Keynote:
Oracle Infrastructure Strategy, Update and Roadmap

Secure, Scalable, Reliable Mission Critical Compute
On-premise and Cloud Driven

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Transformational Technologies – Where YOU Want Them

**On-Premises**
Cloud Ready Systems: Engineered Systems, Servers, Storage, and more...

**Cloud@Customer**
Cloud Machines

**Oracle Cloud**
IaaS, SaaS, PaaS

- Customer Data Center
- Purchased
- Customer Managed

- Customer Data Center
- Subscription
- Oracle Managed

- Oracle Cloud
- Subscription
- Oracle Managed

Engineered Systems
- SPARC
- x86
- Solaris
- Linux
- Storage
- Archive
- Network
# Full-Stack Integration Reduces Operations Risk

## Unique Full-Stack Security
- All layers pre-**configured**, pre-**tuned**, pre-**debugged**
  - DB, OS, drivers, firmware, network, servers, storage

## Unique Full-Stack Reliability
- All users run identical full stack
  - You get:
    - Bank tested full-stack **HA**
    - Telco tested full-stack **scaling**
    - Government tested full **security**

## Unique Full-Stack Support
- One support team expert in and accountable for full stack
- Oracle performs **free full-stack updates and 24/7 monitoring**

## Unique Full-Stack Management
- Full-stack management tool
- Drill down from DB to storage and up from storage to DB
SPARC S7 is 1.6x to 2.1x faster than x86

x86 per core performance is stalled, Intel has run out of steam

- It's more important how you use transistors, than the number transistors you make (Moore's Law)

"per core = (server performance)/(server core count)"
Solaris Product Direction Aligns to Customers and Industry
Continuous Delivery Model For New Features and Functionality

Seamless Upgrades Enable Agile Incorporation of New Capabilities with Guaranteed Compatibility for 1,000’s of Oracle, ISV, and Customer Applications
Current SPARC Transformational Performance and Scale

1.5x Better Per Core Performance Than x86 for Database & Java, 10x Faster Analytics

SPARC M7 is the World’s Fastest Conventional Microprocessor

#1 SPECjEnterprise2010
1-chip
25,093.06 EjOPs

#1 SPECfp_rate2006
1-chip
832 peak

#1 SPECint_rate2006
1-chip
1,200 peak

#1 SAP-SD
2 processor
30,800 SAPs

And more…

Software in Silicon Adds Revolutionary HW/SW Co-Engineering for Security and Analytics

Only 32-Core 4+ GHz Chip - Only Zero Overhead Encryption - Only Built-In Data Analytics Accelerators

(See Disclosure Slide)
SPARC: Best for Enterprise Computing, Anywhere

2010 – 2015: Laggard to Leader
8x Performance Increase.
Dramatic Investment in Performance, Security, Availability

2016 Onwards: Next Gen of Compute
Cloud, Software in Silicon
Continued Industry Leadership

SPARC next
Significantly Increased Throughput & Thread Strength
2x Security and Analytics

SPARC next+
Increased Cache
Increased Bandwidth
Software in Silicon V3
Oracle Systems Engineering Focus on the Future

... for Enterprise and Enterprise Cloud

Security
Efficiency
Reliability
Performance
Scalability

Your Datacenter

ORACLE CLOUD
Oracle Systems Engineering Focus on the Future

... for Enterprise and Cloud

Security

Your Datacenter
Your Systems Will Be Attacked
Secure your enterprise and your career

Source: Verizon 2016 Data Breach Investigations Report
Major Sectors Getting Hacked Everyday

- **23%** Healthcare
- **18%** Financial Services
- **16%** Education
- **12%** Retail
- **2%** Professional Services
- **6%** Insurance
- **6%** Government
- **9%** Hospitality

Percentage of Incidents by Industry in 2016

Mega Breaches in Government Sector

- **191M** US Voter Database Dec ‘15
- **275,000** Syrian Government Mar ‘16
- **25M** US Office of Personnel Management Dec ‘15
- **50M** Turkish Citizenship April ‘16
- **55M** Philippines Voters Data Mar ‘16
- **100,000** IRS – US Tax Services Mar ‘16
- **55M** Philippines Voters Data Mar ‘16

Looking Into the Future

Attack Surfaces

More Users
More Devices
More Data
More Traffic

Attack Vectors

Warehouse of Stolen Data
Social Engineering
Below-the-OS Attacks
Cloud Jail-breaking
Detection Evasion
Privacy Challenges
Why Security is a key for your Enterprise

Build/enable customers trust

Improve customer experience

Limit damage to the reputation of the (Cloud) service provider

Comply with internal audit reviews and data protection laws
Introducing The General Data Protection Regulation (GDPR)

- The General Data Protection Regulation ("GDPR") replaces the over fifteen year old existing EU Data Protection Directive.
- New statutory requirements for both controllers and processors.
- The requirements include a new liability and sanction regime.
- Key Dates
  - Published: May 4, 2016
  - Enforceable law on May 25, 2018

