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.
Agenda

• Engineered Systems
• T4 Servers
• Solaris 11
• OVM 3
• Ops Center
Oracle Engineered Systems
Hardware and Software Engineered to Work Together

“We will accelerate the Engineered Systems trend...new engineered systems will optimally combine Oracle software, Oracle silicon and Oracle hardware to deliver extreme performance, fault-tolerant reliability and improved ease of use.”
- Larry Ellison, Q1 FY12 Earnings Call, September 20, 2011

Oracle Engineered Systems
- Engineered
- Tested
- Certified
- Deployed
- Upgraded
- Managed
- Supported

Together

Value Proposition
- Fastest time to market
- Highest performance
- Easiest to manage
- Lowest TCO
- Maximum innovation: Focus of Oracle R&D

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Evolution of Oracle Engineered Systems
Innovation, Value, Choice

Traditional
- Sun Blade Server Modules
- SPARC Enterprise M Series
- Sun Storage Arrays...

Optimized
- Siebel CRM
- PeopleSoft HCM
- Oracle WebLogic Suite...

Engineered
- Exadata
- Exalogic
- Exalytics
- Oracle Database Appliance
- Big Data Appliance
- SPARC SuperCluster

PUBLIC CLOUD
- Platform as a Service
- Software as a Service
- Database as a Service…
Oracle Engineered Systems
Meet the Family…

Oracle Engineered Systems share the following characteristics in common:

- Expedited time to value
- Easier to manage and upgrade
- Lower cost of ownership
- Reduced change management risk
- One-stop support
- Extreme performance

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Engineered Systems Product Overview
## Engineered Systems Value Proposition

<table>
<thead>
<tr>
<th>Engineered System</th>
<th>Value Proposition</th>
<th>Best Engineered System For:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exadata</strong></td>
<td>Highest performing Database System for OLTP, Data Warehousing and Database Consolidation</td>
<td>• Data Warehousing, OLTP • Database Consolidation • Cloud Computing (DB)</td>
</tr>
<tr>
<td><strong>Exalogic</strong></td>
<td>Highest performing, lowest cost application tier platform for Oracle applications, middleware, Java and 3rd party applications running on Oracle Linux and Solaris x86</td>
<td>• Oracle Business Applications, Oracle Fusion Middleware &amp; Java • OLTP applications • Cloud Computing (Apps)</td>
</tr>
<tr>
<td><strong>Exalytics</strong></td>
<td>Highest performing middle tier and in memory analytics platform provides “Speed of Thought” Analysis</td>
<td>• Business Intelligence • Financial and Operational Planning</td>
</tr>
<tr>
<td><strong>Database Appliance</strong></td>
<td>Complete, affordable HA Database System for the midmarket, optimized for ease of use.</td>
<td>• Departmental Databases • SMB application deployment</td>
</tr>
<tr>
<td><strong>SPARC SuperCluster</strong></td>
<td>Preconfigured, general purpose SPARC/Solaris system designed for enterprise consolidation of applications and database environments</td>
<td>• Database and Application Consolidation • Cloud Computing (DB &amp; Apps)</td>
</tr>
<tr>
<td><strong>Big Data Appliance</strong></td>
<td>Highest performing machine optimized for acquiring, organizing and loading unstructured data into the Oracle Database</td>
<td>• Unstructured Data Analysis • Integrating Big Data Result Sets • Big Data Management</td>
</tr>
</tbody>
</table>
Oracle Engineered Systems
Designed for Performance and Customer Choice

SPARC SuperCluster T4-4
Big Data Appliance
Exadata Database Machine
Exalogic Elastic Cloud
Oracle Database Appliance
Exalytics In-Memory Machine

Oracle Software Specificity

© 2011 Oracle Corporation
Oracle Exadata Database Machine

Oracle Exadata is the only database machine that provides extreme performance for both data warehousing and OLTP applications.

Benefits

- 10x Faster Database
- 10x More Efficient Storage
- Complete & Ready-to-Run
- End-to-End Resource Management
- Most Available and Secure

Unique Features

More: www.oracle.com/exadata
Oracle Exalogic Elastic Cloud provides extreme performance for Java applications, Oracle Applications, and all other enterprise applications

Benefits

• At least 2x faster response times, throughput
• At least 50% lower TCO

Unique Features

• Exabus high-performance communications backplane
• Best performance for Java, Oracle Business Applications
• Runs existing Oracle Linux and Oracle Solaris applications unchanged
• Exclusive integration with Oracle Exadata Database Machine

More: www.oracle.com/exalogic

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Oracle Database Appliance is software, servers, storage and networking that offers a simple, reliable, low-cost package for mid-range database workloads.

