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Private Cloud Database Consolidation

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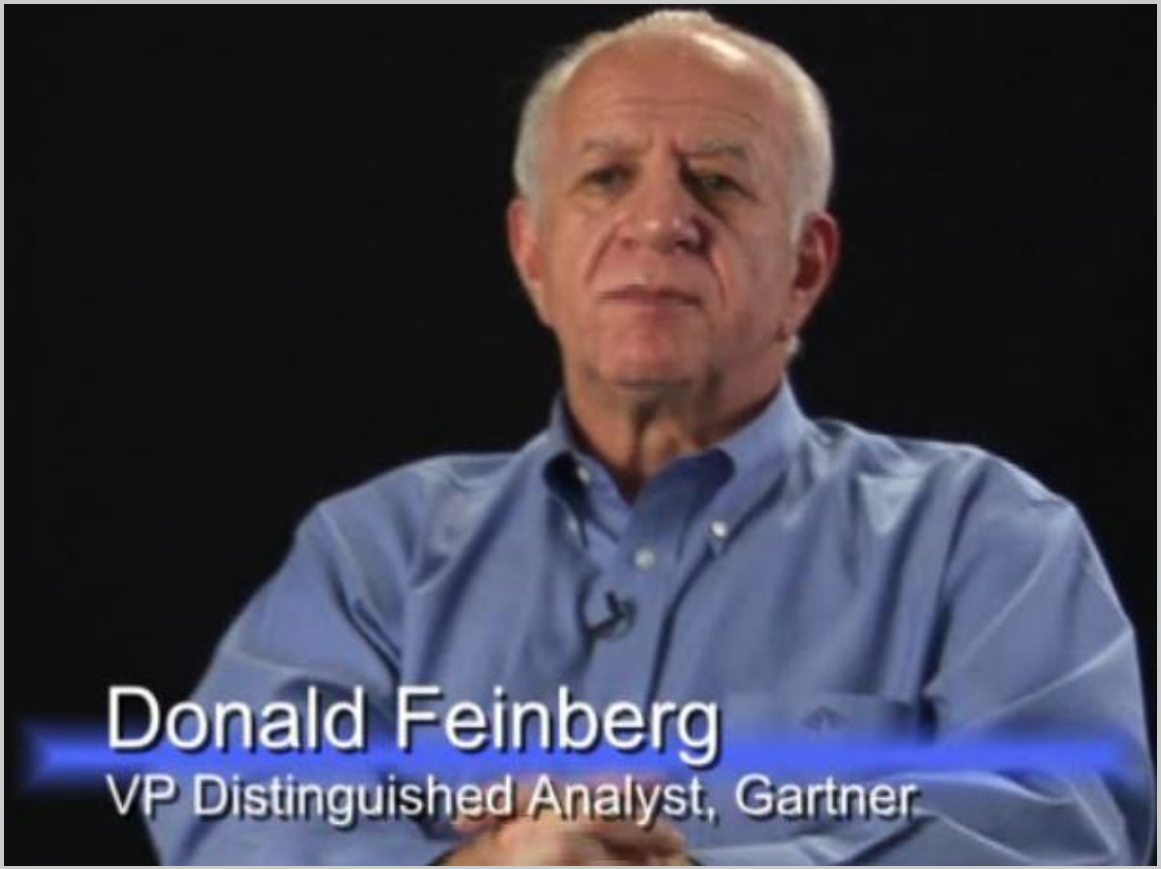
Agenda

- Cloud Introduction
- Business Drivers
- Cloud Architectures
- Enabling Technologies
- Service Level Expectations
- Customer Case Studies
- Conclusions

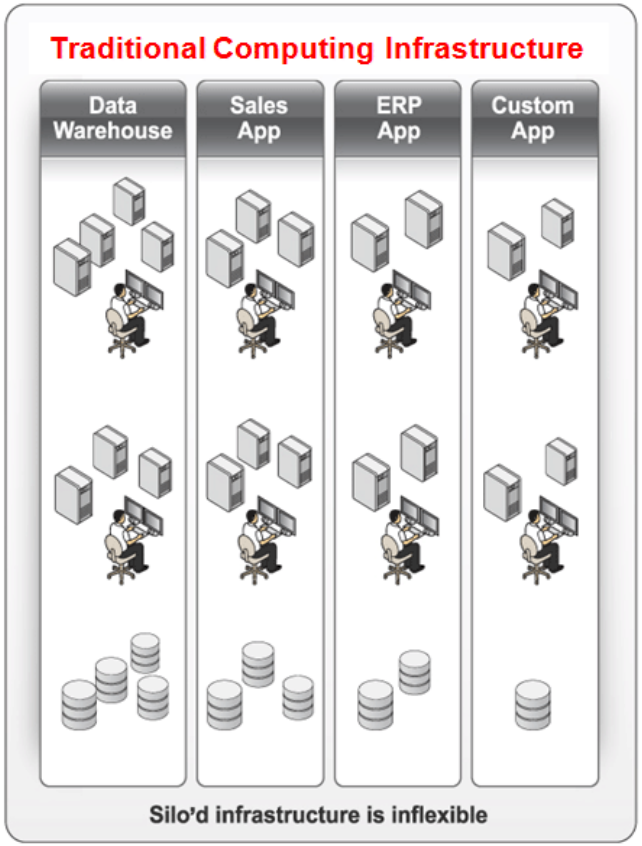
WHAT IS CLOUD COMPUTING ?

Benefits of Cloud Computing



Traditional Computing Environments

Silo's of hardware, storage, software & applications



- Sized for individual peak loads
  - Inefficient and expensive
- Meet changing business needs?
  - Inflexible and unresponsive
- Expensive to manage
  - Too many moving parts

NIST Definition of Cloud Computing v15

Cloud computing is a model for enabling **convenient**, **on-demand** network access to **a shared pool** of **configurable computing resources** (e.g., networks, servers, storage, applications, and services) that can be **rapidly provisioned** and released with **minimal management effort** or service provider interaction.