Some Key Aspects of the Regulation

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Details</th>
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<tbody>
<tr>
<td>Harmonization of privacy laws</td>
<td>Current patchwork of 28 laws become one (with some exceptions)</td>
</tr>
<tr>
<td>Global applicability</td>
<td>Organizations established in the EU as well as organizations outside the EU offering goods and services to EU-based individuals</td>
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<tr>
<td>Stronger rights for individuals</td>
<td>Right to removal/erasure/corrected/to be forgotten - user can request this any time</td>
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<td>Mandatory breach notification</td>
<td>Within 72 hours to regulators, “Without delay” to users</td>
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<td>Joint controllers/joint liability</td>
<td>Between Data Controllers and Processors</td>
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<tr>
<td>Opt-in consent</td>
<td>Clear to user, no opt-out, use data only as agreed with user (owner)</td>
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<td>Data transfers</td>
<td>Privacy rights attach and follow data as it moves globally</td>
</tr>
<tr>
<td>Collective redress</td>
<td>Opens up possibility for class action law suits from individuals</td>
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<tr>
<td>Common enforcement</td>
<td>Data Protection authorities will enforce in consultation with each other</td>
</tr>
<tr>
<td>Increased fines</td>
<td>Up to 4% of global turnover or €20,000,000, whichever is higher</td>
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<td>Need for data protection</td>
<td>Explicit need data protection by design and default, security of processing and ensured timely recovery through continuous validation</td>
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Oracle Promotes Strong Security Principles

Least Privilege

Defence-in-Depth

For all your sensitive data including Intellectual Property, Business Information or Personal Information
Oracle System and Storage Controls which can help

**People Security**

- Immutable VM’s
- Separation of Duties
- Secure by Default
- Self-Service
- Security Compliance Framework
- Least Privilege
- Authorisation
- CVE Aware packaging
- Auditing
- Identity Governance
- Remote Auditing
- Continuous Data Validation

**Data Security**

- Hierarchical Check summing
- SnapShots, CoW
- Replication
- Key Management 3
- Cryptographic Framework
- Administrative Controls
- End to end Audit trails
- Detective Controls
- Retention Policy
- Cryptographic Framework
- Least Privilege
- Least Privilege

Oracle customers have been using these controls to help them for a number of years
Oracle Systems and Storage Products
Applicable for Protecting Personal Information (or any other company sensitive information)

Existing Systems, OS upgrade

- **OS Should** be upgraded to latest release to increase security (secure by default, minimum impact on data)
- **OS Should** be regularly updated and audited using the Security Compliance Framework
- **Should** leverage the Cryptographic and Security Compliance Frameworks
- **Leverage** Roles and Rights through the fine-grained least privileged RBAC access control
- **Auditing** on by default

Systems and OS upgrade

- **Should** have their data store(s), including databases, set up securely with appropriate systems, data, network and database/application security tools
- **Should** leverage Silicon Secured Memory technology and Cryptographic cores
- **Leverage** a unified approach to identity and access management by integrating system’s components as well as its deployed services with an organization’s existing identity and access management architecture
## Oracle Systems and Storage Products and Capabilities Summary

### Systems: SPARC and Solaris

- **SPARC**
  - Software in Silicon
    - Silicon Secured Memory
    - Encryption
- **Solaris**
  - Controlled least privilege system access
  - RBAC fine grained access control, Multifactor authentication
  - Protection implemented by design
    - secure by default, package minimization
    - Immutable zones / VMs
  - Security Compliance Framework
  - Cryptographic Framework
  - Auditing and remote auditing
  - Data protection, integrity protection, availability and recoverability

### Storage

- **Data protection**
  - Encryption, Check summing, Replication, Snapshot, RAID, Backup
- **Data availability**
  - RAID, COW, snapshot, Cloning, Replication
- **Data recoverability**
  - Ensured recovery through continuous validation, Replication, RAID, Restore
- Implementing protection by design
- Minimizing personal data retention time
Oracle Security Inside and Out

Layers of the Stack

- Governance Risk & Compliance
- Access & Certification Review, Anomaly Detection, User Provisioning, Entitlements Management
- Mobile Security, Privileged Users
- Directory Services, Identity Governance
- Entitlements Management, Access Management
- Encryption, Masking, Redaction, Key Management
- Privileged User Control, Big Data Security, Secure Config
- Application + User Sandboxing, Hardening and Defense
- Anti-malware system, Data + Network Protection
- Multi-Node Compliance, Secured App Lifecycle
- Multi-factor Authentication, Remote Auditing
- Secure Live Migration
- Immutable Zones
- Independent Control Plane
- Cryptographic Acceleration
- Silicon Secured Memory
- Verified Boot
- Disk Encryption, Secured Backup, Enterprise Key Management

SPARC/Solaris
Recapping Public Facts for Reference
Secure and Long-Term Investment for You

**5-Year Public Roadmap to 2021**
Oracle SPARC/Solaris Platform Roadmap (Jan 2017)

**Solaris Premier Support to 2031**
Oracle Lifetime Support Policy: Oracle and Sun System Software (Dec 2016 - See page 34)

**Solaris Continuous Delivery Model**
Oracle Solaris Moving to a Continuous Delivery Model blog entry (Jan 2017)
https://blogs.oracle.com/solaris/entry/oracle_solaris_moving_to_a

**Solaris Binary/Source Guarantee to 2021**
Oracle Solaris Guarantee Program (Jan 2017)

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