

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

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# Dynamische Infrastrukturen mit SPARC und Oracle Solaris

Detlef Drewanz

Master Principal Sales Consultant



# Agenda

- SPARC Server, Engineered Systems and Oracle Solaris
- Flexible Virtualization with Solaris Zones and LDOMs
- Positioning Zones and LDOMs
- Oracle Virtual Networking

# Investment in Core Technology



PROCESSORS

- SPARC microprocessors are the fastest in the world, and continue to lead the industry into the multi-core era



SOFTWARE

- Oracle Solaris is the leading enterprise cloud OS, many years ahead in scalability and reliability



BANDWIDTH

- SPARC servers reach incredible scale inside the server, or outside, through leading-edge InfiniBand technology



SYSTEMS

- Oracle's portfolio today has the performance and price / performance advantage, and offers breakthrough virtualization for business critical applications

# Oracle SPARC Portfolio

## 2012 T-Series

- High Performance
- Big Data
- Great Application Consolidation



### SPARC T4-1B

8-cores T4-1B /  
512GB Memory



### SPARC T4-1

8-cores @ 2.85GHz  
512GB Memory



### SPARC T4-2

16-cores @ 2.85GHz  
1TB Memory



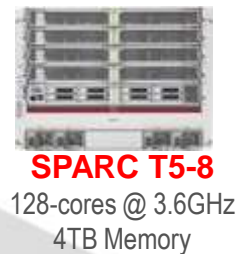
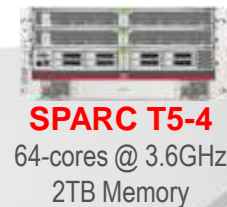
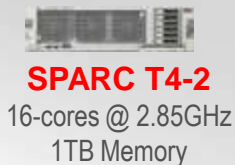
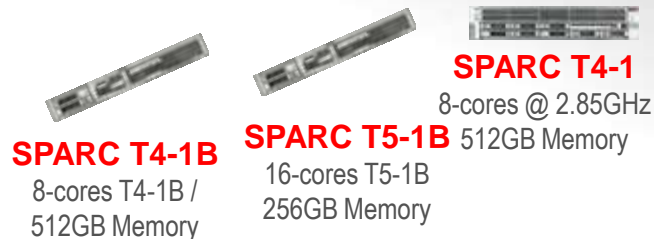
### SPARC T4-4

32-cores @ 3GHz  
2TB Memory

# Oracle SPARC Portfolio

## 2013 T-Series

- Higher Performance
- Bigger Data
- Greater Application Consolidation



# Oracle SPARC Portfolio

Foundation for Mission Critical Computing

## Enterprise Servers

*Designed for best-in-class  
performance, reliability,  
availability & security*



**SPARC  
M6-32**

384-cores  
@ 3.6GHz  
32TB Memory



**SPARC T5-8**

128-cores @ 3.6GHz  
4TB Memory



**SPARC T5-4**

64-cores @ 3.6GHz  
2TB Memory



**SPARC T4-4**

32-cores @ 3GHz  
2TB Memory



**SPARC T5-2**

32-cores @ 3.6GHz  
512GB Memory



**SPARC T4-2**

16-cores @ 2.85GHz  
1TB Memory



**SPARC T4-1**

8-cores @ 2.85GHz  
512GB Memory



**SPARC T5-1B**

16-cores T5-1B  
256GB Memory



**SPARC T4-1B**

8-cores T4-1B /  
512GB Memory

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# SPARC Server Portfolio

Foundation for Mission Critical Computing

## Enterprise Servers

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256GB Memory



**SPARC T4-1B**  
8-cores T4-1B /  
512GB Memory



**NEW FUJITSU  
M10-1**



**NEW FUJITSU  
M10-4**



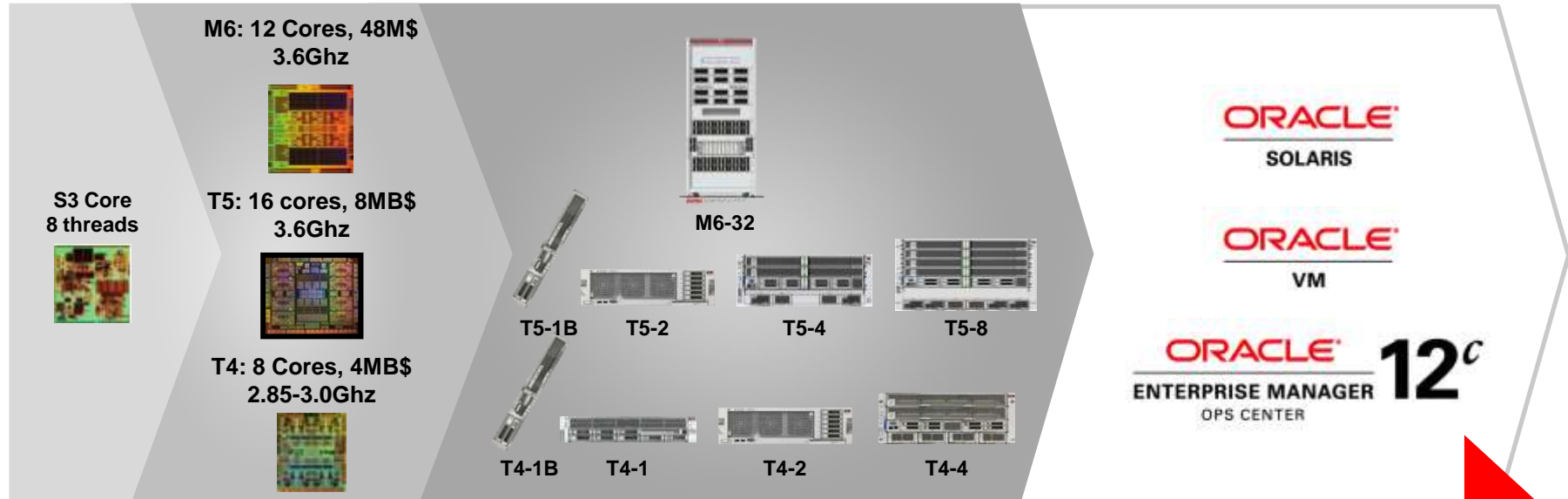
**NEW FUJITSU  
M10-4S**

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# Oracle Systems Execution Strategy

