



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.

ORACLE®

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



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



SPARC T5-1B
16-cores T5-1B
256GB Memory



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8-cores @ 2.85GHz
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SPARC T5-2
32-cores @ 3.6GHz
512GB Memory



SPARC T4-4
32-cores @ 3GHz
2TB Memory



SPARC T5-4
64-cores @ 3.6GHz
2TB Memory



SPARC T5-8
128-cores @ 3.6GHz
4TB Memory

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

8-cores T4-1B /
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SPARC Server Portfolio

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256GB Memory



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



NEW FUJITSU M10-1



NEW FUJITSU M10-4

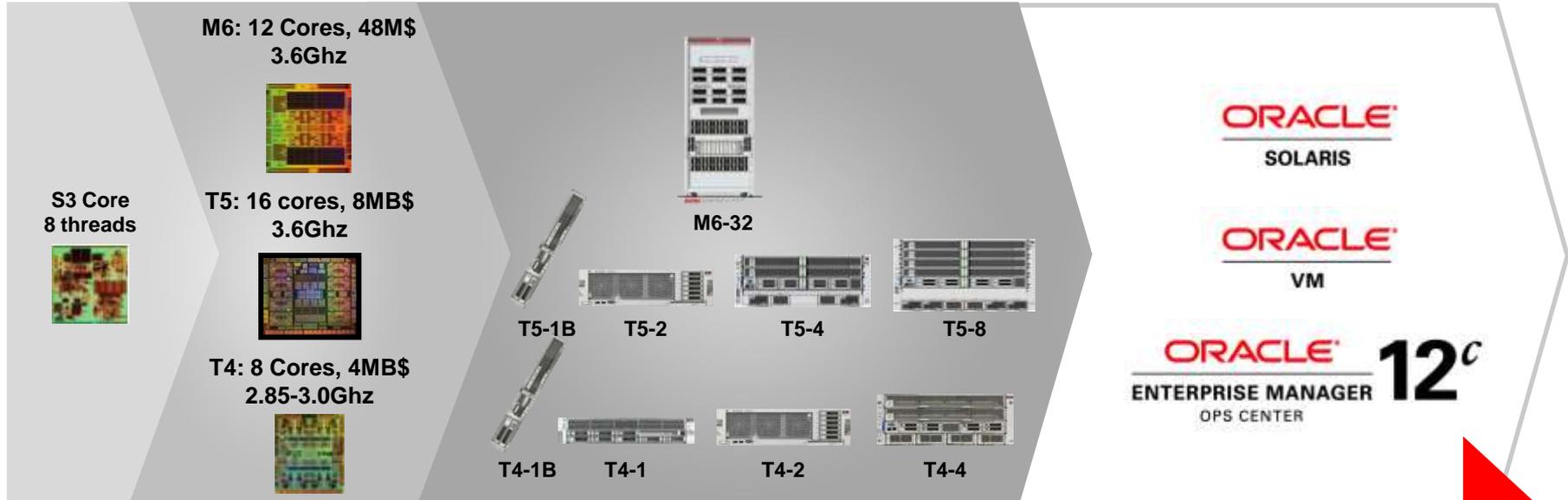


NEW FUJITSU M10-4S



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

ORACLE

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

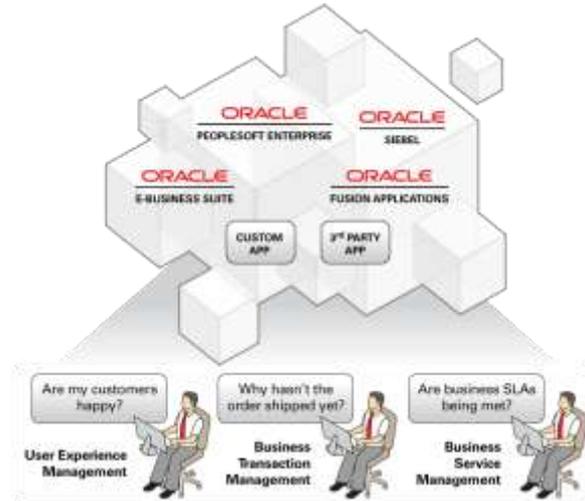


