Oracle Solaris

Continuous innovation & Investment Protection on the journey to the cloud.

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SVP, Oracle Solaris Engineering
March 6, 2018

Safe Harbor Statement

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.

The IT Modernization Challenge

Mature business critical applications

- Delivering critical services
- Costly and difficult to replace

Yet Infrastructure is often obsolete

- Increasing security risk
- Complex, bespoke management
- Lack of real-time insight
- Lack of capacity

Few Options for IT Modernization

Choices are not good:

- Do nothing

- Change everything

What if There Were a Better Way?

Deploy Business Critical Apps on Modern Enterprise UNIX™ Infrastructure

- Leverage investments without starting over

- Improved security, capacity

- Integration with modern tooling

- Simplified management and service delivery

- Clear path to the cloud

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SOLARIS

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Oracle Solaris – Engineering Ethos
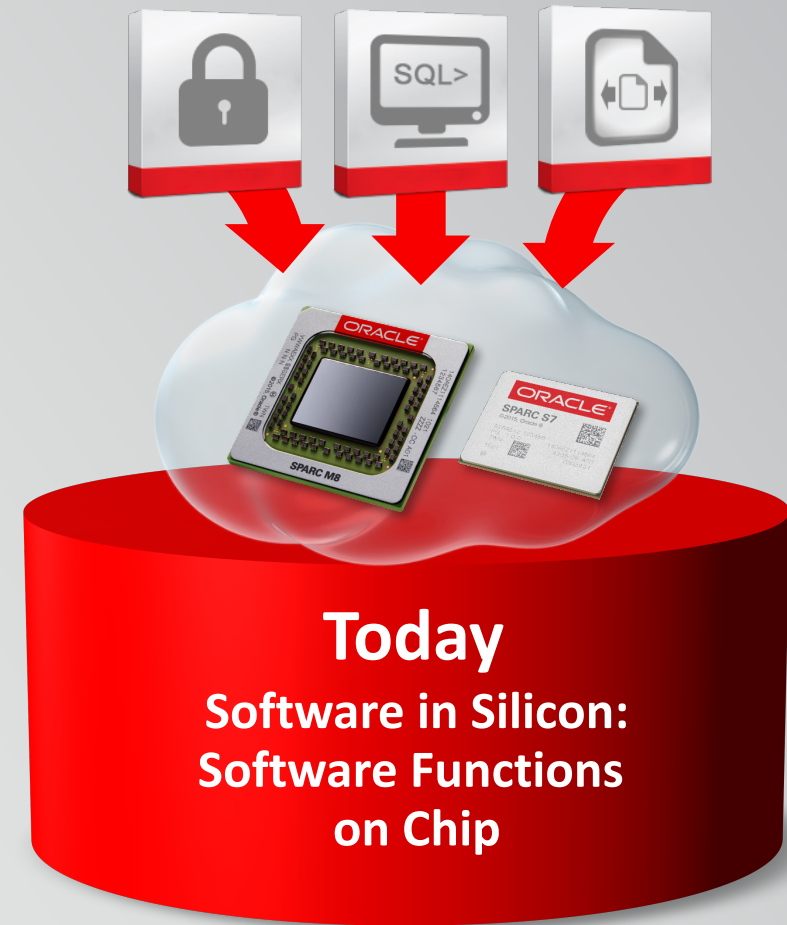
Security Everywhere

Efficient

Open & Compatible

ANSIBLE puppet labs CHEF

No Compromise Performance

Best Platform for Oracle

Java ORACLE® Database

Today
Software in Silicon:
Software Functions
on Chip

ORACLE®

All Existing Applications Work

Solaris Binary Compatibility Guarantee Protects Your Investment On-Premises and in the Cloud
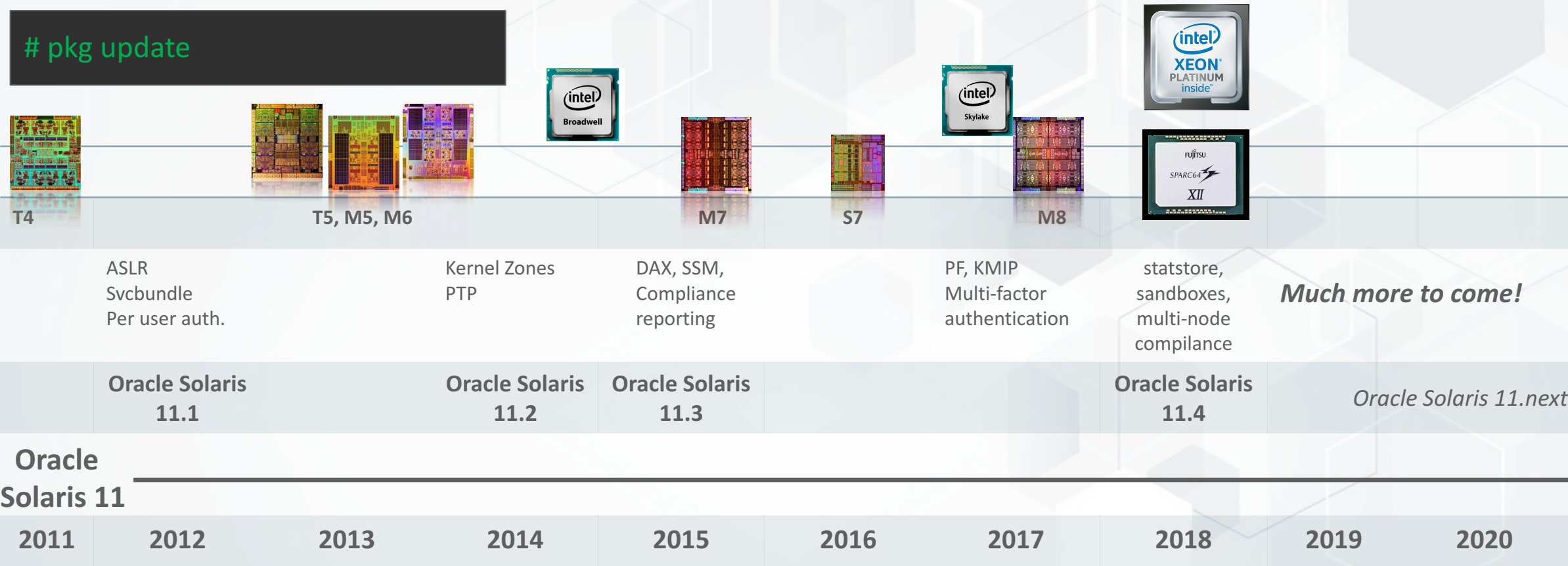
Solaris Directions

Agile and responsive development

- Future features and functionality in Solaris will continue to be delivered through Solaris 11 dot releases instead of more disruptive major releases.