Focused and Leveraged: Building a Complete Portfolio



SINGLE  
INNOVATIVE  
CORE

HIGH  
PERFORMANCE  
PROCESSORS

HIGHLY RELIABLE AND  
SCALABLE SYSTEMS

THE MOST RELIABLE,  
SCALABLE AND SECURE  
OPERATING ENVIRONMENT

INTEGRATED, TESTED, AND OPTIMIZED FOR ORACLE ENTERPRISE SOFTWARE

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# Oracle's Engineered Systems Portfolio

## Leadership in the converged infrastructure market



**Exadata**



**Exalogic**



**Big Data Appliance**



**SuperCluster**



**Oracle Virtual  
Compute Appliance**



**Database Appliance**



**Exalytics**



# Oracle SuperCluster

Best for Oracle. Runs Your Existing Workloads

## SPARC T5 Compute Pool

17 World Records over IBM and HP  
across every tier

## Exadata Storage Servers

750K IOPS, 32 GB/s query  
throughput

## Exalogic Elastic Cloud

10x Java performance

## Integrated ZFS Storage

2x faster and 2x better price  
performance than NetApp

## Oracle Solaris 11

Cloud provisioning in seconds  
Unmatched Scalability

## Virtualization

Oracle VM Server for SPARC  
No cost and zero overhead

## InfiniBand

5-8x the speed of current networks

## Enterprise Manager

Single pane of glass to monitor  
and manage entire system



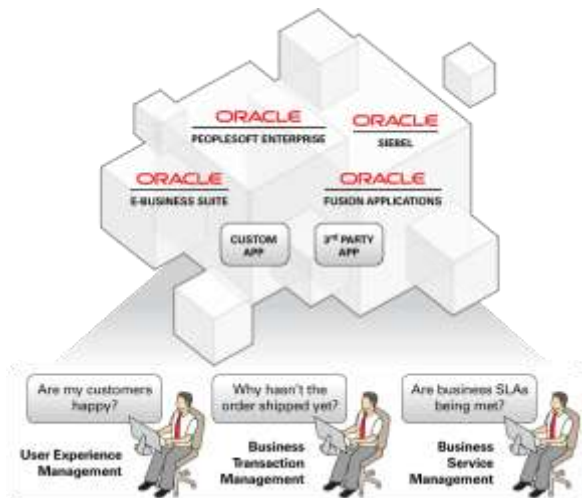
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# Oracle Solaris 11

Best UNIX™ for  
Oracle Deployments



Built for Cloud  
Infrastructures

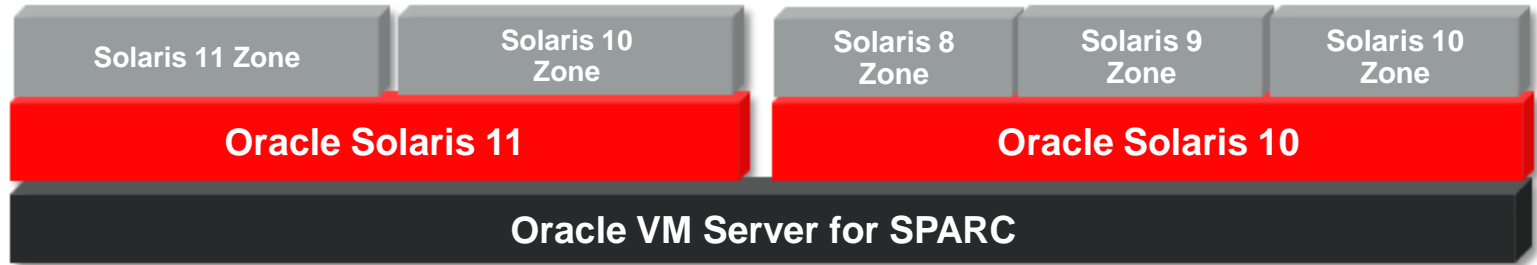


#1 UNIX™ for  
Enterprise Applications



# SPARC Solaris Investment Protection

Safe, Easy Consolidation On SPARC T5 and SPARC T4 Servers

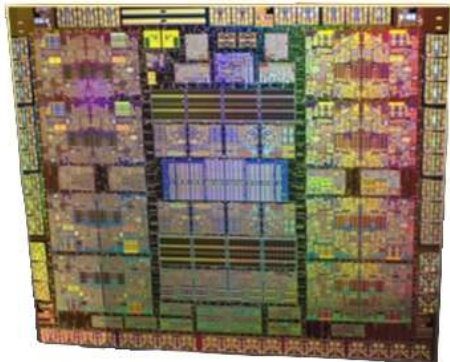


- Preserve existing investment
  - Move older Oracle Solaris environments forward
  - P2V and V2V tools make it easy
- Applications since 1997 guaranteed to work
  - Plus source code compatibility for developers



# SPARC and Oracle Solaris

## Co-Engineered for Breakthrough Capabilities



- Oracle Solaris Cluster for ultimate global resiliency  
low latency interconnects
- M5-32: 32 6-core M5 CPUs, 48MB L3 cache, 32 TB memory, 64 I/O slots
- Glueless 8 socket design, Petabyte-scale memory, 1,000+ cores/, 10,000 threads, 256 zettabyte file system, 500+ concurrent VMs, 8,000\_+ concurrent zones,
- **Software in Silicon:** encryption, database, Java acceleration
- 1000 GB/sec bandwidth to handle massive virtualization workloads.  
Secure live migration, dynamic resource management
- Power-aware dispatcher, co-operative ILOM control, Dynamic Voltage and Frequency Scaling
- Thread and CPU prioritization, directory-based cache coherency
- Single-Root I/O Virtualization: Virtualize peripheral cards for best flexibility *and* highest performance



