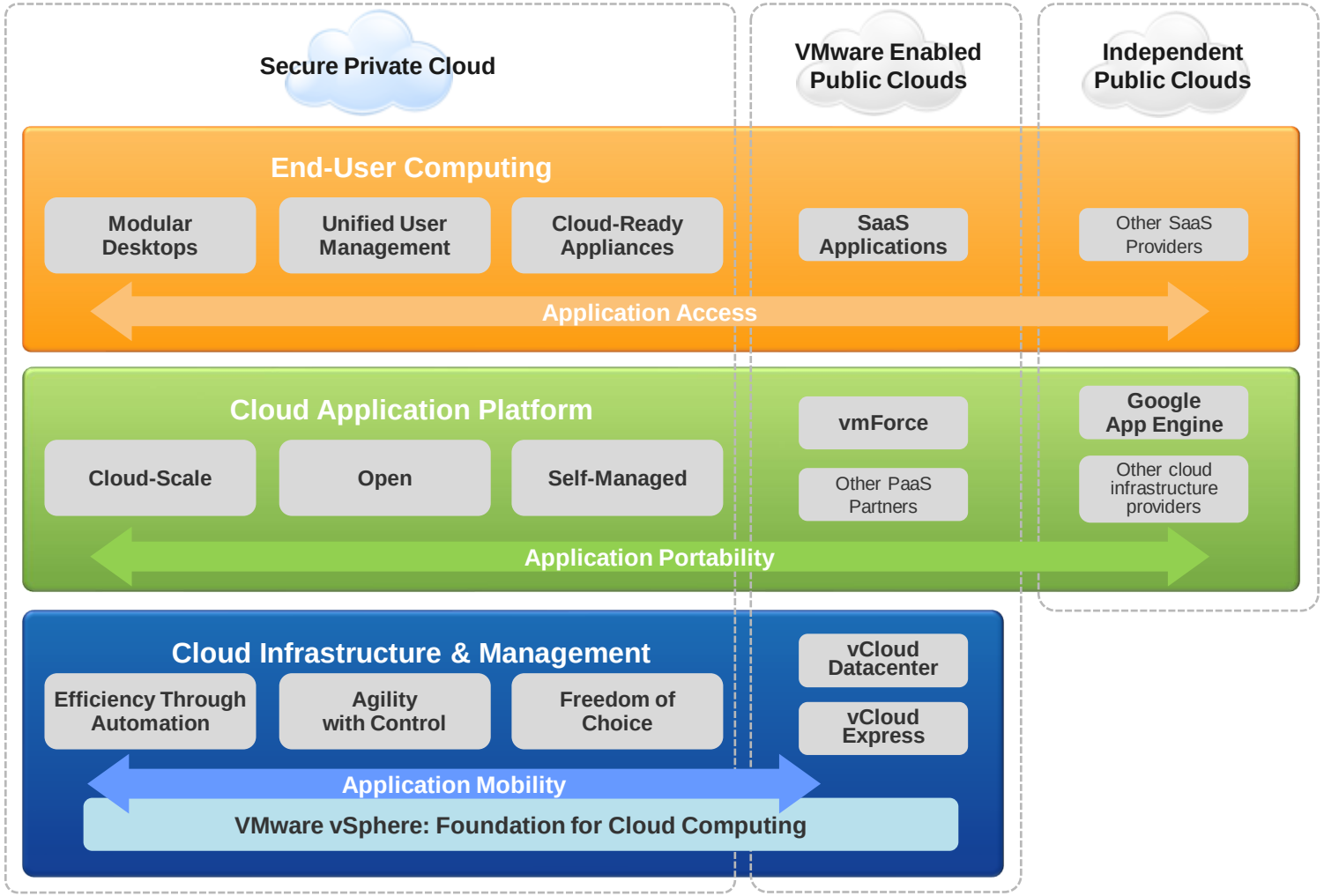
- VMware Cloud Director
- vSphere

IT Business Management
- Govern cloud provisioning processes
- Track cloud software license usage
- Standardize cloud partitions

VMware Management Solutions

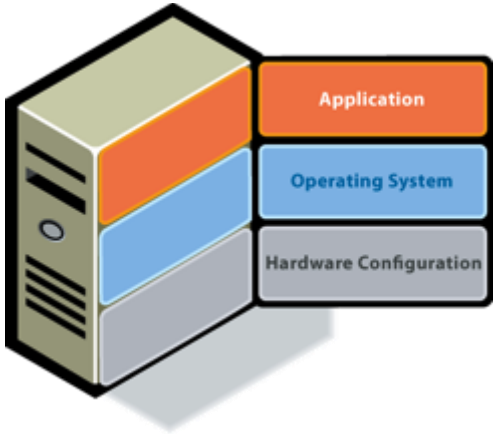
VMware Cloud Stack

Secure, Compliant, Controlled



Once upon a time…

… before virtualization

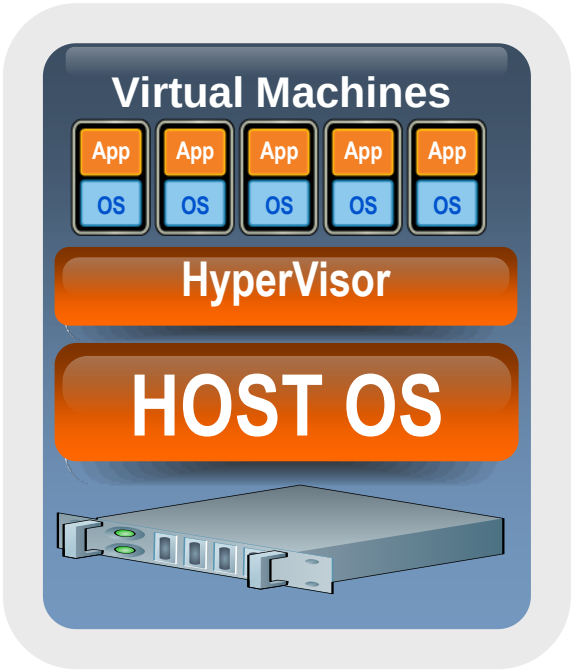


- 1:1 Ratio of Server/OS/Application
- Server Sprawl
- Low utilization
- Some Assembly Required

  Provisioning time
- Complicated and cumbersome DR
- $4000/server/year

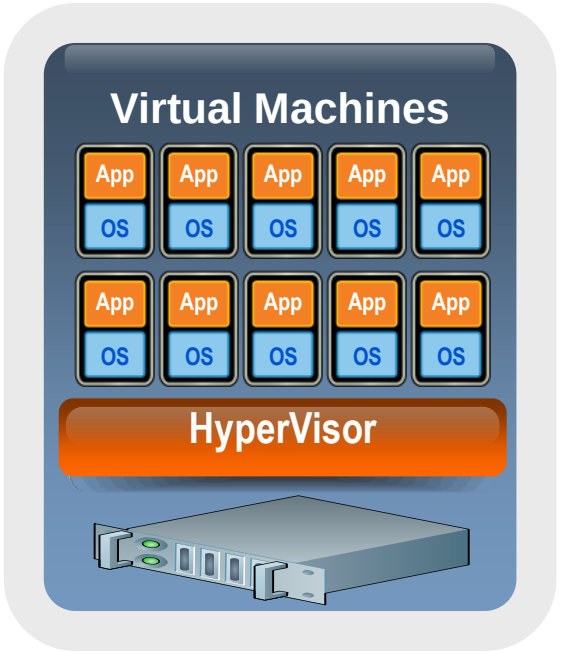
  Power, cooling, real estate, networking (NIC/HBA), service contracts…

Round 1: The Client Hypervisor



Types of Virtualization

Round 2: The Server Hypervisor



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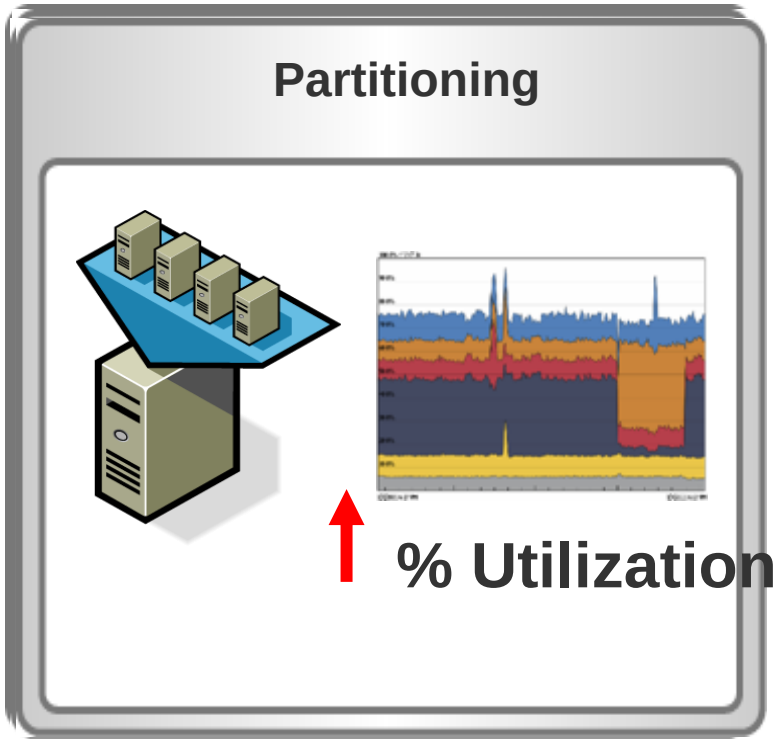

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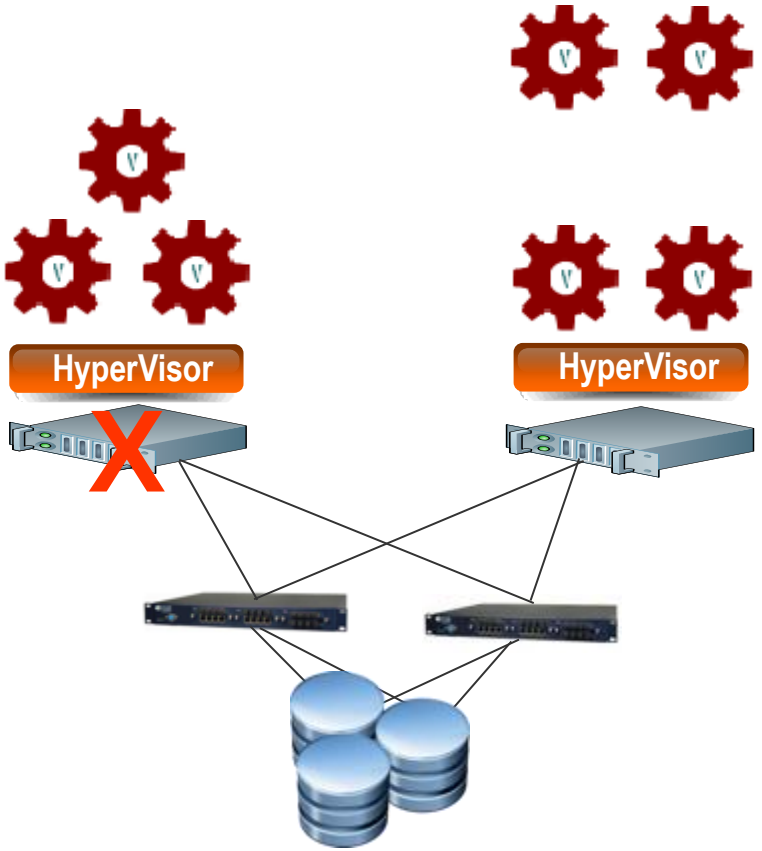
Types of Virtualization



Round 3: Virtual Infrastructure

- Dynamic Computing

  Vmotion

- Greater Availability

  HA (High Availability)

- Quick imaging & provisioning

- Centralized resource management

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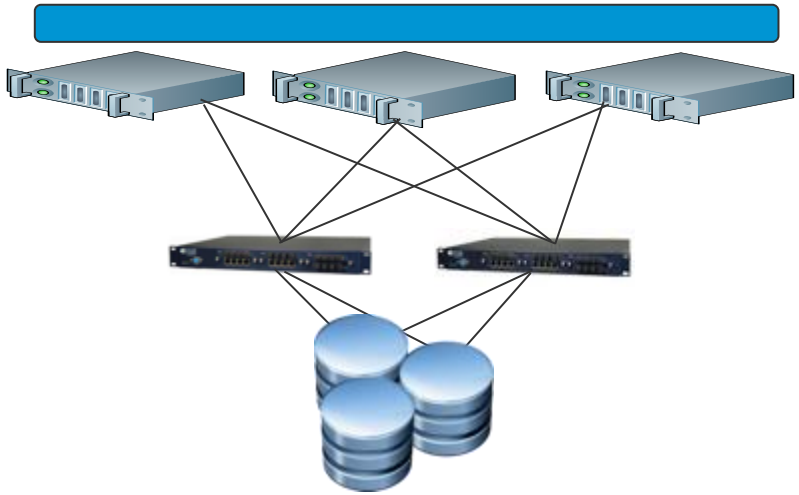
Round 4: the Virtual Data Center OS



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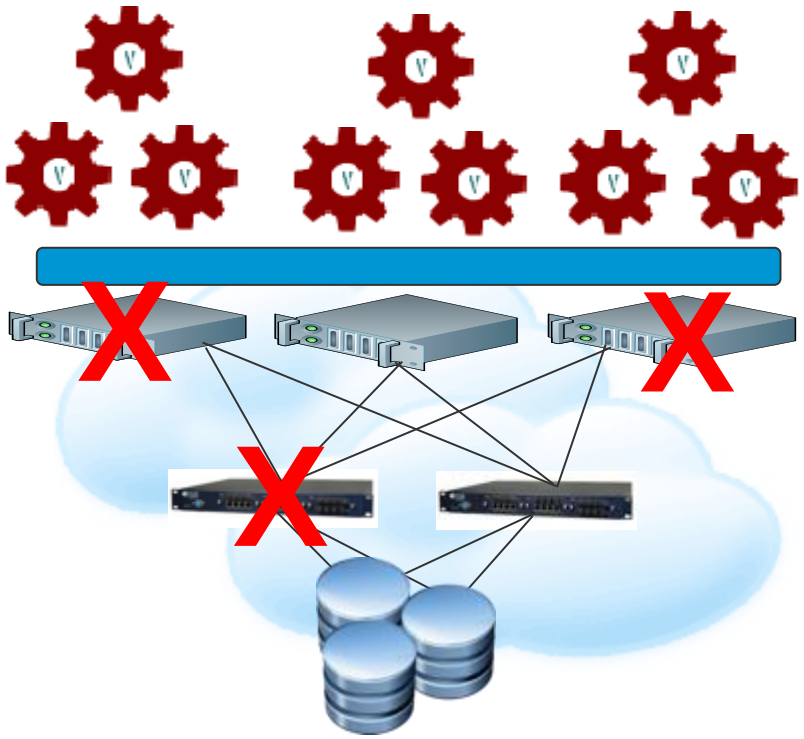
Round 4: the Virtual Data Center OS