- Addresses customer requirements for an agile and smooth transition path between versions, providing ongoing innovation with assured investment protection.

- Allows us to respond quicker to customer and marketplace demands.

- Oracle Solaris 11 and Oracle Solaris Cluster 4 Premier and Extended Support lifespans to January 2031 and January 2034, respectively.

Approachable innovation

- 7+ years of seamless innovation delivery in Oracle Solaris 11

pkg update

T4	T5, M5, M6	M7	S7	M8	
	ASLR Svcbundle Per user auth.	Kernel Zones PTP	DAX, SSM, Compliance reporting		PF, KMIP Multi-factor authentication	statstore, sandboxes, multi-node compilance	*Much more to come!*
	Oracle Solaris 11.1	Oracle Solaris 11.2	Oracle Solaris 11.3			Oracle Solaris 11.4	*Oracle Solaris 11.next*

Oracle Solaris 11

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020

20+ Years of Application Binary Compatibility

Solaris Continuous Delivery

New capabilities delivered in recent 11.3 SRUs

- Security
  - KMIP
  - Multi-factor authentication
  - SSM enhancement
  - Package signing enhancements
  - MIT Kerberos V5 update -> 14.4
- Oracle Database Integration
  - OIC for Database 12.2
  - eXtended Reliable Connected Transport

- Platform
  - SPARC M8, Fujitsu SPARC Athena++
  - Intel Skylake
  - Broadcom 25Gb, Intel 10GbE Ethernet
  - DAX APIs for SPARC M7, M8
- Diagnose-ability & Maintain-ability
  - Fast SRIOV I/O failover
  - SCSI tracing
  - Watchpoints via SSM

New Capabilities in Solaris 11.4 Beta

Solaris Innovation continues

- Security
  - Enhanced exploit mitigation with SPARC SSM
  - Trusted Services via SMF
- Data Management
  - Compressed & resumable replication
  - Scrub scheduling
  - Asynchronous data set destroy

- Deployment
  - Agent-less configuration and management via REST
  - Configuration at Scale via Puppet or Chef
  - Scalable Zone Boot Environment Management
- Networking
  - 802.1x
  - Network configuration via SMF and AI

And much more!

Up to date bundled software

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Solaris

Table 1 Compilers and Interpreters

Software	Oracle Solaris 11.3 Versions	Oracle Solaris 11.4 Versions
gcc	3.4, 4.5, 4.7, 4.8	4.9, 5.5
Java	7, 8	8
Python	2.6, 2.7, 3.4	2.7, 3.4, 3.5
Perl	5.8, 5.12	5.22, 5.26.1
PHP		
Ruby		
TCL/TK		
LLVM/Clang		
Go		

Table 2 Developer and DevOps Tools

Software	Oracle Solaris 11.3 Versions	Oracle Solaris 11.4 Versions
MySQL	5.1, 5.5, 5.6	5.5, 5.6, 5.7
Git	1.7	2.15
GDB	7.6	8
Mercurial	3.4	4.3
Puppet	3.6	4.1
Cmake		
Oracle Instant Client		

Table 4 Network Services and Clients

Software	Oracle Solaris 11.3 Versions	Oracle Solaris 11.4 Versions
Apache HTTPD	2.2, 2.4	2.4
Tomcat	6.0, 8.0	8.5
SSH	SunSSH, OpenSSH 6.5	OpenSSH 7.6
Samba	3.6	4.7
Postfix	2.11	3.2
ISC BIND	9.6	9.1
firewall	IPfilter, PF	OpenBSD 5.5 Packet Filter (PF)
Kerberos	Sun fork	1.15
Wireshark	1.12	2.4
Open Fabric Enterprise Distribution	–	3.18

