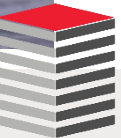


# Channeling Oracle OpenWorld 2017



# 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, Tecnológico 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](http://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



## Morgan's Library

☐ www ☐ library

### International Oracle Events 2016-2017 Calendar

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

## The Library

The library is a spam-free on-line resource with code demos for DBAs and Developers. If you would like to see new Oracle database functionality added to the library ... just email us. Oracle Database 12cR2 is now available in the Cloud. If you are not already working in a 12cR1 CDB database ... you are late to the party and you are losing your competitive edge.

Home

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### Mad Dog Morgan




### Training Events and Travels

- [OTN APAC, Sydney, Australia - Oct 31](#)
- [OTN APAC, Gold Coast, Australia - Nov 02](#)
- [OTN APAC, Beijing China - Nov 04-05](#)
- [OTN APAC, Shanghai China - Nov 06](#)
- [Sangam16, Bangalore, India - Nov 11-12](#)
- [NYOUG, New York City - Dec 07](#)


**Next Event: Indiana Oracle Users Group**

### Oracle Events




**Click on the map to find an event near you**

### Morgan





aboard USA-71





### Library News


- [Morgan's Blog](#)
- [Morgan's Oracle Podcast](#)
- [US Govt. Mil. STIGs \(Security Checklists\)](#)
- [Bryn Llewellyn's PL/SQL White Paper](#)
- [Bryn Llewellyn's Editioning White Paper](#)
- [Explain Plan White Paper](#)



### ACE News

 Would you like to become an Oracle ACE? 










Learn more about becoming an ACE



- [ACE Directory](#)
- [ACE Google Map](#)
- [ACE Program](#)
- [Stanley's Blog](#)

This site is maintained by Dan Morgan. Last Updated: 11/08/2016 22:25:14

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www.morganslibrary.org

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# 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	Riverbed Technology
AccessData	Dataram	Logitech	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	Symmetricon
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, Inc.	Texas Memory Systems
Barracuda Networks	Fujitsu	Northern Software	The Written Word
BlueCat Networks	Fusion-io	Novell	TierPoint
BMC Software	Gemalto	NTP Software	Tintri
Boldon James	GIGABYTE	Nutanix	Titus
Box	Gigamon	NVIDIA	TransVault
Bradford Networks	Google	OCZ Technology	Trend Micro
Brocade	Guidance Software	Opengear	Tripp Lite
CA Technologies	HBGary	Oracle	Tripwire
Cable-Comm Technologies	HDS	Palo Alto Networks	Trustwave Holdings
Carbon Black	Hewlett Packard Enterprise	Panasonic North America	Tufin Software North America, Inc.
Catbird Networks	IBM	Panduit	Variphy
CCX Corporation	Imation		



# Forsythe (2:2)

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



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

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, Inc.	Qlogic	Viavi Solutions
Cloudgenix	Ixia	Qualys	Violin Memory
CommVault	JadeLiquid Software	Quantum	Viptela
Cortelco	JDSU	Radware	Virtual Instruments
Crossbeam Systems	Juniper	Rapid7	VMTurbo
CrowdStrike	Kingston	Raritan	VMware
CTERA Networks	Lancopé	RecoveryPlanner	Voltage Security
CyberArk	Lantronix	Red Hat	Vormetric
Cylance	Lenovo	RedSeal Systems	Websense
Damballa	Liebert	Resilient, an IBM Company	Winchester Systems
		Reveille Software	Zerto



# 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



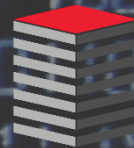


# *Stability: IT Fire Fighting*





# Oracle Stack Security





# *Scalability: VLDBs and Partitioning*



# *Database Performance*





# *Zero Downtime Migration*



# *Just In Time IT Procurement*



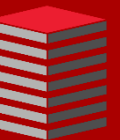
# Learning Experience Alert







Say Hello To Machine Learning





# THE WALL STREET JOURNAL.

DOW JONES | News Corp. \*\*\*\*

THURSDAY, NOVEMBER 16, 2017 ~ VOL. CCLXX NO. 117

WSJ.com

★★★★ \$4.00

World's First  
"Self-Driving"  
Database

Oracle  
Autonomous  
Database

No Human Labor - Half the Cost  
No Human Error - 100x More Reliable

ORACLE

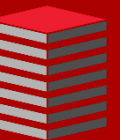
[oracle.com/selfdrivingdb](http://oracle.com/selfdrivingdb)

