



COLLABORATE19

TECHNOLOGY AND APPLICATIONS FORUM
FOR THE ORACLE COMMUNITY

It is all about Visualizing Data

Session ID:

10730

Prepared by:

Francisco Munoz Alvarez

Data Intensity

Director of Innovation

@fcomunoz

10/03/2019

Remember to complete your evaluation for this session within the app!

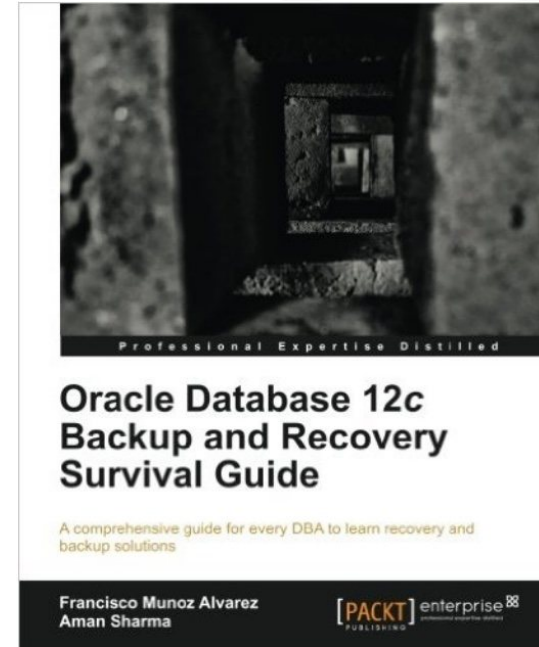
#C19TX

Francisco Munoz Alvarez

- **Oracle ACE Director**
- 8/9/10g/11g/12c OCP, RAC OCE, AS OCA, E-Business OCP, SQL/PLSQL OCA, Oracle 7 OCM
- Oracle 7, 11GR2, 12cR1, 12cR2, ADWCS and OVM 3.1 and 3.2 and 3.3 Beta Tester/Early Adopter
- IOUC LA and APAC Spokesperson, President of APACOUC,IAOUG, CLOUG and NZOUG
- ITIL Certified
- 2008 Top OTN Forum Contributor (All year #1)
- 2008 Oracle ACE Award Winner
- 2010 Oracle Excellence Award Winner
- 2010 Oracle Magazine Editors Choice Award Winner
- 2012 LAOUC Architect of the year Winner
- 2017 APAC Webinar Tour Best Session Winner
- Presented over 420 sessions at 48 Countries around the world

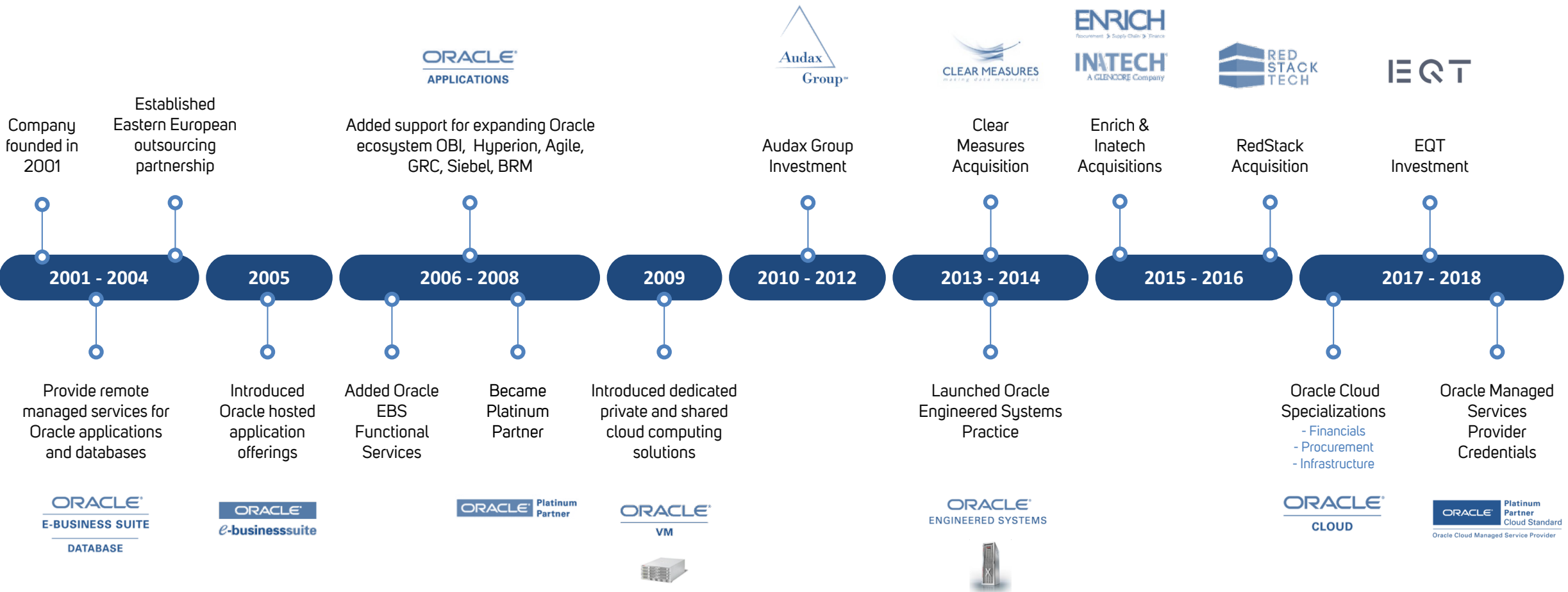
Blog: oraclenz.com - Email: fmunozalvarez@dataintensity.com

Twitter : [fcomunoz](https://twitter.com/fcomunoz)