Oracle Solaris incudes more than 1500 regularly updated open source and 3rd party packages
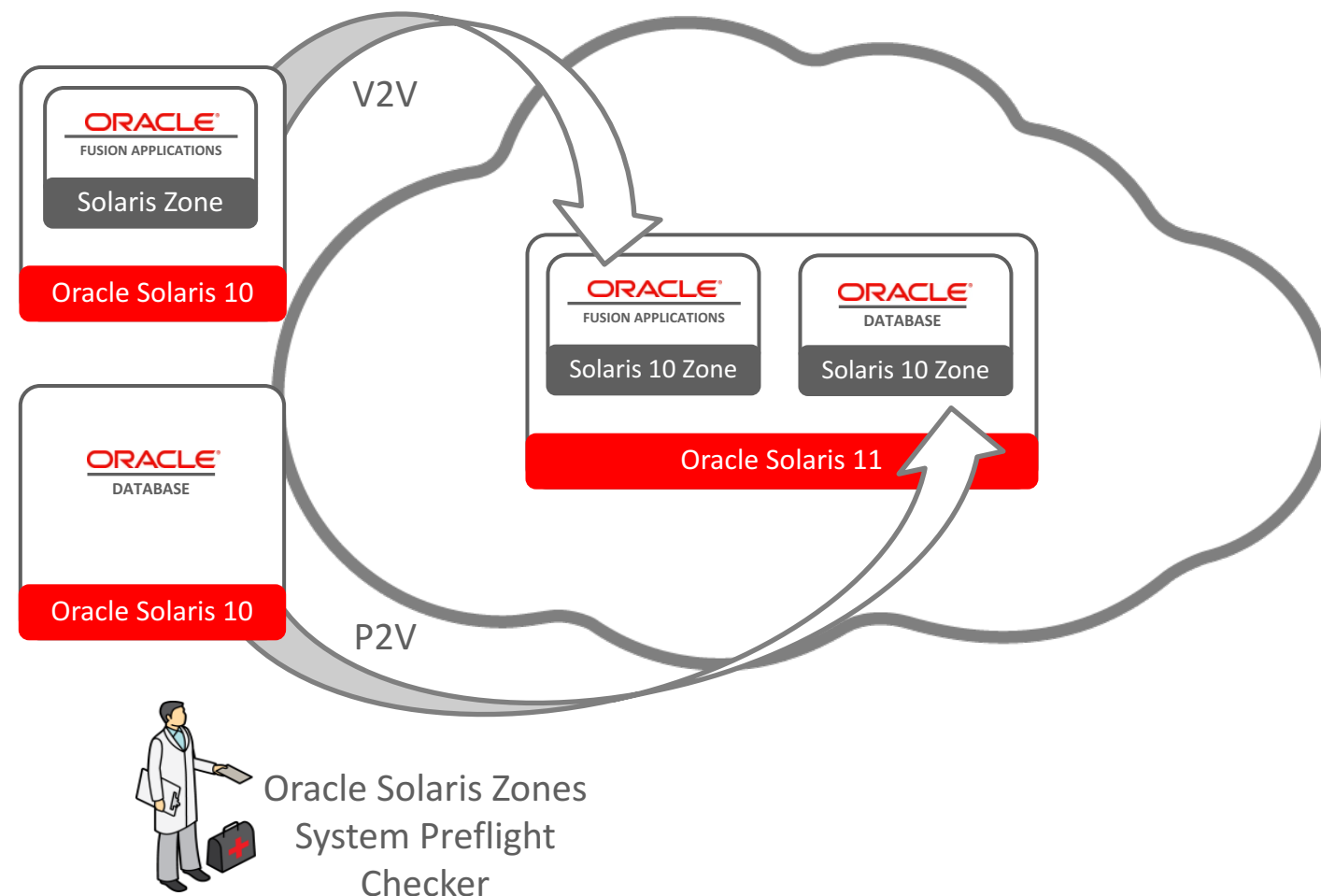
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Continuously maintained Open Source Software

- Popular Open Source utilities, services, productivity and developer tools that complement your Oracle Solaris distribution
  - Built, maintained, signed and delivered by Oracle

- > 1500 3rd party components are delivered with Solaris 11
  - ~150 components updated in SRU since release of Solaris 11.3
  - > 500 additional components updated in Solaris 11.4

- Selected updated components are regularly made available for evaluation via the Solaris "pre-release" repository

Built-in Investment Protection

- 20+ years of binary compatibility
  - **Applications just work on newer Solaris releases**
- Fast & simple migration:
  - Reduce risk with automated checks before you move
  - Tools move you quickly and simply
  - Migrate your S10 environments in minutes

V2V

ORACLE®
FUSION APPLICATIONS
Solaris Zone
Oracle Solaris 10

ORACLE®
DATABASE
Oracle Solaris 10

ORACLE®
FUSION APPLICATIONS
Solaris 10 Zone

ORACLE®
DATABASE
Solaris 10 Zone

Oracle Solaris 11

P2V

Oracle Solaris Zones System Preflight Checker

Preview in Solaris 11.4 Beta…
Admin Web Dashboard

Real-time and historical data

- Essential statistics collected continuously
- More health and performance data acquired instantly
- Compliance and security statistics for authorized users

Lightweight intuitive web based UI

- Designed for minimal overhead
- No Agents to install
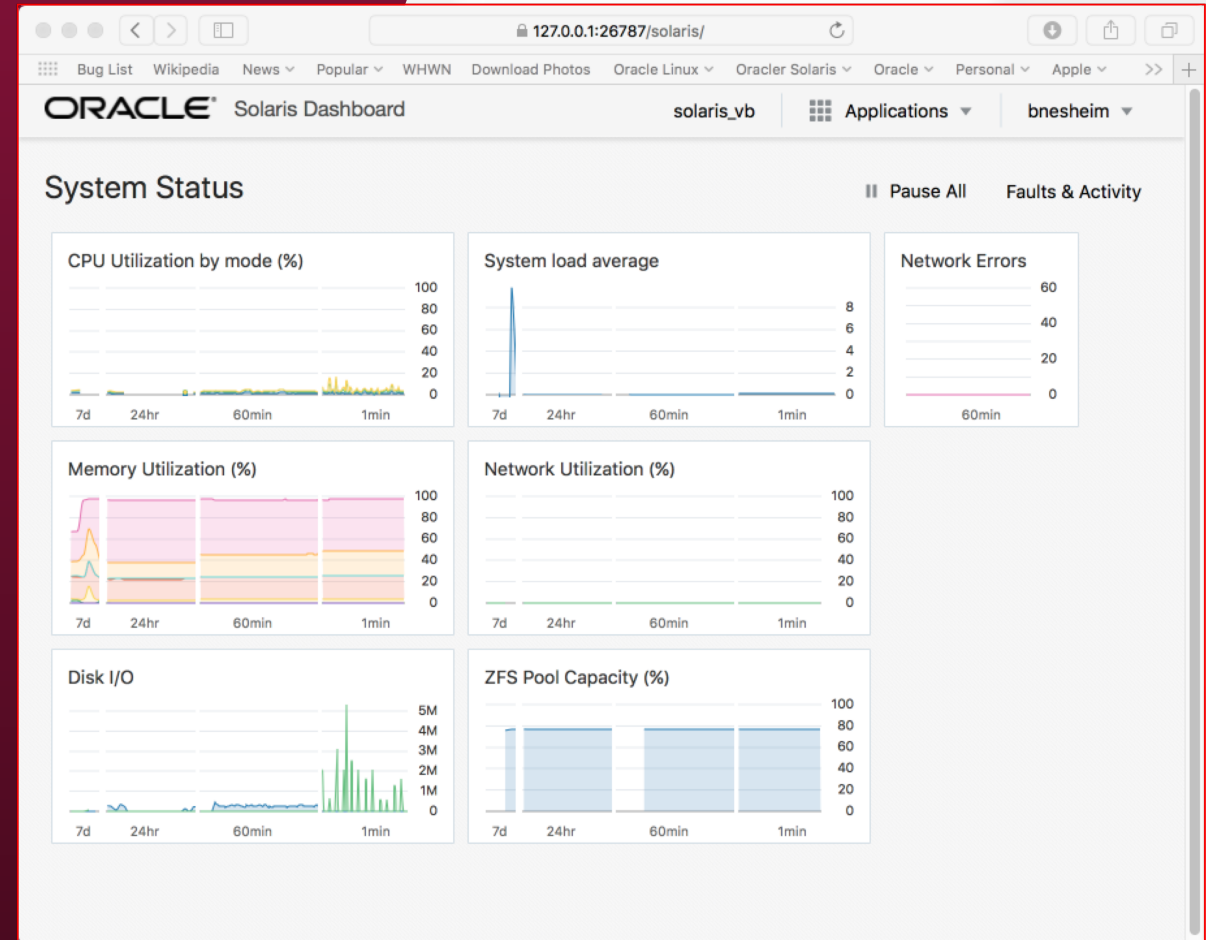
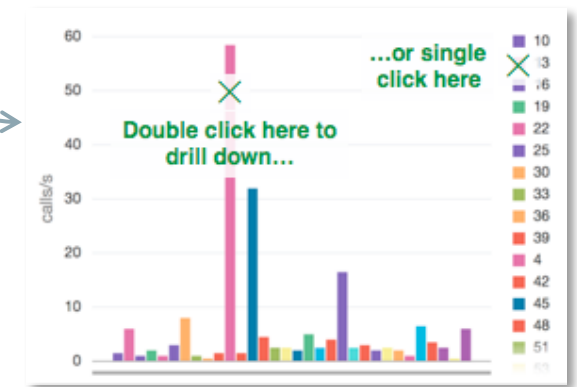# Facilitating the journey from observation to insight

