Ohio Oracle Users Group

Software Defined Everything

The future for Oracle DBAs and Developers

Daniel A. Morgan
email: dmorgan@forsythe.com
mobile: +1 206-669-2949

Thursday: October 9, 2017

Unsafe Harbor

- This room is an unsafe harbor
- You can rely on the information in this presentation to help you protect your data, your databases, your organization, and your career
- No one from Oracle has previewed this presentation
- No one from Oracle knows what I'm going to say
- No one from Oracle has supplied any of my materials
- Everything I will present is existing, proven, functionality

Introduction

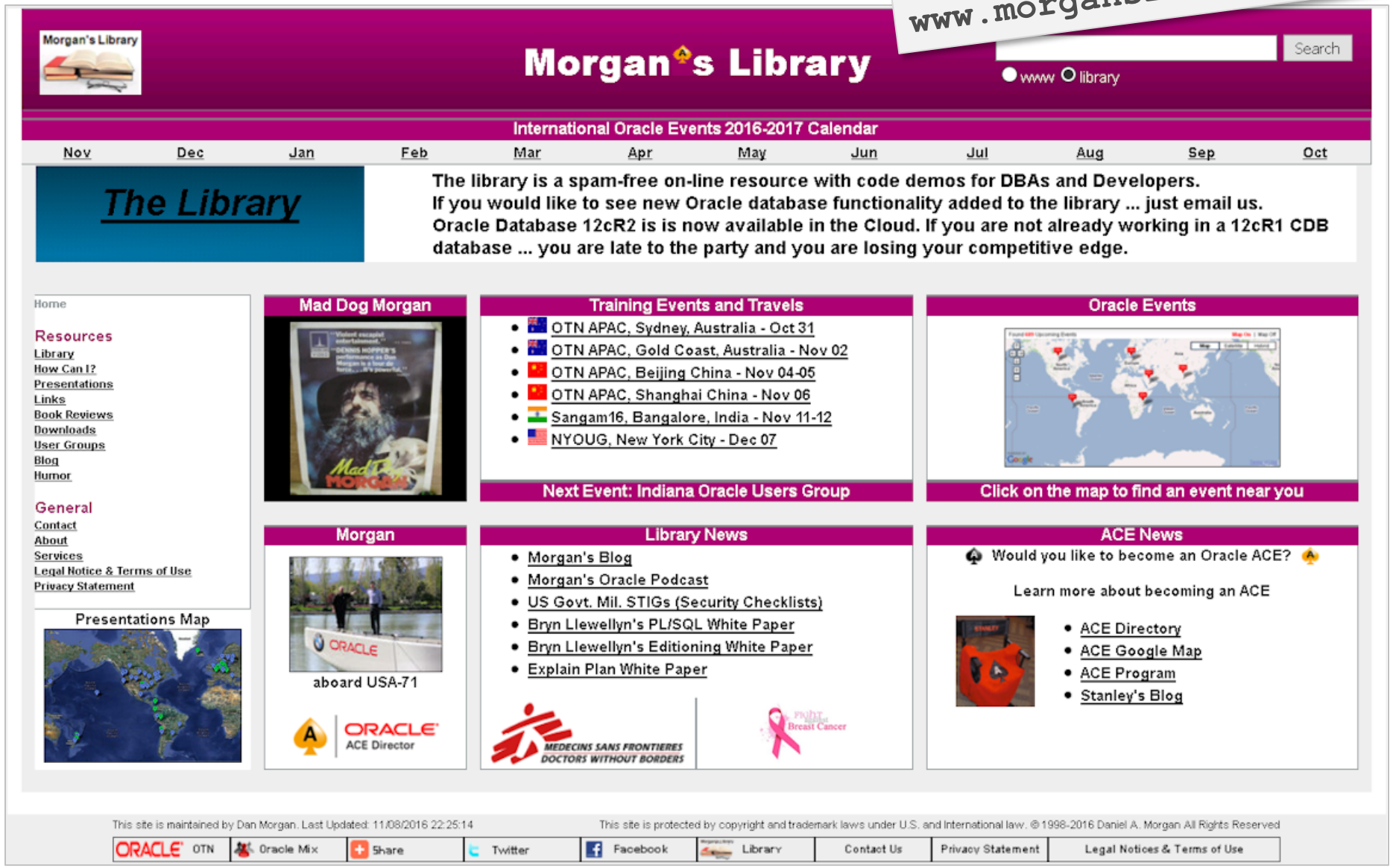
Daniel Morgan

- Oracle ACE Director Alumni
- Oracle Educator
  - Curriculum author and primary program instructor at University of Washington
  - Consultant: Harvard University
  - University Guest Lecturers
    - APAC: University of Canterbury (NZ)
    - EMEA: University of Oslo (Norway)
    - Latin America: Universidad Cenfotec, Universidad Latina de Panama, Technologico de Costa Rica
- IT Professional
  - First computer: IBM 360/40 in 1969: Fortran IV
  - Oracle Database since 1988-9 and Oracle Beta tester
  - The Morgan behind www.morganslibrary.org
  - Member Oracle Data Integration Solutions Partner Advisory Council
  - Vice President Twin Cities Oracle Users Group (Minneapolis-St. Paul)
  - Co-Founder International GoldenGate Oracle Users Group
- Principal Adviser: Forsythe **Meta7**

System/370-145 system console

My Websites: Morgan's Library

www.morganslibrary.org



www.morganslibrary.org

Forsythe (1:2)

- In business 46 years
- $1.2B in 2016
- Partner with more than 200 technology OEMs

- Second largest security integrator in North America

A10 Networks	DataCableTech	Liquidware Labs Logitech	Riverbed Technology
AccessData	Dataram	LockPath	RSA Security
Accutech	Dell EMC	LogLogic	SafeNet
Acronis	Dialogic Dovetailed Technologies	LogRhythm	Sanbolic
ADVA	Digital Guardian	Loop1 Systems	Seagate
Aerohive	Dynatrace	LSI Corporation	Securonix
AirMagnet	Eaton Powerware	Luminex	Server Technology
AirTight Networks	EDGE Memory	Maxell	Service Now
AirWatch	Emulex	McAfee	Silver Peak
AlgoSec	EndRun Technologies	Mellanox Technologies	Software Diversified Services
Amazon	Entrust	Microsoft	Solarflare Communications
APC	Equinix	MobileIron	SolarWinds
AppDynamics	ExtraHop	MRV	Sophos
AppSense	F5 Networks	Multi-Tech Systems	Spectra Logic
Apptio	Fidelis Cybersecurity	nCircle Network Security	Splunk
APTARE	Finisar	Net Optics	STEALTHbits Technologies
Arbor Networks	FireEye	NetApp	SUSE
Arista	FireMon	NetBrain	Symantec
Aruba Networks	Fluke Networks	NetScout	Symmetricom
Avago Technologies	ForeScout Technologies	Netskope	T5
Avant Communications	Fortinet	Network Executive Software	Tele-Communication, Inc.
Avocent Corporation	Fuji	Nimble Storage	Tenable Network Security
Axway	Fujifilm	Norman Data Defense Systems,	Texas Memory Systems
Barracuda Networks	Fujitsu	Inc.	The Written Word
BlueCat Networks	Fusion-io	Northern Software	TierPoint
BMC Software	Gemalto	Novell	Tintri
Boldon James	GIGABYTE	NTP Software	Titus
Box	Gigamon	Nutanix	TransVault
Bradford Networks	Google	NVIDIA	Trend Micro
Brocade	Guidance Software	OCZ Technology	Tripp Lite
CA Technologies	HBGary	Opengear	Tripwire
Cable-Comm Technologies	HDS	Oracle	Trustwave Holdings
Carbon Black	Hewlett Packard Enterprise	Palo Alto Networks	Tufin Software North America,
Catbird Networks	IBM	Panasonic North America	Inc.
CCX Corporation	Imation	Panduit	Variphy

