

Abstract

Emerging information technology trends for the cloud have the power to transform organizations. In the data management and analytics space, a key cloud service offering has arrived: Oracle Autonomous Data Warehouse (ADW) Cloud and Oracle Autonomous Transaction Processing (ATP)



Rich Niemiec

Chief Innovation Officer @ Viscosity
North America



[Tweet](#)



January 25 2024 - premiere 5PM GMT

Thu Jan 25 2024 11:00:00 GMT-0600 (Central Standard Time) in America/Chicago

Player Piano: The World of Autonomous Database (ATP/ADW)

Fast - Easy – Elastic



Conf42: DevOps 2024

January 25 2024 - premiere 5PM GMT



Rich Niemiec

@richniemiec



richniemiec@gmail.com

Special Thanks:

William Hardie, George Lumpkin, Maria Colgan, Charles Kim, Justin Nugent



Agenda – Your Self-Driving Future

- ❑ The DBA, Autonomous & the Cloud
- ❑ A Robot May Not Look Like One
- ❑ Autonomous Transaction Processing (ATP)
- ❑ Autonomous Data Warehouse (ADW)
- ❑ Machine Learning & Data Visualization Desktop
- ❑ Next: Robots & the Future Ahead



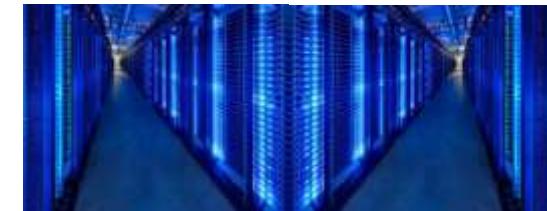
Quick FREE notes

Send email to (for slides):

hello@viscosityna.com

(richniemiec@gmail.com)

@richniemiec - twitter



Conf42: DevOps 2024
January 25 2024 - premiere 5PM GMT



Viscosity Pillars and Delivery Models

Data

Database

Data Integration

Data Warehousing
Analytics
GoldenGate

Performance Tuning

APEX & Apps

SAAS / PAAS
CX ERP SCM HCM

EBS / JDE / PS

Middleware

Web Applications

Mobility

Infrastructure

Oracle Cloud
AWS
Azure

Engineered Systems
Exadata ODA ZFS
@Customer

Virtualization
VMware - KVM

RAC

Turnkey
Projects

Assessments

Proof of
Concepts

Training

Security

Managed
Services

Viscosity's Oracle ACES

Oracle ACE Program

The Oracle ACE Program recognizes and rewards community members for their technical contributions in the Oracle community.



Charles Kim,
CEO & Co-Founder

[Twitter: @racdba](#)



Rich Niemiec,
Chief Innovation Officer

[Twitter: @richniemiec](#)



Craig Shallahamer
Applied AI Scientist

[Twitter: @orapub](#)



Sean Scott,
Consultant

[Twitter: @oraclesean](#)



Gary Gordhamer,
Consultant

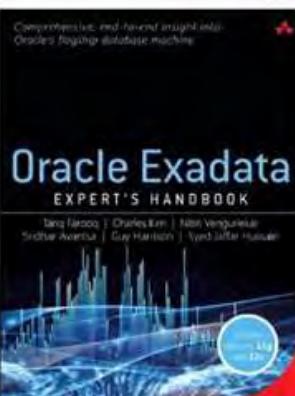
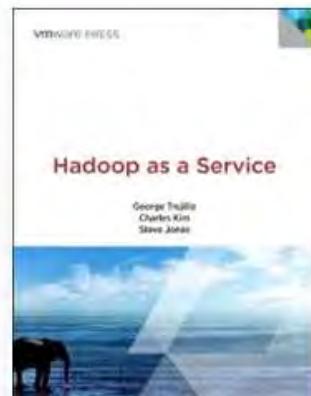
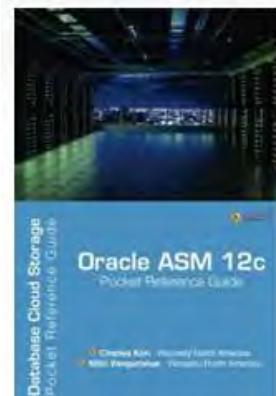
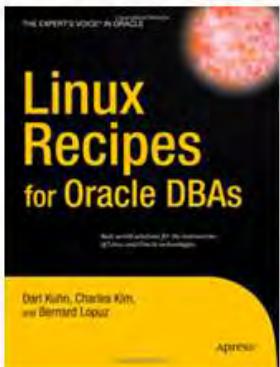
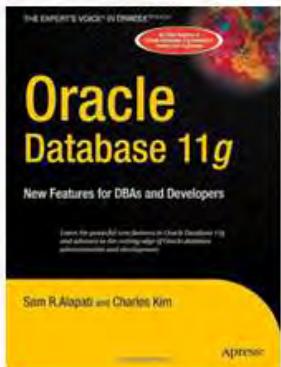
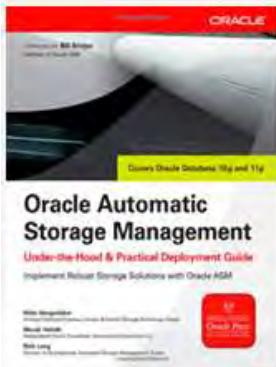
[Twitter: @ggordham](#)



Julio Ayapan,
Consultant



We wrote the books - many Experts!



"We Enable Business Transformation at a Time when Companies must Change to Survive"

Go to 19c or 21c (*get to 19c!*)?

Why Upgrade to 19c?

19^c

Core Aim : Long Term Stability

Long Term Support Release:

- 5 Years of Premier Support to 2024
- 3 Years Extended Support to 2027

21^c

Innovation Release:

- 2 Years of Premier Support to 2023
- No Extended Support

- Need Auto Machine Learning of 21c?
- Want to Export ADW/ATP?
- Leverage Oracle Data Safe. Security Assessment of: Database / Users / Data

MAKE ME A SANDWICH.

SUDO MAKE ME
A SANDWICH.

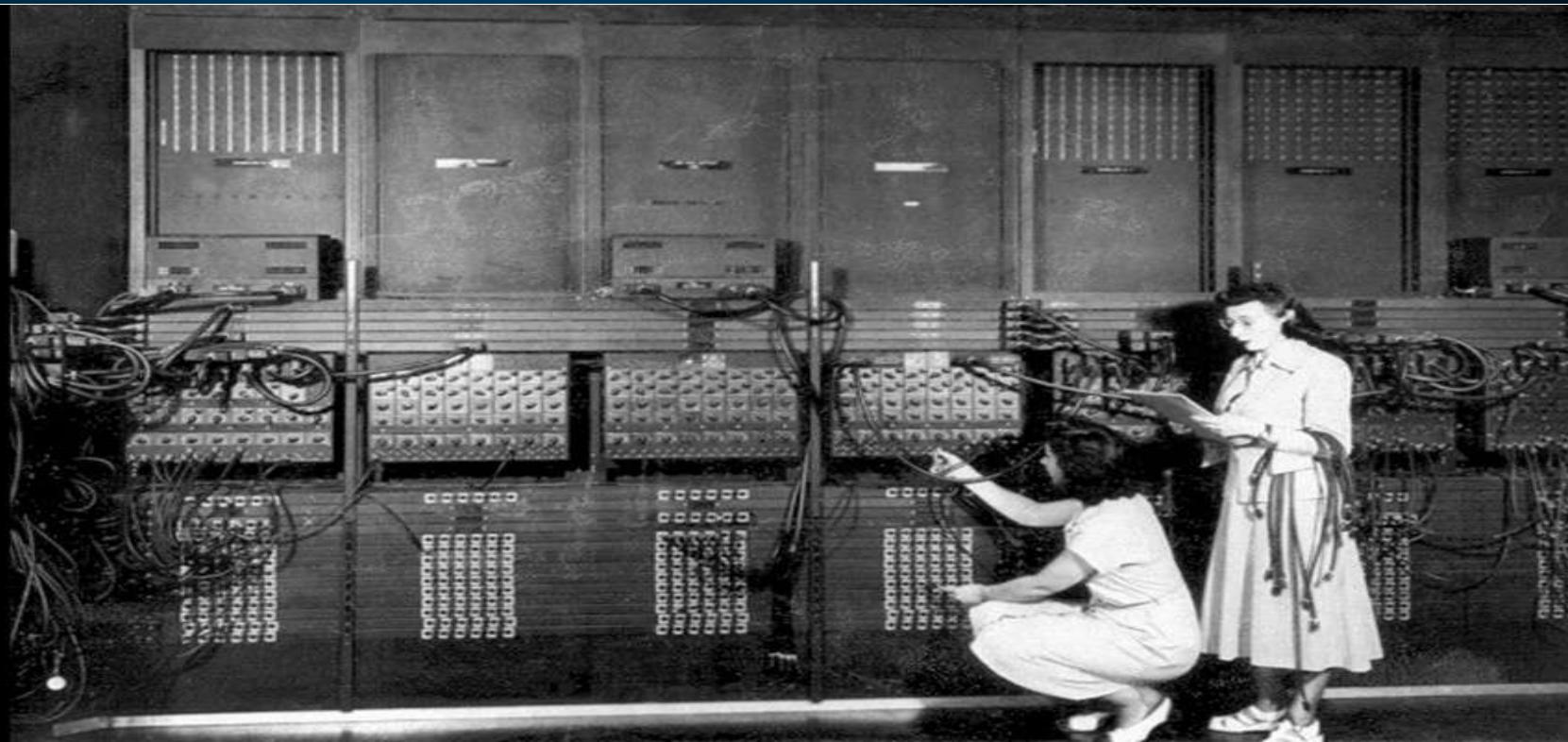


WHAT? MAKE
IT YOURSELF.

/
OKAY.



Some Jobs gone: Computer **Surpassed** Them!



"The competition between Man's Mind vs. the Product of Man's Mind... for this, there is standing room only in the Twilight Zone." - Rod Serling

Autonomous Database – Replacing the DBA?



At OpenWorld



At Modern Cx (Customer Experience)

All 1,000 units of "Pepper" being offered in September sold out within one minute.

AI

GUEST

It's time for workers to worry about AI

GARY GROSSMAN, EDELMAN @GARYG02 APRIL 7, 2019 2:22 PM



MOST READ



[It's time for workers to worry about AI](#)



[Remote AR will make it so we can work —](#)

72% of IT Budget is Spent on Maintenance

DBA & IT Stress by the Numbers



39%

Workloads for DBAs are increasing: 39% of DBAs handle 50 or more databases



95%

Automation is lacking: 95% of DBAs create or upgrade databases manually



78%

78% of DBAs will experience unplanned downtime from untested database changes during their careers



2 out of 3

DBAs and IT staff are struggling to provide full protection: 2 out of 3 organizations use multiple tools to backup a single database



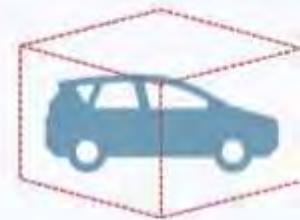
Source: [Oracle customer survey](#)

ORACLE®

The Answer... it's the Self-Driving Database

From Maria Colgan's talk on it...

Oracle's **Vision** for Autonomous Database



Self-Driving

User defines service levels, database makes them happen

Self-Securing

Protection from both external attacks and malicious internal users

Self-Repairing

Automated protection from all downtime

Concerns with Autonomous (worst DBA article)

ComputerWeekly.com

IT Management

Industry Sectors

Technology Topics

Search Computer Weekly



Oracle's autonomous database could leave DBAs unemployed

The long-term future of database administrators could be at risk if every enterprise adopts the Oracle 18c autonomous database

Stuart Kennedy

09 May 2018 1:08

Oracle CEO Mark Hurd threw the long-term future of hundreds of thousands of [database administrators \(DBAs\)](#) into question while talking up the benefits of the company's new autonomous database.

The [autonomous self-patching, self-healing database](#), the first version of which is 18c, is a part of a long-term play to help draw the company's customers into Oracle's piece of the cloud – which is increasingly packing itself with cloud-based applications and services.

Latest News

Leading PC makers set to expand to target existing customers

Artificial intelligence making inroads into Russian banking

The Autonomous Database Cloud



Vendor's view of the Cloud



Vendor's path for you to the Cloud



How Easy to Move to Cloud Quickly



A Few Years Later on the Cloud

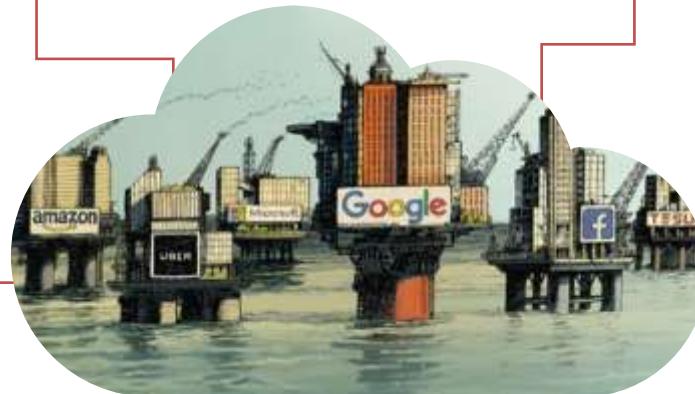


Data: Becoming the World's Most Valuable Resource

Data driven organizations are 23 times more likely to acquire customers, 6x as likely to retain those customers, and 19x as likely to be profitable as a result.⁴



Tesla is (Data from 25M miles/day) Worth More Than GM Which Shipped 92x More Vehicles Q1/17¹



\$430B Advantage to Data Driven Organizations²



Only about 29% of Organizations are Using Deep Business Analytics³

Source:

1. [Economist Magazine, May 2017](#)
2. IDC, 2020 Prediction of Value created by Capitalizing on Data
3. Accenture and General Electric Report On Predictive Analytics
4. McKinsey Global Institute

More Data Variety—Better Predictive Models

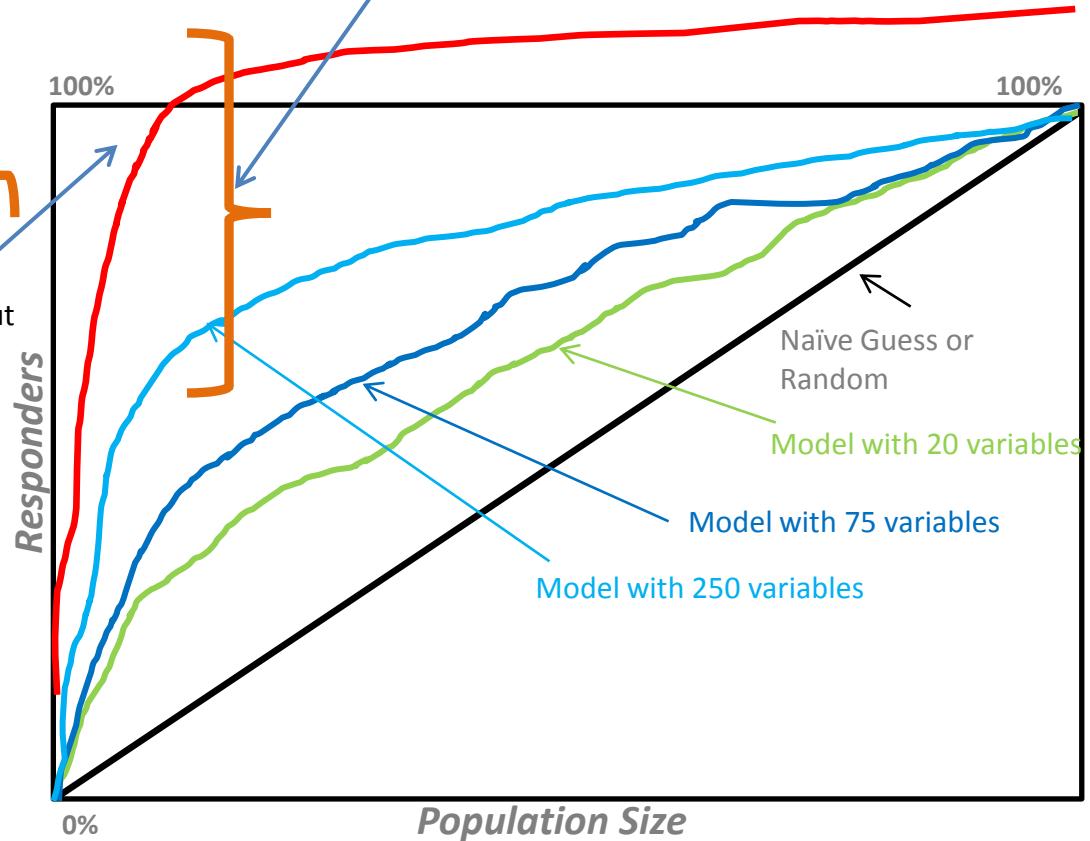
- Increasing sources of relevant data can boost model accuracy



Model with “Big Data” and hundreds -- thousands of input variables including:

- Demographic data
- Purchase POS transactional data
- “Unstructured data”, text & comments
- Spatial location data
- Long term vs. recent historical behavior
- Web visits
- Sensor data
- etc.

Engineered Features – Derived attributes/variable that reflect domain knowledge—key to best models



Characteristics of Big Data

Volume

Big data comes in one size: large. Enterprises are awash with data, easily amassing terabytes and even petabytes of information.

TB, Records, Transactions, Tables, Files

Value

Business value of Big Data

Variety

Big data extends beyond structured data, including semi-structured and unstructured data of all varieties: text, audio, video, click streams, log files and more.

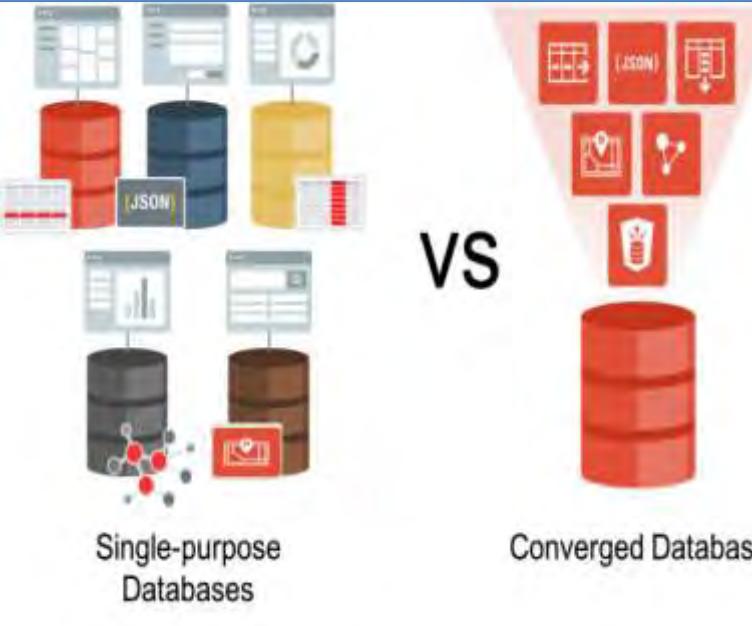
Structured, Unstructured, Semistructured

Velocity

Often time-sensitive, big data is streaming in to the system as it is streaming in to the system to maximize its value to the organization.

Batch, Near time, Real time

Veracity



Big Data Themes

- HW & SW technologies for large data volumes
- Focus on Web 2.0 technologies
- Database Scale-out
- Relational & Distributed Data Analytics
- Real Time Analytics

Big Data Domains

- Digital Marketing Optimization
- Data Exploration & Discovery
- Fraud Detection & Prevention
- Social Network & Relationship Analysis
- Machine-generated Data Analytics

Converged Database - Oracle Multi-Model Database*

- Benefits of Oracle's Converged Database are broad

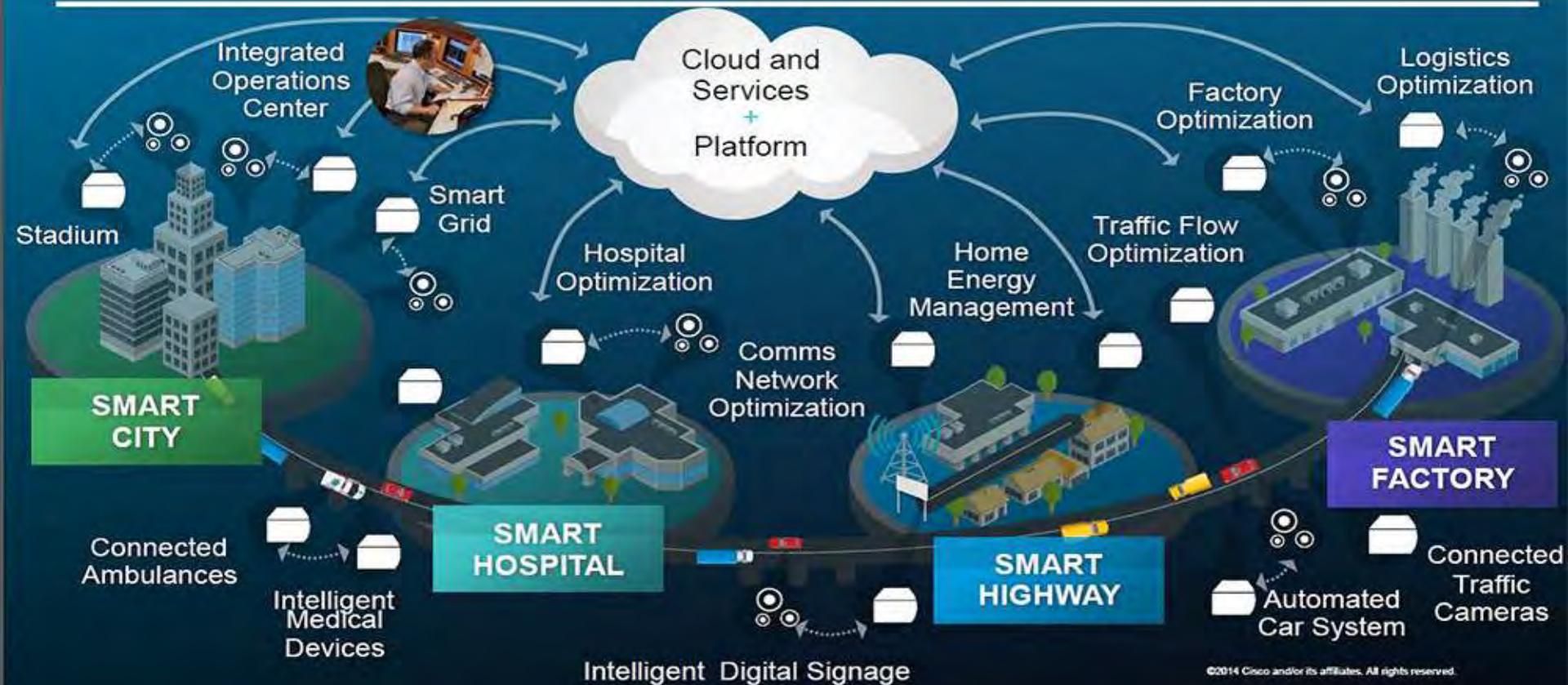
*Slide from Oracle's,
Nitin Vengurlekar



- Integrated development tools (Apex, SQL Dev, Spatial Studio)
- 3rd party and Open Source development tools
- Machine Learning
- Node.js, Python, many others
- In-memory database
- Spatial, Graph support
- NoSQL (JSON, key-value, wide column, XML)
- Containers, microservices, virtualization (Docker, MT)
- Integrated Security
- Deployment choice (on-prem, cloud, hybrid)
- Integrated High Availability and Disaster Recovery

Venturebeat.com – IOT \$14.4T this decade

Typical Views of the Internet of Things



The Consumer IOT Connection



A photograph of a stainless steel refrigerator. A person's hand is pointing at the touchscreen control panel located on the lower left door. The screen displays a 'Smart Shopping' interface with a grocery list for items like Tomatoes, Bananas, Bean Sprouts, and Broccoli, along with their prices and a 'Total 20' summary.

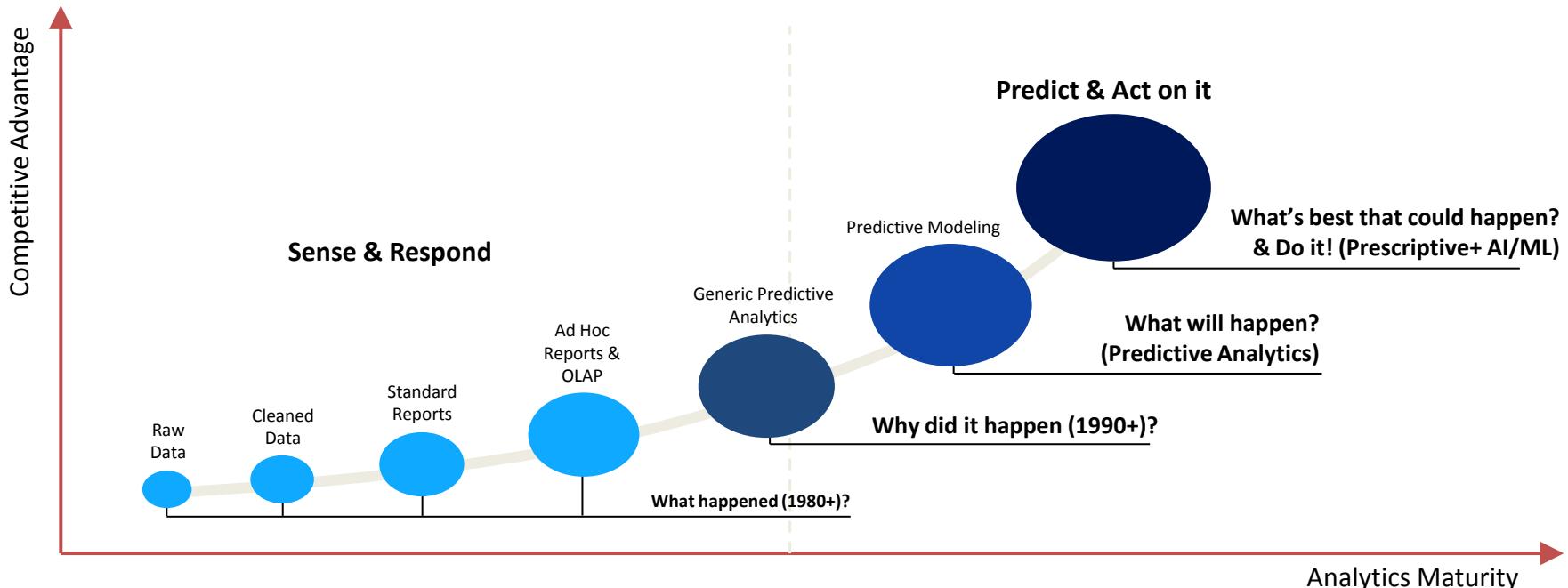


Vessyl smart cup tracks coffee and more for IoT hydration



Big Data / IOT Driving Prescriptive Analytics

Automating the DB gives more time to Impact Business!