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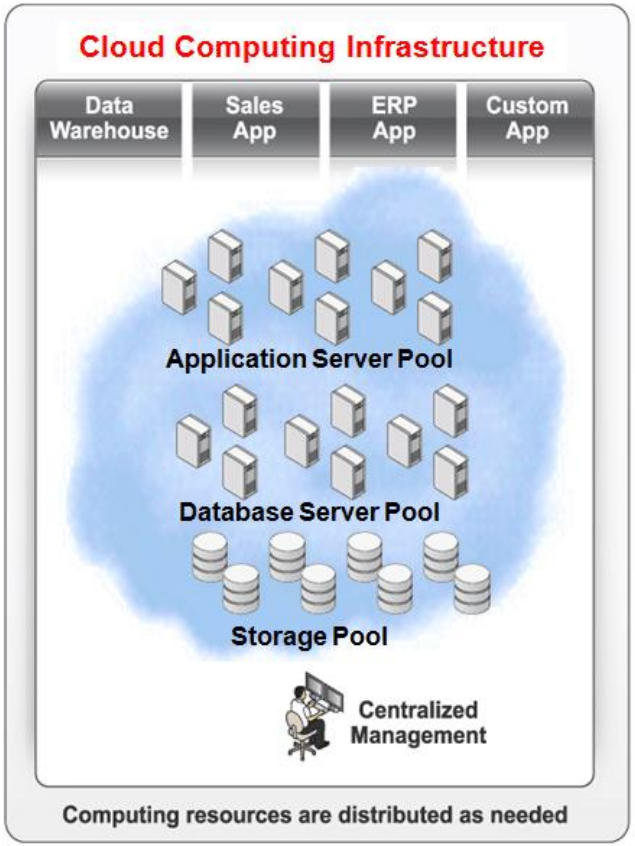
Cloud Computing Environments

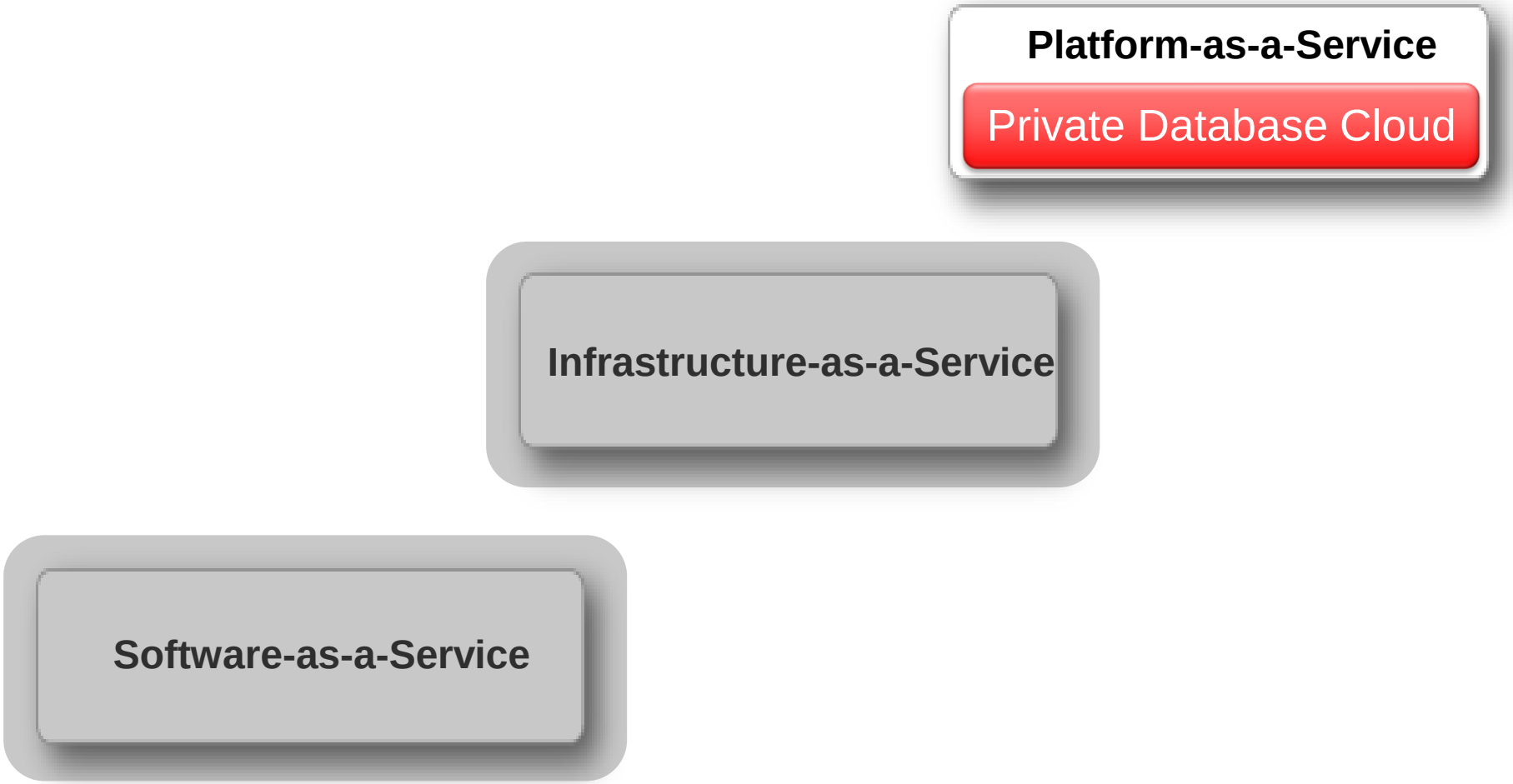
Reduced complexity & costs, higher quality of service

- Sized for Data Center
  - Resource pooling
  - High quality of service
- Meet changing business needs?
  - Elasticity on-demand
  - Rapid self service provisioning
- Easy to manage at lower cost
  - Fewer moving parts



So what is a Private Database Cloud ?

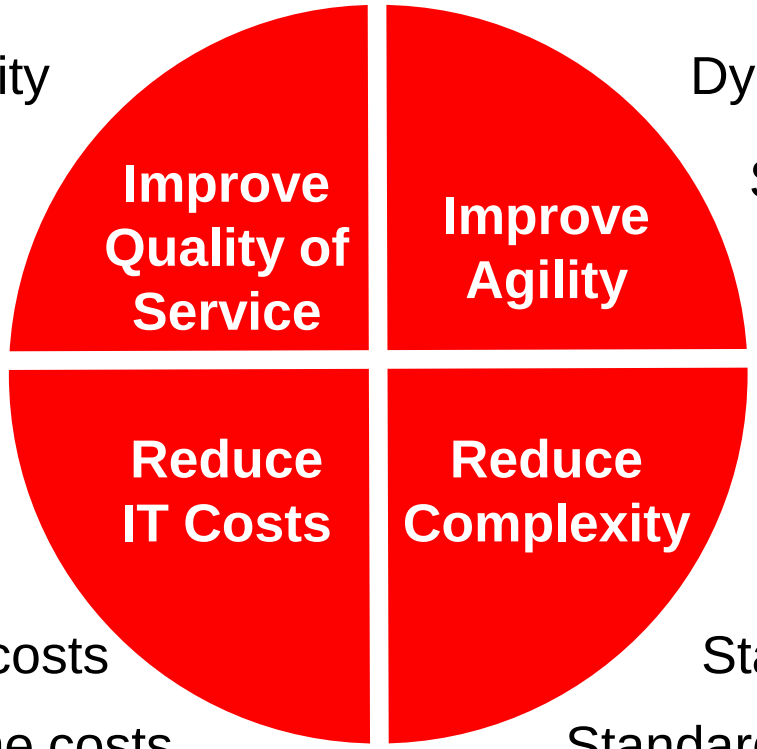
Databases on a Shared Deployment Platform