Forsythe (2:2)

- In business 46 years
- $1.2B in 2016
- Partner with more than 200 technology OEMs

Centrify	Imperva	Panzura	Varonis
Cenzic	Index Engines	Peer Software	VCE
Chatsworth	Infoblox	Pivot3	Veeam
Check Point	Intel	PKWARE	Veracode
Ciena	IPsoft	Proofpoint	Veritas
Cisco	Ipswitch	Pure Storage	Vertiv
Citrix	ISI Telemanagement Solutions,	Qlogic	Viavi Solutions
Cloudgenix	Inc.	Qualys	Violin Memory
CommVault	Ixia	Quantum	Viptela
Cortelco	JadeLiquid Software	Radware	Virtual Instruments
Crossbeam Systems	JDSU	Rapid7	VMTurbo
CrowdStrike	Juniper	Raritan	VMware
CTERA Networks	Kingston	RecoveryPlanner	Voltage Security
CyberArk	Lancope	Red Hat	Vormetric
Cylance	Lantronix	RedSeal Systems	Websense
Damballa	Lenovo	Resilient, an IBM Company	Winchester Systems
	Liebert	Reveille Software	Zerto

Forbes AMERICA'S BEST MANAGEMENT CONSULTING FIRMS 2016

Forbes | 2017 AMERICA'S BEST MANAGEMENT CONSULTING FIRMS Powered by Statista

7th straight year CRN Top 50 Providers

THE CHANNEL CO. CRN SOLUTION PROVIDER 500 2017

THE CHANNEL CO. CRN TECH ELITE 250 2017

THE CHANNEL CO. CRN MSP 500 2017

- Focusing on solutions to business problems ... not products

What Meta7 Brings To The Party

- Oracle only division of Forsythe
- Platinum Partner
- Focuses on the entire Oracle technology stack
  - The entire line of Oracle infrastructure from x86 through the full stack of engineered systems and storage
  - Oracle Database
    - Design and Deployment
    - Stability
    - Security
    - Scalability
  - Data Integration (GoldenGate)
  - Oracle Cloud
    - DevOps
    - Infrastructure as Code
- Focusing on solutions to business problems ... not products

Meta7 In Oracle Magazine (1:2)

Oracle Magazine
July – August 2017

Features
Departments
Technology & Comment Sections—
Articles and Columns

FEATURES

Great Integrations
By David Baum
Cloud-based integration reduces complexity and connects the enterprise.

Analytics for Business
By David Baum
Organizations look to the cloud to make mission-critical decisions.

Go Big, Go Metal
By Linda Currey Post
Falkonry chooses Oracle Bare Metal Cloud Services to support its pattern-recognition software.

Lessons Learned
By Jeff Erickson
Meta7 shares three top tips for moving to the cloud.

Meta7 In Oracle Magazine (2:2)

FEATURE

As Published In
ORACLE MAGAZINE
July/August 2017

Lessons Learned

By Jeff Erickson

Meta7 shares three top tips for moving to the cloud.

Meta7 knows firsthand how cloud computing is changing organizations and careers. Persistent requests from clients prompted the firm, an Oracle Platinum Partner, to purchase more than US$1.3 million worth of Oracle platform and infrastructure services to deepen its own expertise in helping customers procure and implement Oracle Cloud solutions.

Since then, the company has migrated some of its own business processes to the cloud and built many models and demos based on scenarios at clients of various sizes. "We've worked to understand everything from how a third-party on-premises application leverages Oracle Database Cloud to what's involved in a complete lift-and-shift of Oracle E-Business Suite to Oracle Cloud," says Paul Zajdel, vice president at Meta7, a division of Forsythe Technology that is dedicated to the Oracle stack.

> "All the deep-dive tuning and performance work, all the spinning up instances, the time it takes to understand how the new release handles things and explain how it's different— that's high-value, time-consuming work that DBAs don't have to do when the database is in the cloud."
>
> – *Paul Zajdel, Vice President, Meta7*

What the Meta7 team learned goes well beyond cloud service features and functions. Team members have stretched their skills with new technologies and have taken on new roles to accommodate cloud services in application architectures.

That kind of change is nothing new for Meta7 and Forsythe, which began in the early 1970s as a technology hardware leasing company. "We've reinvented ourselves several times throughout our 45-year existence," says Zajdel. It started with leasing, then reselling, then adding services, then adding security, and now adding managed services. He adds, "We're in an industry that shifts. Each time the industry shifts, we have to shift, too."