The key is unlocking data to move decision making from sense & respond to predict & act

Biju Thomas at ODTUG - *Emerging Jobs*

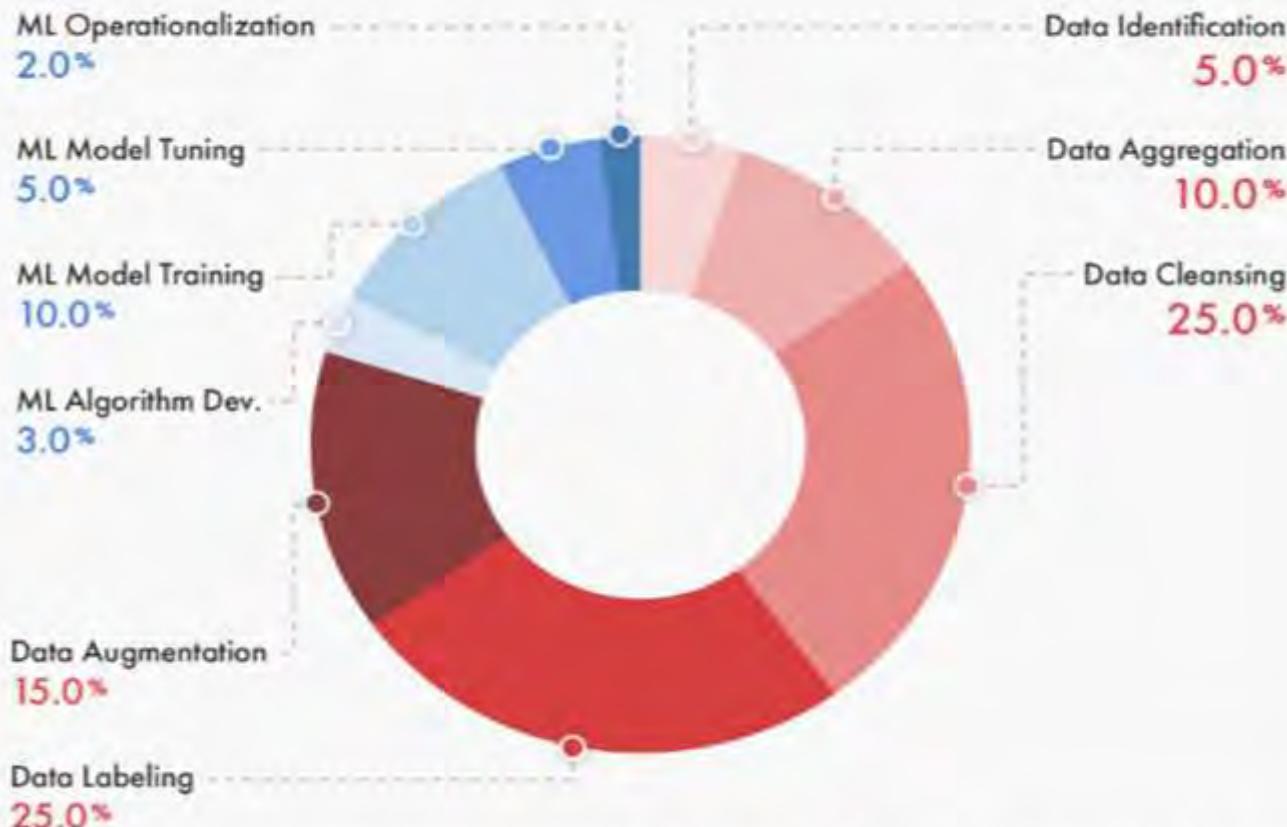
#8 Data Engineer



2020
Emerging
Jobs Report

- 33% annual growth
- Skills
 - Apache Spark
 - Hadoop
 - Python
 - ETL
 - AWS
- Industries
 - Computer Software
 - Information Technology
 - Financial Services
 - Healthcare & Hospitals
- Primary job responsibilities involve preparing data for analytical or operational uses.
- Works as part of an analytics team, providing data in a ready-to-use form to data scientists.
- Commonly deal with both structured and unstructured data sets

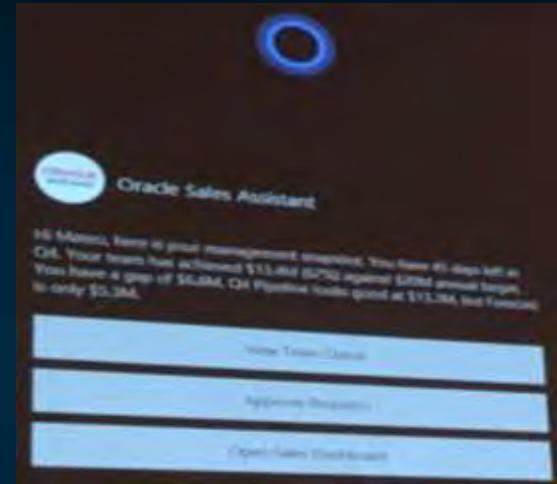
Percentage of Time Allocated to Machine Learning Project Tasks



The **DBA**

**The DBA is
most
important
part of the
Machine
Learning
Process**

Niti Sharma An Introduction to Data Labeling in Artificial Intelligence ***Data Wrangling***
consumes over 80% of the time in AI projects.



A Robot may not look one!

Oh Yeah... they never complain, always happy to do more, work anywhere, get smarter as time goes on, leverages AI & ML, works 24x7, doesn't ask for a raise, no union (yet).

ORACLE
Database Cloud

The World's First Autonomous Database



A Robot may not look one!

*Robots that Manage a Database (ADW/ATP)!

*Robots that secure a system and use ML & AI

The Autonomous Database Cloud

- Self-Healing
- Self-Driving
- Self-Tuning
- Self-Recovering
- Self-Scaling Administration

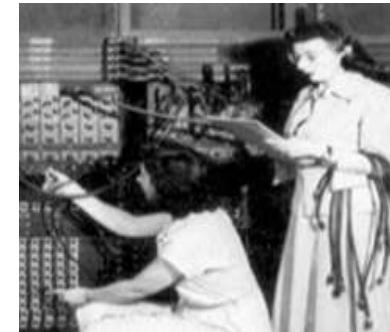


Oracle Unveils World's First
Autonomous Database Cloud

Reality of the Autonomous Database

Will my job change?

- Absolutely...sure hope so!
- Hopefully... It already has!
- It has many times in the past...
- It will move **closer to the business & innovation**
- Data Manager instead of DBA & Developer
- Security Expert instead of Security on the DB
- Watching over costs more
 - Cloud Hidden Costs
 - Cloud, Hybrid, or On-Site Decisions
 - Decide which databases should be Autonomous



Oracle Autonomous spreads to OLTP: 8/7/2018



Rich Niemiec @RichNiemiec · Aug 7

Are DBAs up for early retirement? @larryellison says No, but DBA won't do tedious things - managing disk storage & upgrading O/S. DBAs will work with dev on new apps & work with CIO to help business vs. patching. @oracledatabase

Autonomous Optimizations - Specialized by Workload

	ADW	ATP (Creates Indexes) *In 19c
➡ Primary Goal	Fast Complex Analytics	Fast Transaction Processing
📊 Data Formats	Columnar	Row
📈 Data Access Acceleration	Creates Data Summaries	RDMA for messaging and IO
GMEM Memory Usage	Parallel Joins and Aggregations	Data Caching to Avoid IO
📊 Statistics	Automatically manages optimizer statistics as data changes	

Automatically Withstands Errors

- Autonomous database must be safer than manually operated database
- Exceptional SLA Guarantee:**
 - 99.995 NRX%** (No Ridiculous eXclusions)
 - Guaranteed triggered if there is more than 2.5 minutes downtime a month
 - Includes patching and upgrade, database bugs, regional outages
- Applications that are architected for HA using Oracle best practices will usually see pauses, not failures

Outage	Key Feature	Potential Downtime
Server Outage (HA)	RAC	Near-Zero
Regional Outage, Disaster Recovery	ADG	Seconds
Data Corruption	ADG	Zero
Patches (Updates)	RAC	Near-Zero
Database Upgrade	ADG	Seconds
Table/Index Changes	Redef	Zero
User Error	Flashback	Time Since Error

The Autonomous Database & the IT Dept.

Autonomous Databases into the future:

- Who ensures database is tuned before it gets to the Cloud?
- Who ensures the cloud vendor is charging correctly?
- Who ensures the backup, security, or recovery is correct?
- Who decides what kind of service the databases will be?
- Who will build the policies for those autonomous databases?
- Who will have the knowledge to decide or estimate the cost of these services?
- Who decides the complex IT Infrastructure when we have more options & vendors?
- The answer is obvious: A DBA & the rest of IT, but not a simple DBA; A DBA that has evolved with all this new generation of databases on Cloud (**A Data Manager**).



Get Started FREE: oracle.com/cloud/free

cloud.oracle.com/tryit

oracle.com/cloud/free (Above link takes you here)

- Create your first Autonomous Database Data Warehouse
- Create your first Autonomous Database Transaction Processing
- Try out Analytics & Machine Learning
- Monitor / Clone ...etc.



Get Started FREE: oracle.com/cloud/free

The screenshot shows the top navigation bar of the Oracle Cloud website. It includes the OCI logo, a search bar, and links for Services, Solutions, Why OCI, Customers, Pricing, Learn, Developers, Support, and Marketplace. There is also a "Sign in to Oracle Cloud" button.

Oracle Cloud Free Tier

Build, test, and dep



OCI

Services Solutions Why OCI Customers Pricing Learn Developers Support Marketplace



Sign in to Oracle Cloud



Sign in to Oracle Cloud

New Always Free services
large scale Arm deployment

Start for free

Oracle Cloud Advantage over Amazon Web Services

What's included?

Always Free

Services you can use

- Two Oracle Autonomous Databases, 20 GB each
- Up to 4 instances of Oracle Compute with 3,000 OCPU hours and 18,000 GB hours per month
- Up to 4 instances of Oracle Block, Object, and Egress Monitoring
- 200 GB block volume
- 10 GB object storage

See below for a

Oracle Cloud Free Tier

Always Free

- 2 Autonomous Databases, 20 GB each
- Up to 4 instances of Oracle Compute with 3,000 OCPU hours and 18,000 GB hours per month
- Up to 4 instances of Oracle Block, Object, and Egress Monitoring
- 200 GB block volume
- 10 GB object storage

Start for free

AWS Free Tier

Free for 12 Months

- 1 database, 20 GB
- 1 instance of Oracle Compute
- 30 GB block volume
- 5 GB object storage

Consistently less expensive than AWS

1/4

the cost for outbound bandwidth

>2X

better compute price/performance

44%

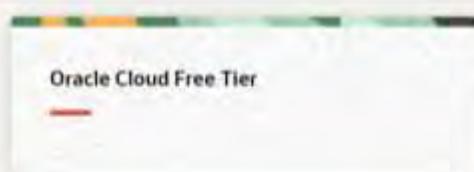
lower compute costs for HPC

20X

the IOPS for half of the price

Cloud Economics—See how we compare

Get Started FREE: oracle.com/cloud/free



Account information

Country/Territory

First Name

Email



I am human



Sign Up for Free Oracle Cloud Promotion

Get \$300 of free credits spent for up to 30 calendar days of Oracle Cloud usage in the next 30 days.

Payment Information

You won't be charged unless you elect to upgrade the account.

You may see a small, temporary charge on your payment method. This is a verification hold that will be removed automatically. See the FAQ for more information.

Oracle uses third-party payment processor CyberSource for Oracle Store payment processing. CyberSource will request and collect certain information as part of the payment processing. Please refer to CyberSource's privacy statement at <http://www.cybersource.com/privacy> for the terms applicable to the data collected.

Add Credit Card Details

How do I end my Free Oracle Cloud Promotion?

Your account will be automatically decommissioned and your data will be permanently deleted 30 calendar days after all the Free Oracle Cloud Promotion credits are spent or the promotion period expires, whichever comes first. There is no action required by you to end the Free Oracle Cloud Promotion.

Terms of Use

By clicking on the button, you understand and agree that the use of Oracle's web site is subject to the [Oracle.com Terms of Use](#). Additional details regarding Oracle's collection and use of your personal information, including information about access, retention, rectification, deletion, security, cross-border transfers and other topics, is available in the [Oracle Privacy Policy](#).





Use the Following Oracle Cloud Services with Free Credits*



Autonomous Data Warehouse

3,338 hours, 2 TB of Exadata storage

Fully managed, pre-configured, and optimized. Load-and-go in minutes.



Autonomous Transaction Processing

3,338 hours, 2 TB of E

Mission critical transaction made effortless; the Database in the Cloud



Database

3,200 hours, 500 GB storage

Fully managed Oracle database



NoSQL Database

1.25 Billion Writes, 2.5 GB storage per hour

Fully managed, elastic. Set up and running in minutes. * 3KB record size, absolute consistency reads, per second



Container Engine for Kubernetes

3,500 hours of compute, 2.5 TB storage

A managed, enterprise-grade service to deploy and manage containers



Cloud Infrastructure Registry

5 TB storage

A highly available service to store and share container images



Big Data - Compute

2,700 hours, 1.5 TB storage

Create Hadoop and Spark based apps



Integration

4,464 hours

Application Integration with Adapter Connectivity and Process Automation. Oracle takes care of management, backups, and patching



Developer Cloud

Always Free

Automate CI/CD workflows



Database Backup

\$300

Oracle database backups



Ravello

2,500 hours

Migrate VMs to multiple clouds



Digital Assistant

50,600 Requests

Build Digital Assistants for Your Enterprise Applications



Mobile Hub

50,000 Requests



API Platform

3,600 hours



Management Cloud

1,500 hours



Identity

10,000 hours of active usage

ADW/ATP – Provisioning a Database

The screenshot shows the Oracle Cloud Infrastructure (OCI) console. The left sidebar contains a navigation menu with various services: Core Infrastructure, Compute, Block Storage, Object Storage, File Storage, Networking, Databases, Bare Metal, VM, and Exadata, Autonomous Data Warehouse, Autonomous Transaction Processing (which is highlighted with a red box), Analytics, Resource Manager, Email Delivery, Application Integration, Edge Services, Monitoring, Developer Services, Marketplace, and Commercial Data Infrastructure. Below the menu, there are two small images: one of a person working at a desk and another of a server room. At the bottom, there are links for Terms of Use and Privacy and Create Preferences.

7. The Create Autonomous Database dialog appears. Enter the following information:
 - **Compartment** - Select a compartment for the database from the drop-down list.
 - **Display Name** - Enter a name for the database for display purposes.
 - **Database Name** - Use letters and numbers only, starting with a letter. Maximum length is 14 characters. (Underscores not initially supported.)
 - **Workload Type** - Autonomous Transaction Processing is automatically selected. Alternately, you can choose Data Warehouse as the workload type.
 - **Deployment Type** - Serverless will automatically be selected. This choice runs the autonomous database without provisioning a dedicated infrastructure. Alternately, you can choose the Dedicated Infrastructure deployment type to run the autonomous database on a dedicated Exadata infrastructure.
 - **CPU Core Count** - Number of CPUs for your service.
 - **Storage (TB)** - Select your storage capacity in terabytes. It is the actual space available to your service instance, including system-related space allocations.
 - **Auto Scaling** - If you select the auto scaling option, Autonomous Transaction Processing can use up to three times more CPU and IO resources than specified by the number of OCPUs currently shown in the Scale Up/Down dialog. When auto scaling is enabled, if your workload requires additional CPU and IO resources, the database automatically uses the resources without any manual intervention required.
 - **Administrator Credentials** - Password for ADMIN user of the service instance. The password must meet the following requirements:
 - The password must be between 12 and 30 characters long and must include at least one uppercase letter, one lowercase letter, and one numeric character.
 - The password cannot contain the username.
 - The password cannot contain the double quote (") character.
 - The password must be different from the last 4 passwords used.
 - The password must not be the same password that is set less than 24 hours ago.
 - **License Type** - Select whether you have existing licenses or if you want to subscribe to new database software licenses and the database cloud service.
 - **Tags** - (Optional) Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values which can be attached to resources.

Click [Create Autonomous Database](#)

19c - Machine Learning with Automatic Indexes*



Rich Niemiec @RichNiemiec · 7 Aug 2018

Oracle19c #autonomousdatabase will leverage #machinelearning when you upgrade from #Oracle18c by using regression testing to ensure things will be faster in the new version. @oracledatabase @IOUG @OAUG1 @odtug @oracleace @viscosityna

Autonomous Optimization – Machine Learning meets Mission Critical



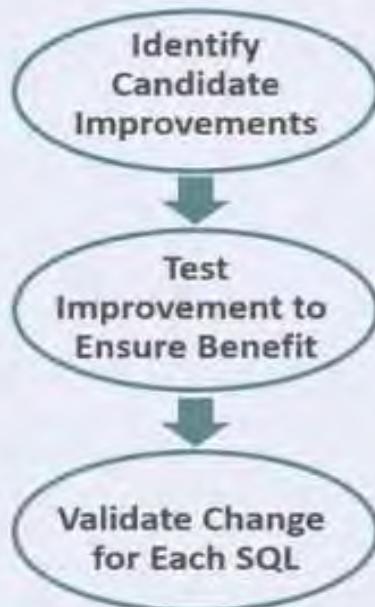
- Machine Learning continuously monitors workload and identifies potential new SQL plans and indexes
 - Plans are like driving directions, Indexes are like new roads
- However, SQL plan and index changes are risky
 - Changes that improve 999 cases but hurt 1 are unacceptable
- Goal of Autonomous is to avoid ALL slowdowns
- Proposed changes **tested** as application workload runs
- Then benefit is **validated** on first execute of **every** changed SQL
 - If performance regresses then old plan is restored

ATP

- Screenshots from Larry Ellison introduction of ATP on 8/7/18 to describe update from Autonomous 18c to Autonomous 19c

Fast 18c to 19c Upgrade

Autonomous Optimization – Machine Learning meets Mission Critical



- Machine Learning continuously monitors workload and identifies potential new **SQL plans** and **indexes**
 - Plans are like driving directions, Indexes are like new roads
- However, SQL plan and index changes are risky
 - Changes that improve 999 cases but hurt 1 are unacceptable
- Goal of Autonomous is to avoid **ALL** slowdowns
- Proposed changes **tested** as application workload runs
- Then benefit is **validated** on first execute of **every** changed SQL
 - If performance regresses then old plan is restored

ATP – Provisioning a Database (PDB)

ATP

The screenshot shows the Oracle Cloud homepage with a grid of provisioning options:

- COMPUTE**: Create a VM Instance (Always Free Edition, 2-6 mins)
- AUTONOMOUS TRANSACTION PROCESSING**: Create an ATP database (Always Free Edition, 3-5 mins)
- AUTONOMOUS DATA WAREHOUSE**: Create an ADW database (Always Free Edition, 3-5 mins)
- NETWORKING**: Set up a network with a wizard (2-3 mins)
- RESOURCE MANAGER**: Create a stack (Always Free Edition, 2-6 mins)
- OBJECT STORAGE**: Store data (2-8 mins)
- NETWORKING**: Set up a load balancer (Always Free Edition, 5 mins)
- ORACLE CLOUD DEVELOPMENT KIT**: Set up an instance with developer tools (Always Free Edition, 10-15 mins)
- SEARCH**: Query all resources

At the bottom, there are links for "Start Exploring", "Get Started", "Key Concepts and Terminology", and "Introduction to APEX".

ORACLE Cloud

Oracle Cloud Account Sign In

User Name

Password

Sign In

Need help signing in? Click here

Get Started

Key Concepts and Terminology

Introduction to APEX

ATP – Provisioning a Database (PDB)

ATP

The image consists of three vertically stacked screenshots of the Oracle Cloud interface, illustrating the steps to provision an Autonomous Database (PDB).

Screenshot 1: Create Autonomous Database (Step 1)

This screen shows the initial configuration steps:

- Provide basic information for the Autonomous Database:**
 - Compartment: techniemie (root)
 - Display name: DB-202 [REDACTED]
 - A user-friendly name to help you easily identify the resource.
 - Database name: DB202 [REDACTED]
 - The name must contain only letters and numbers, starting with a letter.
- Choose a workload type:**
 - Data Warehouse:** Built for decision support and data warehouse workloads. Fast queries over large volumes of data.
 - Transaction Processing:** Built for transactional workloads. High concurrency for short-running queries and transactions.
- Create Autonomous Database** and **Cancel** buttons.

Screenshot 2: Create Autonomous Database (Step 2)

This screen shows the deployment type selection and database configuration:

- Choose a deployment type:**
 - Shared Infrastructure:** Run Autonomous Database on shared Exadata infrastructure.
- Configure the database:**
 - Always Free:** Show only Always Free configuration (selected).
 - Choose database version:** 19c.
 - OCPUs count:** 1.
 - Storage (TB):** 1.
- Create Autonomous Database** and **Cancel** buttons.

Screenshot 3: Create Autonomous Database (Step 3)

This screen shows the final configuration steps before creation:

- Create administrator credentials:**
 - Username: root@DB-202
 - ADMBR
 - Root password: [REDACTED]
 - Confirm password: [REDACTED]
- Choose network access:**
 - Secure access from everywhere:** Allow users with database credentials to access the database from anywhere.
 - Secure access from allowed IPs and VCNs only:** Limit access to specified IP addresses and VCNs.
 - Private endpoint access only:** Limit access to a private endpoint within an OKE VCN.
- Choose a license type:**
 - Bring Your Own License (BYOL):** Bring your organization's Oracle Database software license to the Oracle Database Service. [Learn more](#).
 - License Included:** Oracle Database software license included.
- Create Autonomous Database** and **Cancel** buttons.

ATP – Provisioning a Database (2 minutes)

ATP

The screenshot shows the Oracle Cloud interface for provisioning an Autonomous Database (ATP). On the left, there's a sidebar with a large orange ATP logo and the word "PROVISIONING". Below it, a banner states "Oracle Autonomous Database" and "70% Q4 Growth Rate". A search bar at the top says "Search resources, services, documentation, and marketplace". The main content area shows a green ATP logo with the ID "DB-20220510121752". The navigation bar includes "US East (Ashburn)" and various icons. The main panel has tabs for "Autonomous Database Information", "Tools", and "Tags". Under "General Information", details are provided: Database Name: DB-20220510121752, Workload Type: Transaction Processing, Compartment: richnlemes (root), OCID: 0ppd9g_0jwv, Created: Tue, May 10, 2022, 17:19:34 UTC, OCPU count: 1, OCPU auto scaling: Disabled, Storage: 1 TB, Storage auto scaling: Disabled, License Type: License included, and Database Version: 19c. To the right, sections for "Infrastructure" (Dedicated Infrastructure: No), "Autonomous Data Guard" (Status: Disabled), "Backup" (Last Automatic Backup: No active backups exist for this database), and "Network" are shown. A support link and a small globe icon are also present.

ATP

PROVISIONING

Oracle Autonomous Database

70% Q4 Growth Rate

Annualized Consumption Revenue - ACR

Search resources, services, documentation, and marketplace

US East (Ashburn)

ATP

DB-20220510121752

ATP

DB-20220510121752

Database Actions DB Connection Performance Hub Service Console More Actions

Autonomous Database Information Tools Tags

General Information

Database Name: DB-20220510121752

Workload Type: Transaction Processing

Compartment: richnlemes (root)

OCID: 0ppd9g_0jwv

Created: Tue, May 10, 2022, 17:19:34 UTC

OCPUs: 1

OCPUs auto scaling: Disabled

Storage: 1 TB

Storage auto scaling: Disabled

License Type: License included

Database Version: 19c

Infrastructure

Dedicated Infrastructure: No

Autonomous Data Guard

Status: Disabled

Backup

Last Automatic Backup: No active backups exist for this database

Manual Backup Store: Not Configured

Network

Support

ATP – Stop Database (25 sec.)

ATP

The screenshot shows the Oracle Cloud Autonomous Database Details page for database DB-20220510121752. The top navigation bar includes 'Database Actions', 'DB Connection', 'Performance Hub', 'Service Console', 'More Actions', and a dropdown menu with 'Manage Scaling' and 'Stop'. A red dashed circle highlights the 'Stop' button. A modal dialog titled 'Confirm Stop' asks 'Are you sure you want to stop the Autonomous Database?' with 'Stop' and 'Cancel' buttons.

The image contains three screenshots illustrating the database status transition:

- Left Screenshot:** Shows the database status as 'STOPPING' with a large 'ATP' logo. The status bar at the bottom also says 'STOPPING'.
- Middle Screenshot:** Shows the database status as 'STOPPED' with a large 'ATP' logo. The status bar at the bottom also says 'STOPPED'.
- Right Screenshot:** Shows the database details page with the status bar at the bottom saying 'STOPPED'.

ATP – Start Database (30 sec.)

ATP

The screenshot shows three views of the Oracle Cloud Autonomous Database Details page for database DB-20220510121752.

- Top View:** Shows the database status as "STARTING".
- Middle View:** Shows the database status as "STARTING".
- Bottom View:** Shows the database status as "AVAILABLE".

The Oracle Cloud navigation bar is visible at the top of each view, along with the search bar and region selector (US East (Ashburn)). The URL in the browser is "Overview > Autonomous Database > Autonomous Database Details".

Database Actions: Database Actions, DB Connection, Performance Hub, Service Console

Autonomous Database Information: Tools, Tags

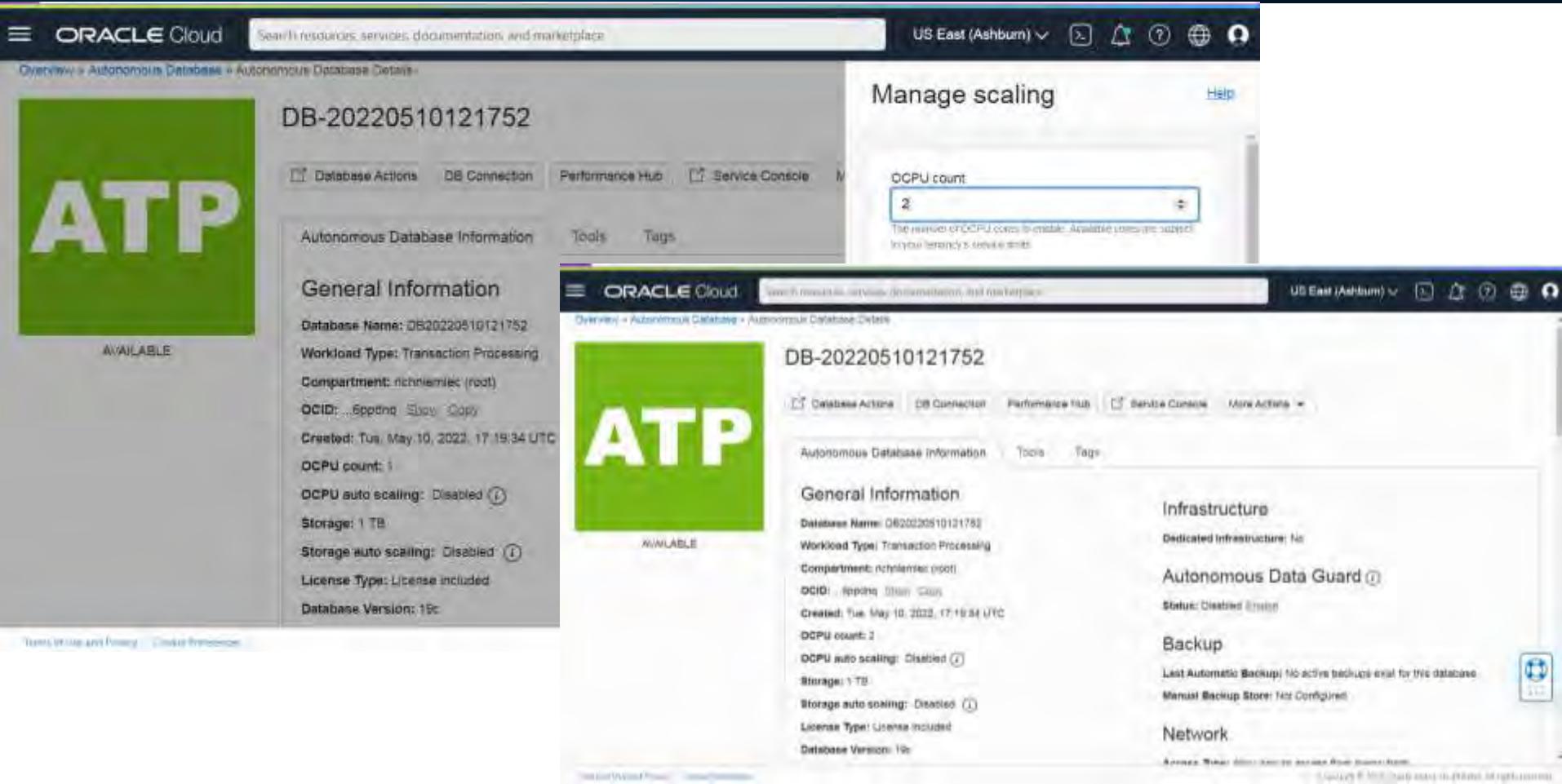
General Information:

- Database Name: DB20220510121752
- Workload Type: Transaction Processing

Infrast
Dedicated

ATP – Scaling Database (50 sec.)

ATP



The screenshot shows two views of the Oracle Cloud Autonomous Database Details page for database DB-20220510121752.

Left View: Shows the main Autonomous Database Information section. Key details include:

- Database Name: DB-20220510121752
- Workload Type: Transaction Processing
- Compartment: richniemiec (root)
- OCID: 0ppqj-8jwv-0cpj
- Created: Tue, May 10, 2022, 17:19:34 UTC
- OCPU count: 1
- OCPU auto scaling: Disabled ⓘ
- Storage: 1 TB
- Storage auto scaling: Disabled ⓘ
- License Type: License included
- Database Version: 19c

Right View: Shows the "Manage scaling" section where the OCPU count is being increased from 1 to 2. A tooltip indicates that the current 1 OCPU core is enabled. Available cores are subject to your tenancy's service limits.

Bottom View: Shows the full Autonomous Database Details page with the following sections:

- General Information:** Includes Database Name, Workload Type, Compartment, OCID, Created date, OCPU count (2), OCPU auto scaling (Disabled), Storage (1 TB), Storage auto scaling (Disabled), License Type (License included), and Database Version (19c).
- Infrastructure:** Shows Dedicated Infrastructure (No).
- Autonomous Data Guard:** Status is Disabled (Enabled).
- Backup:** Last Automatic Backup (No active backup exist for this database) and Manual Backup Store (Not Configured).
- Network:** Shows network interface details.