The Application is the Focus

- Dynamic Compute resources: RAM/processors
- Dynamic Network resources: virtual nics/switches
- Dynamic disc resources – sizing/allocation
- Fault tolerance
- Power Management
- Security

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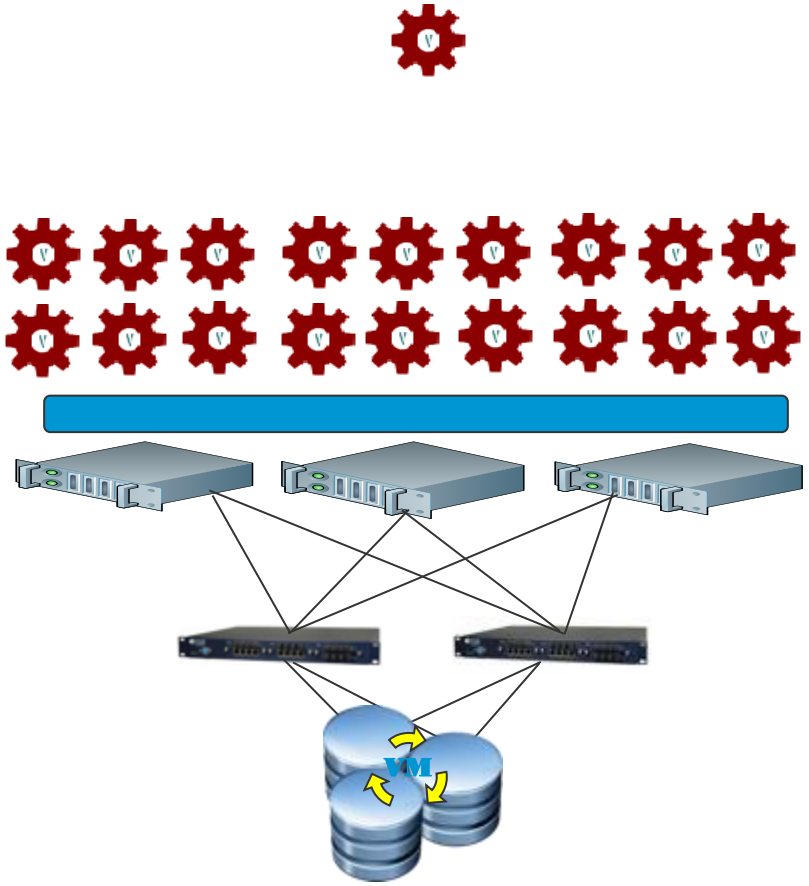
Round 4: the Virtual Data Center OS

Dynamic Computing



Vmotion – stateful (live) migration of VM's

DRS – automated migration (load balancing)

+ intelligent auto-placement of new VM's

Storage Vmotion – stateful migration of vm's storage - i/o, maintenance, new storage

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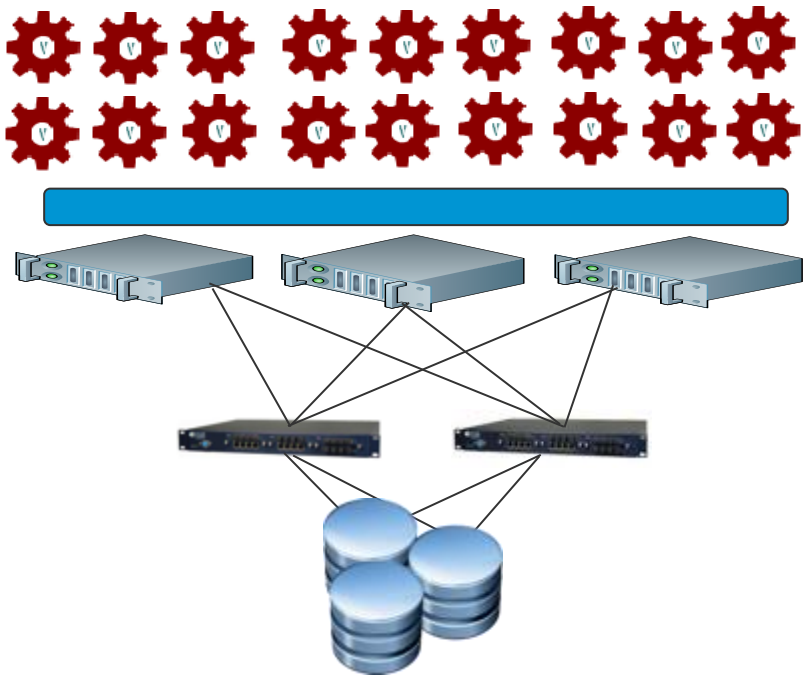
Power Management



DPM – automated migration (load balancing) & Power Management

auto-placement of VM's & powerdown of hardware that is not needed during low workload demands

Green + savings on power & cooling

+ restart when it is needed

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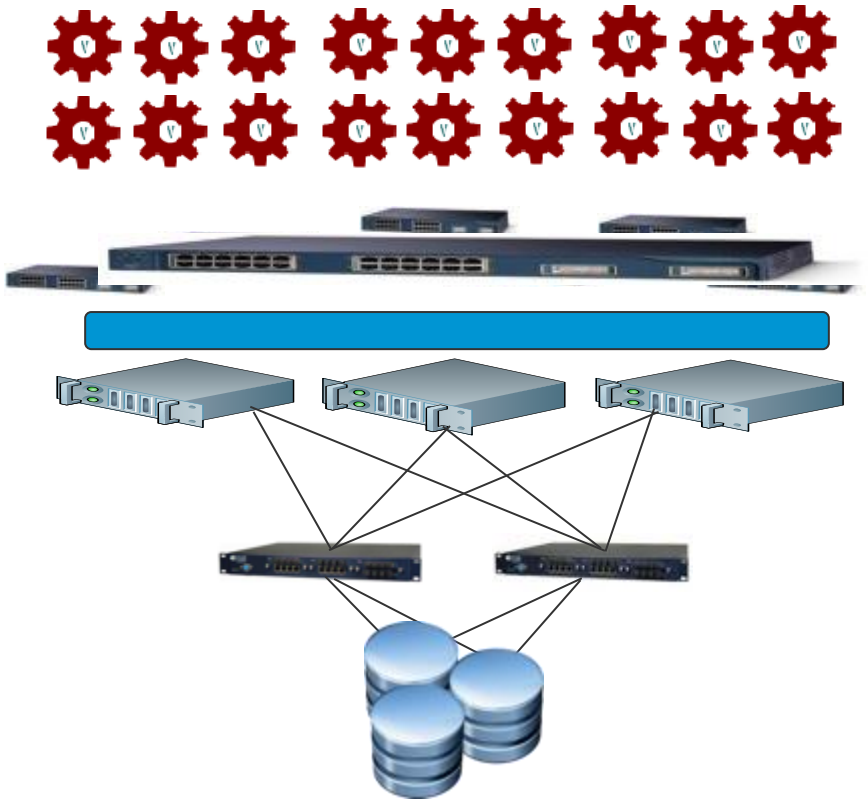
Virtual Switching



Previously virtual switches have been isolated to the host

Distributed switch creates a virtual switch to span across the environment

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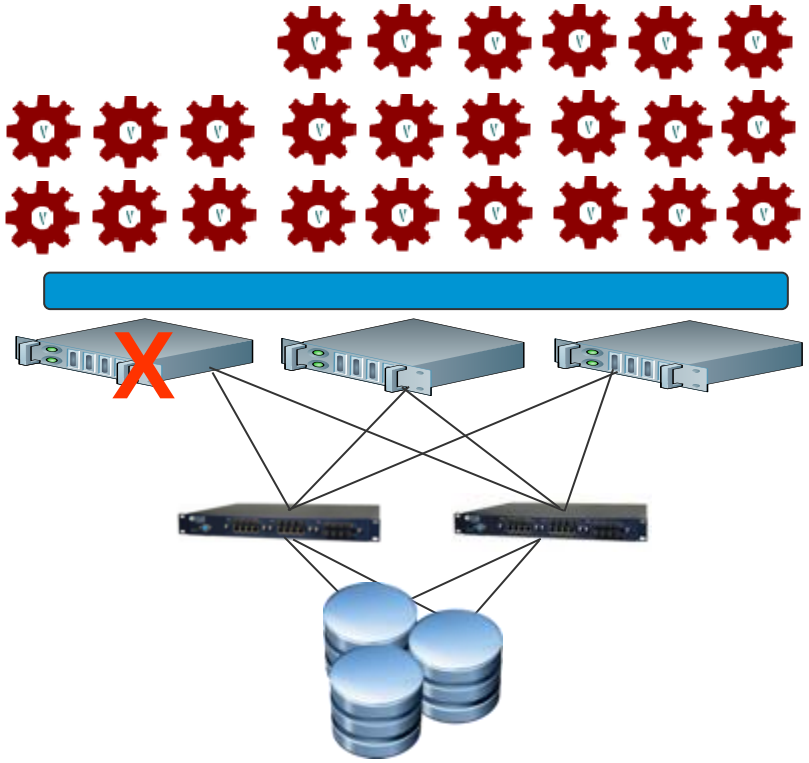
Round 4: the Virtual Data Center OS

Fault Tolerance



HA still available for lower tier apps

Identify VM's you want for fault tolerance and start the service

A shadow VM is created and takes over if host failure occurs

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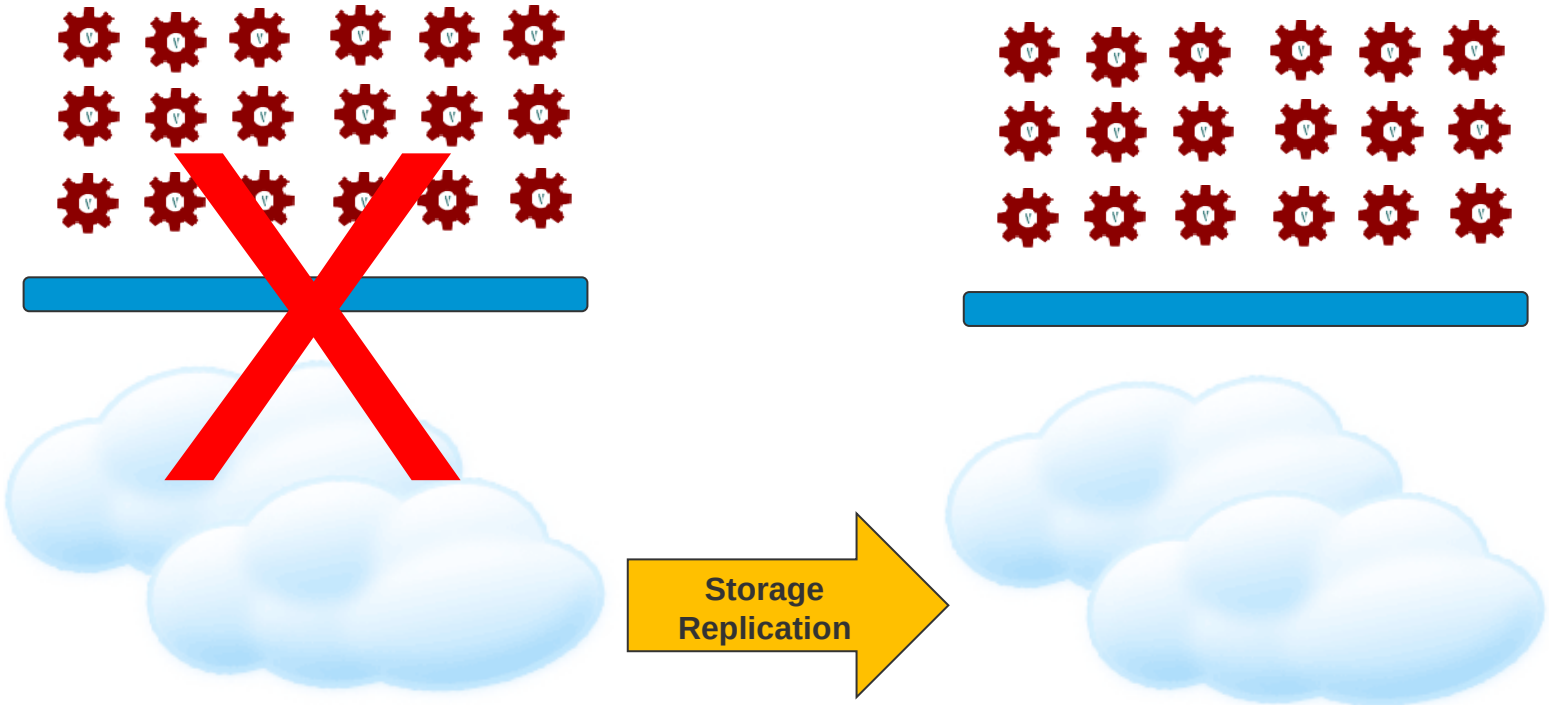
Disaster Recovery



