

# DOAG 2015 Systems Maintenance rEvolution – From Solaris to SuperCluster and M7 Part 2

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<https://blogs.oracle.com/Solaris11Life>  
<https://blogs.oracle.com/patch>



# Safe Harbor Statement

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# The Space Age...Engineered Systems



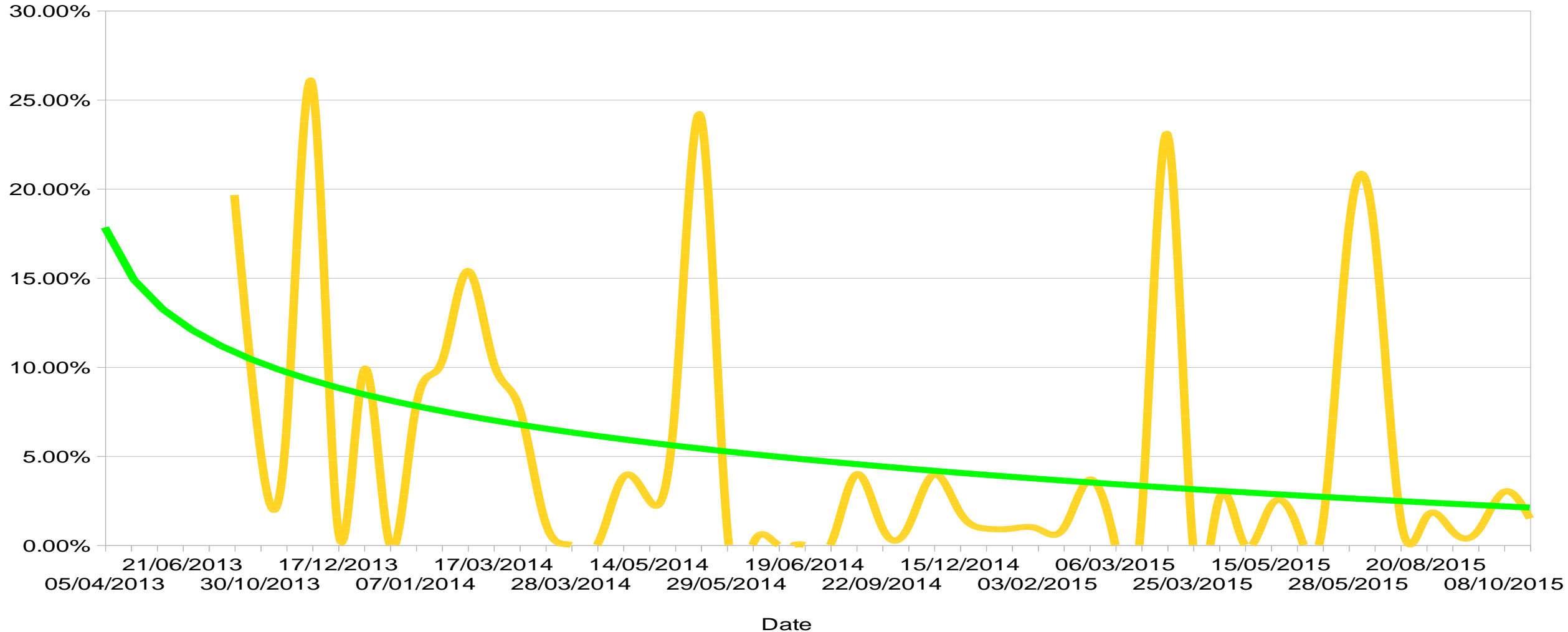
**Engineered Systems** vastly reduce risk as Engineered Together, Tested Together:

- Best practice install and configuration
- Enables rapid deployment
- Increased test effectiveness
- Much faster RCA and bug fix delivery
- Proactive roll-out, safety-in-numbers effect
- Quarterly Full Stack Download Patches (QFSDP)
- Dedicated Support

# SuperCluster Solaris 11 IDR Content

Benefit of Engineered System Install, Configuration, and Maintenance Lifecycle on Bugs Fixed per SuperClusters Sold

- % New Bugs Fixed per SuperClusters sold in trailing 2 quarters
- Logarithmic (% New Bugs Fixed per SuperClusters sold in trailing 2 quarters)



# The Space Age...Oracle Support for Engineered Systems

Helping customers more fully realize the benefits of their Engineered Systems



## Complete. Proactive.

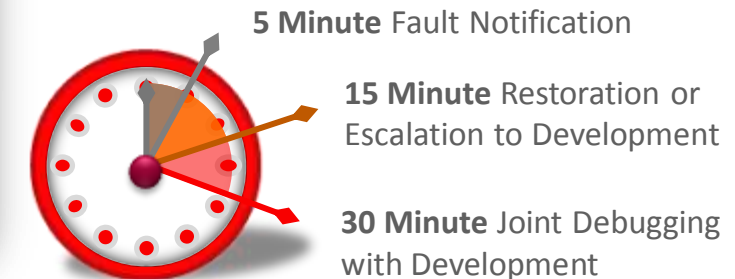
- **Specialized Engineered Systems support team for single point of ownership**
- Customer Incident Managers for support introduction, critical SR monitoring
- Escalation prevention and special handling
- Automated SR creation (ASR), Oracle Configuration Management
- Proactive support via:
  - MyOracle Support publications / alerts
  - **Healthchecks**
  - **Patch bundles / product enhancements**