Oracle Solaris 11

Best UNIX™ for
Oracle Deployments



Built for Cloud
Infrastructures



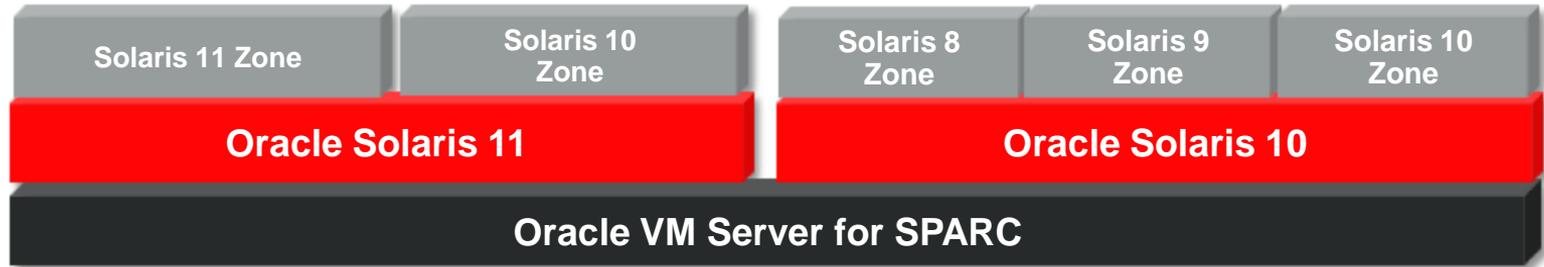
#1 UNIX™ for
Enterprise Applications



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SPARC Solaris Investment Protection

Safe, Easy Consolidation On SPARC T5 and SPARC T4 Servers



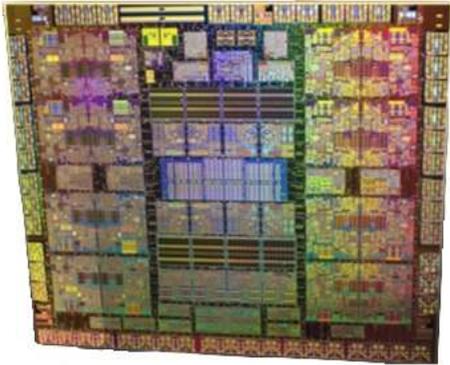
- Preserve existing investment
 - Move older Oracle Solaris environments forward
 - P2V and V2V tools make it easy
- Applications since 1997 guaranteed to work
 - Plus source code compatibility for developers



ORACLE

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

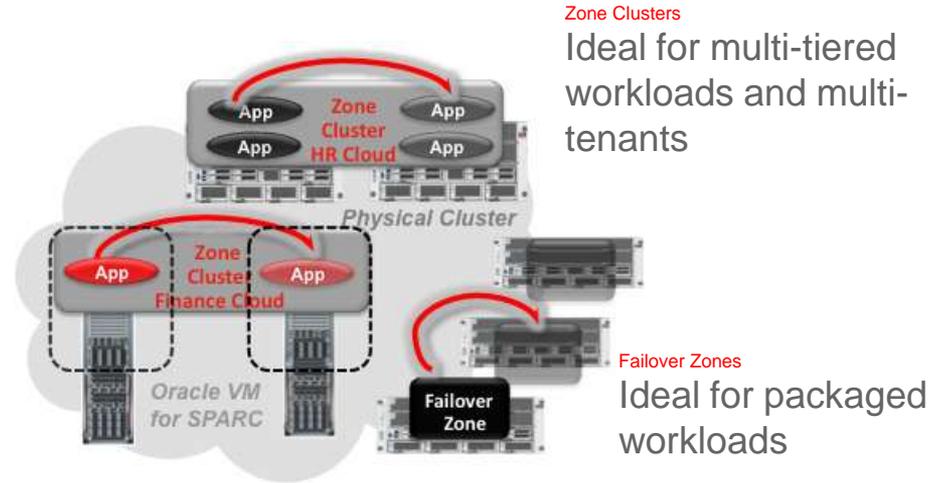
Solaris Zones

- 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

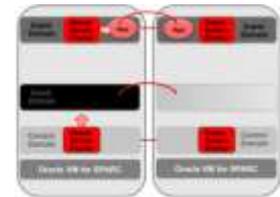
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Oracle Solaris Cluster Virtualization

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



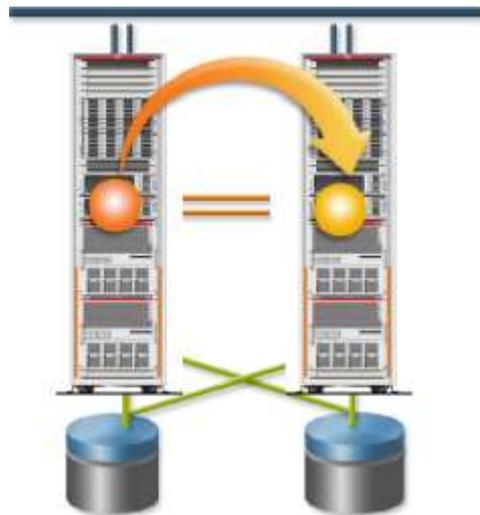
- Domain as cluster node
- Guest Domain as HA resource



