



Channeling Oracle OpenWorld 2017

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



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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

Morgan's Library

International Oracle Events 2016-2017 Calendar

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.

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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

Morgan



Library News

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- [Bryn Llewellyn's Editioning White Paper](#)
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Oracle Events



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ACE News

Would you like to become an Oracle ACE? 

Learn more about becoming an ACE



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www.morganslibrary.org



Learning Experience Alert





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

A white cloud icon with a speech bubble inside. The speech bubble contains the text "Robots Prevent Data Theft" in red. The background of the slide is light blue.



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 if 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

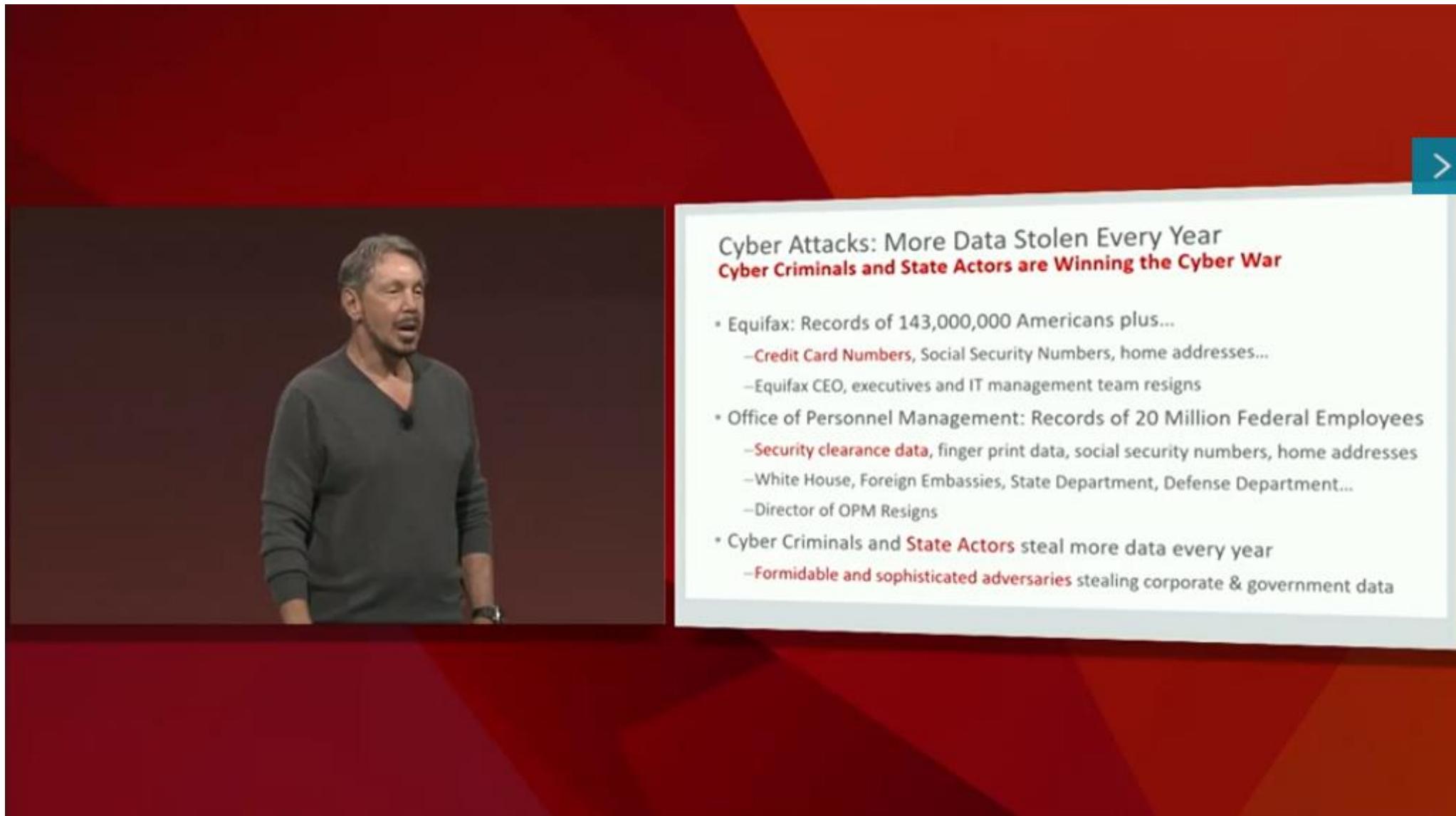


- Log Analytics (Splunk) doesn't fix anything ... it just tells you that you have a problem ... if anyone has time to look
- OMC is a highly automated cyber defense ... not yet 100% autonomous
- Originally designed as a Splunk killer ... but implemented as far more
- With the 18c database ... co-designed 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





The image shows a man with grey hair and a beard, wearing a dark grey long-sleeved shirt, standing on a stage and speaking. He is positioned on the left side of the frame, against a dark red background. On the right side, there is a white rectangular overlay containing text and a blue navigation arrow. The overlay has a title and a list of bullet points.