Stability: IT Fire Fighting


Oracle Stack Security

Scalability: VLDBs and Partitioning

Database Performance

Zero Downtime Migration

META7™ Solutions for the Red Stack

Just In Time IT Procurement

META7™ Solutions for the Red Stack

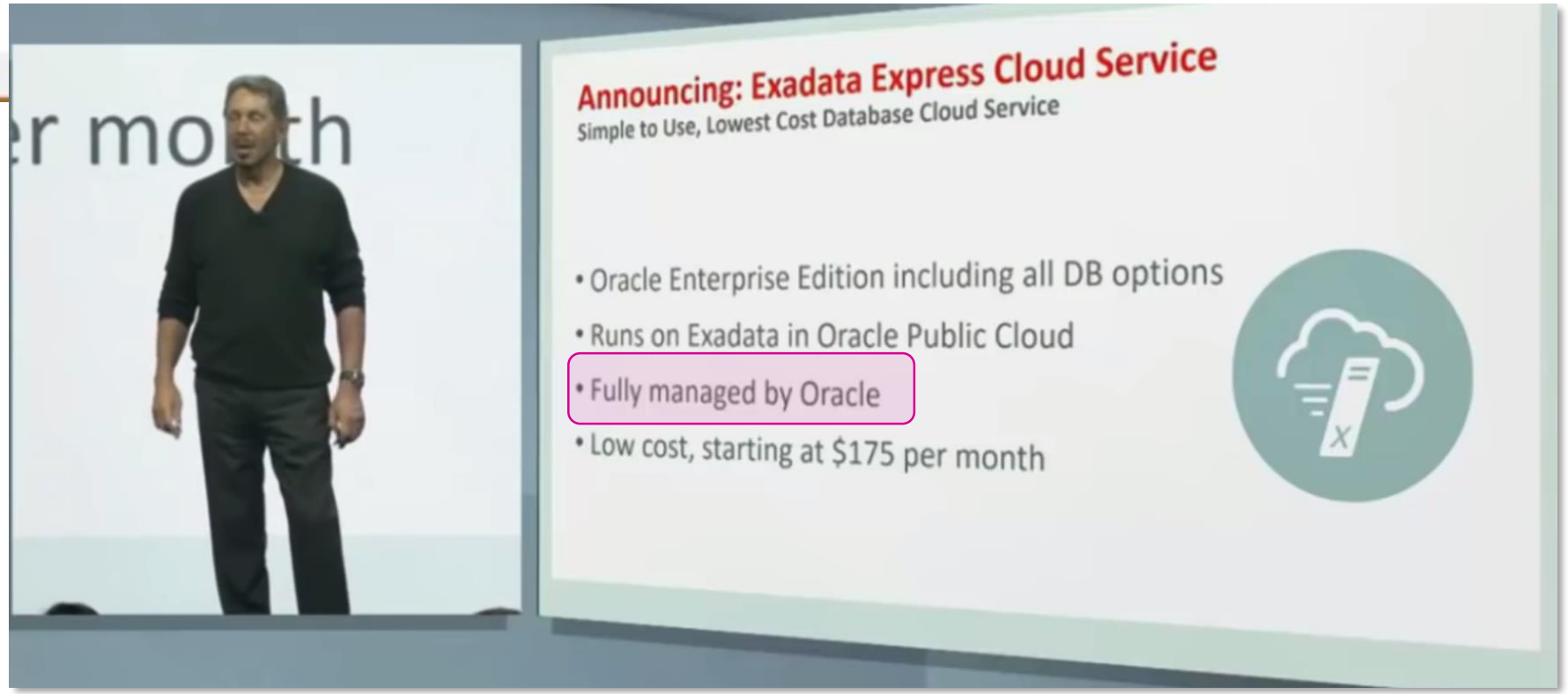
Learning Experience Alert

A Presentation In 5 Parts

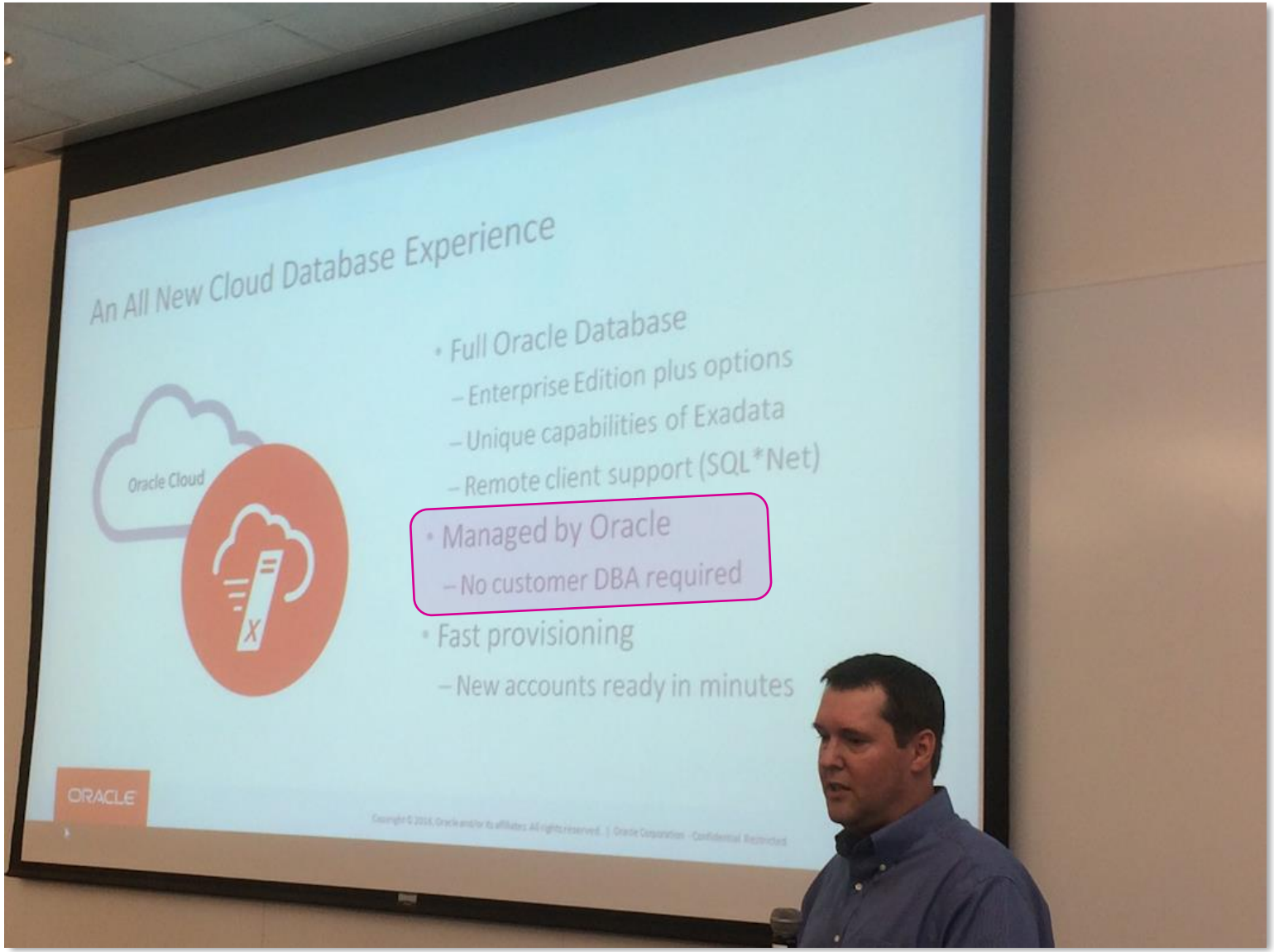
- Capriccio: Tone Deaf
- Rondo : Software Defined Everything
- Legato: Bare Metal Cloud
- Sonatina: The Seven Best Things ....
- Rubato: Wrap-Up

Tone Deaf

Tone Deaf


Announcing: Exadata Express Cloud Service
Simple to Use, Lowest Cost Database Cloud Service
• Oracle Enterprise Edition including all DB options
• Runs on Exadata in Oracle Public Cloud
• Fully managed by Oracle
• Low cost, starting at $175 per month

Tone Deaf


An All New Cloud Database Experience
Oracle Cloud
• Full Oracle Database
– Enterprise Edition plus options
– Unique capabilities of Exadata
– Remote client support (SQL*Net)
• Managed by Oracle
– No customer DBA required
• Fast provisioning
– New accounts ready in minutes
ORACLE

Some People Have Reason To Fear Technology

Oracle DBAs have nothing
to fear from the changes
coming to our industry
if they keep their skills current

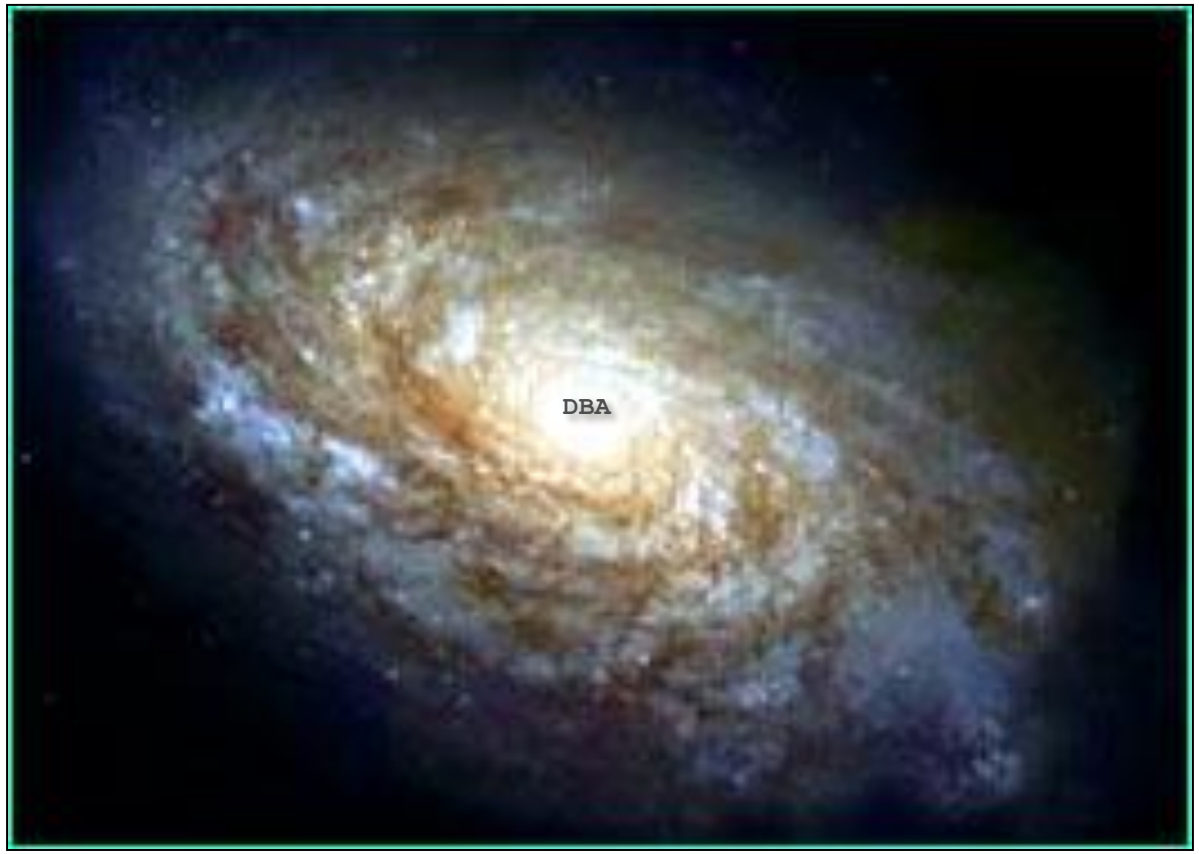
What Is "Fully managed by Oracle?"

