The Oracle Cloud: Let's Get Technical

Summer 2017

Daniel A. Morgan
email: vp@tcoug.org
mobile: +1 206-669-2949

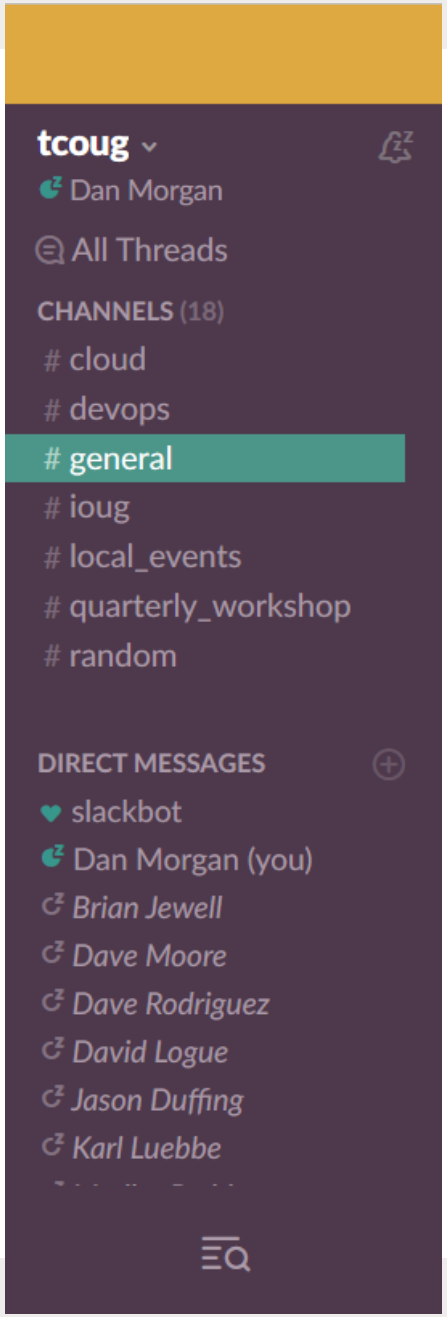
Thursday: July 20, 2017

Welcome

- Dan Morgan
  - Vice President TCOUG
  -  Oracle ACE Director Alumni
- Our TCOUG Slack Community
- Local Events
- OpenWorld 2017

Welcome

- Dan Morgan
  - Vice President TCOUG
  - Oracle ACE Director Alumni
- Our TCOUG Slack Community
- Local Events
- OpenWorld 2017



https://tcoug.slack.com/

To join the TCOUG Slack Group see a Board member today and give them your contact information

Welcome

- Dan Morgan
  - Vice President TCOUG
  - Oracle ACE Director Alumni
- Our TCOUG Slack Community
- Local Events
- OpenWorld 2017

IN-PERSON EVENT

Oracle is proud to be a sponsor of the Minnesota Digital Government Summit

Oracle will be an anchor sponsor of the MN Digital Government Summit on August 2, 2017. Mark Sunday, Chief Information Officer and Senior Vice President, Oracle, will deliver the keynote luncheon.

August 2, 2017 08:00 CST | Minneapolis-St Paul | Register |

IN-PERSON EVENT

Oracle API Integration Day

Hosting 1/2 day API Integration Day in Oracle office in Bloomington, MN office.

August 17, 2017 08:30 CST | Bloomington | Register |

IN-PERSON EVENT

Oracle Database Appliance Hands On Workshop: Minneapolis, MN

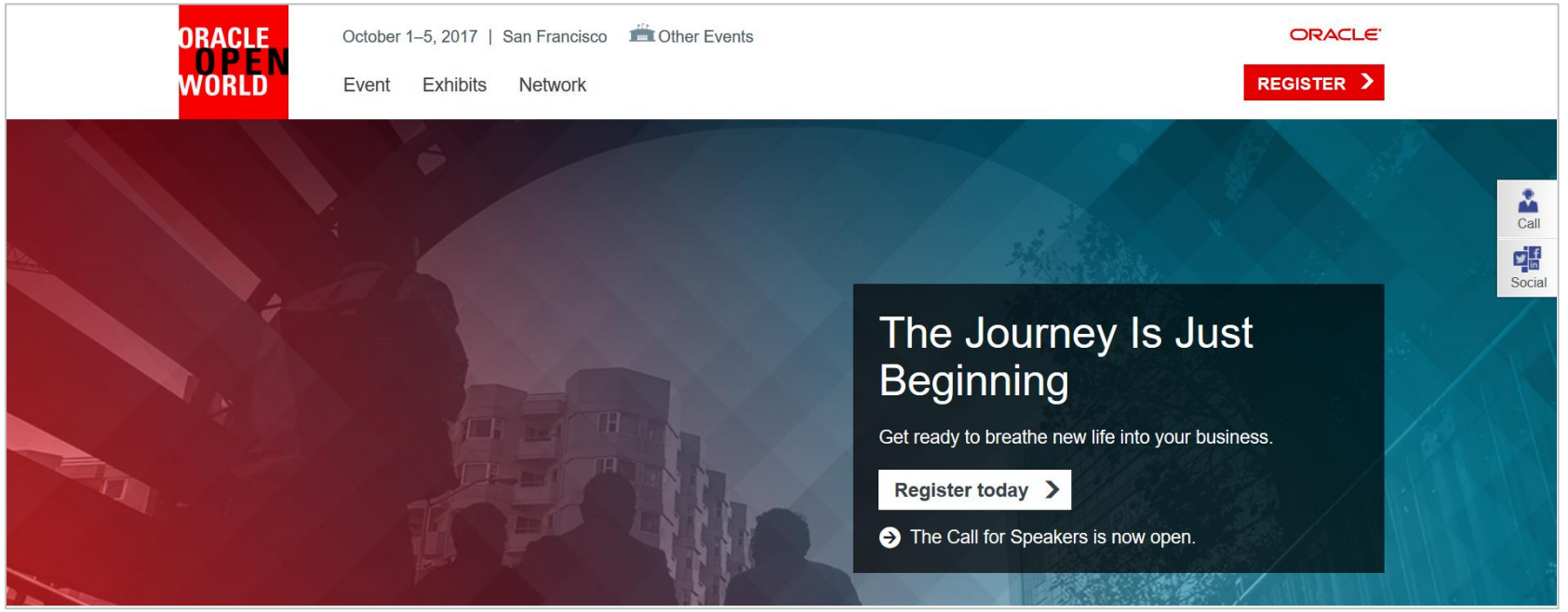
A free, hands-on workshop and learn about Oracle's solution for ultimate database protection utilizing the Oracle Database Appliance (ODA), a complete, simple, reliable and affordable solution.

August 30, 2017 09:00 EST | Minneapolis-St Paul | Register |

`https://www.oracle.com/search/events`

Welcome

- Dan Morgan
  - Vice President TCOUG
  - Oracle ACE Director Alumni
- Our TCOUG Slack Community
- Local Events
- OpenWorld 2017



`https://www.oracle.com/openworld/index.html`

Lightning Sessions: Something New

- A short presentation 5-15 minutes
- A phenomenal way to share your knowledge and experience with our group and our community
- A great way to develop your presentation skills
- I can lead workshops to help our members develop their presentations and presentation skills

Welcome - one small schedule change

Time	Description	Length
08:30 - 09:00	Registration and Networking	30
09:00 - 09:25	Welcoming Remarks, Sponsor and Speaker Introductions	25
09:25 - 09:35	Tone Deaf: Oracle and the Cloud - Dan Morgan, Meta7 	5
09:35 - 10:45	Zen and the Art of IaaS Bare Metal Compute - Glen Shok, Oracle	60
10:45 - 11:00	Break	15
11:00 - 11:45	Innovative Oracle Backup and Restore Taken to the Cloud - George Winter, Veritas	45
11:45 - 12:00	SQLcl, the new kid on the block - Jorge Rimblas, Insum 	15
12:00 - 12:45	Lunch	45
12:45 - 01:00	Client Connections using RAC and SCAN: How it works demo with tcpdump - James Wartnick, Best Buy 	15
01:00 - 01:45	Oracle Cloud Machine - Brian Bream, Collier IT	45
01:45 - 02:15	Q&A	30
02:15 - 03:00	The Cloud Administrator: A Vision for the DBA's Role in our Cloudy Future - Matthew O'Keefe, Oracle	45
03:00 - 03:15	Break	15
03:15 - 03:45	Infrastructure As Code: Dan Morgan, Meta7	30
03:45 - 04:00	Giveaways, Prizes, and Closing Remarks	15

