

ORACLE®

Die Oracle Datenbank 12c auf Oracle Solaris 11.1

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The Safe Harbor

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Oracle Solaris 11

BUILT FOR
CLOUD INFRASTRUCTURES



ORACLE
RUNS BEST ON
SOLARIS



#1 UNIX™
FOR ENTERPRISE
APPLICATIONS



Agenda

- Installation
- Oracle 12c Runs Best on SPARC
- I/O Observability
- Memory Management
- Virtualization and Multitenancy

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Oracle 12c Installation in Solaris 11.1

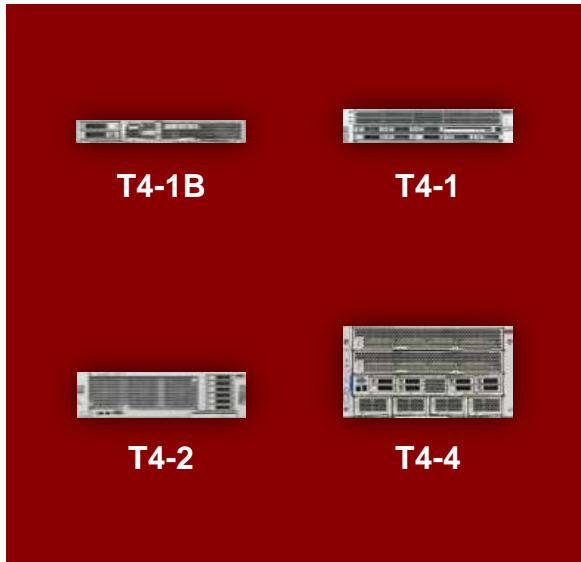
- Choose to install IPS Software Group
 - 1.) `solaris-small-server` (Default for Zones)
or 2.) `solaris-large-server` (Default for Interactive Installation)
or 3.) `solaris-desktop`
- 1. or 2. require to add IPS-Packages to run the 12c GUI Installer
 - `/x11/diagnostic/x11-info-clients`
 - `/developer/build/make`
 - `/x11/session/xauth`
 - `/developer/ assembler`
- The DB-Installation is similar to Oracle 11g Installation
 - user, swap-size, memory settings, projects, shm-settings, ...

Agenda

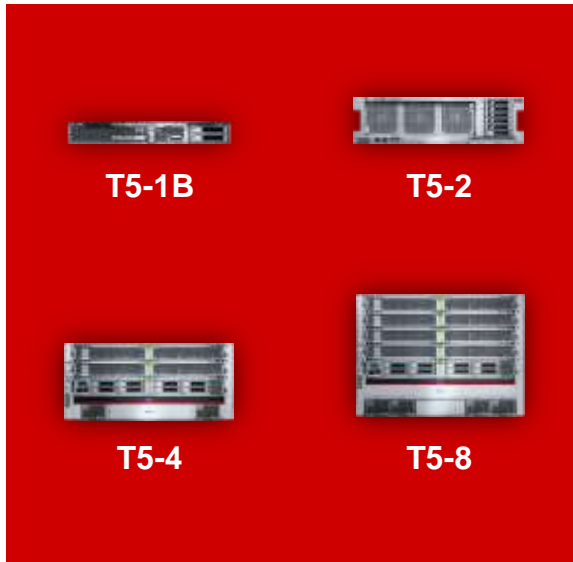
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Best Enterprise Portfolio