PRIVATE DATABASE CLOUD BUSINESS DRIVERS

Private Database Cloud

Business Drivers



Faster performance

Higher availability

Tighter security

Resource management

Dynamic services

Shared resources

Capital costs

Management costs

Downtime costs

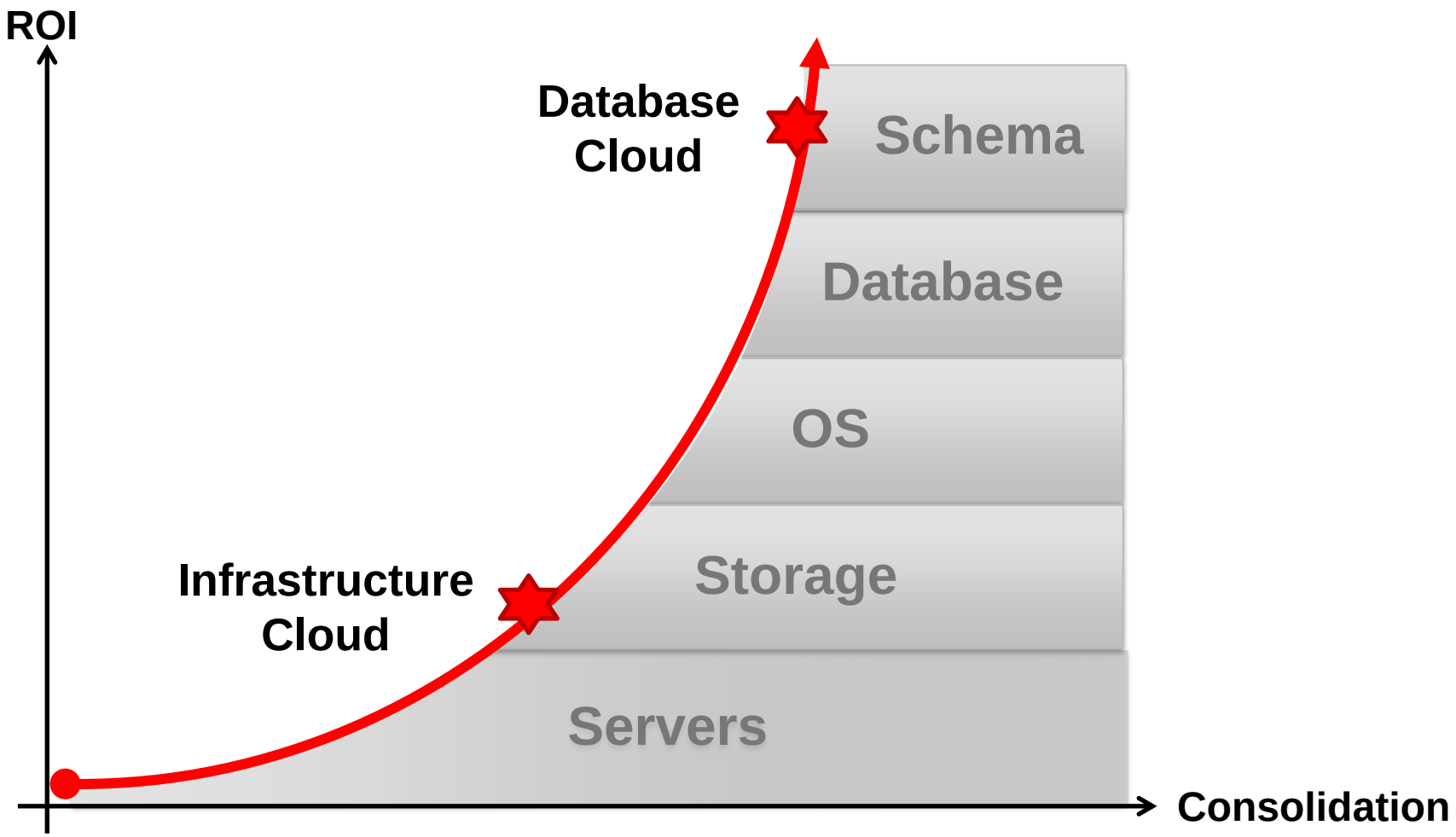
Fewer configurations

Standardize database

Standardize Operating System

Private Database Cloud

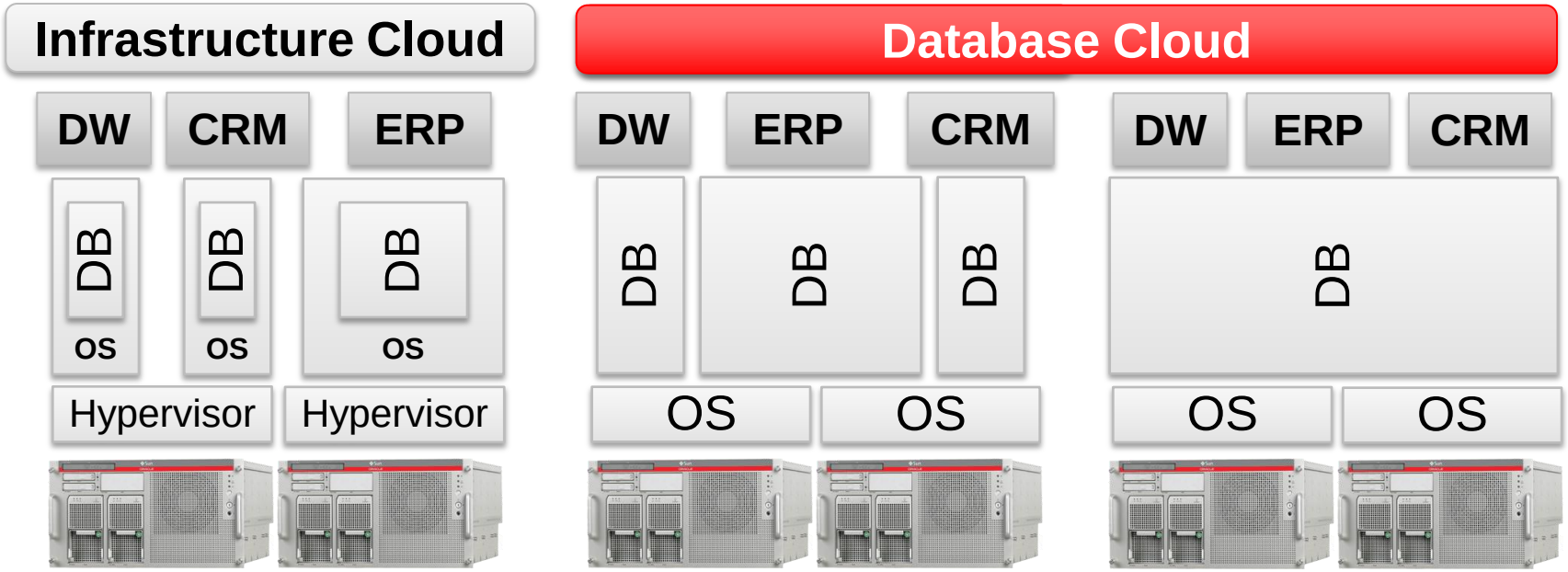
Greatest consolidation, maximum ROI



PRIVATE DATABASE CLOUD ARCHITECTURES

Database Cloud Architectures

Common building blocks are shared server and storage pools



Server
Deploy in dedicated VMs
Server virtualization

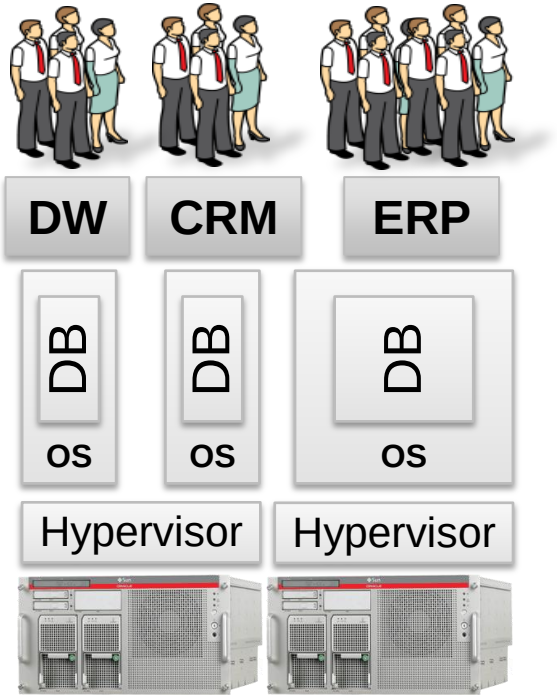
Operating System
Share server pool
Real Application Clusters

Database