Select resource

Specialized diagnostics sheets
System resources, Java, Database, …

Drill-down

Navigate in time
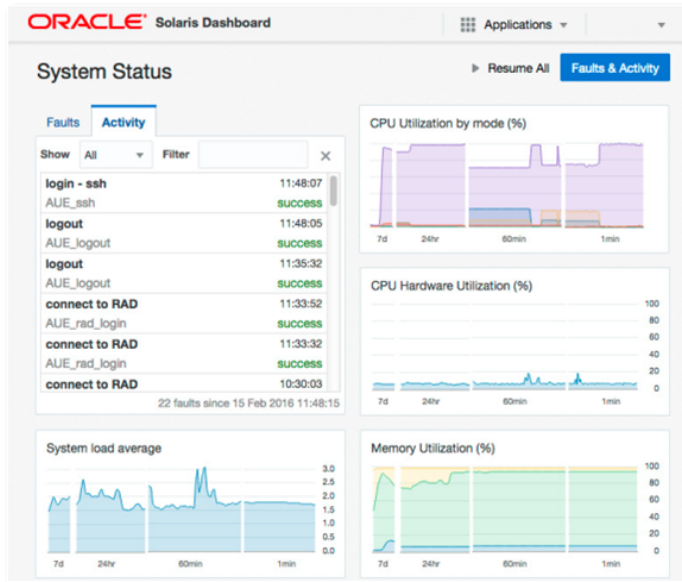
Dashboard - System Status at a glance
Basic system configuration
Historical system data
System faults and activities

Correlate different time periods
and statistics

Explore specific data sets

Not all good things can last forever...

- Features depreciated or removed in Oracle Solaris 11.4 Beta

- Pre-2011 SPARC platforms
  - MX000, T1000, T2000, T5XX0, T3

- Pre-2011 x86 chipsets

- OpenStack

- MLS Gnome-2 desktop
  - Replaced with "generic" Gnome-3

Planning quarterly 11.3.x sustaining releases for customers unable to move
  - *Will include only those CRITICAL Security and availability fixes applicable to depreciated platforms or software capabilities.*

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Generic Infrastructure Delivers Generic Results

Generic x86 servers, operating system, hypervisor, networking and storage

Substandard Performance:
Less work per core, increasing licensing costs

Increased Operational Effort:
IT tunes, patches and supports multi-vendor complexity

Inefficient Use of Resources:
More hardware is the only answer when more is needed