Human labor refers to tuning, patching, upgrading, and maintenance of database.  
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Say Hello To Machine Learning



# Welcome To Our Future

- Larry Ellison's keynotes focused on two different new products
- Both based on a single underlying technology that Oracle is working to build into all of the products in its technology stack
- In his first keynote Larry focused on what he called:

"The new, greatest, version of Oracle 18c which is the world's first autonomous database"





## Oracle Autonomous Database and Highly Automated Cyber Defense

Larry Ellison  
Chief Technology Officer

ORACLE

Robots  
Prevent Data Theft







Based on a Technology  
As Revolutionary  
As the Internet



# The Premise Is As Ground-Shaking As It Is Obvious (1:2)

- There can be a variety of threats to our data, our databases, and our organizations
- The threats include
  - Stability Issues
  - Security Threats
    - Denial of Service Attacks
    - Data Theft
    - Data Corruption
  - Performance Issues
- The solution Oracle has chosen in Machine Learning
  - Not Artificial Intelligence ... but very specifically "machine learning"
  - The point is that "We do everything we can to avoid human intervention"
- The "cold war" has moved from the military to our computers
- We are the front line ... and while there is no blood or burning buildings ... make no mistake about it ... this is escalating and our ability to pretend that we are not on the front line is evaporating



# The Premise Is As Ground-Shaking As It Is Obvious (2:2)

- It is now "Our computers" vs "Their Computers" in cyberwarfare
  - If it is their computers vs us ... we will lose
  - If you don't believe me try to beat Deep Blue at chess or AlphaGo at go
  - If the opposition is an crime family your data will be sold on the dark web
  - If the opposition is a nation-state expect your data to be used to attack your country, your community, your family
  - The worst data thefts have occurred after a patch was available
  - Because we all know we do not patch the instant the patch is available
  - We schedule downtime
  - Patching is never a top priority for our employers
- To win we must
  - Apply patches the instant they are available
  - Act the instant the database detects a threat
- We no longer have the luxury of scheduling patches ... taking an outage ...
- The "old" way is not a tactic or a strategy ... it is a guaranteed failure

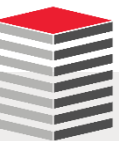




- Log Analytics (Splunk) doesn't fix anything ... it just tells you that you have a problem ... if anyone has time to look
- OMC is a highly automated cyber defense ... not yet 100% autonomous
- Originally designed as a Splunk killer ... but implemented as far more
- With the 18c database ... co-designed to stop data theft
- We need to reprioritize and we need to help our management reprioritize
- We need to completely rethink how we protect systems
- What happened at Equifax?
  - For one thing they couldn't find all of the installed instances of Apache Struts
  - Which prevented them from patching them
  - The attackers, it seems, found them all
  - And they made the mistake of focusing on perimeter defense rather than defense in depth





- We don't tolerate airplane crashes ... but we tolerate security failures daily
- We need to elevate the priority of security
- We need to reprioritize ... to do security without it being a speed bump
- Humans can't keep up ... we must have more automation
- We need to automatically fix vulnerabilities and, if there is an attack, detect it and shut it down
- There **must** be no human intervention and no downtime required
- Which means we need to
  - Identify normal events
  - Distinguish normal from abnormal events
  - Act instantly and autonomously to abnormal events






>

## Cyber Attacks: More Data Stolen Every Year **Cyber Criminals and State Actors are Winning the Cyber War**

- Equifax: Records of 143,000,000 Americans plus...
  - **Credit Card Numbers**, Social Security Numbers, home addresses...
  - Equifax CEO, executives and IT management team resigns
- Office of Personnel Management: Records of 20 Million Federal Employees
  - **Security clearance data**, finger print data, social security numbers, home addresses
  - White House, Foreign Embassies, State Department, Defense Department...
  - Director of OPM Resigns
- Cyber Criminals and **State Actors** steal more data every year
  - **Formidable and sophisticated adversaries** stealing corporate & government data





>

## Modern Cyber Security Requires More Automation

**Cyber Defense: Our People versus Their Computers**

- Most Data Thefts Occur **After** Security Fix Available
  - Target did not detect the attack
  - Target behind in applying security patches
    - Wrong priorities
    - Waiting for downtime window






Modern Cyber Security Requires More Automation  
**Security & Database Automation Work Together to Prevent Data Theft**

- **Cyber Defense System:** Automatically Detects Attacks in Real-Time
  - Automated Intrusion Detection
- **Database System:** Automatically and Immediately Secures Your Data
  - Automated database immediately **patches itself while running**
    - No delay for downtime window, **no manual intervention**
  - Recovers data that's deleted by ransomware, etc.