- Is Oracle going to rack and stack the hardware in their data center?
- Is Oracle going to provide network connectivity and a firewall?
- Is Oracle responsible for NTP and DNS?
- Is Oracle responsible for infrastructure security?
- Is Oracle going to install and patch the operating system?
- Is Oracle going to install and patch the database?

- Do you think Oracle is going to install your application?
- Do you think Oracle is going to create users on demand? Grant privs?
- Do you think Oracle is going to configure your application's security?
- Do you think Oracle is going to patch and upgrade your application?
- Do you think Oracle is going to tune developer's "bad" SQL statements?

Why It Matters

- Oracle first customer wasn't the CIA it was the first Oracle DBAs
- Oracle's next 100,000 customers were also Oracle DBAs
- And Oracle has always treated our database as the center of its universe



- The Cloud doesn't change that

Oracle's IaaS and DBaaS (1:3)

- Consider the historical perspective
- If in the 1970s you would have been working on an IBM mainframe
  - In the 80's you would you have transitioned your skills to Oracle on Client Server
  - How many Oracle mainframe jobs exist today?
- Twenty years later, in the 2000's, you would have been working in a Client Server environment with applications distributed on client desktops
  - Would you have transitioned your skills to n-Tier architecture with application servers like WebLogic, WebSphere, JBoss, IIS?
  - How many Oracle Client-Server jobs are you aware of today?
- It is 2017 and the industry is transitioning again; this time to what we call "the Cloud"
  - What are you going to do?
  - How many Oracle n-Tier jobs do you think there will be in another 10 years?

Oracle's IaaS and DBaaS (2:3)

- Do you remember when Oracle introduced the UNDO tablespace?
  - Oracle will never be able to manage rollback segments as well as a DBA
  - Do you want to go back to `"SET TRANSACTION USE ROLLBACK SEGMENT rb1"`?
- Do you remember when Oracle introduced OEM?
  - It's a GUI ... we're all going to lose our jobs!!!
- Do you remember when Oracle introduced ASM?
  - DBAs will never be able to manage storage it is too complex
- Do you remember when Oracle introduced Engineered Systems?
  - Would anyone in this room give up an Exadata for a 3U pizza box?

- Is there anyone that thinks their Architects and System Admins engineer more stable, more secure, and higher performing systems than Oracle's?
- Is there anyone that thinks their primary job skills as a DBA is typing `./runInstaller`?

Oracle's IaaS and DBaaS (3:3)

- The Oracle Cloud, whether on or off our premises means
  - Not just our servers and databases are engineered by Oracle
  - Our entire operating environment is engineered by Oracle
  - No more LUNS too small to be of value
  - No more interconnects on oversubscribed VLANs
  - No more technically challenged blade servers
- As DBAs we can focus our efforts on
  - Providing architecture and coding advice to development
  - Enhancing application stability
  - Enhancing application security
  - Enhancing application performance
  - Performing thorough root cause analysis when something goes wrong
  - Reading the docs to keep our skill sets up-to-date
  - Going home in fewer than 60 hours per week
  - Spending time with family and friends on weekends, evenings, and holidays

Software Defined Everything

In the past we've based our careers on product expertise

Hardware
&
Software

That is not a viable path to the future

We are as responsible for our organization's success as the CEO

To be successful we need to focus on "business solutions"

We need to help our organizations invest in solving business problems

We need to ask ourselves the following question

What is the value of "the cloud"?

What is the value of "the cloud"?

And have an answer!

In Enterprise Computing Only Two Things Matter

QoS

&

TCO

In Enterprise Computing Only Two Things Matter

- **QoS** ... Quality of Service is a simple way of saying a solution is
  - Stabile
  - Secure
  - Scalable
  - Addresses a business need

- **TCO** ... Total Cost of Ownership is a simple way of saying enterprise computing solutions must
  - Not negatively impact the cost or ability to deliver products and services

- Many separate factors contribute to each of these from licensing and staffing to complexity and flexibility ... but ultimately what matters can be summed up in these two acronyms

- At Meta7 we are in the business of solving business problems through the application of technologies that achieve both goals simultaneously

A Short History of Enterprise Computing (1:2)

- In the 1960s applications ran on mainframes; databases were flat files, application ran on dumb terminals; reports were green bar

  - IT's customers paid for computing by the tick of the cpu clock
- In the 1980s we replaced mainframes with client-server, flat files with relational databases such as Informix, Sybase and Oracle and applications resided on millions of Windows desktops
  - IT's customers paid for computing by licensing cpu cores
- In the 2000s client-server was replaced with n-tier architecture with separate tiers hosting databases, applications, and web servers
  - Databases continued to reside on a UNIX server; applications resided in the data center and were delivered to web browsers
  - Our customers continued to pay for computing by licensing cpu cores
- Beginning in the 2010s it became apparent we were drowning; too much complexity, too little security, far too much cost

A Short History of Enterprise Computing (2:2)

- In the 2010s with the realization that once again "**IT was not responsive to the needs of the business**" industry leaders began the search for a new paradigm based on lessons learned from previous deployment architectures and lessons learned in manufacturing
- What we learned from previous deployment architectures:
  - IT works for the business ... the business does not work for IT
  - Central deployment and management enhances QoS and reduces TCO
- What we learned from manufacturing:
  - "Just-In-Time Delivery" reduces costs and cycle times (1977)
  - Continual Process Improvement (1986)
  - Lean Manufacturing (1988)
  - Delivery must be rapid, seamless and flexible
  - Process automation reduces costs, risks and human errors
- The same pressures that drove mainframes and client-server to near extinction are now driving the adoption of Software Defined Everything (SDE)

Software Defined Everything (SDE)