Entry Level



Mid-range



High-end



ORACLE
PEOPLESOFT

ORACLE
DATABASE

ORACLE
E-BUSINESS SUITE

ORACLE
SIEBEL

ORACLE
FUSION MIDDLEWARE

ORACLE
FUSION APPLICATIONS

ORACLE
TIMESTEN
IN-MEMORY DATABASE

ORACLE
JD EDWARDS

ORACLE

Engineered Together for Performance

Oracle's SPARC M5, T5 and T4 Processors running Oracle Software

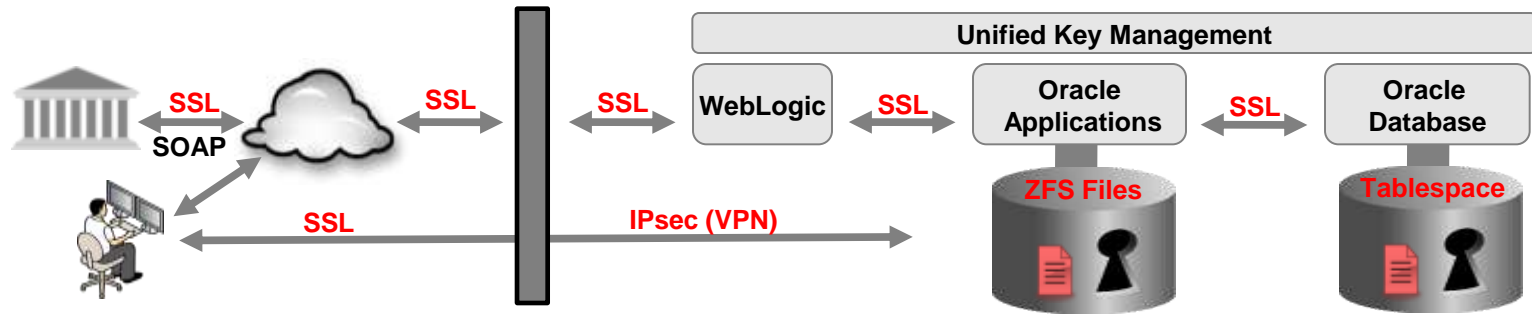
- Critical Threads optimize performance by assigning a process exclusive access to all of a core's hardware resources.
- Proves up to 30% improvement in Oracle Database and Oracle Coherence performance and up to 2X improvement for Java.

	Applicability	Opportunity	Current Status
Oracle Database	Logwriter, LMS	Up to 30% improvement in efficiency	LMS and LGWR are already CT ready.
Oracle Solaris	Solaris 11.1 Solaris 10 1/13	Improve CT perf to be within 10% of best case (hand optimized)	Optimizations for decayed PG util and stealing are integrated into Solaris 11.1

Unmatched Security: End-to-End Encryption

No Compromise, No Tradeoff, No Additional Costs

- Auto-offload of CPU-intensive security work to SPARC crypto accelerators
- Fast Oracle Database Advanced Security Transparent Data Encryption (TDE)
- Turbo charged JRE security
- Reduce risk with encryption by default
- ZFS Filesystem Crypto **3.9x faster** vs. x86
- 10Gb/s SSL **T5 uses <10% of system to saturate 10GbE** vs. 30% for Xeon E5



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Ultimate Oracle Database I/O Observability

Oracle Solaris DTrace Integration

New with Oracle Database 12c

- Provides end-to-end view for I/O operations taking too long
- Traces I/O requester, I/O device and the exact time spent in each layer: database, OS and the storage device
- Tracing info is loaded in V\$ views for queries