Faster Failure Detection and Services Recovery

Robust High Availability Infrastructure

- Unrivaled 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

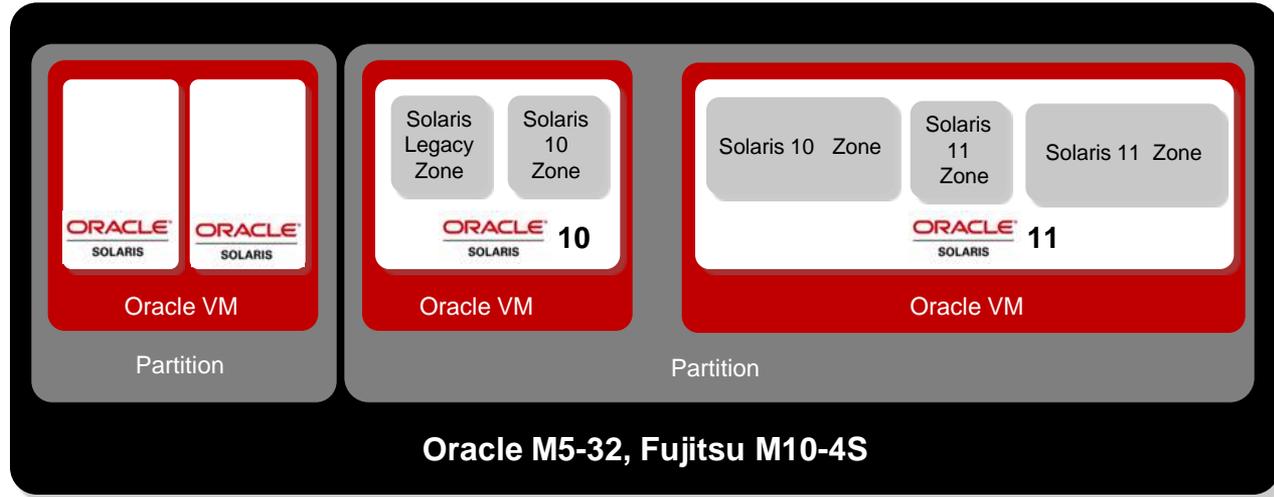
Virtualize in both Hardware and Software

Physically Protect from

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

Maximize Utilization

- Applications
- Business users
- Test and production environments

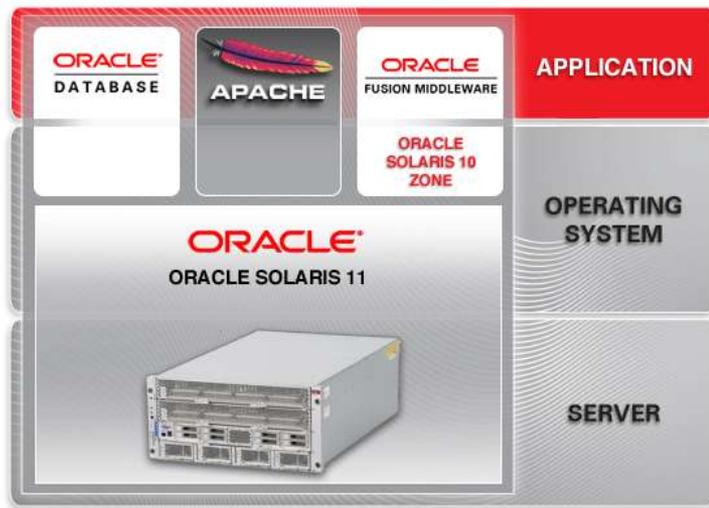


Only Oracle Provides This Level of Protection

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)