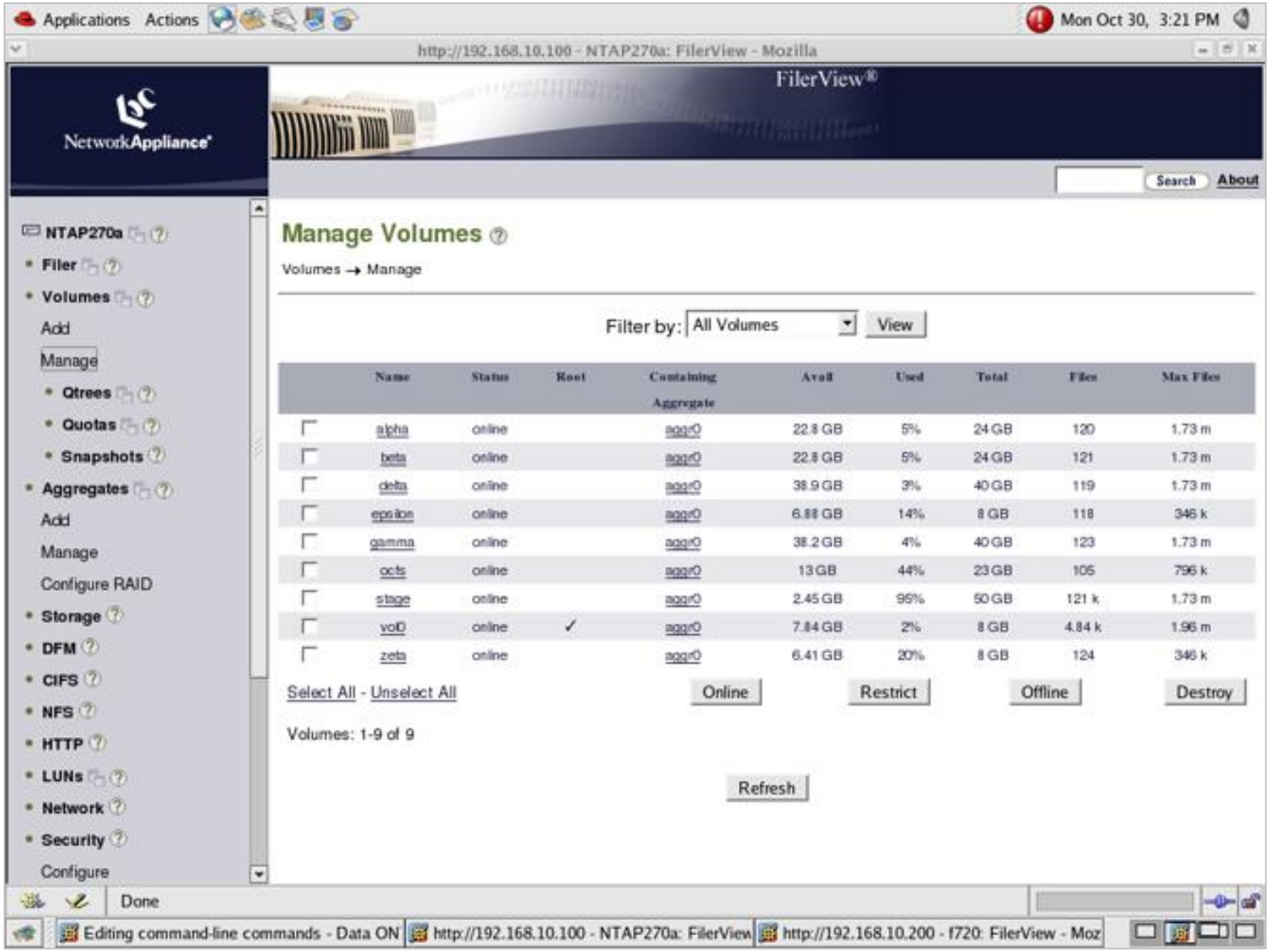
- Enterprise software defined deployment began with Oracle database response files 30+ years ago
- Next was software defined storage ... EMC, NetApp, Oracle ZFS
- Followed by Software Defined Networks (SDN) ... Oracle Xsigo (2012)
- The Cloud has brought software definition to compute and load balancing, storage and backups
- Which led to discussions of Software Defined Data Centers
- And now it is all being consolidated into the concept of Software Defined Everything

SDE Database Deployment

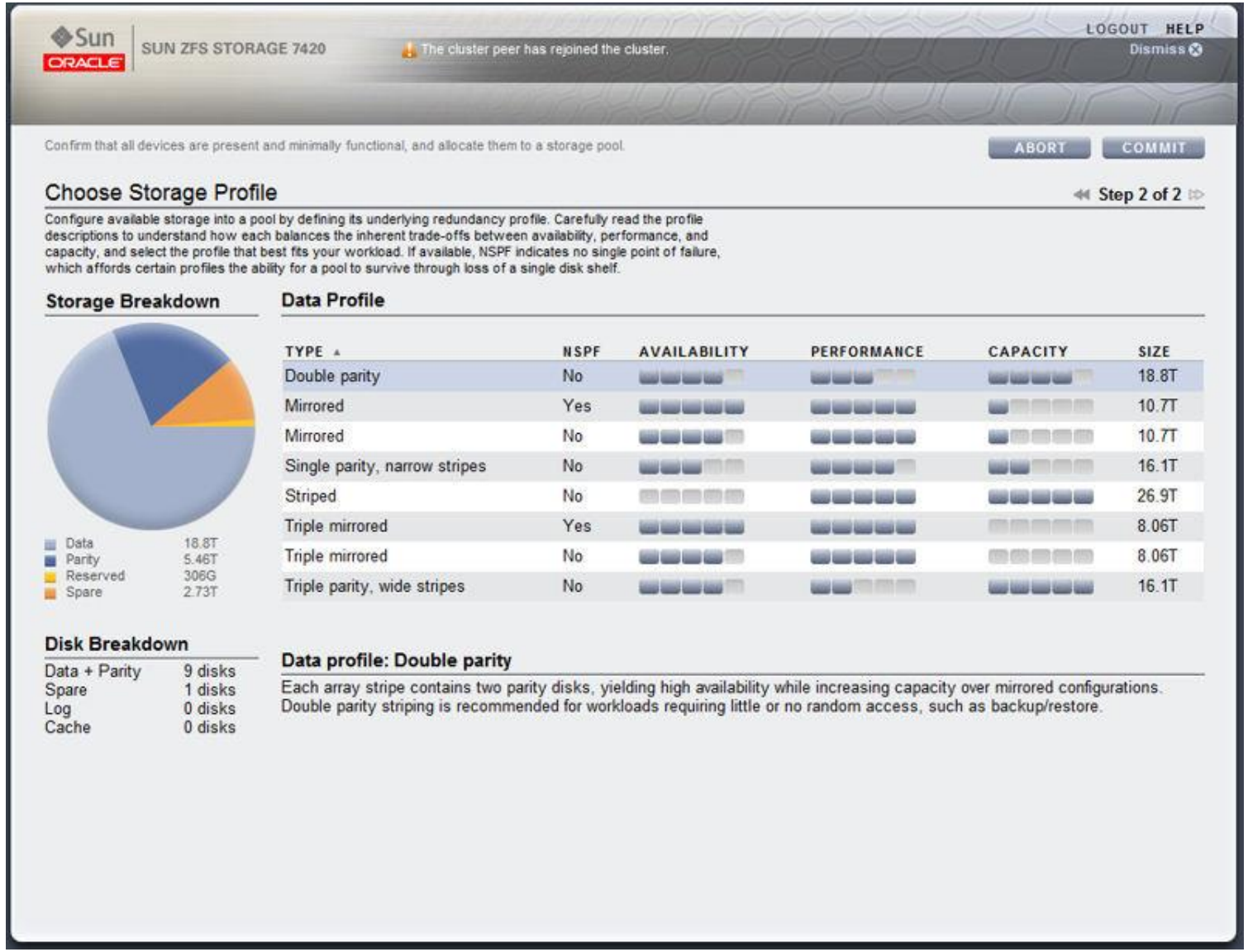
```
[oracle@db12r2 u01]$ more db.rsp
##################################################################
## Copyright(c) Oracle Corporation 1998,2017. All rights reserved.##
##                                                              ##
## Specify values for the variables listed below to customize   ##
## your installation.                                           ##
##                                                              ##
## Each variable is associated with a comment. The comment      ##
## can help to populate the variables with the appropriate      ##
## values.                                                      ##
##                                                              ##
## IMPORTANT NOTE: This file contains plain text passwords and  ##
## should be secured to have read permission only by oracle user##
## or db administrator who owns this installation.              ##
##                                                              ##
##################################################################


#------------------------------------------------------------------------------
# Do not change the following system generated value.
#------------------------------------------------------------------------------
oracle.install.responseFileVersion=/oracle/install/rspfmt_dbinstall_response_schema_v12.2.0

#------------------------------------------------------------------------------
# Specify the installation option.
# It can be one of the following:
#   - INSTALL_DB_SWONLY
#   - INSTALL_DB_AND_CONFIG
#------------------------------------------------------------------------------
oracle.install.option=INSTALL_DB_SWONLY

#------------------------------------------------------------------------------
# Specify the Unix group to be set for the inventory directory.
#------------------------------------------------------------------------------
UNIX_GROUP_NAME=oinstall

#------------------------------------------------------------------------------
# Specify the location which holds the inventory files.
# This is an optional parameter if installing on
# Windows based Operating System.
#------------------------------------------------------------------------------
INVENTORY_LOCATION=/u01/app/oraInventory

#------------------------------------------------------------------------------
# Specify the complete path of the Oracle Base.
#------------------------------------------------------------------------------
ORACLE_BASE=/u01/app/oracle
```

```
oracle@db12r2 u01]$ more dbca.rsp
##################################################################################
##                                                                              ##
##                            DBCA response file                                ##
##                            ------------------                                ##
## Copyright(c) Oracle Corporation 1998,2017. All rights reserved.              ##
##                                                                              ##
## Specify values for the variables listed below to customize                   ##
## your installation.                                                           ##
##                                                                              ##
## Each variable is associated with a comment. The comment                      ##
## can help to populate the variables with the appropriate                      ##
## values.                                                                      ##
##                                                                              ##
## IMPORTANT NOTE: This file contains plain text passwords and                  ##
## should be secured to have read permission only by oracle user                ##
## or db administrator who owns this installation.                              ##
##################################################################################
#-------------------------------------------------------------------------------
# Do not change the following system generated value.
#-------------------------------------------------------------------------------
responseFileVersion=/oracle/assistants/rspfmt_dbca_response_schema_v12.2.0
#-------------------------------------------------------------------------------
# Name          : gdbName
# Datatype      : String
# Description   : Global database name of the database
# Valid values  : <db_name>.<db_domain> - when database domain isn't NULL
#                 <db_name>             - when database domain is NULL
# Default value : None
# Mandatory     : Yes
#-------------------------------------------------------------------------------
gdbName=orcl.example.com
#-------------------------------------------------------------------------------
# Name          : sid
# Datatype      : String
# Description   : System identifier (SID) of the database
# Valid values  : Check Oracle12c Administrator's Guide
# Default value : <db_name> specified in GDBNAME
# Mandatory     : No
#-------------------------------------------------------------------------------
sid=orcl
#-------------------------------------------------------------------------------
# Name          : databaseConfigType
# Datatype      : String
# Description   : database conf type as Single Instance, Real Application Cluster or Real
Application Cluster One Nodes database
# Valid values  : SI\RAC\RACONENODE
# Default value : SI
# Mandatory     : No
#-------------------------------------------------------------------------------
databaseConfigType=SI
```