## ORACLE PLATINUM SERVICES

## Integrated. **No Additional Cost.**

- Special entitlement for qualifying Exadata, Exalogic and SuperCluster configurations
- **Oracle engineers perform remote patch planning and deployment up to 4x/year**
- 24/7 remote fault monitoring, Software ASR
- Accelerated response and restoration





# Platinum Services Objectives and Results

More than 1,000 customers have adopted Platinum Services

## Maximize Availability & Performance

- Proactive, integrated approach to sustaining system health
- Best practice configs and patching
- Critical issue prevention
- **37% fewer bugs encountered**
- **75% fewer Sev 1 service requests**
- **27% faster issue resolution time**

Reduces operational risk with around the clock fault monitoring and ensures continued availability for our core banking processes running on Oracle Exadata



## Reduce Support Complexity

- Single-vendor access to engineering expertise for complete Oracle stack
- Service Requests (SRs) opened automatically through monitoring
- Oracle performs patching when it's best for your business
- **86% of SRs opened by Oracle**

"It (Exadata) is being monitored 24/7 by Oracle, and we are notified before we've actually realized that we are having a problem. That type of support model allows me to sleep at night – this has been a godsend."



## Decrease IT Resource Requirements

- Oracle experts perform support and maintenance services on your behalf at no extra cost
- **70% fewer escalations**
- **Fewer IT support resources required**

thetrainline.com leveraged Oracle Platinum Services to reduce IT resource workload by 30%



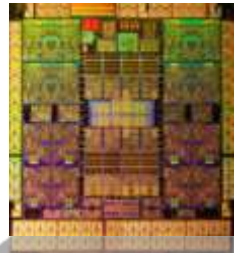
# Consistent Execution

6 Processors in 5 Years

Including  
Software in Silicon



- Silicon Secured Memory
- DB Query Acceleration
- Inline Decompression
- More....



2010

SPARC T3

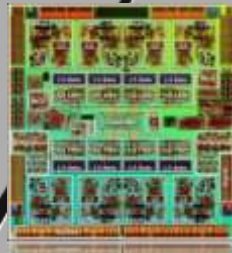
16 x 2<sup>nd</sup> Gen cores  
4MB L3 Cache  
1.65 GHz



2011

SPARC T4

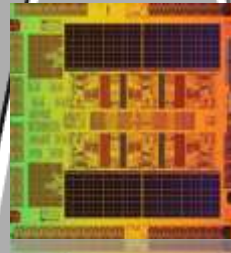
8 x 3<sup>rd</sup> Gen Cores  
4MB L3 Cache  
3.0 GHz



2013

SPARC T5

16 x 3<sup>rd</sup> Gen Cores  
8MB L3 Cache  
3.6 GHz



2013

SPARC M5

6 x 3<sup>rd</sup> Gen Cores  
48MB L3 Cache  
3.6 GHz



2013

SPARC M6

12 x 3<sup>rd</sup> Gen Cores  
48MB L3 Cache  
3.6 GHz



2015

**SPARC M7**

32 x 4<sup>th</sup> Gen Cores  
64MB L3 Cache  
4.1 GHz

More To  
Come

Today

# SuperCluster M7

Secure Cloud Infrastructure for Database and Applications

- Industry's Most Advanced **Security**
- World's **Fastest** Engineered System
- Extremely **Cost Effective** Secure Cloud Infrastructure



- Private **Cloud**
- Optimized for Oracle **Database**
- Runs Any Standard Enterprise **Application**
- Ready to deploy **IaaS & PaaS**



# Breakthrough Processor and Systems Design

## Technology That Delivers

### Security in Silicon



Silicon secured memory and wide key encryption – Designed for Security

### SQL in Silicon



Hardware SQL acceleration and decompression - Breakthrough Oracle Integration & Efficiency