Share database instances
Real Application Clusters

Infrastructure Cloud

Provision a Database in a VM

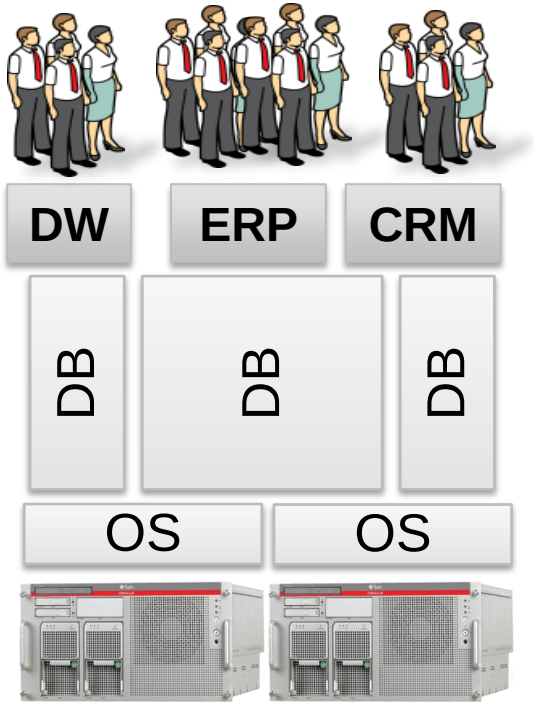
- Requires Hypervisor
  - Works with single & clustered servers
- Supports heterogeneous OS
  - Excellent isolation
- Low consolidation density
  - Server and storage only
- Performance issues
  - Hypervisor overhead
- Low ROI
  - But, simple to implement



Private Database Cloud

Provision Databases Natively

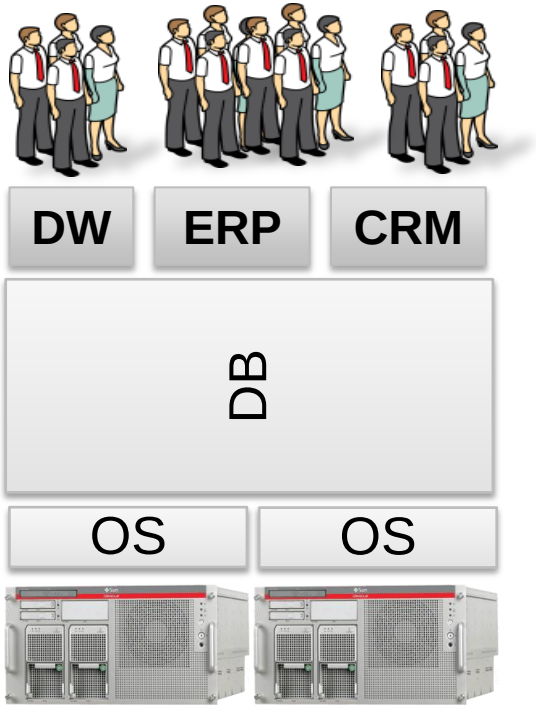
- Requires Real Application Clusters
  - Supports all Oracle applications
- Requires common OS
  - Linux, Unix, Windows
- High consolidation density
  - Servers, storage and OS
- Excellent performance
  - No hypervisor overhead
- High ROI
  - Especially using commodity hardware



