SPARC Overview & News update
fall 2018
Overview of SPARC M8
SPARC

Performance

Security

Reliability
Oracle SPARC Processor Evolution

M8
32 x 5\textsuperscript{th} Gen Cores
64MB L3 Cache
5.0 GHz
SW in Silicon v2

T3
16 x 2\textsuperscript{nd} Gen Cores
6MB L2 Cache
1.7 GHz

T4
8 x 3\textsuperscript{rd} Gen Cores
4MB L3 Cache
3.0 GHz

T5
16 x 3\textsuperscript{rd} Gen Cores
8MB L3 Cache
3.6 GHz

M5
6 x 3\textsuperscript{rd} Gen Cores
48MB L3 Cache
3.6 GHz

M6
12 x 3\textsuperscript{rd} Gen Cores
48MB L3 Cache
3.6 GHz

M7
32 x 4\textsuperscript{th} Gen Cores
64MB L3 Cache
4.1 GHz
SW in Silicon v1

S7
8 x 4\textsuperscript{th} Gen Cores
16MB L3 cache
4.2 GHz
SW in Silicon v1

Guaranteed Binary Compatibility
SPARC M8: Performance Leadership Once Again

SPARC M8 is the world’s fastest conventional microprocessor

- 32-core, 5.0 GHz chip
- Record breaking Database, Java, Security benchmarks

#1
SPECjbb2015
153,352 Max jOPS

#1
OLTP
6,762,488 TPM

#1
Encryption
SHA512
104 GB/s

#1
In-Memory DB
430.7 QPM

#1
SPECjEnterprise 2010
34,259.69 EjOPS

And more...

(See Disclosure Slide)
Oracle’s SPARC M8 for Java

2x Faster Than x86

SPARC M8
chip, core: 1,32
5.0 GHz

Intel Skylake
chip, core: 1,28
2.5 GHz

Max jOPS per chip

SPECjbb2015 - See disclosure slide
Oracle SPARC Delivers **2x Better** Database Performance

Faster than AWS and IBM

**Oracle Database**

- **6.7M TPM**
- **211K /core**

**AWS i2.8xlarge**
- **1.1M TPM**
- **69K /core**

**IBM S824**
- **3.5M TPM**
- **148K /core**

**Oracle T8-1**
SPARC T8 vs T5, T4 per core

Get more value per core
SPARC T8 vs T5, T4 per processor

SPARC T4
chip, core: 1.8
2.8 GHz
1.0X

SPARC T5
chip, core: 1.16
3.6 GHz
2.4X

SPARC T8
chip, core: 1.32
5.0 GHz
3.6X

3.6x faster
Oracle’s New SPARC T8 and M8 Servers
Powered by the Oracle M8 processor

<table>
<thead>
<tr>
<th></th>
<th>T8-1</th>
<th>T8-2</th>
<th>T8-4</th>
<th>M8-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8 5.0GHz Procs</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Max Cores</td>
<td>32</td>
<td>64</td>
<td>128</td>
<td>256</td>
</tr>
<tr>
<td>Max Memory*</td>
<td>1 TB</td>
<td>2 TB</td>
<td>4 TB</td>
<td>8 TB</td>
</tr>
<tr>
<td>Storage (SSD/HDD)</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>-</td>
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<tr>
<td>Storage (NVMe)</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>12 (AIC)</td>
</tr>
</tbody>
</table>

* Using 64 GB DIMMs
Oracle’s SPARC M8 Processor

Software in Silicon v2

SQL in Silicon

Second-generation DAX for data analytics acceleration. Oracle Numbers units accelerate database processing.

Security in Silicon

Silicon Secured Memory protects in-memory data structures. No compromise wide key encryption, now including SHA3.

Place SW functions directly onto the processor

- Specialized units
- Off-load engines
Oracle DB In-Memory Delivers Transformational Performance

• Analytics & reporting run **100x faster** with new in-memory Column format
  – Optimized for vector processing
  – Pure in-memory, so changes are fast enabling mixed OLTP and analytics

• Table data kept in **BOTH** row and column format with full consistency
  – OLTP uses proven Oracle row format

• No app changes, trivial to deploy
  – Full Scale-Out, Scale-Up, HA, etc.
SQL in Silicon

Accelerate in-memory query performance

M8 Processor
8 dax units per processor

- Dedicated acceleration engines built on chip
  - Independently process streams of database column elements placed in system memory

- Frees cores for higher level SQL functions
  - Like adding 32 additional specialized cores to chip

- Acceleration engines can decompress data simultaneous to processing SQL functions
  - Like adding 64 extra cores for decompression
Oracle’s SPARC M8 for In-Memory Analytics
Faster Than x86 for Database Analytics

SPARC M8
chip, core: 1,32
5.06 GHz

Intel Skylake
chip, core: 1,24
2.7 GHz

queries per minute /chip

10x faster
Security in Silicon
32 Crypto Accelerators with the Broadest Set of Ciphers and Hashes
Offload the task of 16 different ciphers, including the popular RSA, SHA and AES
Oracle’s SPARC Processor Security
Silicon Secured Memory & End-to-End Encryption

Hardware-based memory protection and encryption prevents up to 90% of security vulnerabilities

Malicious attacks
Invalid/stale references
Buffer overflows

Database, App, & Web Tier

SECURE

UNSECURE

Only 2% Overhead with Oracle M8 or S7
Security In Silicon: Silicon Secured Memory