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



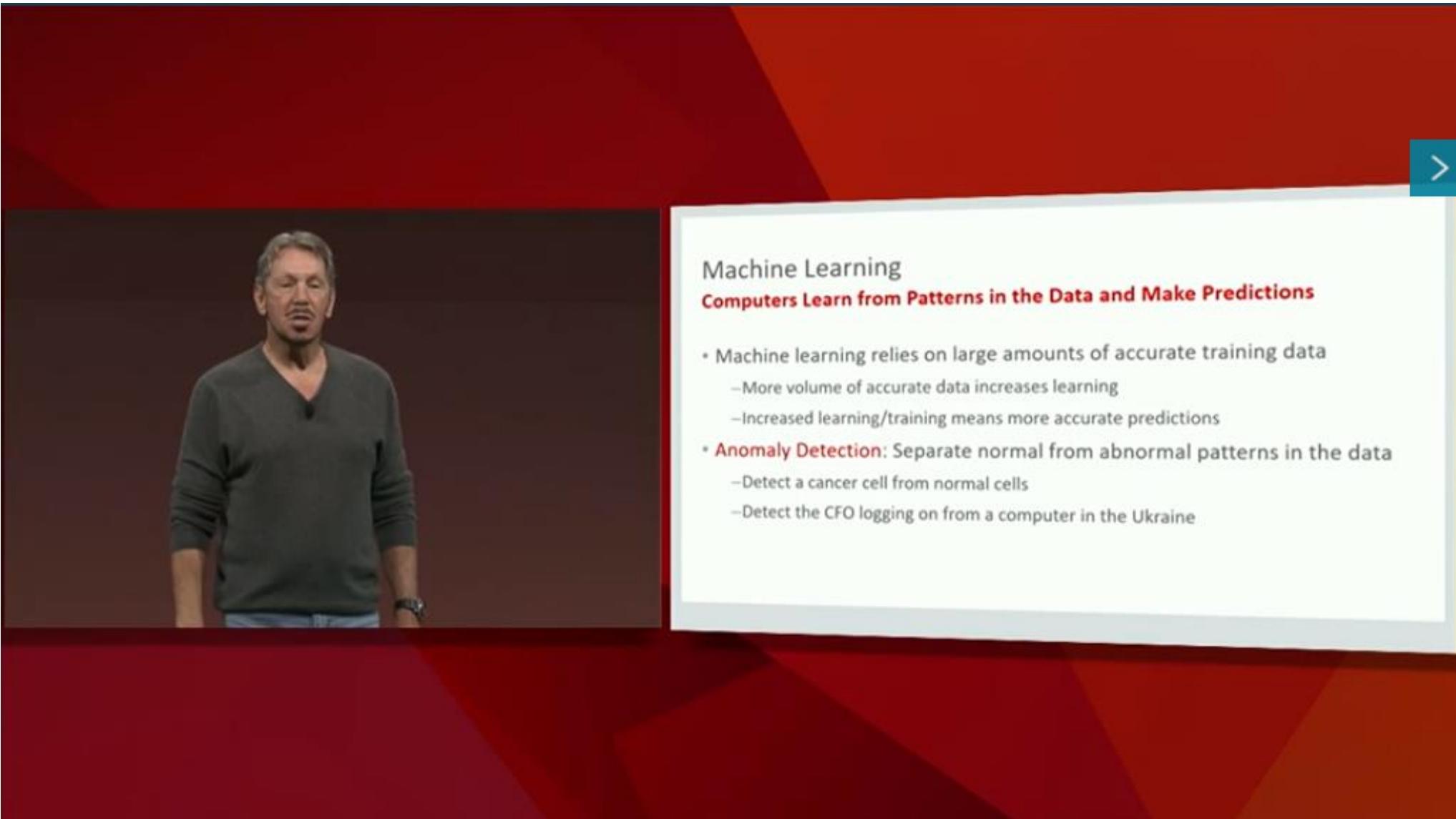


A man with short grey hair, wearing a dark grey V-neck sweater, is speaking on stage. He is gesturing with his hands and holding a small device in his right hand. To his right is a white rectangular presentation slide with a dark red background. The slide has a title and two bullet points. In the top right corner of the slide is a small blue square with a white right-pointing arrow. The stage has a dark red carpet and a red and orange geometric patterned backdrop.