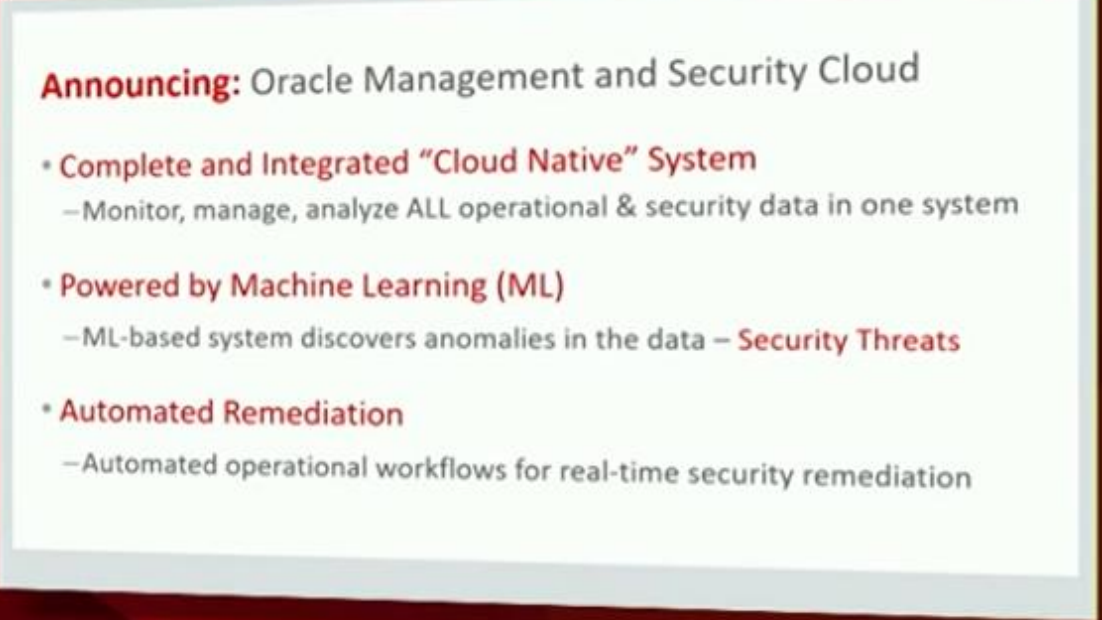

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## Machine Learning

**Computers Learn from Patterns in the Data and Make Predictions**

- Machine learning relies on large amounts of accurate training data
  - More volume of accurate data increases learning
  - Increased learning/training means more accurate predictions
- **Anomaly Detection:** Separate normal from abnormal patterns in the data
  - Detect a cancer cell from normal cells
  - Detect the CFO logging on from a computer in the Ukraine






**Announcing:** Oracle Management and Security Cloud

- **Complete and Integrated “Cloud Native” System**
  - Monitor, manage, analyze ALL operational & security data in one system
- **Powered by Machine Learning (ML)**
  - ML-based system discovers anomalies in the data – **Security Threats**
- **Automated Remediation**
  - Automated operational workflows for real-time security remediation





>

## Machine Learning (ML)

**The Applications are Revolutionary**

- Autonomy: "Self-Driving" cars
- Computer Vision: Facial Recognition
- New ML Applications: Autonomous Database & Automated Cyber Security

>

## Machine Learning

**Computers Learn from Patterns in the Data and Make Predictions**

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## Huge Amounts of Computer Systems Data in Event Logs Enable New Database and Security Applications for Machine Learning