SDE NetApp Configuration



SDE ZFS Configuration



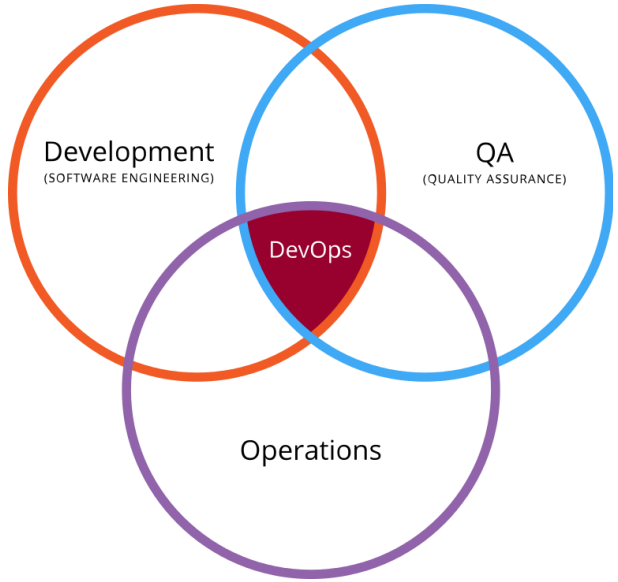
Orchestration Tools

- Software defined deployment requires the use of tools that allow us to take an action one in a development environment, run it through a QA cycle, then implement it repeatedly in production with lower cost and higher reliability
- At Meta7 we have years of experience with orchestration tools and have used them for a wide variety of projects to address business challenges

- We know which tools do what, which introduce security issues, which are designed for on-premise use, which for the Cloud, and which provide the most value
- These tools support alignment with the DevOps concept referred to as Infrastructure as Code (IaC)

DevOps & IaC

- DevOps
  - A software development and delivery process that emphasizes communication and collaboration between product management, software development, and operations
  - It supports this by automating and monitoring the process of software integration, testing, deployment, and infrastructure changes by establishing a culture and environment where building, testing, and releasing software can happen rapidly, frequently, and more reliably



- Infrastructure as Code
  - The process of managing and provisioning computer data centers through machine-readable definition files, rather than manual hardware configuration and interactive configuration tools
  - The concept is to use code to design, implement, and deploy with known best practices
  - The ability to treat infrastructure as code allows for a cycle of development, pre-production testing and deployment after quality checks that has been behind the success of essentially all technology-based projects from the Hubble Space Telescope to the mobile phone system

The IaC Business Case

- The value of Infrastructure as Code is best viewed by focusing on three measurable categories
  - Cost (reduction)
    - Cost reduction is measured not only on its impact on the enterprise financially but also in terms of its impact on people and level of effort
    - By removing the manual component people are able to refocus their efforts towards away from routine activities to higher value tasks
  - Speed (faster execution)
    - Automation enables speed through faster execution when configuring your infrastructure and provides visibility to help other teams across the enterprise work quickly and more efficiently
  - Risk (remove errors and security violations)
    - Automation removes the risk associated with human error, caused by manual misconfiguration which decreases downtime and increases reliability
    - IaC, by definition, increases the organization's maturity providing built-in Change Management and a single version of truth

IaC Database Deployment

- Identify resource requirements
  - Storage requirements
  - Network requirements
  - Server capabilities
  - System Management requirements
  - Monitoring requirements
  - Governance requirements
  - Security requirements
  - High Availability Requirements (DR, SLA, RTO, RPO)
- Write the definition of what you want to deploy in an IaC configuration file
- Quality control the configuration
- Execute the configuration once or hundreds of times in production

Need less of a resources ... update the parameters and rerun the configuration - operating costs are immediately reduced ... Need more of a resources ... update the parameters and rerun the configuration - operating costs are immediately increased ... the enterprise can now fine tune utilization and costs

The Traditional IT Purchasing Algorithm

- Determine the largest resource requirement you anticipate having over the following 12-60 months
  - Add a percentage to that requirement to provide a safety margin
- Purchase infrastructure and licensing capable of meeting that peak load requirement up front as a capital expenditure
- Pay for that infrastructure, licensing, and associated support cost 7 x 24 x 365
- If your requirement decreases you are stuck with what you purchased
- If your requirements increase use a forklift to move it out into the parking lot and make a bigger investment
  - more expensive infrastructure
  - more storage
  - more servers
  - more licenses
  - more support
  - more FTEs

IaC = Just In Time Procurement

Purchase what you need when you need it
Stop paying for it when you no longer need it

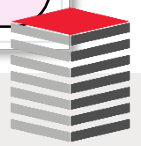
The Metered Services Purchasing Algorithm

- Purchase, each hour precisely what you need for that hour
- If your requirement decreases purchase less lowering your cost of operations
- If your requirements increase purchase more in accordance with your need