ATP – Restart Database (Stop/Start) (40 sec.)

ATP

The screenshot shows the Oracle Cloud Autonomous Database Details page for database DB-20220510121752. The main content area displays 'Autonomous Database Information' with various details like Database Name, Workload Type, Compartment, OCID, Created date, OCPU count, OCPU auto scaling, Storage, and Storage auto scaling. A large green banner with the word 'ATP' is prominently displayed. In the top right corner, there is a 'More Actions' dropdown menu. A red dotted circle highlights the 'Restart' option under the Infrastructure section of this menu.

This block contains two side-by-side screenshots of the Oracle Cloud Autonomous Database Details page. The left screenshot shows the database in a 'RESTARTING' state, indicated by a yellow banner with 'ATP'. The right screenshot shows the database in an 'AVAILABLE' state, indicated by a green banner with 'ATP'. Both screenshots show the same basic information as the first one, including the 'Autonomous Database Information' section and the 'More Actions' menu with the 'Restart' option circled.

Automatic Scheduling to Start/Stop DB!

ATP

The screenshot shows the Oracle Cloud Autonomous Database Details page for a database named DB-20220510121752. The database is labeled 'AVAILABLE' and features a large green 'ATP' logo. In the top right corner of the main panel, there is a 'More Actions' dropdown menu. This menu contains several options: 'Administrator Password', 'Update License Type', 'Auto Start/Stop Schedule' (which is highlighted with a red oval), 'Dedicated Infrastructure', and 'Manage Encryption Key'. Below the dropdown, a modal window titled 'Auto Start/Stop Schedule' is displayed, showing a weekly grid for setting start and stop times.

ATP - Create a Clone

ATP

The screenshot shows the Oracle Cloud Autonomous Database Details page for a database named DB-20220510121752. The database is labeled 'AVAILABLE' and features a large green 'ATP' logo. The General Information section displays the following details:

- Database Name: DB-20220510121752
- Workload Type: Transaction Processing
- Compartment: rch/namespaces (root)
- OCID: 8ppdrj-1kew-4cgt
- Created: Tue, May 10, 2022, 17:19:34 UTC
- OCPU count: 1
- OCPU auto scaling: Disabled

The Infrastructure section includes tabs for Dedicated and Autonomous, with 'Autonomous' selected. A 'Create Clone' button is highlighted with a red dotted circle. Other tabs in this section include 'Restart', 'Status: Disc', 'Update Network Access', 'Backup', 'Administrator Password', and 'Last Automate'. The top navigation bar includes Database Actions, DB Connection, Performance Hub, Service Console, More Actions (with Manage Scaling), Stop, and a search bar.

The screenshot shows the 'Create Autonomous Database Clone' wizard. The first step, 'Choose a clone type', offers three options:

- Full Clone**: Creates a new database with source database's data and metadata.
- Refreshable Clone**: Creates a read-only full clone that can be easily refreshed with source database data. Must be refreshed within 7 days (168 hours) to remain connected to the source database.
- Metadata Clone**: Creates a new database that includes all source database schema metadata, but not the source database data.

The second step, 'Clone source', shows two options:

- Clone from database instance**: Selected. It allows cloning from an Autonomous Database or a non-autonomous database.
- Clone from a backup**: Allows cloning from a backup of an Autonomous Database or a non-autonomous database.

The third step, 'Provide basic information for the Autonomous Database clone', includes fields for choosing a preferred region (US East (Ashburn) - Current Region) and buttons for 'Create Autonomous Database Clone' and 'Cancel'.

Database Actions are Numerous!

The screenshot shows the Oracle Cloud interface for an Autonomous Database named DB-20220510121752. A red dotted circle highlights the 'Database Actions' button in the top navigation bar.

Database Actions

Development

- SQL: Execute queries and create and manage database objects.
- DATA MODULES: Create reusable components for database objects.
- REST: Generate REST APIs for your database.

General Information

- Database Name: DB20220510121752
- Workload Type: Transactional
- APX: Build web applications rapidly.

Data Tools

- LATENT PUMP: Import and export data between your database and other databases.
- DATA LOAD: Load or extract data from local files to your database.
- COPYLOAD: Unstructured Data (JSON/BSON/CSV): The import of JSON.
- MATRIX INSIGHT: Discover anomalies, outliers and hidden patterns in your data.
- DATA ANALYST: Visualize your data.

Getting Started

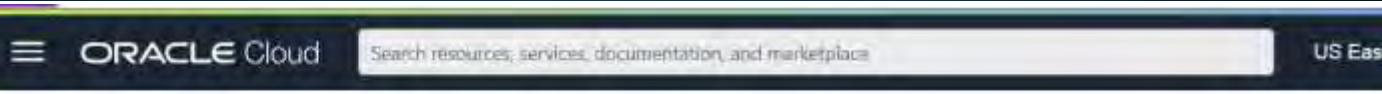
- Charts: Create visualizations using area, bar, pie, and other popular charting methods from your SQL query results.
- RESTful Web Services: Deploy REST APIs for your Oracle database - GET, POST, PUT and DELETE securely using HTTPS with your Oracle data and stored procedures.
- Load Data: Populate existing tables or build new ones from local files (Avro, JSON, XML, CSV, or Excel) using our data loading Wizard.
- JSON: Create collections, documents, add, edit, delete, and browse your documents, and visualize your JSON Data Guides.

Need Help?

- Documentation: SQL Developer Community Forum, SQL Developer on Twitter.

ATP - Performance Hub

ATP

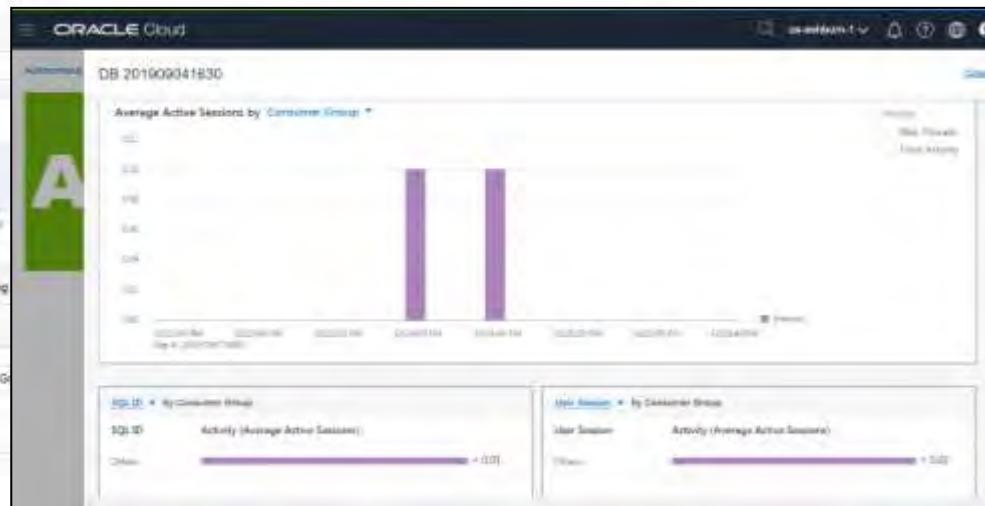


Overview • Autonomous Database • Autonomous Database Details



DB-20220510121752

Database Actions DB Connection **Performance Hub** Service Console More Actions ▾



ATP - Service Console (Overview/Activity)

ATP

DB-20220510121752

Service Console



Database Actions



DB Connection



Performance Hub



Service Console



More Actions

ATP

ORACLE
Cloud Infrastructure

ORACLE
Cloud Infrastructure



Autonomous
Transaction
Processing

Transaction
Processing

Overview

Activity

Administration

Development

DATABASE

DB201909041630

The Monitored SQL tab shows information about current and past monitored SQL statements. See documentation for more information.

	PARALLEL	USER NAME	MODULE	CONSUMER GROUP	DATABASE TIME	IO BYTES
1		ADMIN	Oracle REST Data Se	LOW	1.83 s	11 GB
2		ADMIN	SQL Developer	LOW	51.77 s	
3		ADMIN	SQL Developer	LOW	50.43 s	
4		ADMIN	SQL Developer	LOW	53.42 s	
5		ADMIN	SQL Developer	LOW	19.91 s	
6		ADMIN	SQL Developer	LOW	18.95 s	
7		ADMIN	SQL Developer	LOW	36.95 s	

ADW - Provision Database (1 min. 20 sec.)

ADW

The screenshot shows the Oracle Cloud interface for provisioning an Autonomous Database. The main title is "DB-20220510174437". The left sidebar lists steps: Overview, Autonomou... (partially visible), and Provisioning. The main content area displays the database details, including the name DB-20220510174437, workload type (Data Warehouse), compartment (root), and creation date (Tue, May 10, 2022). It also shows the status as AVAILABLE. The Oracle Cloud logo is prominently displayed at the top.

The screenshot shows the Oracle Cloud interface for the provisioned Autonomous Database DB-20220510174437. The main title is "DB-20220510174437". The left sidebar lists steps: Overview, Autonomous Database, and Autonomous Database Details. The main content area displays the database details, including the name DB-20220510174437, workload type (Data Warehouse), compartment (root), and creation date (Tue, May 10, 2022). It also shows the status as AVAILABLE. The Oracle Cloud logo is prominently displayed at the top.

Autonomous Database Information

- Database Name: DB20220510174437
- Workload Type: Data Warehouse
- Compartment: root (root)
- OCID: ...abjpa-3tarl-Copy
- Created: Tue, May 10, 2022, 22:57:35 UTC
- OCPU count: 1
- OCPU auto scaling: Disabled ⓘ
- Storage: 1 TB
- Storage auto scaling: Disabled ⓘ
- License Type: License included

Tools

- Database Actions
- DB Connection
- Performance Hub
- Service Console
- More Actions

Tags

General Information

Infrastructure

- Dedicated Infrastructure: No

Autonomous Data Guard ⓘ

- Status: Disabled
- Enable

Backup

- Last Automatic Backup: No active backups exist for this database.
- Manual Backup Store: Not Configured

Network

Copyright © 2022, Oracle and/or its affiliates. All rights reserved.

Optimized for Autonomous Database



- Managed service for data warehouse workloads
- **Easy to import data** from various source: existing Oracle installation, external tables...
- ADB Originally configured for **best DW (ADW) performance**: no parameter settings required. **New ATP with auto-indexes (19c+ only)!**
- Optimizer **statistics are automatically gathered and maintained**; pre-configured for accuracy and efficiency
- **No SQL tuning or hints needed**
- DOP for SQL is automatically chosen for best performance

ADW vs. ATP - *sqlmaria.com* blog

Autonomous Data Warehouse

Optimizes Complex SQL

Columnar Format

Creates Data Summaries

Memory Speeds Joins, Aggs
(Columnar In-Memory Usage)

Statistics gather as part of
bulk load operations

Autonomous Transaction Processing

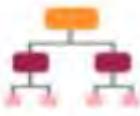
Optimizes Response Time

Row Format

Creates Indexes
(Auto-Indexing on 19c)

Memory for Caching, No IO

Statistics gather as part of
DML operations



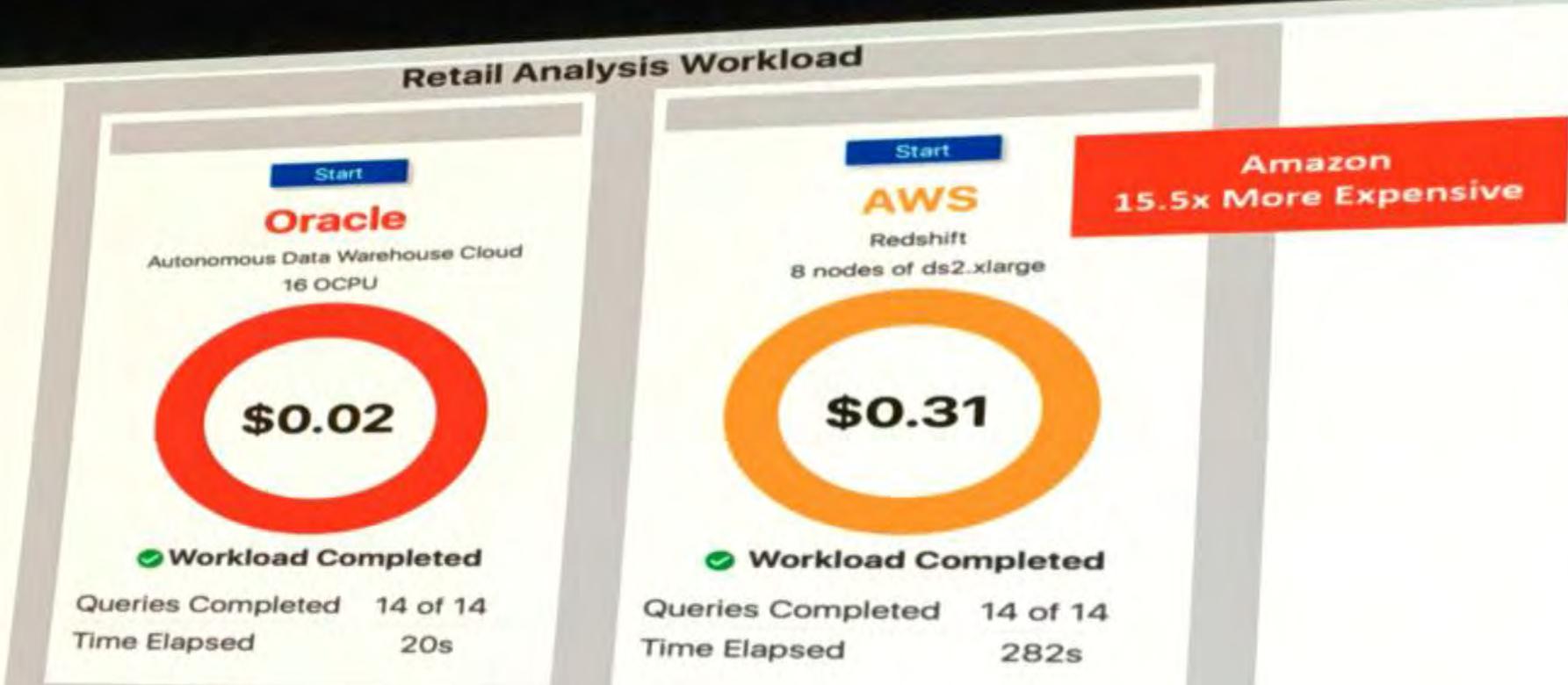
Autonomous Database: Performance vs. AWS



Rich Niemiec @RichNiemiec · Oct 1

Replies to @RichNiemiec

Demo by **#LarryEllison** of #oracle vs #Amazon is 15x faster "but you have to be willing to pay less." #ioug #viscosityna #oracleace



Autonomous Database Summary

MY ADW/ATP Benefits:

- Oracle19c PDB –19c features (Server, Storage, VM, RAC)
- 3rd Party **BI and Integration tools** as well as Oracle’s
- Pay/Scale what you need only! **Shut down idle instances**
- Runs on Oracle Cloud or YOUR Cloud at Customer
- Auto Full stack **patching** once/quarter with pre-checks prior
- **Automatic Patching** rolls across nodes for availability
- Automatic Quarterly patches or off-cycle Security Patches
- **ML Security**, Fully Encrypted, with Data Vault & Masking
- Oracle “break glass” access when approved by client
- Monitors CPU, Disk, Memory with Alerts & Resource Mgr.
- Cluster Health Monitor & Error Handling use ML algorithms

Results in Less Admin, More Uptime & Better Security!

Autonomous Database Summary

Database management simplified...

* Sean Stacey Session

1 Auto-Provisioning

Automatically deploys mission-critical databases (RAC or Exadata infrastructure) which are fault-tolerant and highly available. Enables seamless scale-out, protection in case of a server failure and allows updates to be applied in a rolling fashion, while apps continue to run.

2 Auto-Configuration

Automatically configures the database to optimize for specific workloads. Everything from the memory configuration, the data formats, and access structures are optimized to improve performance. Customers can simply load data and go.

3 Auto-Indexing

Automatically monitors workload and detects missing indexes that could accelerate applications. It validates each index to ensure its benefit before implementing it and uses machine learning to learn from its own mistakes.

4 Auto-Scaling

Automatically scales compute resources when needed by workload. All scaling occurs online, while the application continuously runs. Enables true pay per use.

5 Automated Data Protection

Automatically protect sensitive and regulated data in the database, all via a unified management console. Assess the security of your configuration, users, sensitive data, and unusual database activities.

6 Automated Security

Automatic encryption for the entire database, backups and all network connections. No access to OS or admin privileges prevents phishing attacks. Protects the system from both cloud operations and any malicious internal users.

7 Auto-Backups

Automatic daily backup of database or on-demand. Restore or recover a database to any point-in-time you specify in the last 60 days.

8 Auto-Patching

Automatically patch or upgrade with zero downtime. Applications continue to run as patching occurs in a round-robin fashion across RAC nodes or servers.

9 Automated Detection and Resolution

Using pattern recognition, hardware failures are automatically predicted without long timeouts. IOs are immediately redirected around unhealthy devices to avoid database hangs. Continuous monitoring for each database automatically generates service requests for any deviation.

10 Automatic Failover

Automatic failover with zero-data loss to standby. It's completely transparent to end-user applications.



Autonomous Database - Cost Analysis

ATP ADW

ORACLE Cloud Search resources, services, documentation, and marketplace US East (Ashburn) ⚙️ 🔔 ⓘ ⓘ ⌂ ⓘ

Billings & Cost Management

Billing Subscriptions Invoices Payment History Upgrade and Maintenance

Cost Management Cost Analysis Cost and Usage Budgets

Cost details (USD)

Cost details by date + Add Tab

Cost by Date (UTC)

Time Period : May 1, 2022-May 17, 2022 | Cost To Date : \$215.11 (USD)

Legend

- Block Storage
- Compute
- Database
- Object Storage
- Identity
- Virtual Cloud

The bar chart displays Oracle Compute costs over a 17-day period. The Y-axis represents cost in USD, ranging from -\$100 to +\$100. The X-axis shows dates from May 01 to May 17. The chart consists of two stacked series: one in green and one in orange. The orange series consistently shows higher values than the green series, peaking around \$100 on May 10 and ending at approximately \$20 on May 17.

Date	Green Series (\$)	Orange Series (\$)	Total (\$)
May 01	20	70	90
May 02	20	70	90
May 03	20	70	90
May 04	20	70	90
May 05	20	70	90
May 06	20	70	90
May 07	20	70	90
May 08	20	70	90
May 09	20	70	90
May 10	20	70	90
May 11	20	70	90
May 12	20	70	90
May 13	20	70	90
May 14	20	70	90
May 15	20	70	90
May 16	20	70	90
May 17	20	70	90

https://console.us-east-1.oraclecloud.com/account-management/cost-analysis

Autonomous DB: ATP-ADW-AJD-APEX *all in root*

The screenshot shows the Oracle Cloud interface with the navigation bar "ORACLE Cloud" and "US East (Ashburn)". The main menu on the left includes Home, Compute, Storage, Networking, Oracle Database (selected), Databases, Analytics & AI, Developer Services, Identity & Security, Observability & Management, Hybrid, Migration, Billing & Cost Management, and Governance & Administration. The Oracle Database section has sub-options: Overview, Autonomous Database (selected), Autonomous Data Warehouse, Autonomous JSON Database, and Autonomous Transaction Processing. The main content area displays "Exadata Cloud@Customer", "External Database", "Data Safe", and "Related Services" (APEX Application Development, SQL Worksheet, Database Management, Migrations, Data Integration).

The screenshot shows the "Autonomous Database" creation page. The title is "Autonomous Databases in richniemiec (root) Compartment". It states that Autonomous Database delivers fast performance and requires no database administration. It performs all routine database maintenance tasks while the system is running, without human intervention. Autonomous Database located in the Oracle cloud can run on dedicated or shared infrastructure. Below is a table of existing databases:

Display Name	State	Dedicated	OCpus	Storage	Workload Type	Autonomous Data Guard	Created
DB_2022081037447	Stopped	No	1	1 TB	Data Warehouse	—	Tue, May 10, 2022, 22:57:56 UTC
areu07223	Stopped	No	1	1 TB	APEX	—	Tue, Feb 8, 2022, 17:45:00 UTC
DB_2022082718113	Stopped	No	1	1 TB	ODON Database	—	Tue, Aug 27, 2022, 21:17:04 UTC
DB_20220903111914	Starting	No	1	1 TB	Data Warehouse	—	Tue, Sep 3, 2022, 23:18:40 UTC
DB_202210241349	Avaliable	No	1	1 TB	Transaction-Processing	—	Fri, Oct 28, 2022, 16:49:54 UTC

ADW

ATP

AJD

APX

Create/Run Notebooks in Oracle ML

Quick Actions

ORACLE Machine Learning

Analyzing Customer Data Notebook

PL/SQL procedure successfully completed.

Oracle

```
g_Visualize_Lift_Result
select QUANTILE_NUMBER, GAIN_CUMULATIVE from LIFT_TABLE
```

All fields

QUANTILE_NUMBER GAIN_CUMULATIVE

Keys

Household Size

Household Size vs. Yrs_Residence

Household Size

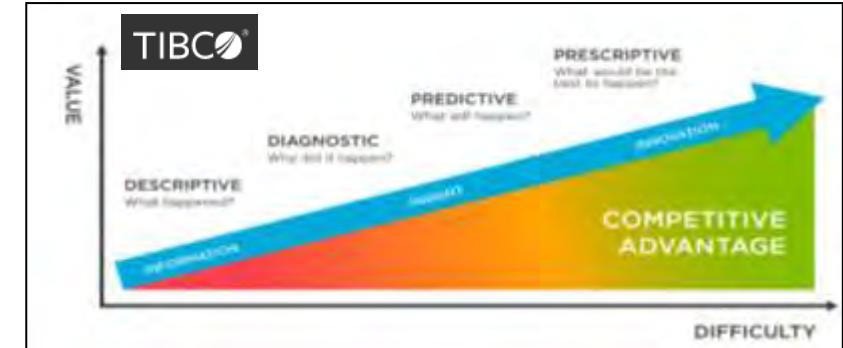
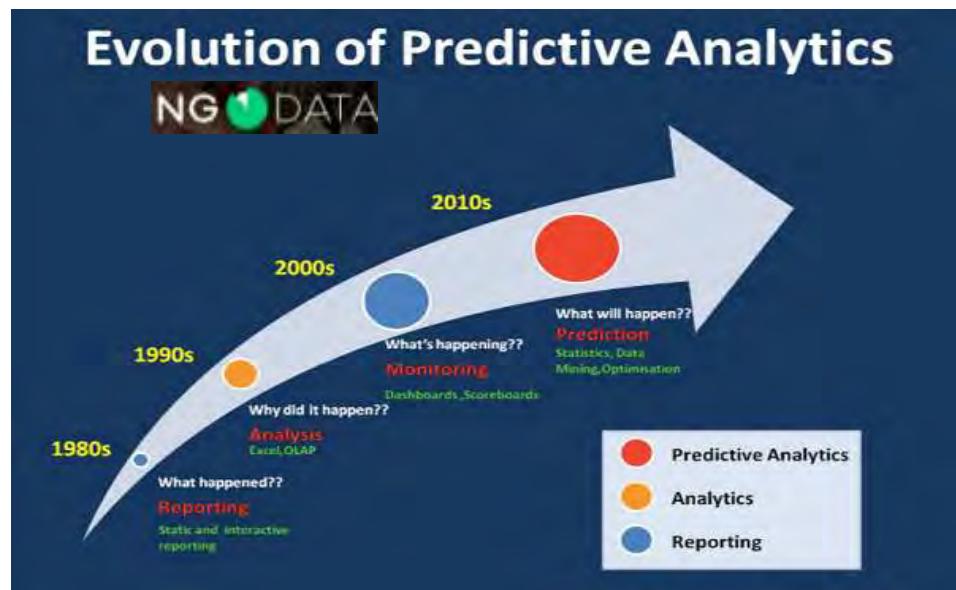
Yrs_Residence

Legend:

- HG-grad
- Bach
- Masters
- Assoc-A
- 12th
- Profes
- Assoc-V
- PHD
- 10th
- HS-grad
- 7th-8th
- 9th
- 1st-4th
- Precsch

The screenshot displays the Oracle Machine Learning interface. On the left, there's a sidebar with 'Quick Actions' and a 'Notebooks' section. The main area shows a notebook titled 'Analyzing Customer Data Notebook'. It includes a code snippet for generating a lift chart, a bar chart for Household Size, and a pie chart for education levels. Below these are two stacked area charts showing Household Size vs. Yrs_Residence. The interface has a clean, modern design with a light blue header and white background.

What You Need; Nick of Time (*Predictive Analytics*)



ATP - Service Console (Development)

ATP

ORACLE
Cloud Infrastructure

Autonomous
Transaction
Processing

Ongoing
Activity
Administration
Development

DATABASE
DB201909041630

Oracle Application Express

Oracle Application Express (APEX) provides a low-code development environment that enables you to build apps in a single, extensible platform, which is fully supported by Autonomous Database.

SQL Developer Web

Oracle SQL Developer Web provides a browser-based interface to Oracle Database. It provides a subset of the features available in the desktop version.

Oracle ML SQL Notebooks

Oracle Machine Learning SQL notebooks provide easy access to Oracle Analytics' machine learning algorithms (classification, regression, etc.), SQL, PL/SQL and Oracle's statistical and analytical functions.

Download Oracle Instant Client

This is a free, light-weight set of tools, libraries and SQL drivers for Node.js, Python and PHP and provide access for OCI. Included - Oracle recommends using this version of OCI.

Service Console

① ⓘ

The dashboard displays four main metrics:

- DATABASE STATUS:** A green circle with a checkmark, indicating no critical issues.
- ALERTS:** A red circle with the number 82, indicating 82 active alerts.
- DATABASE STORAGE:** A yellow circle showing 1.91 GB used.
- Sessions:** A chart showing the number of sessions over time, with categories: Active (green), Inactive (yellow), and Blocked (red).
- Physical IO Panel:** A chart showing the number of physical IO operations over time, with categories: Read (blue) and Write (orange).
- Waits:** A chart showing the number of waits over time, with categories: User IO (blue), System IO (orange), Thread (green), Queue (red), Other (purple), and Network (pink).

Quick Links:

- Worksheet
- Data Modeler
- Application Express

▲ How Do I?



Get Started

Get started with Oracle Machine Learning



Create Notebooks

How to create a notebook



Create Jobs

How to create a job



Manage Permissions

How to manage collaborative permissions in workspaces



Try It

Follow along with a hands on workshop

▲ Quick Actions



Run SQL Statements

Enter and run SQL statements



Run SQL Scripts

Enter and run SQL scripts



Notebooks

The place for data discovery and analytics



Jobs

Schedule notebooks to run at certain times



Examples

Check out some examples

Machine Learning connection to ADW/ATP - SQL

The screenshot shows the Oracle Machine Learning Service console interface. At the top, there is a navigation bar with tabs: DB Connection, Performance Hub, Service Console (which is highlighted with a red dotted circle), Scale Up/Down, Stop, and Actions. Below the navigation bar, there are two tabs: Autonomous Database Information and Tags. The main content area displays a list of "Example Templates".