No Integrated Security:
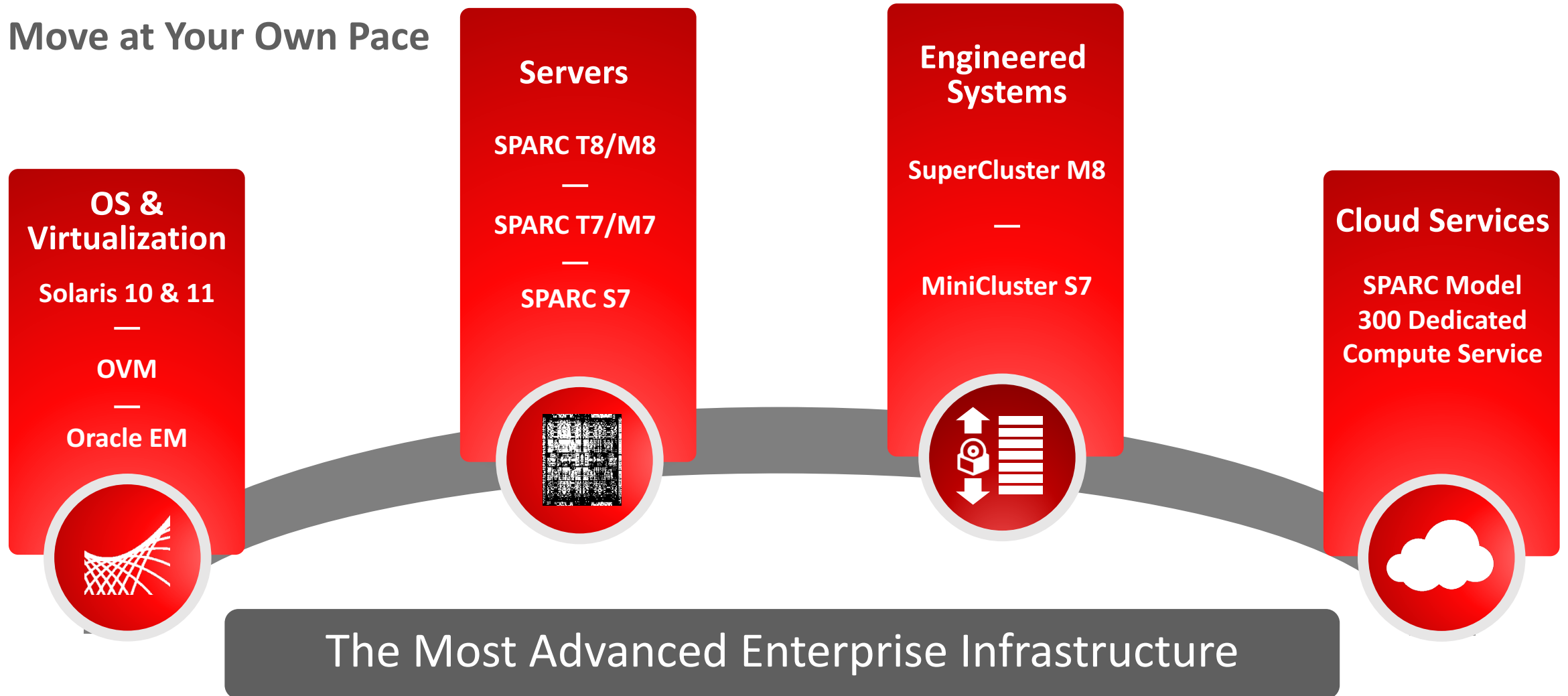Advanced security technologies are not deeply integrated

No Cloud Insurance:
Few compatible public cloud consumption options

Optimized Infrastructure for Superior Results

Move at Your Own Pace

OS & Virtualization

Solaris 10 & 11

—

OVM

—

Oracle EM

Servers

SPARC T8/M8

—

SPARC T7/M7

—

SPARC S7

Engineered Systems

SuperCluster M8

—

MiniCluster S7

Cloud Services

SPARC Model 300 Dedicated Compute Service

The Most Advanced Enterprise Infrastructure

ORACLE®

SPARC Platform

Fastest for Database and Java, Data Analytics Acceleration, Security in Silicon

SuperCluster M8 · M8-8 · T8-4 · T8-2 · T8-1 · MiniCluster S7 · S7-2L · S7-2
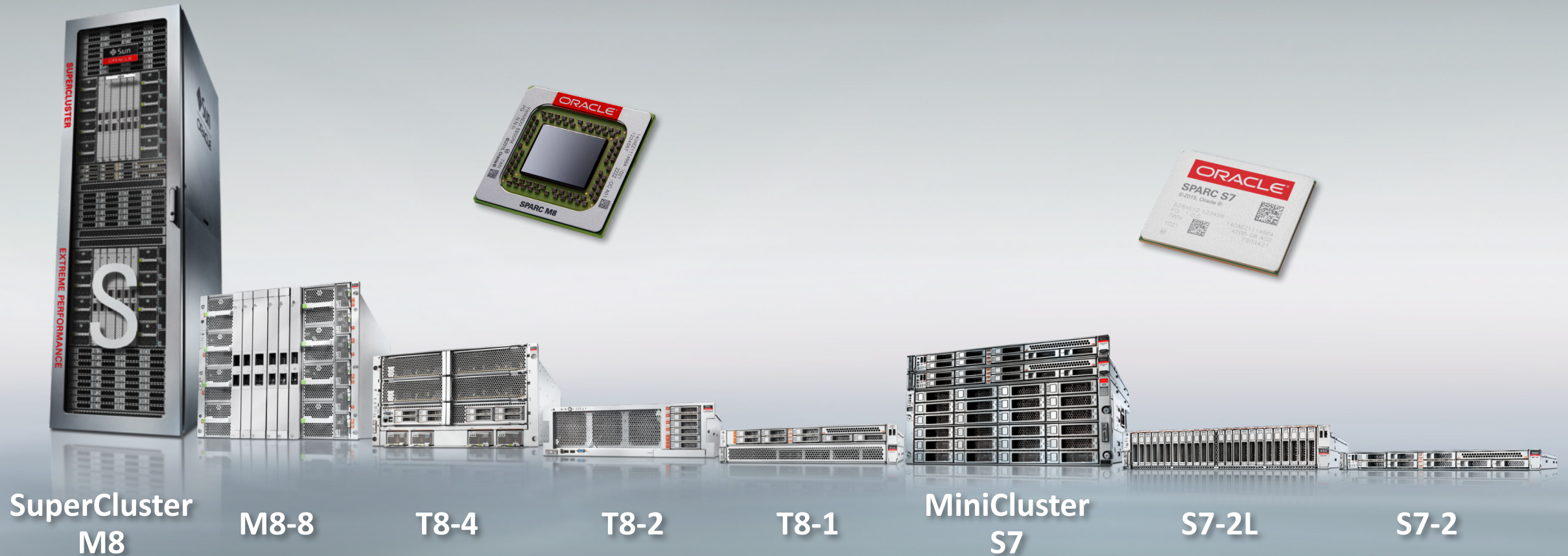
Security in Silicon is More Efficient than Security in Software

Security-in-Silicon makes enterprise-wide encryption practical

Protection from attacks against data
in memory,
on media,
or over the network
with virtually no
performance impact
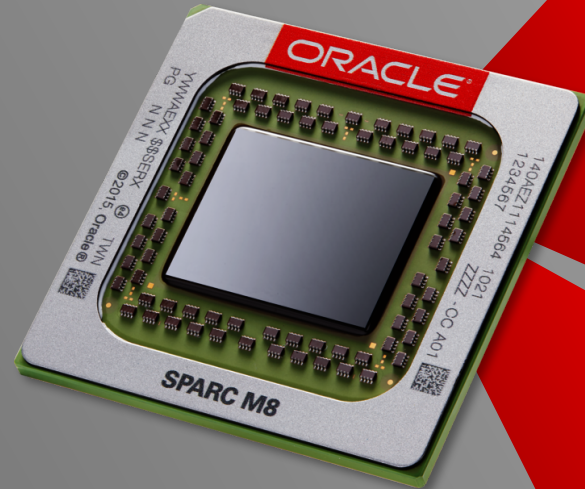
Silicon Secured Memory