# **ORACLE DEPLOYMENTS RUN BEST ON ORACLE SOLARIS AND SPARC**

# Critical Threads for key applications

	Applicability	Opportunity	Current Status
Database	Logwriter, LMS	Up to 30% improvement in efficiency	LMS is already CT ready. LGWR planned for 12c
JAVA (JVM)	Compiler threads, GC and priority mapping support	Up to 2x improvement for app startup, Smooth GC	Support for JVM and JAVA apps to be CT aware is integrated in JDK7U4
Coherence	Packet writer, service thread	Up to 20% improvement in throughput	Integrated in Coherence version 3.7.1 Patch 1
Solaris	S11U1 / S10U11	Improve CT perf to be within 10% of best case (hand optimized)	Optimizations for decayed PG util and stealing being integrated in S11U1



# Why Customers Choose SPARC Solaris

## Top Reasons for Investing in Oracle SPARC Solaris Systems

**1**

### Reliability

SPARC Systems have  
the best uptime

**2**

### Performance

Proven in application benchmarks

**3**

### Roadmap

Exciting path to future  
performance gains

# Virtualize with Oracle

SPARC Hypervisors

OS Virtualization

## Oracle VM for SPARC

- Up to 128 Virtual Systems
- Live Migration
- Built-in, no cost
- Multiple OSs
- P2V Enhancements
- Dynamic, Low-overhead
- Cloning and quick deployment
- P2V

## Oracle Virtualization

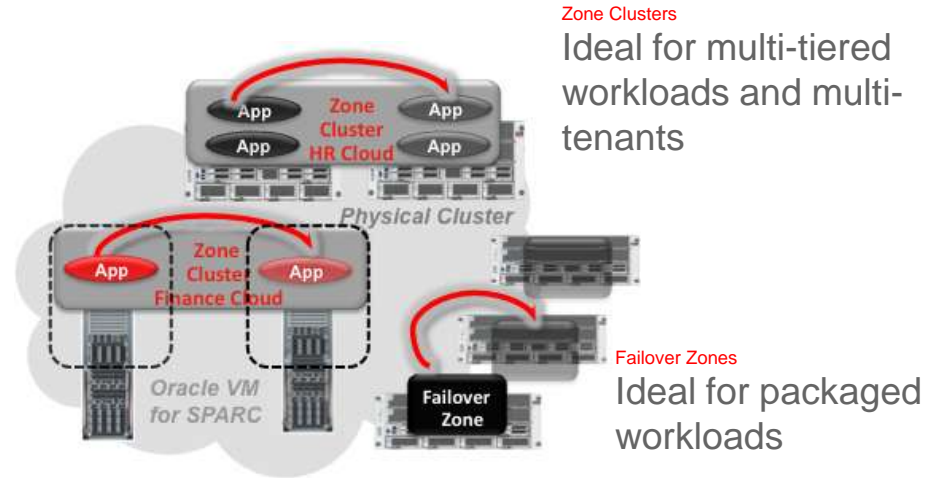
## Solaris Zones

- Thousands of zones
- Solaris Resource Manager
- Solaris 8 and 9 Containers
- Solaris 10 and 11 Zones
- Built-in, no cost
- Dynamic, Low-overhead
- Cloning and quick deployment
- P2V

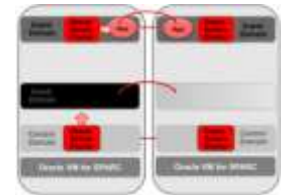
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# Oracle Solaris Cluster Virtualization

- Deep Protection in Clouds
- Security isolation
- Application fault isolation
- Resource Management
- Dedicated cluster model



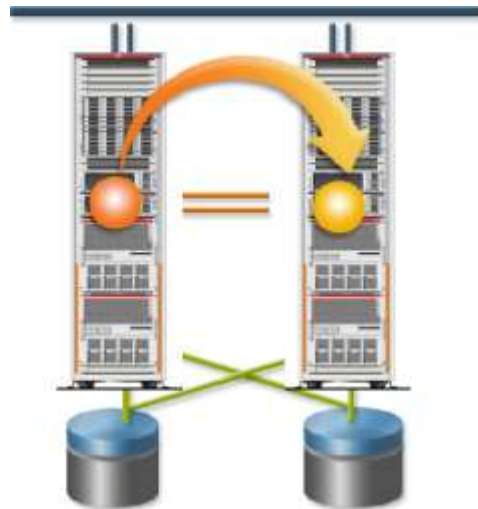
- Domain as cluster node
- Guest Domain as HA resource



# Faster Failure Detection and Services Recovery

## Robust High Availability Infrastructure

- Unrivaed High Availability
- Faster failure notification
- Faster reconfiguration
- Faster application failover
- Faster services recovery



- Monitor health of all cluster components
- Tolerates any failure
- Recovers infrastructure and applications

# Mission Critical Virtualization

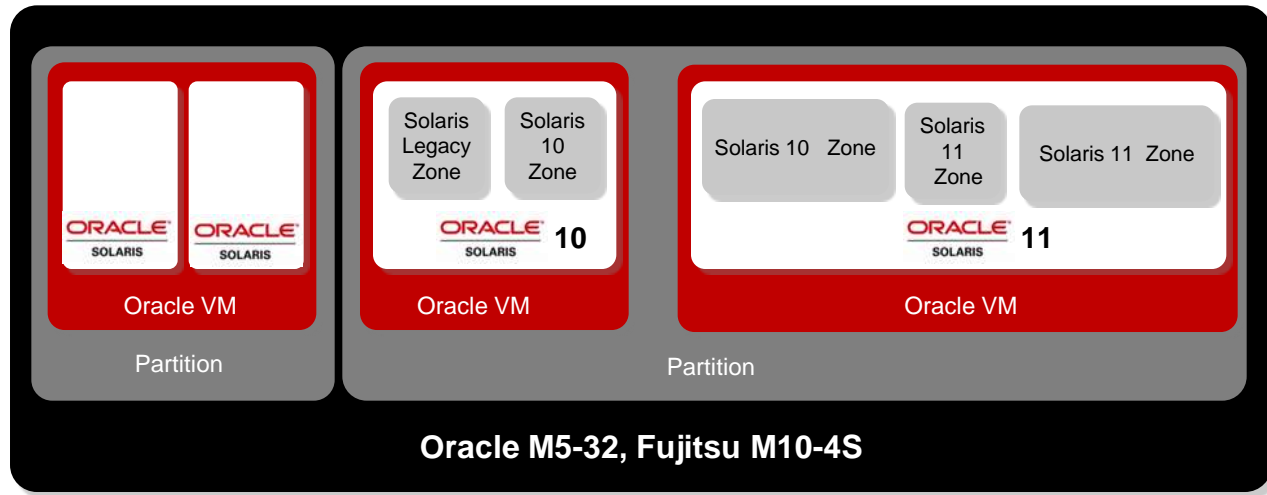
Virtualize in both Hardware and Software