### World's Fastest Microprocessor

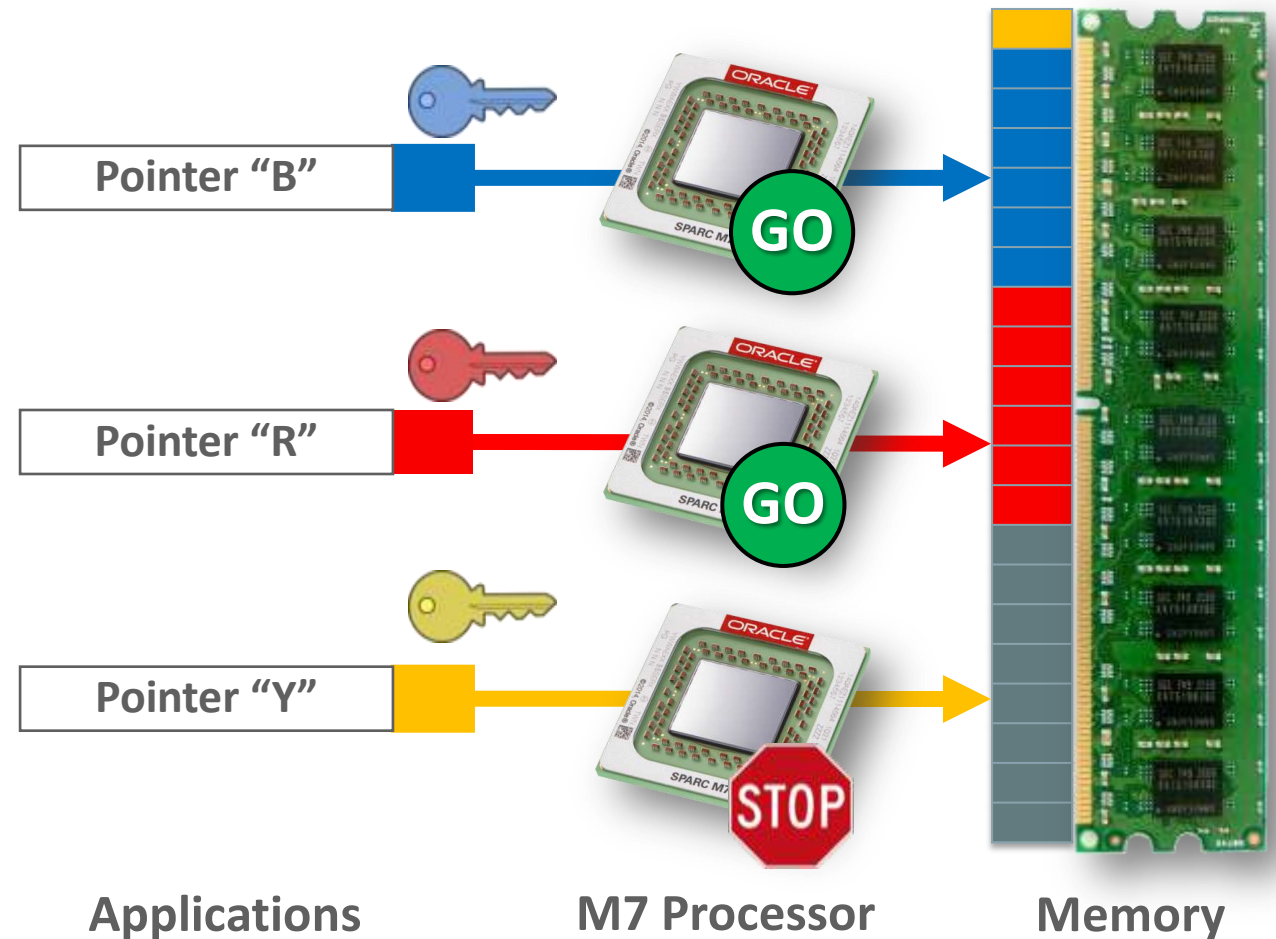


More cores, more threads, more memory & IO Bandwidth, lower latency - Extreme Performance for Apps and Cloud



# Security In Silicon: Silicon Secured Memory

- **Protects data in memory**
- Hidden “color” bits added to *pointers* (key), and content (lock)
- Pointer color (key) must match content color or program is aborted
  - Set on *memory allocation*, changed on *memory free*
  - Protects against *access off end of structure*, *stale pointer* access and malicious attacks



# Developer Tools to Find and Fix Memory Access Errors

## Provides Developers Additional Diagnostics



Oracle Solaris Studio Code Analyzer

File View Tools Window Help

Issues: Sources

Open Analysis: x Results x Details Window x t1\_lib.c x

Showing 1 Issues: Show: Snippets Reviewed Ignored New Fixed

Issues: Core All

Analysis

- Dynamic (1)
- Severity
- ERROR (1)
- Bug type: ABR
- ☒ ABR (Beyond Array Bounds Read)
- ☐ ABW (Beyond Array Bounds Write)
- ☐ OLP (Overlapping Memory)
- ☐ UMR (Uninitialized Memory Read)

Binaries

- libnsi.so.1
- openssl (1)

Files

- t1\_lib.c (1)

Stacktrace

Call Stack

- tls1\_process\_heartbeat at t1\_lib.c:2586
- ssl3\_read\_bytes at s3\_pkt.c:1092
- ssl3\_get\_message at s3\_both.c:458
- ssl3\_check\_client\_hello at s3\_srvr.c:882
- ssl3\_accept at s3\_srvr.c:581
- SSL\_accept at ssl\_lib.c:940
- ssl23\_get\_client\_hello at s23\_srvr.c:634
- ssl23\_accept at s23\_srvr.c:210

Allocated At Stack (size 17,736)