Near-zero-overhead
Cryptographic Acceleration

SPARC M8

Oracle SuperCluster M8

High performance Oracle Database & Java machine

- **Optimized for Oracle Database and Applications**

- **Integrated Compute, Storage, Networking, Virtualization, OS & Management**

- **Supports thousands of applications on Oracle Solaris 10 & 11**

Oracle MiniCluster S7-2

Simple & Secure Database & Application Consolidation

Database & Applications

Virtual Assistant

Operating System

Virtualization

Compute & Storage

Runs
Your Existing
and New
Applications

ORACLE 12c
DATABASE

informatica

ORACLE
E-BUSINESS SUITE

ORACLE
ENDECA

Neusoft®

§sas

ORACLE
FUSION MIDDLEWARE

ORACLE
BUSINESS INTELLIGENCE

Java

Infosys®
Finacle

ORACLE
JD EDWARDS

SAP

ORACLE
FINANCIAL SERVICES

TEMENOS
The Banking Software Company

Ruby
RAILS

ORACLE
PEOPLESOFT

ORACLE
SIEBEL

SIEMENS

and 1000's
more

MiniCluster S7-2
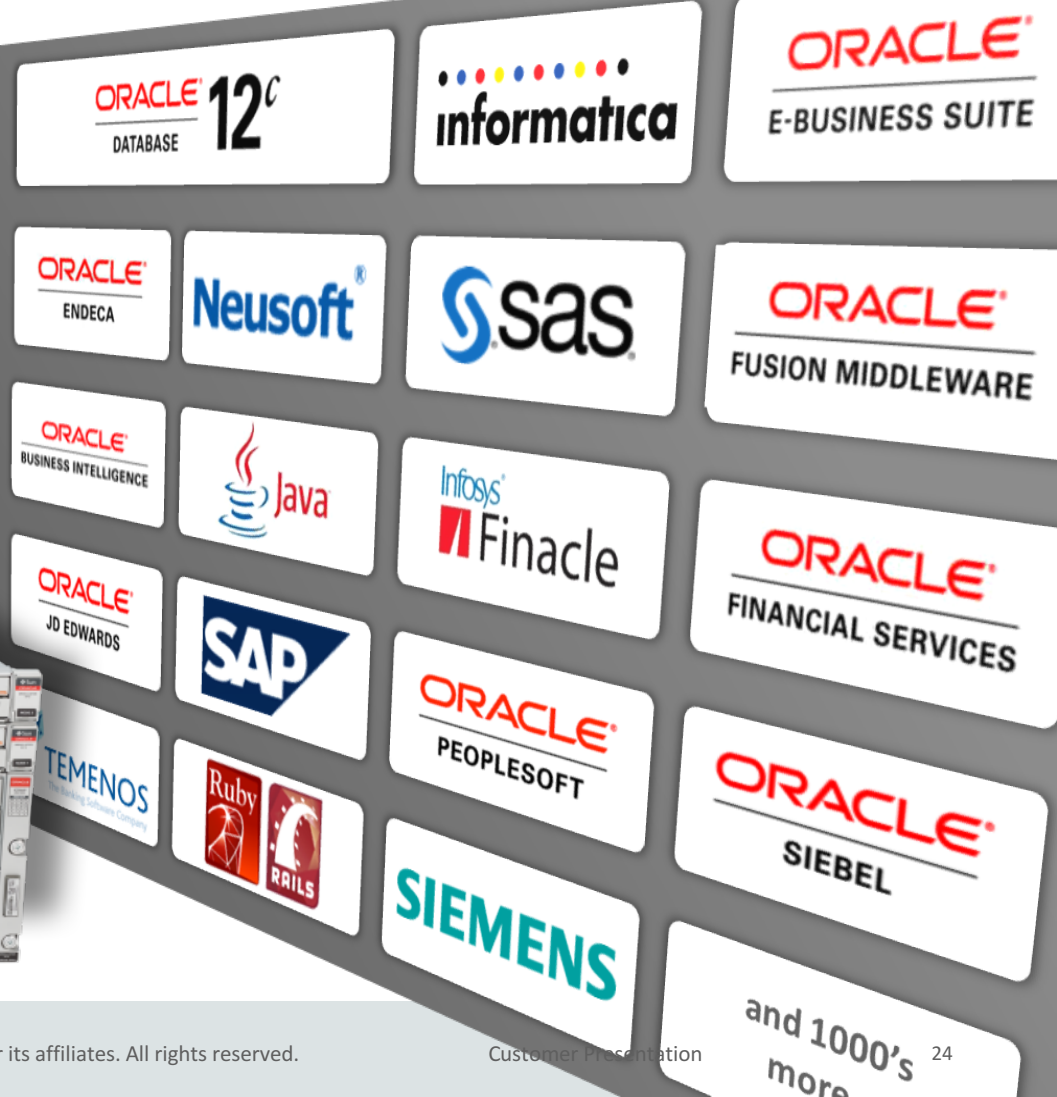
Solaris in Oracle Cloud Infrastructure Classic