Welcome - one small schedule change

Time	Description	Length
08:30 - 09:00	Registration and Networking	30
09:00 - 09:25	Welcoming Remarks, Sponsor and Speaker Introductions	25
09:25 - 09:35	Tone Deaf: Oracle and the Cloud - Dan Morgan, Meta7 	5
09:35 - 10:45	Zen and the Art of IaaS Bare Metal Compute - Glen Shok, Oracle	60
10:45 - 11:00	Break	15
11:00 - 11:45	Innovative Oracle Backup and Restore Taken to the Cloud - George Winter, Veritas	45
11:45 - 12:00	SQLcl, the new kid on the block - Jorge Rimblas, Insum 	15
12:00 - 12:45	Lunch	45
12:45 - 01:00	Client Connections using RAC and SCAN: How it works demo with tcpdump - James Wartnick, Best Buy 	15
01:00 - 01:45	Oracle Cloud Machine - Brian Bream, Collier IT	45
01:45 - 02:30	The Cloud Administrator: A Vision for the DBA's Role in our Cloudy Future - Matthew O'Keefe, Oracle	45
02:30 - 02:45	Break	15
02:45 - 03:15	Q&A	30
03:15 - 03:45	Infrastructure As Code: Dan Morgan, Meta7	30
03:45 - 04:00	Giveaways, Prizes, and Closing Remarks	15

Sponsor Introductions

TWIN CITIES ORACLE USERS GROUP

Sponsors


VERITAS
VOX Community
Support
Veritas Provides Visibility for Your Data and Workloads in the Multi-Cloud
Confidently manage your most important digital assets across hybrid *and* multiple public clouds - *without lock-in*.
Save money, reduce risk, fast track digital transformation.
LEARN MORE NOW
amazon web services
Google Cloud
IBM
Microsoft Azure

Sponsors

Sponsors

Sponsors

Speaker Introductions

George Winter

- Product Manager at Veritas
- Focus is on Oracle database protection with Veritas NetBackup
- George enjoys working on performance topics related to data protection and has performed a number of performance benchmark tests including testing focused on Oracle protection
- Prior to joining Veritas, George was with Sun Microsystems as a System Support Engineer assigned to Oracle's corporate datacenter
- Before that George spent a number of years as a UNIX Systems Administrator
- George has presented at numerous user conferences including Oracle Open World, Veritas Vision and VMworld

Jorge Rimblas

- Senior APEX Consultant at Insum Solutions
- Oracle ACE in Database Application Development
- Co-author of the book Expert Oracle Application Express
- Database professional since 1995 and HTMLDB/APEX since version 1.6
- Areas of expertise include Oracle Application Express (APEX), Oracle e-Business Suite, and the Oracle Databases
- Speaker at Oracle conferences including OpenWorld, Kaleidoscope, RMOUG, ECOUC, and UTOUG
- APEX instructor
- Jorge has helped several companies, in diverse industries, bring their requirements to live in the form of creative solutions
- In addition to his UI and Theme experience, he is an avid problem solver that thrives in finding elegant and efficient solutions
- Twitter as @rimblas and on his blog rimblas.com/blog

insum

Matthew O'Keefe

- Matthew O’Keefe, Ph.D. is a Vice President and Corporate Technologist in the Cloud Infrastructure group at Oracle, specializing in helping customers leverage the Oracle cloud to build agile, next-generation enterprise IT that supports game-changing cloud applications
- Prior to Oracle he co-founded and sold two storage startups, and was a tenured professor at the University of Minnesota, teaching computer engineering and doing research and development in application development and devOps

Glen Shok

- Director Business Development, Oracle
- Maintain strategic partner development within North America alliances and channels focusing in IaaS, EC, Bare Metal, Big Data, Storage aaS as well as on Premise Storage solutions

Brian Bream

- Chief Technology Officer at Collier IT
- Oracle ACE in Systems Technologies
- He has over 36 years in the Information Technology field starting in the US Navy in 1981
- Although proficient in many technologies his passion has been in the Operating Environment, Engineered Systems, Data Center grade servers, Big Data/Hadoop, and storage
- He has been teaching for Sun Microsystems / Oracle since 2000
- Brian actively writes a blog and provides formal presentations on various Oracle and related technology topics
- You can follow Brian on Twitter @Snatchbrain

Dan 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 Latina de Panama and Technologico de Costa Rica
- IT Professional
  - First computer: IBM 360/40 in 1969: Fortran IV
  - Oracle Database since 1988-9
  - Beta Tester 10g, 11g, 12c, GoldenGate, TimesTen
  - The Morgan behind www.morganslibrary.org
  - Member Oracle Data Integration Solutions Partner Advisory Council
  - Co-Founder International GoldenGate Oracle Users Group
  - Vice President Twin Cities Oracle Users Group
- Principal Adviser: Forsythe **Meta7**

META7™
A Division of Forsythe

Learning Experience Alert

Content Density Warning

Take Notes


I DON'T ALWAYS TEST MY CODE
BUT WHEN I DO, I DO IT IN PRODUCTION
Troll.me

Tone Deaf: Oracle and the Cloud

Dan Morgan, Meta7

TWIN CITIES ORACLE USERS GROUP

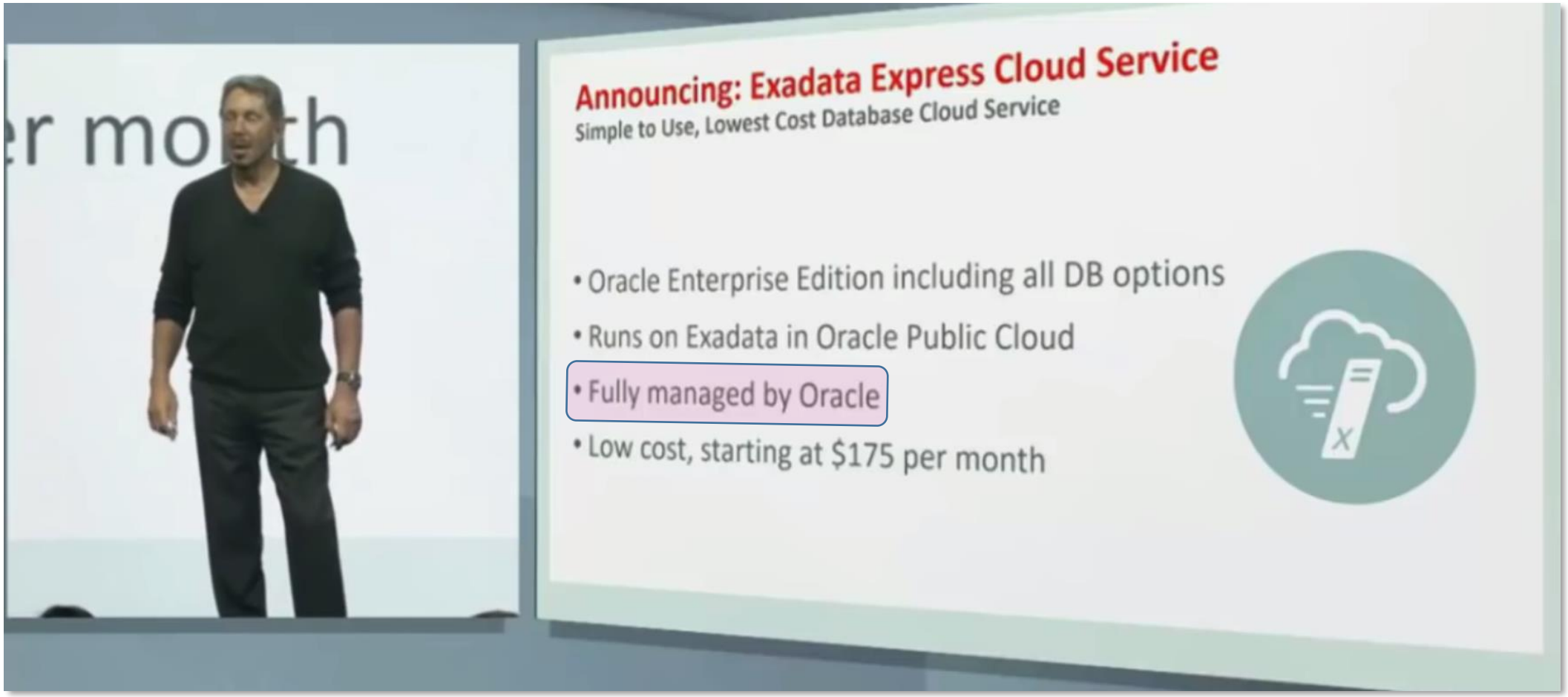
Why Am I Starting Today By Criticizing Oracle?