Anomaly Detection
This notebook shows how to build and apply an anomaly detection model using OML4Py.
Author: Oracle
Date Added: 2/13/18 11:16 PM
Tags: "Anomaly Detection", "ML", "Python"
★ 5 Likes

OML4Py Text Mining SVM
This notebook builds and applies a classification model using OML4Py.
Author: Oracle
Date Added: 11/26/20 5:49 AM
Tags: Classification, TextMining, Details, Python, SupLearn
★ 0 Likes

OML4SQL Anomaly Detection SVM
This notebook builds an anomaly detection (1-class) support vector machine (SVM) model using OML4SQL.
Author: Oracle
Date Added: 11/26/20 5:49 AM
Tags: Anomaly Detection, SQL, ml, Create View, SupLearn
★ 0 Likes

OML4SQL Association Rules Apriori
This notebook builds an association rules model (a frequent itemset mining algorithm) using OML4SQL.
Author: Oracle
Date Added: 11/26/20 5:49 AM
Tags: SQL, Super, Market Basket Analysis, Frequent Itemsets
★ 0 Likes

OML4SQL Attribute Importance MDL
This notebook computes attribute importance (minimum description length).
Author: Oracle
Date Added: 11/26/20 5:49 AM
Tags: SQL, Attribute Importance, Minimum Description Length
★ 0 Likes

Clustering
This notebook shows how to build and apply a clustering model using OML4Py.
Author: Oracle
Date Added: 2/13/18 11:16 PM
Tags: "Clustering", "K-Means", "ML", "Python"
★ 1 Likes

OML4SQL Classification DT
This notebook builds and applies a Decision Tree classifier using OML4SQL.
Author: Oracle
Date Added: 11/26/20 5:49 AM
Tags: SQL, Classification, Decision Tree, ml, Create View, SupLearn
★ 0 Likes

OML4SQL Classification GLM
This notebook builds and applies a Generalized Linear Model (GLM) classifier using OML4SQL.
Author: Oracle
Date Added: 8/20/21 8:40 AM
Tags: ml, Create View, SH, SUPPLEMENTARY, DEMOGRAPH
★ 0 Likes

OML4SQL Classification NB
This notebook builds and applies a Naive Bayes classifier using OML4SQL.
Author: Oracle
Date Added: 8/20/21 8:40 AM
Tags: ml, Create View, SH, SUPPLEMENTARY, DEMOGRAPH
★ 0 Likes

OML4SQL Classification NN
This notebook builds and applies a Neural Network classifier using OML4SQL.
Author: Oracle
Date Added: 8/20/21 8:40 AM
Tags: ml, Create View, SH, SUPPLEMENTARY, DEMOGRAPH
★ 0 Likes

Machine Learning connection ADW/ATP - Python

ORACLE Machine Learning

ML_USER Project [ML_USER Works...]

ML_USER

Example Templates

+ Create Notebooks

X

OML Run-me-first

This notebook loads and prepares tables with data...

Author: Oracle

Date Added: 2/17/21 5:18 PM

Tags: 'SQL' 'sql' 'Object Storage' 'Customer Insurer...

☆ 0 Likes

OML4Py -0- Tour

This notebook highlights a wide range of OML4Py ...

Author: Oracle

Date Added: 11/26/20 5:41 AM

Tags: 'Attribute Importance' 'Classification' 'Rando...

☆ 2 Likes

OML4Py -1- Introduction

This notebook highlights OML4Py core features

Author: Oracle

Date Added: 11/26/20 5:41 AM

Tags: 'Anomaly Detection' 'Attribute Importance' 'R...

☆ 2 Likes

OML4Py -2- Data Selection and Mani...

This notebook highlights the OML4Py Transparency...

Author: Oracle

Date Added: 11/26/20 5:41 AM

Tags: 'Join' 'Split' 'Python' 'Data Selection' 'Proxy O...

☆ 2 Likes

OML4Py -3- Datastore and Script Rep...

This notebook highlights features of OML4Py data...

Author: Oracle

Date Added: 11/26/20 5:41 AM

Tags: 'Regression' 'Python' 'Data Selection' 'Iris' 'Da...

OML4Py -4- Embedded Python Execu...

This notebook highlights features of OML4Py Emb...

Author: Oracle

Date Added: 11/26/20 5:41 AM

Tags: 'Regression' 'Python' 'Matplotlib' 'Iris' 'Embed...

OML4Py -5- AutoML

This notebook highlights the AutoML features of O...

Author: Oracle

Date Added: 11/26/20 5:41 AM

Tags: 'Classification' 'Regression' 'Random Forest' ...

OML4Py Anomaly Detection SVM

This notebook builds an anomaly detection (1-Class...

Author: Oracle

Date Added: 11/26/20 5:41 AM

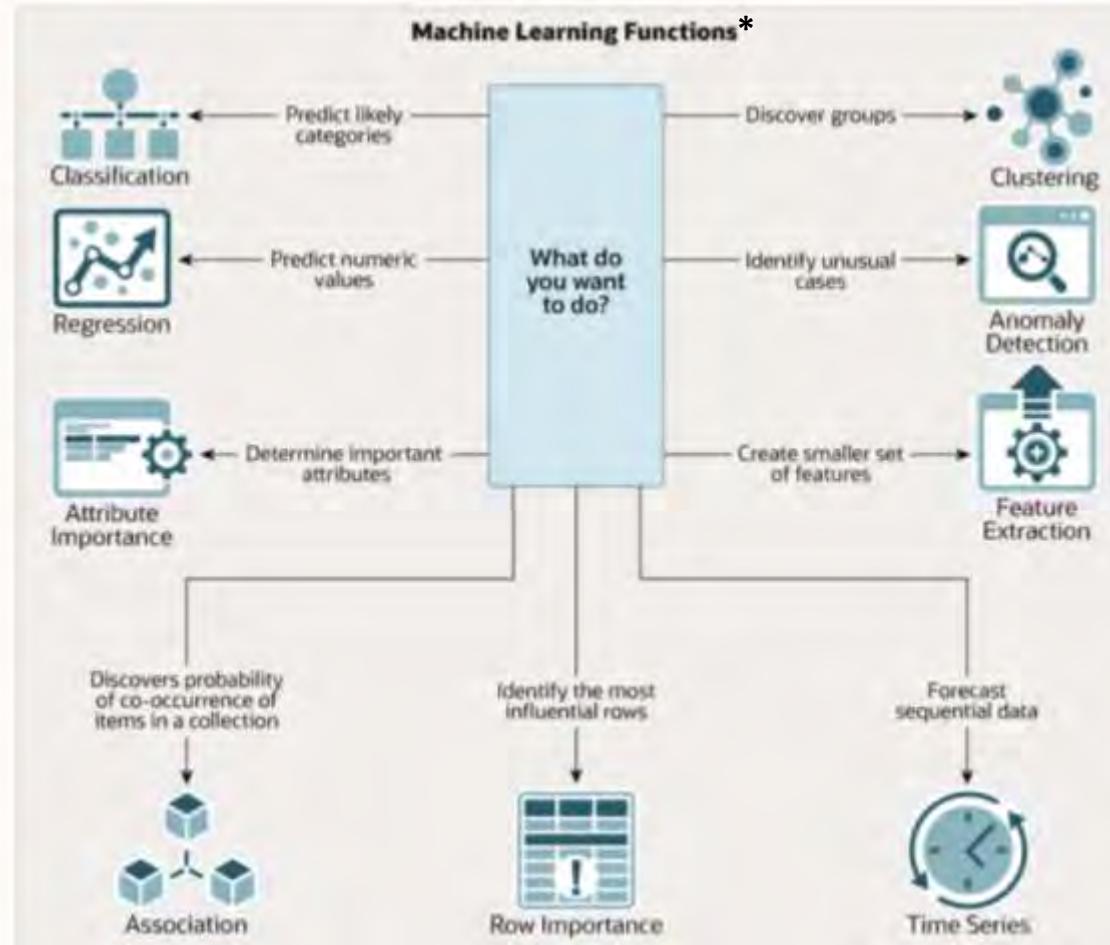
Tags: 'Anomaly Detection' 'Sampling' 'Join' '1-Class...

Machine Learning Functions* - Oracle Docs.

- First: Clear Business Problem to Solve
 - Second: Function to Perform
 - Third: Algorithm to use
-

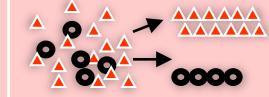
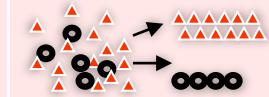
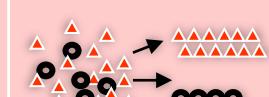
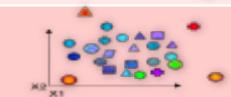
- First: Build/Train the Model when you build it using about 60% of data.
- Second: Test/Score Model for accuracy/precision using about 40% of data.

Compare Algorithms!

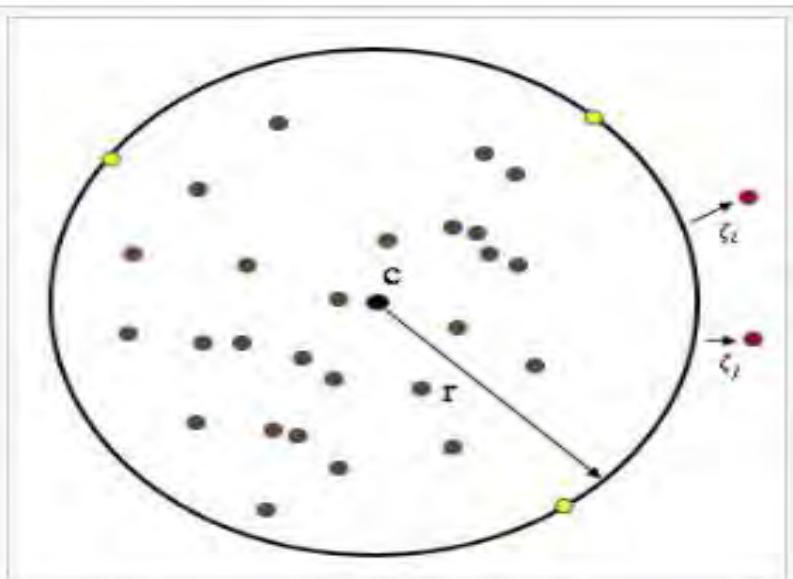


Business Understanding

Be Extremely Specific in Problem Statement:

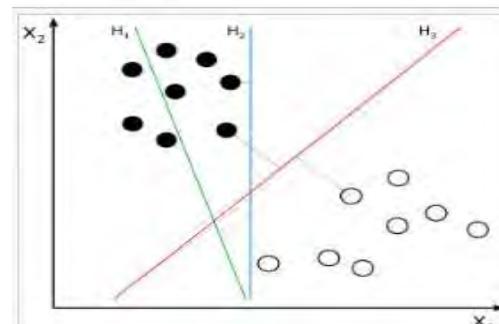
Poorly Defined	Better	Data Mining Technique
Predict employees that leave	<ul style="list-style-type: none">Based on past employees that voluntarily left:<ul style="list-style-type: none">Create New Attribute Empl Turnover → 0/1	
Predict customers that churn	<ul style="list-style-type: none">Based on past customers that left (churn):<ul style="list-style-type: none">Create New Attribute Churn → YES/NO	
Target “best” customers	<ul style="list-style-type: none">Recency, Frequency Monetary (RFM) AnalysisSpecific Dollar Amount over Time Window:<ul style="list-style-type: none">Who has spent \$500+ in most recent 18 months	
How can I make more \$\$?	<ul style="list-style-type: none">What helps me sell soft drinks & coffee?	
Which customers are likely to buy?	<ul style="list-style-type: none">How much is each customer likely to spend?	
Who are my “best customers”?	<ul style="list-style-type: none">What descriptive “rules” describe “best customers”?	
How can I combat fraud?	<ul style="list-style-type: none">Which transactions are the most anomalous?<ul style="list-style-type: none">Then roll-up to physician, claimant, employee, etc.	

One-Class SVM (ML Anomaly Detection)*



The hypersphere containing the target data having center a and radius R . Objects on the boundary are support vectors, and two objects lie outside the boundary having slack greater than 0.

Support Vector Data Description (SVDD):
Find the smallest hypersphere containing all data points (use supervised training to get it)



H_1 does not separate the classes.
 H_2 does, but only with a small margin.
 H_3 separates them with the maximal margin.

Linear SVM

*Wikipedia

One-Class SVM (ML Anomaly Detection) - FYI Only

- Support Vector Machine (**SVM**)
- One-Class Classification (**OCC**)
- Used to Classify Data
- **Identify specific objects of a class** based on supervised learning based on objects of that class.
- **Supervised Learning** using **Algorithms**
- SVM maps training data into separated areas
- **Unsupervised Learning** does data **clustering**
- They analyze the data used for **regression**
- SVM as binary non-probabilistic linear classifier
- **Classify images, text, & even hand written text.**

Machine Learning connection to ADW/ATP

ORACLE Machine Learning

ADMIN_RICH2 Project |ADMIN_RIC... ADMIN_RICH2

Anomaly Detection

Display CUSTOMERS360 table

```
SELECT * FROM CUSTOMERS360;
```

CUST_ID	CUST_GENDER	CUST_MARITAL_STATUS	CUST_YEAR_OF_BIRTH	CUST_INCOME_LEVEL	CUST_CREDIT_LIMIT	EDUCATION	AFFINITY_CARD	HOU...
104086	M	NeverM	1980	L: 300,000 and above	11000	Bach.	0	1
104089	M	Married	1970	H: 150,000 > 169,999	5000	< Bach	0	3
104090	M	Married	1970	SELECT * FROM CUSTOMERS360;				
104091	M	Married	1970					
104092	F	NeverM	1970					
104093	M	Married	1970					
104094	M	Married	1970					
104095	M	NeverM	1970					

settings ▾

Grouped Stacked

NeverM Married Absent Divor Separ Widowed Mar-AF

1928 1936 1942 1948 1954 1960 1968 1972 1978 1984

Machine Learning connection to ADW/ATP

Build Anomaly Detection model (1-Class Support Vector Machine)

```
-->Build Anomaly Detection Model (1-Class SVM) on CUSTOMERS360 data

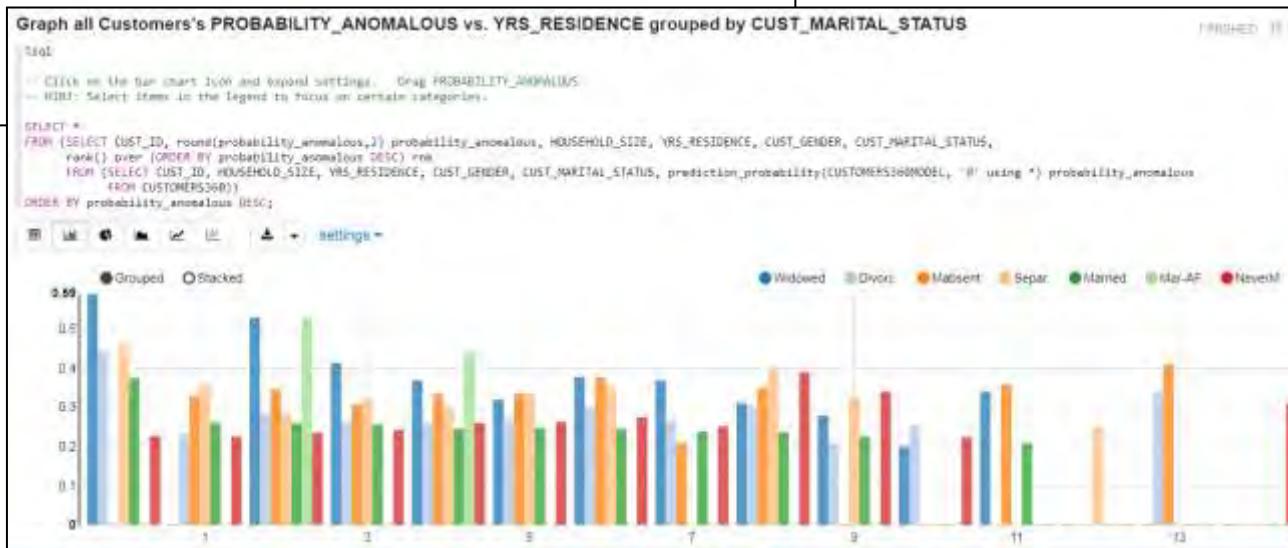
DECLARE
  V_sql varchar2(100);
BEGIN
  --Create a Build Setting table for Model Build
  EXECUTE IMMEDIATE 'CREATE TABLE CUSTOMERS360_SET (setting_name VARCHAR2(30),setting_value VARCHAR2(4000))';
  EXECUTE IMMEDIATE 'INSERT INTO CUSTOMERS360_SET (setting_name, setting_value) VALUES (''ALGO_NAME'', ''ALGO_SUPPORT_VECTOR_MACHINES'')';
  EXECUTE IMMEDIATE 'INSERT INTO CUSTOMERS360_SET (setting_name, setting_value) VALUES (''PREP_AUTO'', ''ON'')';
  DBMS_OUTPUT.PUT_LINE ('Created model build settings table: CUSTOMERS360_SET');

  --Build the 1-Class SVM model.
  EXECUTE IMMEDIATE 'CALL DBMS_DATA_MINING.CREATE_MODEL(''CUSTOMERS360MODEL'', ''CLASSIFICATION'', ''CUSTOMERS360'', ''CUST_ID = null'', ''CUSTOMERS360_SET'')';
  DBMS_OUTPUT.PUT_LINE ('Created model: CUSTOMERS360_MODEL');

END;

```

Created model build settings table: CUSTOMERS360_SET
Created model: CUSTOMERS360_MODEL
PL/SQL procedure successfully completed.



Machine Learning connection to ADW/ATP

View Prediction_Details that explain why the record was selected as anomalous

```
-- Select customers with OCCUPATION of 'TechSup' and more than 55% probability of being anomalous
SELECT CUST_ID,
       RTRIM(TRIM(SUBSTR(OUTPRED,"Attribute1",17,100)),'rank="1"/>') FIRST_ATTRIBUTE,
       RTRIM(TRIM(SUBSTR(OUTPRED,"Attribute2",17,100)),'rank="2"/>') SECOND_ATTRIBUTE,
       RTRIM(TRIM(SUBSTR(OUTPRED,"Attribute3",17,100)),'rank="3"/>') THIRD_ATTRIBUTE,
       RTRIM(TRIM(SUBSTR(OUTPRED,"Attribute4",17,100)),'rank="4"/>') FOURTH_ATTRIBUTE,
       RTRIM(TRIM(SUBSTR(OUTPRED,"Attribute5",17,100)),'rank="5"/>') FIFTH_ATTRIBUTE
  FROM (SELECT CUST_ID, PREDICTION_DETAILS(CUSTOMERS360MODEL, '0' USING *) PREDICTION_DETAILS FROM CUSTOMERS360
    WHERE PREDICTION_PROBABILITY(CUSTOMERS360MODEL, '0' USING *) > 0.50
      AND OCCUPATION = 'TechSup'
      ORDER BY CUST_ID) OUT,
        XMLTABLE('/Details'
          PASSING OUT.PREDICTION_DETAILS
          COLUMNS
            "Attribute1" XMLType PATH 'Attribute[1]/',
            "Attribute2" XMLType PATH 'Attribute[2]/',
            "Attribute3" XMLType PATH 'Attribute[3]/',
            "Attribute4" XMLType PATH 'Attribute[4]/',
            "Attribute5" XMLType PATH 'Attribute[5]/'
          )
        OUTPRED;
```

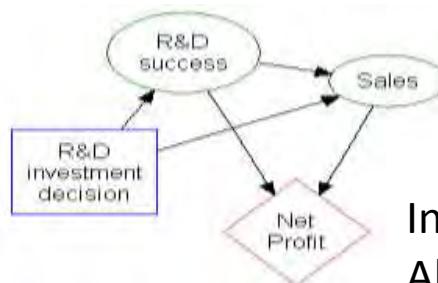
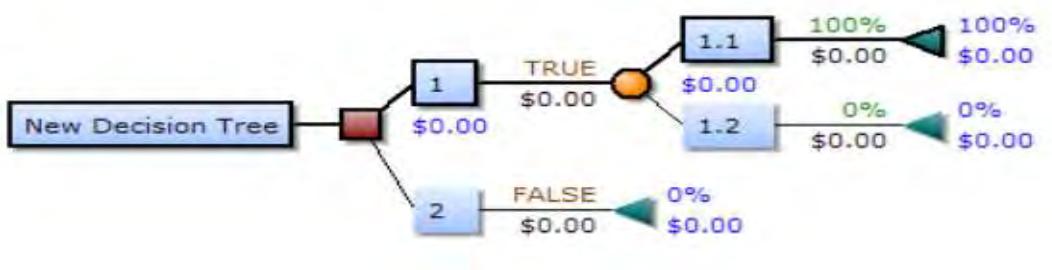


CUST_ID	FIRST_ATTRIBUTE	SECOND_ATTRIBUTE	THIRD_ATTRIBUTE
100646	"CUST_MARITAL_STATUS" actualValue="Widowed" weight=".226"	"CUST_YEAR_OF_BIRTH" actualValue="1941" weight=".118" "CUST_CREDIT_LIMIT" actualValue="1500" weight=".165"	
102922	"CUST_MARITAL_STATUS" actualValue="Widowed" weight=".222"	"CUST_YEAR_OF_BIRTH" actualValue="1931" weight=".169"	"CUST_CREDIT_LIMIT" actualValue="1500" weight=".165"
103441	"CUST_MARITAL_STATUS" actualValue="Widowed" weight=".222"	"CUST_YEAR_OF_BIRTH" actualValue="1941" weight=".117" "EDUCATION" actualValue="Bach." weight=".076"	
104286	"EDUCATION" actualValue="9th" weight=".165"	"HOUSEHOLD_SIZE" actualValue="4-5" weight=".146"	"CUST_CREDIT_LIMIT" actualValue="1500" weight=".165"

Decision Tree Algorithm (ML Classifier)

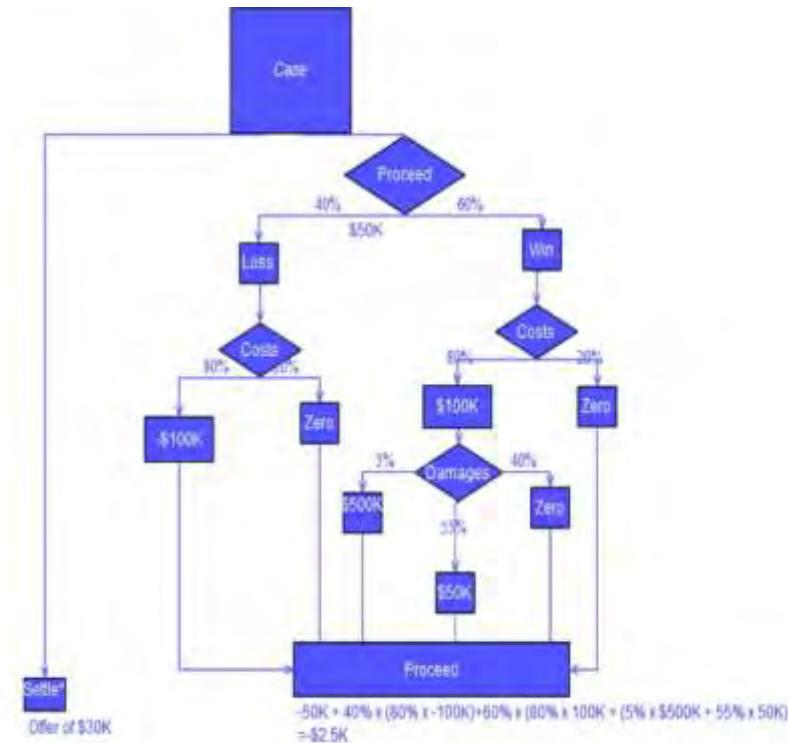
A decision tree consists of three types of nodes:^[1]

1. Decision nodes – typically represented by squares
2. Chance nodes – typically represented by circles
3. End nodes – typically represented by triangles



Influence Diagram is
Also a Decision Tree

Flow Chart calculates whether to settle a case or not based on costs/probabilities



OML (OAA) Oracle Data Mining SQL Sample (PARTIAL)

dmdtdemo.sql – DBMS_DATA_MINING package – Decision Tree

```
-- Given demographic data about a set of customers, predict the  
-- customer response to an affinity card program using a classifier  
-- based on Decision Trees algorithm.
```

```
INSERT INTO dt_sh_sample_settings VALUES  
  (dbms_data_mining.algo_name, dbms_data_mining.algo_decision_tree);
```

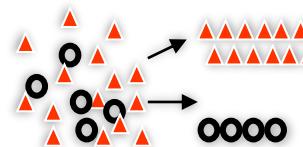
```
--  
-- CREATE A NEW MODEL  
-- Build a DT model
```

```
BEGIN  
  DBMS_DATA_MINING.CREATE_MODEL(  
    model_name      => 'DT_SH_Clas_sample',  
    mining_function => dbms_data_mining.classification,  
    data_table_name  => 'mining_data_build_v',  
    case_id_column_name => 'cust_id',  
    target_column_name => 'affinity_card',  
    settings_table_name => 'dt_sh_sample_settings');  
END;  
/
```



```
SELECT T.cust_id, S.prediction, S.probability, S.cost  
FROM (SELECT cust_id,  
          PREDICTION_SET(dt_sh_clas_sample COST MODEL USING *) pset  
       FROM  mining_data_apply_v  
      WHERE cust_id < 100011) T,  
     TABLE(T.pset) S  
ORDER BY cust_id, S.prediction;
```

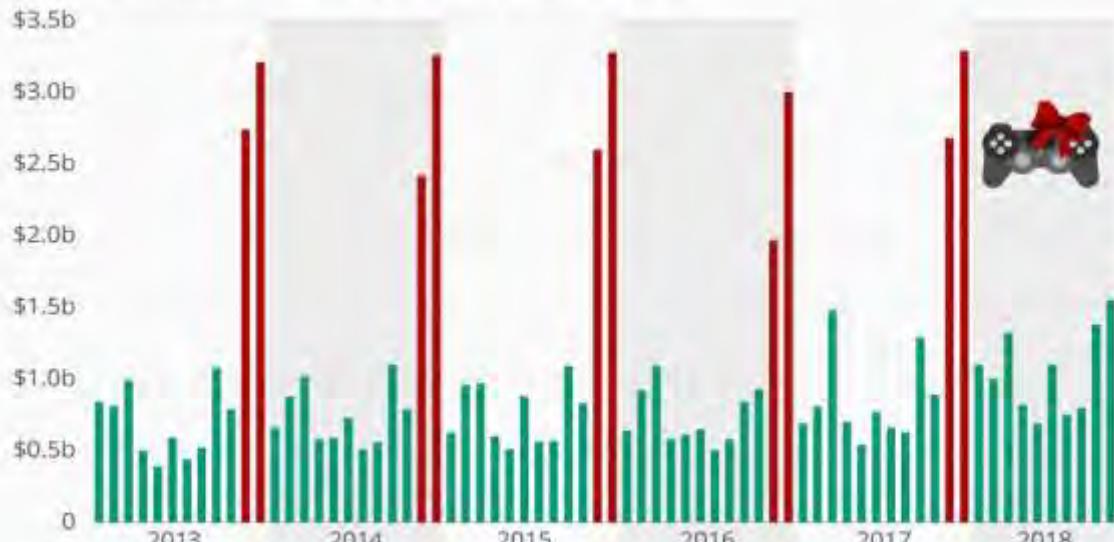
CUST_ID	PREDICTION	PROBABILITY	COST
100001	0	.966183575	.270531401
100001	1	.033816425	.966183575
100002	0	.740384615	2.076923077
100002	1	.259615385	.740384615
100003	0	.909090909	.727272727
100003	1	.090909091	.909090909
100004	0	.909090909	.727272727
100004	1	.090909091	.909090909
100005	0	.272357724	5.821138211
100005	1	.727642276	.272357724
100006	0	1.000000000	.000000000
100006	1	.000000000	1.000000000
100007	0	.909090909	.727272727
100007	1	.090909091	.909090909
100008	0	.909090909	.727272727
100008	1	.090909091	.909090909
100009	0	.272357724	5.821138211
100009	1	.727642276	.272357724
100010	0	.675965665	2.592274678
100010	1	.324034335	.675965665



Seasonal, Irregular & Missing Data: Time Series Algorithm

Video Game Sales Are Extremely Seasonal

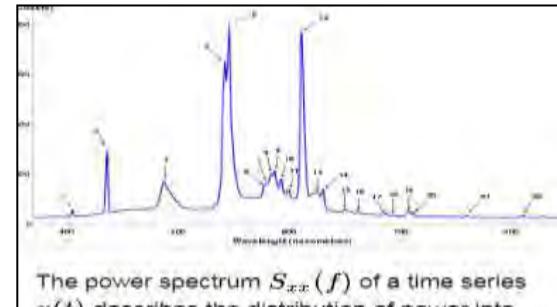
Monthly video games industry sales in the United States*



* incl. video games hardware, PC & video games software, accessories and game cards

Source: NPD Group

statista

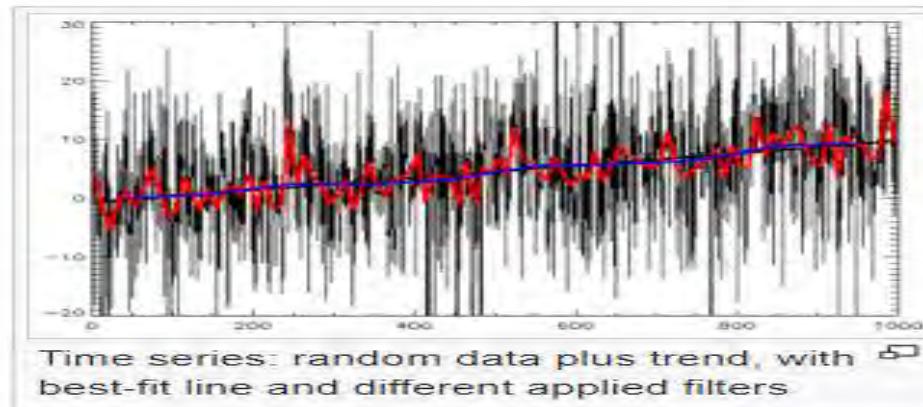


Exponential Smoothing Algorithm (Time Series)



Stock Application (Left)
A Time Series (Below)

Use Exponential Smoothing
to Weight older data to have
less effect than newer data



Machine Learning & AI - Oracle's Built-In Algorithms

Oracle's Machine Learning & Adv. Analytics Algorithms

CLASSIFICATION

- Naïve Bayes
- Logistic Regression (GLM)
- Decision Tree
- Random Forest
- Neural Network
- Support Vector Machine
- Explicit Semantic Analysis



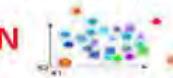
CLUSTERING

- Hierarchical K-Means
- Hierarchical O-Cluster
- Expectation Maximization (EM)



ANOMALY DETECTION

- One-Class SVM



TIME SERIES

- State of the art forecasting using Exponential Smoothing.
- Includes all popular models e.g. Holt-Winters with trends, seasons, irregularity, missing data



- OAA (Oracle Data Mining + Oracle R Enterprise) and ORAAH combined
- OAA includes support for Partitioned Models, Transactional, Unstructured, Geo-spatial, Graph data, etc.
- OAA is Oracle Advanced Analytics; ORAAH is Oracle R Advanced Analytics for Hadoop

ORACLE®

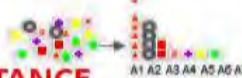
REGRESSION

- Linear Model
- Generalized Linear Model
- Support Vector Machine (SVM)
- Stepwise Linear regression
- Neural Network
- LASSO *



ATTRIBUTE IMPORTANCE

- Minimum Description Length
- Principal Comp Analysis (PCA)
- Unsupervised Pair-wise KL Div
- CUR decomposition for row & AI



ASSOCIATION RULES

- A priori/ market basket



PREDICTIVE QUERIES

- Predict, cluster, detect, features

SQL ANALYTICS

- SQL Windows, SQL Patterns, SQL Aggregates



FEATURE EXTRACTION

- Principal Comp Analysis (PCA)
- Non-negative Matrix Factorization
- Singular Value Decomposition (SVD)
- Explicit Semantic Analysis (ESA)



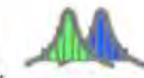
TEXT MINING SUPPORT

- Algorithms support text type
- Tokenization and theme extraction
- Explicit Semantic Analysis (ESA) for document similarity



STATISTICAL FUNCTIONS

- Basic statistics: min, max, median, stdev, t-test, F-test, Pearson's, Chi-Sq, ANOVA, etc.