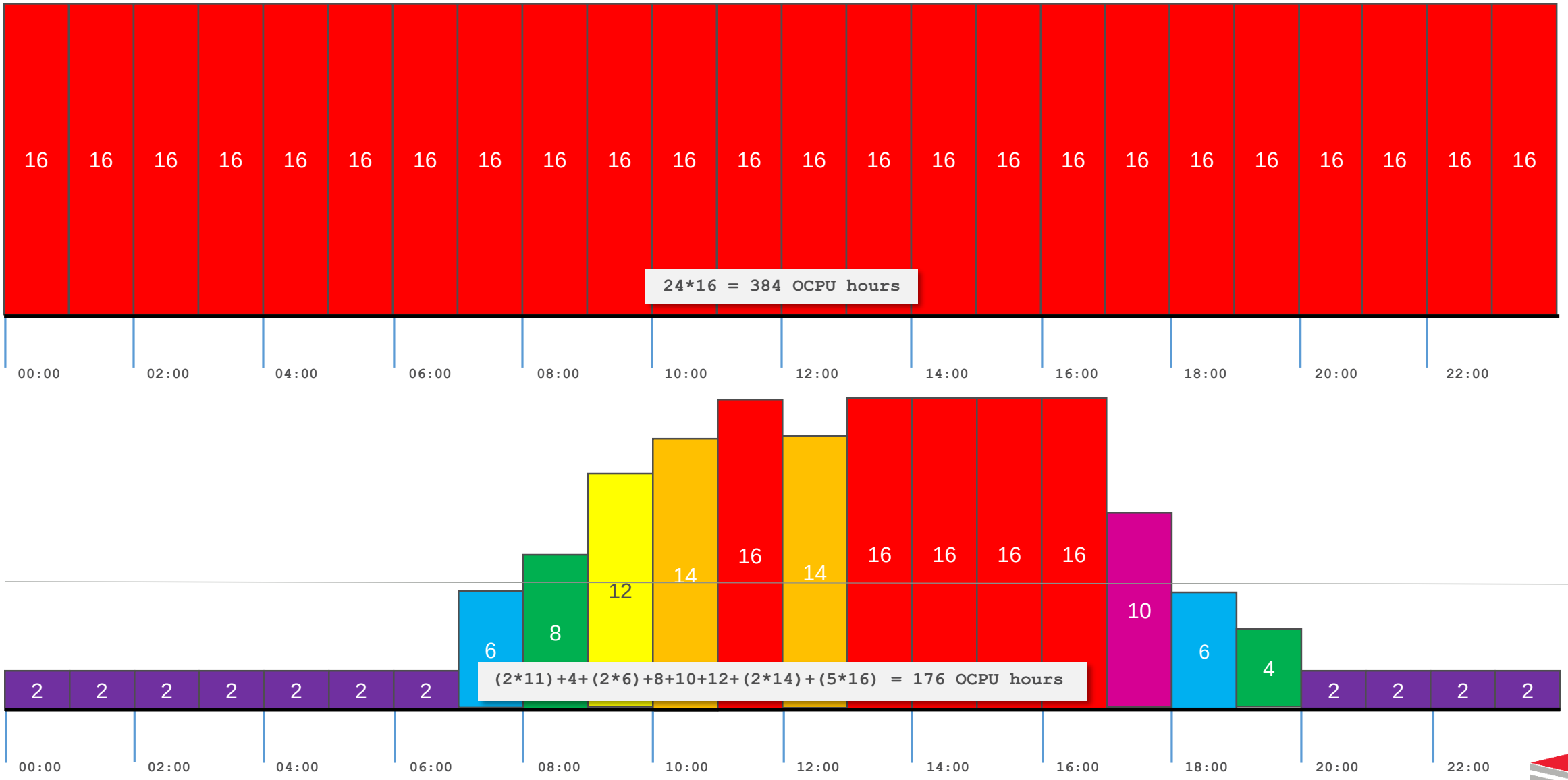
Metered Services - Bare Metal Instances

Buy Now

Instance Type	Shape	OCPU	Memory (GB)	Local Disk (TB)	Price	Metric
Standard Compute Capacity	BM.Standard1.36	36	256	Block Storage Only	$0.075	OCPU / Hour
High I/O Compute Capacity	BM.HighIO1.36	36	512	12.8TB NVMe SSD	$0.12	OCPU / Hour
Dense I/O Compute Capacity	BM.DenseIO1.36	36	512	28.8TB NVMe SSD	$0.15	OCPU / Hour



Fixed vs. IaC (1:2)



Fixed vs. IaC (2:2)

- The following is based on Oracle's published cost of $0.15 Per OCPU per hour for an 8,760 hour year (365 x24) based on a 7 day week

IaaS CPU cores	Cost/OCPU/hour	OCPU hrs/year	Annual Cost
Fixed 16	0.15	140,160	$21,024
Dynamic: Managed	0.15	64,240	$ 9,636

- Calculated on a 5 day business week not paying for maximum capabilities on Saturdays and Sundays

IaaS CPU cores	Cost/OCPU/hour	OCPU hrs/year	Annual Cost
Fixed 16	0.15	140,160	$21,024
Dynamic: Managed	0.15	50,752	$ 7,613

- Dynamic Management brings in addition to providing all of its other benefits provides an annual Cloud deployment saving of between 54% and 64%

- Because you can dynamically provision with IaC in the Oracle Cloud you can accomplish a 3:1 or 4:1 consolidation because during peak periods you can dynamically burst to immediately provision required resources

x86 vs. IAC

- DL580 pricing is based on the fully discounted price of all components over 3 years and an Oracle EE license discount of 35%
- Cloud pricing is based on Oracle's published list price for DBaaS of $6.72 Per OCPU per hour after applying a 15% discount ($5.71/ocpu hr) over 3 years
- Both are based upon bare metal installation and 20 TB of usable storage

Compute Node	Server Cost	Storage	Server Support	O/S Support	DB Support	FTEs	DC	TCO (3 yrs)
HP DL580 16 core	$58,100	$30,000	$2,176	$2400	$163,020	$60,000	$1,736	$317,432
DBaaS 16 ocpu	$289,794	$13,000	included	included	included	$8,000	included	$310,794

- Now add to the HP DL580 solution all costs associated with
  - Oracle Database licensing (16 x $45,000 list) $720,000
  - Network infrastructure including switches and routers, load balancers, firewalls
  - Insurance & Taxes
- With the HP DL580 if you need 20 cpu cores ... buy another server + licenses
- With the IaC solution if you need 20 cpu cores ... you bring it online make one incremental change to the configuration file and it is online 60 seconds later
- Again consider the ability to accomplish a 3:1 or 4:1 consolidation

To Provision a Traditional Data Center

- You must consider multiple components and you are responsible for all
  - Racks
  - Power Conditioning
  - Air Conditioning
  - Servers
  - Storage
  - Switches, Hubs, Routers
  - Firewalls
  - NTP and DNS
  - Load Balancers
  - Software
  - OEM
  - SSO
  - Backup Appliances
  - DR
  - Training

To Provision a 21st Century Data Center

- You need to consider far few components and your vendor takes the risks
  - Bare Metal Cloud (BMC)
    - Flexible, load balanced, pool of compute and storage resources with the full stack engineered by Oracle
  - Oracle Management Cloud (OMC)
    - Provides a single pane of glass for monitoring and managing ... OEM in the Cloud
  - Cloud Application Security Broker (CASB)
    - Provides Governance and Continuous Adaptive Risk & Trust Assessment (CARTA)
  - Cloud Identity Service
    - Provides Single Sign-on (SSO and LDAP)
  - Backup Services
  - DR
  - Training