**Benefits**

- Extreme Simplicity - one-button implementation & patching
- Pay-As-You-Grow Licensing - most cost-effective entry point for Oracle Database Enterprise Edition, aligns to budget cycles

**Unique Features**

- Complete, integrated system for Single Instance (Enterprise Edition), RAC One Node, and RAC
- Complete, plug-and-go hardware and software
- Highly available database cluster configured in minutes
- Advanced management features and single vendor support

Oracle Exalytics is the industry's first in-memory BI machine that delivers the fastest performance for business intelligence and planning applications.

**Benefits**

- Speed-of-Thought Interactive Visual Analysis
- Scales to many thousands of business analysts

**Unique Features**

- In-memory Analytics
- Runs BI and EPM Apps
- Fits with existing data sources, infrastructure
- Optimized with Exadata – InfiniBand
- Optimized BI Foundation Suite – OBIEE and Essbase

**More:** [http://www.oracle.com/exalytics](http://www.oracle.com/exalytics)
Oracle Big Data Appliance

Oracle Big Data Appliance is an Engineered System optimized for acquiring, organizing and loading unstructured data into Oracle Database 11g

Benefits

• Leverage Big Data for business decisions
• Better manage Big Data environment
• Leverage SQL-based tools and data warehouse platforms for complete data analysis available to all business analysts

Unique Features

• Engineered System to Acquire, Organize, Analyze “Big Data”
• Super-Fast – Massively Parallel Processing & Loading into Oracle DB
• High-speed InfiniBand interconnect for moving information to Exadata


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Oracle’s Enterprise Ready Big Data Platform

Exadata is at the center of Oracle’s Big Data Strategy
Redefining General Purpose
New Generation of SPARC

SPARC SuperCluster
• Fastest General Purpose Platform

SPARC T4 Servers
• Biggest Single Generation Performance Boost in History

Solaris 11
• Breakthrough scale, virtualization and manageability
New | SPARC SuperCluster
Best for Oracle. Runs All Existing Workloads.

SPARC T4 Compute Pool
10 World Records over IBM and HP across every tier

Exadata Storage Cells
1.2M IOPS, 42 GB/s query throughput

Exalogic Elastic Cloud
10x Java performance

Integrated ZFS Storage
2x faster and ½ the price of NetApp

Solaris 11
Cloud provisioning in seconds
Unmatched Scalability

Cloud Built-In
Zero virtualization overhead

InfiniBand
5-8x the speed of current networks

Enterprise Manager
Up to 90% reduction of downtime due to proactive critical application patching
SPARC SuperCluster Architecture
Best infrastructure solution for enterprise applications

- Exadata Storage Servers
- SPARC T4-4 Compute Nodes
- ZFS Storage Appliance
- InfiniBand Switches

- 1,200 CPU threads
- 4 TB DRAM
- 97 to 198 TB Hard Disk
- 8.66 TB Flash
- 1.2M IOPS
- 42 GB/sec Storage Bandwidth
- 896 Gb/sec InfiniBand Interconnect
Exadata Storage Cells

• **Intelligent storage**
  – Smart Scan query offload
  – Scale-out storage

• **Smart Flash Cache**
  – Accelerates random I/O up to 30x
  – Doubles data scan rate

• **Hybrid Columnar Compression**
  – 10x compression for warehouses
  – 15x compression for archives

Data remains compressed for scans and in Flash
SPARC SuperCluster Management

• Converged Hardware Management

• Unified management of Servers, Storage, and Network Fabric
• Simplified management of virtual infrastructure for easy application consolidation
• Instant Network and Storage provisioning
• Automated update of all firmware and software components
• Direct connection to Oracle knowledge-base speeds problem resolution
SPARC SuperCluster is an Engineered System for General Purpose Computing, delivering data center consolidation, extreme performance, and lower TCO

Benefits
• Runs All Existing SPARC Solaris Workloads
• Application and DB consolidation on a single system

Unique Features
• SPARC T4 Processor
• Exadata and Exalogic Software
• Exadata Storage Cells
• Solaris 10 & 11
• InfiniBand backplane integration in Solaris, Java, DB
• Coordinates the entire solution, orchestrating dependencies to ensure fast & reliable failover and recovery
• Secure by Design: integrated crypto and Solaris features provide security for Oracle applications