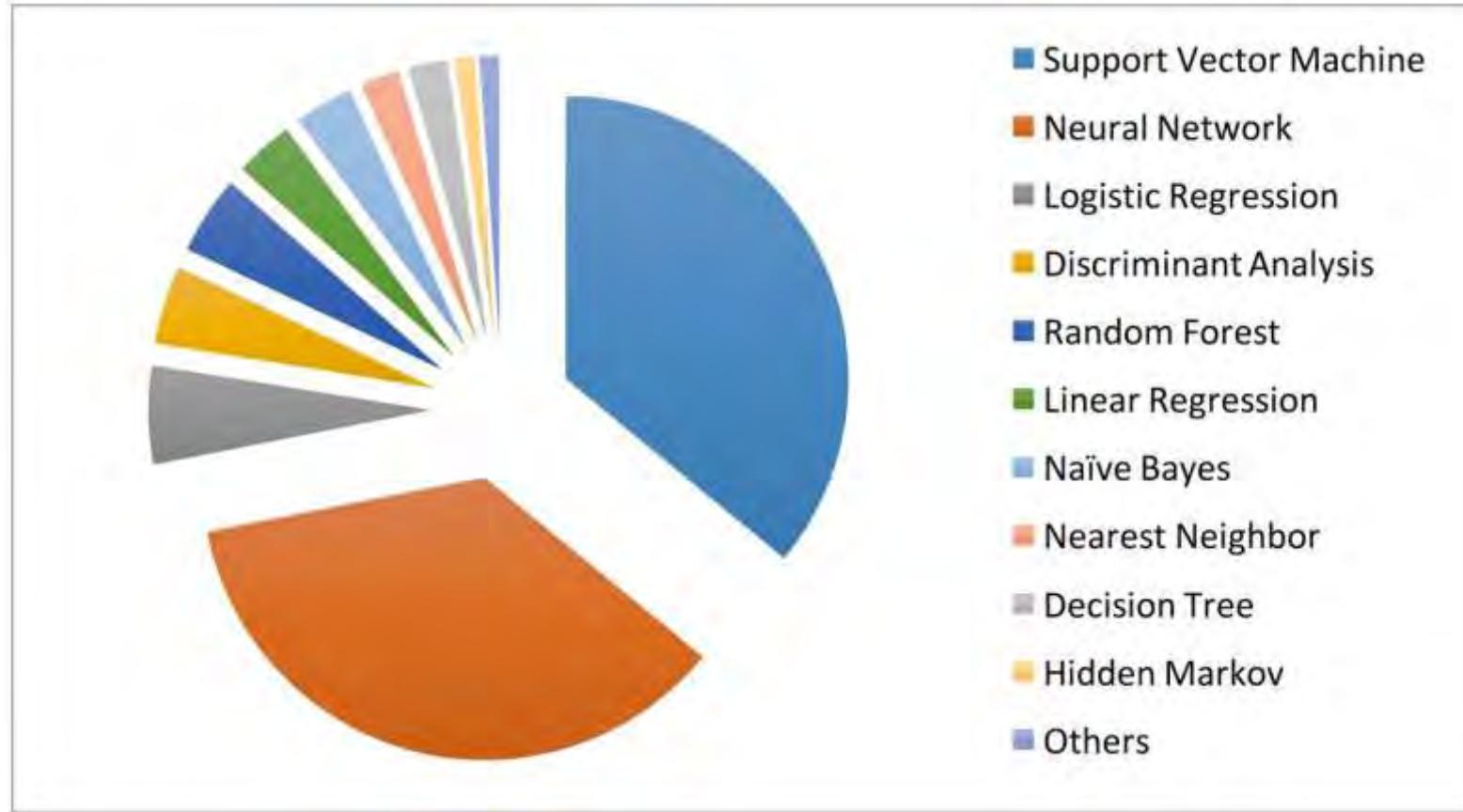
R PACKAGES

- CRAN R Algorithm Packages through Embedded R Execution
- Spark MLlib algorithm integration

EXPORTABLE ML MODELS

- REST APIs for deployment

Types of ML Algorithms in Healthcare on PubMed*



AutoML for Autonomous Database- 3/18/2021

The screenshot displays the Oracle Machine Learning interface. On the left, a sidebar titled 'How Do I?' contains links for 'Use AutoML' (selected) and 'Get Started'. Below this is a 'Quick Actions' section with 'AutoML' (circled in blue), 'Scratch', and 'Run Script'. The main content area shows a 'Create Experiment' form with fields for Name (AutoML_Rich), Date Source (ml_tutorial_rich), Predict (AFFINITY_CARD), and Class ID (CUST_ID). Below the form are sections for 'Additional Settings' and 'Features'. A table provides statistical details for columns: AFFINITY_CARD (Type: NUMBER, Nulls: 0, Distinct Values: 2, Min: 0, Max: 1, Mean: 0.24, Std Dev: 0.6), CUST_CREDIT_LIMIT (Type: NUMBER, Nulls: 0, Distinct Values: 8, Min: 1500, Max: 15000, Mean: 7924.22, Std Dev: 4200), CUST_GENDER (Type: CHAR, Nulls: 0, Distinct Values: 2), and CUST_ID (Type: NUMBER, Nulls: 0, Distinct Values: 4900, Min: 10001, Max: 104500, Mean: 102250.5, Std Dev: 1300).

ORACLE Machine Learning

ML_USER Project [ML_USER Works...]

Start Faster Results Better Accuracy

How Do I?

Use AutoML How to create AutoML Experiments

Get Started Get started with Oracle Machine Learning

Quick Actions

AutoML Create and run AutoML Experiments

Scratch Run Script

Create Experiment

Name * AutoML_Rich

Date Source * ml_tutorial_rich

Predict * AFFINITY_CARD

Class ID CUST_ID

Additional Settings

Features

Refresh

Name	Type	Percent Nulls	Distinct Values	Min	Max	Mean	Std Dev
AFFINITY_CARD	NUMBER	0	2	0	1	0.24	0.6
CUST_CREDIT_LIMIT	NUMBER	0	8	1500	15000	7924.22	4200
CUST_GENDER	CHAR	0	2				
CUST_ID	NUMBER	0	4900	10001	104500	102250.5	1300

+ Create X Edit Comment

AutoML_Experiments

Name Comment

AutoML_Rich Testing Automatic Machine Learning

AutoML_Rich1 Testing Test

Weltmeisters ml

AutoML is here for Autonomous Database

ORACLE Machine Learning

← Experiments

AutoML_Rich

Experiment Settings Edit

Accuracy

Leader Board

Deploy Create Notebook Metrics

Algorithm Model Name Accuracy

Algorithm	Model Name	Accuracy
Support Vector Machine (Gaussian)	svmg_09cd02ee4e	0.7878
Random Forest	rf_df53fb31a8	0.7821
Generalized Linear Model	glm_74cbb2b7ac	0.7821
Generalized Linear Model (Ridge Regres...	glmr_df24288679	0.7821
Support Vector Machine (Linear)	svml_a031bb0ae1	0.7431
Support Vector Machine (Linear)	svml_a031bb0ae1	0.7431

AutoML is here for Autonomous Database

The screenshot shows the Oracle Machine Learning interface. At the top, there's a navigation bar with 'ORACLE Machine Learning' and a dropdown for 'ML_USER Project [ML_USER Works...]'.

The main area displays a graph titled 'Accuracy' showing the performance of different machine learning models over time. A blue arrow points from the 'Create Notebook' dialog to the 'Create Notebook' button in the graph's header.

Below the graph is a 'Leader Board' section with tabs for 'Deploy', 'Create Notebook' (which is highlighted with a blue oval), and 'Metrics'. The 'Create Notebook' tab is currently selected.

A 'Create Notebook' dialog box is open on the right side of the screen. It contains instructions: 'Create a notebook based on selected model and this experiment's settings. Use a generated notebook to further tune your approach using Python.' It has a 'Notebook Name:' field containing 'AutoML_Classify', and 'OK' and 'Cancel' buttons at the bottom.

Algorithm	Model Name	Accuracy	Precision	Recall	ROC AUC	Balanced Accuracy
Support Vector Machine (Gaussian)	svmg_09rd02ee4e	0.7878	0.5522	0.8409	0.8439	0.8054
Random Forest	rf_df53fb31a8	0.7821	0.5449	0.8273	0.8616	0.7971
Generalized Linear Model	glm_74ccb2b7ac	0.7821	0.5441	0.8409	0.8518	0.8016
Generalized Linear Model (Ridge Regres...	glm_r_df24288679	0.7821	0.5441	0.8409	0.8521	0.8016
Support Vector Machine (Linear)	svml_a031bb0ae1	0.7431	0.4947	0.8500	0.8477	0.7785

Quick Actions



AutoML
Create and run AutoML Experiments.



Scratchpad
Run Scratchpad



Notebooks
The place for data discovery and analytics



Jobs
Schedule notebooks to run at certain times



Examples
Check out some examples

AutoML_Classify

Build Data

```
%Python
import oml

columns = 'CUST_ID', 'CUST_CREDIT_LIMIT', 'CUST_GENDER', 'CUST_INCOME_LEVEL', 'CUST_MARITAL_STATUS', 'CUST_YEAR_OF_BIRTH', 'EDUCATION', 'HOUSEHOLD_SIZE', 'OCCUPATION', 'YRS_RESIDENCE',
          'Y_BOX_GAMES', 'AFFINITY_CARD'
schema='ML_USER'
table='CUSTOMERS300'

column = ','.join(columns)
query = 'SELECT ' + column + ' FROM ' + schema + ' ' + table

data_build = oml.sync(query=query)
# Show data build
```

Create Train Data

```
%Python
import oml

X_train = data_build[['CUST_ID', 'CUST_CREDIT_LIMIT', 'CUST_GENDER', 'CUST_INCOME_LEVEL', 'CUST_MARITAL_STATUS', 'CUST_YEAR_OF_BIRTH', 'EDUCATION', 'HOUSEHOLD_SIZE', 'OCCUPATION', 'YRS_RESIDENCE',
                      'Y_BOX_GAMES']]
y_train = data_build['AFFINITY_CARD']
```

Build 'SUPPORT_VECTOR_MACHINES' Model

```
%Python
import oml

svm_settings = {
    'ODMS_SAMPLE_SIZE': '3294', 'SVMS_COMPLEXITY_FACTOR': '66.70000000000002', 'SVMS_KERNEL_FUNCTION': 'SVMS_GAUSSIAN', 'SVMS_STD_DEV': '2.23606797749979', 'CLAS_WEIGHTS_BALANCED': 'OFF',
    'SVMS_NUM_PIVOTS': '200', 'ODMS_DETAILS': 'ODMS_DISABLE', 'ODMS_SAMPLING': 'ODMS_SAMPLING_ENABLE', 'ALGO_NAME': 'ALGO_SUPPORT_VECTOR_MACHINES'
}

svm_mod = oml.svm(**svm_settings)

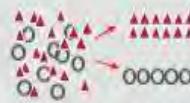
svm_mod = svm_mod.FIT(TXN_TRAIN, Y_TRAIN)
```

Oracle Machine Learning Algorithms



CLASSIFICATION

Naïve Bayes
Logistic Regression (GLM)
Decision Tree
Random Forest
Neural Network
Support Vector Machine
Explicit Semantic Analysis
XGBoost*



REGRESSION

Linear Model
Generalized Linear Model
Support Vector Machine (SVM)
Stepwise Linear regression
Neural Network
XGBoost*



FEATURE EXTRACTION

Principal Comp Analysis (PCA)
Non-negative Matrix Factorization
Singular Value Decomposition (SVD)
Explicit Semantic Analysis (ESA)



CLUSTERING

Hierarchical K-Means
Hierarchical O-Cluster
Expectation Maximization (EM)



ANOMALY DETECTION

One-Class SVM
MSET-SPRT*



TIME SERIES

Forecasting - Exponential Smoothing
Includes popular models
e.g. Holt-Winters with trends,
seasonality, irregularity, missing data

ATTRIBUTE IMPORTANCE

Minimum Description Length
Principal Comp Analysis (PCA)
Unsupervised Pair-wise KL Div
CUR decomposition for row & Al



STATISTICAL FUNCTIONS

Basic statistics: min, max,
median, stdev, t-test, F-test, Pearson's,
Chi-Sq, ANOVA, etc.



PREDICTIVE QUERIES

Predict, cluster, detect, features



SQL ANALYTICS

SQL Windows
SQL Patterns
SQL Aggregates



*Includes support for Partitioned Models, Transactional data and aggregations,
Unstructured data, Geo-spatial data, Graph data, etc,*

R & PYTHON * Coming soon

Third-party R & Python Packages
through Embedded Execution
Spark MLlib algorithm integration



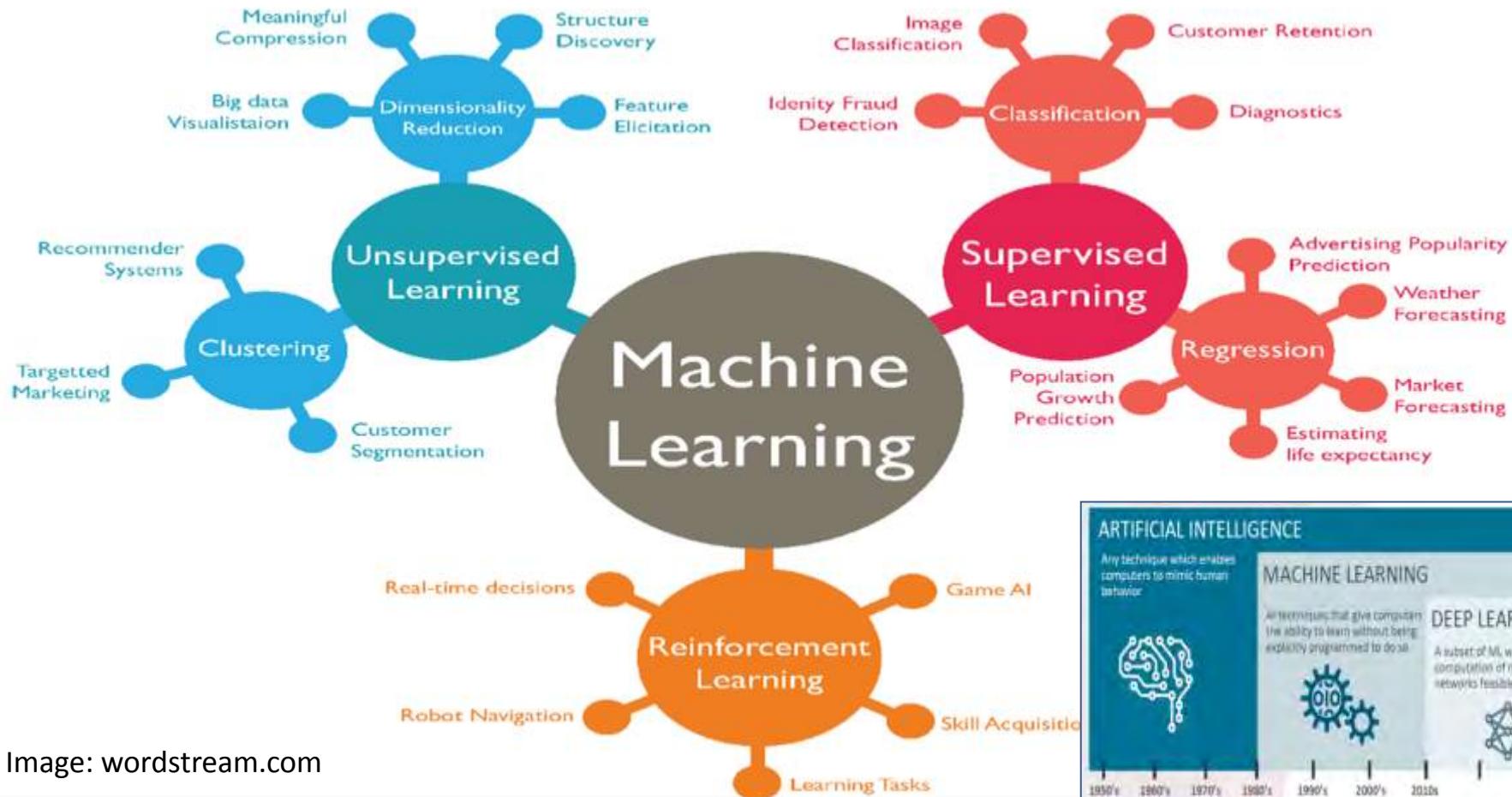
MODEL DEPLOYMENT & MONITORING

SQL—1st Class Objects
Oracle RESTful API (ORDS)
OML Web Services (for Apps)



* New in 21^c

Machine Learning has many parts



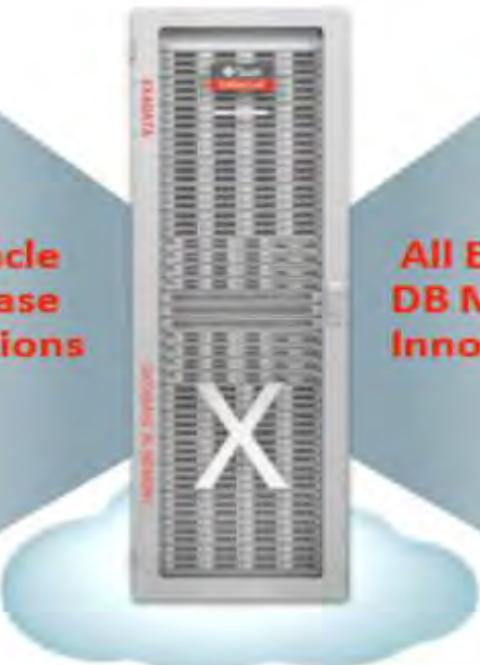
Exadata Cloud Machine: ALL Features

(Oracle's Juan Loaiza presentation on Exadata Cloud)

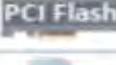
Exadata Cloud: Compatible, Scalable, Available, Secure
Decades of Database Innovation Proven at Millions of Mission-Critical Deployments

	Multitenant
	In-Memory DB
	Real Application Clusters
	Active Data Guard
	Partitioning
	Advanced Compression
	Advanced Security, Label Security, DB Vault
	Real Application Testing
	Advanced Analytics, Spatial and Graph
	Management Packs for Oracle Database

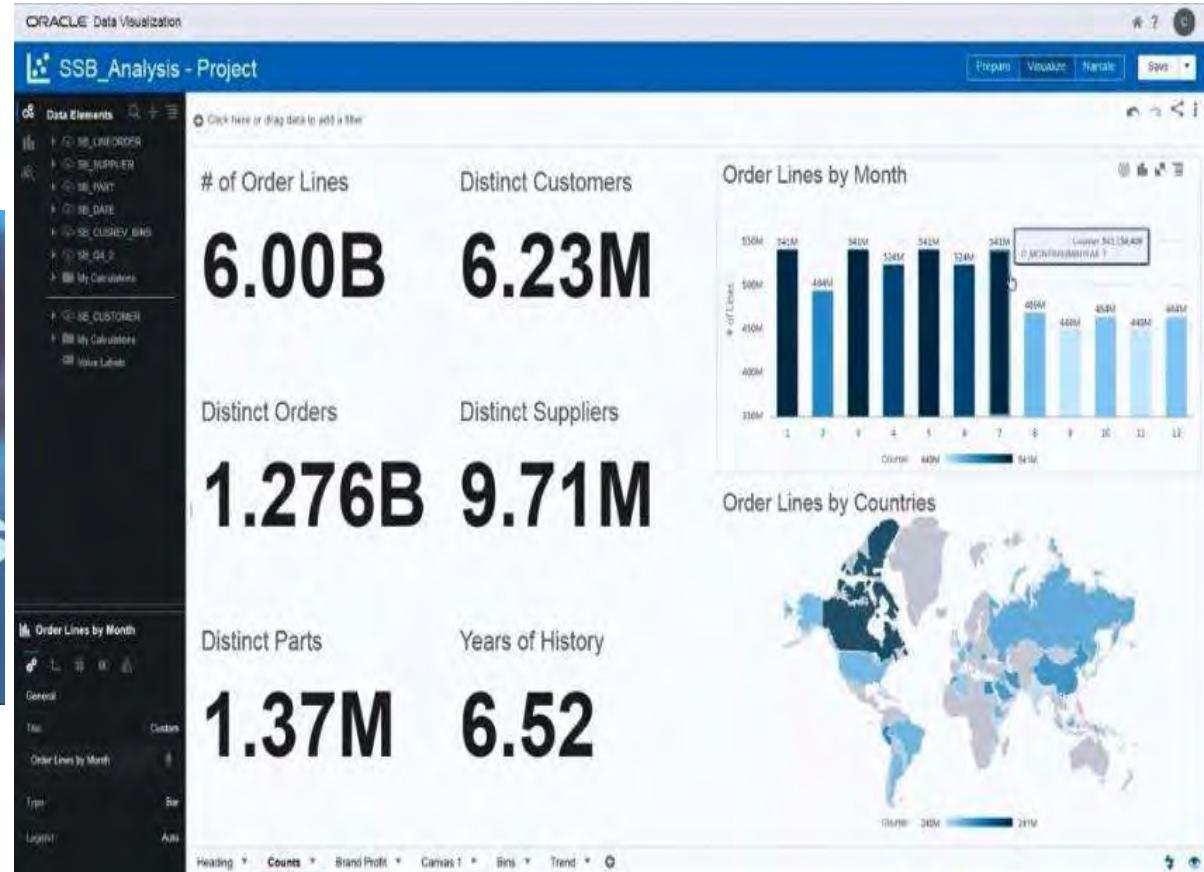
All Oracle Database Innovations



All Exadata DB Machine Innovations

	Offload SQL to Storage
	InfiniBand Fabric
	Smart Flash Cache, Log
	Storage Indexes
	Columnar Flash Cache
	Hybrid Columnar Compression
	I/O Resource Management
	Network Resource Management
	In-Memory Fault Tolerance
	Exafusion Direct-to-Wire Protocol

George Shows How to Mine ADW with Oracle Analytics



Many Graph Choices

Untitled - Oracle Data Visualization Desktop

You are viewing

ORACLE Data Visualization Desktop

Untitled - Project

Data Elements

- PROD_ID
- AMOUNT SOLD
- CHANNEL_ID
- CUST_ID
- PROMO_ID
- QUANTITY SOLD
- TIME_ID
 - Year
 - Quarter
 - Quarter of Year
 - Month
 - Month of Year
 - Week
 - Week of Year
 - Weekday
 - Day
 - Day of Year
 - Day of Month

AMOUNT SOLD by TIME_ID...

Type: Treemap

Legend: Auto

General

Title: Auto

Click here or drag data to add a filter

Treemap

Trellis Columns

Trellis Rows

Values (Box Size)

AMOUNT_SO...

Category (Boxes)

TIME_ID (Qua...