## Physically Protect from

- Hardware failure
- Hypervisor failure
- OS failure
- Application failure

## Maximize Utilization

- Applications
- Business users
- Test and production environments

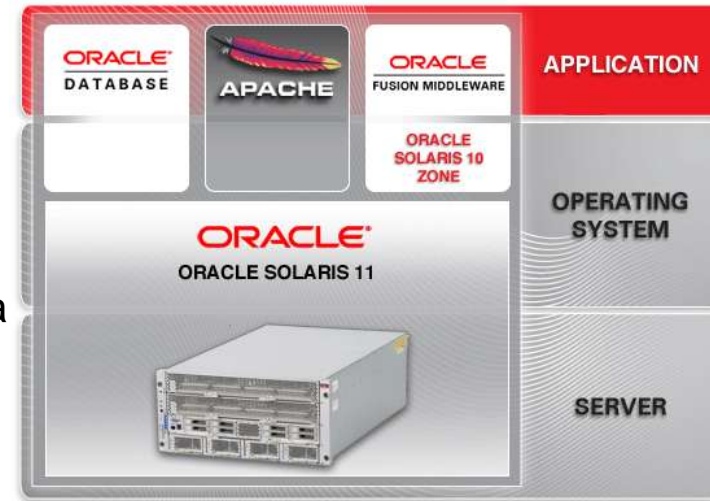


Only Oracle Provides This Level of Protection

# Oracle Solaris Zones

## Built-in Virtualization on Any Oracle Solaris System

- Same virtualization technology for all SPARC, x86 systems
- Simple; lowest overhead; highest performance, secure
- Mission-critical deployments
- Ideal for a variety of scenarios
  - Lightweight test environments
  - Dynamic environments with resource sharing
  - Workload Consolidation
  - Rapid prototyping test beds on same hardware as
  - Zones cloning/migration/instant restart



# Zones on Shared Storage (ZOSS)

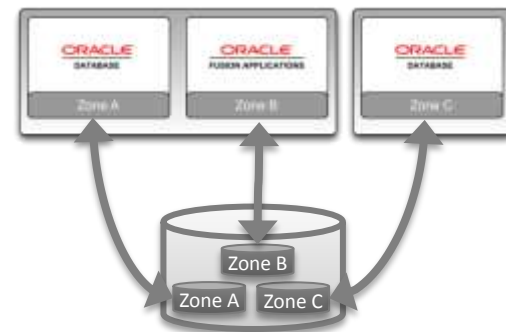
Place zones on shared storage with ease

- Move zones around between systems quickly with shared storage
- Eliminate configuration errors with less commands
- Still benefit from ZFS

Zones framework automatically manages

- Configuration/un-configuration of storage services
- Attach/detach of storage devices
- zpool creation, import, export
- For SAN and iSCSI

- Use a single interface to setup
- 66% shorter command sequence to migrate



# Secure Multiversion Database Multitenancy

## For Database Consolidation and Database Clouds

- Multiple versions of Database on same server
  - No impact on Performance
  - High-density Consolidation
  - Multitenant Isolation and security level options
  - Highly available clustered Zones



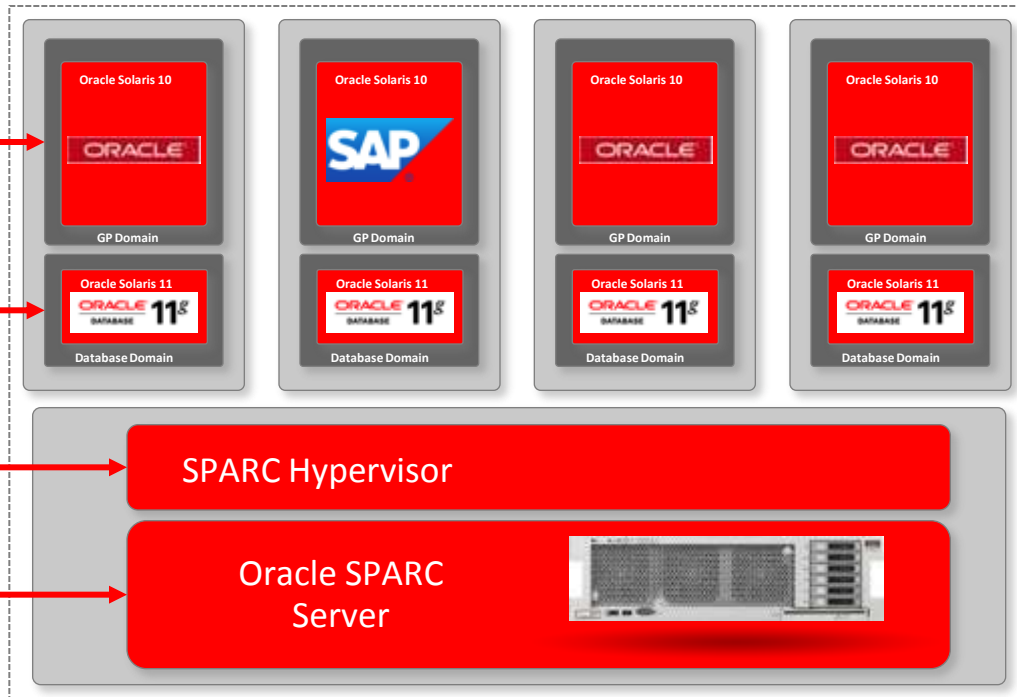


# Oracle VM Server for SPARC

The Virtualization Platform combining the best of Oracle Solaris and SPARC for Your Enterprise Server Workloads