- default\_malloc\_ex at mem.c:79
- CRYPTO\_malloc at mem.c:308
- freelist\_extract at s3\_both.c:708
- ssl3\_setup\_read\_buffer at s3\_both.c:770
- ssl3\_setup\_buffers at s3\_both.c:827
- ssl23\_get\_client\_hello at s23\_srvr.c:266
- ssl23\_accept at s23\_srvr.c:210
- ssl23\_read at s23\_lib.c:127

ABR Beyond Array Bounds Read: at address 8ccc9eb (65535 bytes) on the heap

/export/sheldon/openssl/openssl-1.0.1f/ssl/t1\_lib.c:2586

```
2583: /* Enter response type, length and copy payload */
2584: *bp++ = TLS1_HB_RESPONSE;
2585: s2n(payload, bp);
2586: memcpy(bp, pl, payload);
2587: bp += payload;
```

Error Type

Memory Freed

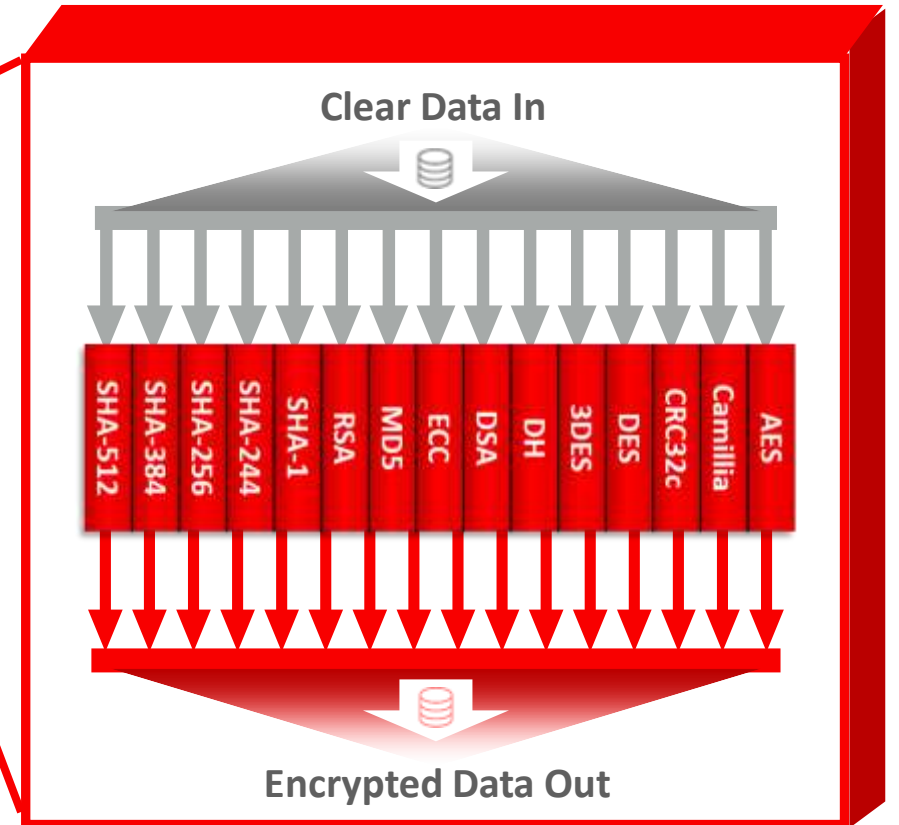
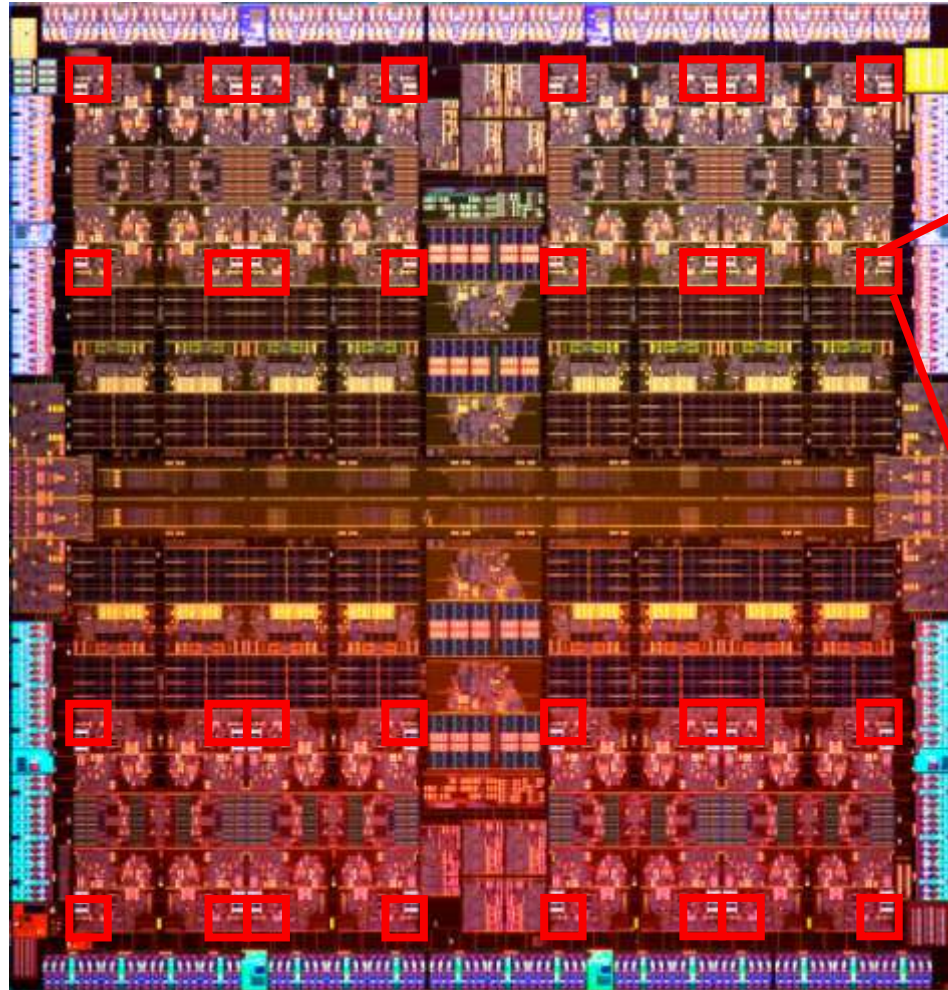
Memory Allocated