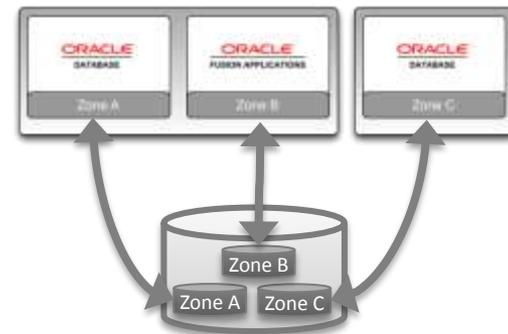
Place zones on shared storage with ease

- 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

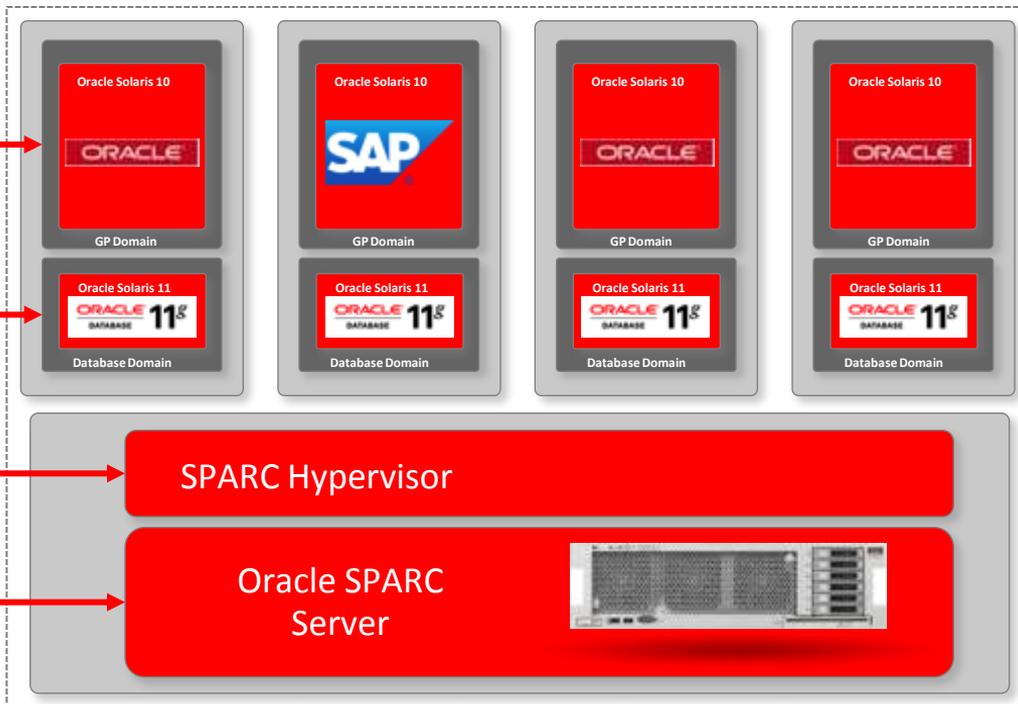


Oracle VM Server for SPARC

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



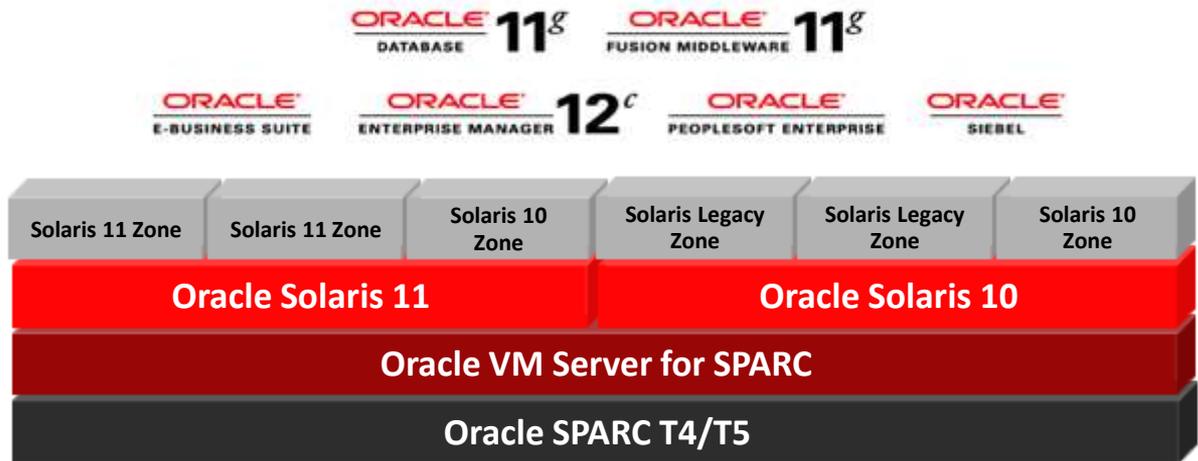
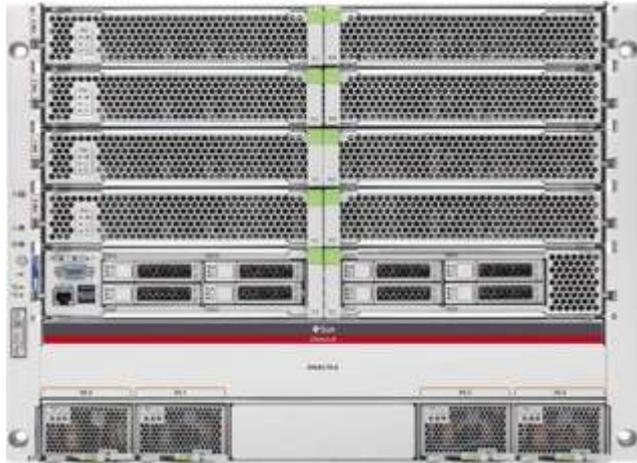
Isolated OS and applications in each logical (or virtual) domain