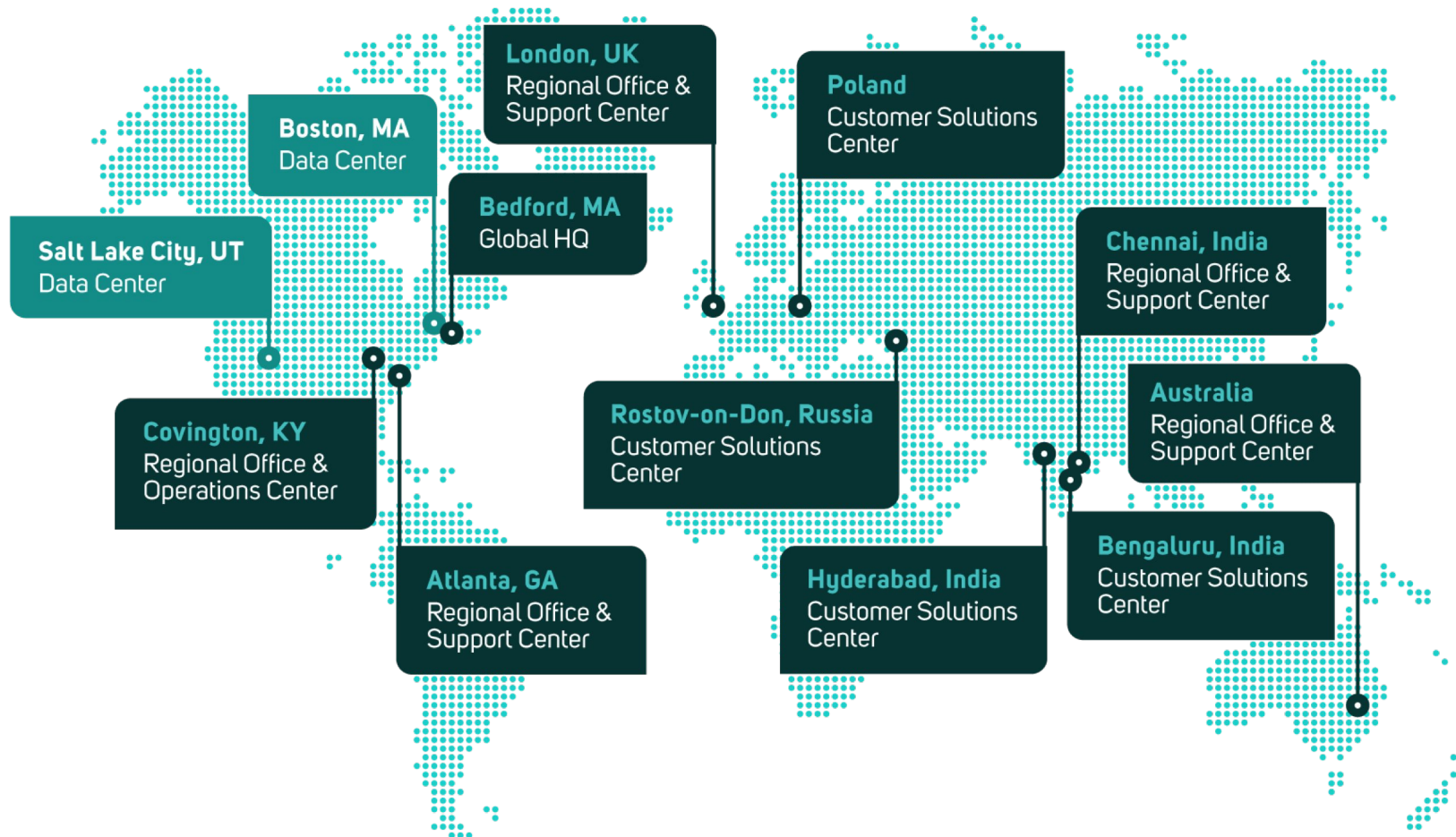


Data Intensity
Director of Innovation
www.dataintensity.com

Corporate Evolution & Strategy



Delivery & Service Capabilities That Span The Globe



Oracle Credentials & Deep Oracle Expertise



650+

Customers



3,225+

Implementations Supported



15,000+

Managed Environments



200+

Cloud Migrations



6,200+

Upgrades



20+

Oracle Specializations



800+

Professionals Worldwide



2,800+

Staff Certifications

SSAE 16 SOC 1 Type II ISO 9001 Certified
ITIL & ITSM Certified



Oracle Cloud Managed Service Provider

Oracle Cloud Applications

Financials Cloud
Procurement Cloud
Infrastructure Cloud

Oracle Applications

E-Business Suite R12 Financials
E-Business Suite R12 Supply Chain

Oracle Engineered Systems

Exadata Database Machine X2
Exadata Database Machine
Oracle Database Appliance

Oracle Platform

Linux 5 / 6
OVM 2 / 3

Oracle Technology

Database 11g / 12c
Database 11g / 12c Security
Database 11g / 12c Data Warehousing
Database 11g / 12c Performance Tuning
Enterprise Manager 11g / 12c
Real Application Clusters 11g / 12c
Business Intelligence Foundation 10 / 11g
Data Integration 11g / 12c
WebLogic Server 12c
Identity Management 12c
SOA Suite 12c
Big Data Appliance

Oracle Cloud Infrastructure

Associate Architect Certifications

Customer Advisory Board

Oracle EBS ATG
Oracle Cloud Infrastructure

2017 Oracle Cloud Infrastructure

Partner of the Year – UK

2015 Engineered Systems

Partner of the Year - Global

BETA Program Participant

Global Portfolio of Oracle Solutions and Services Delivered Your Way

DELIVERY MODELS

Oracle Database &
Engineered Systems

Oracle Applications
ERP / Procurement

Oracle BI & Analytics

Remote Managed Services

Extension of Customer IT Team | 24x7 Monitoring & Critical Response |
Daily Management & Maintenance

Cloud Managed Services

On-Premises/Private Cloud | Public Cloud | Hybrid Cloud

Professional Services
/ Consulting

Assessments/Design | Migration | Implementations | Upgrades |
Quick Start Programs

The Data Intensity Oracle Advantage

We are an **Oracle First** service provider and believe in Oracle on Oracle for Oracle

Comprehensive portfolio of solutions from **Oracle Cloud** to **On-Premises Applications and technology**.

Oracle Platinum and Managed Services Partner focused on accelerated migration and management services for **Oracle Cloud Infrastructure**.



We have been **selling enterprise cloud services for over 12 years** and understand the sales process

We architected **OCI for our own EBS environment** and presented it at Oracle Cloud Days

Proven with **hundreds of Oracle clients worldwide** who have entrusted us to handle the implementation, management, and support of their mission-critical Oracle applications and technologies

Oracle Capabilities & Alignment Partner for Growth

Delivery

SaaS

- Oracle ERP Cloud
 - Financials
 - Procurement
 - OM
- HCM
- PPM
- EPM

PaaS

- Oracle Database Cloud
- Oracle SOA Cloud
- Oracle Identity Cloud
- Oracle Data Integrator
- Oracle Management Cloud
- Java
- BI

IaaS

- Oracle Cloud Infrastructure

Capabilities

Applications (On-Premises)

- Oracle E-Business Suite - Financials, SCM, Procurement
- Hyperion
- OBIEE
- Agile
- Siebel
- PeopleSoft
- BRM
- ATG Web Commerce
- Fusion Middleware

Database & Advanced Technology

- Oracle Database
- RAC
- Active
- Data Guard
- GoldenGate
- Oracle Streams
- Advanced Security
- WebLogic Suite
- Database Vault
- Advanced Compression
- TDE
- Advanced Compression
- WebCenter
- ODI

Infrastructure

- Oracle Exadata Machine
- Exalogic Elastic Cloud
- Exalytics
- Oracle SuperCluster
- Oracle Database Appliance
- Oracle Private Cloud Appliance
- ZFS
- VM
- OEL

Alignment to 3 Oracle Sales Plays

Move Workloads to the Cloud

Modernize Data Management

Connect & Extend Apps

Technical & Functional Integration

It is all about Visualizing Data

- 🌐 Why Visualizing Data is so Important
- 🌐 Introduction to Autonomous Data Warehouse Cloud Service
- 🌐 Machine Learning
- 🌐 Introduction to Oracle Data Visualization Desktop
- 🌐 Gain insights from data in the ADWC
- 🌐 Conclusion

It is all about Visualizing Data

- 🌐 Why Visualizing Data is so Important
- 🌐 Introduction to Autonomous Data Warehouse Cloud Service
- 🌐 Machine Learning
- 🌐 Introduction to Oracle Data Visualization Desktop
- 🌐 Gain insights from data in the ADWC
- 🌐 Conclusion

Why Visualizing Data is so Important

Data visualization is the presentation of data in a pictorial or graphical format. It enables decision makers to see analytics presented visually, so they can grasp difficult concepts or identify new patterns. With interactive visualization, you can take the concept a step further by using technology to drill down into charts and graphs for more detail, interactively changing what data you see and how it's processed.

It is all about Visualizing Data

- Why Visualizing Data is so Important
- **Introduction to Autonomous Data Warehouse Cloud Service**
- Machine Learning
- Introduction to Oracle Data Visualization Desktop
- Gain insights from data in the ADWC
- Conclusion

Autonomous Data Warehouse Cloud

- **Easy**
 - Fully-managed, pre-configured and optimized for DW workloads
 - Simply load data and run
 - No need to define indexes, create partitions, etc.
- **Fast**
 - Based on Exadata technology
- **Elastic**
 - Instant scaling of compute or storage with no downtime



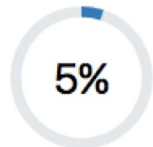
Fully Managed

- Automated end-to-end management of the DW
 - Provisioning new Databases
 - Growing/shrinking storage and/or compute
 - Patching and Upgrades
 - Backup and Recovery
- Fully lifecycle managed using the service console
 - Alternatively, can be managed via command line interface or REST API
- Load and Go
 - Fast Performance with zero tuning
 - Simple Web based monitoring console
 - Built-in resource-management plans



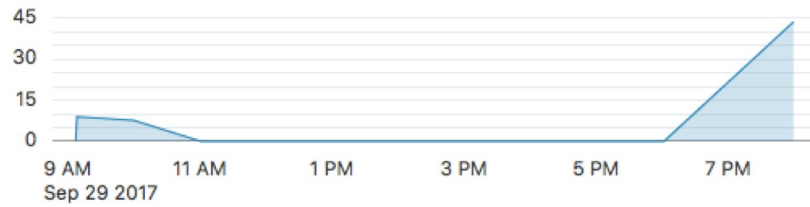
My Dashboard

Storage

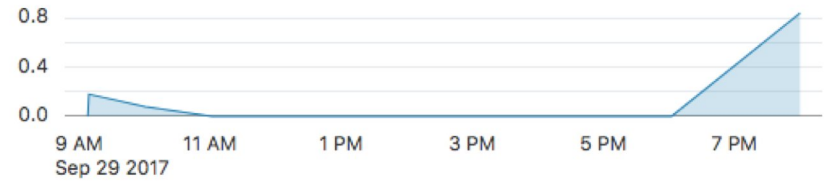


60 GB / 1 TB

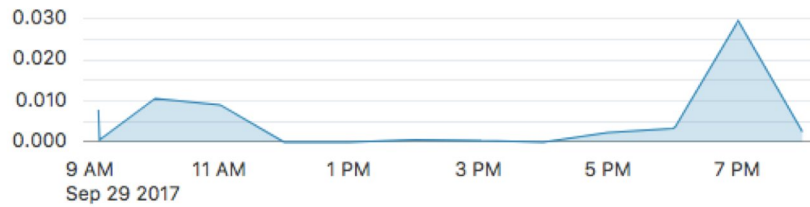
CPU utilization (%)



Running statements



Average SQL response time (s)