Private Database Cloud

Provision a Schema to a Shared Database

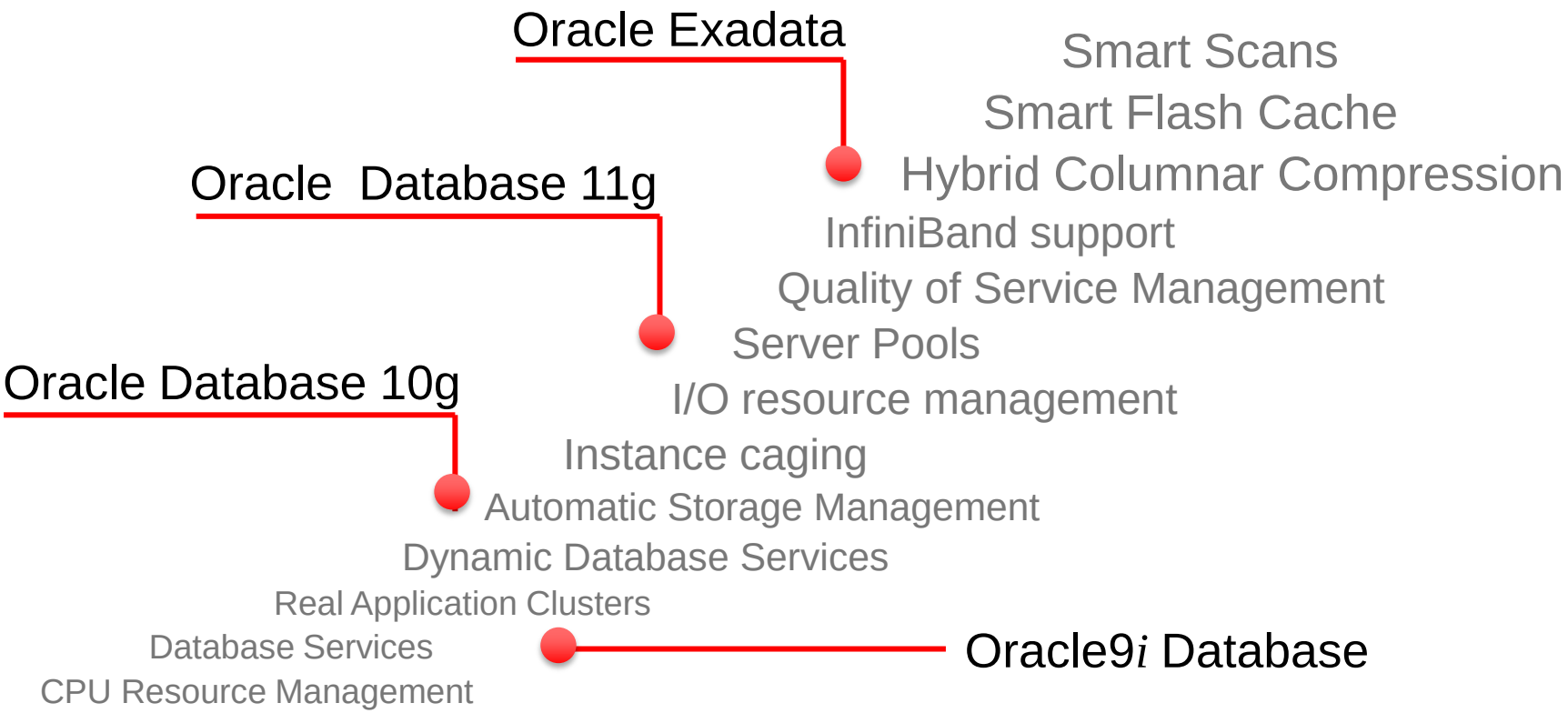
- Requires Real Application Clusters
  - Extremely fast provisioning
- Requires common OS
  - Least isolation
- Highest consolidation density
  - Servers, storage, OS, database
- Excellent performance
  - Fewest database instances
- Highest ROI
  - But, requires application validation



PRIVATE DATABASE CLOUD ENABLING TECHNOLOGIES

Enabling the Private Database Cloud

Years of continuous Oracle innovation



Private Database Cloud

Software Managed Server and Storage Pools

Enterprise Manager

Automatic Storage Management

Real Application Clusters

In-Memory Database Cache

Oracle Exadata Database Machine

Optimized for Private Cloud Consolidation

- Database Server Pool
  - Oracle Database 11g Release 2
  - Oracle Real Application Clusters
  - Automatic Storage Management
- Storage Server Pool
  - Up to 336 TB disk
  - 5 TB flash storage
  - Oracle Exadata Storage Software
- InfiniBand Network
  - 40 Gb/sec redundant switches

Standardized Configuration

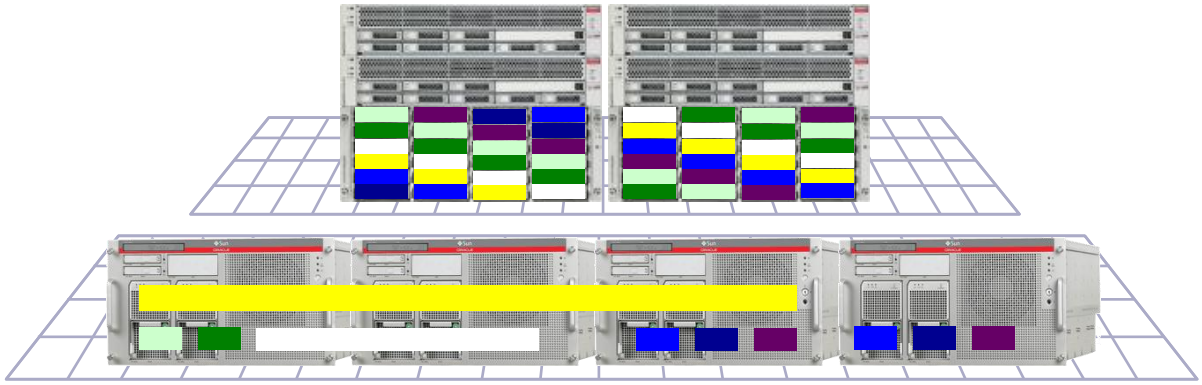
Deploy in days not months

- All Database Machines are the same
  - Delivered tested and ready-to-run
  - Highly optimized
  - Highly supportable
  - No unique configuration issues
- Runs existing OLTP and DW applications
  - Over 30 years of Oracle Database capabilities
  - No Exadata certification required
- Leverages Oracle ecosystem
  - Skills, knowledge base, people, partners