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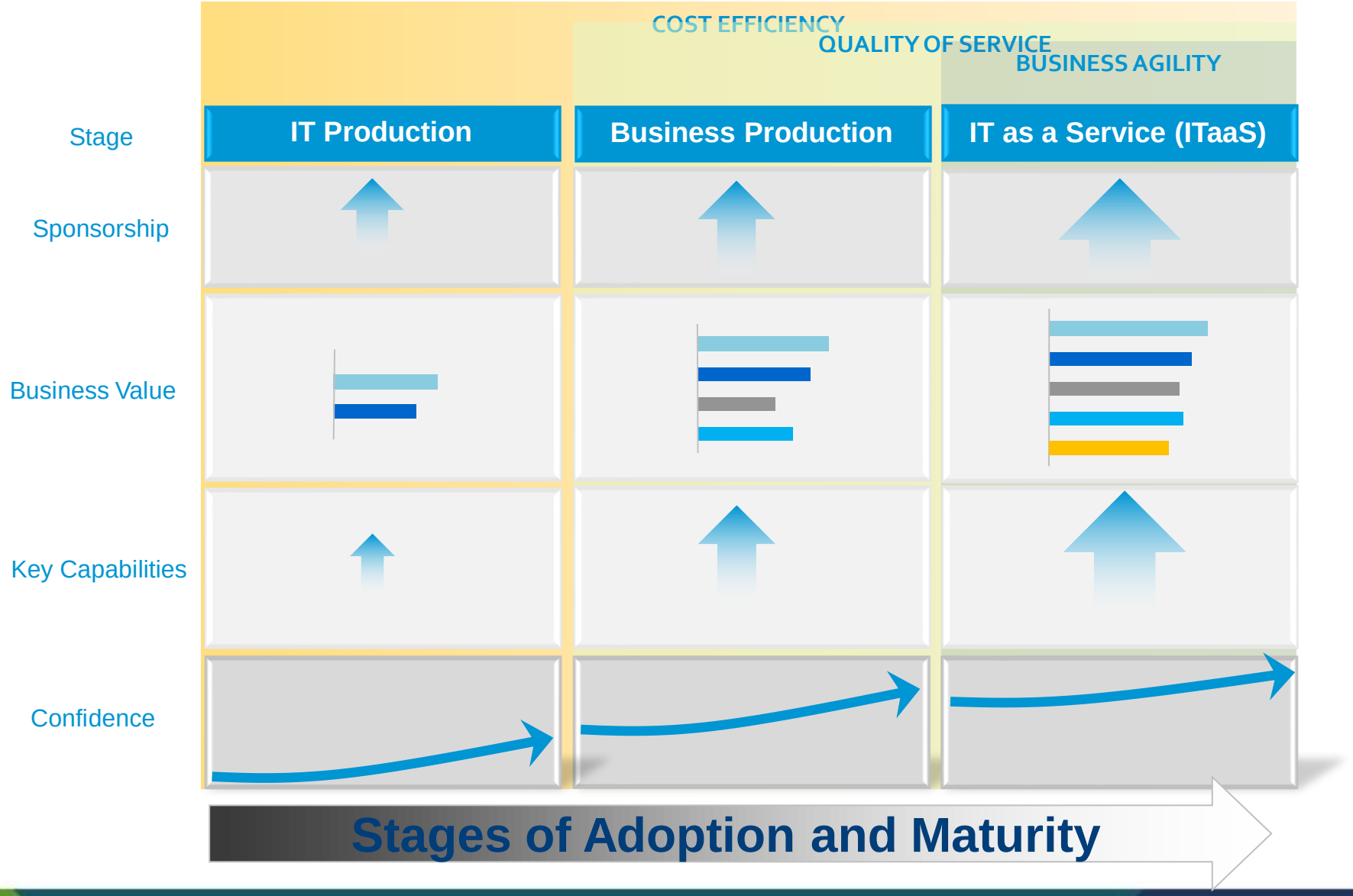
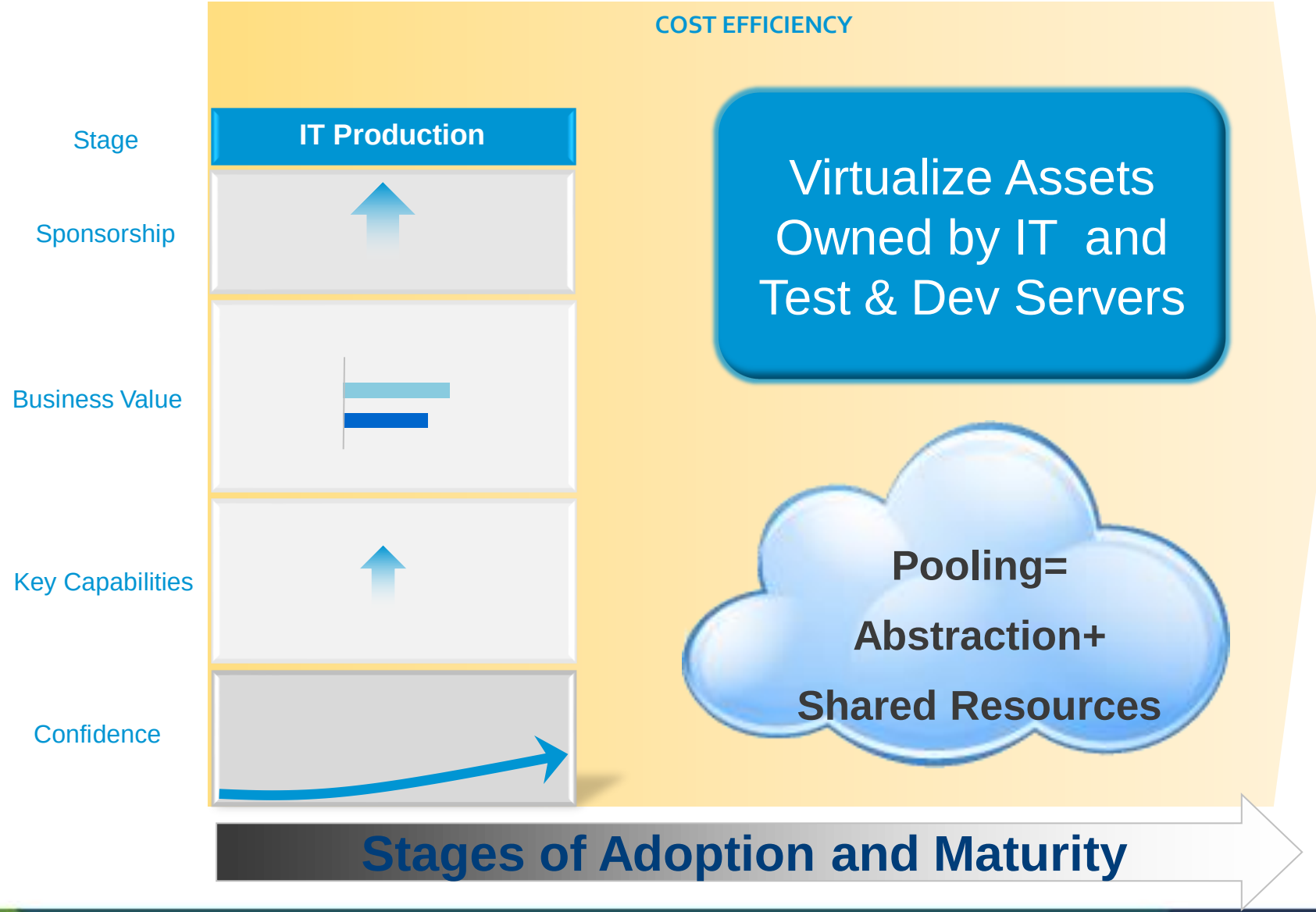
The Virtualization Journey – Stages and Maturity Axis



The Virtualization Journey – IT Production



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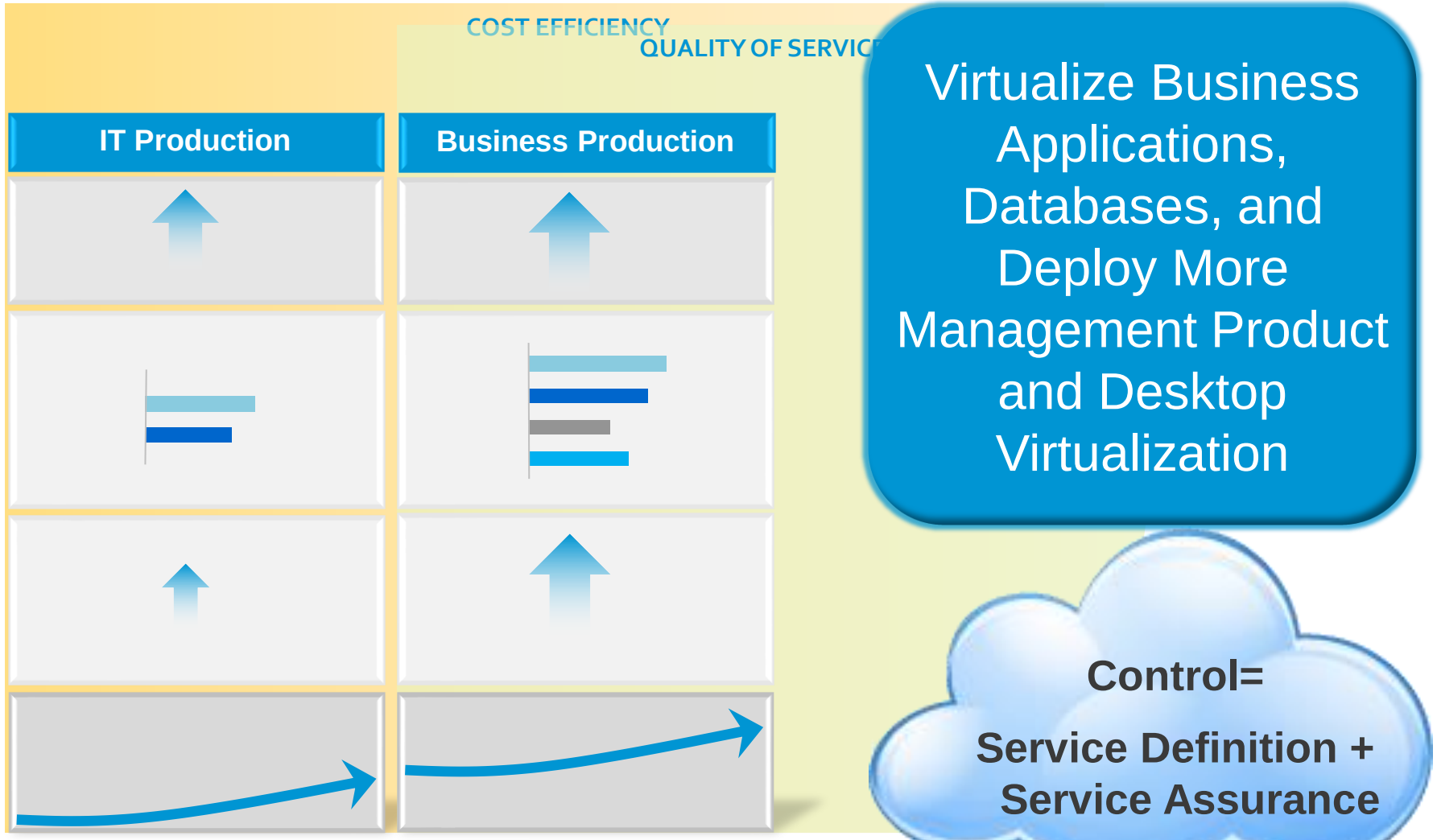

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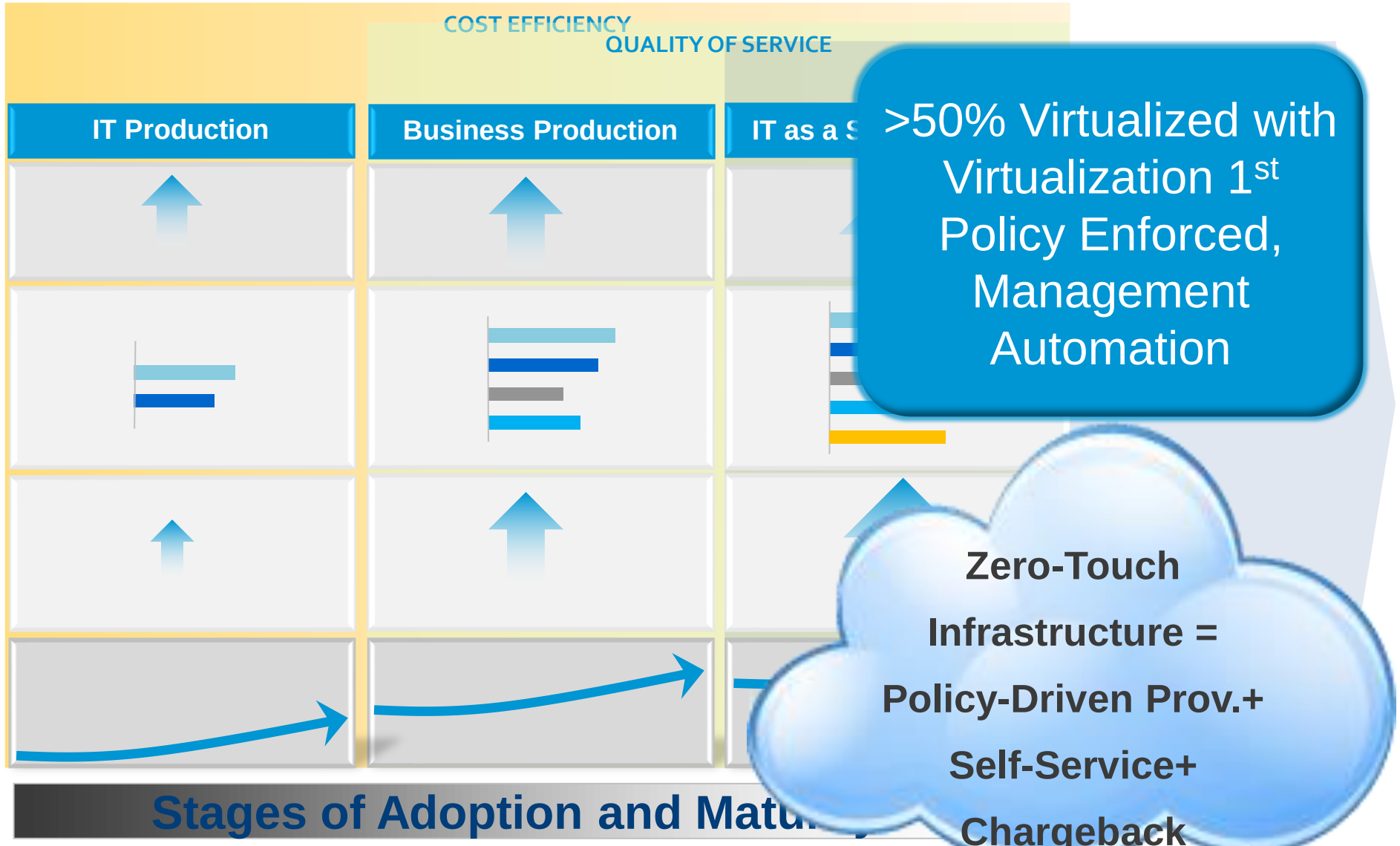
The Virtualization Journey – IT as a Service



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Private clouds, the best place to run tier 1 app's

Consolidation

- Decrease infrastructure cost for Server HW
- Save space and energy in the datacenter
- Archive consolidation ratios of 5:1 to 10:1
- Scale physical infrastructure on demand