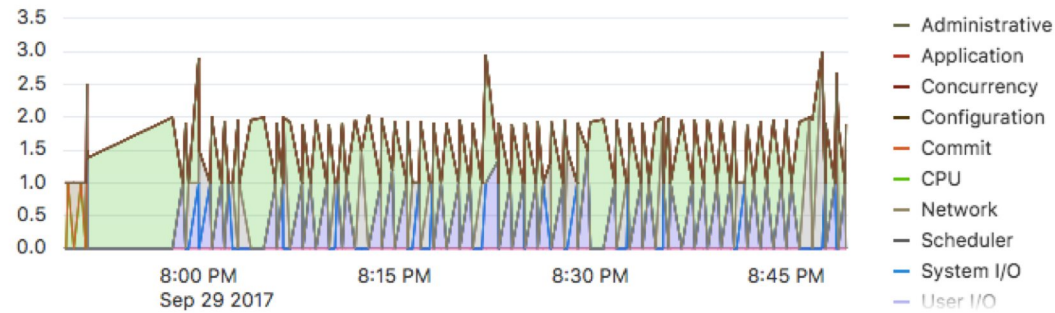


Monitor

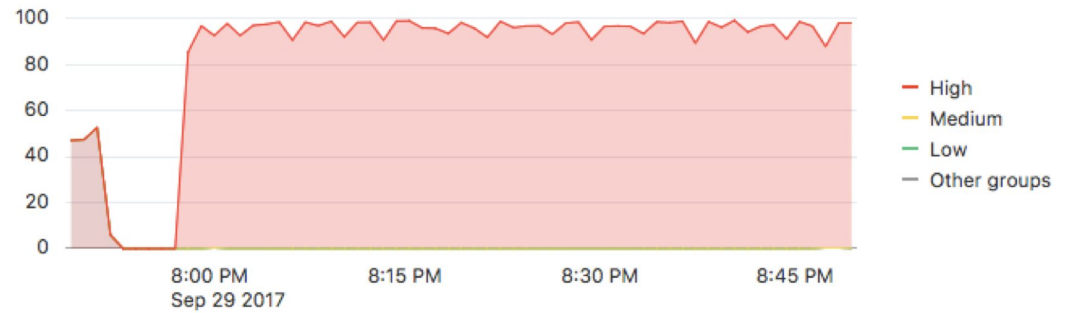
Monitored SQL

Real time Time period

Database Activity



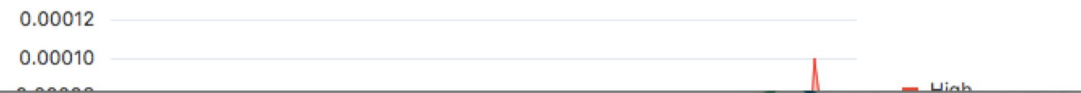
CPU Utilization (%)



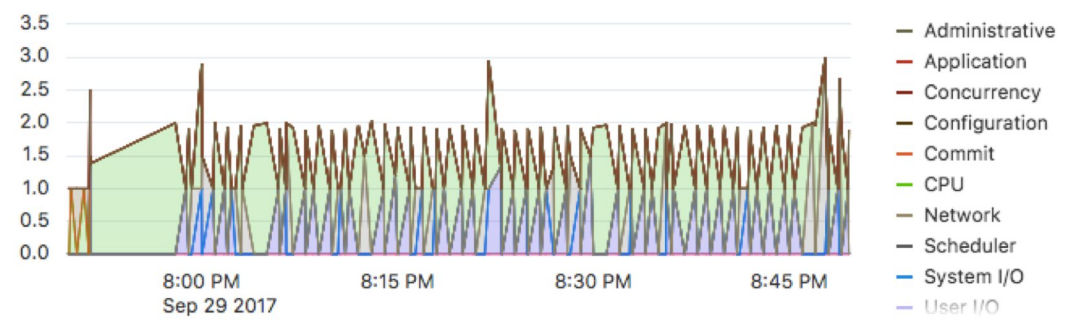
Running Statements



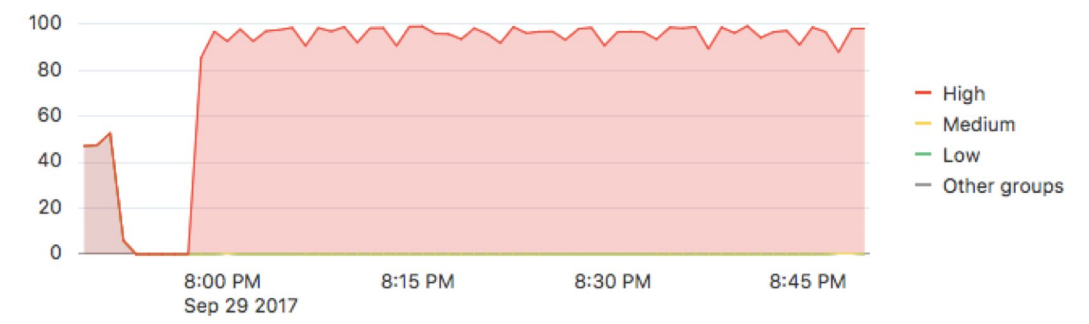
Queued Statements



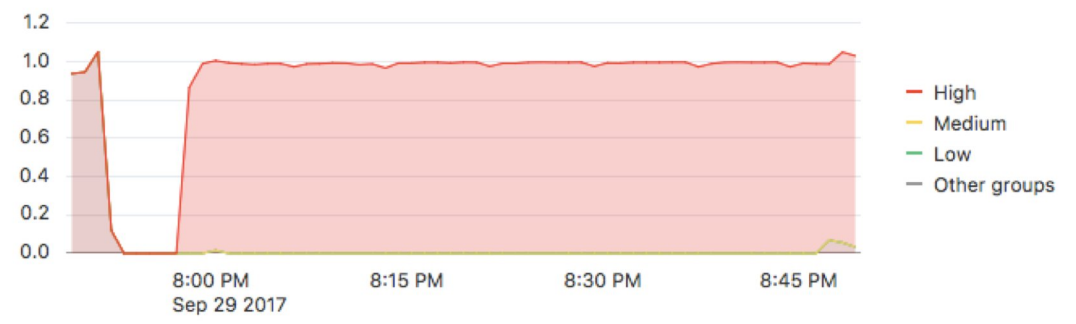
Database Activity



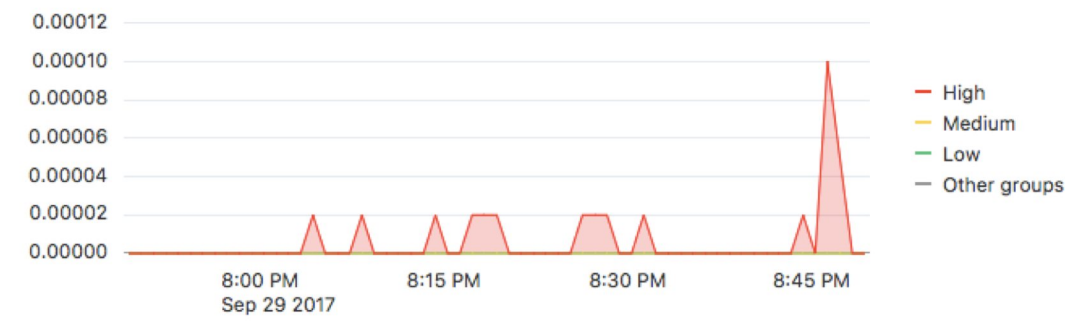
CPU Utilization (%)



Running Statements



Queued Statements



Monitor

Monitored SQL

Show details Download report Diagnose SQL Cancel execution

Refresh Settings

	STATUS	DURATION	USER NAME	MODULE	PARALLEL	DATABASE TIME	I/O BYTES	START TIME	EN
13	✓ DONE (ALL ROWS)	<div style="width: 20%;"></div>	SSB	SQL*Plus	2	<div style="width: 20%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:47:31 PM	9/29/2017,
14	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:47:50 PM	9/29/2017,
15	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:48:38 PM	9/29/2017,
16	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:49:26 PM	9/29/2017,
17	✓ DONE (ALL ROWS)	<div style="width: 20%;"></div>	SSB	SQL*Plus	2	<div style="width: 20%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:50:21 PM	9/29/2017,
18	✓ DONE (ALL ROWS)	<div style="width: 20%;"></div>	SSB	SQL*Plus	2	<div style="width: 20%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:50:56 PM	9/29/2017,
19	✓ DONE (ALL ROWS)	<div style="width: 20%;"></div>	SSB	SQL*Plus	2	<div style="width: 20%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:51:24 PM	9/29/2017,
20	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:51:47 PM	9/29/2017,
21	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:52:28 PM	9/29/2017,
22	✓ DONE (ALL ROWS)	<div style="width: 20%;"></div>	SSB	SQL*Plus	2	<div style="width: 20%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:53:04 PM	9/29/2017,
23	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:53:31 PM	9/29/2017,
24	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:54:11 PM	9/29/2017,
25	✓ DONE (ALL ROWS)	<div style="width: 40%;"></div>	SSB	SQL*Plus	2	<div style="width: 40%;"></div>	<div style="width: 100%;"></div>	9/29/2017, 10:54:45 PM	9/29/2017,