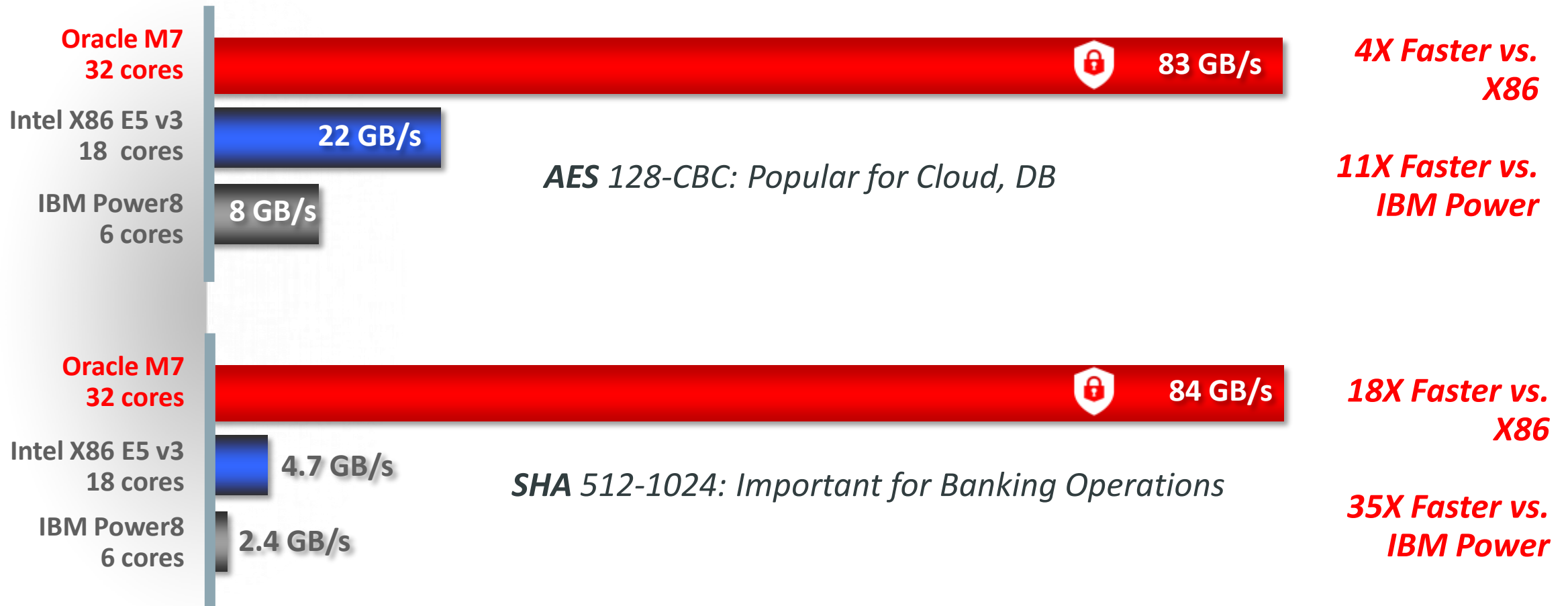
# Hardware Accelerated Cryptography

## 32 Crypto Accelerators with the broadest set of ciphers



# Oracle M7: Much Faster End-To-End Encryption

## M7 Advantage Increases on Highest Security Ciphers

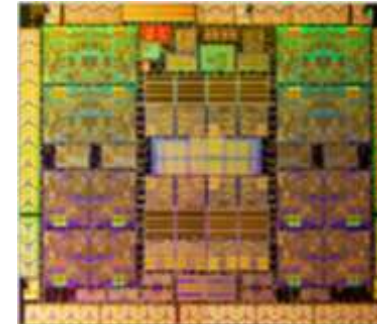




# Makes Encryption Everywhere Affordable

## End-to-End, Always on Cryptography

- **No performance loss**
- **Automatically** accelerates Java, Oracle Database, OpenSSL, and custom applications
- Protection of **data at rest and in motion**
- Meet compliance with high performance **disk encryption**
- **Integrates with Oracle Key Manger**