Availability

- Minimize planned downtime
- Reduce recovery timer for server failure down to zero
- Build cross site disaster recovery solutions
- Increase overall availability
- Use redundant infrastructure immediately

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Private clouds, the best place to run tier 1 app's

Manageability

- Scale infrastructure as needed
- Gain flexibility through workload mobility
- Move Apps during hardware maintenance
- Reduce management cost per app

Quality of Service

- Ensure appropriate resource assignment
- Continuously monitor SLAs
- React proactive and fast to issues
- Dynamic scale resource as application needs grow

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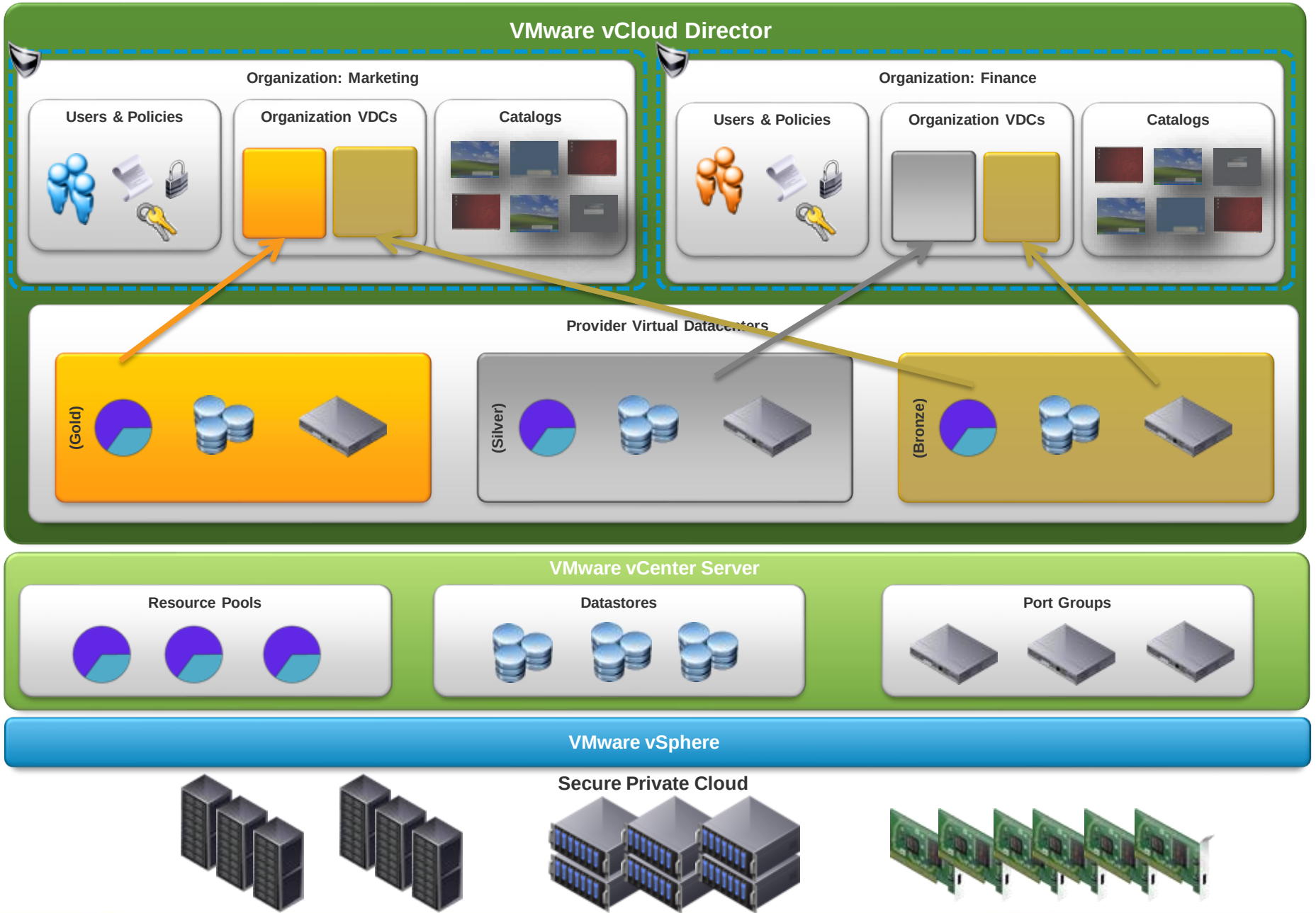
Technical Overview Technologies enabling

- ✓ Automation
- ✓ Self Service
- ✓ Efficient Security
- ✓ Efficient Management
- ✓ Hybrid Clouds
- ✓ ...

vCloud Director – Architecture

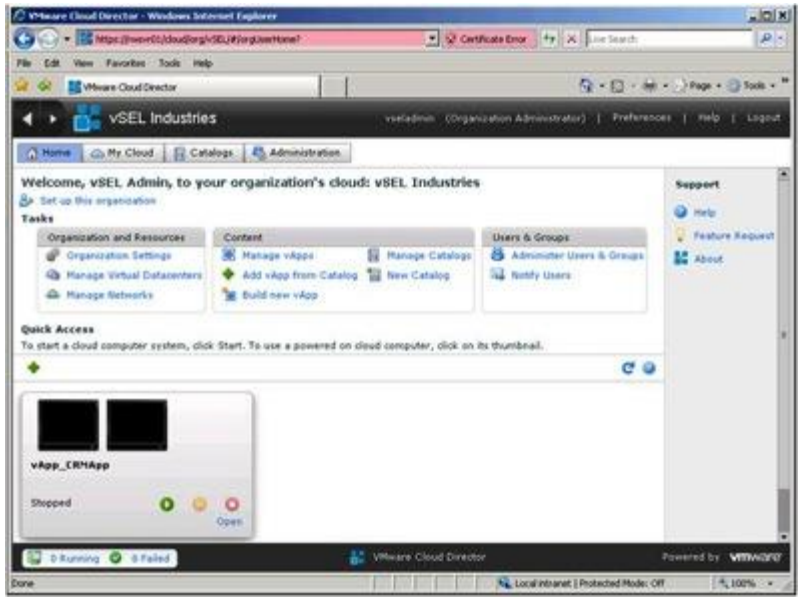


vCloud Director Portals

System Administrator View

System Portal

Organization Portal



Organization Administrator View

End User/Consumer View

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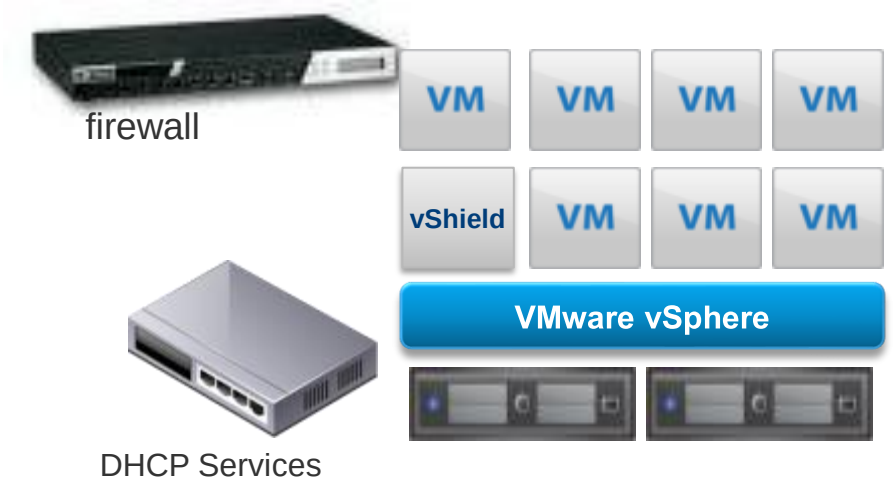
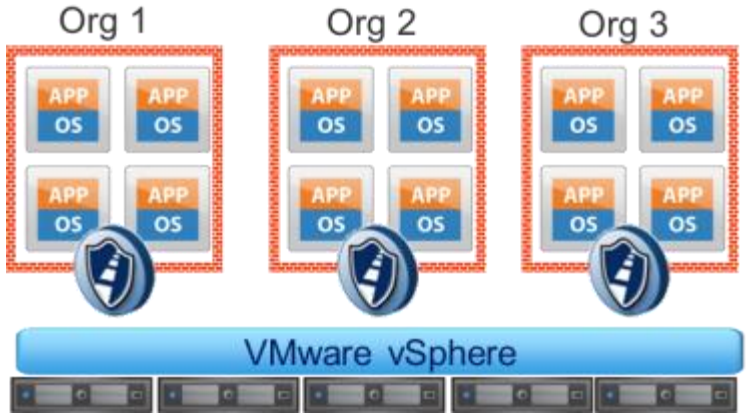
Integrated vShield features simplify security and compliance

- **vShield for vCloud Director is a virtual appliance providing essential perimeter network and security services including:**
  - Port-level stateful firewall
  - Network Address Translation
  - DHCP services

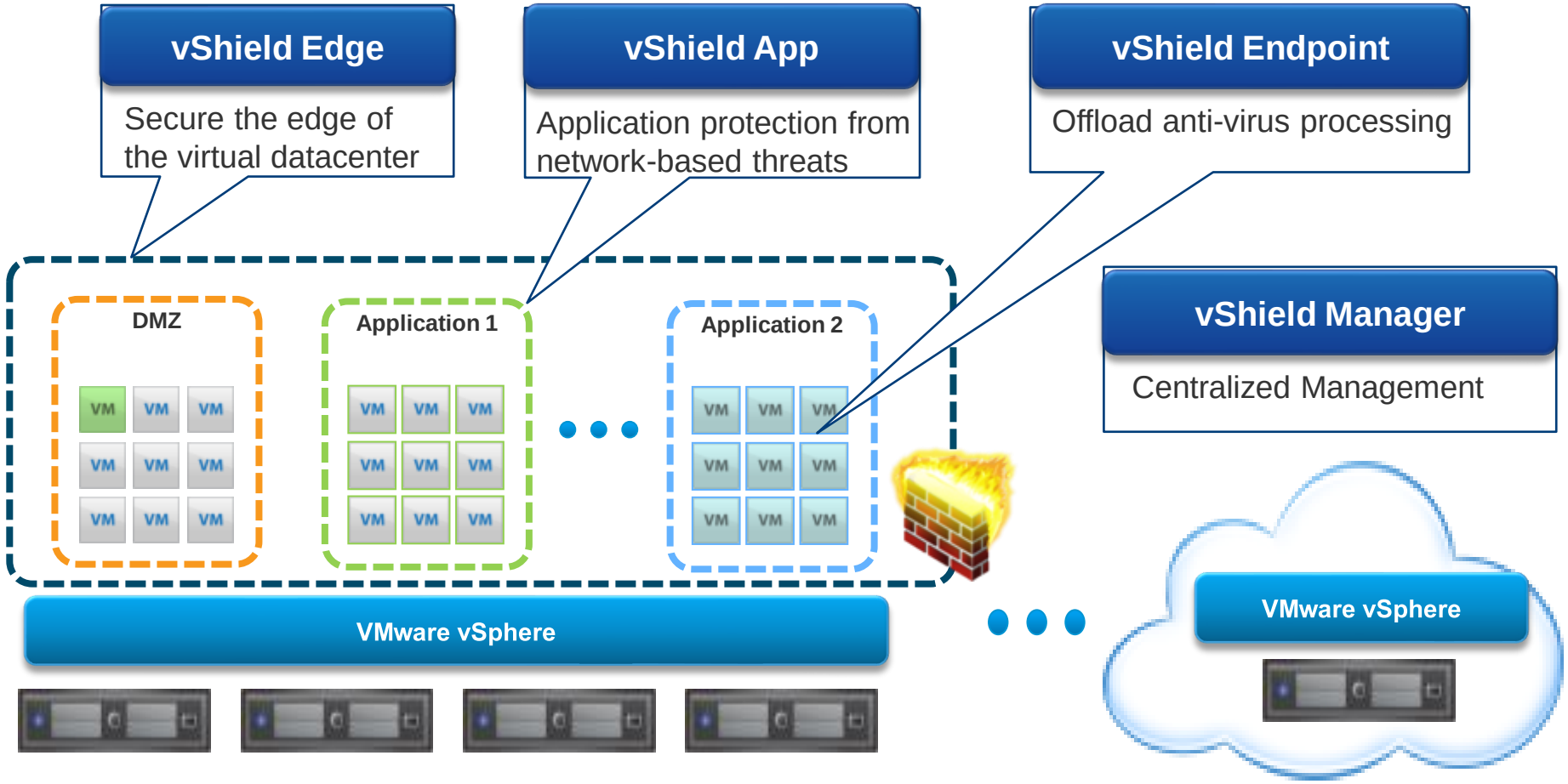


- **Enables fast, secure and automated provisioning of multitenant Org VDCs in private clouds**
  - Simpler, easer to operate
    - One Edge per Org, deployed anywhere
    - Built-in network isolation
    - Integrated and manageable by REST APIs for script and 3rd party automation
  - Improved visibility, control and compliance
    - Application aware NetFlow visibility