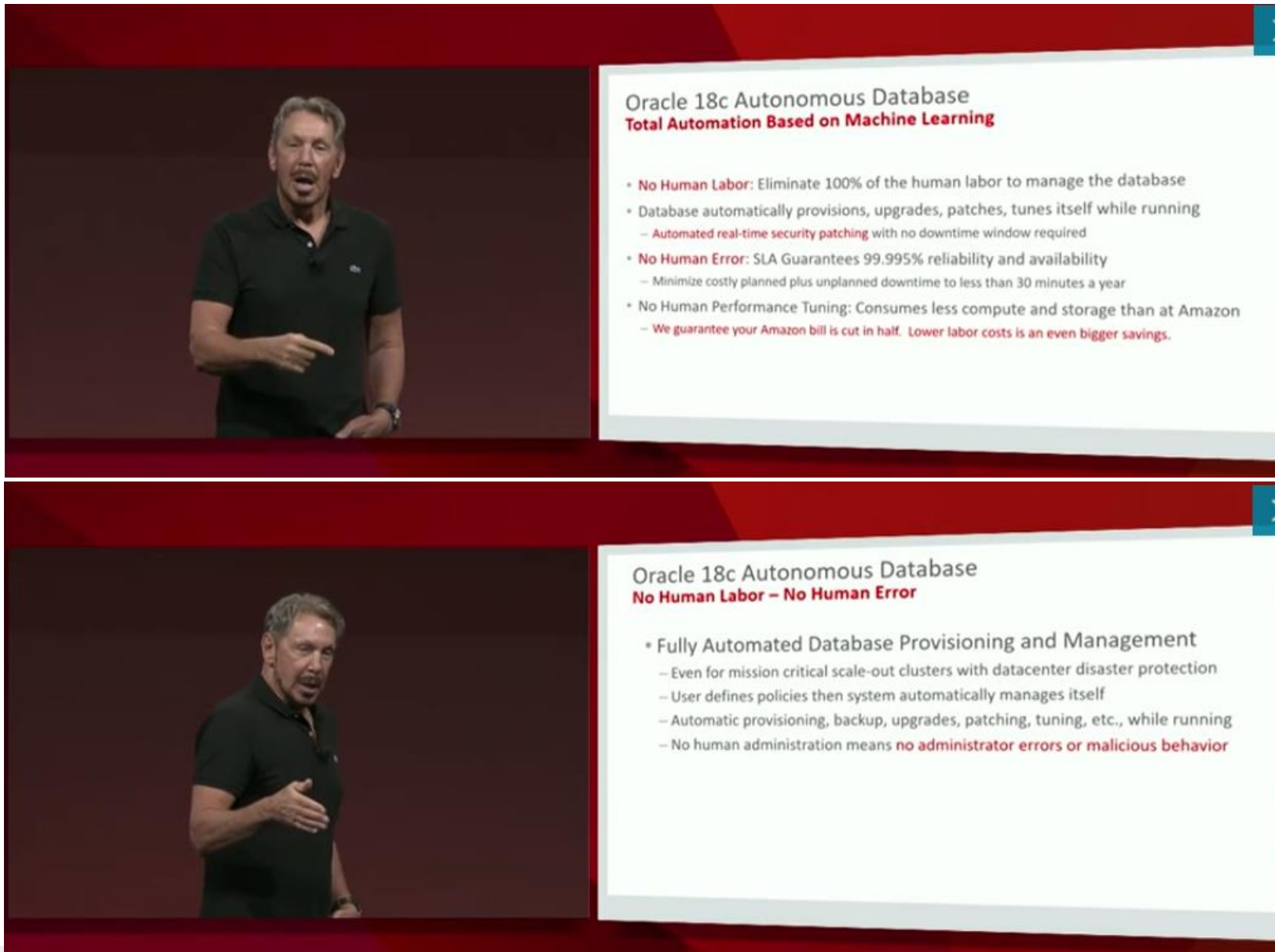
- Lots of Event Logs
  - Infrastructure logs: Network, Server, Storage, VM, OS
  - Platform logs: Database, Java, Analytics, etc.
  - Applications logs: ERP, CX, HCM, Custom, etc.
- Event Log Training Data Enables New Machine Learning Applications
  - **Security**: Detect and connect anomalous events: Login from Ukraine and unique SQL
  - **Database**: Classify normal query patterns and automatically tune database

## Database Autonomy & Highly Automated Cyber Security

- Database Autonomy: Fully automated 100% “self-driving” database
- Automated Cyber Defense: Detect & remediate attacks in real-time
- They Work Together:
  - **Discover attack**: Real time ML log processing detects security anomaly in data
  - **Remediate**: Database automatically patches itself while running

**Lots of Other Benefits Come with Total Database Automation**





The image shows two slides from a presentation about Oracle 18c Autonomous Database. Each slide features a video of a man in a black polo shirt speaking on the left, and a list of bullet points on the right. The slides are set against a dark red background with a white text box on the right. A blue arrow icon is in the top right corner of each slide's header area.