- Because there are a lot of very good reasons why DBAs should embrace the Oracle Cloud and Oracle has been tone deaf until today ... we're changing that
- Because no company has done a worse job of explaining the value of the Oracle Cloud's than Oracle Corp.
- Because some of Oracle's messaging at User Group Conferences, and especially last year at OpenWorld, was ... well ... "tone deaf"
- Because we have worked hard to make sure that the information you will receive today is targeted to precisely what you need to know as it is information you should have had 2 years ago

What Is The Cloud?

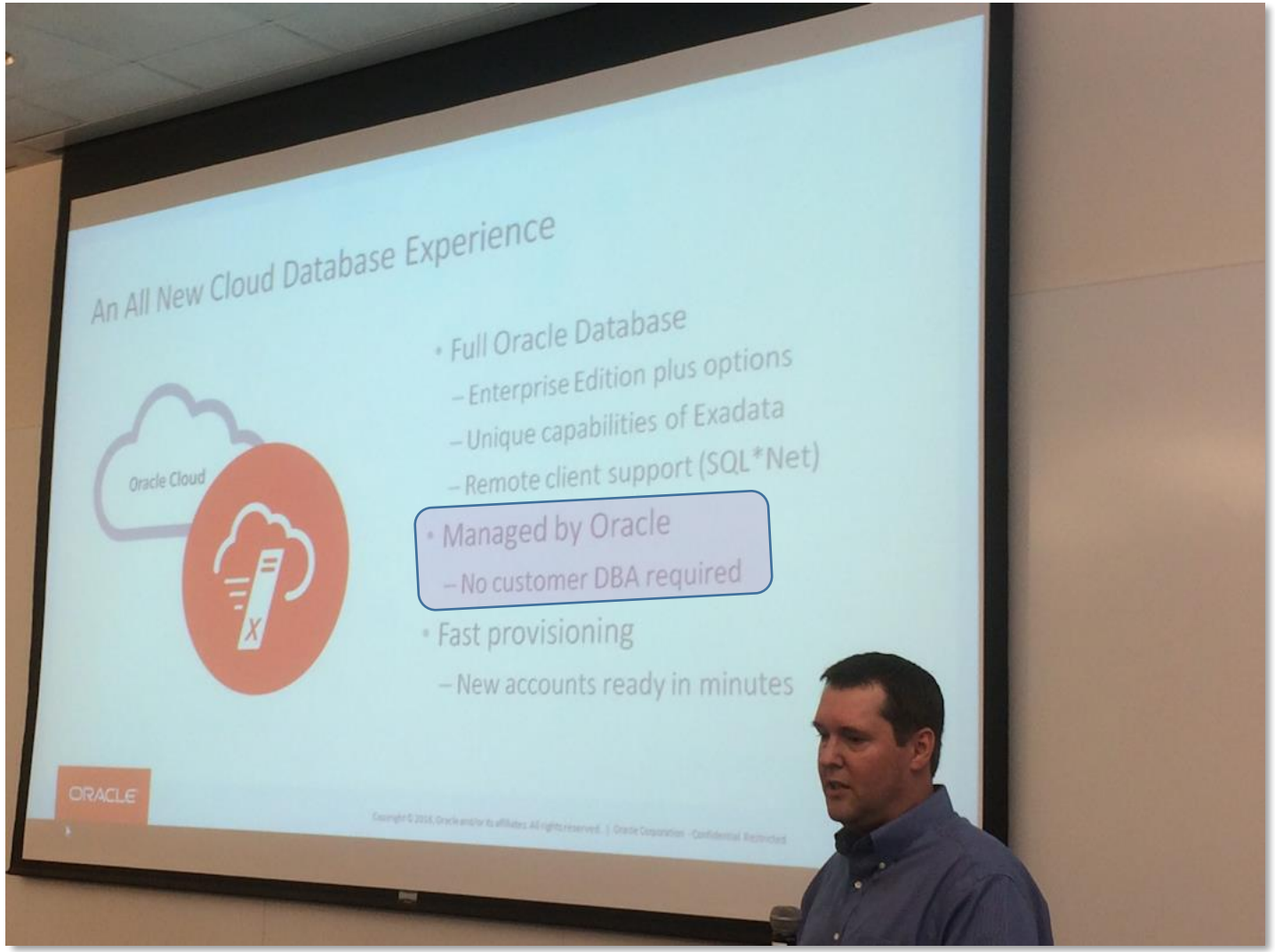
- Surely Morgan you aren't going to explain this to a group of intelligent Oracle professionals
- You're right ... I'm not
- No history lesson on 1950s service bureaus with IBM mainframes such as Service Bureau Corp. providing "Cloud" in 1957
- No explanation about AaaS *aka* SaaS because everyone here knows about Salesforce.com and Oracle's thousands of application cloud offerings
- We'll waste no time on Amazon AWS, Microsoft Azure, etc. etc. *ad nauseum*
- You can't build RAC Clusters there so nothing to talk about
- But we do want to spend today talking about the Oracle Cloud not as a list of products, not as a list of logos, not from the point of view that X is less expensive than Y
- We want to talk about it from the standpoint of the technology and how DBAs and their organizations will benefit

A Partial Truth At OpenWorld 2016



- What, specifically, is "Fully managed by Oracle?"
- And why is the definition of "fully" critically important to Oracle DBAs?

A Non-Truth At The ACE Director Briefings Before OpenWorld 2016



Some People May Have Good Reason to Fear Technology

Oracle DBAs have nothing to fear from the changes coming to our industry

What Is "Fully managed by Oracle?"