Isolated OS and applications in each logical (or virtual) domain

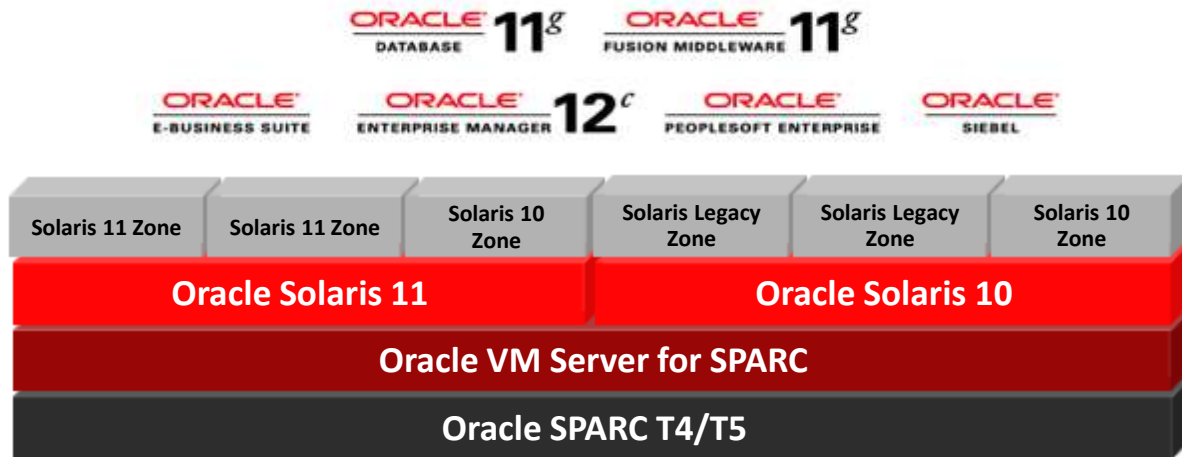
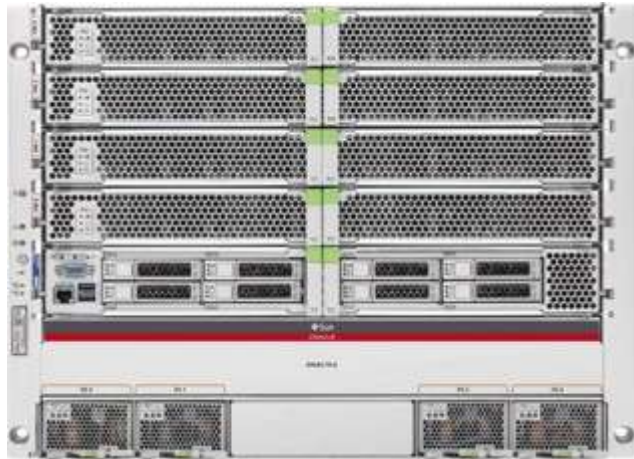


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# Roles of Domains

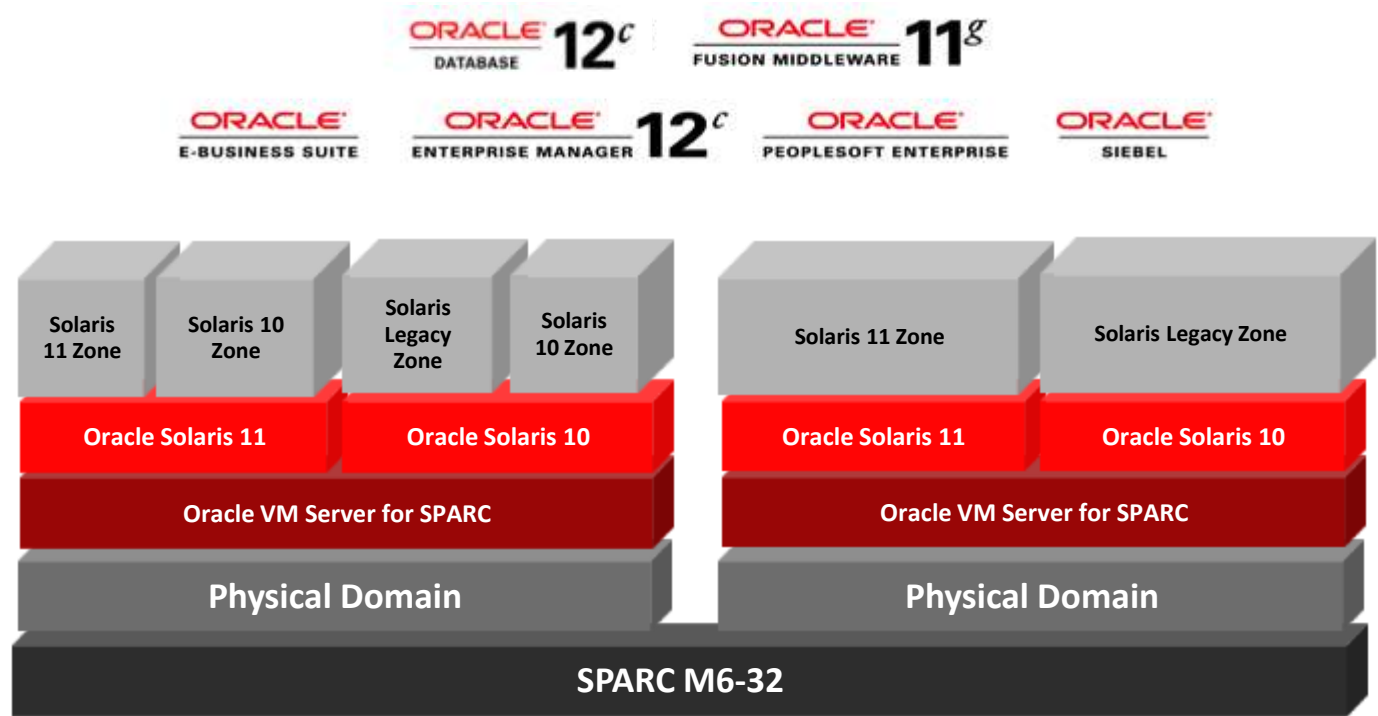
- Control domain
  - Creates and manages other logical domains and services
  - Control domain usually also a service and I/O domain
- I/O domains
  - own physical I/O bus or devices. May run apps using physical I/O for native performance
- Service domains
  - provide virtual network and disk devices. Typically an I/O domain
- Guest domain:
  - run applications on virtual I/O devices provided by service domain