SERVICE LEVEL EXPECTATIONS ON PRIVATE CLOUDS

Workload and Resource Management

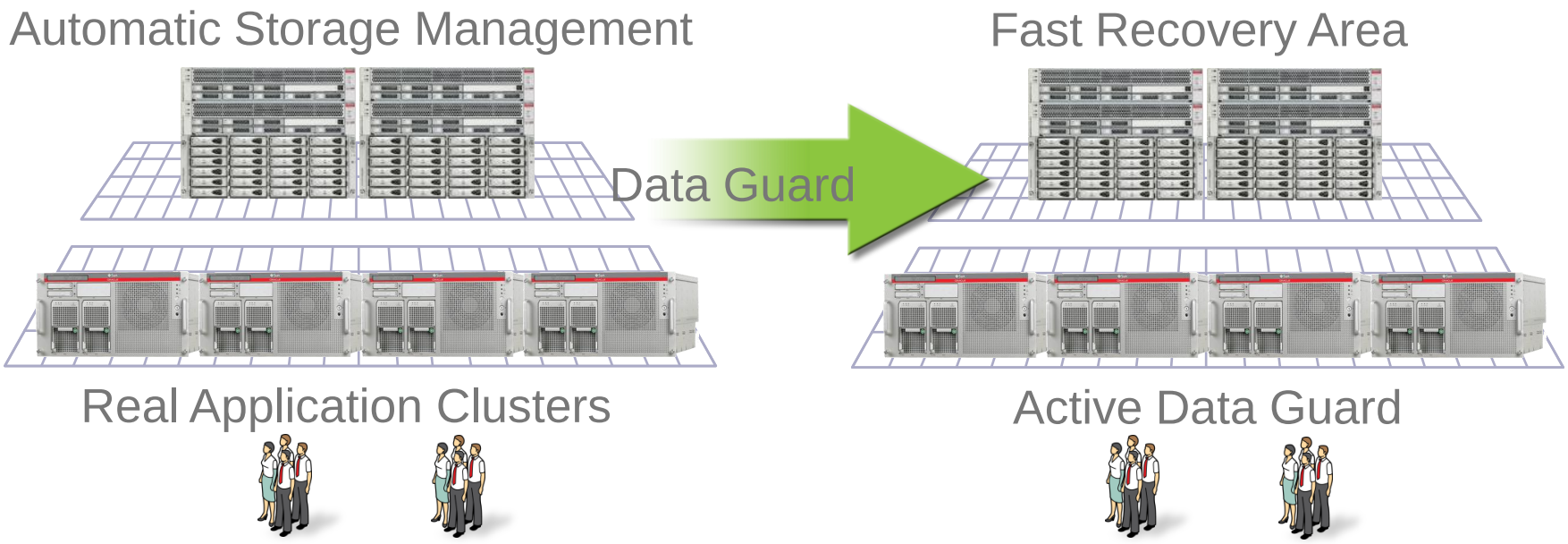
Databases run as Services across shared platform



- Resource Manager allocates CPU and Memory
  - Also I/O usage on Exadata
- Instance caging allocates cores per instance
- Capacity-on-demand for elastic cloud computing

Maximum Availability Architecture

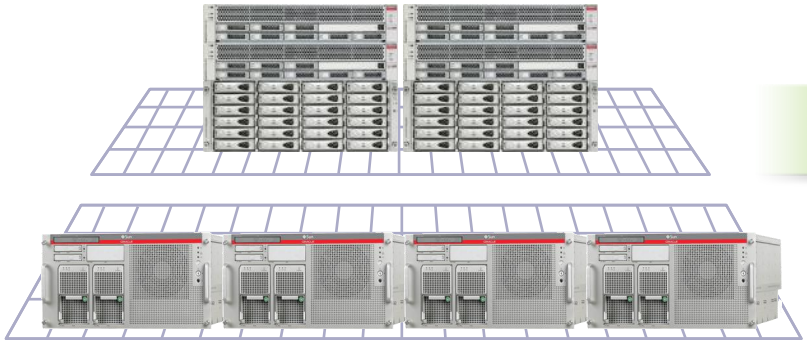
Fully utilizes all redundancy in Private Cloud



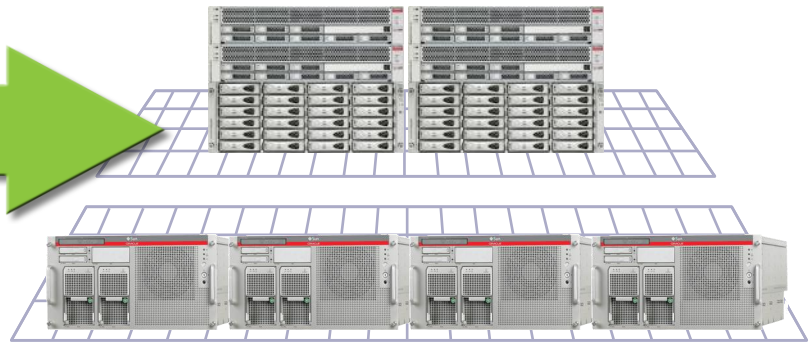
Oracle Maximum Availability Architecture