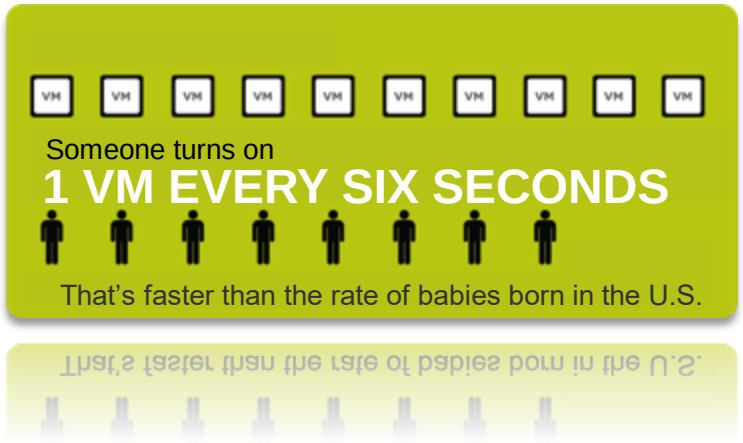


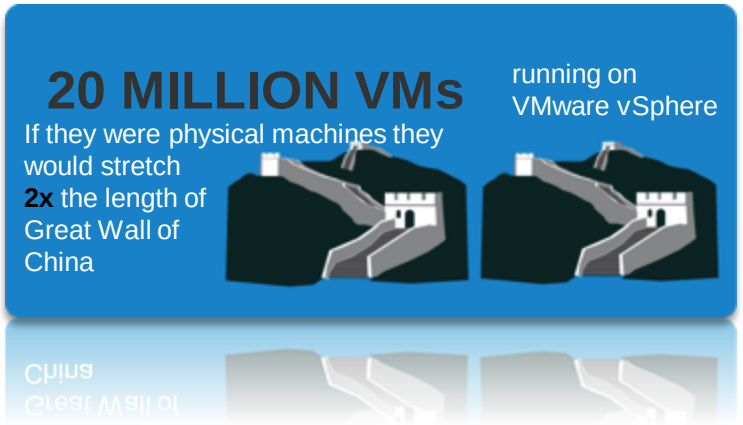
vShield

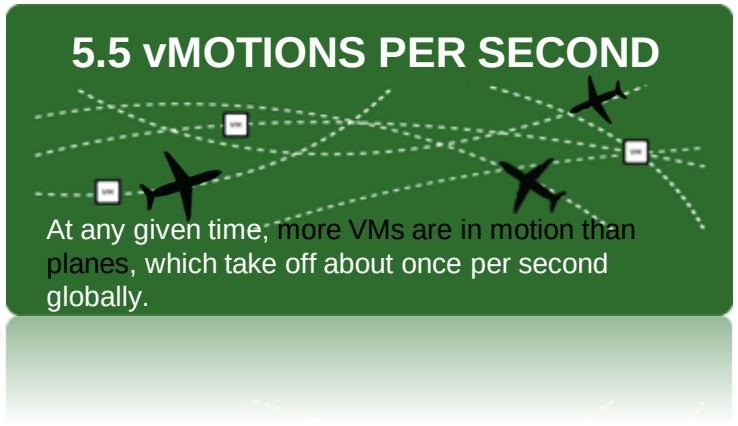
Security from Edge to Endpoint



Virtualization is the Foundation for Cloud

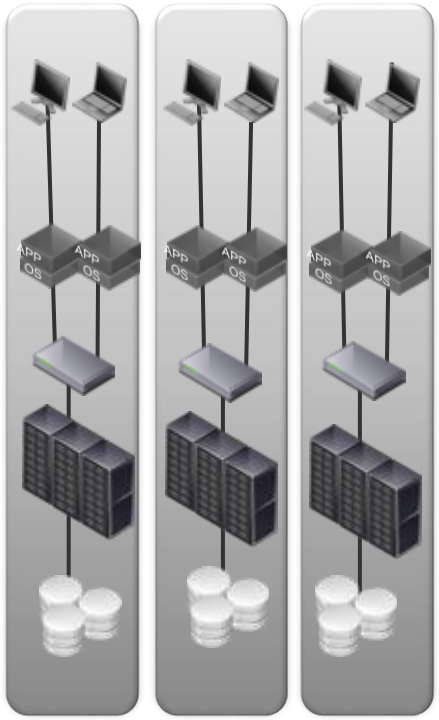






Cloud Requires a New Approach

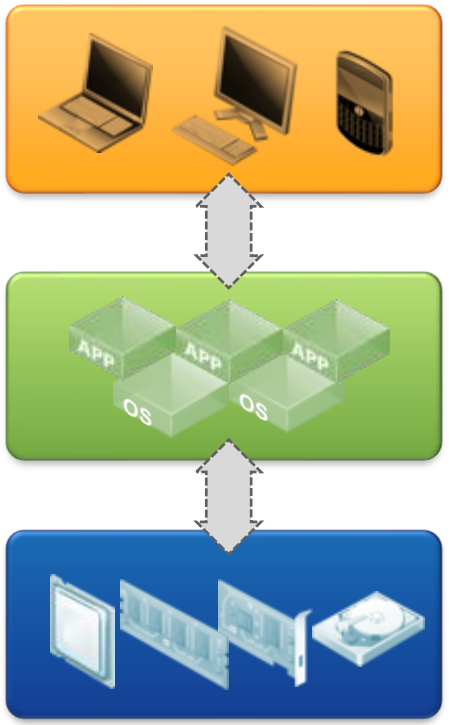
Traditional IT Management



Services and assets tied together in complex, brittle, vertical stacks that are hard to change and manage

Business agility suffers

Cloud Management



Service components are abstracted and sourced from dynamic resource pools with horizontal layers loosely bound into services

IT able to keep up with speed of the business

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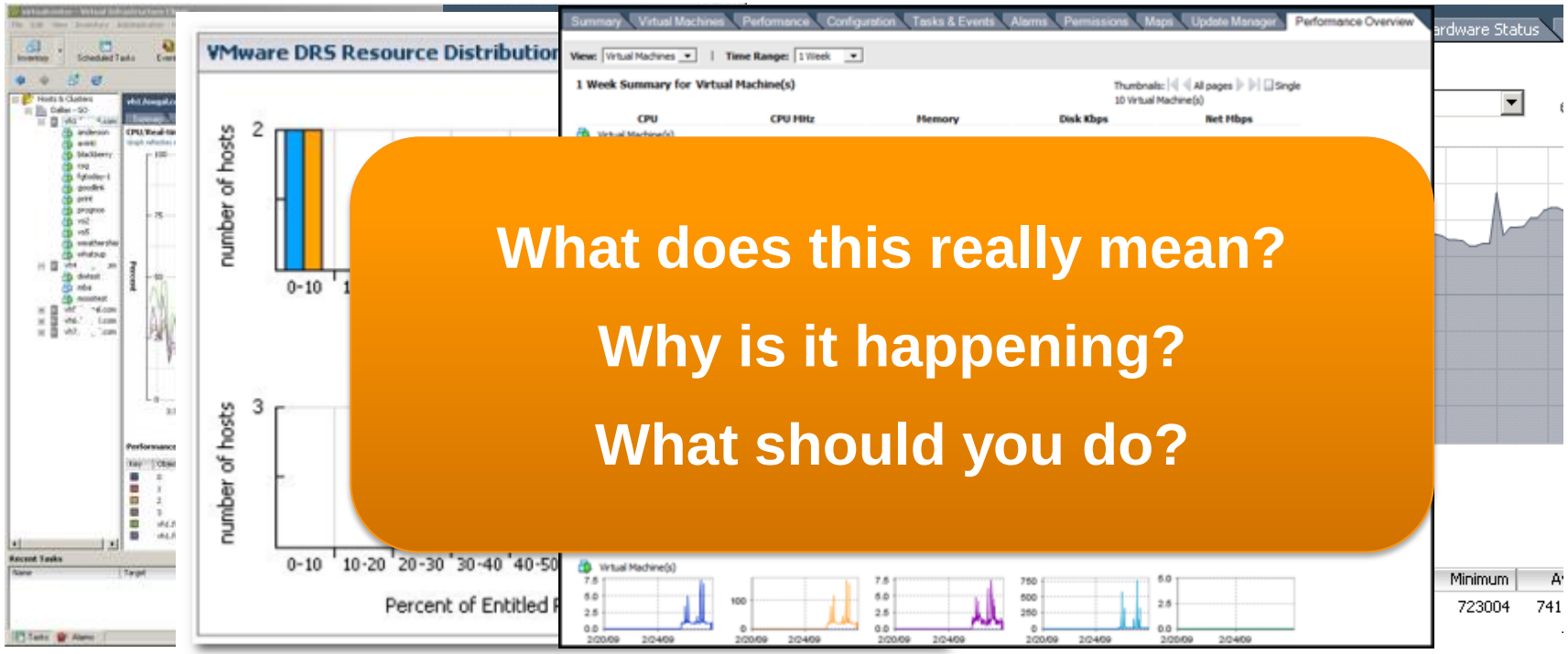
Traditional Tools?

Example: Problems with Traditional Monitoring Tools



Cloud requires a new approach to management.
Traditional monitoring tools alone can't handle it.

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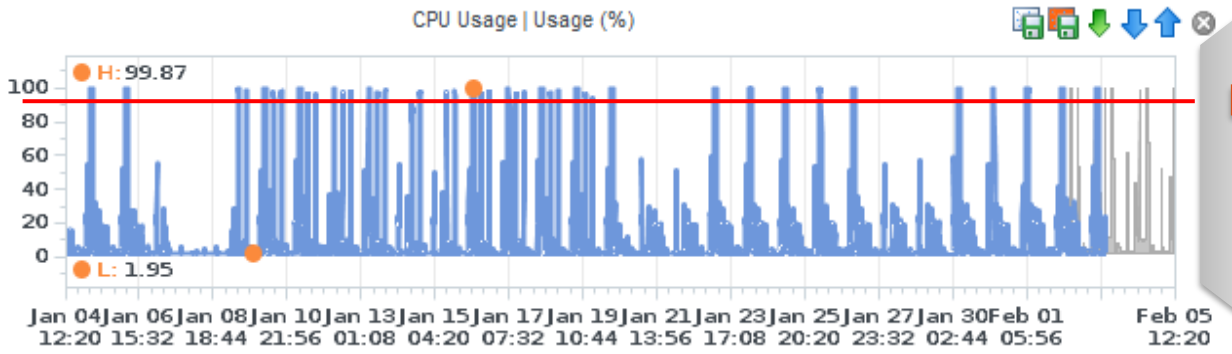
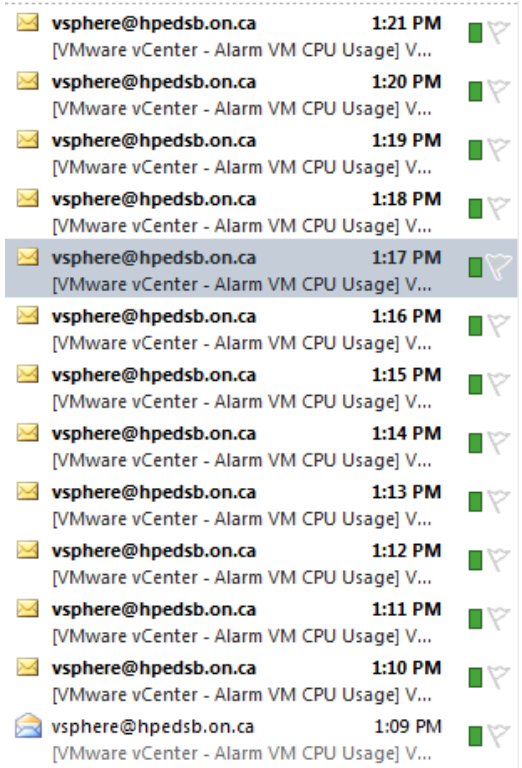
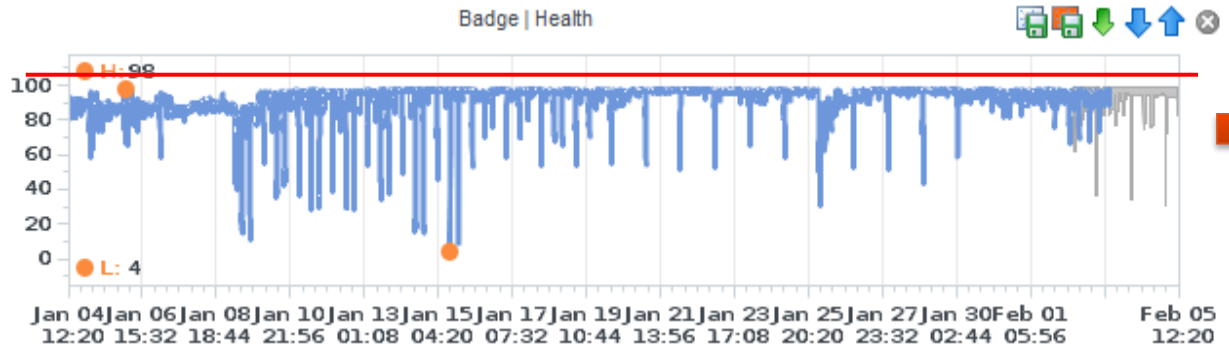
Example: Problems with Static Thresholds and Alerts





Low thresholds cause alert storms

High thresholds miss alerts



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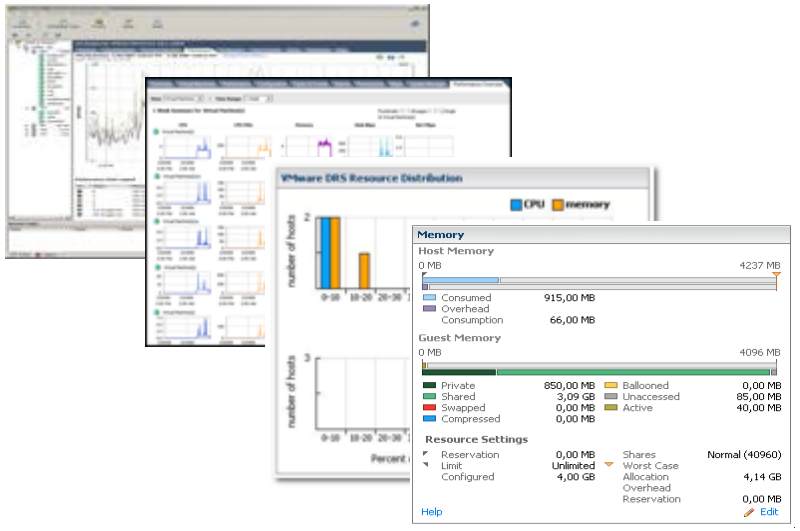
Solving the Monitoring Problem with Analytics