- Protects in memory data structures
- Application can only access its own memory region
- Pointer color (key) must match content color or program is aborted
  - Set on memory allocation, changed on memory free
- Easily identify memory allocation issues
- Improve SW quality and reliability
- Help to prevent security attacks
SPARC Platform
Fastest for Database and Java, Data Analytics Acceleration, Security in Silicon
MiniCluster S7-2
Turn-key, Secure Database and Application Machine

Open platform for 1000’s of Oracle and 3rd party applications, tools and frameworks

- Secure Database & Applications
- Virtual Assistant
- Operating System
- Virtualization
- Compute & Storage

Runs Existing and New Applications

MiniCluster S7-2
MiniCluster Hardware Architecture

- **10GbE**
  - (Base-T or Fibre, 2 ports per node)
- **10GbE**
  - (Redundant, Base-T)
- **SAS3**
  - (12 Gb/s, redundant)

- Compute Node #1
- Compute Node #2
- Disk Array
Minimal Need for OS Skills and Training

Introducing the MiniCluster Virtual Assistant

- Security & compliance
- Full-system patching
- Oracle RAC and Single Instance Oracle Database deployment
- Application VM provisioning
- Automatic performance tuning
- System health checks
MiniCluster S7-2 Virtual Assistant
NEW: MiniCluster SW 1.2.5.15
Support for latest Oracle Database versions

- Solaris 11.3 SRU34.4
- Grid Infrastructure 18c RU 3
- Oracle DB 18c RU 3
- Oracle DB 12.2, 12.1, 11gR2 with July 2018 RU/PSU
October 22–25, 2018
SAN FRANCISCO, CA

#OOW18

Oracle SuperCluster

oracle.com/openworld
Oracle SuperCluster M8

- High performance Oracle Database and Java machine
- Optimized for Oracle Database and Applications
- Integrated Compute, Storage, Networking, Virtualization, OS & Management
Oracle SuperCluster M8: Converged Compute, Network and Storage

Oracle M8
World’s Most Advanced Processor

Oracle InfiniBand Ultra-fast IO Fabric

Oracle ZS5 Powerful Application and System Storage

Oracle Exadata Storage World’s Best Oracle Database Storage
Oracle SuperCluster M8: Elastic Configurations
Low Cost Elastic Capacity on Demand

1. Start With Elastic Base Rack
2. Scale to Elastic Full Rack
3. Scale Further to Multi-Rack

- (3) Exadata Storage Servers
- (1) ZS5 Storage Appliance
- (2) InfiniBand leaf switches
- (0) InfiniBand spine switch

M8 Chassis, Compute & Memory
Extreme Flash Storage
High-Capacity Storage

Add Racks to Continue Scaling
Incrementally add Compute and/or Storage
Oracle SuperCluster Cloud Deployments

Managed Cloud

• Oracle Managed Cloud Services (OMCS)
  – Maintains data centers worldwide
  – Hosts many Oracle SuperCluster racks for customers
  – Combines the benefits of cloud-based hosting and SuperCluster capabilities
Oracle SuperCluster Cloud Deployments
IaaS with SuperCluster Virtual Assistant

• Simple, intuitive user interfaces (BUI, REST)
  – Virtual machines (VMs) created without sysadmin intervention
  – No understanding required of underlying hardware or software architecture
  – VM components drawn down automatically from resource pools
  – VMs can be resized or (cold) migrated
  – User chargeback based on resource usage

• End user responsible for managing and patching OS and applications
• Underlying cloud infrastructure managed centrally
Oracle SuperCluster Infrastructure-as-a-Service
IaaS VMs in Oracle SuperCluster M8

Created on Demand

IaaS VM
DB Domain

IaaS VM
DB Domain

IaaS VM
App Domain

IaaS VM
App Domain

IaaS VM
App Domain

CPU Repository

Memory Repository

Virtual IO Interface Repository

Created on Demand

Set up at Initial Install

Root Domain

Root Domain

User Managed

Control Plane
# Oracle Solaris 11.4 – Available Now!

**Solaris innovation continues**

<table>
<thead>
<tr>
<th>Secure</th>
<th>Simple</th>
<th>Cloud-Ready</th>
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<tbody>
<tr>
<td>• New application sandbox management tool</td>
<td>• Improved zone migration between systems using shared storage</td>
<td>• Enhanced secure remote administration</td>
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<tr>
<td>• Enhanced exploit mitigation with SPARC SSM</td>
<td>• New live zone reconfiguration support</td>
<td>• New dehydrated unified archives with lower archive sizes</td>
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<tr>
<td>• Expanded compliance assessment for multiple instances</td>
<td>• Easy monitoring, restart and notification of zone states</td>
<td>• Enhanced encryption controls - retrieve crypto keys from OASIS KMIP</td>
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<tr>
<td></td>
<td>• Improved ZFS replication</td>
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Beyond the Next Release

Further Simplify Lifecycle Management

• Lift and shift tools
  – Simplify transfer of workloads from standalone SPARC systems to SuperCluster

• Improved upgrade process
  – Speed up and simplify Quarterly Full Stack Download Patchs (QFSDP)
Oracle SPARC Solaris Roadmap

Publicly available at:
Oracle Solaris

- Deploy enterprise mission critical applications securely with no compromise
- Easy to apply update stream of monthly updates and quarterly critical patches
- Binary Application Guarantee
  - 20 years and counting! Now updated until 2021
- New Oracle Solaris 11.4 released in August 2018!
  - New capabilities with compatibility for 1,000’s of Oracle, ISV and customer apps

Continued Support To At Least 2034

http://www.oracle.com/technetwork/server-storage/solaris/overview/guarantee-jsp-135402.html