No planned downtime required for online maintenance

Undo Human Error
Add/Remove Nodes
Add/Remove Storage



Rolling Upgrades

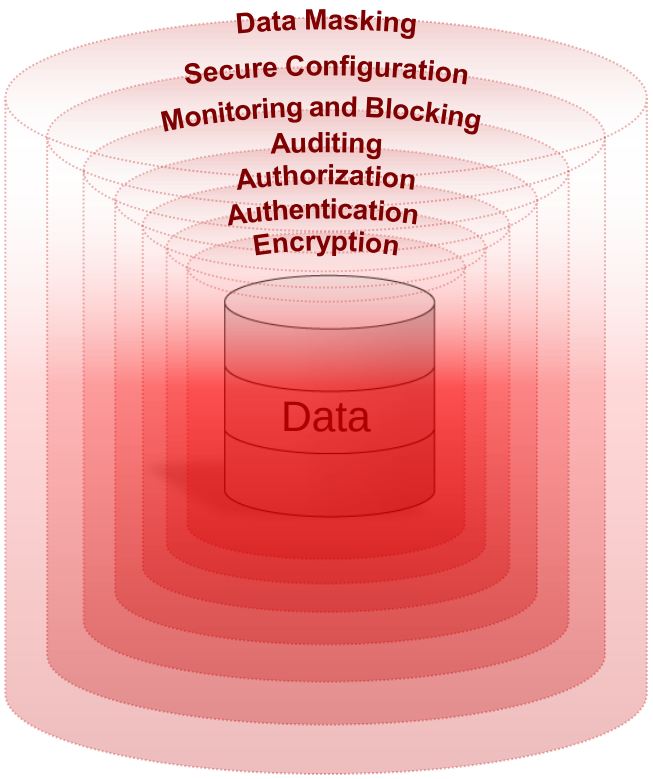


Online Application Upgrade
Table & Index Redefinition
Rolling Patches and PSUs

Automated Upgrade Testing

Oracle Database 11g

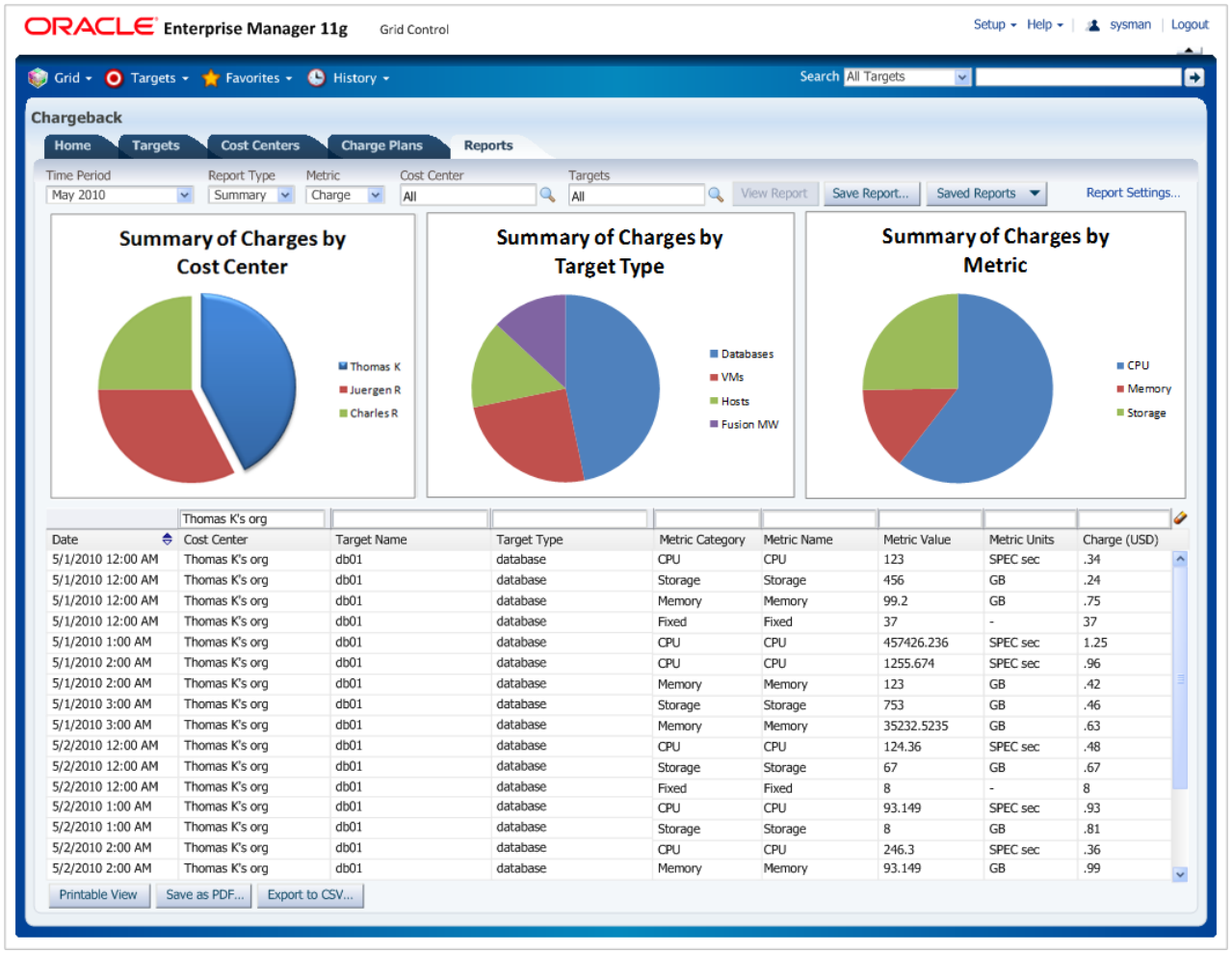
Complete Data Security



- Oracle Advanced Security
- Oracle Identity Management
- Oracle Database Vault & Label Security
- Oracle Audit Vault & Total Recall
- Oracle Database Firewall
- Oracle Configuration Management
- Oracle Data Masking

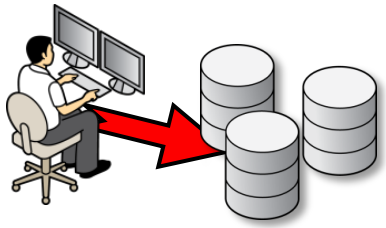
Monitoring, Metering and Chargeback

Share costs across user groups



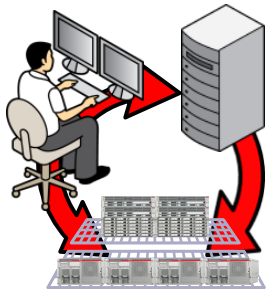
Provisioning Software to the Cloud

Lower complexity via Reference Configurations

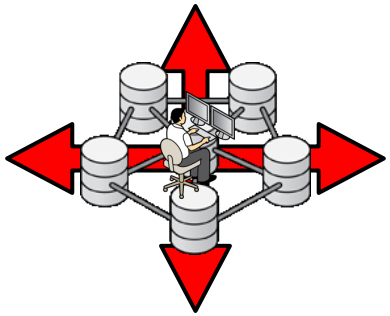


Create Reference Configuration

Stage As Gold Image



Provision Database On Cloud



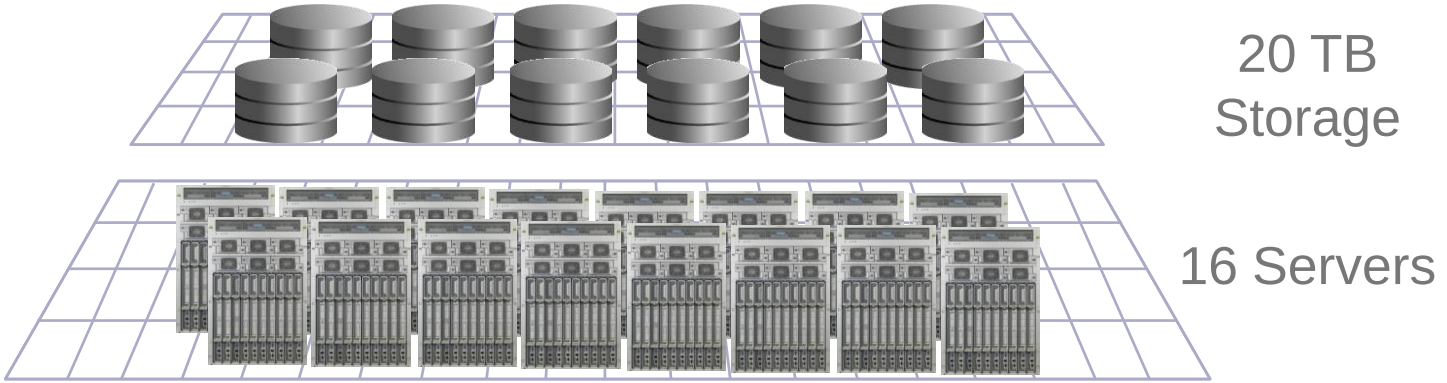
Manage Centrally

- Gold image reference configurations
- Standardized deployments via profiles
- Rapidly provision databases to the Cloud
- Monitor change centrally to ensure compliance