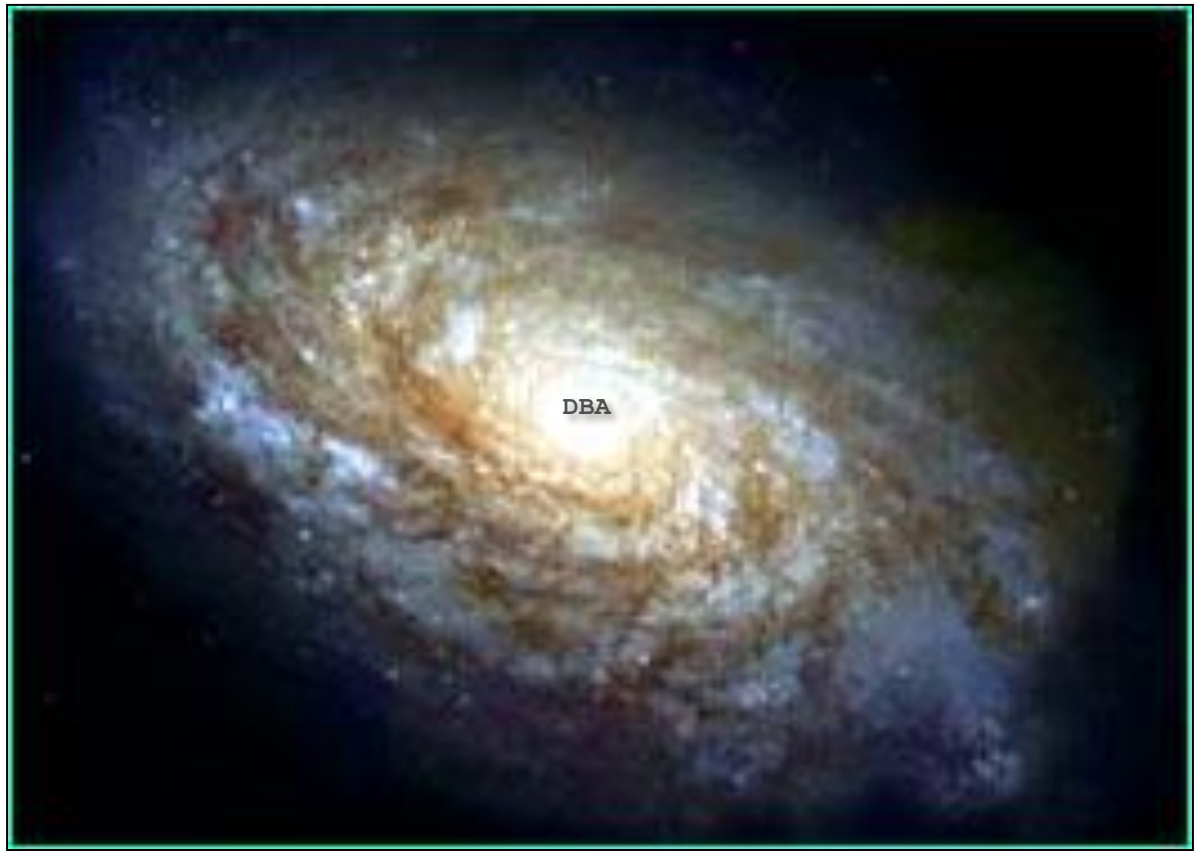
- Is Oracle going to rack and stack the hardware in their data center?
- Is Oracle going to provide network connectivity and a firewall?
- Is Oracle responsible for NTP and DNS?
- Is Oracle responsible for infrastructure security?
- Is Oracle going to install and patch the operating system?
- Is Oracle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

For a fixed-price subscription?

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)

- Let's consider a historical perspective
- If in the 1970s you would have been working on an IBM or Amdahl mainframe
  - Would you have transitioned your skills to Client Server and Oracle in the 80's?
  - How many mainframe jobs are you aware of today?
- Twenty years later 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 in the 2000s?
  - How many 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 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
  - 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 can engineer more stable, more secure, and higher performing systems than Oracle?
- 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 with VMs starved for resources
- As DBAs we will be able to 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 skills up-to-date
  - Going home in fewer than 60 hours per week
  - Spending time with family and friends on weekends, evenings and holidays

Today

- Take some time to seriously reflect on
  - The history of change in our industry
  - The history of change in the DBA job
  - The pivot you want to start making with your career
- Our speakers and subjects today have been carefully selected to give you an introduction to what our industry will look like in 5 to 7 years
  - Computing in the Cloud ... Glen Shok from Oracle
  - Backup and Restore in the Cloud ... George Winter from Veritas
  - A new user interface tool SQLcl ... Jorge Rimblas from Insum
  - Connection troubleshooting ... James Wartnick from Best Buy
  - Hybrid Clouds ... Brian Bream from Collier IT
  - Cloud Administrators and the role of DBAs in the Cloud ... Matt O'Keefe from Oracle
  - Infrastructure as Code (an old paradigm reborn) ... Dan Morgan from Meta7
- I hope everyone has a great day, a great adventure in learning, and finds value in our program