Calculate supermetrics from thousands of data points

Health

Risk

Efficiency

vCenter Server and external data sources

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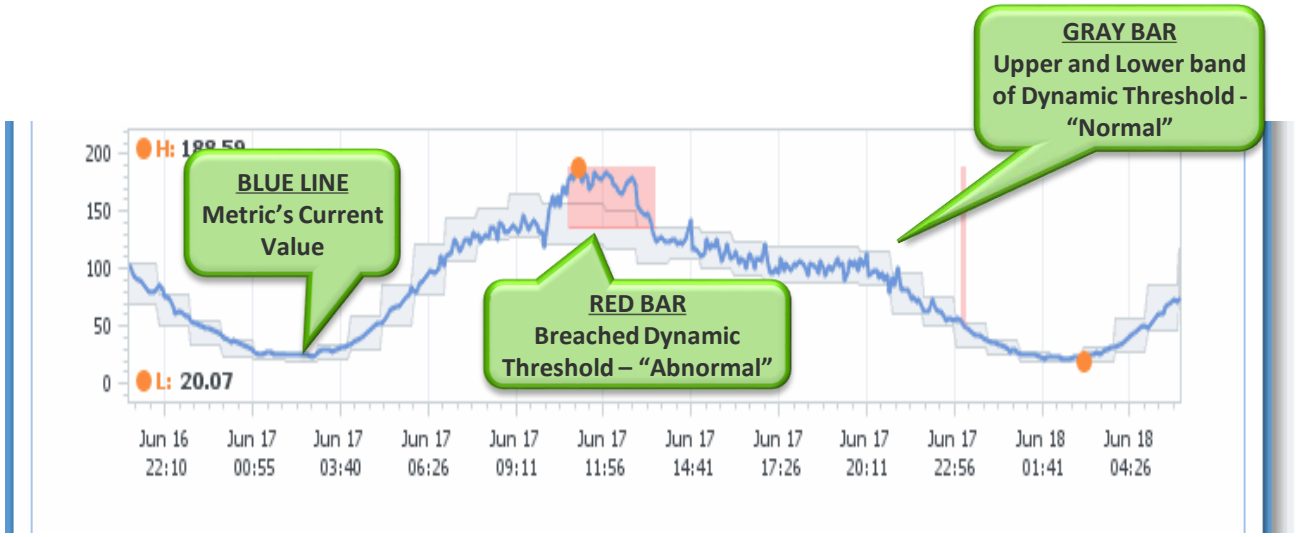
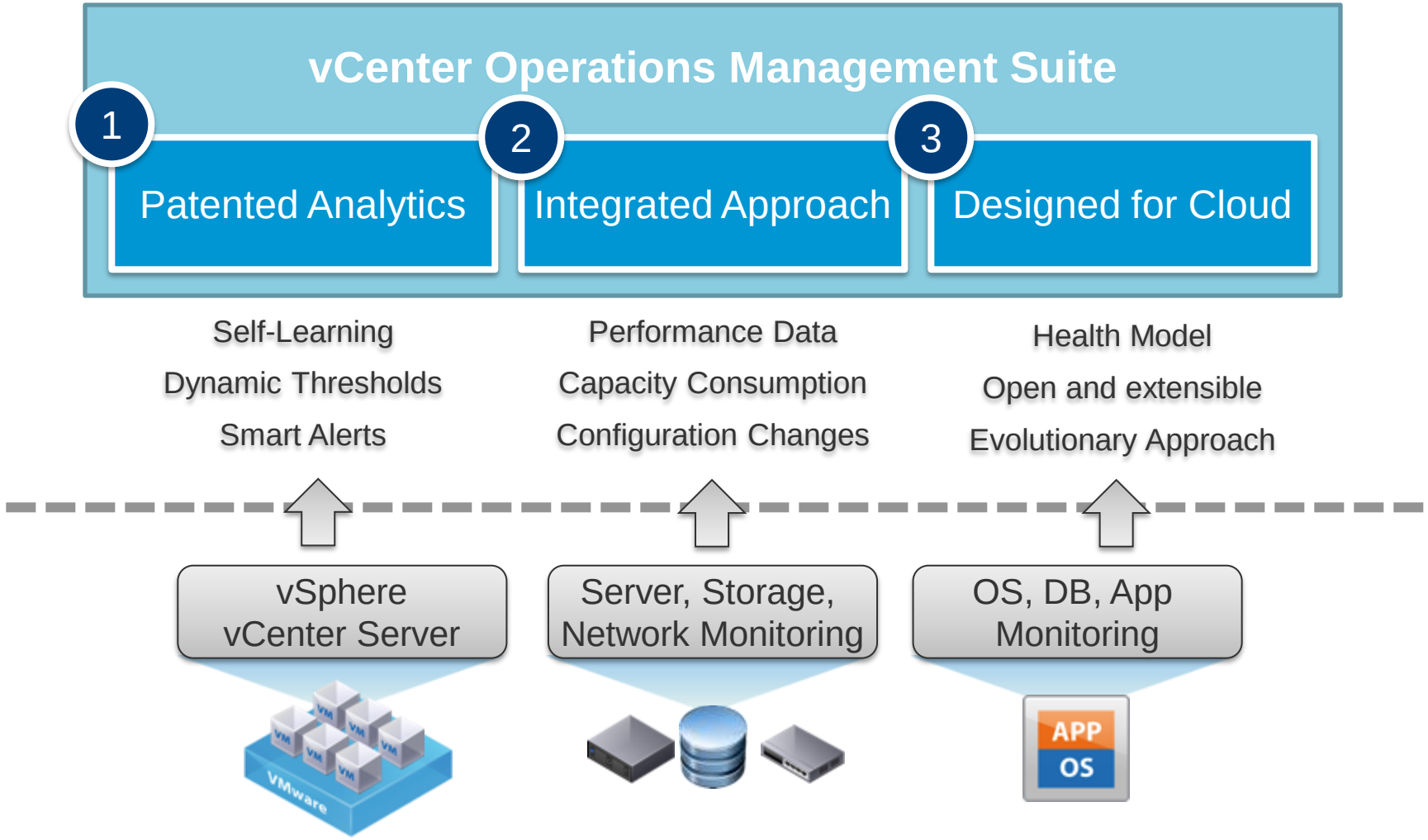
Solving the Alerts Problem with Dynamic Thresholds



- Learns your dynamic ranges of "Normal" without templates
- Learns patterns of behavior and identifies Abnormalities
- Dynamic thresholds eliminate "false alerts"
- vSphere Health Models further optimize analytics engine

Early Warning

VMware's Approach and Differentiation



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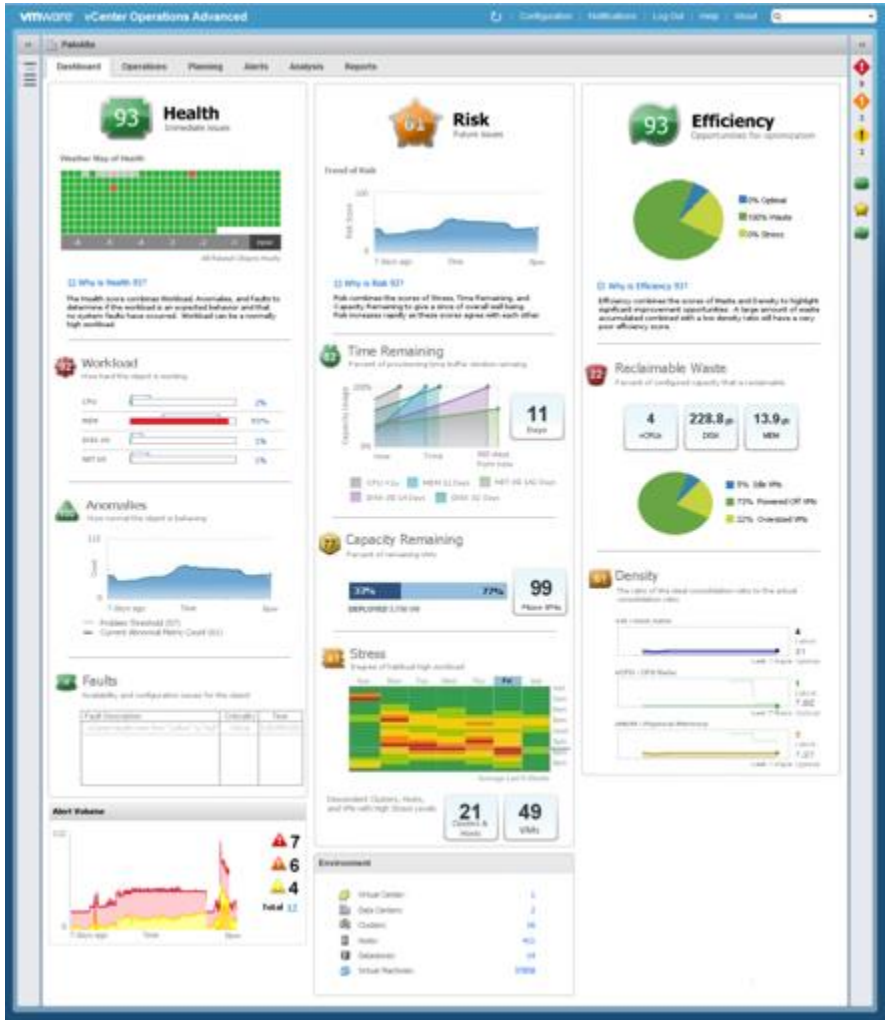
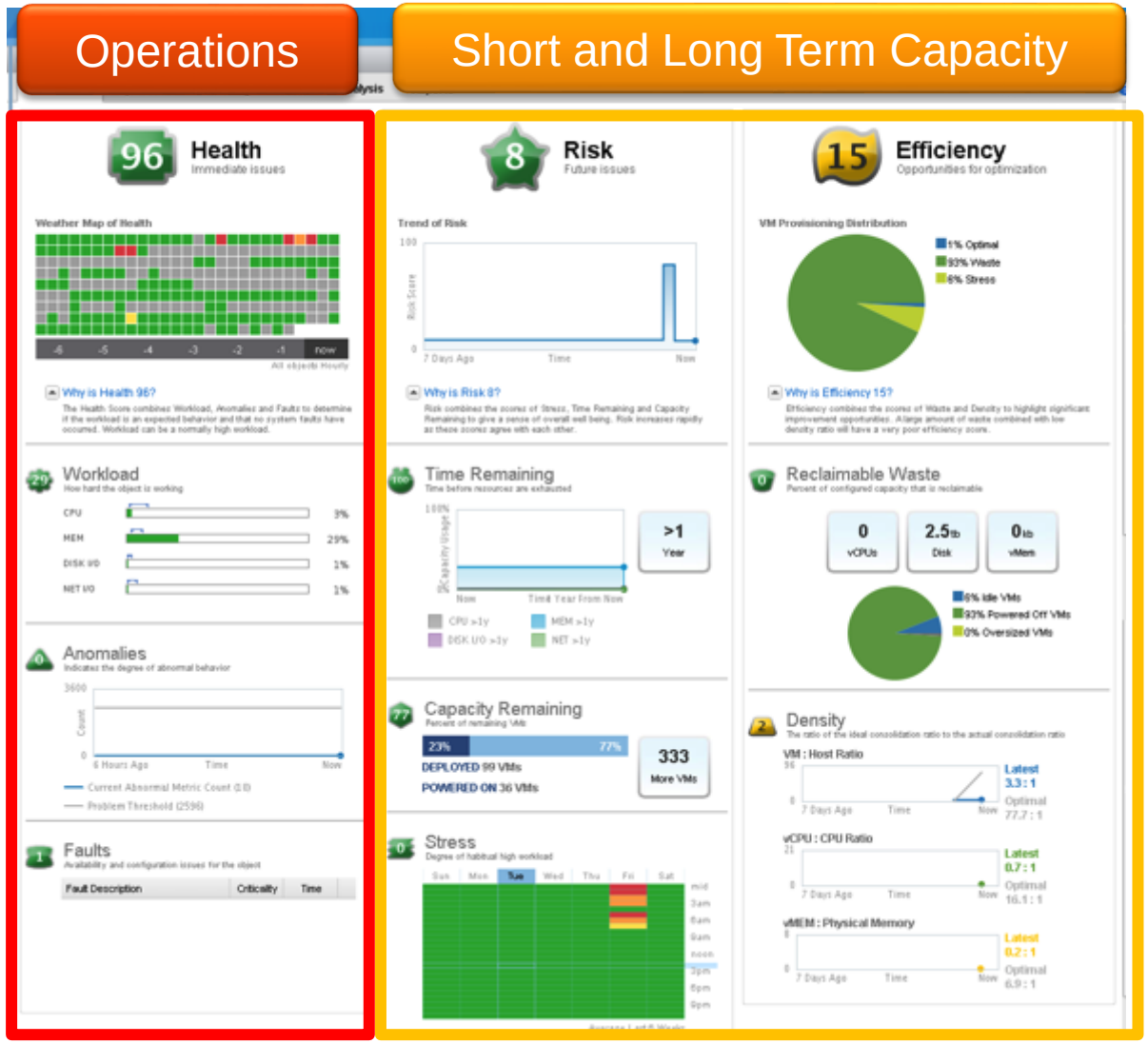
Introducing vCenter Operations Management Suite 5.0



- **Key Capabilities**
  - New Operations Management Dashboard
  - Completely integrated capacity management capabilities
  - Application-dependency mapping with vCenter Infrastructure Navigator
  - In-guest change events correlated with performance and health
  - Cost-based Capacity Optimization with vCenter Chargeback Manager

Visibility into Immediate and Potential Future Problems

- Immediate problems
- What is happening right now?
- What do I need to pay attention to?

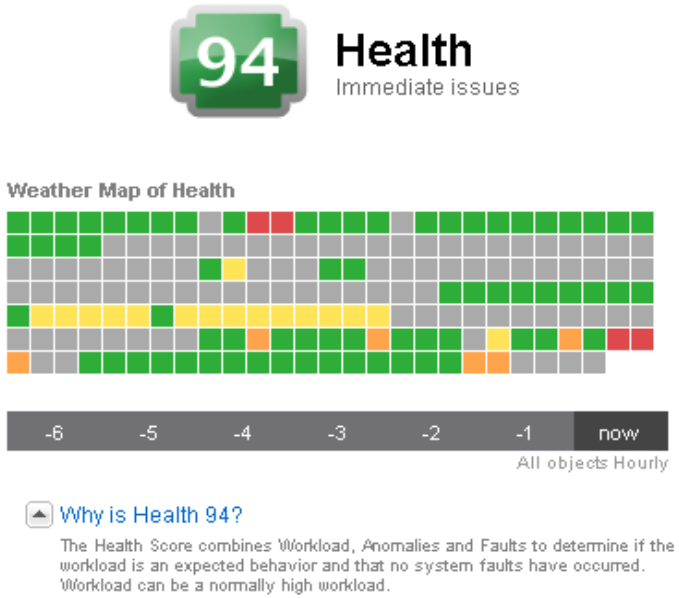


- Forward Looking
- Are there areas that I should be concerned about from a capacity perspective?
- Have I deployed my VI in the most efficient manner?

Operations: Major Badge – Health

- **One Source of Truth Across the Enterprise**
- **Health Score - *Objective* measure of performance based on underlying level of abnormal behavior**
  - High Health is good (100-0)
  - Identifies current problems in the systems
  - Issues that need to be resolved immediately to avoid problems
  - Analytics based, calculated from 3 minor badges (Workload, Anomalies, Faults)
  - For any resource or grouping:
    - A single Server, Device, Resource
    - Entire Tier or Silo
    - Entire Application or Service
    - Entire Datacenter
    - Any Arbitrary Group of Resources

"How is our world doing?"