Applications

Java

Oracle Database

Operating  
System Utilities

Storage

Virtualization

Firmware

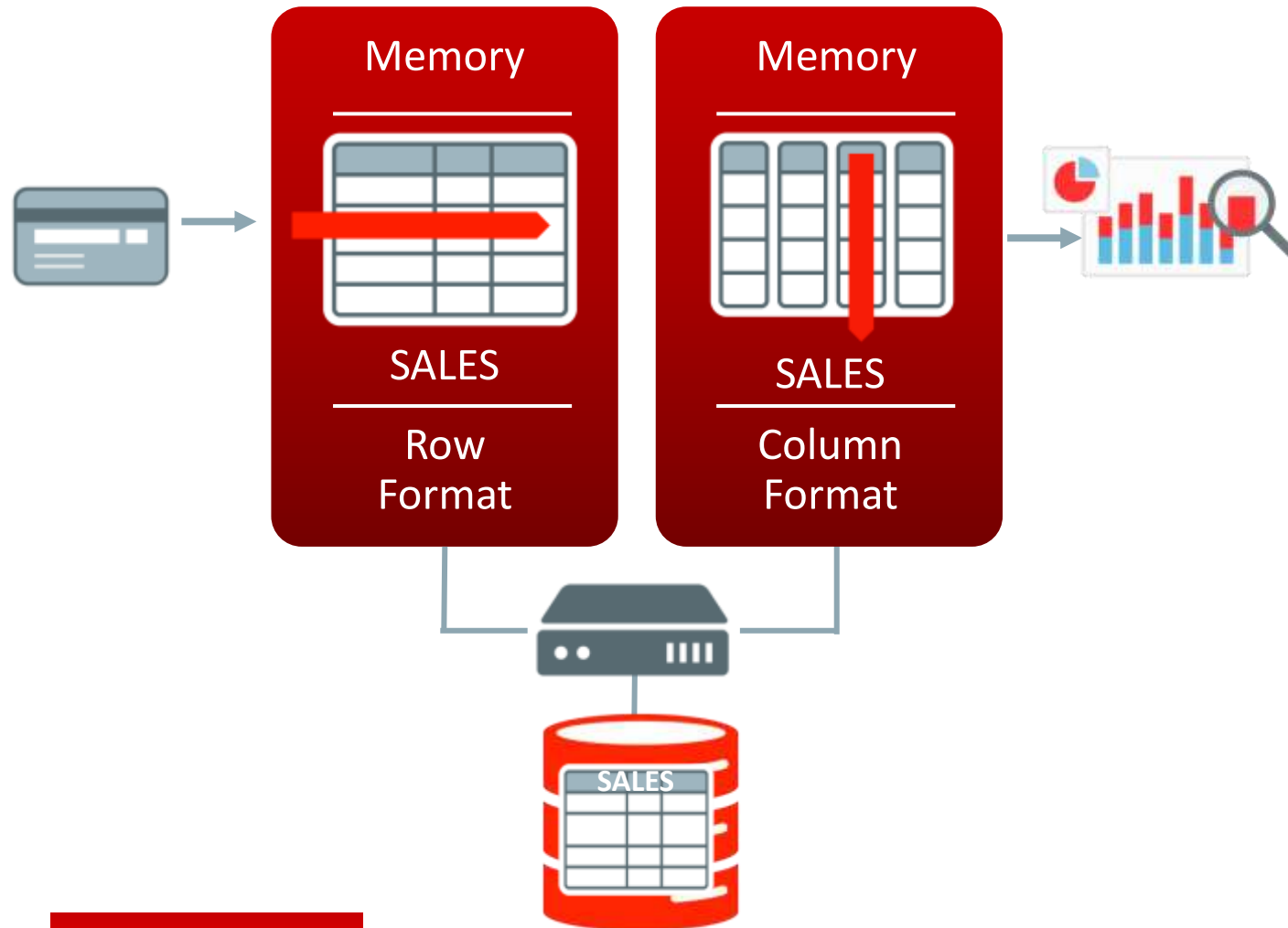
# No Compromise

# Architectural Scalability: Scale Security To Your Needs

## Encryption Speed for AES 128



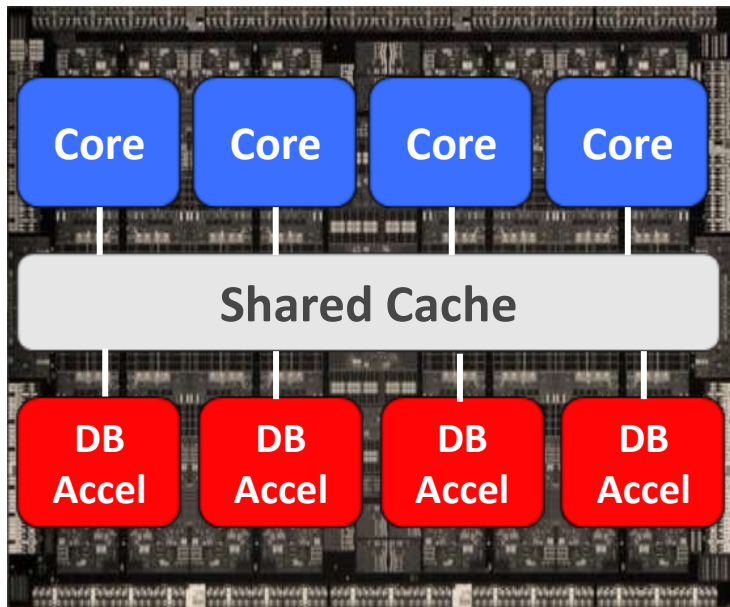
# Oracle Database 12c Breakthrough: Dual Format Database



- **BOTH** row and column formats for same table
- Simultaneously active and transactionally consistent
- Analytics and reporting use new in-memory column format
- OLTP uses proven row format

# SQL in Silicon: Database In-Memory Acceleration Engines

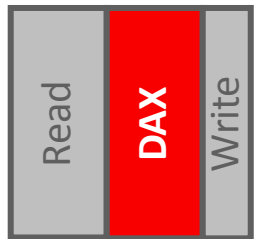
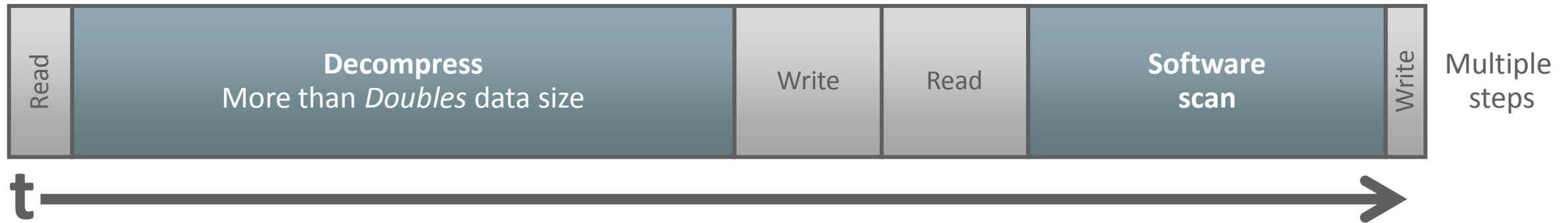
## SPARC M7



- SIMD Vectors instructions are fast, but were designed for graphics, not database
- New SPARC M7 chip has 32 optimized database acceleration engines (DAX) built on chip
- Independently process streams of columns
  - E.g. find all values that match 'California'
  - **Up to 170 Billion rows per second!**
- Like adding 32 additional specialized cores to chip
  - Using less than 1% of chip space

# SQL In Silicon: Accelerating Oracle Database 12c

Decompress at memory speed >120 GB/sec



One  
step

**10X  
faster**

SQL:

```
SELECT count(*)  
...WHERE lo_orderdate = d_datekey  
...AND lo_partkey = 1059538  
AND d_year_monthnum BETWEEN 201311 AND 201312;
```