# Oracle SPARC T4/T5 Virtualization



# High Efficiency from Advanced Virtualization

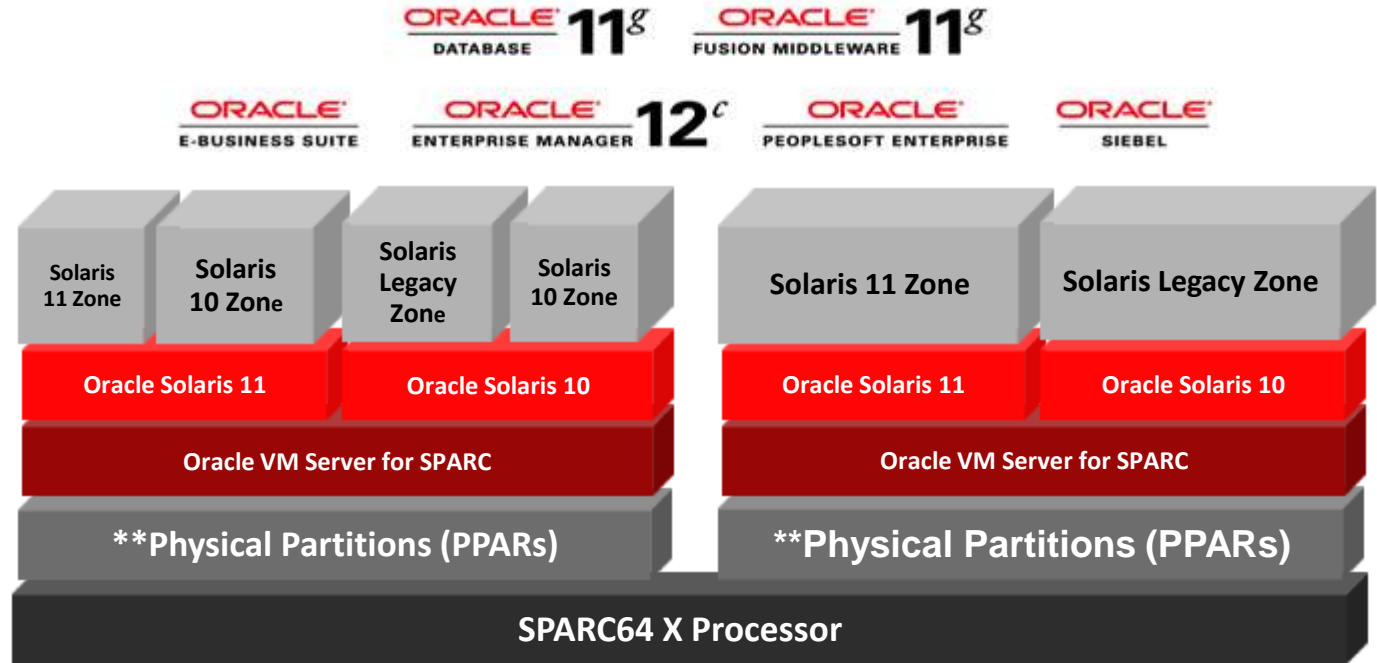
Unique Virtualization Technology: Built-in, No Cost, Zero Overhead



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# Fujitsu M10 Virtualization

No additional cost Virtualization



\*\*Fujitsu M10-4S only

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# What about zones?

- These are complementary technologies – use *both*
- Deploy applications in zones even within a domain
  - You may have 1 app in domain at first, but change your mind later
  - Better for large numbers of small-footprint virtual environments
- No hit on performance or license cost
- Provides operational flexibility
- Provides further security isolation
- Allows larger number of virtual environments per host
- Excellent in staging from test/dev to production at zone level

# Virtualization Characteristics

Characteristics		OVM SPARC	Solaris Zones
Architectural Flexibility			
	Configuration Flexibility	Good	Best
	Resource Granularity	Good	Best
	Dynamic Reassignment	Yes	Yes
	Auto Load Balancing	Yes	Yes
	Guest Density	Good	Best
	Hardware Dependence	SPARC	x86, SPARC
	Solaris Versions	10, 11	8, 9, 10, 11
	Binary Compatibility	Yes	Yes
	Different kernel levels	Yes	No
Security		High	High, configurable

Characteristics		OVM SPARC	Solaris Zones
Manageability			
	Software Isolation	Yes	Yes
	OS isolation	Yes	No
	Hardware isolation	Some	Little
	P2V Tools	Yes	Yes
	Delegated Admin	Yes	Yes
	Cold Migration	Yes	Yes
	Live Migration	Yes*	No
	Central Observability	No	Yes
CPU/Memory overhead		None	None
I/O overhead		Virt I/O	None
Hard Partitions – Licensing		Yes	Yes