Color

TIME_ID (Year)

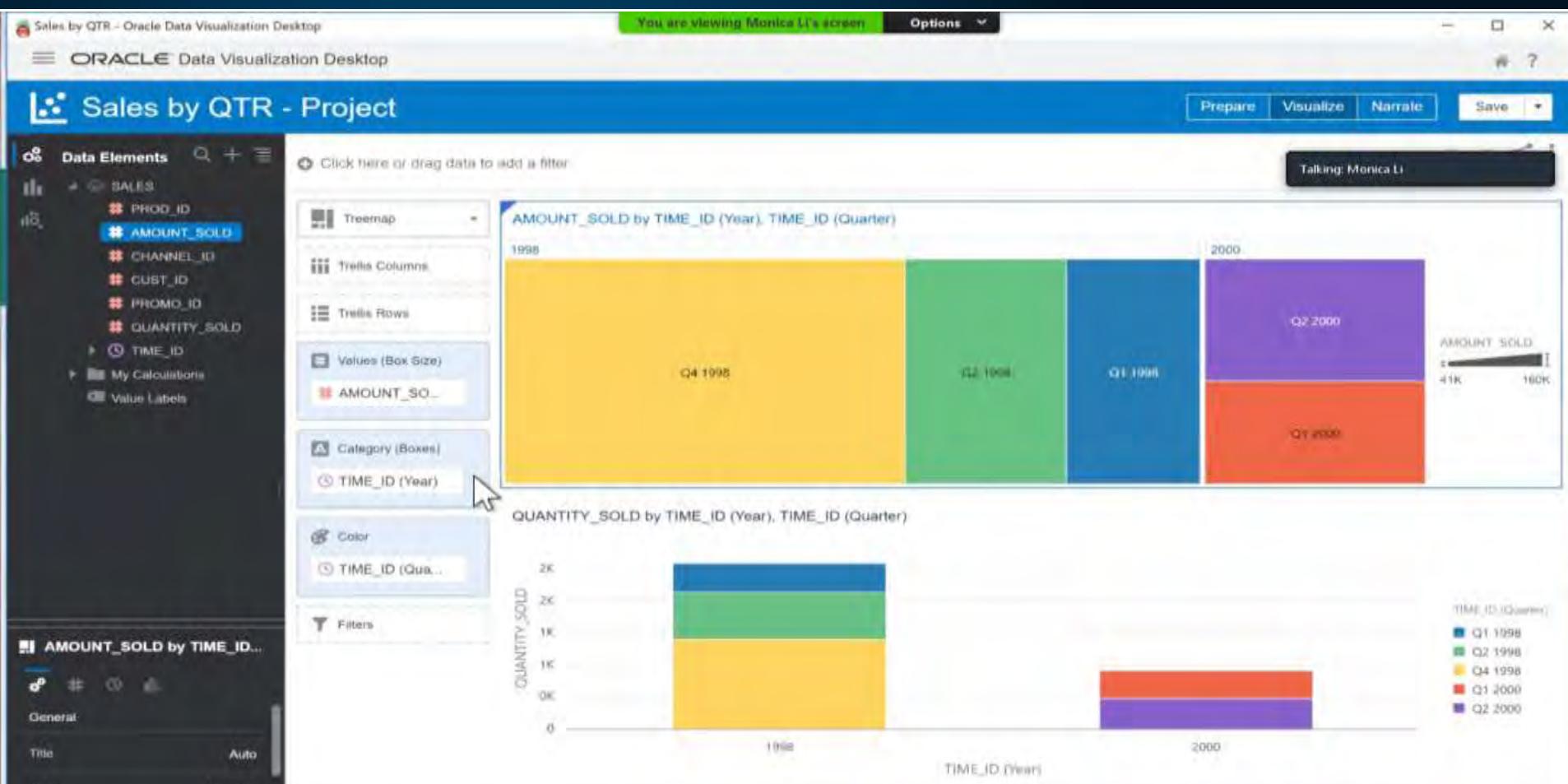
Filters

AMOUNT SOLD by TIME_ID (Q4 1990)

199



More Complex Treemap

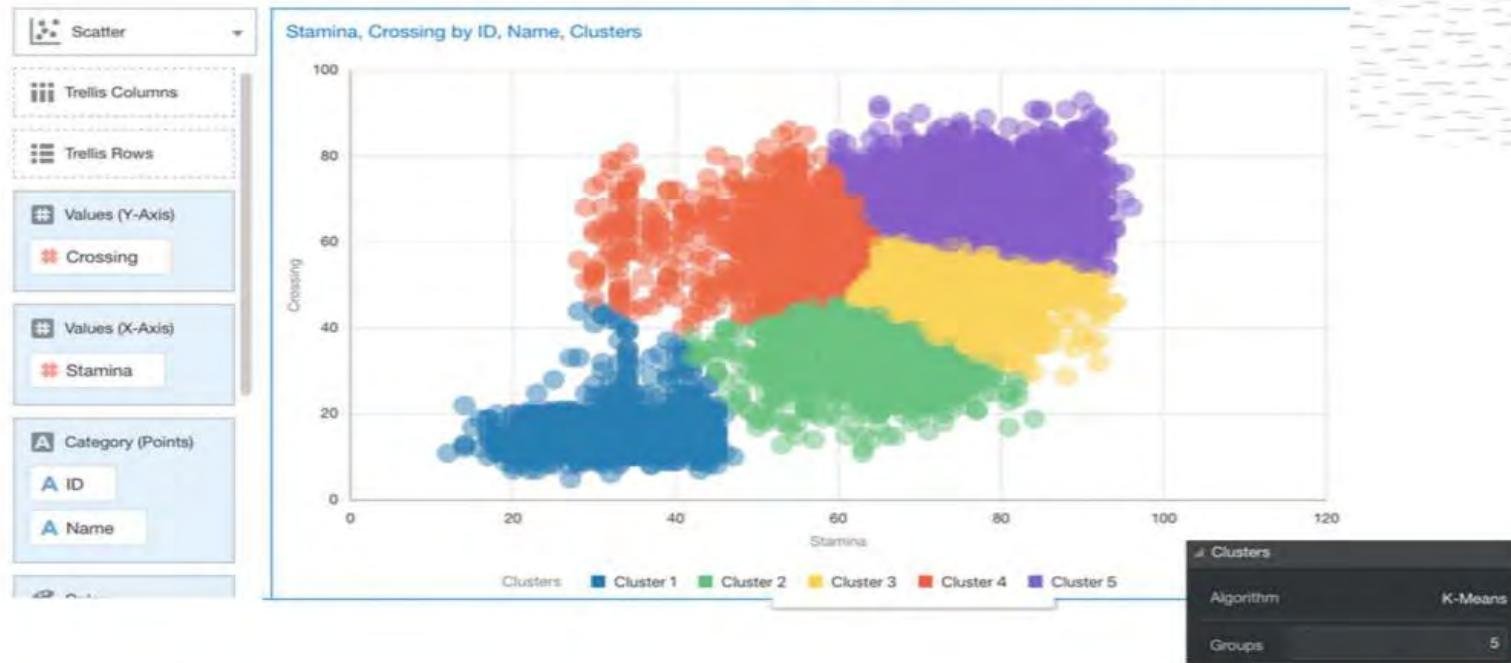


Much More Complex Available



Oracle Analytics Cloud (OAC) to Cluster Data

Easy Models



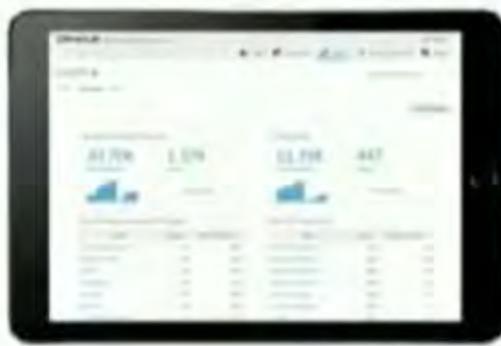
Oracle Analytic Summit 2020



Advanced Innovations to Leverage from Oracle:

Built-In Innovations to Drive Faster Transformation

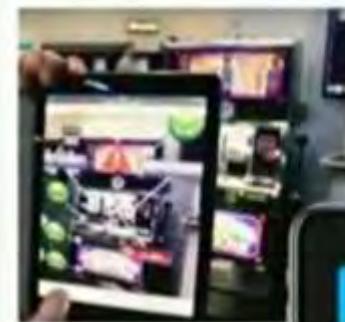
AI / ML Embedded into Apps



IoT Apps

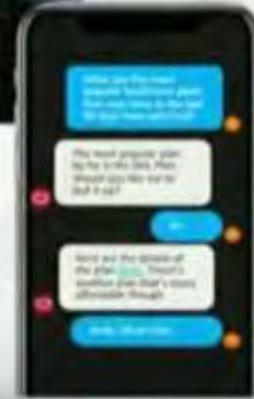


Human Interface



Augmented Reality

ChatBots



Future World – Enabling Innovation!

THE TWILIGHT ZONE

"You unlock this door with the key of imagination. Beyond it's another dimension - a dimension of sound, a dimension of sight, a dimension of mind. You're moving into a land of both shadow and substance, of things and ideas. You've just crossed over into the Twilight Zone."

— Rod Serling



64-Bit advancement of Directly addressable memory



	<u>Address Direct</u>	<u>Indirect/Extended</u>
<u>4 Bit:</u>	16	(640)
<u>8 Bit:</u>	256	(65,536)
<u>16 Bit:</u>	65,536	(1,048,576)
<u>32 Bit:</u>	4,294,967,296	
<u>64 Bit:</u>	18,446,744,073,709,551,616	

As the hardware physically implements the theoretical possibilities of 64-Bit, things will dramatically change.... moving from 32 bit to 64 bit will be like moving from 4 bit to 32 bit or like moving from 1971 to 2000 overnight.

Addressable Memory Growth

Shift

- 8-bit to 16-bit
- 16-bit to 32-bit
- 32-bit to 64-bit
- 64-bit to 128-bit

Increase (Result)

1 mph (Windows)

65K mph (Internet)

300T mph (Robotics/3D...etc.)

5T*T*B mph (Implants/4D)

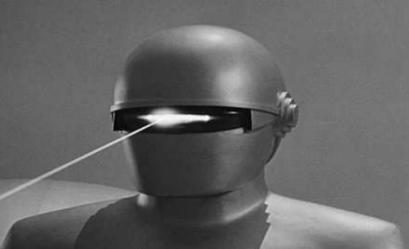
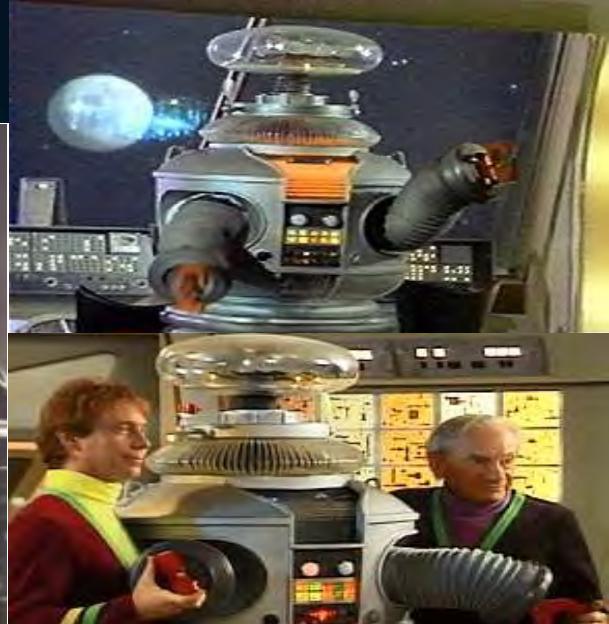
Experts In Focus

**Technology Feels Like It's Accelerating
— Because It Actually Is**

Here Come the Robots!



Robots We Grew up With...



Your Robotic Backup DBA ... *may be Your Clone!*



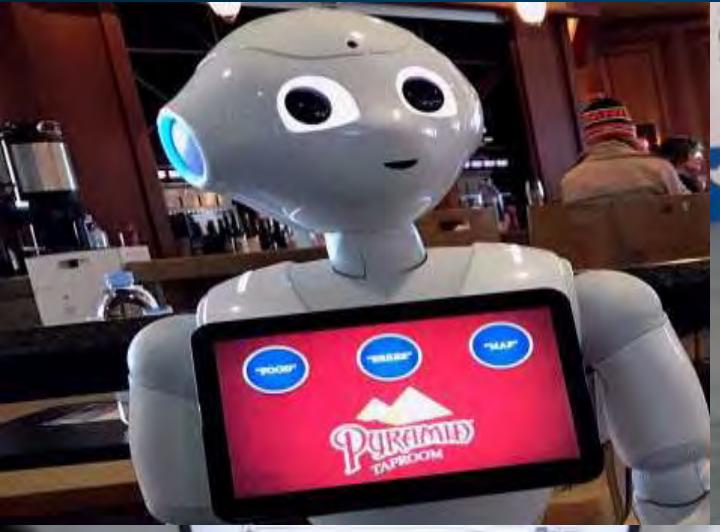
From Agnes with Love (*Computers try to help*)



Google Assistant	
Alexa	
Siri	
Bixby	



Service Robots at Work... 24x7



How to Connect Pepper to Oracle (so far)

How Pepper + Oracle are Connected



ORACLE[®]
MOBILE



ORACLE[®]
POLICY AUTOMATION

ORACLE[®]
Service Cloud

ORACLE[®]
MARKETING
CLOUD

ORACLE[®]
Commerce Cloud

ORACLE[®]
CONFIGURE, PRICE,
AND QUOTE

ORACLE[®]
SALES CLOUD

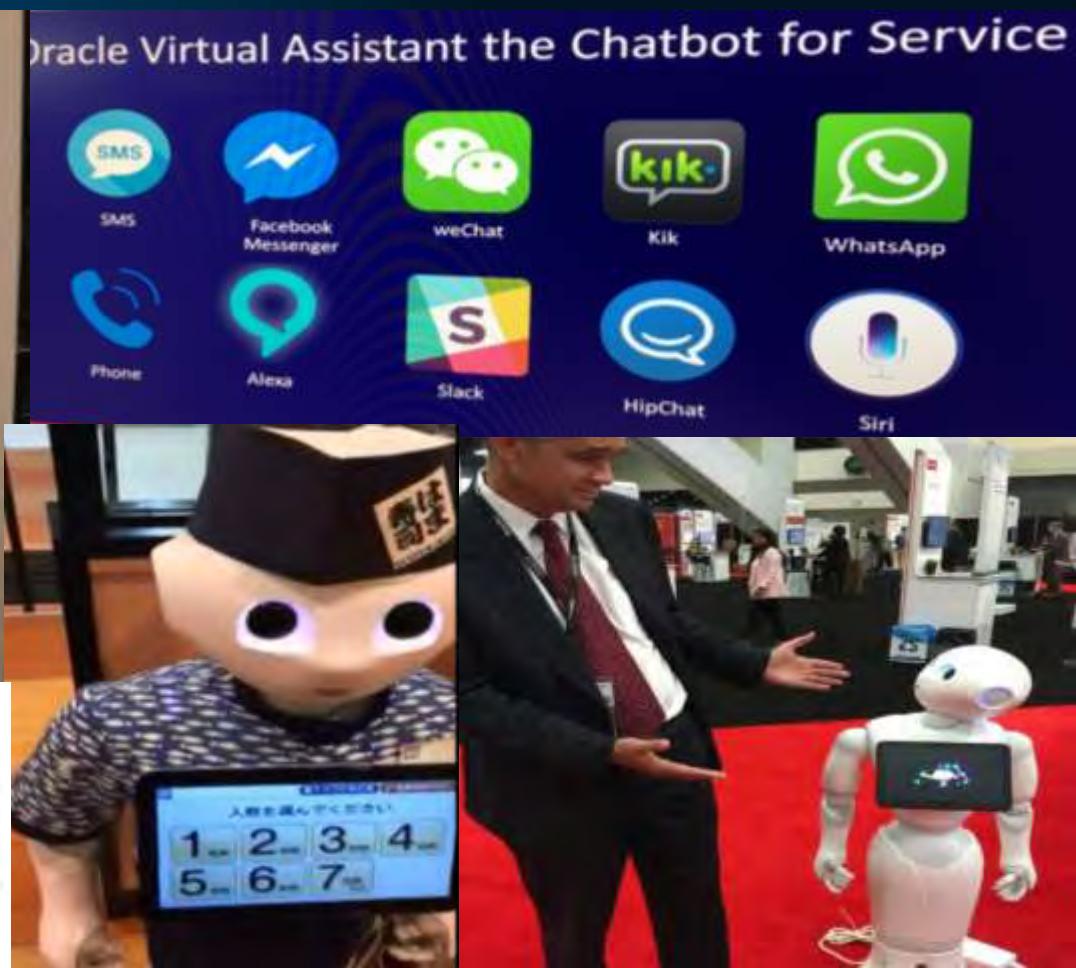
Meet Pepper



- Humanoid robot designed by SoftBank Robotics
- Able to recognize principal human emotions and tailor interactions
- Facial / object recognition
- Spatial awareness



Use Oracle Virtual Assistant with Robots - FYI Only!



Oracle Virtual Assistant Interface

The screenshot displays the Oracle Virtual Assistant Dashboard interface. At the top, there are four main tabs: Dashboard (selected), Analysis, Intents, and Administration. A 'Test' button and a user profile icon are also visible.

Now: Updated every 30 secs

- Conversations: 2 (blue)
- Issues: 3 (red)
- Average Exchange: 12% (red)

Intents: Updated every 30 secs

- Total: 348
- Published: 332 (green)
- Not Published: 16 (red)

This Week: April 8, 2018 to April 14, 2018

Most Popular Expressions:

- without issues (blue): sometimes, there is a blinking...
- with issues (red): I need to reset my password...
- without issues (blue): how are you...
- with issues (red): how do i reset my password...
- without issues (blue): where do i find the heart vide...
- with issues (red): my coffee maker makes weak esp...
- without issues (blue): coffee maker...
- with issues (red): can you breath...

Most Popular Intents:

- Sort By: Total
- Without Issues (blue): Can I talk to an agent? (299)
- With Issues (red): I need to reset my password (43)
- Without Issues (blue): My coffee makes makes weak expr...
- With Issues (red): I'm seeing error message m...
- Without Issues (blue): I'm still seeing the same error mes...
- With Issues (red): Where can I find the making a hot...

Issues: 16% (red)

90 Day Average:

The chart shows a fluctuating trend with several peaks, indicating the volume of issues over a 90-day period.

The Brain Center at Whipple's - *Robots Coming*

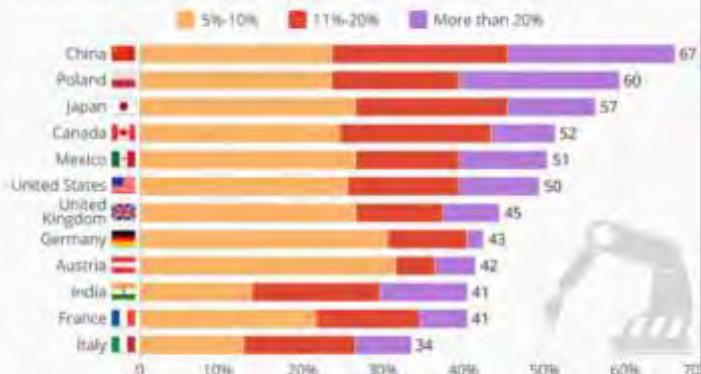


"Okay, I will destroy humans."

Robotics/Automation Impact to Jobs

How Advanced Robotics Will Impact Job Markets

Share of companies expecting a reduction in the number of employees



Low-Income Jobs at Highest Risk

Share of workers in occupations at high risk of automation



The New York Times

Uber's Self-Driving Trucks Hit the Highway, but Not Local Roads



Robotics/Automation Impact to Jobs



The Obsolete Man (Twilight Zone)



Autonomous Database – Replacing the DBA?



Rich Niemiec @RichNiemiec · Oct 2

I'll ask Pepper if she can tune my #database in 11 AM session on #innovation #iot #robotics #cloud at #oow17 #oug #viscosityna #oracleace



Are DBAs Obsolete?

Posted on February 20, 2014

Before we go any further, let me briefly answer "No Way!" OK... with that out of the way, let's move on.

Every so often, some industry pundit gets hot under the collar and says "Database administrators are obsolete" or they hear this, it makes me shake my head sadly because



BUREAU OF LABOR STATISTICS

Home ▾ Subjects ▾ Data Tools ▾ Publications ▾ Economic Releases ▾

OCCUPATIONAL OUTLOOK HANDBOOK

Occupational Outlook Handbook > Computer and Information Technology >

Database Administrators

Summary What They Do Work Environment How to Become One Pay Job Outlook

Summary

Quick Facts: Database Administrators

2017 Median Pay	\$87,020 per year \$41.84 per hour
Typical Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-Job Training	None
Number of Jobs, 2016	119,500
Job Outlook, 2016-26	11% (Faster than average)
Employment Change, 2016-26	13,700

What Database Administrators Do

Database administrators (DBAs) use specialized software to store and organize data, such as information and customer shipping records. They make sure that data are available to users

Good News: DBA +11% Increase (2016-2026)

Leveraging – DB, AI & Virtual Reality!



Virtual Reality



- > Immersion in virtual worlds
- > Total interaction with virtual
- > E.g. Oculus Rift



Mixed Reality



- > Virtual World integrated to reality
- > Interaction between reality and virtual
- > E.g. Microsoft HoloLens



Augmented Reality



- > Virtual on top of reality
- > Limited interaction with the virtual
- > E.g. Smartphones & tablets

Apple – Tech Innovator!



WATCH



03.21.16 | MOST INNOVATIVE COMPANIES
Why Apple Is The World's Most Innovative Company
In this exclusive interview with Apple CEO Tim Cook, he explains the culture and approach that led to iPhone X, Air Pods, Apple Watch 3, and HomePod.

3 Signs That Apple Has Lost Its Innovation Mojo
Peter Cettini



iPhone 5s
4 Inches



iPhone 6
4.7 Inches



iPhone 6
5.5 Inches



iPad mini
7.9 Inches



Amazon - Retail Innovator (since 1994)

AMAZON PRESENTS INNOVATION DAY

Innovations at 20% Off

DEAL OF THE DAY
£55.99
Price: £79.99 (30% off)
Ends in 12:24:21
Dashboard Camera Recorder with

DEAL OF THE DAY
£207.00
Price: £259.99 (20% off)
Ends in 12:24:21
Ookla Sinos 8 Black Cherry Mini PC

DEAL OF THE DAY
£39.99
Price: £49.99 (20% off)
Ends in 12:24:21
USENSE 2-in-1 Smart Tennis Wrist

DEAL OF THE DAY
£39.00
Price: £49.99 (20% off)
Ends in 12:24:21
Femometer Smart Basal Body

DEAL OF THE DAY
£134.99
List: £169.99 (21% off)
Ends in 12:24:21
Roli Lightpad Block

DEAL OF THE DAY
£169.00
Ends in 12:24:21
23% OFF or
Prime members
get 20% OFF

Home Services

You haven't submitted a service request yet.
If you ordered a service and already received an estimate, please check Your Orders. If you'd like to submit a project request to get estimates for a new project, you can shop for services below.

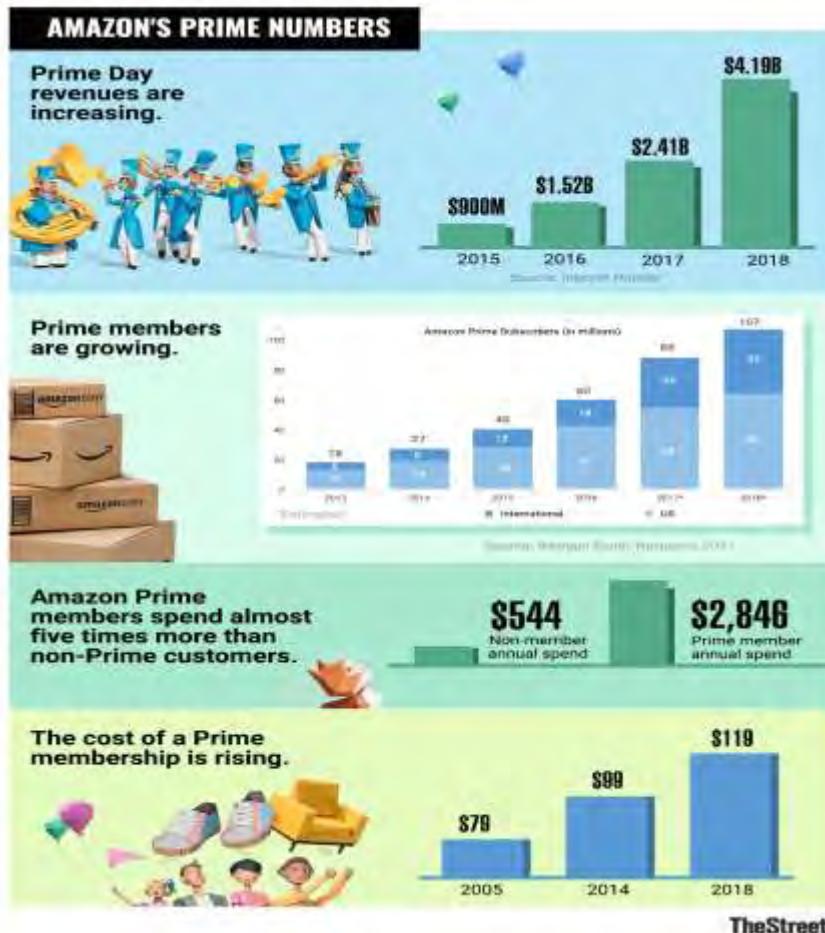
amazon home services

Book your next home project
Landscaping, TV setup, plumbing and more.

Hire a pro

Landscaping, TV setup, plumbing and more.

View Details



Google - Marketing Innovator (& Leveraging Data)!

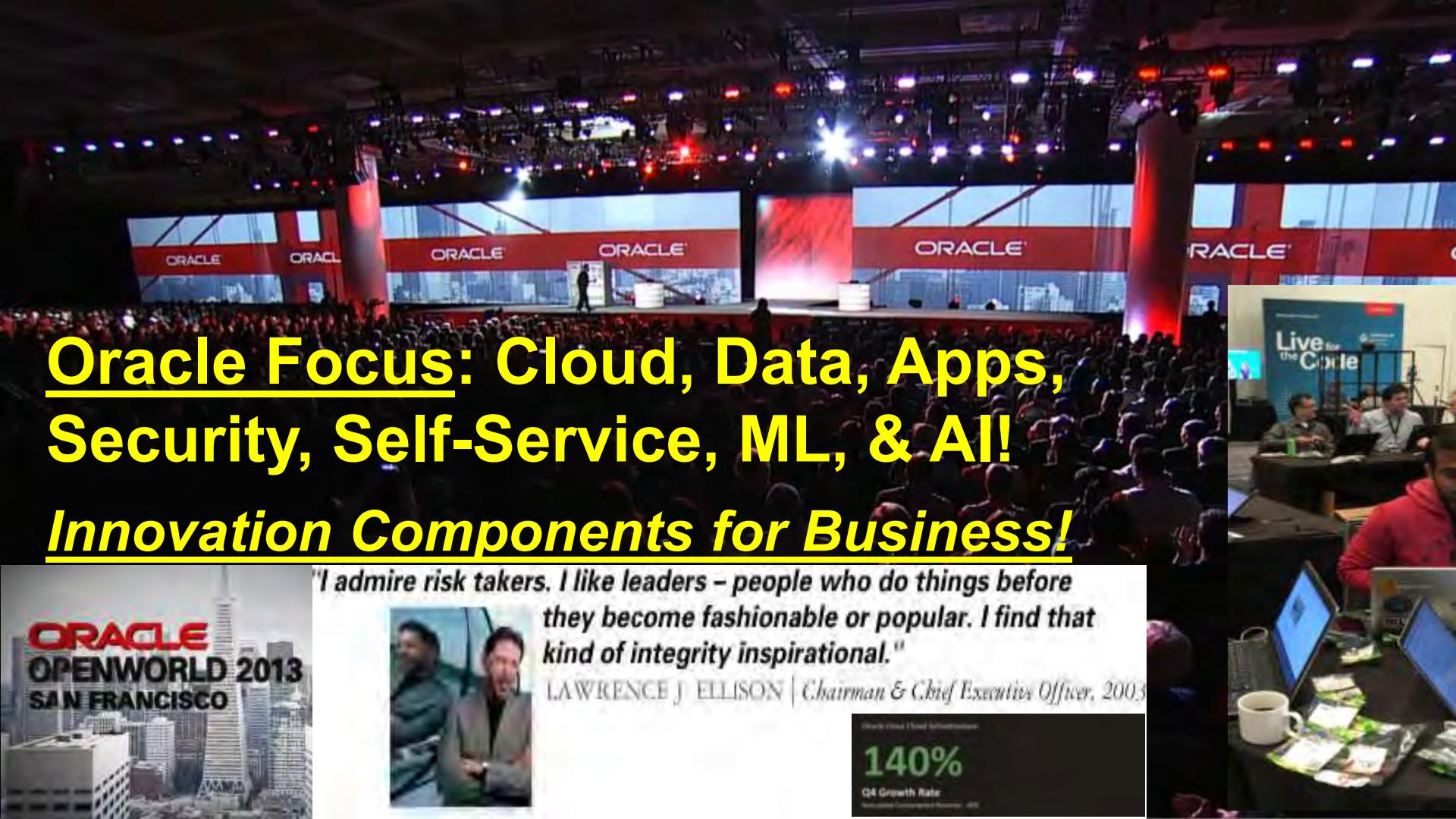


Oracle Focus: Cloud, Data, Apps, Security, Self-Service, ML, & AI!

Innovation Components for Business!

"I admire risk takers. I like leaders - people who do things before they become fashionable or popular. I find that kind of integrity inspirational."