(1-25 of 25 items) 1

Details for SQL ID: 5dvc1jg7y0qk9

Overview Plan Statistics Plan Parallel

OPERATION	OBJECT NAME	LINE	PLAN ROWS	ACTUAL ROWS	PLAN COST	TIMELINE
SELECT STATEMENT		0		4		
TEMP TABLE TRANSFORMATION		1		4		
LOAD AS SELECT (CURSOR DURATION MEMORY)	SYS_TEMP_0FD9D68B0_E606E	2		1		
PX COORDINATOR		3		2		
PX SEND QC (RANDOM)	:TQ10001	4	4	2	54	
HASH GROUP BY		5	4	2	54	
PX RECEIVE		6	4	4	52	
PX SEND HASH	:TQ10000	7	4	4	52	
KEY VECTOR CREATE BUFFERED	:KV0000	8	4	4	52	

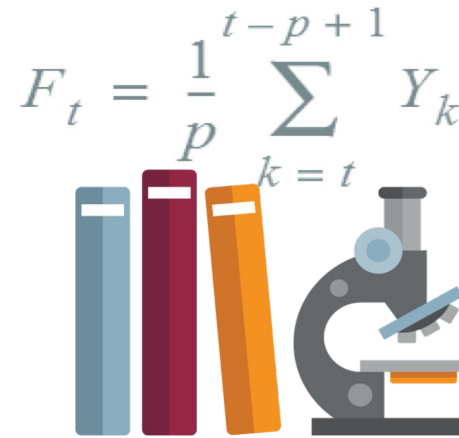
Key Use Cases for Autonomous Data Warehouse Cloud

Data Marts / Warehouses



Business Analytics

Sandboxes for Data Scientists



Machine Learning

Data Lakes



Query Across
All Data

ADW – In-Database SQL Analytics

Hierarchical
Analytics

Window
Functions

Forecasting

Statistics

Approximate
Analytics

Pattern
Matching

SQL
Modeling

Advanced
Aggregations

Ranking

Pivoting

Used-Defined
PTFs

Text
Analytics

ADW – In-Database SQL Analytics

Oracle Machine Learning SQL notebooks provide easy access to Oracle's parallelized, scalable in-database implementations of a library of [Oracle Advanced Analytics' machine learning algorithms](#) (classification, regression, anomaly detection, clustering, associations, attribute importance, feature extraction, times series, etc.), SQL, PL/SQL and Oracle's statistical and analytical SQL functions.

Oracle Machine Learning SQL notebooks and Oracle Advanced Analytics' library of machine learning SQL functions combined with PL/SQL allow companies to automate their discovery of new insights, generate predictions and add "AI" to data viz dashboards and enterprise applications.

ADW : In-Database Machine Learning (Built in Algorithms Methods)

Classification

Regression

**Anomaly
Detection**

**Attribute
Importance**

**Association
Rules**

Clustering

**Feature
Extraction**

**Descriptive
statistics**

**Hypothesis
Testing**

ANOVA

**Test
Distribution Fit**

**Text
Mining**

It is all about Visualizing Data

- 🌐 Why Visualizing Data is so Important
- 🌐 Introduction to Autonomous Data Warehouse Cloud Service
- 🌐 **Machine Learning**
- 🌐 Introduction to Oracle Data Visualization Desktop
- 🌐 Gain insights from data in the ADWC
- 🌐 Conclusion

Machine Learning

Data Science

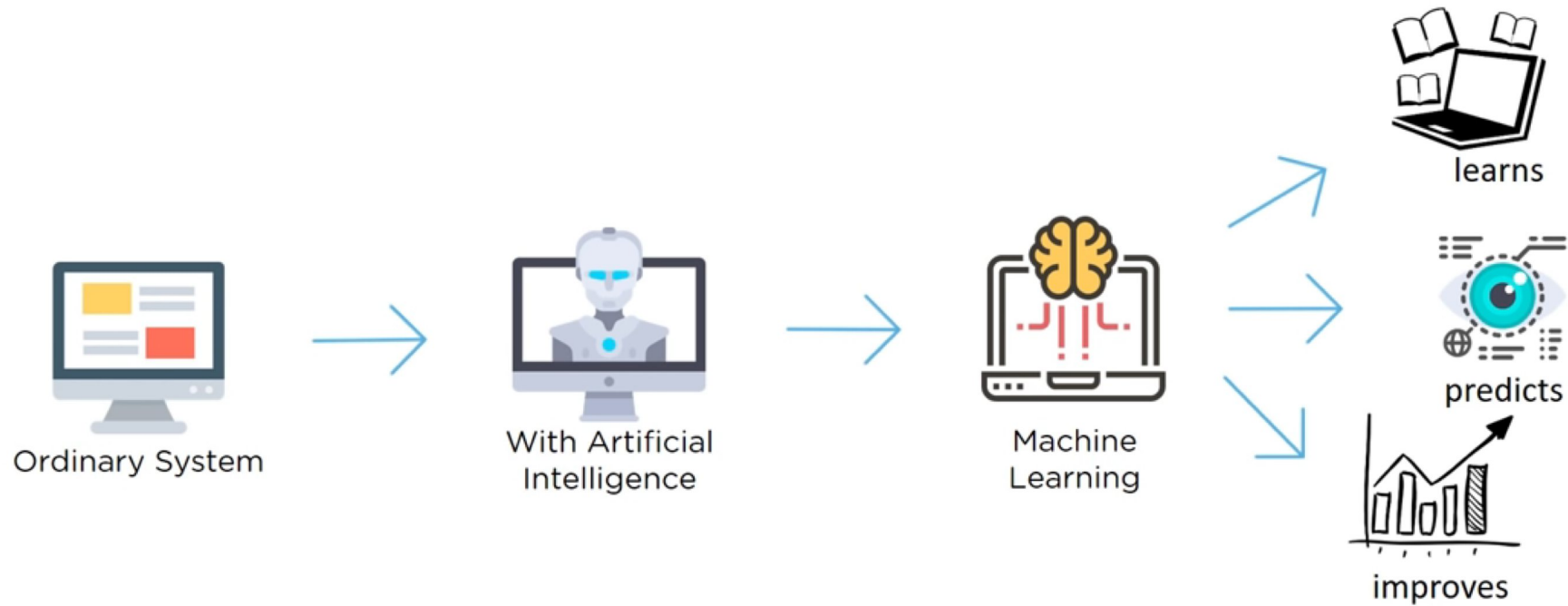
First of all, let's review what machine learning is.

- Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. **Machine learning focuses on the development of computer programs** that can access data and use it learn for themselves.
- The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. **The primary aim is to allow the computers learn automatically** without human intervention or assistance and adjust actions accordingly.
- Machine learning enables analysis of massive quantities of data. While it generally delivers faster, more accurate results in order to identify profitable opportunities or dangerous risks, it may also require additional time and resources to train it properly. Combining machine learning with AI and cognitive technologies can make it even more effective in processing large volumes of information.

Machine Learning

Data Science

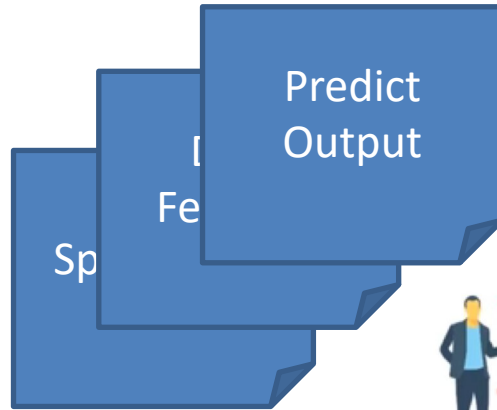
First of all, let's review what machine learning is.