Optimize your
Database I/O
performance

Quickly resolve
I/O issues

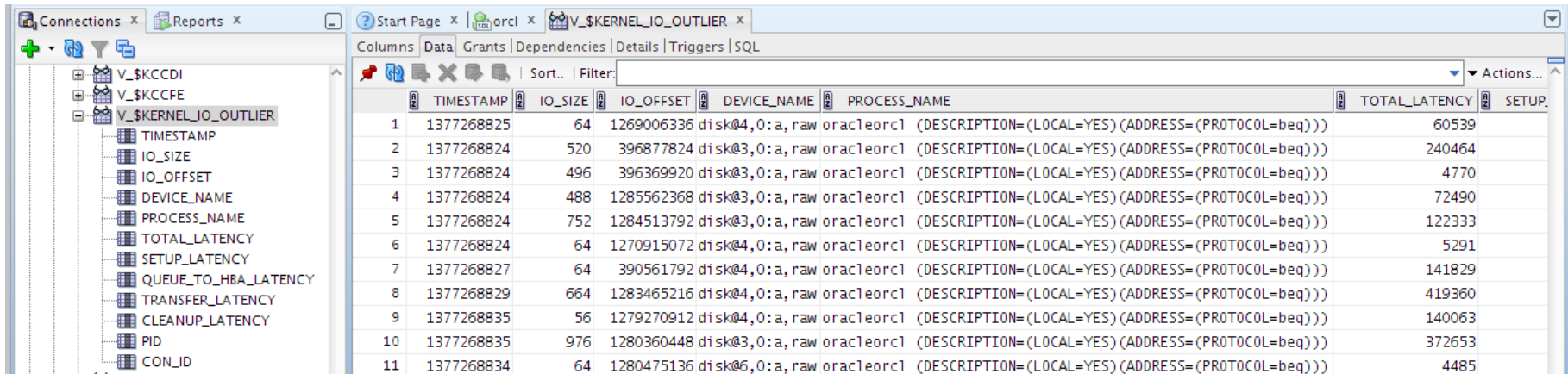
v\$kernel_io_outlier

```
TIMESTAMP  
IO_SIZE  
IO_OFFSET  
DEVICE_NAME VARCHAR2(513)  
PROCESS_NAME VARCHAR2(64)  
TOTAL_LATENCY  
SETUP_LATENCY
```

...

v\$kernel_io_outlier

Using DTrace to identify I/O-issues



	TIMESTAMP	IO_SIZE	IO_OFFSET	DEVICE_NAME	PROCESS_NAME	TOTAL_LATENCY	SETUP
1	1377268825	64	1269006336	disk@4,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	60539	
2	1377268824	520	396877824	disk@3,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	240464	
3	1377268824	496	396369920	disk@3,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	4770	
4	1377268824	488	1285562368	disk@3,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	72490	
5	1377268824	752	1284513792	disk@3,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	122333	
6	1377268824	64	1270915072	disk@4,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	5291	
7	1377268827	64	390561792	disk@4,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	141829	
8	1377268829	664	1283465216	disk@4,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	419360	
9	1377268835	56	1279270912	disk@4,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	140063	
10	1377268835	976	1280360448	disk@3,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	372653	
11	1377268834	64	1280475136	disk@6,0:a,raw	oracleorcl (DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))	4485	

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- **Memory Management**
- Virtualization and Multitenancy

Memory

History and Today

1986

- One page size (8K)
- 16MB of RAM (2 thousand 8K pages)
- 1 CPU

2013

- Multiple pages sizes up to 1GB or 2GB
- 32TB of RAM (4 billion 8K pages)
- Multi-socket, multi-core, multi-threaded
- Dynamic systems with respect to memory

Memory Optimizations

Maximize Database

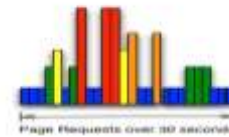
Ready for the Future

- Low overhead scaling of memory to **100s of TBs**
- Improve performance
 - Very large memory pages
 - NUMA I/O
- Auto memory page tuning with built-in predictor

Adapts memory allocation to application needs

Predicable performance at scale

Samples



Analyzes



Adjusts



Memory Allocation (SGA)

Improving DB Startup Time by faster SGA Allocation

- DB instance startup time depends on shared memory allocation time
- Oracle Solaris parallelizes allocation using kernel threads (VMTASKS)
 - Default maximum number of vmtasks limited to 16
 - On larger systems, vmtasks limit can be increased for better parallelism
 - For example, add the following line to /etc/system

```
set vmtask_ntasks_max = 0x20
```