Available today!
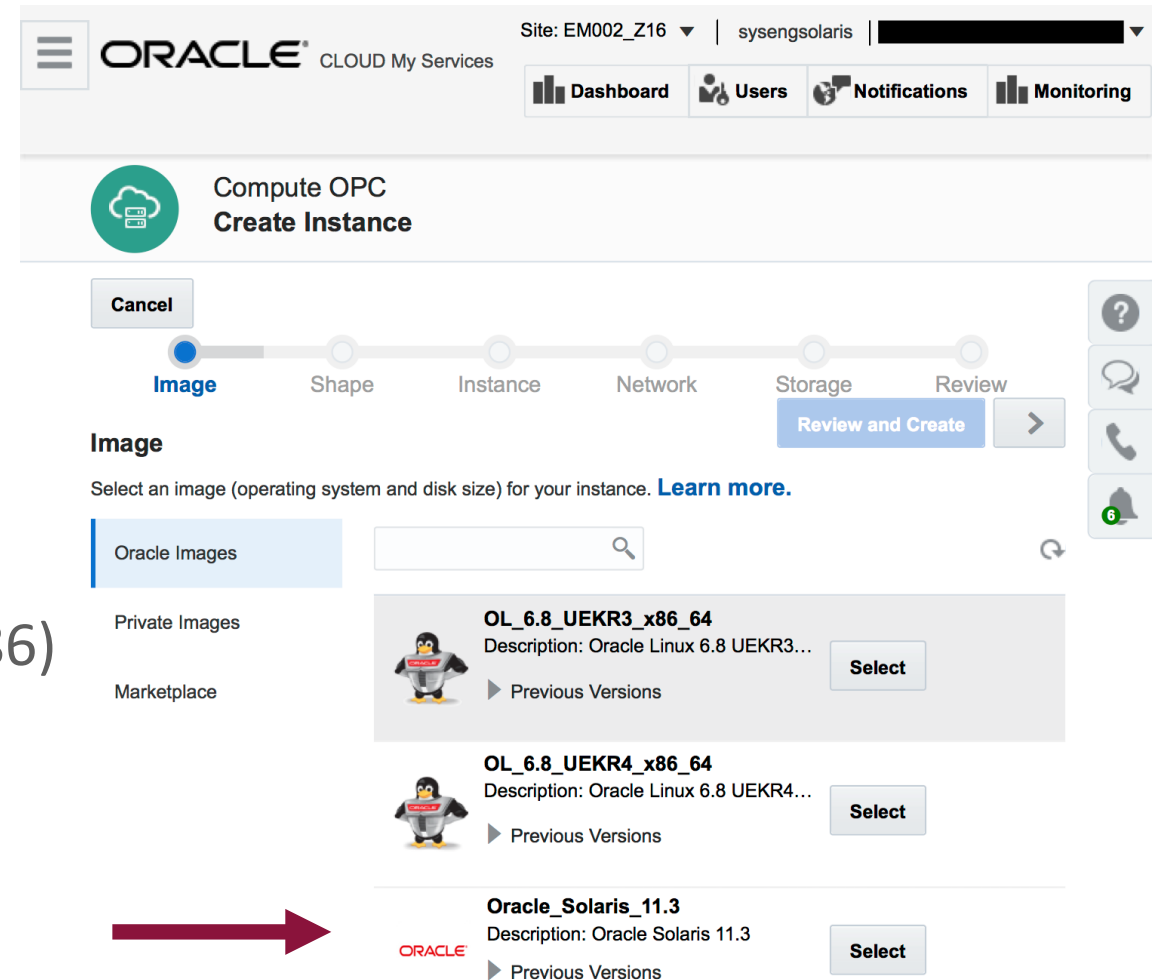
DEDICATED COMPUTE

SPARC Model 300

- Also Virtual Machine Compute (x86) & Dedicated Compute (x86)

Summary: Oracle Solaris Directions

- Long Term Investment Protection
  - Oracle Solaris 11 Support through at least 2034

- Easy-to-apply Update Stream
  - Monthly support updates
  - Quarterly Critical Patch Updates

- 20+ year history of Guaranteed Application Binary Compatibility

- Lifetime Support for Oracle Solaris Legacy environments

- Secure, up to date Platform
  - Includes more than 1500 regularly updated widely used open source packages

- Built-in on-prem and cloud platform migration tools

- Continuous Innovation
  - New HW support and product enhancements included in monthly support stream & periodic update releases.

Oracle Solaris 11

Your secure foundation for cloud-ready enterprise UNIX™ innovation

ORACLE®
Solaris

Security/ Compliance
HW based application protection
Time and role based access management
Immutable VMs; integrated compliance validation

Efficiency
Engineered for Oracle DB & Enterprise Applications
Zero-Overhead, Secure Virtualization
Extreme Scalability

Simplicity
1-Step network based update & rollback
Continuous delivery
Built in migration, archival and recovery tools

Investment Protection
One OS, any cloud
1000's of applications
Application Binary Guarantee

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Required Benchmark Disclosure Statement

- Two-tier SAP Sales and Distribution (SD) Standard Application benchmarks SAP Enhancement package 5 for SAP ERP 6.0 as of 3/26/14:SPARC M6-32 (32 processors, 384 cores, 3072 threads) 140,000 SAP SD users, 32 x 3.6 GHz SPARC M6, 16 TB memory, Oracle Database 11g, Oracle Solaris 11, 0.58 resp time, Cert# 2014008. IBM Power 780 (12 processors, 96 cores, 384 threads) 57,024 SAP SD users, 12 x 3.72 GHz IBM POWER7+, 1536 GB memory, DB210, AIX7.1, 0.98 resp time, Cert#2012033. Fujitsu PRIMEQUEST 2800E (8 processors, 120 cores, 240 threads) 47,500 SAP SD users, 8 x 2.8 GHz Intel Xeon Processor E7-8890 v2, 1024 GB memory, SQL Server 2012, Windows Server 2012 Standard Edition, 0.97 resp time, Cert# 2014003. SPARC T5-8 (8 processors, 128 cores, 1024 threads) 40,000 SAP SD users, 8 x 3.6 GHz SPARC T5, 2 TB memory, Oracle Database 11g, Oracle Solaris 11, Cert# 2013008. IBM Power 760 (8 chips, 48 cores, 192 threads) 25,488 SAP SD users, 8 x 3.41 GHz IBM POWER7+, 1024 GB, DB2 10, AIX 7.1, Cert#2013004. IBM Power S824 (4 processors, 6-cores/chip 24cores, 192threads) 21,212 SAP SD users, 4x 3.52GHZ Power8, 512 GB memory DB2 10.5, AIX 7.1, Cert# 2014016. Two-tier SAP Sales and Distribution (SD) Standard Application benchmarks SAP Enhancement package 4 for SAP ERP 6.0 as of 4/30/12. IBM Power 795 (32 processors, 256 cores, 1024 threads) 126,063 SAP SD users, 32 x 4 GHz IBM POWER7, 4 TB memory, DB2 9.7, AIX7.1, Cert#2010046. SPARC Enterprise Server M9000 (64 processors, 256 cores, 512 threads) 32,000 SAP SD users, 64 x 2.88 GHz SPARC64 VII, 1152 GB memory, Oracle Database 10g, Oracle Solaris 10, Cert# 2009046. SAP, R/3, reg TM of SAP AG in Germany &other countries. info www.sap.com/benchmark SPEC & benchmark names