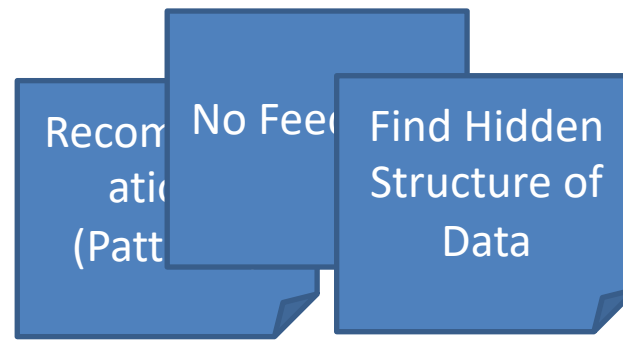
Machine Learning

Data Science

Types of Machine Learning



Supervised Learning
The machine learns from the training data that is labeled



Unsupervised Learning
Non-labeled training data



Reinforcement Learning
The machine learns on its own



Machine Learning

Data Science

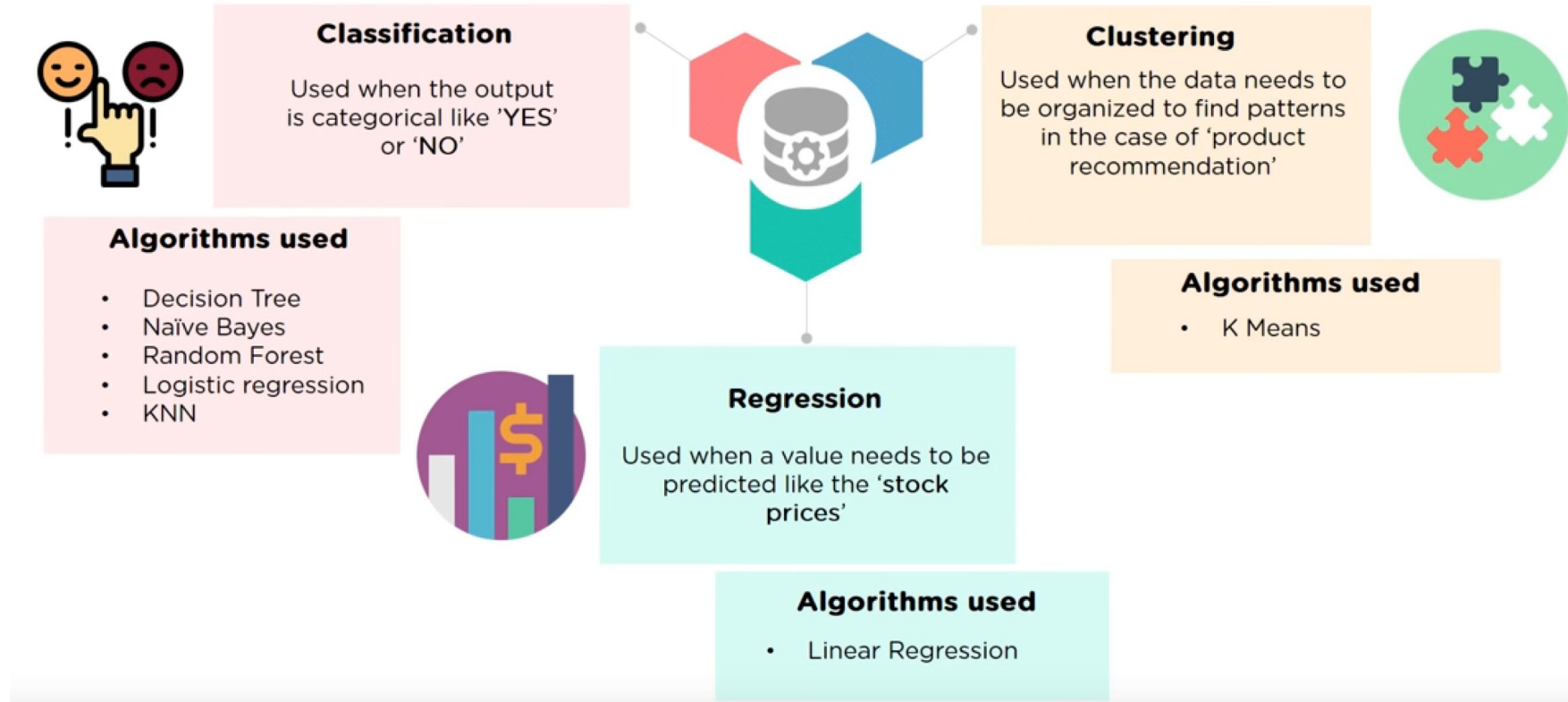
Algorithms (Methods to Solve Specific Problems)

- **Supervised machine learning algorithms** can apply what has been learned in the past to new data using labeled examples to predict future events. Starting from the analysis of a known training dataset, the learning algorithm produces an inferred function to make predictions about the output values. The system is able to provide targets for any new input after sufficient training. The learning algorithm can also compare its output with the correct, intended output and find errors in order to modify the model accordingly.
- In contrast, **unsupervised machine learning algorithms** are used when the information used to train is neither classified nor labeled. Unsupervised learning studies how systems can infer a function to describe a hidden structure from unlabeled data. The system doesn't figure out the right output, but it explores the data and can draw inferences from datasets to describe hidden structures from unlabeled data.
- **Semi-supervised machine learning algorithms** fall somewhere in between supervised and unsupervised learning, since they use both labeled and unlabeled data for training – typically a small amount of labeled data and a large amount of unlabeled data. The systems that use this method are able to considerably improve learning accuracy. Usually, semi-supervised learning is chosen when the acquired labeled data requires skilled and relevant resources in order to train it / learn from it. Otherwise, acquiring unlabeled data generally doesn't require additional resources.
- **Reinforcement machine learning algorithms** is a learning method that interacts with its environment by producing actions and discovers errors or rewards. Trial and error search and delayed reward are the most relevant characteristics of reinforcement learning. This method allows machines and software agents to automatically determine the ideal behavior within a specific context in order to maximize its performance. Simple reward feedback is required for the agent to learn which action is best; this is known as the reinforcement signal.

Machine Learning

Data Science

Algorithms Methods (Methods to Solve Specific Problems)



Machine Learning

Data Science

Example:

The best way to explain what machine learning is would be to give you a simple example.

Let's say you want to develop a program that automatically detects what's in a picture, and we show a picture of a dog.

However, this kind of approach gets tricky pretty quickly. What if there's a white dog in the picture with no brown hair? What if the picture shows only the round parts of the table?

This is where machine learning comes in.

Machine learning typically implements an algorithm that automatically detects a pattern in the given input.

You can give, say, 1,000 pictures of a dog and 1,000 pictures of a table to a machine learning algorithm. Then, it will learn the difference between a dog and a table. When you give it a new picture of either a dog or a table, it will be able to recognize which one it is.

Machine Learning

Data Science

Machine learning algorithms work much the same way.

You can apply the same idea to:

- Recommendation systems (think YouTube, Amazon, and Netflix)
- Face recognition
- Voice recognition
- Among other applications.

Popular machine learning algorithms you might have heard about include:

- Neural networks
- Deep learning
- Support vector machines
- Random forest

You can use any of the above algorithms to solve the picture-labeling problem I mentioned before.