TCO Summary

- Unlike the unrealized promises we have heard for years ... with IaC the TCO savings are measurable
  - Finance
    - CapEx becomes OpEx
    - Move your IT to Just In Time (JIT) procurement and provisioning
    - Purchase only what you need only when you need it
    - All data center costs reduced to 0
    - Cost of asset insurance reduced to 0
    - State and local taxes on assets reduced to 0
    - Budgeting becomes more predictable
    - If something breaks it is not your problem
  - FTEs
    - Network administration resources required 0
    - Storage administration resources required 0
    - System administration resources required reduced by more than 65%
    - Database administration resources refocused on QoS

QoS Summary

- Stability and reliability enhanced because applications run on infrastructure designed and deployed by Oracle's architects
- Security enhanced because application run in data centers built, certified and operated in compliance with the strictest DOD regulations
  - DBAs and IT professionals have time to concentrate on what is important to the business
- Scalability enhanced because the pool of assets, network bandwidth, storage, memory, and cpu can be immediately, and flexibly, expanded to meet essentially any requirement
- Performance enhanced by more frequent tech refreshes
- Consistent on-demand creation of Dev, Test, and Production environments

In Enterprise Computing Only Two Things Matter

QoS

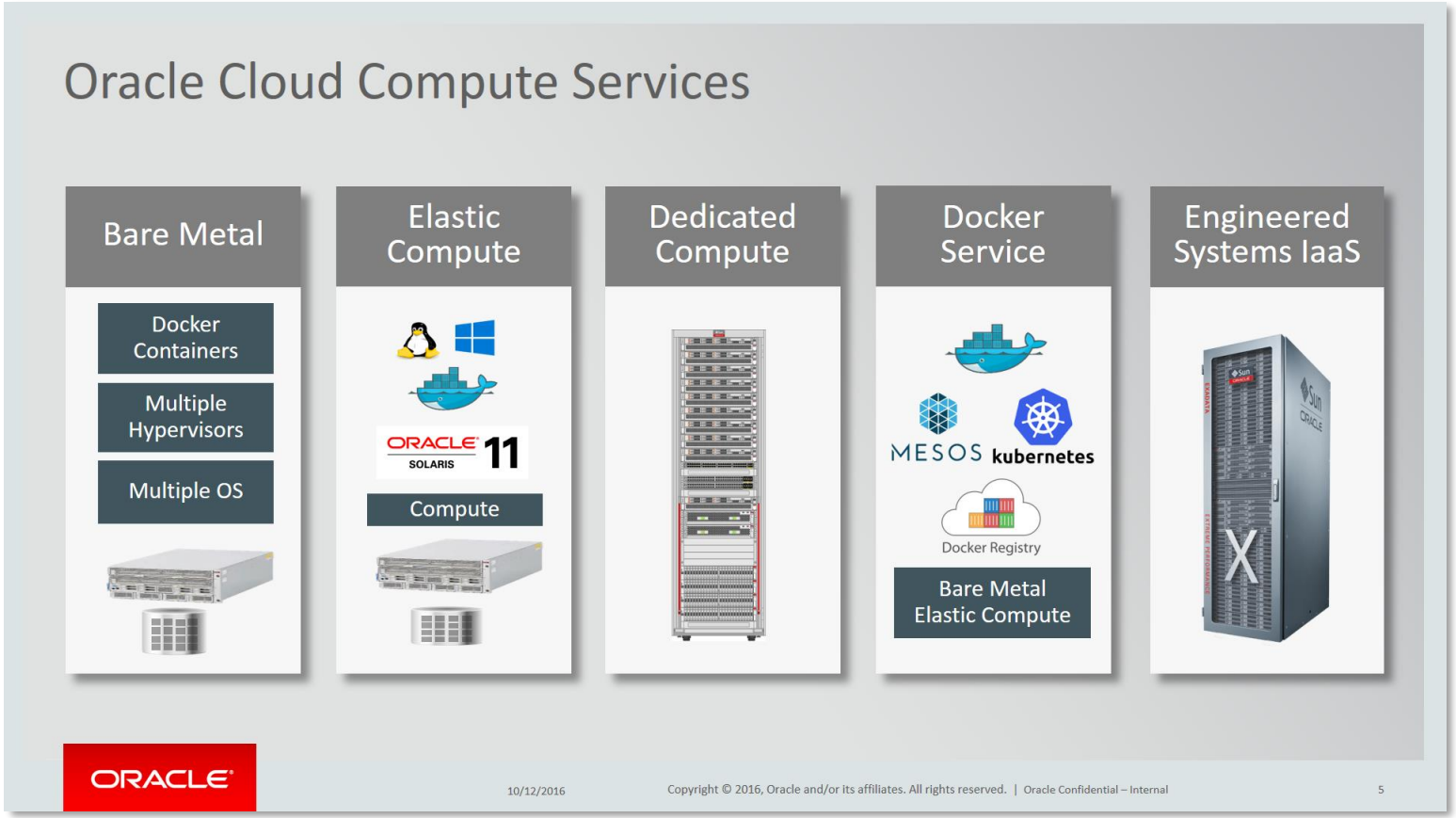
&

TCO

Oracle Cloud Infrastructure

Oracle Cloud Infrastructure (1:2)

- Of all of Oracle's Cloud offerings the one you want to focus on is the bare metal cloud



Oracle Cloud Infrastructure (2:2)

- We all know what's wrong with putting databases into virtualized environments
  - Instead of 1 ASM instance per server we get an ASM instance per container
  - Instead of 1 Management Database per server we get a Management Database in each and every container
  - Instead of leveraging all of Oracle's optimizations where the database talks directly to the hardware the database is forced to talk to a hypervisor
  - Instead of patching O/S + Clusterware + Database we get to patch the hypervisor too giving us 25% more patching work and outages
  - Instead of worrying about security at two levels, O/S and Database we get to worry about hypervisor vulnerabilities ... and there are many
  - We know stability is not improved by more complexity
  - We know performance and scalability are not improved by adding the overhead of hypervisors and containers

- Oracle's Bare Metal Cloud is just that ... Oracle ASM, Clusterware, and Database installed on bare metal
- And your existing perpetual licenses are fully utilized lowering Cloud costs

The Seven Best Things About The Oracle Cloud

The Seven Best Things About The Oracle Cloud

1. It has bugs
   - Which allowed us to open an SR and find out how fantastic Cloud support is
2. We couldn't find patches using the REST API
   - Because when we created a new database ... it was already fully patched
3. It can force a dinosaur to use the new container architecture
   - DBaaS deployment forces use of the new, vastly superior, container architecture
4. If you're not careful you can bust your budget
   - Cloud deployment allows DBAs to better appreciate costs and help control them
5. You can't install "any" application in the Cloud
   - The limitations will force our organizations to dump legacy apps older than we are
6. There are no AS/400s and M5000s in the Cloud
   - 5+ year old hardware with its stability and performance issues is automatically eliminated
7. It isn't AWS ... or Azure ... or Google
   - We can use metered services to substantially cut the costs of database licensing

Wrap Up

Conclusion

- Worried about your future after listening to Oracle talk about the Cloud?
- You've no need to be concerned if you keep your skills up to date
- The advantages to Oracle DBAs in embracing the IaaS Bare Metal Cloud are substantial and mirror the very same advantages we received from embracing other Oracle technologies
- Oracle Engineering substantially improves stability and performance
- Oracle Security is substantially greater than what you have in your place of employment ... but security within your application is still your responsibility
- IaC and metered licensing puts DBAs in the position of becoming part of the financial conversation (but we need to learn to talk to the business about $)
- As soon as you can you should establish an account with the Oracle Cloud and start learning it just as you learned other technologies you have mastered
- If you need any assistance in navigating version 12.2 or Oracle's IaaS, PaaS Cloud offerings and orchestration tools, contact me by email, text, or phone

```
*
ERROR at line 1:
ORA-00028: your session has been killed
```

Daniel A. Morgan
mobile: +1 206-669-2949