## Oracle 18c Autonomous Database

### Total Automation Based on Machine Learning

- **No Human Labor:** Eliminate 100% of the human labor to manage the database
- Database automatically provisions, upgrades, patches, tunes itself while running
  - Automated real-time security patching with no downtime window required
- **No Human Error:** SLA Guarantees 99.995% reliability and availability
  - Minimize costly planned plus unplanned downtime to less than 30 minutes a year
- **No Human Performance Tuning:** Consumes less compute and storage than at Amazon
  - We guarantee your Amazon bill is cut in half. Lower labor costs is an even bigger savings.



## Oracle 18c Autonomous Database

### No Human Labor – No Human Error

- **Fully Automated Database Provisioning and Management**
  - Even for mission critical scale-out clusters with datacenter disaster protection
  - User defines policies then system automatically manages itself
  - Automatic provisioning, backup, upgrades, patching, tuning, etc., while running
  - No human administration means **no administrator errors or malicious behavior**









Oracle 18c Autonomous Database  
**Dynamic Elastic Hardware Allocation**

- Fully Automated Hardware Resource Elasticity
  - Instantly expand/shrink compute and storage without downtime
  - Minimizes cost by delaying resource allocation until time needed
  - No overpaying for partially used fixed configurations

Oracle 18c Autonomous Database  
**Non-Stop Availability: Fault Tolerant plus On-line Recovery and Upgrades**

- System Failure or Scaling	- Exadata, RAC, ASM
- Regional Outage or DB Corruption	- Active Data Guard
- Patches (Updates)	- RAC Rolling Upgrade
- Major Release Upgrades	- Transient Logical Standby
- Table/Index/Schema Changes	- Online and Edition Based Redefinition
- User Error	- Flashback transaction, table, or database






**Oracle 18c Autonomous Database**  
**Guaranteed 99.995% Reliability and Availability**

- SLA Guarantees 99.995% Reliability and Availability
  - Less than 30 minutes of downtime per year
  - Includes both planned and unplanned downtime
  - No exceptions in fine print: **100x more reliable than Amazon**

**Autonomous Database for Data Warehouses**  
**Available: December 2017**

- **Automated**
  - Automatically provision, upgrade, patch, tune while running
  - Eliminates human labor and human error
- **Efficient**
  - Minimize Hardware Resource Consumption
  - **Guaranteed half the cost of Amazon**
- **Reliable**
  - Guaranteed 99.995% availability
  - Guaranteed 100x better availability than Amazon







# The Future Is Just 2 Months Away

- Databases that use machine learning to detect attacks and stop
- Databases that patches themselves
- Databases that back themselves up
- A database that guarantees  $\leq 30$  minutes of downtime per year






## Autonomous Database for OLTP

Available: **June 2018**

- **Automated: upgrade, patch, tune... while running**
  - Handles OLTP and Mixed workloads
  - Provision **Mission Critical** with High-Performance 99.995% availability configuration
  - Provision **Low Cost** for non-critical workloads or test/dev with single server config
- **Efficient: Consume fewer computer resources**
  - Running faster on Exadata infrastructure consumes less compute time
  - Data Compression consumes less storage
  - Instant scaling of compute or storage only when needed with no downtime
- **Reliable: 99.995% Availability**

## Database Professionals: Evolution of Skill Set

**Problem: More data management tasks than humans to do the work**

<u>Less time on Administration</u>		<u>More time on Innovation</u>
• Less time on infrastructure		• More time on database design
• Less time on patching, upgrades		• More time on data analytics
• Less time on ensuring availability		• More time on data policies
• Less time on tuning		• <b>More time on securing data</b>



# We've Come A Long Way ... We Have Far Further To Go



Ed Oates   Bruce Scott   Bob Miner   Larry Ellison





\*

ERROR at line 1:

ORA-00028: your session has been killed



Daniel A. Morgan  
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