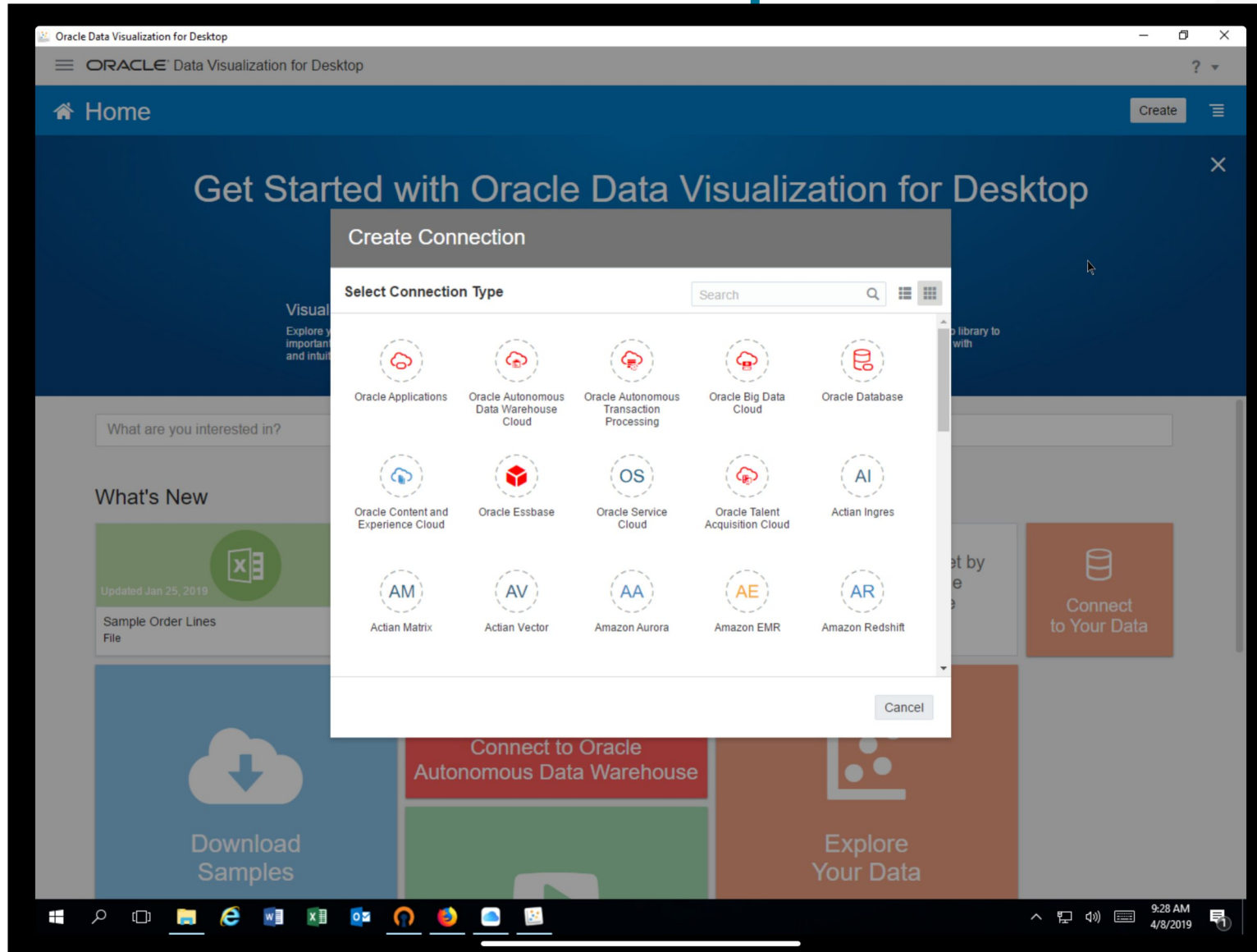
It is all about Visualizing Data

- Why Visualizing Data is so Important
- Introduction to Autonomous Data Warehouse Cloud Service
- **Introduction to Oracle Data Visualization Desktop**
- Gain insights from data in the ADWC
- Conclusion

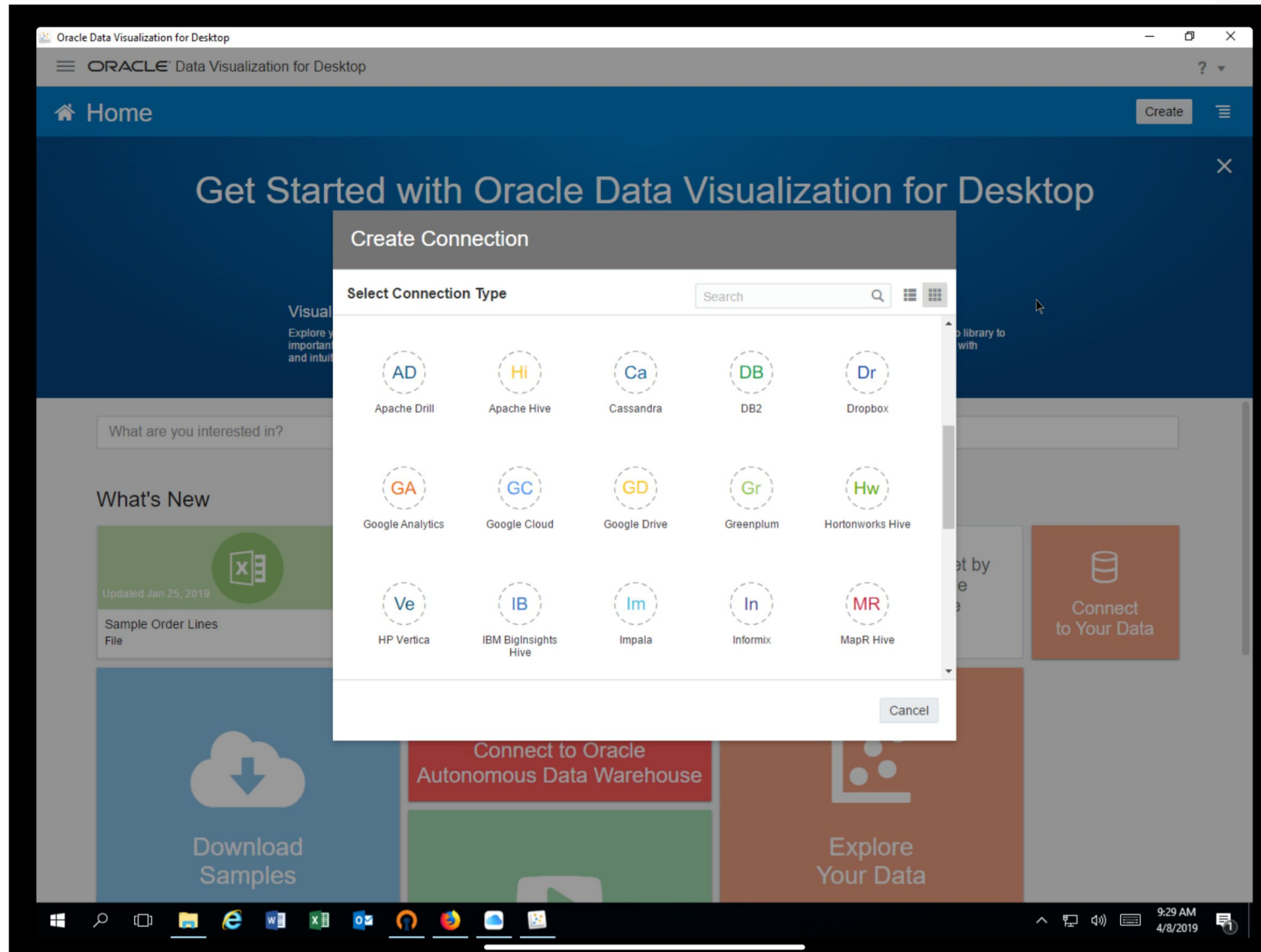
Oracle Data Visualization Desktop

The screenshot shows the Oracle Data Visualization for Desktop application window. The title bar reads "Oracle Data Visualization for Desktop". The main header is blue with "Home" on the left and a "Create" button on the right. Below the header is a large blue banner with the text "Get Started with Oracle Data Visualization for Desktop" and a "Watch Overview" button. Underneath are three columns: "Visualize Data" (Explore your data and uncover important insights using interactive and intuitive visualizations), "Prepare Data" (Get your data ready for analysis using visual data flows that transform, enrich and blend different sources), and "Learn More" (Visit our Academy and video library to learn how you can do more with Oracle Analytics Cloud). A search bar asks "What are you interested in?". Below that is a "What's New" section with several tiles: "Sample Order Lines File" (Updated Jan 25, 2019), "Sample States File" (Updated Jan 25, 2019), a tip "Tip: Create a new Data Set by simply dropping your file anywhere on this page", "Connect to Your Data", "Download Samples", "Connect to Oracle Autonomous Data Warehouse", and "Explore Your Data". The Windows taskbar is visible at the bottom with the time 9:28 AM on 4/8/2019.