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.





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

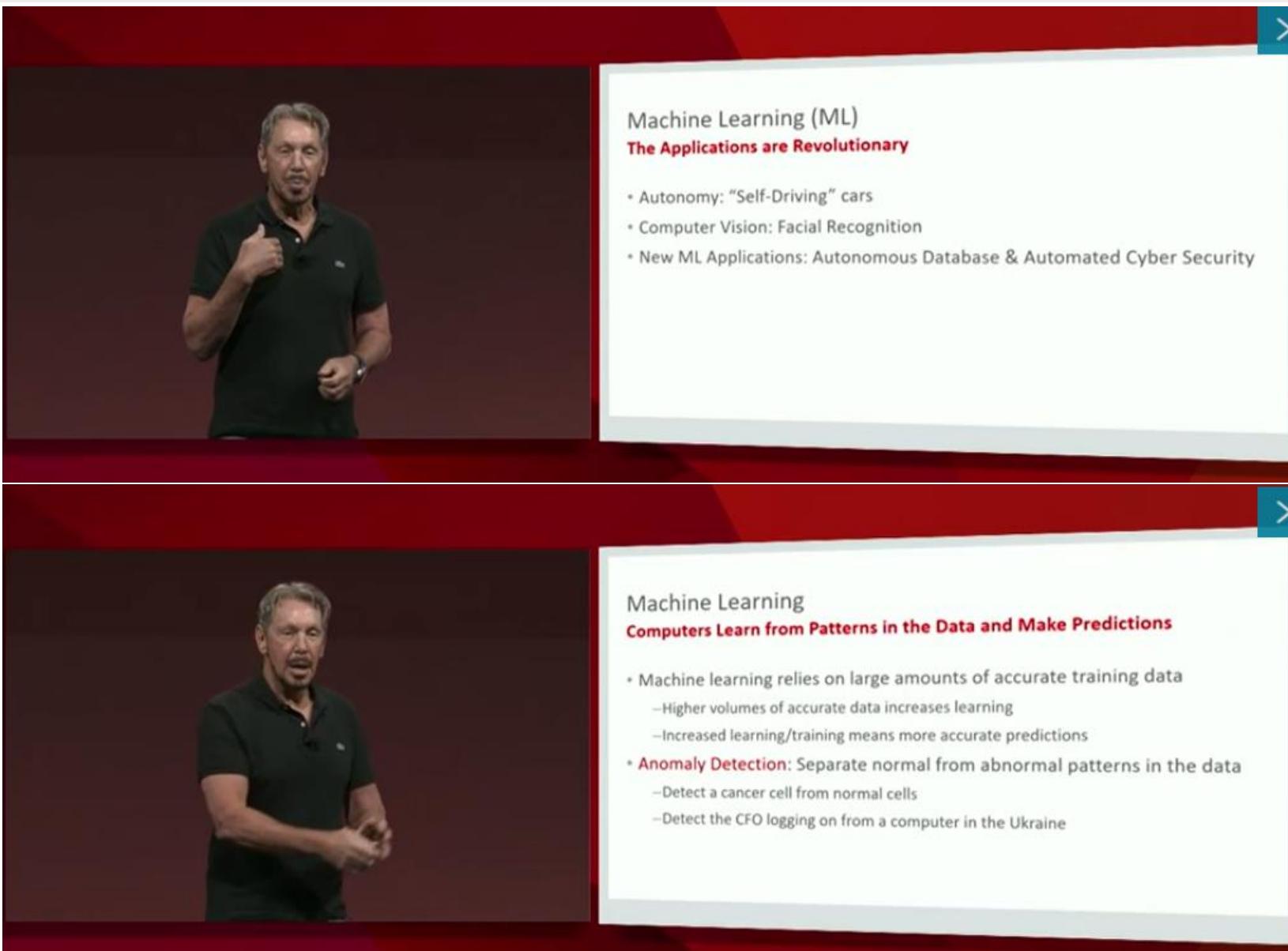




Announcing: Oracle Management and Security Cloud

- **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
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Autonomous Database 18c (2:6)

**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





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



Autonomous Database 18c (5:6)

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 ≤ 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

Less time on Administration

- Less time on infrastructure
- Less time on patching, upgrades
- Less time on ensuring availability
- Less time on tuning

More time on Innovation

- More time on database design
- More time on data analytics
- More time on data policies
- **More time on securing data**



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
mobile: +1 206-669-2949