Roles of Domains

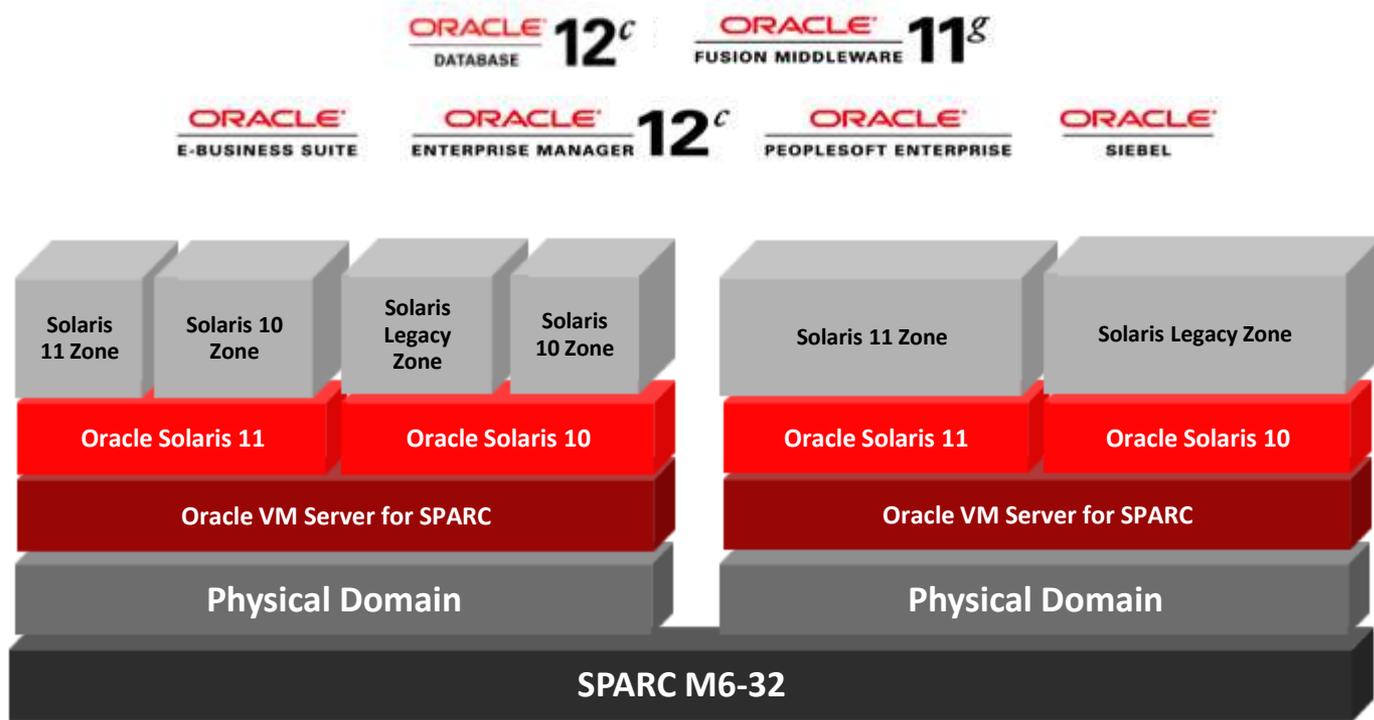
- **Control domain**
 - Creates and manages other logical domains and services
 - Control domain usually also a service and I/O domain
- **I/O domains**
 - own physical I/O bus or devices. May run apps using physical I/O for native performance
- **Service domains**
 - provide virtual network and disk 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