More: www.oracle.com/supercluster
SPARC T4 Servers
SPARC T4
5x Per Thread Performance

- 3.0 GHz
- 8 Cores, 64 Threads
- Dynamic Threading
- Out of Order Execution
- 2 On Chip Dual-Channel DDR3 Memory Controllers
- 2 On Chip 10 GbE Networking
- 2 On Chip x8 PCIe gen2 I/O Interfaces
- 18 On Chip Crypto functions
- Balanced high-bandwidth interfaces and internals
- Co-engineered with Oracle software

10 World Records and Counting
SPARC T4: Processor Key Features

- Each Core has two Level 1 cache memories, one for data and one for instructions, each 16KB in size
- Each Core has a Level 2 unified cache, 128KB in size
- Caches are all inclusive: L3 inclusive of L2; L2 inclusive of L1 (in this context, ‘inclusive’ refers to the fact a cached entry is always present in the next higher level of cache)
- Each core on SPARC T4 is capable of OOO execution, dual-issue of instructions but in order commit.
- Each core on SPARC T4 also includes cryptographic acceleration hardware, accessible via user-level instructions.
# SPARC T4 Servers

<table>
<thead>
<tr>
<th></th>
<th>SPARC T4-1B</th>
<th>SPARC T4-1</th>
<th>SPARC T4-2</th>
<th>SPARC T4-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>SPARC T4 2.85GHz</td>
<td>SPARC T4 2.85GHz</td>
<td>SPARC T4 2.85GHz</td>
<td>SPARC T4 3.0GHz</td>
</tr>
<tr>
<td>Max Processor Chips</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Max Cores/Threads</td>
<td>8, 64</td>
<td>8, 64</td>
<td>16, 128</td>
<td>32, 256</td>
</tr>
<tr>
<td>DIMM Slots</td>
<td>16</td>
<td>16</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>Max Memory</td>
<td>256 GB</td>
<td>256 GB</td>
<td>512 GB</td>
<td>1 TB</td>
</tr>
<tr>
<td>Drive Bays</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>I/O Slots</td>
<td>2 x PCIe 2.0 EM, 2 NEM, 1 REM, 1 REM slots</td>
<td>6 LP x 8 PCIe 2.0, 4 x 1 GbE ports, 2 x 10 GbE XAUI ports</td>
<td>10 x PCIe 2.0, 4 x 1 GbE ports, 4 x 10 GbE XAUI ports</td>
<td>16 x PCIe 2.0 EM, 4 x 1 GbE ports, 8 x 10 GbE XAUI ports</td>
</tr>
<tr>
<td>Form Factor/RU</td>
<td>Blade</td>
<td>Rack 2U</td>
<td>Rack 3U</td>
<td>Rack 5 U</td>
</tr>
</tbody>
</table>

**Key Differentiators of SPARC T4**

- 5x single thread performance increase over SPARC T3 processor while retaining throughput performance of SPARC T3
- Expanded application workload fit to meet requirements for both multi thread and single thread applications
SPARC Future Work

2x application performance improvement every two years

Software in Silicon
- Security: Enhanced cryptography
- Oracle numbers Arithmetic Acceleration
- Hardware Decompression
- In Memory Columnar Database Acceleration
- Memory Versioning
- Low Latency Clustering

Increased Performance
- Higher core frequency
- Multiple pipelines per core
- Increased core counts per chip
- Larger caches
- More memory bandwidth
Solaris 11
#1 Enterprise Operating System
If It Must Run, It’s On Solaris

- Scalability and Performance
- Availability
- Security
- Efficiency

Solaris 11 Set the Standard…..
What’s New in Oracle Solaris 11

• Virtualization
  • Network, CPU/memory, network
• Installation and maintenance
  • Fast, safe, simplified
• Networking
• Security
• Performance and scalability
• Familiarity
Oracle Solaris 11
Built for Enterprise Clouds

Seamless Scaling with Hardware: 9 NEW World Records
Dynamic Threading + Next Gen I/O Terrabyte of Memory + 10,000s of threads

Simplified Administration: 4x faster upgrades, 2.5x faster reboots
 Provision in seconds + Fool-proof updates + Horizontal Scaling

Virtualization: Cloud provisioning in seconds, Near zero overhead
Virtualized network with QoS + Solaris 10 Zones + Built in

Efficient Data Management: 5x compression
Integrated deduplication, compression + Infinite snapshots and clones + No cost replication

Advanced Protection: 3x faster encryption
Hardware Accelerated Encryption + Integrated auditing + Advanced user access controls
Oracle Solaris 11