- or modify on a live system using mdb

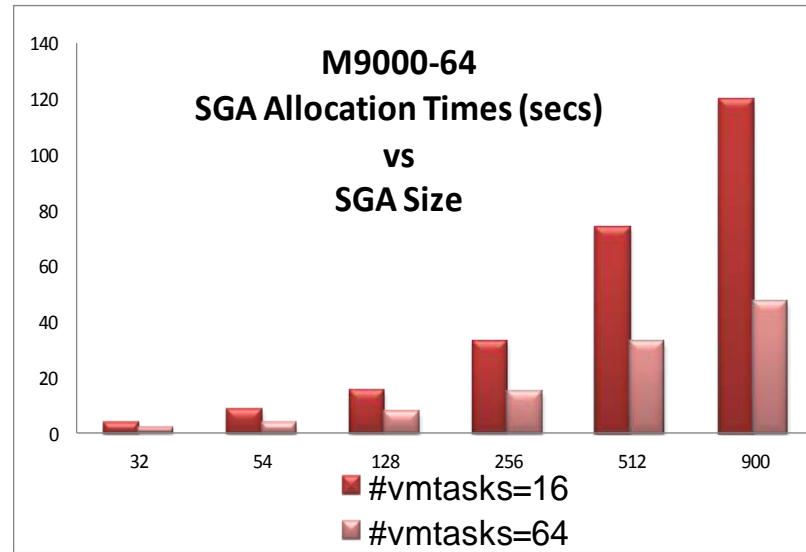
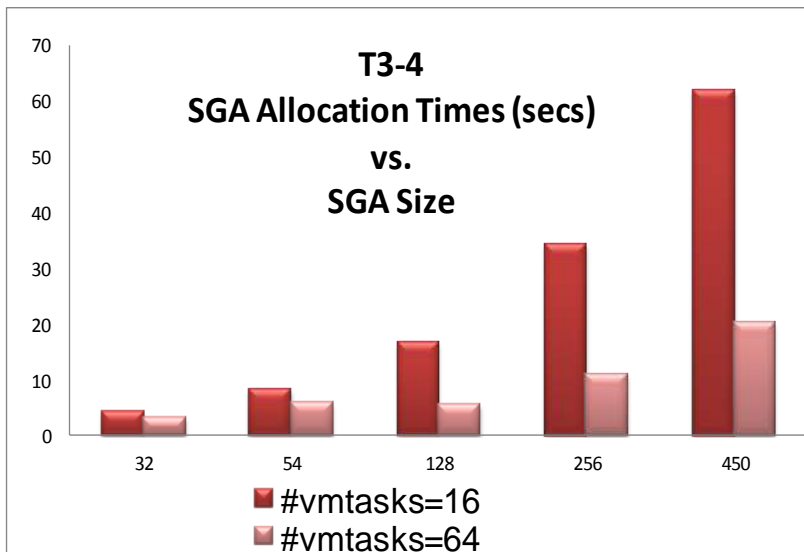
```
# echo "vmtask_ntasks_max /W 0x20" | /bin/mdb -kw
```

- Set vmtask_ntasks_max parameter to 10-20% of available cpus

Memory Allocation (SGA)

Improving DB Startup Time by faster SGA Allocation (contd.)

- Comparing SGA allocation time for different SGA sizes



OOW12, CON7892, Top 10 DB perf. Tips for SPARC Systems Running Oracle Solaris

Most Efficient SGA online resizing

Increased Uptime

New with Oracle Database 12c

- New Oracle Solaris Optimized Shared Memory (OSM) interface – replaces DISM
- Works with Oracle DB Automatic Memory Management (AMM)
- Dynamic, NUMA- aware granule based shared memory