Zen and the Art of IaaS Bare Metal Compute

Glen Shok, Oracle


Break

Innovative Oracle Backup and Restore Taken to the Cloud

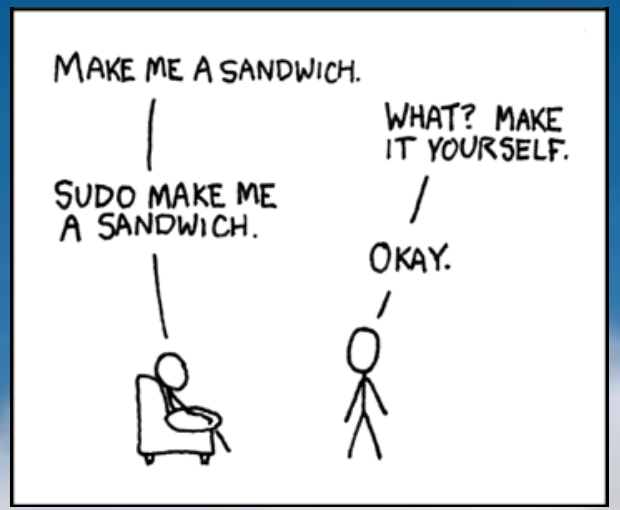
Dan Fischer, Veritas

TWIN CITIES ORACLE USERS GROUP

SQLcl, the New Kid on the Block

Jorge Rimblas, Insum

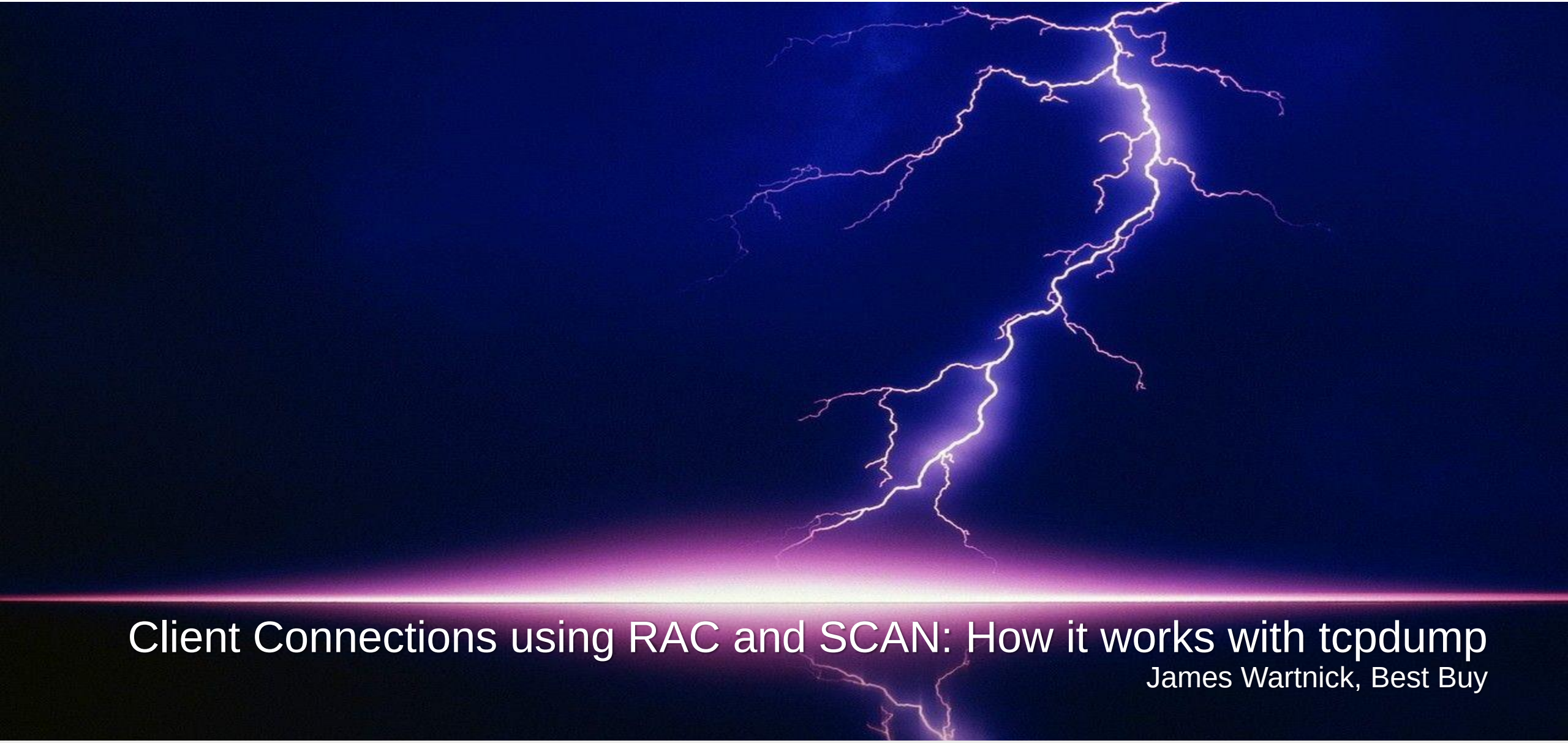
TWIN CITIES ORACLE USERS GROUP



ORACLE®

CLOUD

Lunch: we will resume at 12:45



Client Connections using RAC and SCAN: How it works with tcpdump

James Wartnick, Best Buy

TWIN CITIES ORACLE USERS GROUP

Oracle Cloud Machine

Brian Bream, Collier IT

TWIN CITIES ORACLE USERS GROUP

The Cloud Administrator: A Vision for the DBA's Role in our Cloudy Future

Matthew O'Keefe, Oracle

TWIN CITIES ORACLE USERS GROUP


ORACLE
CLOUD
Break

TWIN CITIES ORACLE USERS GROUP

If you don't think this will affect you consider the following

- Oracle 18.0 will be released this Fall with more than 180 new features
  - Oracle has changed `./runInstaller` and OUI to make them more Cloud compatible
- Oracle 18.1 will be released in January
- Oracle 18.2 will be released in April
- Oracle is moving to eliminate SYSDBA
  - We now have users named GGSYS, SYSBACKUP, SYSDG, SYSKM, SYSRAC?
- The Oracle Database on Linux may move to rpms with installation and patching fully automated from a YUM server
- The database's kernel is being rewritten so that almost all patches will not require an outage
- Expect OEM and other tools to manage the database through the REST API
- Do not be surprised if SQL*Plus and Server Control are merged into a single tool and DBAs will be strongly discouraged for using it for everything except troubleshooting and root cause analysis

Infrastructure as Code

Daniel Morgan, Meta7

TWIN CITIES ORACLE USERS GROUP

In Enterprise Computing Only Two Things Matter

QoS

TCO

QoS + TCO

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

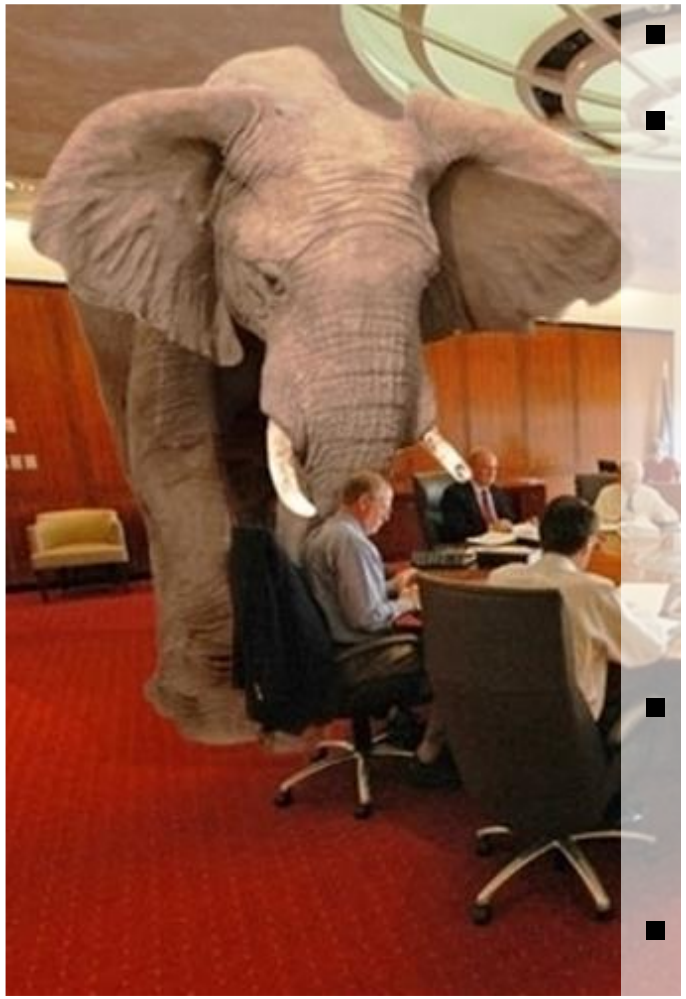
- **TCO** ... Total Cost of Ownership is a simple way of saying enterprise computing solutions must
  - Not negatively impact the cost or ability to deliver products and services

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

In The Beginning ...

"Those that do not study history are doomed to repeat it"

George Santayana



- IT is not immune to physics or human nature
- We are at the cutting edge of technology ... and we are 30 years behind manufacturing when it comes to acknowledging economic realities and embracing some of manufacturing's hard learned lessons
  - 1908 Henry Ford and the Model T
  - 1977 "Just-In-Time Delivery" (JIT) reduces costs
  - 1986 Continual Process Improvement CPI)
  - 1988 Lean Manufacturing
- In 1988 while the Boeing Company was adopting JIT, CPI, and Lean Manufacturing Oracle was supporting version 7 on 92 operating systems and platforms
- Oracle now supports only 4

A Brief History of Enterprise Computing (1:3)

- 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
  - IT' 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, and far too much cost

A Brief History of Enterprise Computing (2:3)

- 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 enhances QoS and reduces TCO
- What we have learned from manufacturing
  - "Just-In-Time Delivery" reduces costs and cycle times
  - Continual Process Improvement reduces errors and improves stability
  - Lean Manufacturing reduces costs
  - Delivery must be rapid, seamless, and flexible
  - Process automation reduces costs and human errors
- The same pressures that drove mainframes and client-server to near extinction are now driving the adoption of DevOps and the Cloud

A Brief History of Enterprise Computing (3:3)

- What we learned from the mainframe
  - To be successful we must be able to scale our systems both vertically and horizontally
  - Costs and lower, stability and security higher if databases and applications are centrally managed by a small group of highly skilled professionals
  - We must be more responsive to the needs of the business
- What we learned from client-server
  - Distributing applications onto thousands or millions of individual desktops makes them unmanageable from the standpoint of patching and upgrades (though this may be changing with the introduction of micro-services concepts
  - We must simplify infrastructure reducing the number of options
  - We must be more responsive to the needs of the business
- What we learned from n-tier architecture
  - We must further simplify infrastructure reducing the number of options
  - We must be more responsive to the needs of the business

What is Infrastructure as Code (IaC)?