Performance

- Dynamic threads
- NUMA I/O
- Crypto acceleration
- Latency-aware kernel memory allocator
- Optimized shared memory
- Parallel network stack
- DTrace
- Adaptable thread and memory placement

Database
#1 TPC-C
#1 Oracle OLAP
#1 TDE Secure Queries
#1 SPC-1C
# Single-Sever TPC-H 3TB

Middleware/Apps
#1 Java (SPECjEnterprise)
#1 SAP (SAP-SD, ATO)
#1 E-Business Order to Cash
#1 Peoplesoft Payroll Batch

Web
#1 SPECweb2005
Oracle Solaris Roadmap

“Oracle is committed to continued development and support of Solaris. The potential synergy between Oracle software and Solaris is obvious.”
—Richard Fichera, Forrester

Solaris 10
Platform Support
Software Integration

Solaris 11
Software Lifecycle
Scalability
Networking
Security

Solaris 11
Update
High Availability
Memory
Scalability
Virtualization

Solaris 11
Update
Core Scalability

Solaris 11
Update
System Management
I/O Scalability

2010 2011 2012 2013 2014 2015

SPARC
T-Series 1-64 Socket + 20%

T-Series 1-4 Socket + 2x Throughput

T-Series 8-64 Sockets +6x Throughput +1.5x Single Strand

T-Series 8-64 Sockets +2x Throughput

SPARC 1-64 Sockets +2x Throughput +1.5x Single Strand

x86
Performance, Reliability, Power Management Optimizations for Latest-Generation x86 Processors

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Solaris 11 Express (Sep 2007 - )

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Scalability
Virtualization

Solaris 11
Update
Core Scalability

Solaris 11
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System Management
I/O Scalability

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Performance, Reliability, Power Management Optimizations for Latest-Generation x86 Processors
Oracle VM
New | Oracle VM 3.0

• Significantly enhanced Oracle VM Manager
  – Policy-driven power and resource management
  – Centralized network and storage configuration
  – Manage of thousands of VMs from one console
• High performance at scale
  – Up to 128 vCPUs and 1 terabyte of memory per VM
Oracle VM
High performance server virtualization

• State of the art features
  • Live migration, high availability, template deployment, dynamic resource scheduling, automatic power management

• Virtualize your entire data center
  • Oracle Linux, Oracle Solaris, and Microsoft Windows guests
  • Runs on x86 and SPARC

• Engineered for Oracle
  • Designed to run production database and middleware workloads
  • Built into Exalogic and SPARC SuperCluster engineered system
  • Certified for use with all Oracle products
Oracle VM Server for SPARC
Optimized for SPARC T4

• SPARC T4 Servers
  • Dynamic CPU threading controls to optimize performance under Oracle VM for SPARC

• SPARC SuperCluster T4-4
  • Built-in Oracle VM for SPARC
Ops Center
Oracle Enterprise Manager Ops Center Overview

Bundled in the Support Contract

• Most comprehensive Systems Management solution for physical & virtual systems

• Centralized end-to-end management
  -- Combines discover, provision, update, monitor and manage

• Extends to heterogeneous server environments
  -- e.g., patching Linux & Windows
New Oracle Enterprise Manager 12c
Complete Engineered System Management

- Single, vertically integrated console for the entire stack
- Deep manageability built into each tier
- **Complete management of Exadata, Exalogic, Exalytics, SPARC SuperCluster**
- Proactive support through My Oracle Support Integration

- Consolidation Planner
- Cloud Design and Setup
- Self-Service Provisioning
- Elastic Workload Management
- Metering and Chargeback

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Summary

• Start using features you already pay for
  • upgrade to Solaris 11, utilize BE and new IPS packaging
  • Start using Oracle Enterprise Manager 12c / Ops Center, deploy and better manage your environment
  • Try OVM 3.0 virtualization

• Investigate Engineered Solutions

• Investigate new T4s

• Resource on the Web http://search.oracle.com

• Oracle team contact for Hardware information
  • Jeff Jones, Hardware Sales Manager: j.jones@oracle.com
  • Patrick Houle, Hardware Sales Manager: patick.houle@oracle.com
  • Sean Rouillard, Hardware Sales Manager: sean.rouillard@oracle.com
  • Adrian Cervatiuc, Principal Sales Consultant: adrian.cervatiuc@oracle.com
  • Rolawe Bakare Sales Consultant: rolawe.bakare@oracle.com
Hardware and Software

Engineered to Work Together