# Revolutionary Transformation to Real-Time Analytics

No more overnight batch and reporting

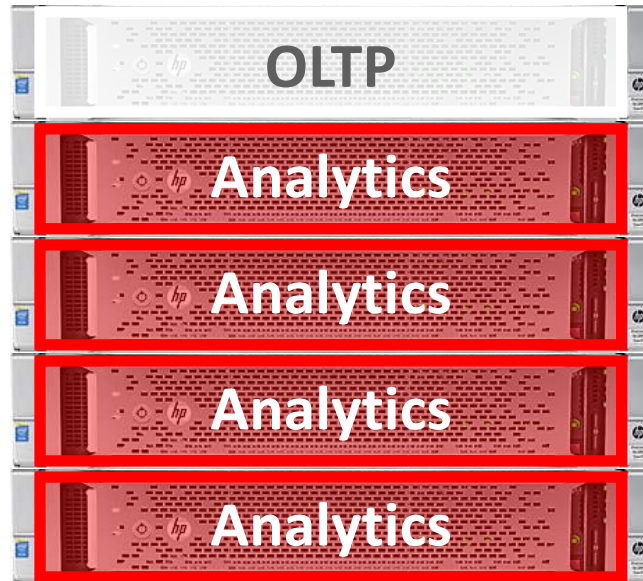
In-Memory Application  
Architecture



In-Memory Everything

# Software in Silicon Efficiency for In-Memory

With Oracle M7 You Can Run Both Analytics and OLTP



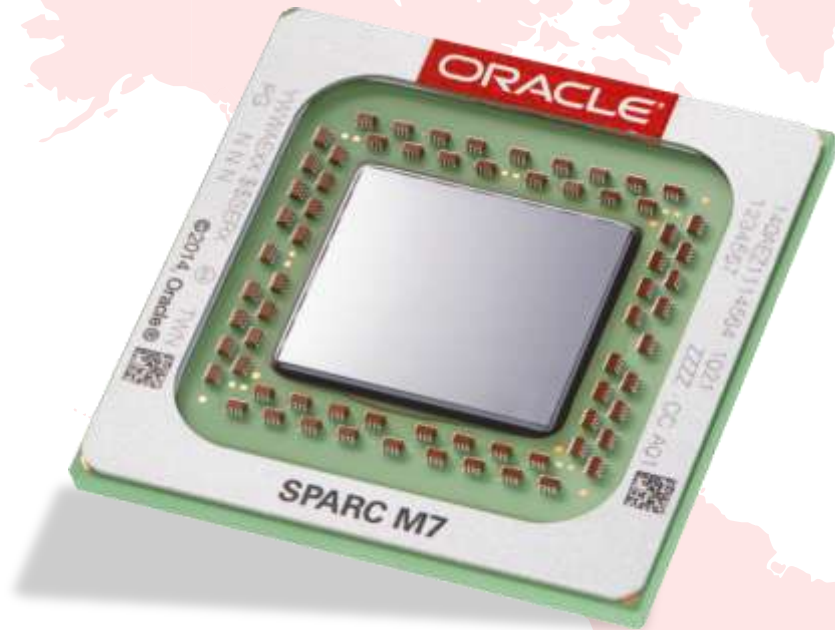
5x Latest Generation HP DL380  
10 chips, 180 cores  
RHEL



Oracle T7-1  
1 chip, 32 cores  
Solaris

*Running 1 TB Database compressed into 120 GB of memory*

# SPARC M7: Setting 20 World Records in Performance



#1 SPECint\_rate2006: **1,200 peak**

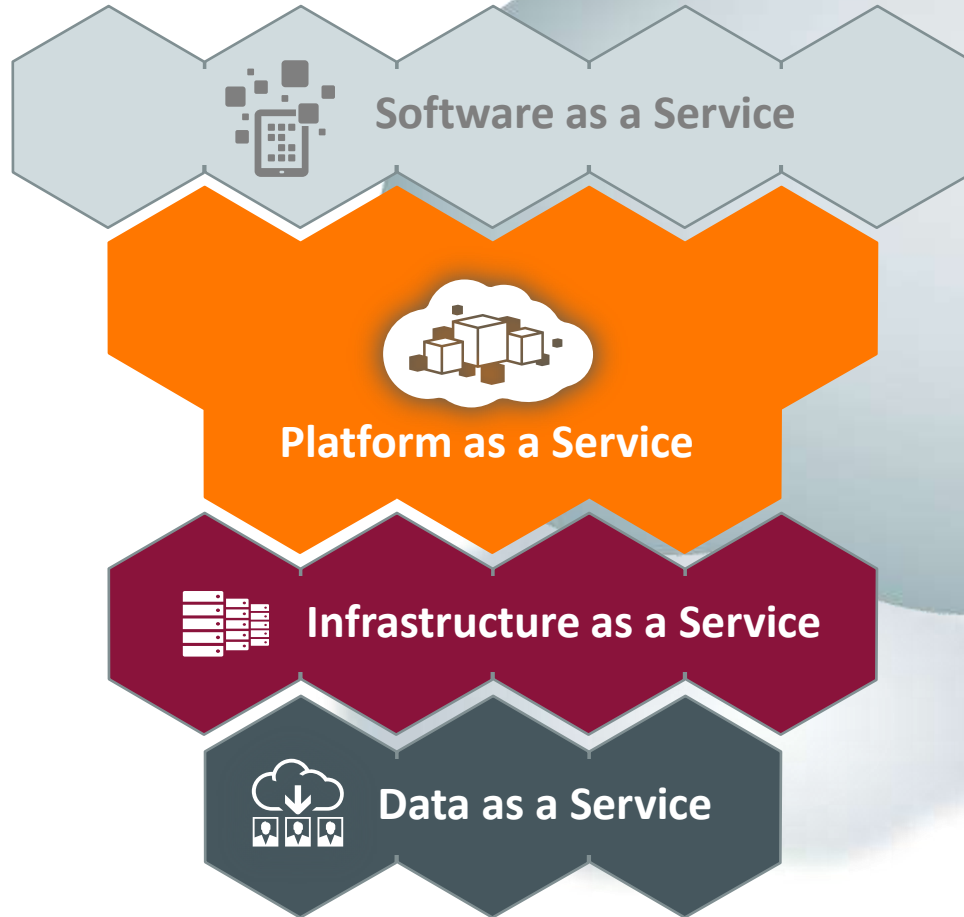
#1 SPECfp\_rate2006: **832 peak**

#1 SPECjEnterprise2010: **25,093.06 EjOPs**

#1 SAP-SD 2 processor: **30,800 SAPs**

And more...

# Head in the Cloud...



On premise and in cloud are identical

- Migrate seamlessly from one to the other
- Dev and test in cloud, production on premise
- Off-site back-ups and Disaster Recovery in the cloud
- Or go the whole hog!