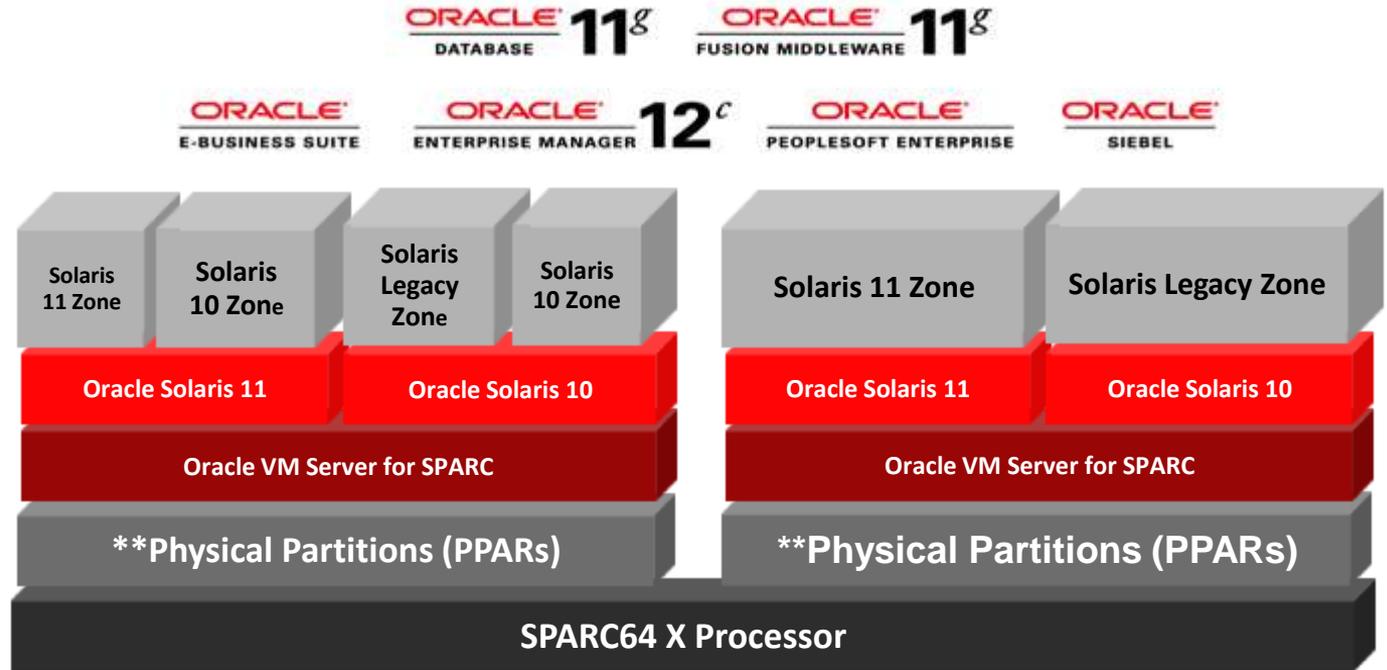
Unique Virtualization Technology: Built-in, No Cost, Zero Overhead