Dynamically resize your Database SGA **online** without a reboot

Bring Oracle Database instances up **2x faster**



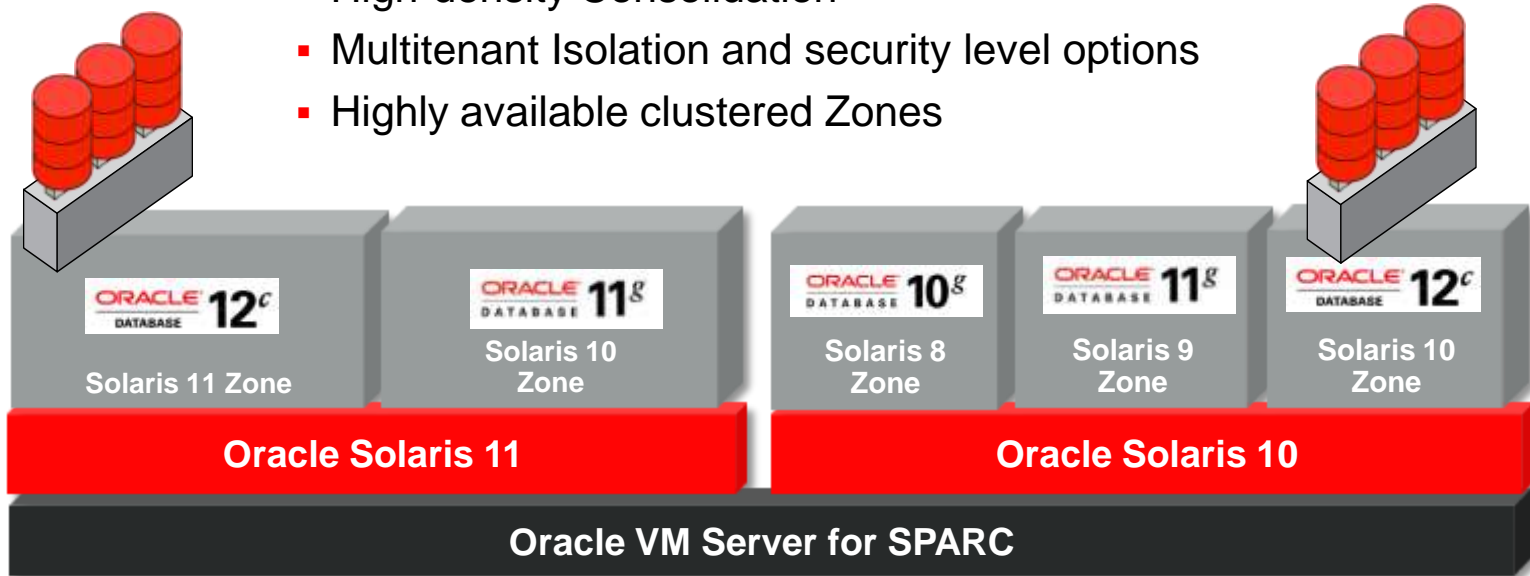
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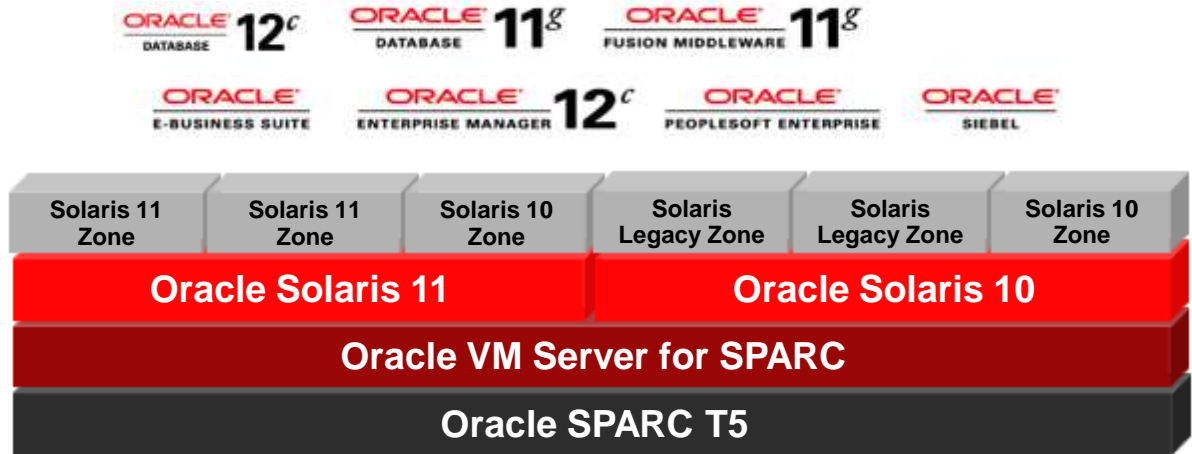
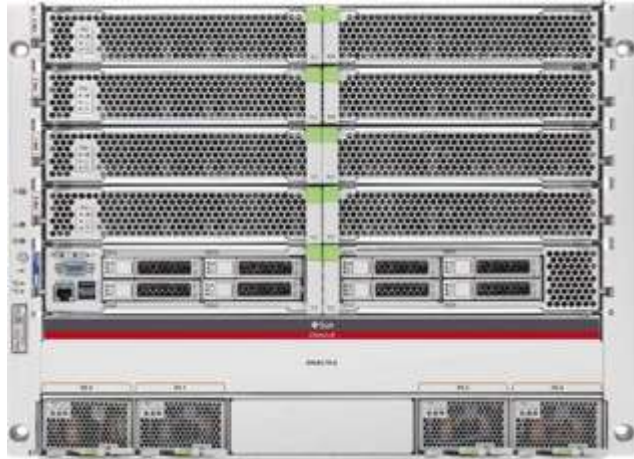
Secure Multiversion Database Multitenancy