- SPEC and the benchmark name SPECvirt_sc are registered trademarks of the Standard Performance Evaluation Corporation. Results from www.spec.org as of 3/5/2014. SPARC T5-2, SPECvirt_sc2010 4270 @ 264 VMs; HP ProLiant DL380p Gen8, SPECvirt_sc2010 2442 @ 150 VMs; IBM x3850 X5, SPECvirt_sc2010 3824 @ 234 VMs; IBM Flex System x240, SPECvirt_sc2010 2741 @ 168 VMs; HP Proliant BL620c G7, SPECvirt_sc2010 1878 @ 120 VMs.

- Intel's server virtualization benchmark as found 2/28/2014 in the presented pdfs at http://www.intel.com/content/www/us/en/processors/xeon/xeon-intel-server-processor-comparison-guide.html, http://www.intel.com/content/www/us/en/data-center/server-consolidation-and-virtualization-brief.html, and http://www.intel.com/content/www/us/en/processors/xeon/xeon-e5-brief.html. The pdfs can be found directly at Intel xeon-intel-server-processor-comparison-guide.pdf, Intel server-consolidation-and-virtualization-brief.pdf, and Intel xeon-e5-brief.pdf with local copies available xeon-intel-server-processor-comparison-guide.pdf, server-consolidation-and-virtualization-brief.pdf, and xeon-e5-brief.pdf. The Intel information reads: "New Configuration and Score on Benchmark: Intel Server Board S2600CP platform with two Intel Xeon Processor E5-2697 v2 (2.7 GHz, 12-core, 30 MB L3 cache, 8.0 GT/s, 130W, C0-stepping), Virtualization Technology Enabled, Turbo Enabled, HT Enabled, NUMA Enabled, MLC Spatial Prefetcher Enabled, DCU Data Line Prefetcher Enabled, 256 GB memory (16x 16 GB DDR3-1866 DR REG ECC), 128 GB SATA SSD, ESXi 5.1(build 799733). Source: Intel TR#1359 as of 24 July 2013. Score: 2246 @ 144VMs"

- TPC Benchmark C, tpmC, and TPC-C are trademarks fo the Transaction Processing Performance Council (TPC). SPARC T5-8 (www.tpc.org/1792) 8,552,523 tpmC at $0.55 USD/tpmC available 9/25/2013. Oracle Sun Server X2-8 (www.tpc.org/1787) 5,055,888 tpmC at $0.89 USD/tpmC, available 7/10/12. Oracle SPARC SuperCluster (www.tpc.org/1780) 30,249,688 tpmC at $1.01 USD/tpmC, historical result. IBM Power780 Cluster (www.tpc.org/1777) 10,366,254 tpmC at $1.38 USD/tpmC, historical result. IBM Power 780 Server (www.tpc.org/1773) 1,200,011 tpmC at $0.69 USD/tpmC, historical result. Cisco UCS C240 M3 (www.tpc.org/1789) 1,609,186 tpmC at $0.47 USD/tpmC, available 9/27/12. Results as of 8/22/14. Source: http://www.tpc.org/tpcc.

- TPC Benchmark, TPC-H, QphH, QthH, QppH are trademarks of the Transaction Processing Performance Council (TPC). Results as of 8/22/14, prices are in USD. SPARC T5-4 (www.tpc.org/3288) 409,721 QphH@3,000GB at $3.94 USD/QphH@3,000GB, available 9/24/13; SPARC T4-4 (www.tpc.org/3278) 205,792 QphH@3,000GB at $4.10 USD/QphH@3,000GB, available 5/31/12; SPARC Enterprise M9000 (www.tpc.org/3262) 386,478 QphH@3,000GB, $18.19 USD/QphH@3,000GB, historical result; SPARC Enterprise M9000 (www.tpc.org/3258) 198,907 QphH@3,000GB at $15.27 USD/QphH@3,000GB, historical result; IBM Power 780 (www.tpc.org/3277) 192,001 QphH@3,000GB at $6.37 USD/QphH@3,000GB, available 11/30/11.

- SPC Results as of September 10, 2013, for more information go to http://www.storageperformance.org/results SPC-2. Results for Oracle ZFS Storage ZS3-4 are 17,244.22 SPC-2 MBPS™, $22.53 SPC-2 Price-Performance. Full results at http://www.storageperformance.org/results/benchmark_results_spc2#b00067. Results for IBM DS8870 are 15,423.66 SPC-2 MBPS, $131.21 SPC-2 Price-Performance. Full results at http://www.storageperformance.org/results/benchmark_results_spc2#b00062. Results for HP P9500 XP Disk Array are 13,147.87 SPC-2 MBPS, $88.34 SPC-2 Price-Performance. Full results at http://www.storageperformance.org/results/benchmark_results_spc2#b00056. ZS3-2 Results as of June 25, 2014, for more information go to http://www.storageperformance.org/results SPC-2. Results for Oracle ZFS Storage ZS3-4 are 16,212.66 SPC-2 MBPS™, $12.08 SPC-2 Price-Performance. 3.67 SPC-2 MBPS™ / WATT. Full results are available at http://www.storageperformance.org/results/benchmark_results_spc2#be00002

- SPEC SFS SPEC & benchmark names SPECfp, SPECint are registered trademarks of the Standard Performance Evaluation Corporation. Results as of September 10, 2013, for more information see www.spec.org. For details on performance and price comparisons see http://www.oracle.com/us/solutions/performance-scalability/sun-storage-gateway-160373.html

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