LAWRENCE J. ELLISON | Chairman & Chief Executive Officer, 2003



Machine Learning: Oracle ML

READY-TO-GO

ORACLE

SaaS APPS w/EMBEDDED ML

Pre-built, packaged ML and
data-driven SaaS applications

READY-TO-WORK

ORACLE

AUTONOMOUS DATABASE

Embedded AI in Databases to
simplify enterprise
data management

Ready-to-Build

READY-TO-BUILD

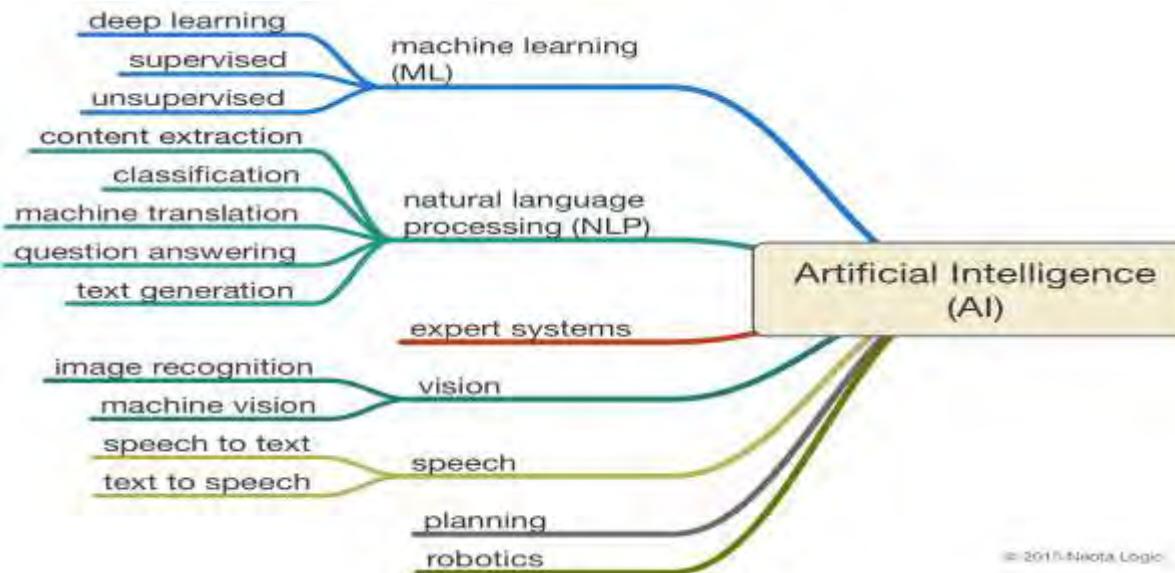
ORACLE

DATA SCIENCE PLATFORM

Complete platform to build and
support ML-powered
applications

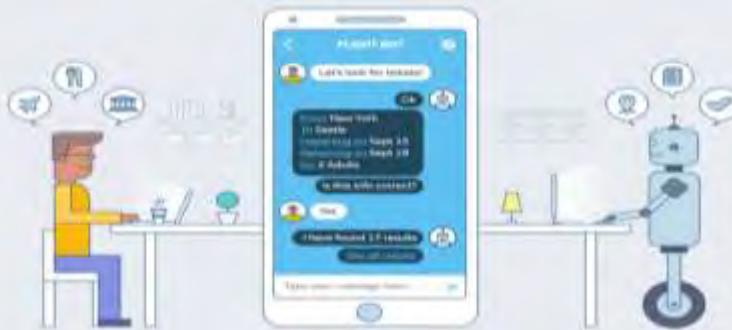
Oracle Chatbots & AI

Viscosity helps to Leverage NOW!



© 2015 Neota Logic

Oracle's AI Platform



OpenAI - Ten Years Later... the Baby Talks!

HOW LONG IT TOOK TOP APPS TO HIT 100M MONTHLY USERS

ChatGPT is estimated to have hit 100M users in January, 2 months after its launch.

Here's how long it took other top apps to reach that:

APP MONTHS TO REACH 100M GLOBAL MAUS.



About One Year Ago: ChatGPT 3.5 was Born ... the Baby Talks

ChatGPT 3.5 was Born ... the Baby Talks

About One Year Ago: ChatGPT 3.5 was Born ... the Baby Talks

About One Year Ago: ChatGPT 3.5 was Born ... the Baby Talks

- Developed by OpenAI: A Company Founded by Elon Musk 10 Years Ago
- Huge Artificial Neural Network: Multi-Billion Parameter Large Language Model (LLM)
- Trained on Language: Trillions of Data Elements ... Wikipedia + Public Internet
- ChatGPT 3.5 Talks: Generates Answers to Questions ... Engages in Conversations

A Big Surprise

ChatGPT's Scale Enabled it to Understand and Generate Language

Main Difference Between GPT-4 and ChatGPT

Unlike ChatGPT, GPT-4 can see and understand images, whereas the former is limited to text.

While ChatGPT had several issues upon its arrival, Microsoft claims that GPT-4 has been trained to avoid several malicious prompts.

ChatGPT

GPT-4 has arrived. It will blow ChatGPT out of the water **The Washington Post**

3/14/2023

ChatGPT was launched on November 30, 2022, by San Francisco-based OpenAI (the creator of the GPT series of large language models; DALL-E 2, a diffusion model used to generate images; and Whisper, a speech transcription model).



OpenAI Research Product Developers Safety Company Search Log In Sign Up

Introducing ChatGPT

We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.

Try ChatGPT → Read our白皮书



OpenAI

ChatGPT → DALL-E → API

Interact with our flagship language model in a conversational interface

Create realistic images and art from a description in natural language

Integrate OpenAI models into your application or business

what are the top 10 databases

As of my knowledge cutoff in September 2021, the top 10 databases were:

1. Oracle Database: A relational database management system (RDBMS) known for its scalability, security, and comprehensive features.
2. MySQL: An open-source RDBMS widely used for web applications due to its simplicity, reliability, and compatibility.
3. Microsoft SQL Server: A popular RDBMS developed by Microsoft, known for its strong integration with Windows Server and seamless integration with other Microsoft products.
4. PostgreSQL: An open-source object-relational database management system (ORDBMS) known for its extensibility, robustness, and compliance with SQL standards.
5. MongoDB: A NoSQL database that uses a flexible, document-oriented model and is known for its scalability, performance, and ease of use.
6. IBM Db2: A family of database management systems developed by IBM, known for its reliability, scalability, and support for a wide range of applications.
7. SQLite: A lightweight, file-based, embedded database engine that requires no separate server process and is commonly used in mobile and embedded systems.
8. Redis: An in-memory data structure store that can be used as a database, cache, or message broker. It is known for its high performance and flexibility.
9. Cassandra: A distributed and highly scalable NoSQL database designed for handling large amounts of data across commodity servers and providing high availability and fault tolerance.
10. Amazon DynamoDB: A fully managed NoSQL database service provided by Amazon Web Services.

Google's Bard



Bard Experiment

Reset chat

Bard Activity

FAQ

Updates

Help



Bethesda, USA

From your IP address - Update location

R

What are the top 10 databases

Here is a brief overview of each of the top 10 databases:

- Oracle is a commercial database that is known for its scalability and performance. It is often used by large enterprises that need to store and manage large amounts of data.
- MySQL is an open-source database that is known for its ease of use and flexibility. It is often used for web applications and other applications that need to be scalable and easy to maintain.
- Microsoft SQL Server is a commercial database that is known for its integration with other Microsoft products. It is often used by businesses that use Microsoft's Windows operating system and other Microsoft products.
- PostgreSQL is an open-source database that is known for its power and flexibility. It is often used for applications that need to store complex data or that need to be highly scalable.
- MongoDB is a NoSQL database that is known for its flexibility and scalability. It is often used for applications that need to store large amounts of unstructured data.
- Redis is a NoSQL database that is known for its speed and performance. It is often used for applications that need to store and manage large amounts of data in real time.
- IBM DB2 is a commercial database that is known for its scalability and performance. It is often used by businesses that need to store and manage large amounts of data.
- Elasticsearch is a search engine database that is known for its speed and scalability. It is often used for applications that need to search and index large amounts of data.
- Cassandra is a NoSQL database that is known for its scalability and fault tolerance. It is often used for applications that need to store and manage large amounts of data in a distributed environment.
- MariaDB is a fork of MySQL that is known for its stability and performance. It is often used as a replacement for MySQL when MySQL is not available or when a more stable database is needed.

Enter a prompt here



Transformers - Google, 2017

FYI

See: Illustrated Guide to Transformers Neural Network: YouTube step by step

Attention Is All You Need

Ashish Vaswani*
Google Brain
avaswani@google.com

Noam Shazeer*
Google Brain
noam@google.com

Niki Parmar*
Google Research
nikip@google.com

Jakob Uszkoreit*
Google Research
usz@google.com

Llion Jones*
Google Research
llion@google.com

Aidan N. Gomez* †
University of Toronto
aidan@cs.toronto.edu

Lukasz Kaiser*
Google Brain
lukasz.kaiser@google.com

Illia Polosukhin* ‡
illia.polosukhin@gmail.com

Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

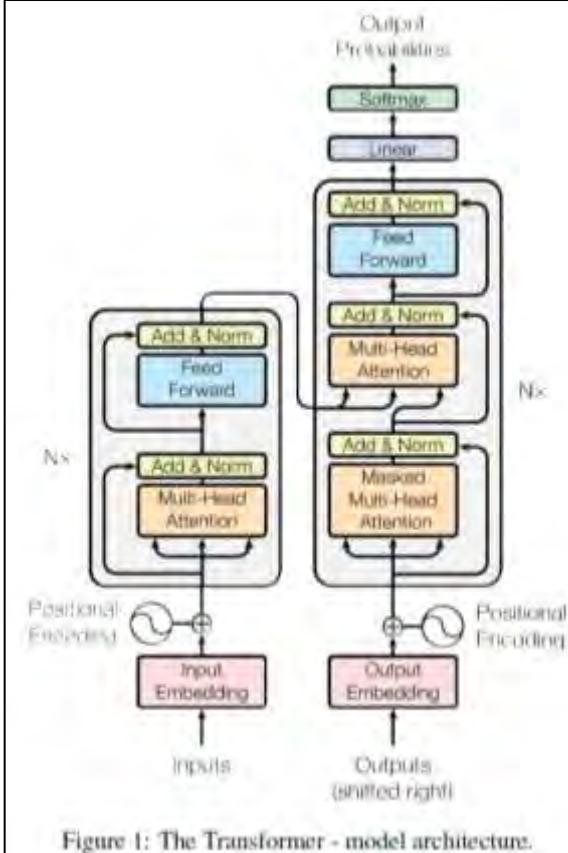


Figure 1: The Transformer - model architecture.

Outperformed
Recurrent NN,
GRU, & LSTM

Transformers
Have Longer
Term Memory

- Google BERT
- OpenAI GPT

Next word
learned tend
to much
earlier words
thru
Backprop

Leverages Parallelism to train model

Stanford (113 authors / 215 pgs.) on Foundation Models 2021/2022

On the Opportunities and Risks of Foundation Models

Rishi Bommasani^{*} Drew A. Hudson Ethan Adeli Russ Altman Simran Arora
Sydney von Arx Michael S. Bernstein Jeannette Bohg Antoine Bosselut Emma Brunskill
Erik Brynjolfsson Shyamal Buch Dallas Card Rodrigo Castellon Niladri Chatterji
Annie Chen Kathleen Creel Jared Quincy Davis Dorothea Demszky Chris Donahue
Mousa Doumbouya Esin Durmus Stefano Ermon John Etchemendy Kawin Ethayarajh
Li Fei-Fei Chelsea Finn Trevor Gale Lauren Gilespie Karan Goel Noah Goodman
Shelby Grossman Neel Guha Tatsunori Hashimoto Peter Henderson John Hewitt
Daniel E. Ho Jenny Hong Kyle Hsu Jing Huang Thomas Icard Saahil Jain
Dan Jurafsky Prajyusha Kalluri Siddharth Karamcheti Geoff Keeling Fereshte Khani
Omar Khattab Pang Wei Koh Mark Kraai Ranjay Krishna Rohith Kuditipudi
Ananya Kumar Faisal Ladha Mina Lee Tony Lee Jure Leskovec Isabelle Levent
Xiang Li Li Xuechen Li Tengyu Ma Ali Malik Christopher D. Manning
Sovir Mirchandani Eric Mitchell Zanele Munyikwa Suraj Nair Avanika Narayan
Deepak Narayanan Ben Newman Allen Nie Juan Carlos Niebles Hamed Nilforoshan
Julian Nyarko Giray Ogut Laurel Orr Isabel Papadimitriou Joon Sung Park Chris Piech
Eva Portelance Christopher Potts Aditi Raghunathan Rob Reich Hongyu Ren
Frieda Rong Yusuf Roehani Camilo Ruiz Jack Ryan Christopher Ré Dorsa Sadigh
Shiori Sagawa Keshav Santhanam Andy Shih Krishnan Srinivasan Alex Tamkin
Rohan Teori Armin W. Themas Florian Tramèr Rose E. Wang William Wang Bohan Wu
Jiajun Wu Yuhuai Wu Sang Michael Xie Michihiro Yasunaga Jiaxuan You Matei Zaharia
Michael Zhang Tianyi Zhang Xikun Zhang Yuhui Zhang Lucia Zheng Kaitlyn Zhou
Percy Liang[†]

Center for Research on Foundation Models (CRFM)
Stanford Institute for Human-Centered Artificial Intelligence (HAI)
Stanford University

AI is undergoing a paradigm shift with the rise of models (e.g., BERT, DALL-E, GPT-3) trained on broad data (generally using self-supervision at scale) that can be adapted to a wide range of downstream tasks. We call these models foundation models to underscore their critically central yet incomplete character. This report provides a thorough account of the opportunities and risks of foundation models, ranging

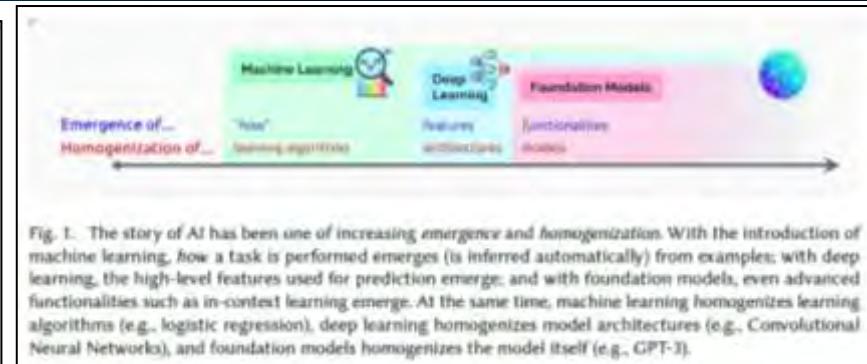
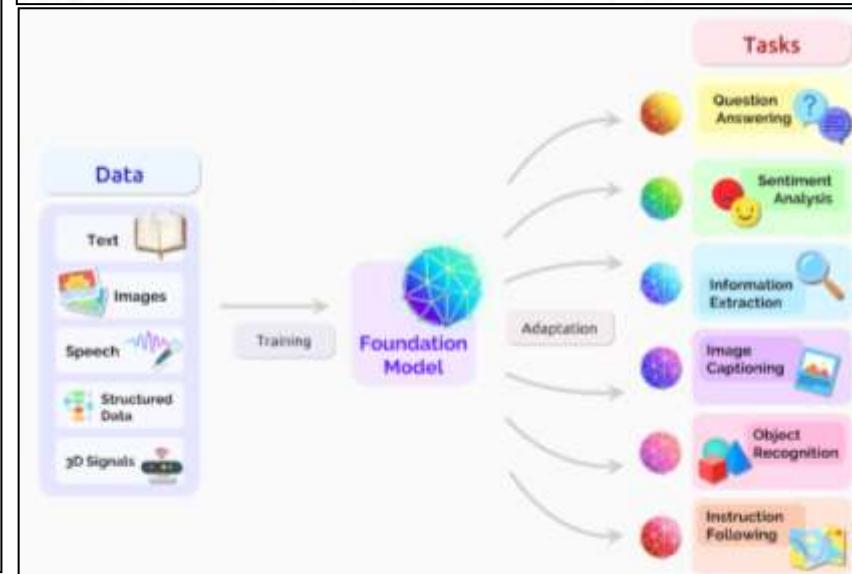


Fig. 1. The story of AI has been one of increasing *emergence* and *homogenization*. With the introduction of machine learning, *how* a task is performed emerges (is inferred automatically) from examples; with deep learning, the high-level features used for prediction emerge; and with foundation models, even advanced functionalities such as in-context learning emerge. At the same time, machine learning homogenizes learning algorithms (e.g., logistic regression), deep learning homogenizes model architectures (e.g., Convolutional Neural Networks), and foundation models homogenizes the model itself (e.g., GPT-3).



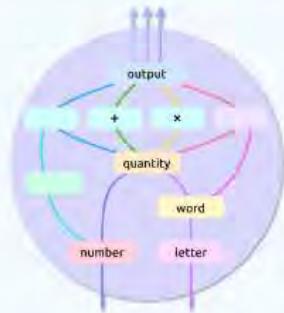
From Stanford Paper

124

Center for Research on Foundation Models (CRFM)

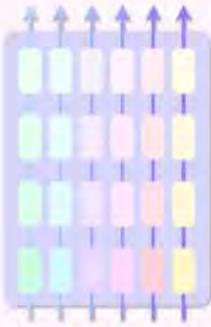
One Model

A finite number of **generalizable model mechanisms** are combined to produce behaviors across tasks.



Many Models

For each task, distinct model mechanisms are used to produce behaviors; akin to a **large collection of individual expert models**.



On the Opportunities and Risks of Foundation Models

4.7 Security and privacy

Authors: Florian Tramér*, Rohith Kuditipudi*, Xuechen Li*

Large Uncurated Datasets

- ✓ Source of robustness
- ✗ Increased risk of poisoning



Foundation Model

- ✓ Security choke point
- ✗ Single point-of-failure
- ✗ Increased attack surface



Downstream Applications

- ✓ Cheaper private learning
- ✗ Function creep



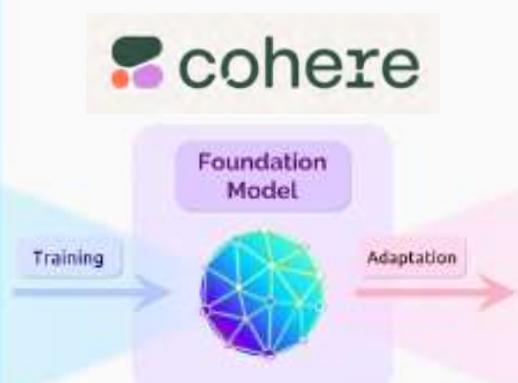
Fig. 20. Risks and opportunities raised by foundation models for security and privacy of ML systems.

Fig. 23. The one model–many model nature of foundation models: A central interpretability question is to understand where a foundation model lies on the spectrum between *one model* and *many models*. As one model, behavior can be made interpretable by identifying and characterising the finite number of generalizable model mechanisms used to produce behaviors across tasks (e.g., mechanisms that assign meaning to words, compare quantities, and perform arithmetic). As many models, explanations of model behavior in one task are not necessarily informative about behavior in other tasks, thus requiring the independent study of behavior in each task.

Will Businesses of the Future just be a Single Foundation Model to do all Tasks? (my own question)

From Stanford Paper (Example Application)

Section on Healthcare & Biomedicine



ORACLE®



Vector Search

Imagine a house-hunting app that helps customers find houses for sale that are similar to a picture the customer uploads



The distance between the vectors is proportional to their semantic similarity



Create table with Vector Data Type & Blob

```
CREATE TABLE house_for_sale (house_id      number,  
                             price        number,  
                             city         varchar2(400),  
                             house_photo blob,  
                             house_vector vector  
);
```

Find houses that are similar to this picture
and match the customer's preferred city
and budget



```
SELECT ...  
FROM   house_for_sale  
WHERE  price <= (SELECT budget      FROM customer ...)  
AND    city  in (SELECT search_city FROM customer ...)  
ORDER BY vector_distance(house_vector, :input_vector);
```

AI Vector search Preview!



Announcing:
AI Vector Search in
Oracle Database 23c

*Sign up
for Preview Now*



The Oracle AI Stack



Business applications, Oracle SaaS portfolio

ORACLE
Corner

ORACLE
NETSUITE

ORACLE
Acumatica



AI services



Digital Assistant



Speech



Language



Vision



Document
Understanding



Anomaly Detection



Forecasting



OCI Generative AI

Machine learning services



OCI Data Science



ML in Oracle Database



MySQL Heatwave



OCI Data Labeling

Data Platform

AI infrastructure



Compute bare metal instances and VMs



Cluster networking



Block, object, and file storage; HPC filesystems

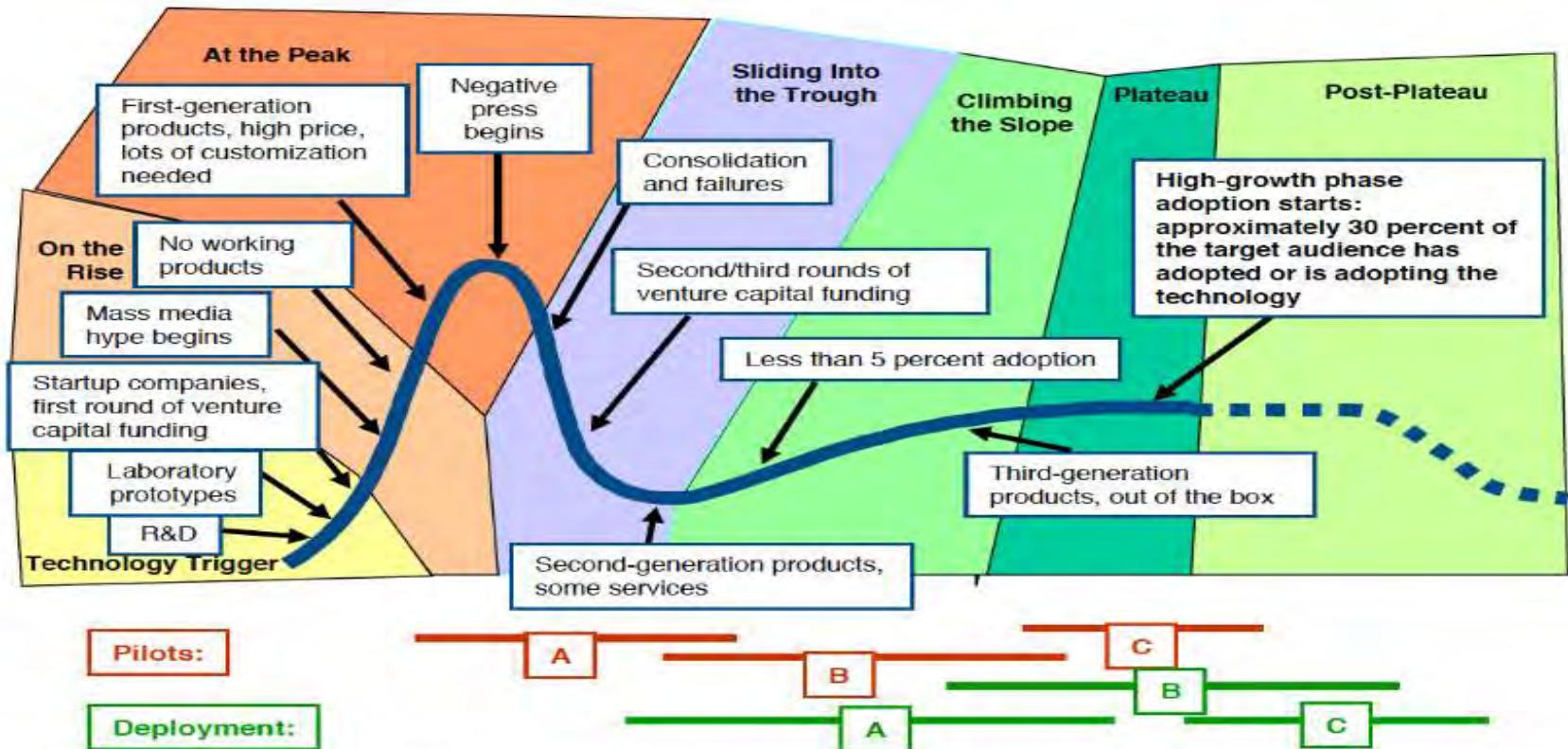


GPUs, OCI Supercluster

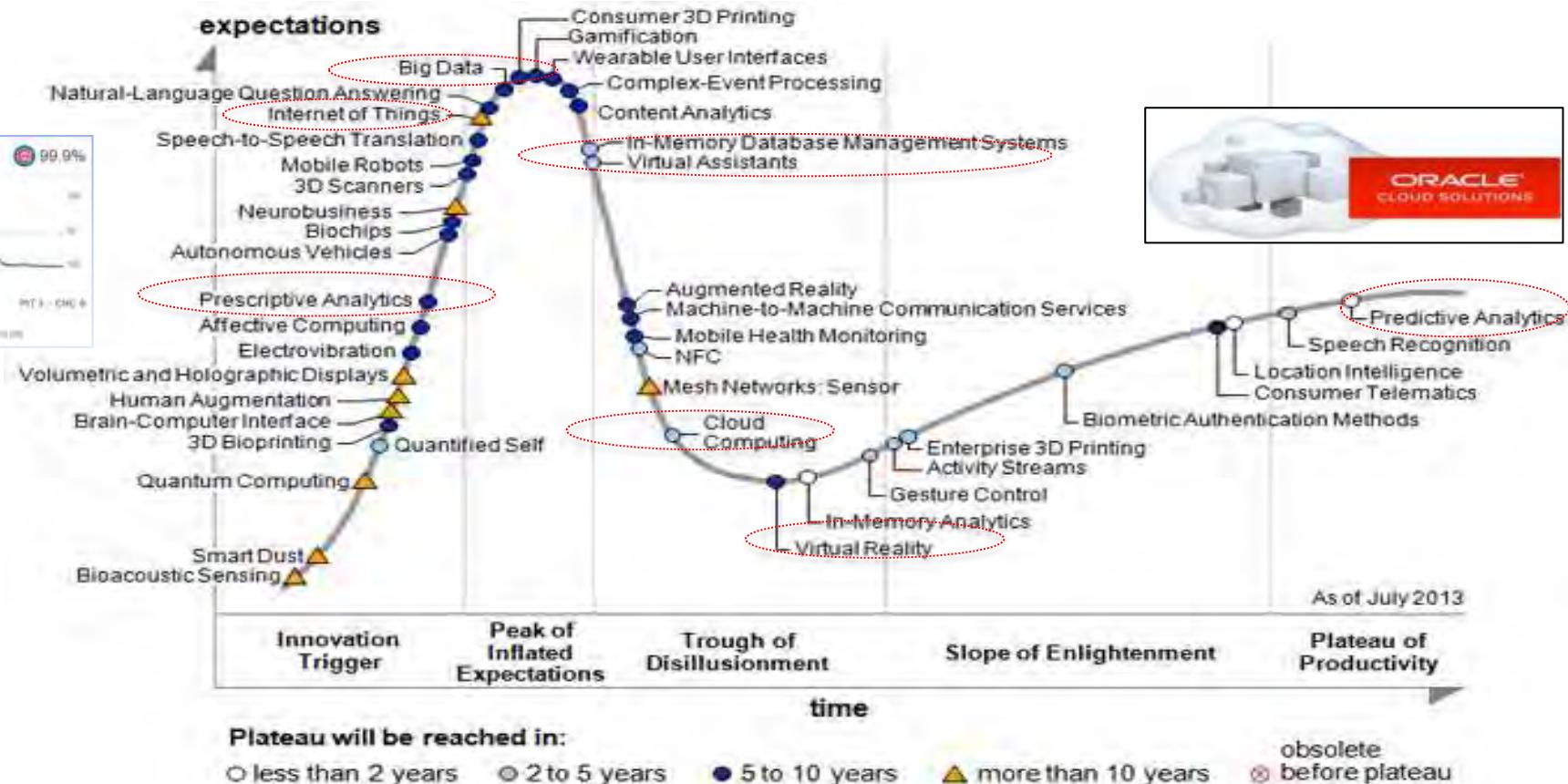


NVIDIA
A100

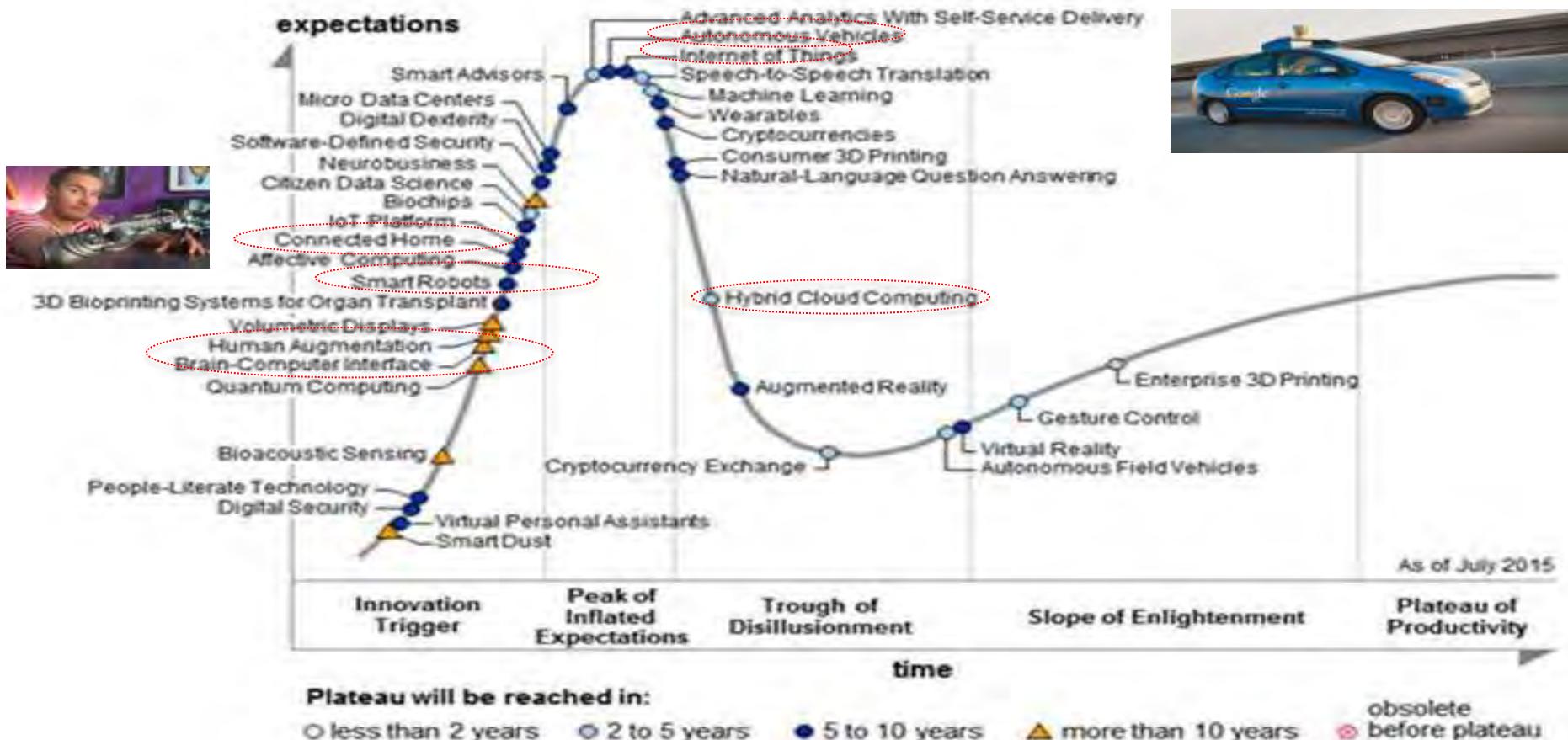
Tech Trends - Gartner Hype Cycle



Tech Trends - Gartner Hype Cycle 2013: All about Tech ...