For Database Consolidation and Database Clouds

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

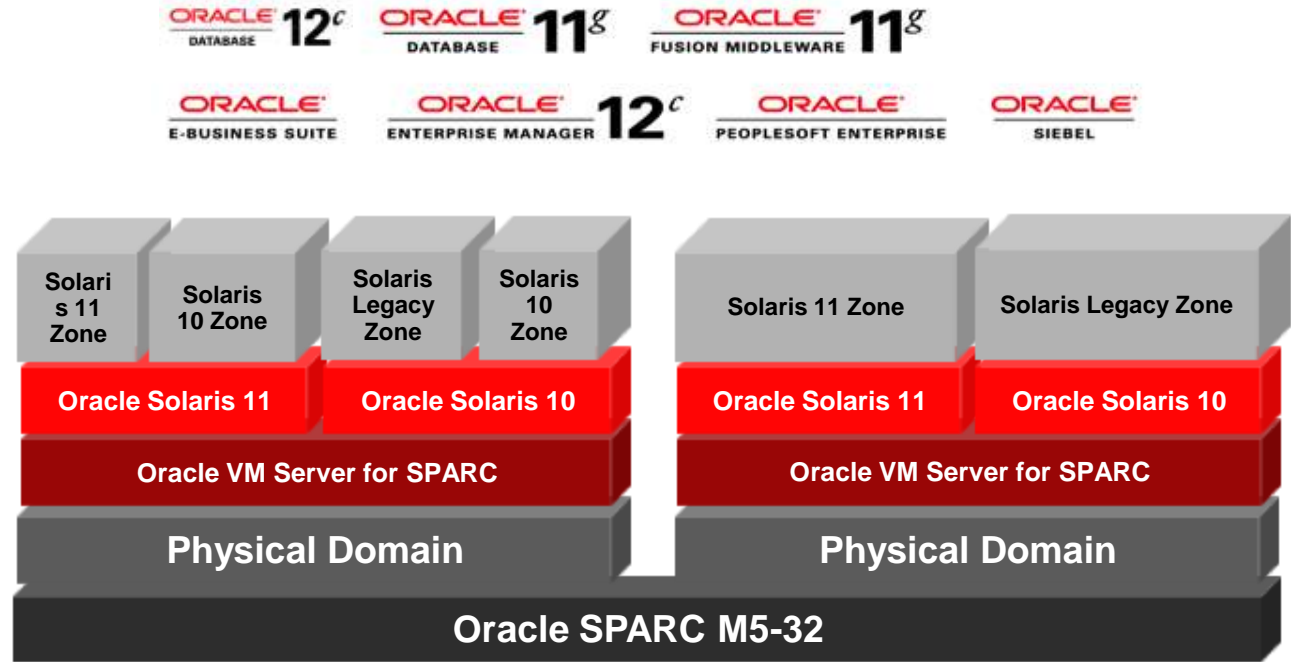
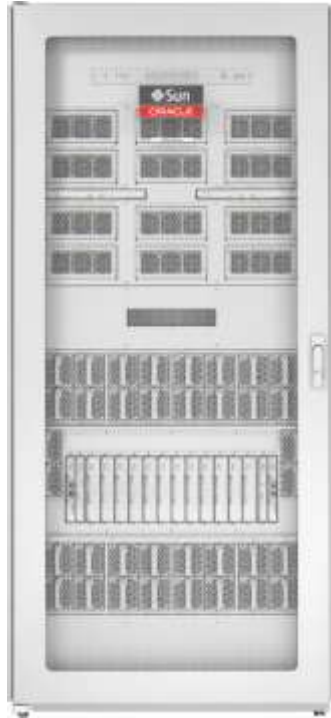