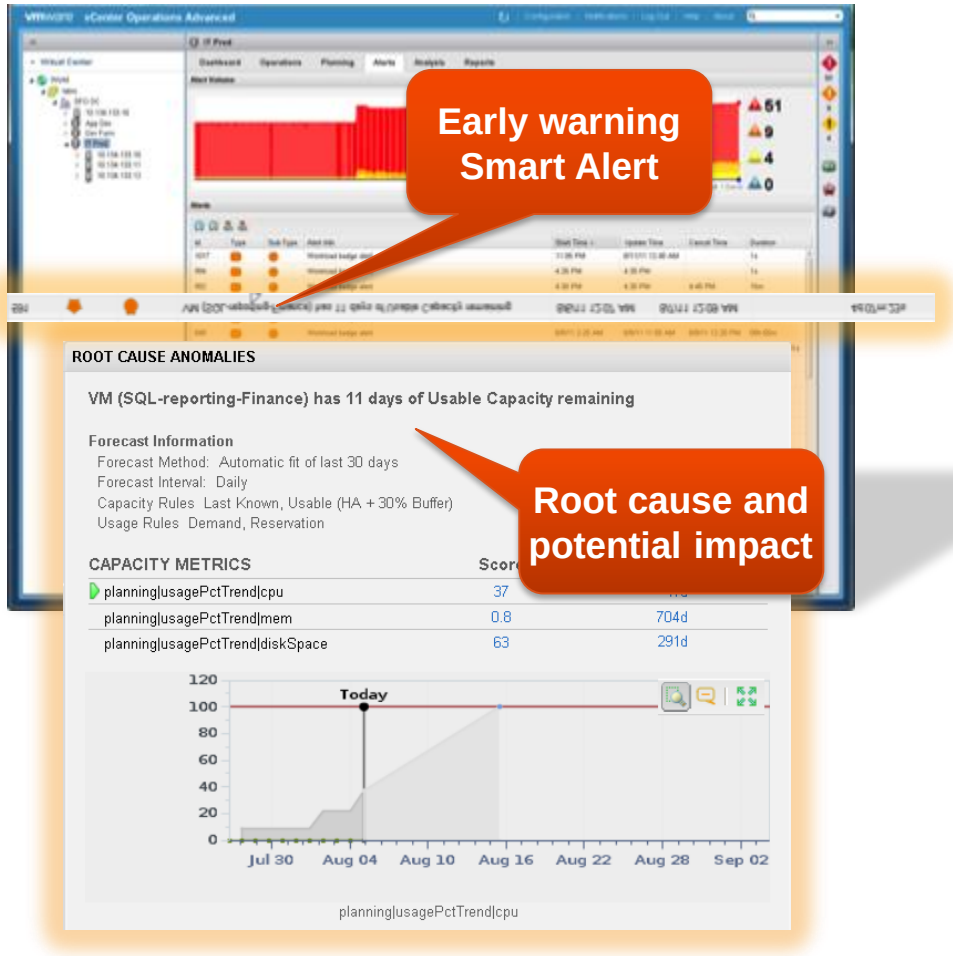
Heatmap

-> Provides quick view of many objects at once

-> Shows Health of all parent and child objects

-> Go back in time (6 hours) and see the "weather" of the Virtual Infrastructure

Smart Alerts – Before problems happen….



Overview

- Proactive alerts that provide early warning on building issues
- Identify upcoming health, performance and capacity issues
- Automatic root cause analysis of offending metrics across all layers

Benefits

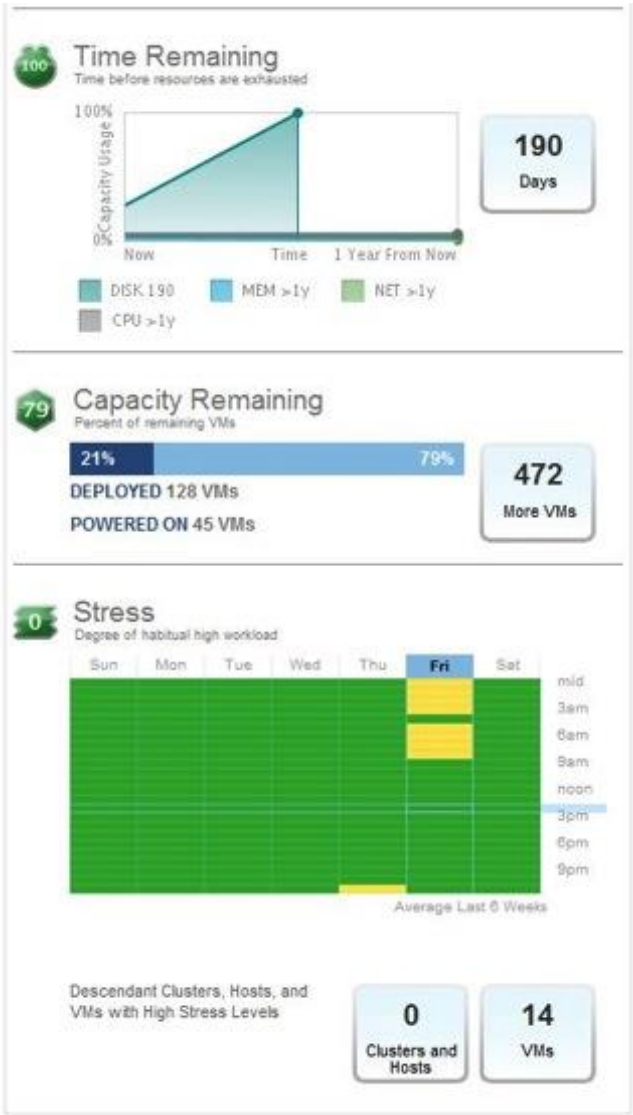
- Advance notification of abnormal behavior help avoid incidents
- Immediately focus on the root cause rather than symptoms or false alerts

Capacity Planning – Risk

Are there future risks to my systems and virtual Infrastructure?

Identifies potential problems that could eventually hurt the performance

Risk score over the last 7 days
Low risk is good (0-100)



Minor badges

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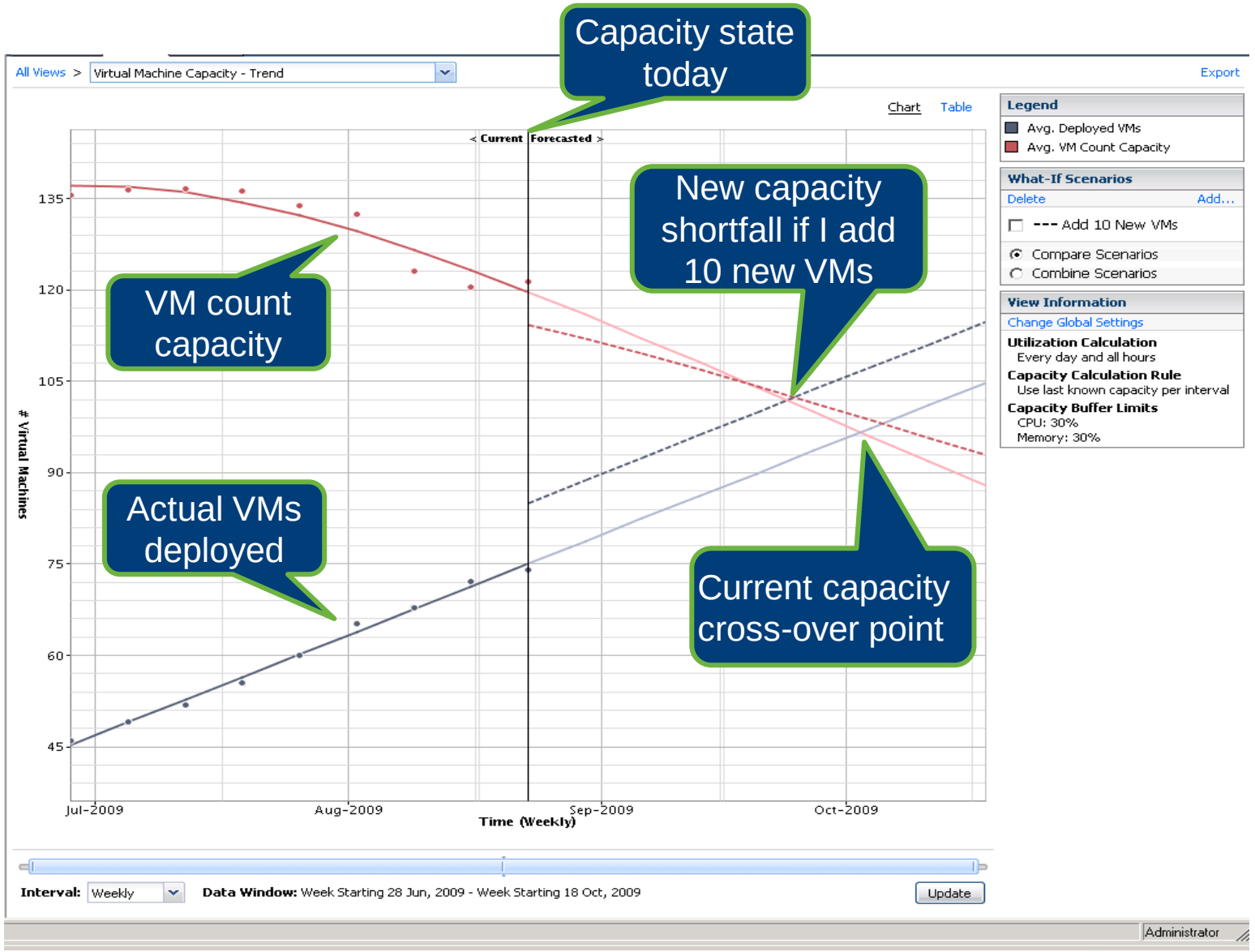
Capacity Planning: *Forecast* - "What-If" Analysis



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Capacity Planning: Major Badge – Efficiency

- **Are there optimization opportunities in my systems?**
  - Save $$$ by better utilizing resources
- **How to run a leaner datacenter**
- **High Efficiency is good (100-0)**
- **Graph Depicts VMs by Percent**
  - Optimal – Optimally Provisioned VMs
  - Waste – Over Provisioned VMs
  - Stress – Under Provisioned VMs
- **Efficiency Score calculated from Minor Badges**
  - Reclaimable Waste
  - Density

- **Three Resources Considered**
  - CPU
  - Memory
  - Disk Space

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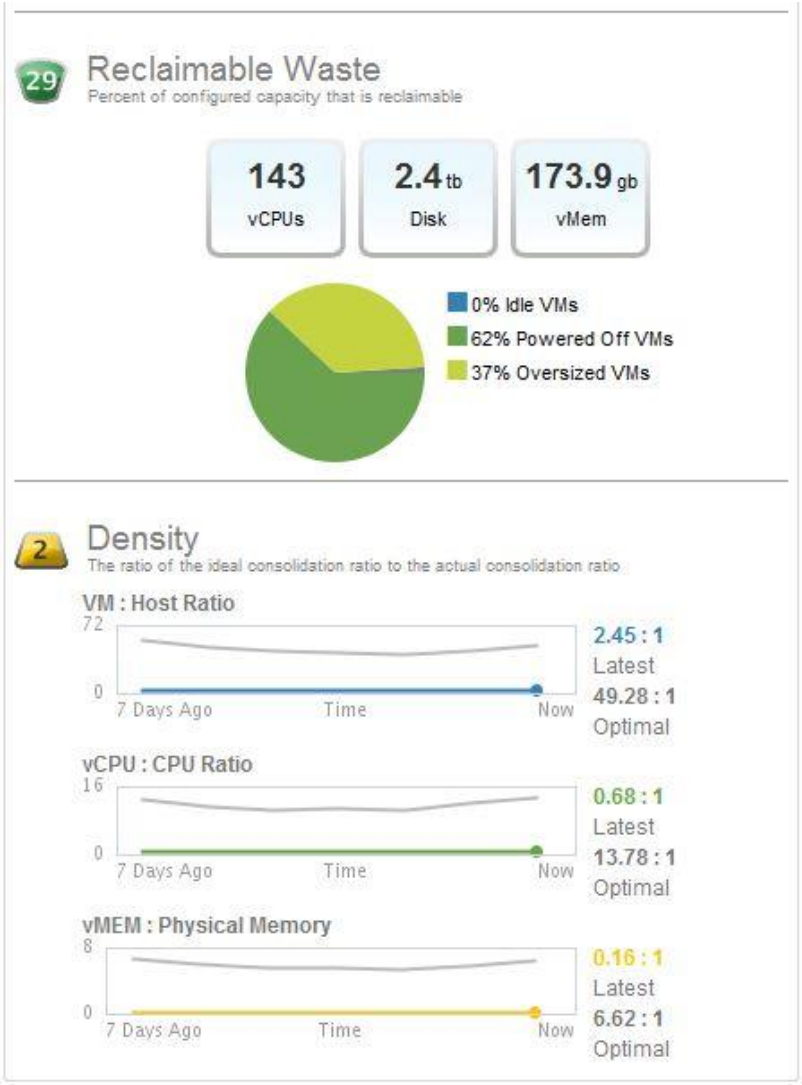
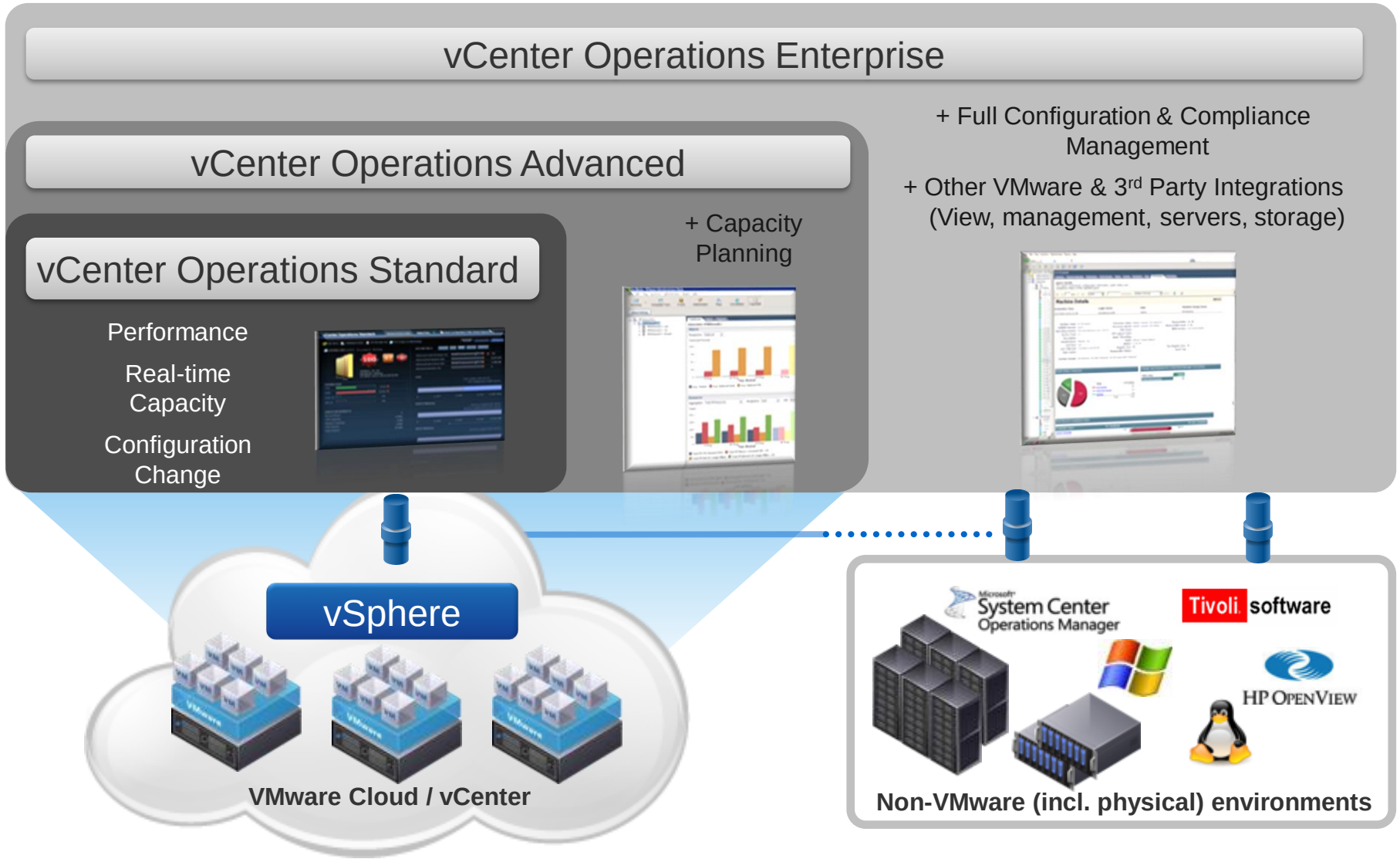
Sub-Badges - Optimization Opportunities