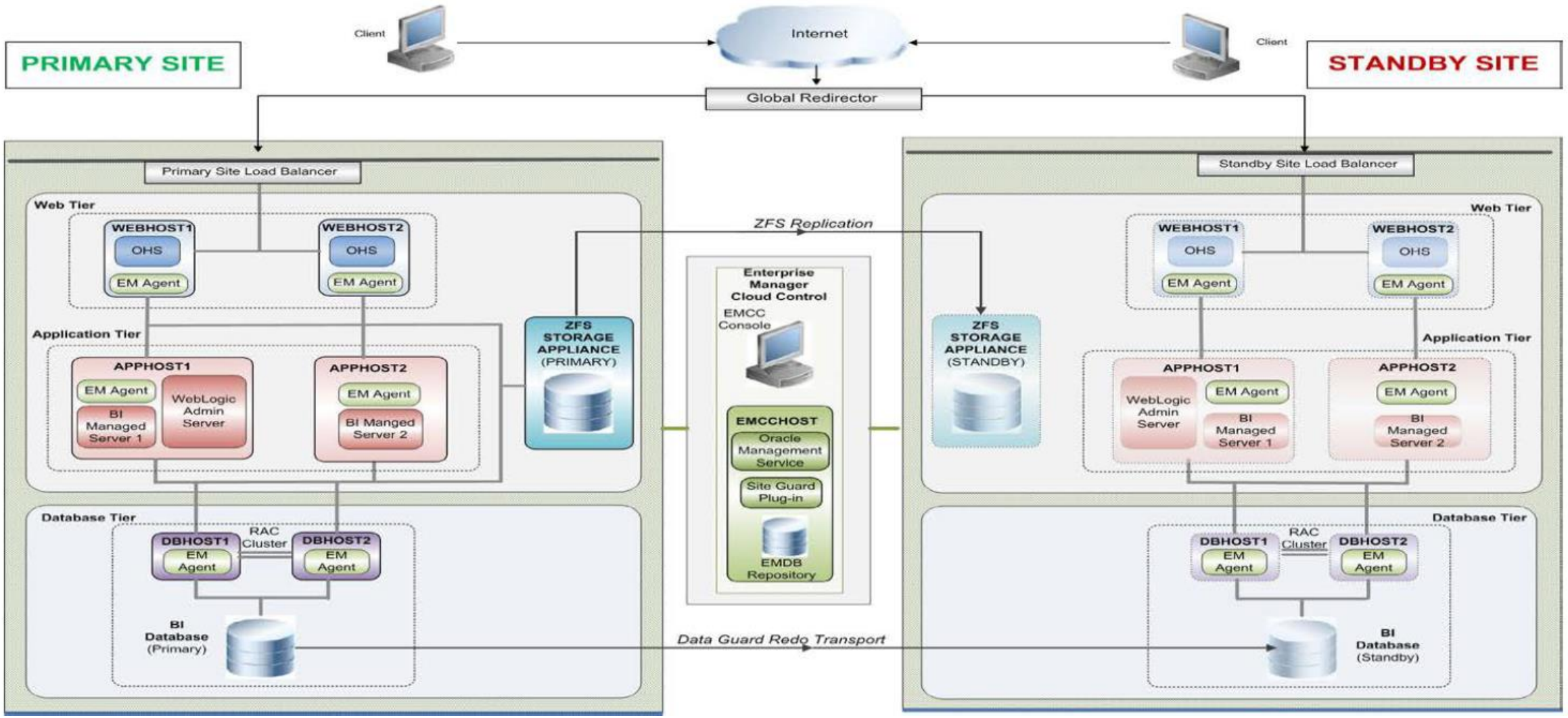
- Infrastructure as Code is the process of managing and provisioning computer data centers through machine-readable definition files, rather than physical hardware configuration or interactive configuration tools
- Both physical equipment such as bare-metal servers and virtual machines and associated configuration resources are called "infrastructure"
- The concept of IaC is one of using code to design, implement, and deploy application infrastructure with known software 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

We've Been Doing IaC for Decades

```
[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
```

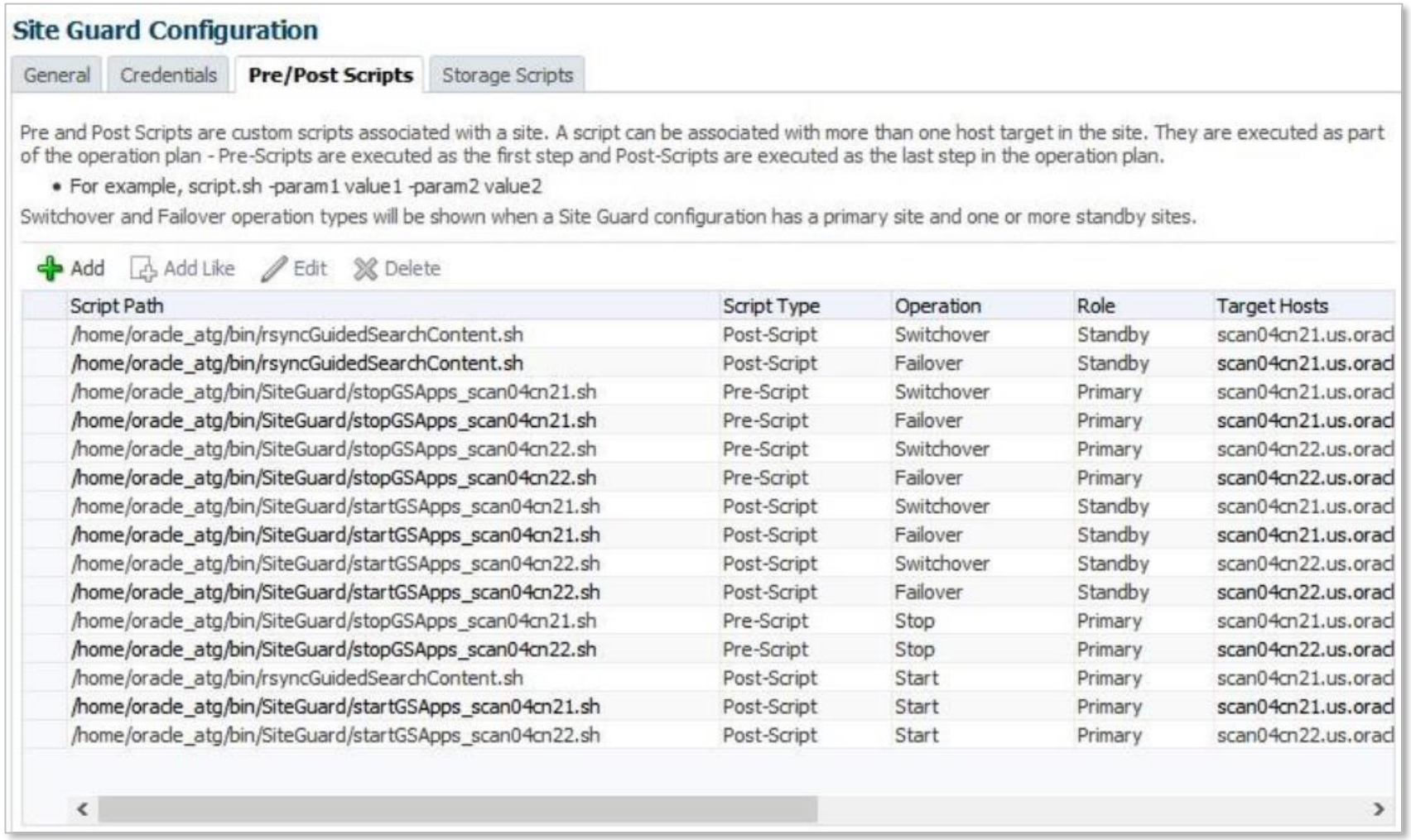
```
oracle@db12r2 u01]$ more dbca.rsp
###############################################################################
##                                                                           ##
##                           DBCA response file                              ##
##                           ------------------                              ##
## 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
```

Site Guard (1:2)



Site Guard (2:2)

- Sample Site Guard script



Site Guard Configuration

General | Credentials | **Pre/Post Scripts** | Storage Scripts

Pre and Post Scripts are custom scripts associated with a site. A script can be associated with more than one host target in the site. They are executed as part of the operation plan - Pre-Scripts are executed as the first step and Post-Scripts are executed as the last step in the operation plan.

- For example, script.sh -param1 value1 -param2 value2

Switchover and Failover operation types will be shown when a Site Guard configuration has a primary site and one or more standby sites.