Oracle SPARC T5 Virtualization



Oracle SPARC M5-32 Virtualization

No additional cost Virtualization

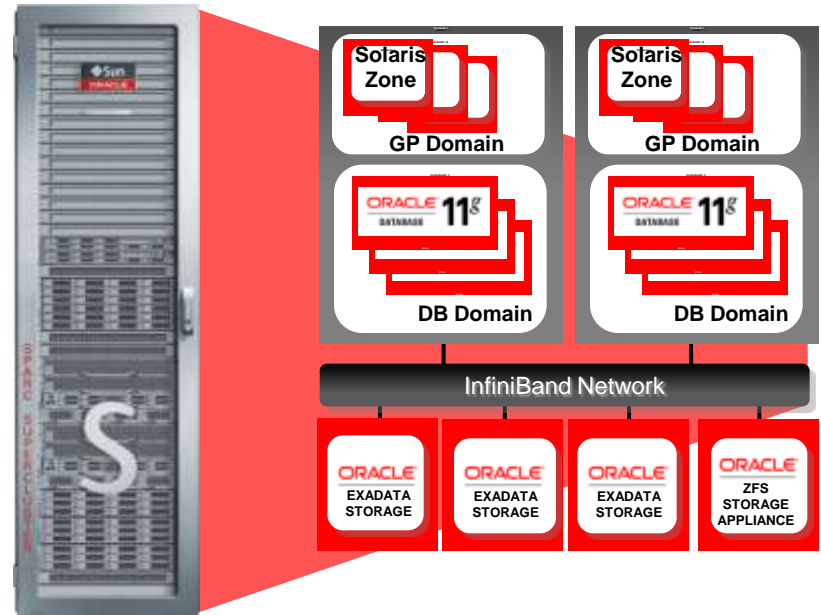


Oracle SuperCluster T5-8

Ideal For Secure Multitenant Database Consolidation

Optimized for Oracle Database

- Up to 256 compute processors and 4 TB of memory in a single rack
- Integrated Oracle Exadata Features
- Includes Exadata Storage Server
- Superfast, low latency, secure InfiniBand networking
- Oracle Solaris 11 Zones support
- Built-in, hardware encryption to provide end-to-end data security



Database Licensing Savings

Oracle Multitenant on SPARC T5-8 Server Example

- Hard partition recognized for database licensing using Solaris Zones
- Dedicate **1** core or more, out of the total **128** cores to the database zone
- Pay only for cores needed, not total cores in server
- Potential savings



SPARC T5-8

Oracle Database 12c Runs Best On Oracle

Unique SPARC / Oracle Solaris Advantages

Best Performance

- ✓ World record Oracle Database performance
- ✓ Unmatched scalability and security
- ✓ Unequaled database I/O performance manageability

Most Efficient

- ✓ Most efficient SGA online resizing
- ✓ Secure multiversion database multitenancy
- ✓ Most cost-effective for database licensing

Q&A

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Hardware and Software

ORACLE

Engineered to Work Together

ORACLE®