ORACLE

Fujitsu M10 Virtualization

No additional cost Virtualization



**Fujitsu M10-4S only

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 |

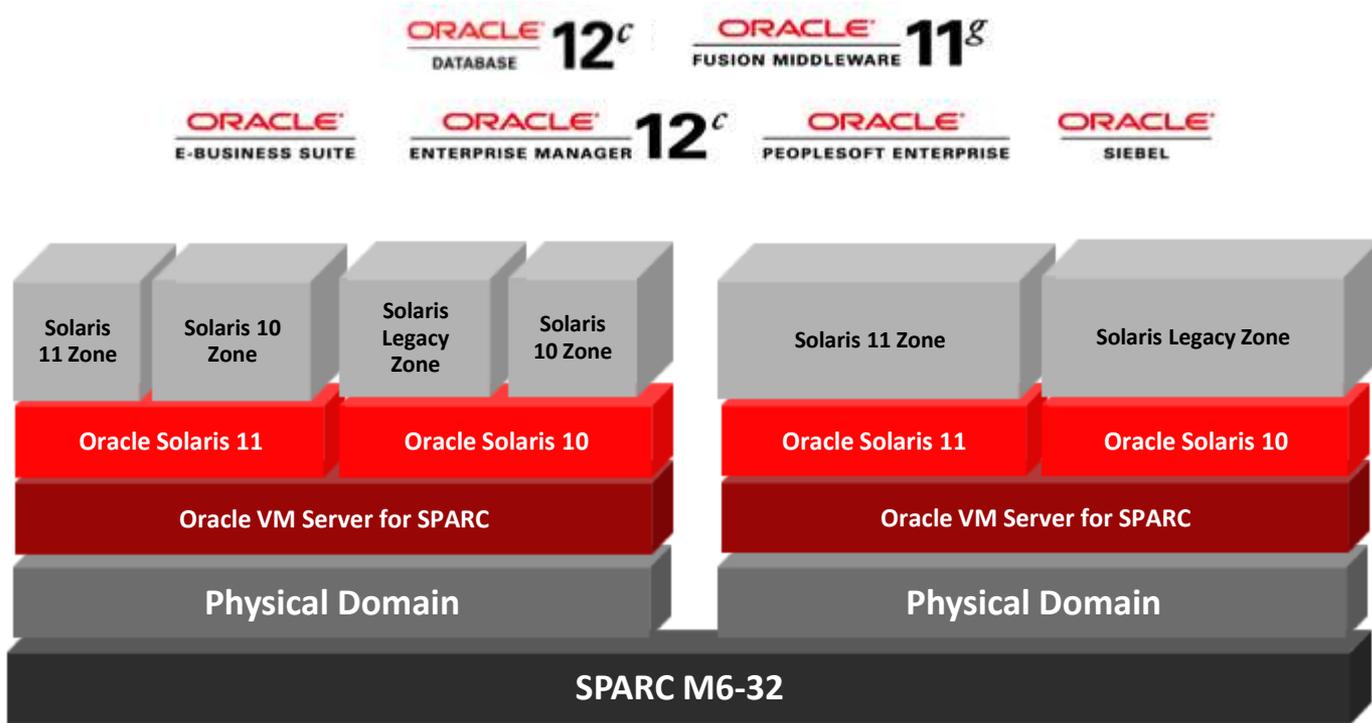
The Future for Oracle's SPARC Customers

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

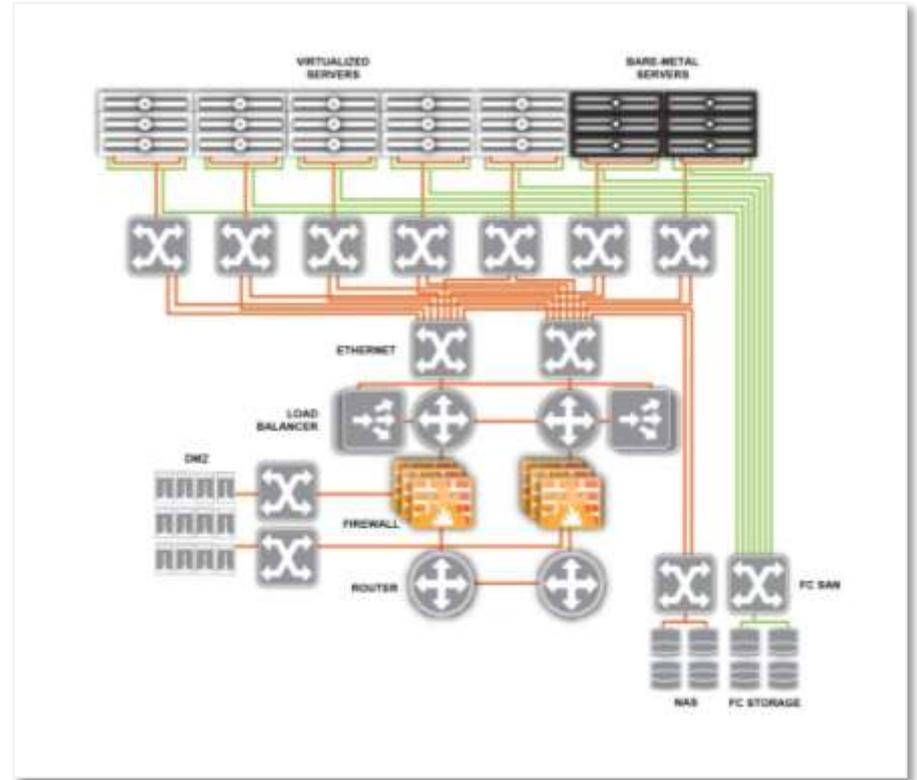
Unique Virtualization Technology: Built-in, No Cost, Zero Overhead



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Traditional Infrastructure Issues

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



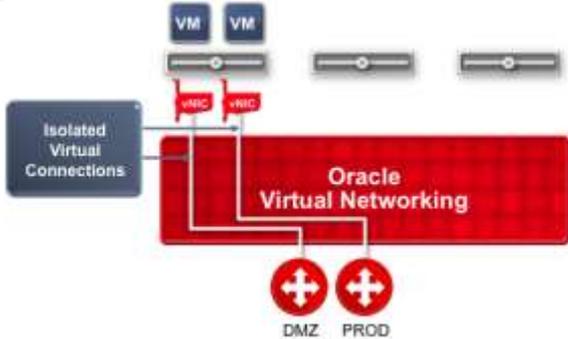
Oracle Virtual Networking Product Family