Add | Add Like | Edit | Delete

Script Path	Script Type	Operation	Role	Target Hosts
/home/oracle_atg/bin/rsyncGuidedSearchContent.sh	Post-Script	Switchover	Standby	scan04cn21.us.orac
/home/oracle_atg/bin/rsyncGuidedSearchContent.sh	Post-Script	Failover	Standby	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/stopGSApps_scan04cn21.sh	Pre-Script	Switchover	Primary	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/stopGSApps_scan04cn21.sh	Pre-Script	Failover	Primary	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/stopGSApps_scan04cn22.sh	Pre-Script	Switchover	Primary	scan04cn22.us.orac
/home/oracle_atg/bin/SiteGuard/stopGSApps_scan04cn22.sh	Pre-Script	Failover	Primary	scan04cn22.us.orac
/home/oracle_atg/bin/SiteGuard/startGSApps_scan04cn21.sh	Post-Script	Switchover	Standby	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/startGSApps_scan04cn21.sh	Post-Script	Failover	Standby	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/startGSApps_scan04cn22.sh	Post-Script	Switchover	Standby	scan04cn22.us.orac
/home/oracle_atg/bin/SiteGuard/startGSApps_scan04cn22.sh	Post-Script	Failover	Standby	scan04cn22.us.orac
/home/oracle_atg/bin/SiteGuard/stopGSApps_scan04cn21.sh	Pre-Script	Stop	Primary	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/stopGSApps_scan04cn22.sh	Pre-Script	Stop	Primary	scan04cn22.us.orac
/home/oracle_atg/bin/rsyncGuidedSearchContent.sh	Post-Script	Start	Primary	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/startGSApps_scan04cn21.sh	Post-Script	Start	Primary	scan04cn21.us.orac
/home/oracle_atg/bin/SiteGuard/startGSApps_scan04cn22.sh	Post-Script	Start	Primary	scan04cn22.us.orac

The IaC Business Case

- The value of Infrastructure as Code can be broken down into three, measurable categories
  - Cost (reduction)
    - Cost reduction aims at helping not only the enterprise financially but also in terms of people and effort, meaning that by removing the manual component, people are able to refocus their efforts towards other enterprise tasks
  - Speed (faster execution)
    - Infrastructure automation enables speed through faster execution when configuring your infrastructure and aims at providing 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, like manual misconfiguration; removing this can decrease downtime and increase reliability
    - IaC, by definition, increases the organization's maturity providing built-in Change Management and a single version of truth

Traditional Database Deployment (1:4)

1. Identify resource requirements
   - Storage requirements
   - Network requirements
   - Server capabilities
   - Security requirements
   - High Availability Requirements (DR, SLA, RTO, RPO)
2. Provision infrastructure
   - IP addresses
   - Appropriate quantities of Tier 1 (and Tier 2 storage)
   - Rack space
   - Operating system licenses
   - Database licenses
   - Other licenses
3. Download software for installation

Traditional Database Deployment (2:4)

4. Wait while
   - Storage is provisioned
   - Holes are punched in the firewall
   - Infrastructure is racked and stacked
   - Operating systems are misconfigured
5. Install software in the Oracle Home(s)
   - Multiplex the control file
   - Multiplex the redo logs
   - Configure sqlnet, listener, and tnsnames .ora files
   - Configure spfile parameters
   - Configure auditing
6. Go to support.oracle.com and
   - Research the one-off patches that need to be applied
   - Download the patches
7. Apply each patch sequentially

Traditional Database Deployment (3:4)

8. Install the OEM Agent and configure credentials
9. FTP everything to the DR site and repeat steps 2, 4, 5, 7 and 8
10. Register the database with the RMAN repository

Traditional Database Deployment (4:4)

- You may be Ok if
  - It isn't a RAC cluster
  - GoldenGate or other Data Integration products are not in use
  - The current SAN has sufficient capacity and can be expanded to hold storage for the next 3-5 years
  - The current VLANs are not overprovisioned so that you are getting only a fraction of the 10gEth you need
  - The initial requirements, as gathered, are reasonably accurate
  - The system either does not grow or has a growth rate within the expected range
  - Your system architects, System Admins, Network Admins, and Storage Admins regularly read the Oracle docs, read Oracle books and blogs, attend user group conferences, and are aware of the many issues that exist when deploying on blade servers and generic converged infrastructure solutions
  - Nothing else is provisioned in the data center as a shared service that starts utilizing your database's portion of the resources

IaC Database Deployment

1. Identify resource requirements
   - Storage requirements
   - Network requirements
   - Server capabilities
   - Security requirements
   - High Availability Requirements (DR, SLA, RTO, RPO)
2. Write what definition of what you want to deploy in an IaC configuration file
3. Execute the configuration

The Traditional Database 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
- 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 purchase more
  - more expensive infrastructure
  - more storage
  - more servers
  - more licenses
  - more support

The Metered Services Purchasing Algorithm

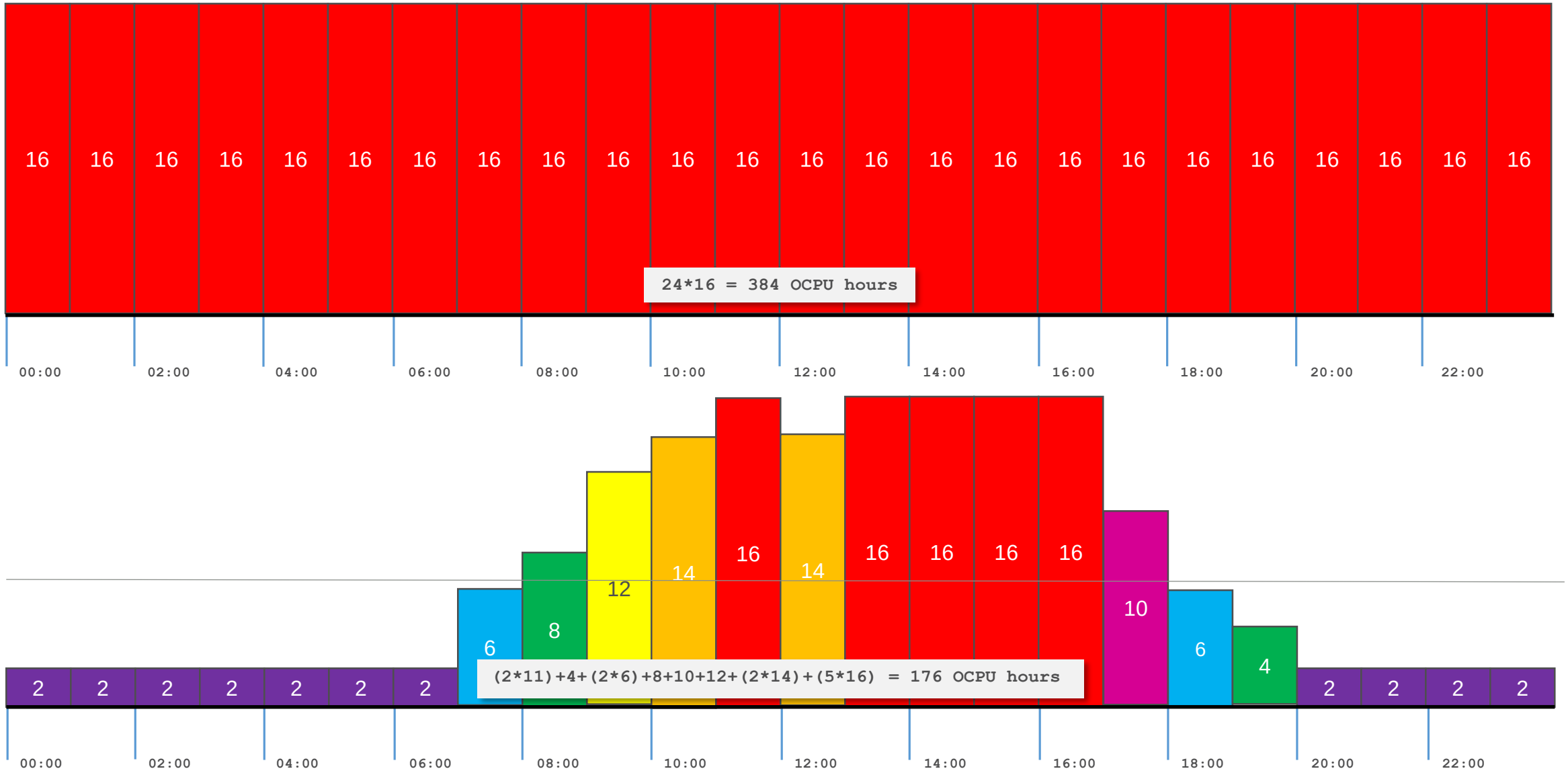
- Purchase, each hour precisely what you need for that hour
- If your requirement decreases purchase less lowering your cost of operations
- If your requirements increase purchase more in accordance with your need