# The Future for Oracle's SPARC Customers

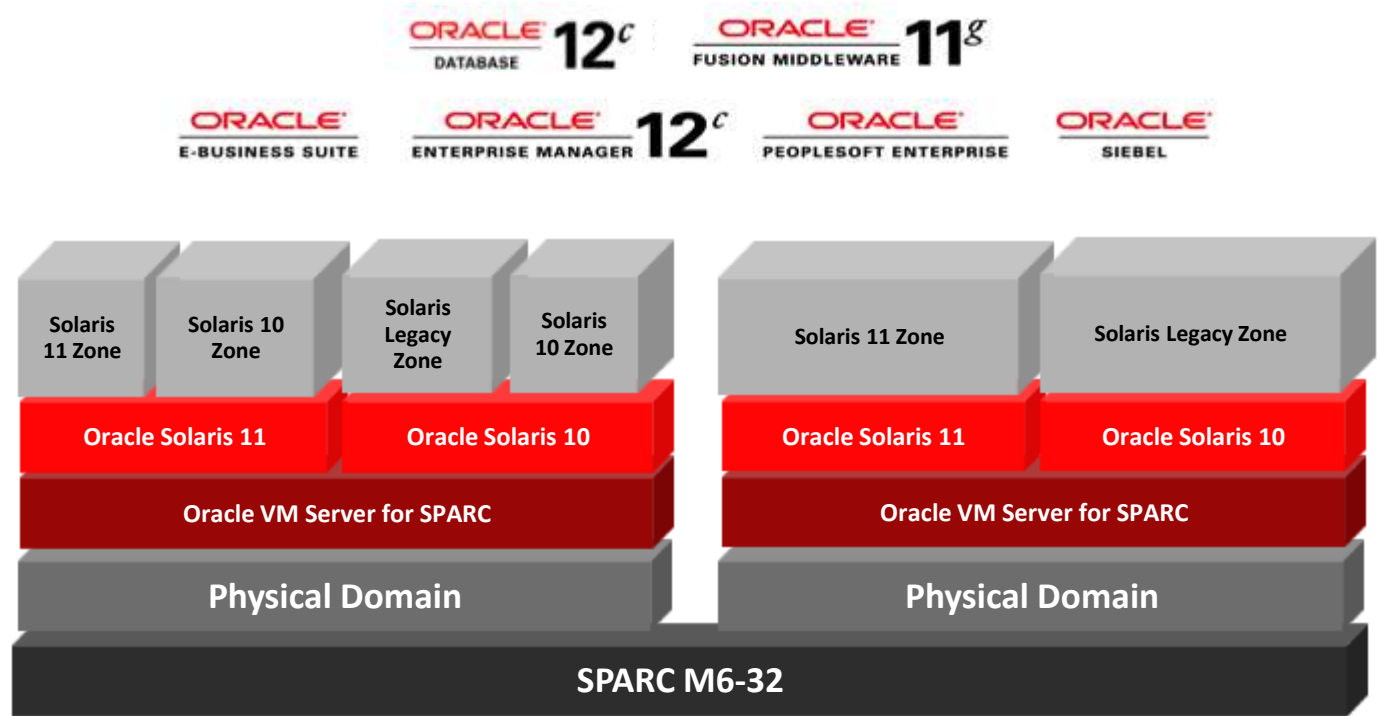
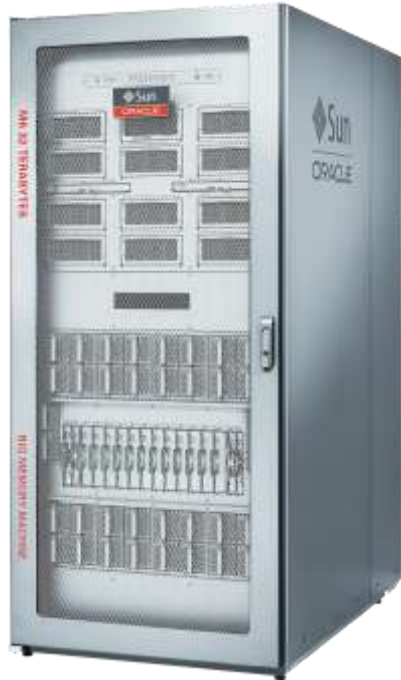
## Here are Oracle's Plans

- Deliver significant application performance acceleration every 2 years
- Lead in processor technology
  - Deliver highest scalability, security, RAS, and investment protection
- Lead in enterprise operating systems, virtualization and system management
  - Deliver software that simplifies management of IT stack
- Increase integration of hardware and software for the entire solution stack
  - Optimize application, middleware, management tools, together with hardware



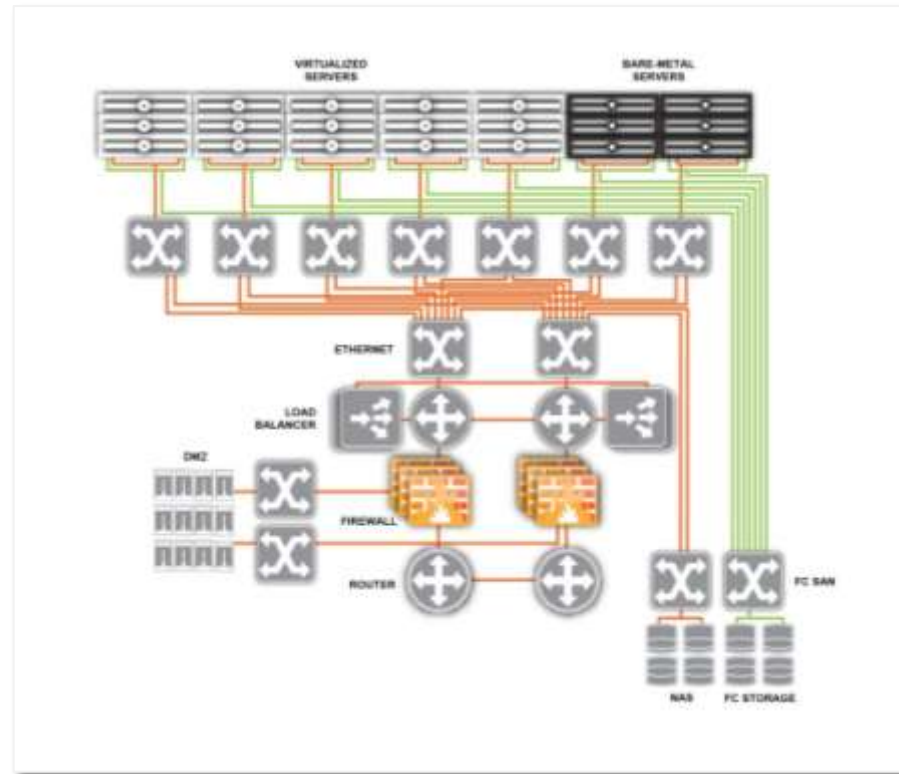
# High Efficiency from Advanced Virtualization

Unique Virtualization Technology: Built-in, No Cost, Zero Overhead



# Traditional Infrastructure Issues

- Complex
  - Many networks & devices
- Inflexible
  - Difficult to re-configure
- Limited performance
  - Topology creates bottlenecks