CUSTOMER CASE STUDIES

Dell IT

Consolidated 450 Databases onto 3 Private Clouds



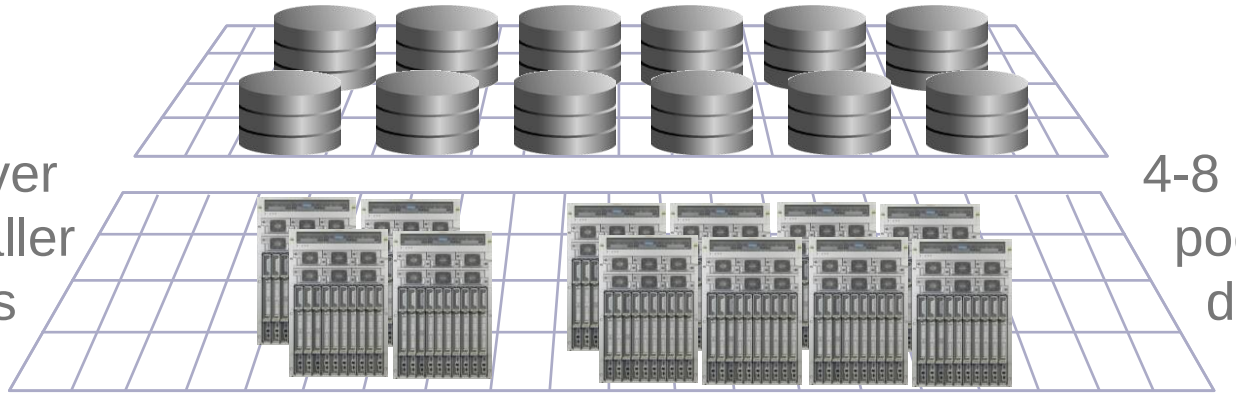
Up to 150 databases per server pool

- P & L break even in 19 months
- Saved $3.3M from labor productivity and cost avoidance
- 50% faster delivery of BI to decision makers
- Time-to-wire reduced from 8 weeks to 2 days

FedEx Services

Re-hosted 400 Databases onto Private Cloud

4-node server pool for smaller databases



4-8 node server pool for large databases

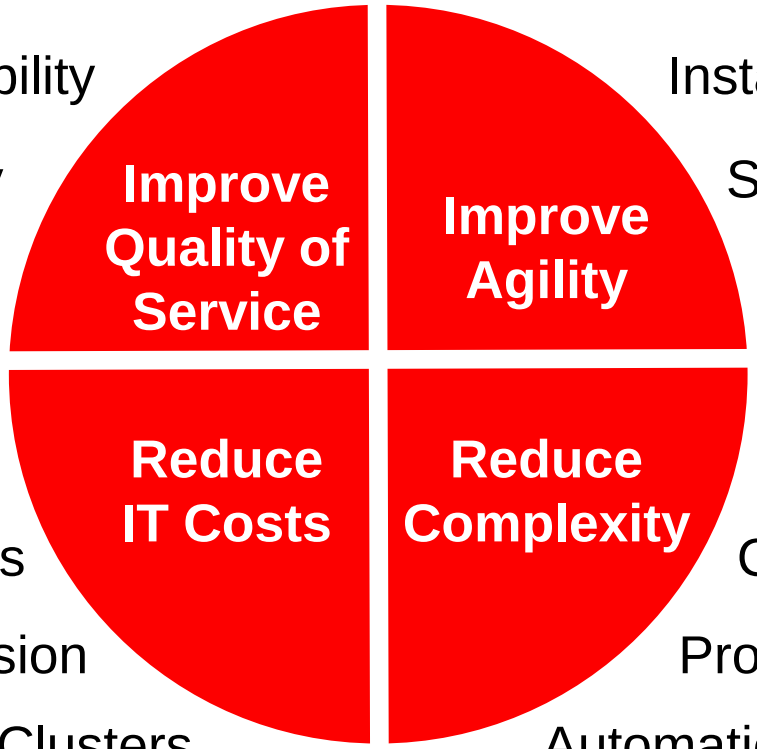
- Scale out workloads by adding nodes to server pools
- Economies of scale consolidating small database schemas
- Standardization provides better service at lower cost
- 90% of OLTP workload leverages dynamic infrastructure

Oracle Exadata for Consolidation

Conclusions

Private Database Cloud

Oracle Technology Enables Private Database Clouds



Extreme performance

Maximum availability

Database security

Workload management

Instance caging

Server pools

Diag & Tuning Packs

Advanced Compression

Real Application Clusters

Configuration Pack

Provisioning Pack

Automatic Storage Management

Cloud Architectural Assessment

Pick the architecture that best suits your needs

Business Value	Server Consolidation	OS Consolidation	Database Consolidation
Implementation	Easy	Easy	Difficult*
Application Suitability	Some	All	Some
Isolation	Highest	High	Limited
Availability	High	Highest	Highest
Scalability	Limited	Excellent	Excellent
Consolidation Density	Low	High	Highest
ROI	Low	High	Highest

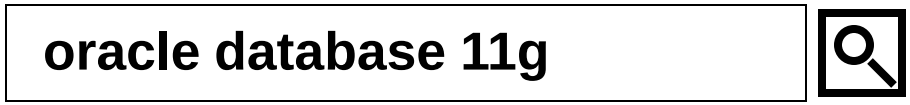
*** = Need to ensure application schemas can co-exist**

Private Cloud Database Consolidation

- Oracle enables all levels of consolidation
  - Infrastructure, OS, Database
- The higher the consolidation density
  - The greater the return on investment
- Oracle Exadata Database Machine
  - Ideal Private Cloud consolidation platform
  - Fastest time-to-market
- Customers already saving with consolidation

For More Information

http://search.oracle.com



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Hardware and Software
Engineered to Work Together