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. Dynamic Management (1:2)



Fixed vs. Dynamic Management (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%

DBaaS with Dynamic Management vs. x86

- HP DL580 pricing is based on the fully discounted price of all components over 3 years and a standard Oracle EE license discount
- 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

Add to the HP DL580 solution all costs associated with

- Security including firewalls
- Network Infrastructure including firewalls, load balancers, switches and routers
- Backups and their storage
- Insurance & Taxes

- With the HP DL580 if you need 20 cpu cores ... buy another server + licenses
- With the DBaaS solution if you need 20 cpu cores ... bring it online in 60 sec.

Oracle Cloud IaC Code Sample (1:2)

```
  sshKeys.#: "" => "1"
  sshKeys.0: "" => "ATS-cluster-ssh"
  vcable:    "" => "<computed>"
opc_compute_instance.web_nodes.0: Creating...
  imageList: "" => "/Compute-a430291/DRAUBA@forsythe.com/Ubuntu.16.04-LTS.amd64.20170307.1"
  ip:        "" => "<computed>"
  label:     "" => "WEB1"
  name:      "" => "WEB1"
  opcId:     "" => "<computed>"
  shape:     "" => "oc3"
  sshKeys.#: "" => "1"
  sshKeys.0: "" => "ATS-cluster-ssh"
  vcable:    "" => "<computed>"
opc_compute_security_ip_list.open-internet: Creation complete (ID: open-internet)
opc_compute_security_list.ATS-cluster: Creation complete (ID: ATS-cluster)
opc_compute_ip_reservation.web_node_reservations.1: Creation complete (ID: 0edc423b-...fd4311f1)
opc_compute_ip_reservation.web_node_reservations.0: Creation complete (ID: 7a72ecf7-...3b0c8701)
opc_compute_security_list.allow-ssh: Creation complete (ID: allow-ssh)
opc_compute_security_rule.allow-ssh: Creating...
  action:           "" => "permit"
  application:      "" => "/oracle/public/ssh"
  destination_list: "" => "seclist:allow-ssh"
  disabled:         "" => "false"
  name:             "" => "allow-ssh"
  source_list:      "" => "seciplist:open-internet"
opc_compute_security_rule.allow-ssh: Creation complete (ID: allow-ssh)
opc_compute_instance.web_nodes.1: Still creating... (10s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (10s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (20s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (20s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (30s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (30s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (40s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (40s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (50s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (50s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (1m0s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (1m0s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (1m10s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (1m10s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (1m20s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (1m20s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (1m30s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (1m30s elapsed)
opc_compute_instance.web_nodes.1: Still creating... (1m40s elapsed)
opc_compute_instance.web_nodes.0: Still creating... (1m40s elapsed)
opc_compute_instance.web_nodes.1: Creation complete (ID: WEB2)
opc_compute_instance.web_nodes.0: Still creating... (1m50s elapsed)
```

Oracle Cloud IaC Code Sample (2:2)

```
null_resource.install-consul (remote-exec): Reading package lists... 0%
null_resource.install-consul (remote-exec): Reading package lists... 100%
null_resource.install-consul (remote-exec): Reading package lists... Done
null_resource.install-consul (remote-exec): Building dependency tree... 0%
null_resource.install-consul (remote-exec): Building dependency tree... 0%
null_resource.install-consul (remote-exec): Building dependency tree... 50%
null_resource.install-consul (remote-exec): Building dependency tree... 50%
null_resource.install-consul (remote-exec): Building dependency tree
null_resource.install-consul (remote-exec): Reading state information... 0%
null_resource.install-consul (remote-exec): Reading state information... 7%
null_resource.install-consul (remote-exec): Reading state information... Done
null_resource.install-consul (remote-exec): curl is already the newest version (7.47.0-1ubuntu2.2).
null_resource.install-consul (remote-exec): 0 upgraded, 0 newly installed, 0 to remove and 23 not upgraded.
null_resource.install-consul (remote-exec): Fetching Consul...
null_resource.install-consul (remote-exec):   % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
null_resource.install-consul (remote-exec):                                 Dload  Upload   Total   Spent    Left  Speed
null_resource.install-consul (remote-exec):   0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
null_resource.install-consul (remote-exec):   0 8559k    0 29473    0     0  33309      0  0:04:23 --:--:--  0:04:23 33302
null_resource.install-consul: Still creating... (1m0s elapsed)
null_resource.install-consul (remote-exec):  28 8559k   28 2463k    0     0  1310k      0  0:00:06  0:00:01  0:00:05 1310k
null_resource.install-consul (remote-exec):  88 8559k   88 7615k    0     0  2645k      0  0:00:03  0:00:02  0:00:01 2645k
null_resource.install-consul (remote-exec): 100 8559k  100 8559k    0     0  2803k      0  0:00:03  0:00:03 --:--:-- 2804k
null_resource.install-consul (remote-exec): Installing Consul...
null_resource.install-consul (remote-exec): Installing Systemd service...
null_resource.install-consul (remote-exec): Starting Consul...
null_resource.install-consul (remote-exec): using systemctl
null_resource.install-consul (remote-exec): Created symlink from /etc/systemd/system/multi-user.target.wants/consul.service to /etc/systemd/system/consul.service.
null_resource.install-consul (remote-exec): # Generated by iptables-save v1.6.0 on Fri Apr  7 15:49:47 2017
null_resource.install-consul (remote-exec): *filter
null_resource.install-consul (remote-exec): :INPUT ACCEPT [4:388]
null_resource.install-consul (remote-exec): :FORWARD ACCEPT [0:0]
null_resource.install-consul (remote-exec): :OUTPUT ACCEPT [4:356]
null_resource.install-consul (remote-exec): -A INPUT -p tcp -m tcp --dport 8400 -j ACCEPT
null_resource.install-consul (remote-exec): -A INPUT -p tcp -m tcp --dport 8302 -j ACCEPT
null_resource.install-consul (remote-exec): -A INPUT -p tcp -m tcp --dport 8301 -j ACCEPT
null_resource.install-consul (remote-exec): -A INPUT -p tcp -m tcp --dport 8300 -j ACCEPT
null_resource.install-consul (remote-exec): COMMIT
null_resource.install-consul (remote-exec): # Completed on Fri Apr  7 15:49:47 2017
null_resource.install-consul: Creation complete (ID: 3750839304722881756)

Apply complete! Resources: 18 added, 0 changed, 0 destroyed.

The state of your infrastructure has been saved to the path
below. This state is required to modify and destroy your
infrastructure, so keep it safe. To inspect the complete state
use the `terraform show` command.
```

TCO Summary

- Unlike the unrealized promises you have heard for years ... 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
- 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

Now that you know how to achieve it ... what are your next steps?

Giveaways, Prizes & Closing Remarks

TWIN CITIES ORACLE USERS GROUP

TWIN CITIES ORACLE USERS GROUP

I hope today has been valuable and encourage you to contact me ... vp@toug.org ... with suggestions and to volunteer to present at our Fall meeting, October 12th at Thomson Reuters where we will focus on OpenWorld 2017 announcements and new features in Oracle 18.0

Daniel A. Morgan
email: vp@tcoug.org
mobile: +1 206-669-2949