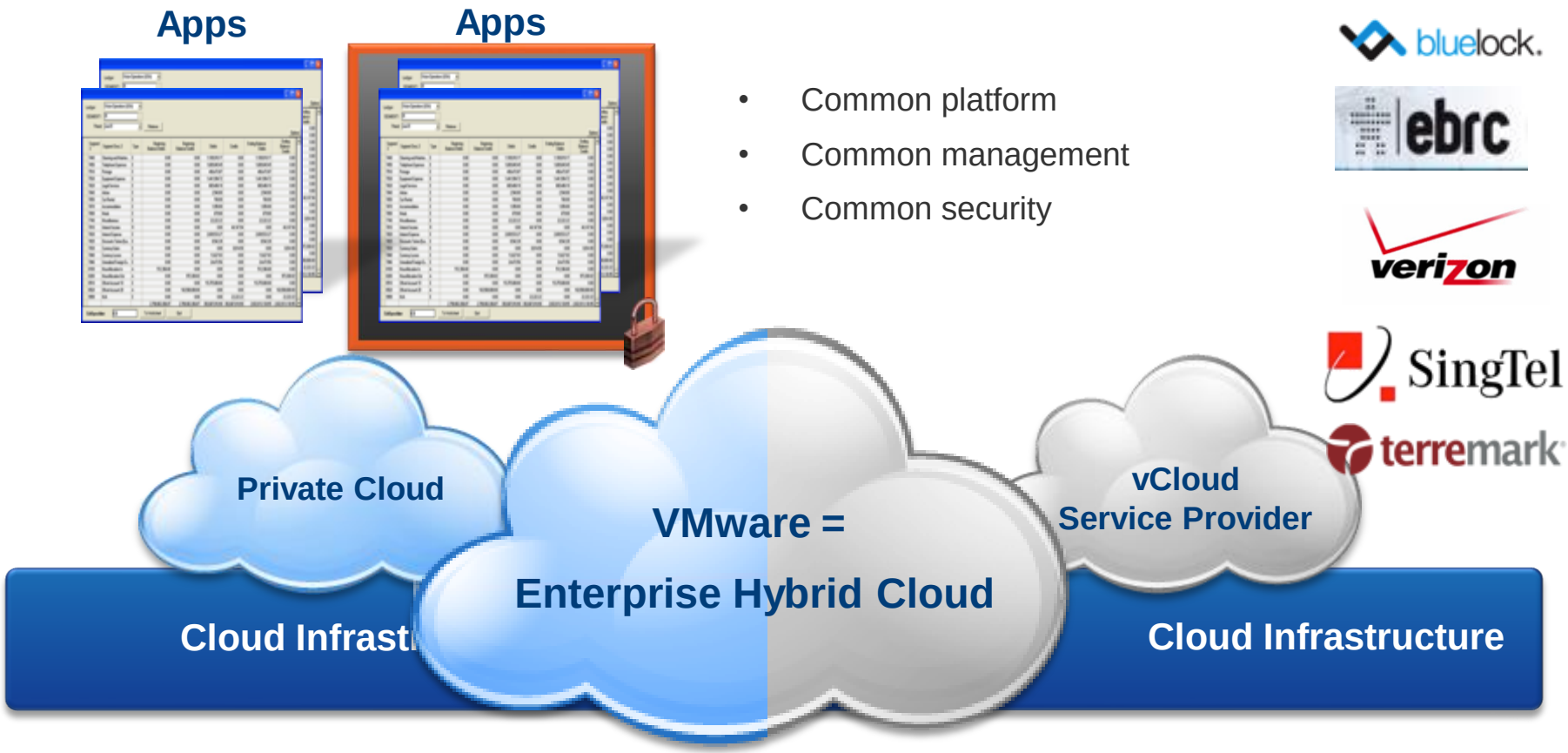


- **Reclaimable Waste: lists excessive resource allocation**
  - Identifies VMs with too many CPUs/vRAM and hosts with too few VMs
- **Density: computes the ideal consolidation ratio**
  - Computes optimal VMs per host to maximize resource utilization without sacrificing performance

VMware vCenter Operations Editions



Enterprise hybrid cloud computing

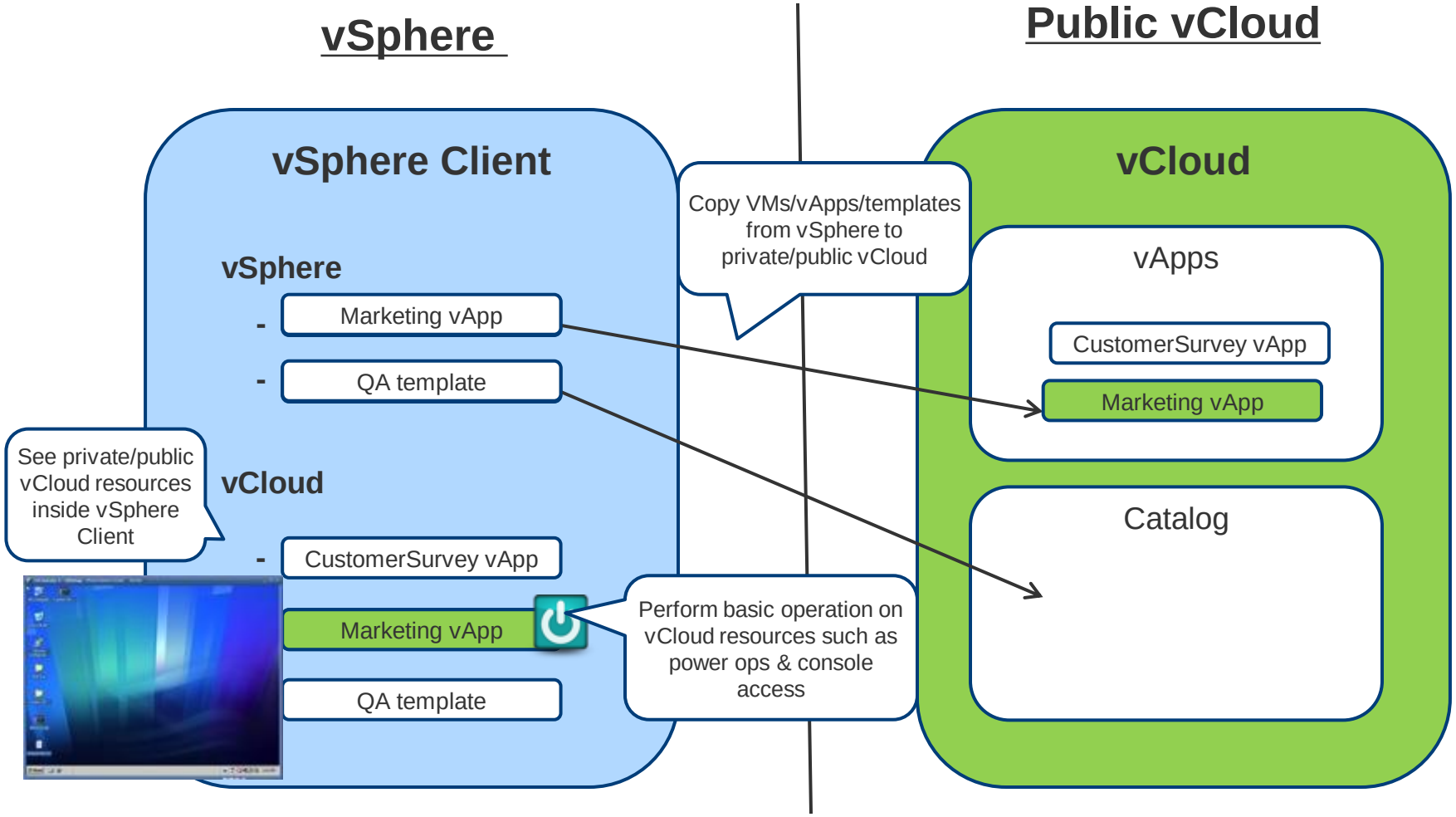


- Common platform
- Common management
- Common security

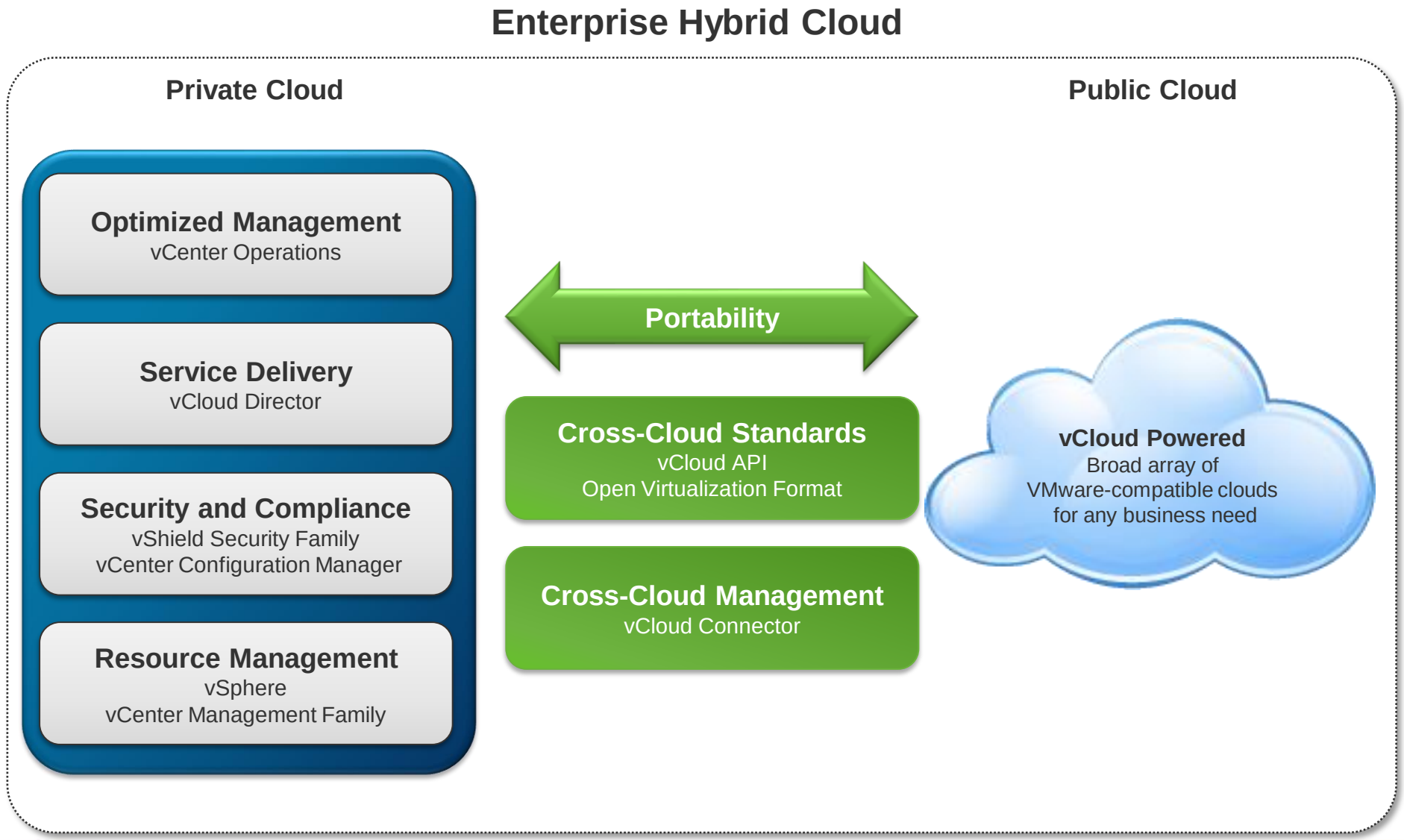
vmware vCLOUD POWERED
bluelock.
ebrc
verizon
SingTel
terremark

Cloud Computing Moves from a Technology Discussion to a Business Decision

vCloud Connector



VMware offers a robust set of product and solutions



Na próxima aula...

* Iniciaremos a Etapa 2