Oracle Fabric Interconnect



Oracle
Fabric
Manager



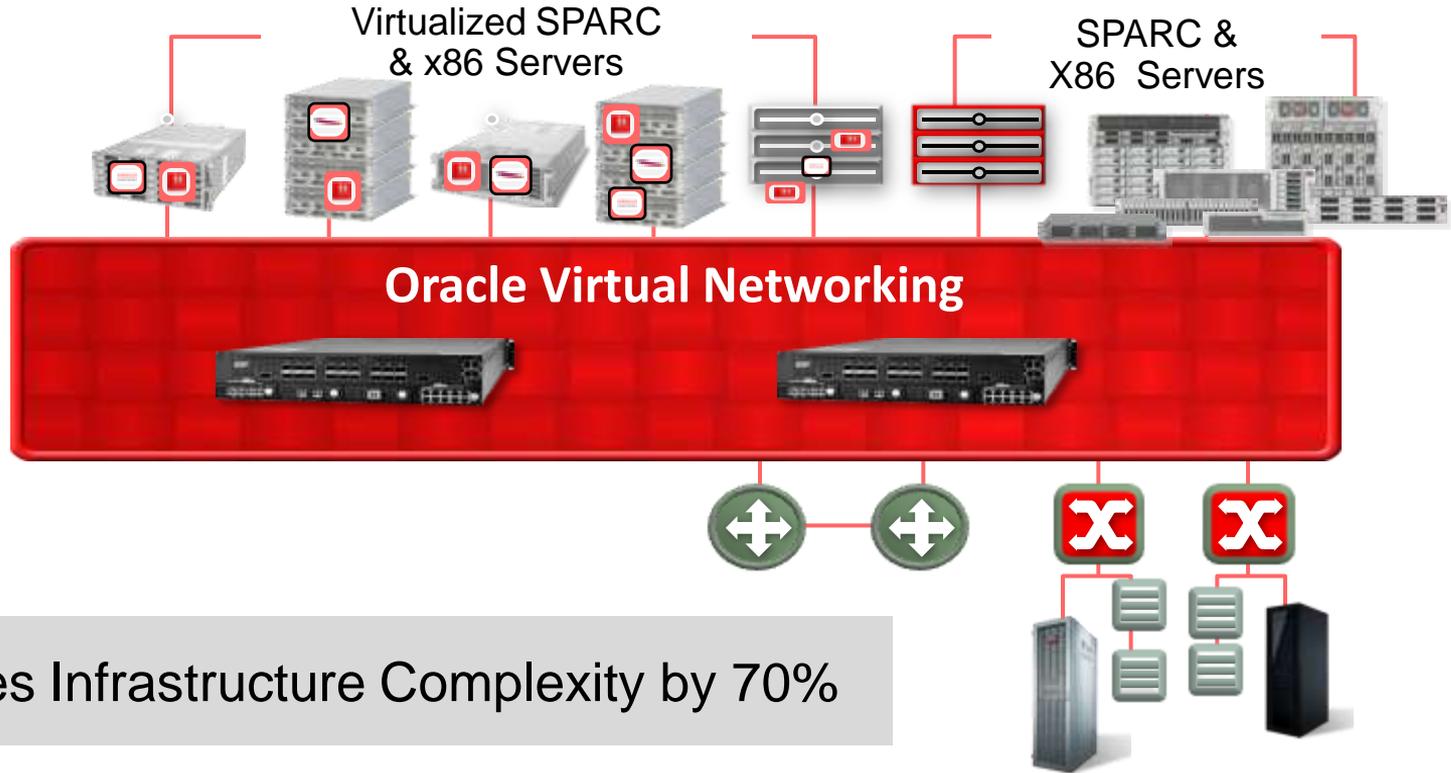
Oracle SDN



Oracle
Fabric
Monitor

Oracle Virtual Networking Delivers:

Complete Fabric Infrastructure for the Data Center

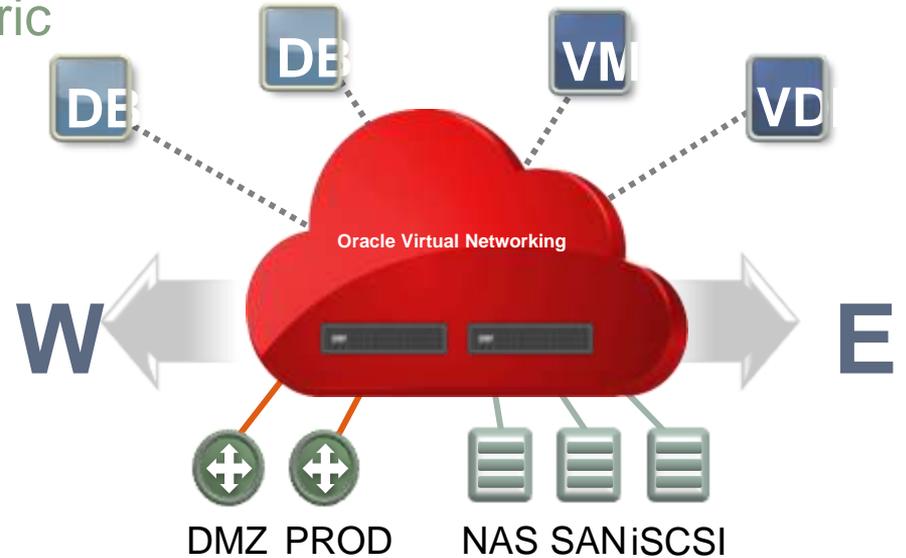


Reduces Infrastructure Complexity by 70%

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

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Hardware and Software

ORACLE

Engineered to Work Together

ORACLE®