# Oracle Virtual Networking Product Family

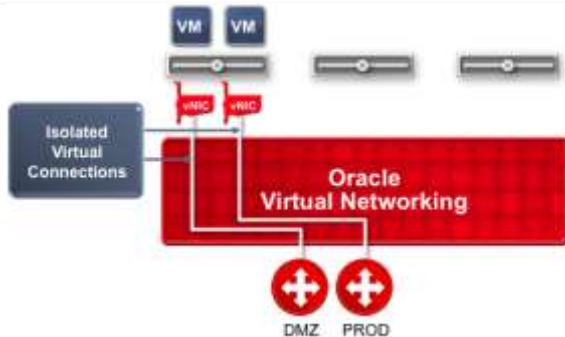


Oracle Fabric Interconnect

Oracle  
Fabric  
Manager



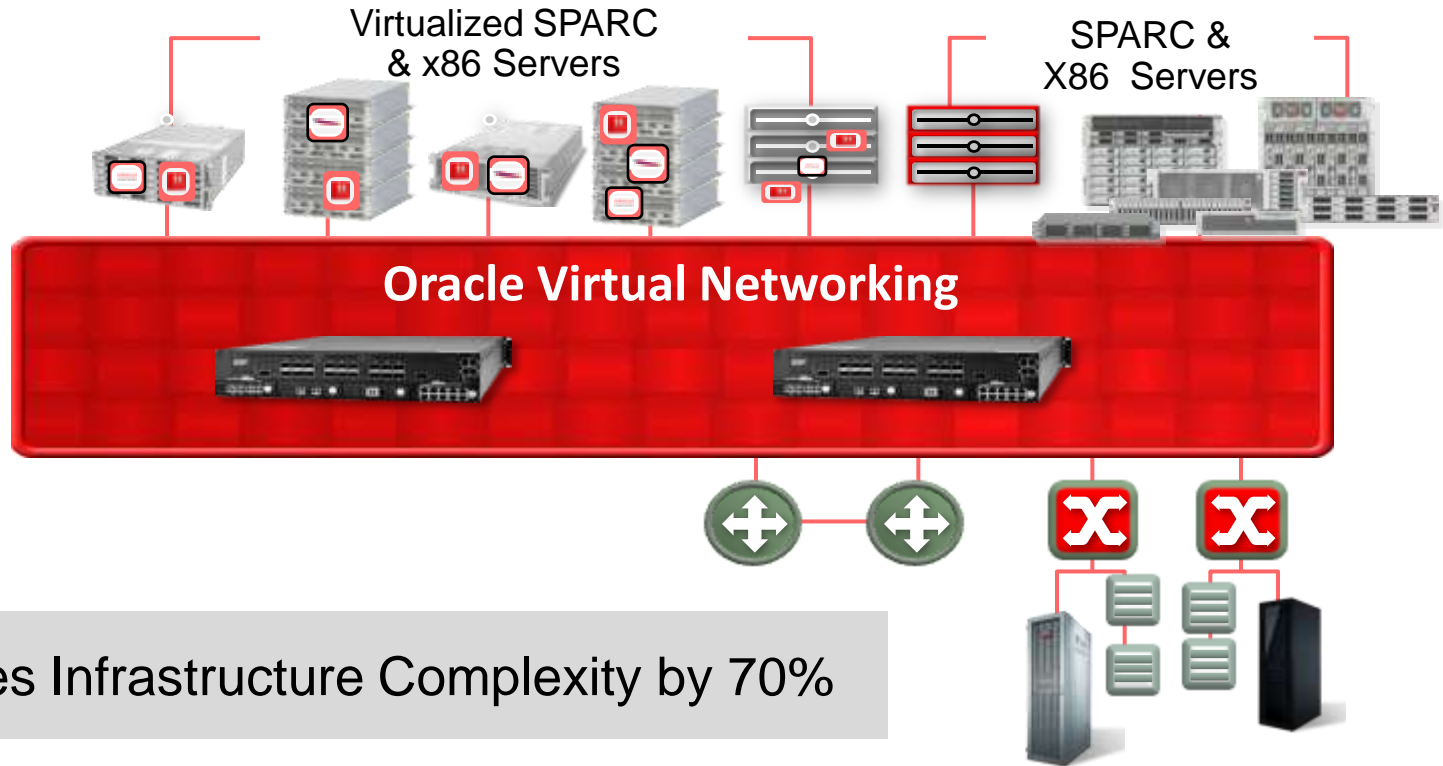
Oracle  
Fabric  
Monitor



Oracle SDN

# Oracle Virtual Networking Delivers:

## Complete Fabric Infrastructure for the Data Center

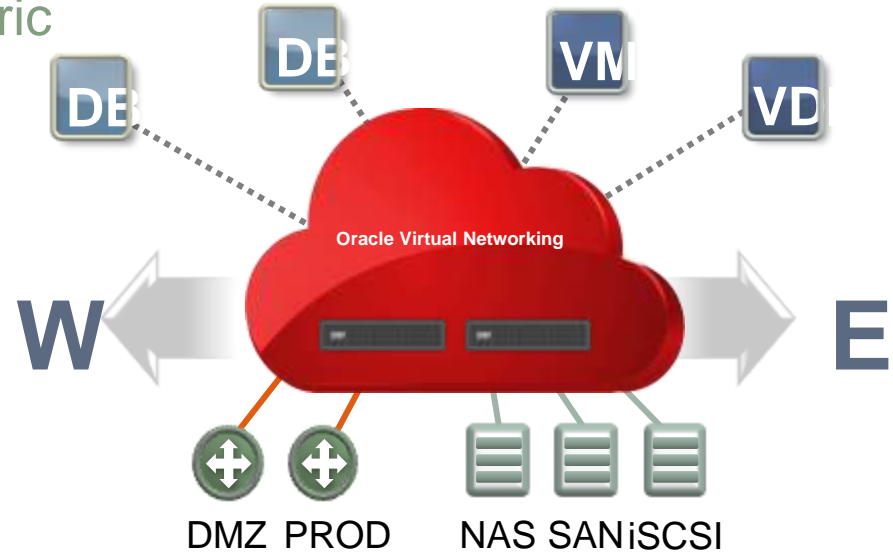


Reduces Infrastructure Complexity by 70%

# Oracle Virtual Networking

## Next Generation Data Center Fabric

- Simple
  - 70% less I/O complexity
  - 50% less cost
  - Wire-once infrastructure
- Agile
  - Dynamically connect any server to any network and storage
- Fast
  - 80Gbp/s throughput eliminates I/O bottleneck



# Q&A

Detlef.Drewanz@oracle.com

**Hardware and Software**

**ORACLE**

**Engineered to Work Together**

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