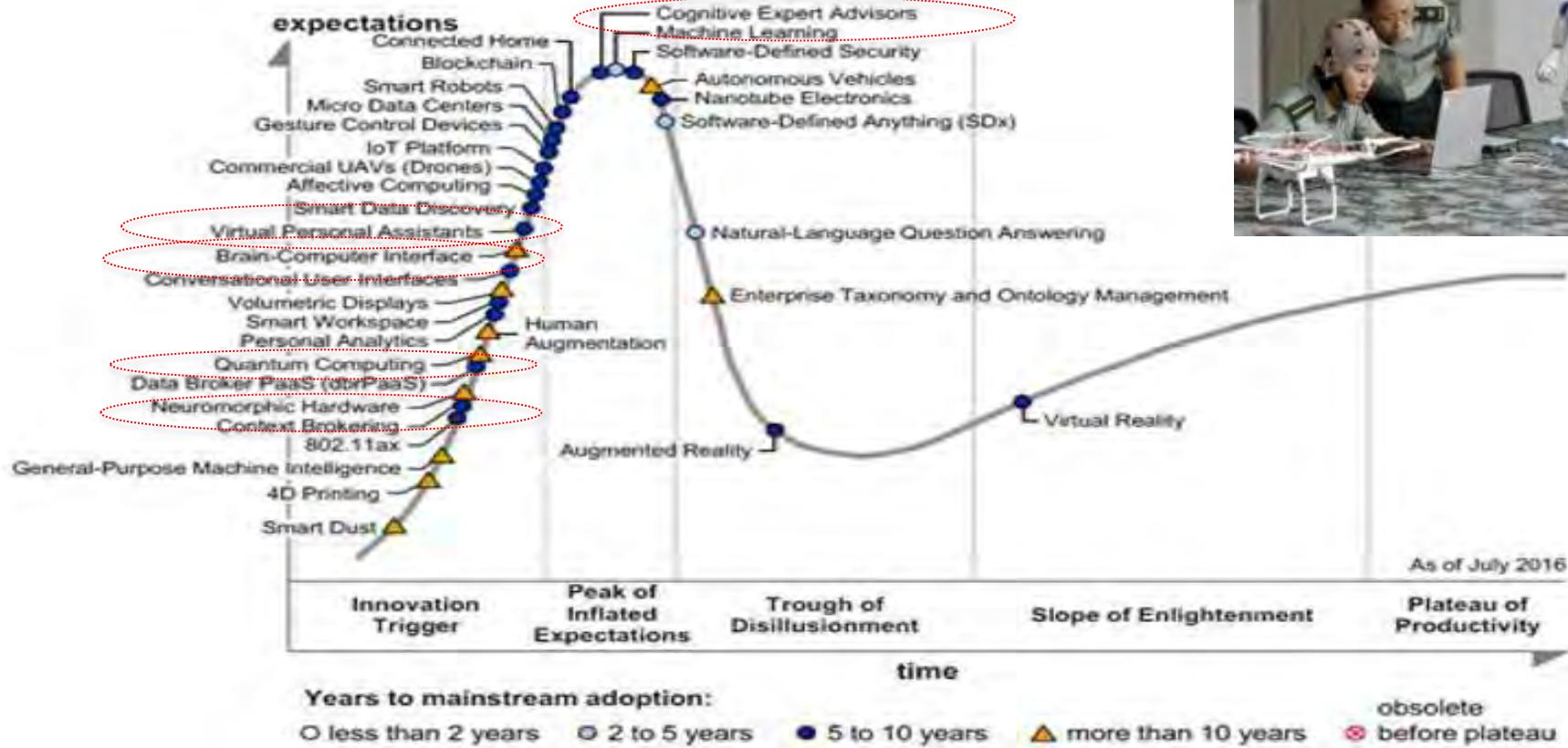


Tech Trends - Gartner Hype Cycle 2015: All about Robotics ...

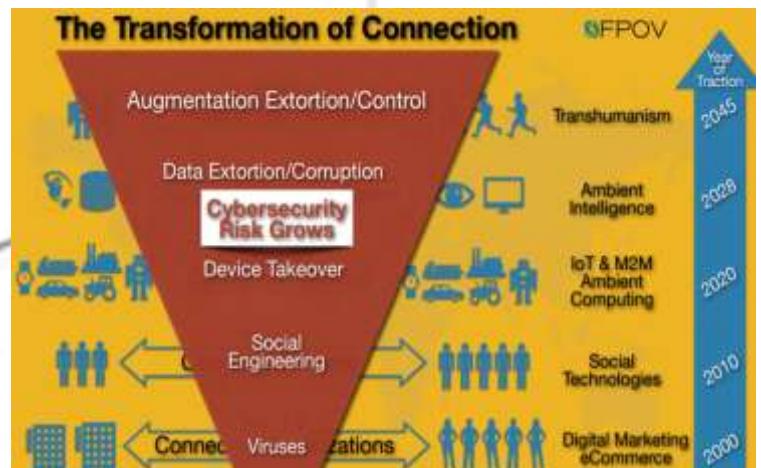
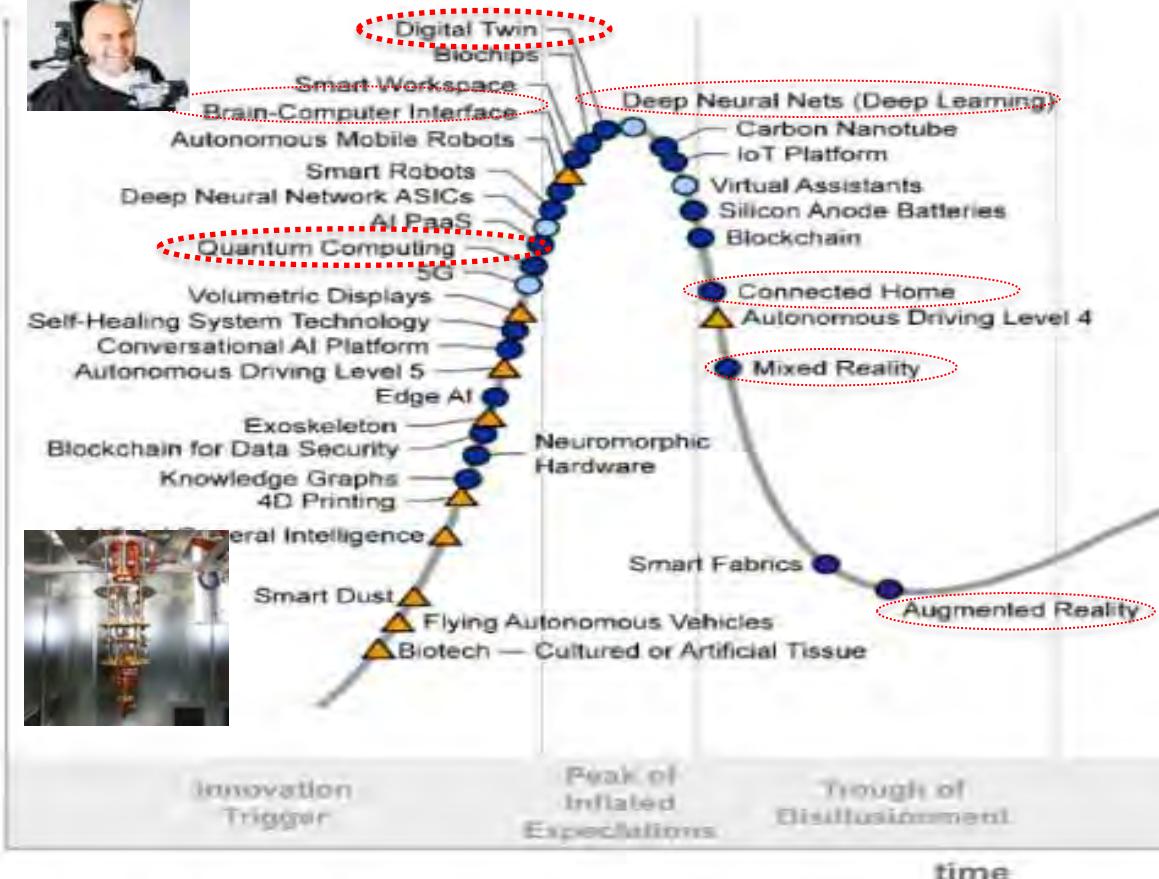


Gartner Hype Cycle July, 2016

All about Implants & the Twilight Zone



Gartner Hype Cycle August 2018 - All about Robotics ... All about Tech Creating a New Reality (just 5 years later!)



Gartner 2020 hype cycle



Plateau will be reached:

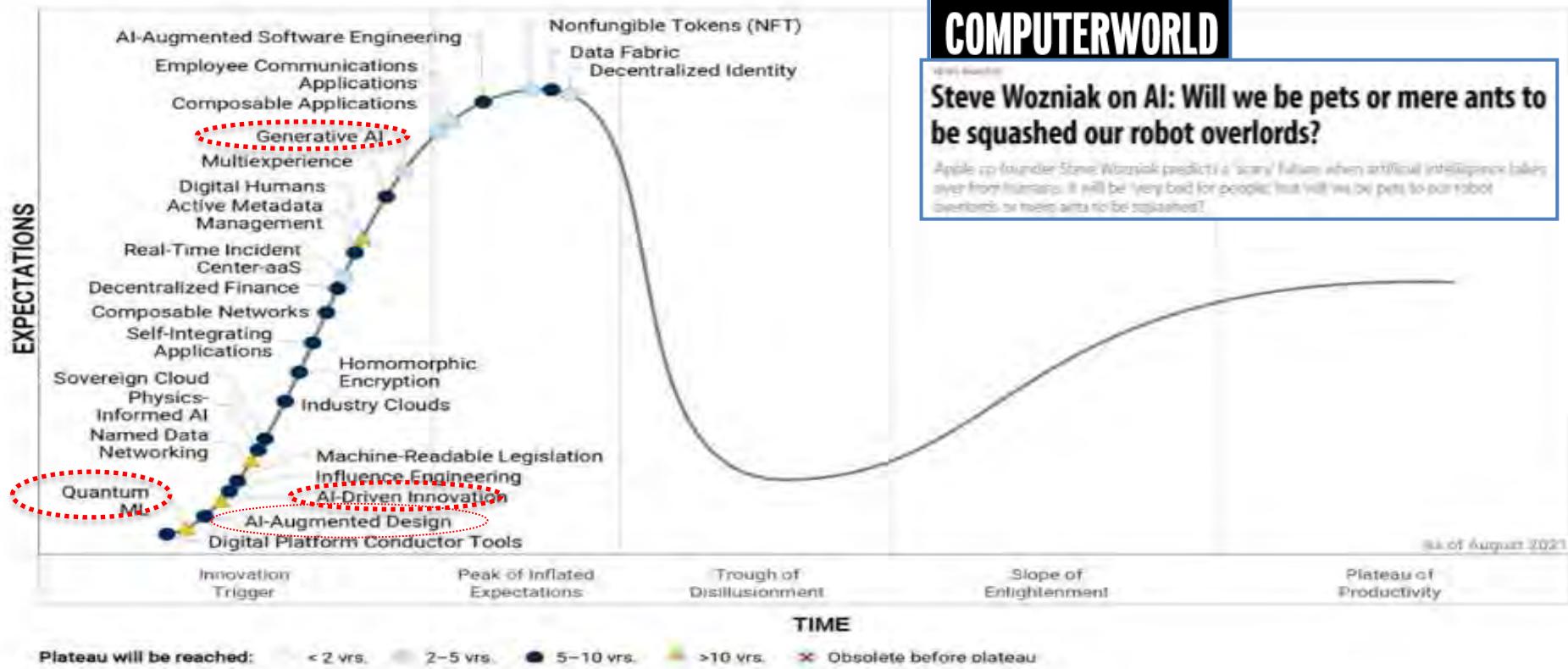
- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ more than 10 years
- ✖ obsolete before plateau



Consumers also want help from a robot

Gartner 2021 hype cycle for Emerging Tech

Hype Cycle for Emerging Technologies, 2021



COMPUTERWORLD

Steve Wozniak on AI: Will we be pets or mere ants to be squashed our robot overlords?

Apple co-founder Steve Wozniak predicts a 'scary' future where artificial intelligence takes over from humans. It will be 'very bad for people' but will we be pets to our robot overlords, or mere ants to be squashed?

Final Thoughts... world changing fast!

“Those who use things of the world should not become attached to them. For the world in its present form is passing away.”

1 Corinthians 7:31



Star Trek

- Communicator - Motorola Flip Phone
- Phaser - EPM or Stun Gun / Taser
- Tablets (Medical) - Tablet Computers
- Tricorders - Many Medical Devices (below)
- Translators - Google Translate (others)
- Tractor Beam - MIT has it in concept
- Telepresence - Zoom Virtual Conferences
- Geordi's Visor - Robotic Eyes / Implants
- Communicator Badges - Many Security Badges
- Food Replicator - 3D Printer
- Holodeck - VR
- Teleportation - Quantum Entanglement
- Big Screen TV - Everyone has it
- Hands Free Phone - Bluetooth headset / Airpods



MouthLab



Hololens VR Apps Above



Microsoft working on Holodeck

Final Thoughts... Catch your Ride!



“Things may come to those who wait, but only the things left by those who hustle.”

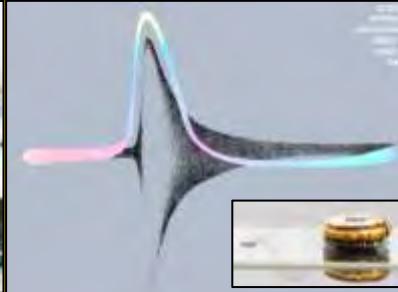
— Abraham Lincoln



The Digital Transformation Ahead

Digital Transformation 2000 to 2050

A historically significant
change in humanity...



Gerd



Disconnected
The Dark Ages

Using
Digital

Wearing
Digital

Implanting
Digital

The Hive
Mind

ADB Gives You Time Enough at Last



Summary – Prepare now for the Future!

- ❑ Innovation, Autonomous & the Cloud
- ❑ A Robot May Not Look Like One...
- ❑ Autonomous Transaction Processing (ATP)
- ❑ Autonomous Data Warehouse (ADW)
- ❑ Machine Learning & Data Visualization Desktop
- ❑ Next: Robots & the Future Ahead

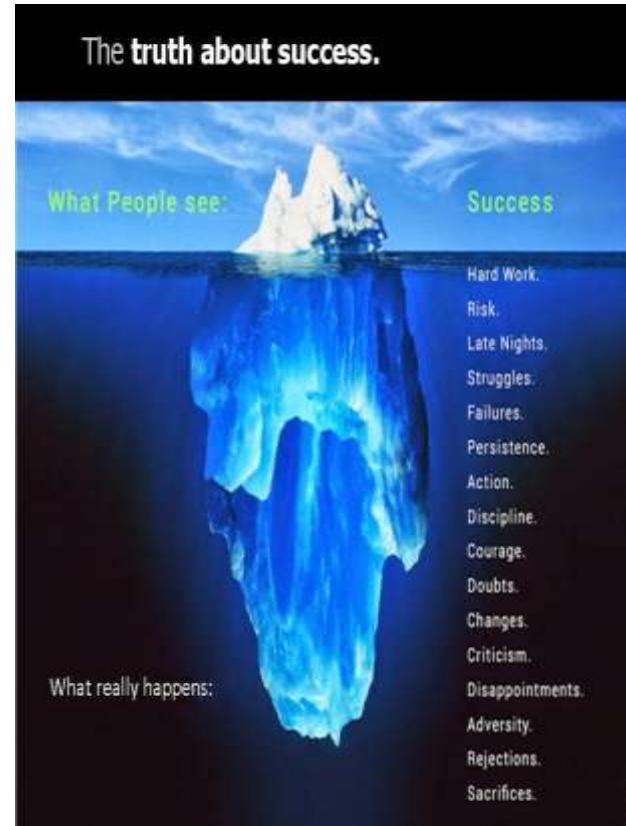


*“We make a Living by what we get.
We make a Life by what we give.”*

-Sir Winston Churchill

Conf42: DevOps 2024

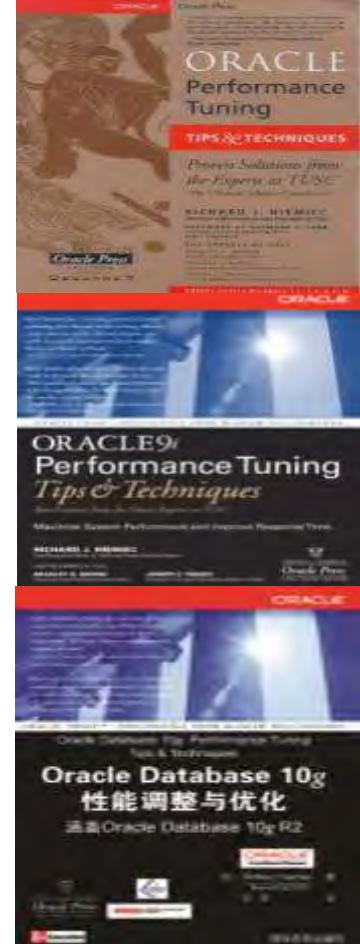
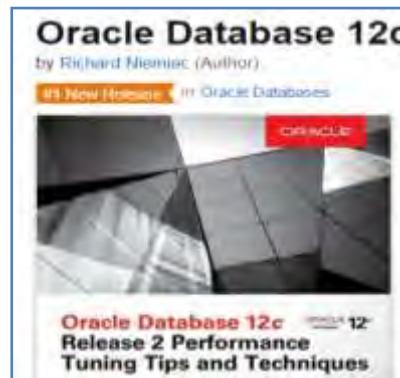
January 25 2024 - premiere 5PM GMT



Smartsalesolutions.net

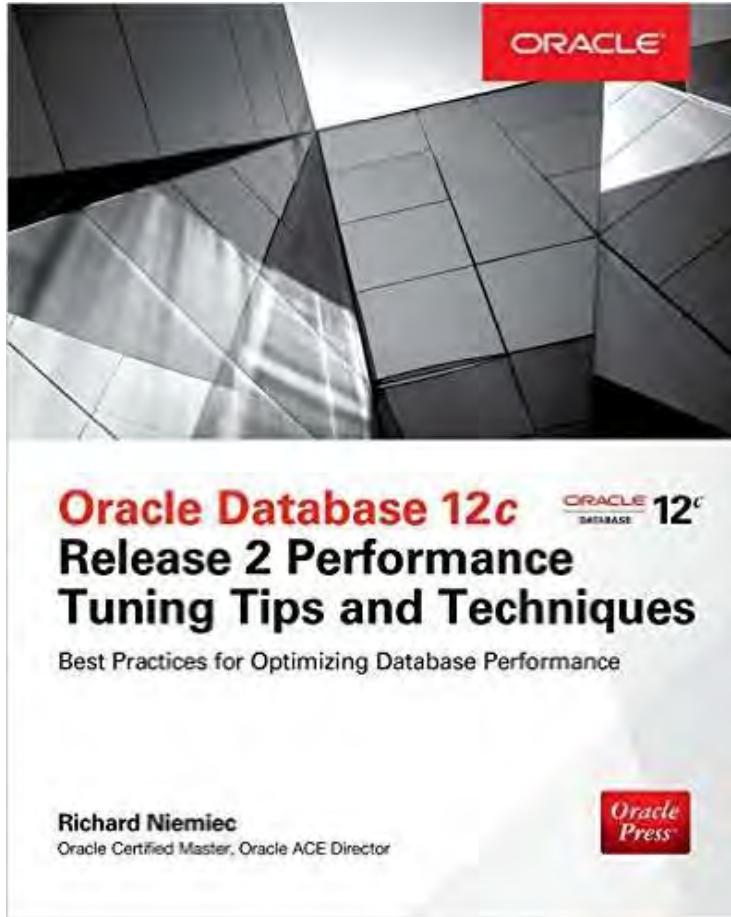
For More Information

- *Oracle 12c Release 2 Performance Tuning Tips & Techniques*; Richard J. Niemiec; Oracle Press (Available now – 3/14/2017)



“If you are going through hell, keep going” - Churchill

12c R2 Book – Available Now!



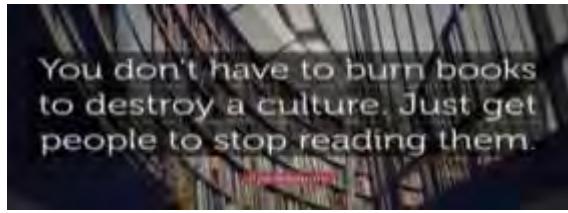
Top New Release

A screenshot of the Amazon product page for the book. The top navigation bar shows the Amazon logo and a search bar with "niemiec". Below the navigation, there are links for "Departments", "Books", "Advanced Search", and "New Releases". The main title "Oracle Database 12c" is displayed in large bold letters, followed by "by Richard Niemiec (Author)". A yellow banner indicates it is a "#1 New Release in Oracle Databases". The book cover image is shown again, and the full title and subtitle are repeated below it, along with the "Best Practices for Optimizing Database Performance" tagline.

References



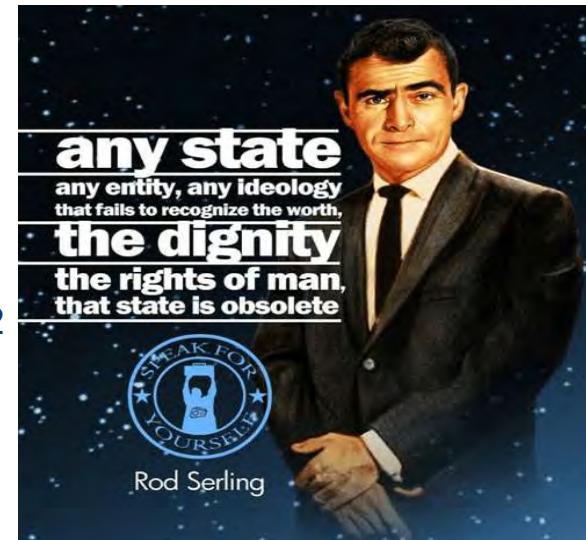
- The Emerging Technology Roadmap, Scott Klososky
- Futurist Gerd Leonhard The Futures Agency, Technology vs. Humanity, Gerd Leonhard, oracle.com & Juan Loiza presentations, amazon.com, smartcitiescouncil.com, youtube.com, business coach, libelium.com, monetate, en.wikipedia.org, Netflix, Black Mirror, cooking-hacks.com, hometoys.com, FPOV, huffingtonpost.com, theguardian.com, nationalgeographic.com, newscientist.com, enswmu.blogspot.com, dailymail.co.uk, FutureRobot, theguardian.com, thinkhealthwireless.blogspot.com, ge.com, cmswire.com, runningsupplement.co.uk, quickmeme.com, nike.com, thisiswhyimbroke.com, businessinsider.com, slideshare.com, forrester.com, spiceworks.com, mwaintel.com, humancapitalist.com, wired.com and Wired Magazine, shodanhq.com, developer.nokia.com, extremetech.com, Getty Images, & any other company products are the property of their respective companies.



Copyright Information

- Neither the Viscosity nor the author guarantee this document to be error-free. Please provide comments/questions to rich.niemiec@viscosityna.com & richniemiec@gmail.com. I'm always looking to improve!
- Rich Niemiec ©2022. This document cannot be reproduced without expressed written consent from Rich Niemiec, but may be reproduced or copied for presentation and conference use.
- References include Rich Niemiec's Exadata Presentation & Oracle 12cR2 Database Performance Tuning Tips & Techniques book, www.oracle.com, en.wikipedia.org, slashgear.com, gifsoup.com, www.amazon.com, Tech Crunch, www.roalta.com, The Twilight Zone, Information Week, Gartner, Computerworld, & Oracle OpenWorld

Contact Information: richniemiec@gmail.com

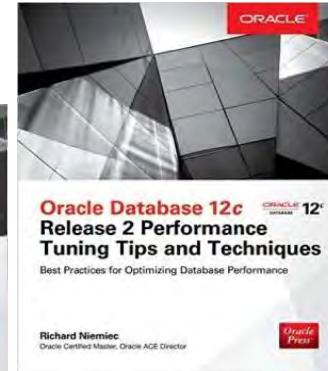


**THERE IS A FIFTH DIMENSION
BEYOND THAT WHICH IS KNOWN TO
MAN. IT IS A DIMENSION AS VAST
AS SPACE AND AS TIMELESS AS INFINITY.**

Rich's Overview @richniemiec



- Chief Innovation Officer, Viscosity North America
- Board Member – TEC, Entrigna, Ask DB Experts
- Former President of TUSC
 - Inc. 500 Company (Fastest Growing 500 Private Companies)
 - 10 Offices in the United States (U.S.); Based in Chicago
 - Oracle Advantage Partner in Tech & Applications
- Former President Rolta TUSC & President Rolta EICT International
- Author (5 Oracle Best Sellers – #1 Oracle Tuning Book for over a Decade):
 - Oracle Performing Tips & Techniques (Covers Oracle7 & 8i)
 - Oracle9i Performance Tips & Techniques
 - Oracle Database 10g Performance Tips & Techniques
 - Oracle Database 11g Performance Tips & Techniques
 - Quick Start Guide to Oracle Query Tuning (2015)
 - Oracle Database 12c Performance Tips & Techniques
- Former President of the International Oracle Users Group
- IOUG Top Speaker in 1991, 1994, 1997, 2001, 2006, 2007
- MOUG Current President & Top Speaker Twelve Times
- National Trio Achiever award - 2006
- Oracle Certified Master & Oracle Ace Director
- Purdue Outstanding Electrical & Computer and Engineer – 2007
- Honorary Senior Technical Advisor to Oracle China - 2014
- Chris Wooldridge Award – 1998, 2012
- Chicago Entrepreneur Hall of Fame - 1998
- E&Y Entrepreneur of Year & National Hall of Fame - 2001



Join Thousands Of Happy Customers And End The Frustration In Tuning Oracle Databases

Our services give you the training you need so your Oracle database runs faster and more efficiently. And, you get the credit!



MEMBERSHIPS



TRAINING



FREE TOOLS



BOOKS

Follow Us Online!



[Facebook.com/ViscosityNA](https://www.facebook.com/ViscosityNA)



[Linkedin.com/company/Viscosity-North-America](https://www.linkedin.com/company/Viscosity-North-America)



[@ViscosityNA](https://twitter.com/ViscosityNA)



[Viscosity North America](https://www.youtube.com/ViscosityNorthAmerica)



[Facebook.com/ViscosityNA](https://plus.google.com/113454711111111111111)



[@Viscosity_NA](https://www.instagram.com/_viscosity_na)

Quick FREE notes

Send email to (for slides):

hello@viscosityna.com

(richniemiec@gmail.com)

@richniemiec - twitter



Conf42: DevOps 2024

January 25 2024 - premiere 5PM GMT