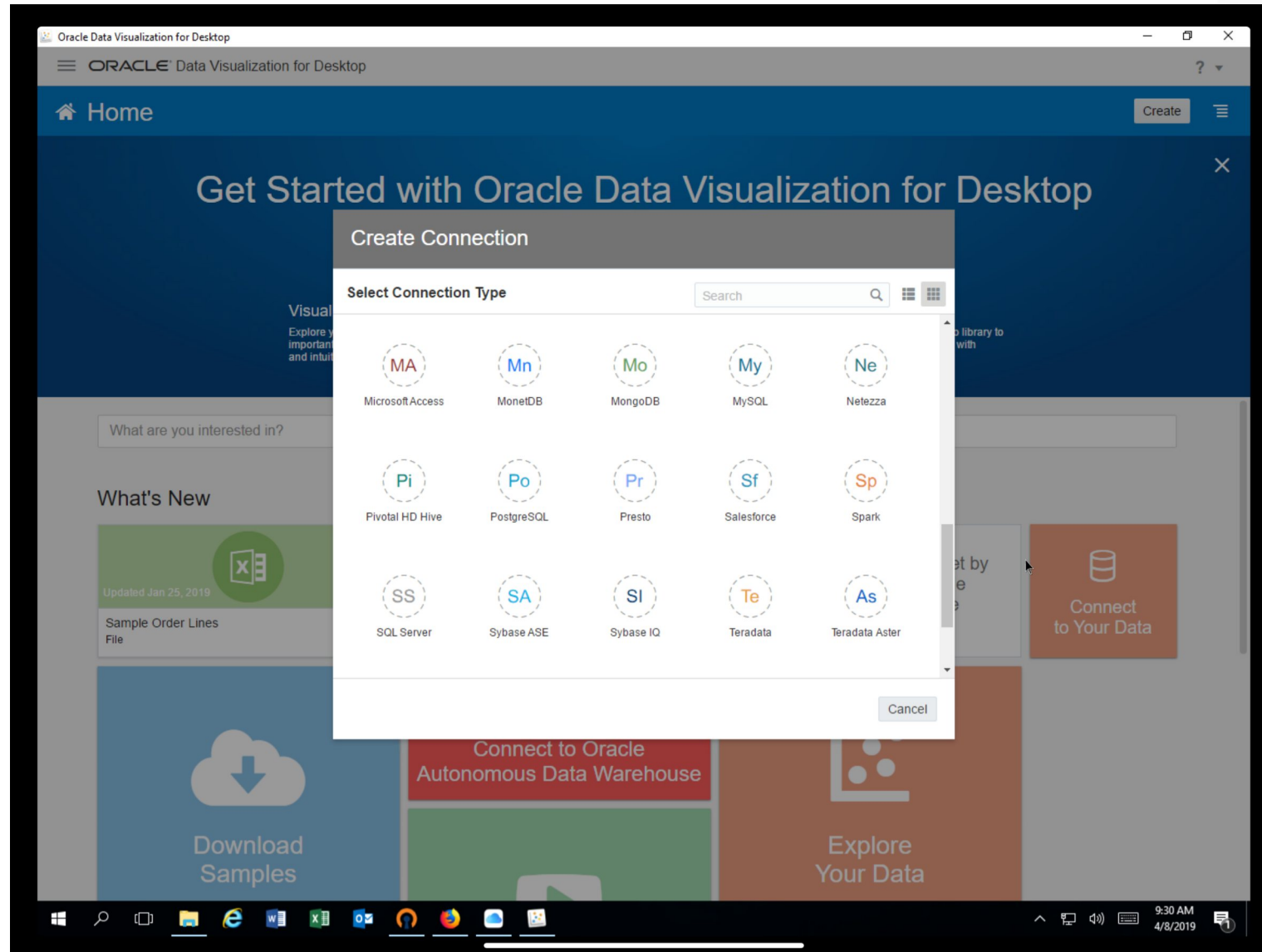
Oracle Data Visualization Desktop



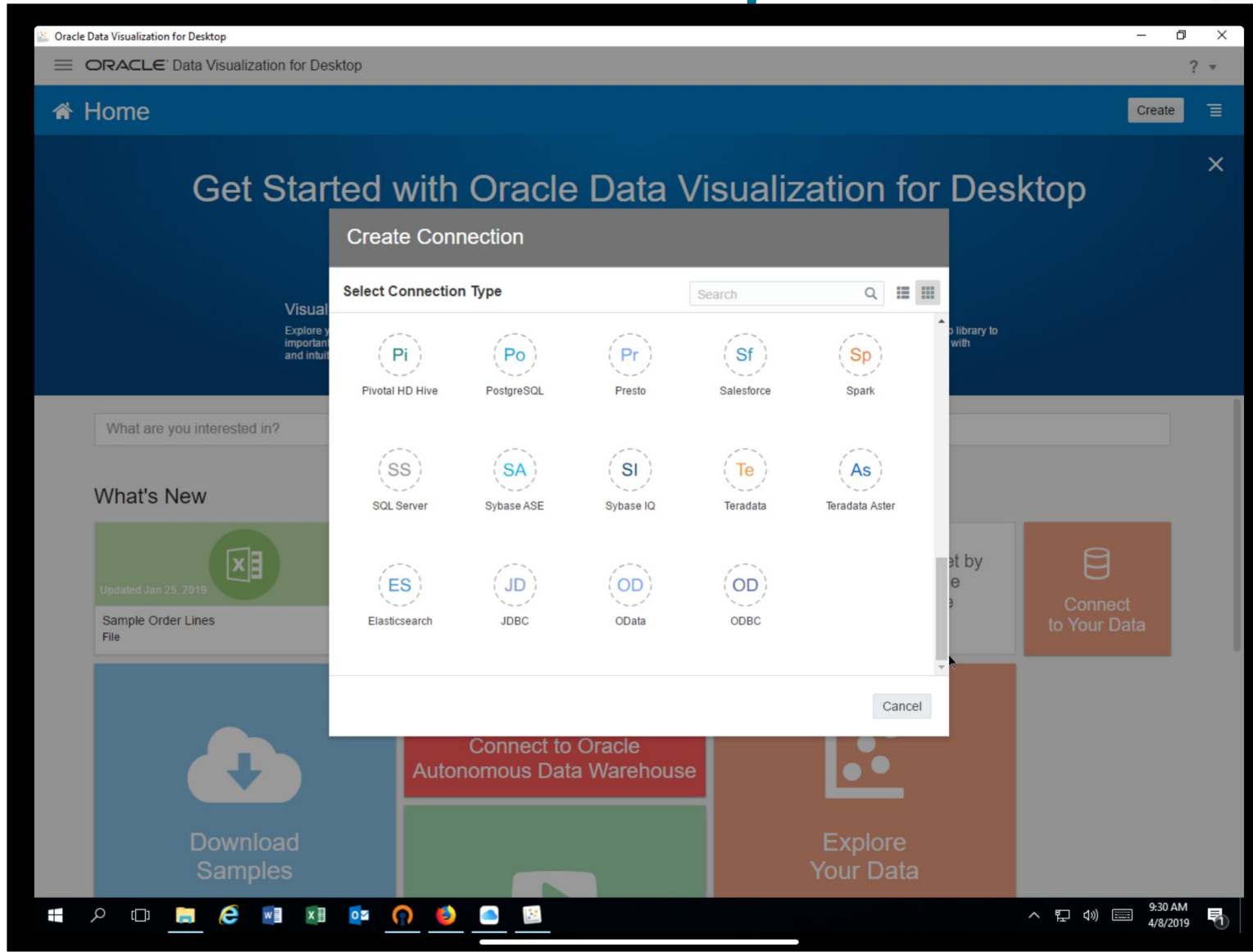
Oracle Data Visualization Desktop



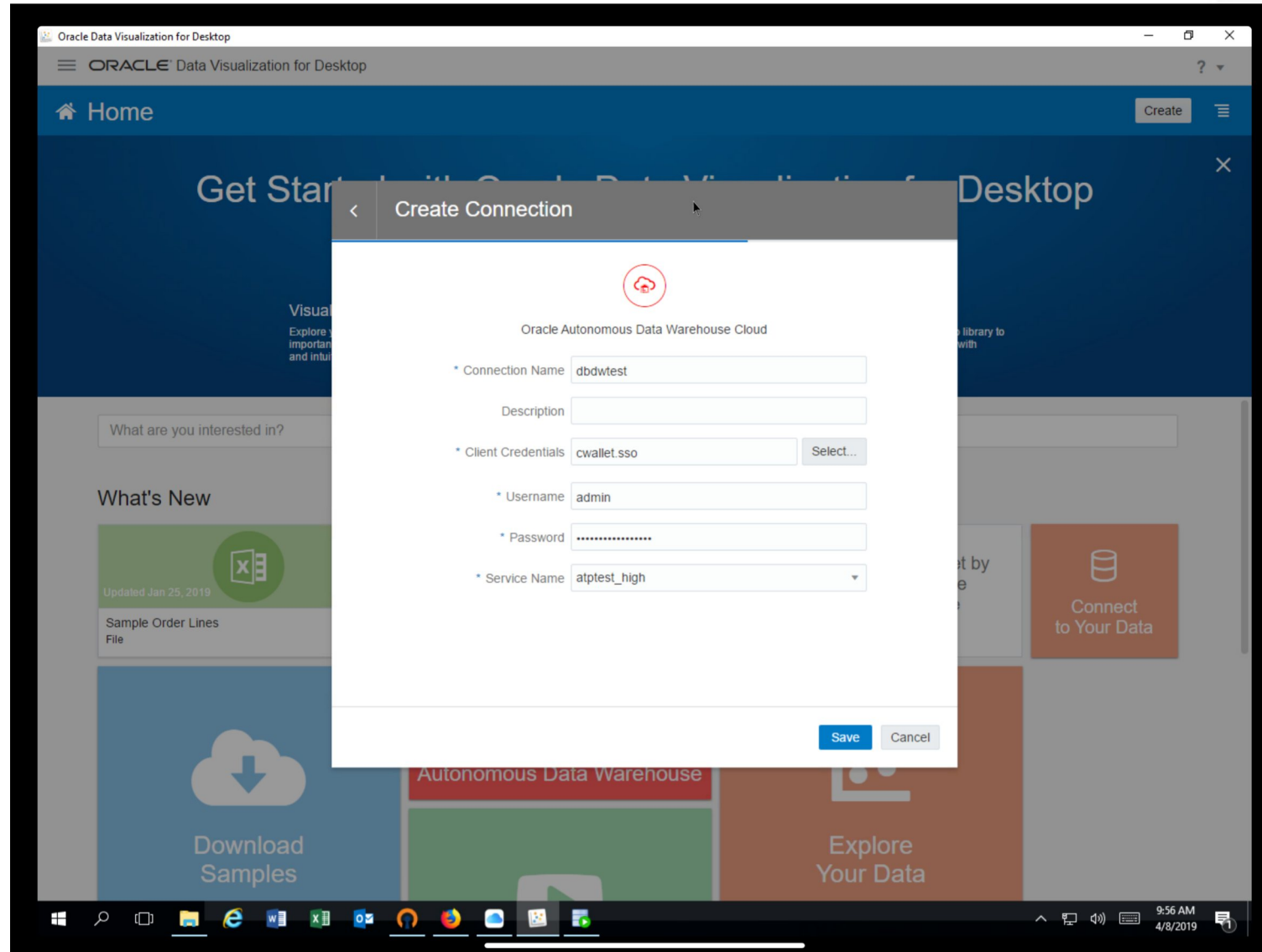
Oracle Data Visualization Desktop



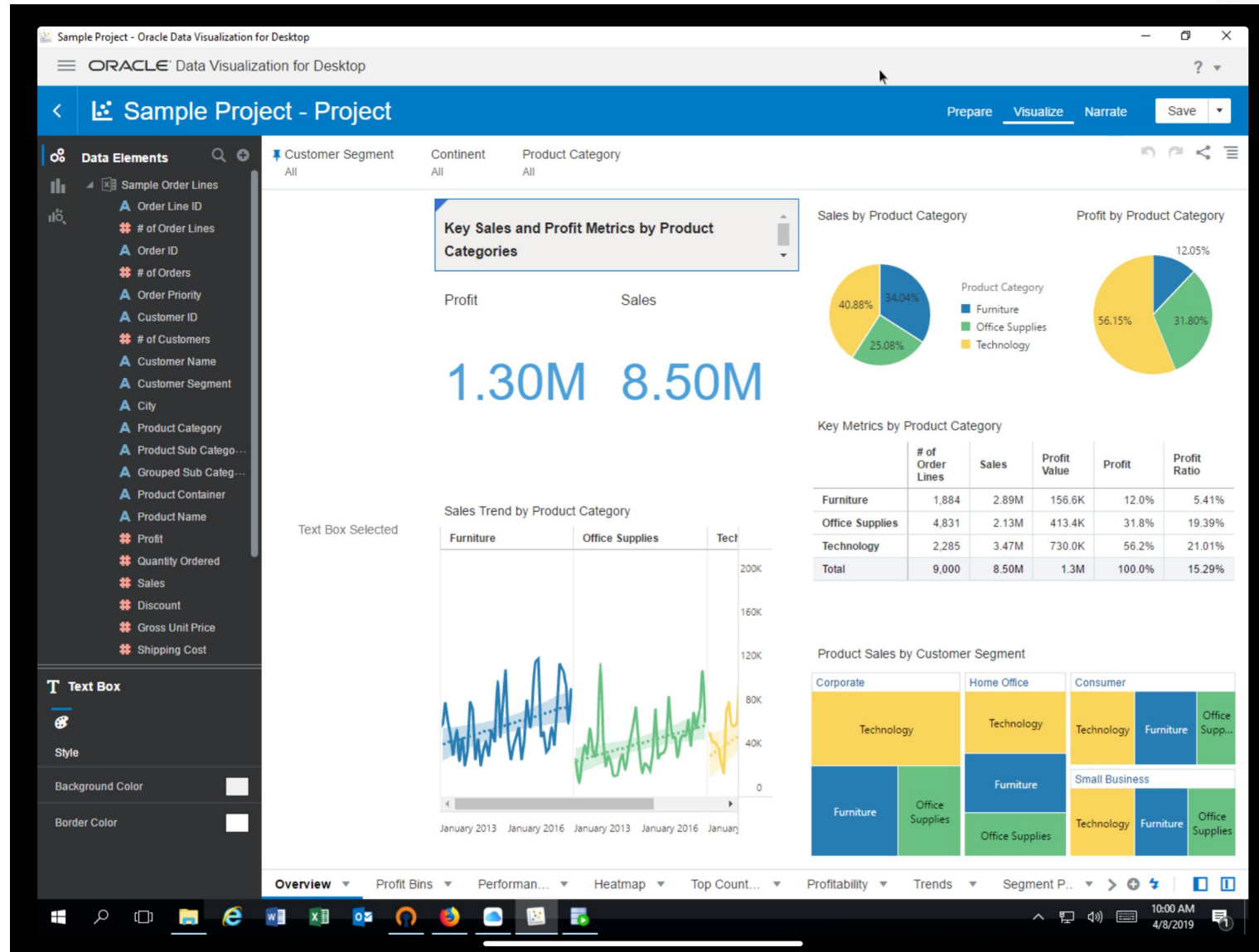
Oracle Data Visualization Desktop



Oracle Data Visualization Desktop



Oracle Data Visualization Desktop



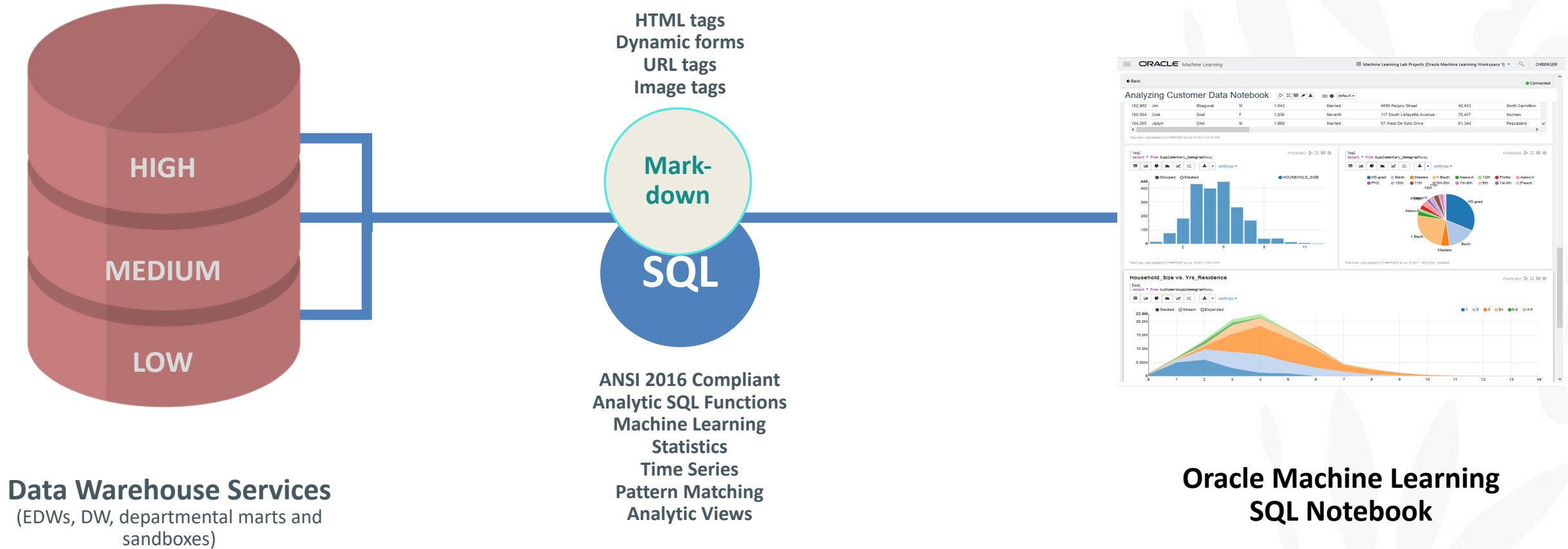
It is all about Visualizing Data

- 🌐 Why Visualizing Data is so Important
- 🌐 Introduction to Autonomous Data Warehouse Cloud Service
- 🌐 Introduction to Oracle Data Visualization Desktop
- 🌐 **Gain insights from data in the ADWC**
- 🌐 Conclusion

What is Oracle ML

- Built-in, web-based SQL Notebook
- Bundled with Autonomous Data Warehouse
- Derived from open-source Apache Zeppelin
 - Extensive additions that are being fed back into the Apache Zeppelin project
- Provides web-based SQL access to ADW
- Simple but powerful set of data visualizations
- Includes sharing and collaboration framework
- All workspaces, projects, notebooks etc saved inside database
 - Automatically (i.e. autonomously) managed and backed up by database

Autonomous Data Warehouse Cloud: Architecture Overview



Smart Way to Use Oracle ML

1. Write **SQL** using 18c in-database **analytics**
2. **Document** and **annotate** using the HTML, URL, image markdown tags
3. Build **interactive** visualizations using markdown tags
4. **Collaborate** and **share**
 - Version notebooks for team work
 - Share entire notebook with report consumers
 - Export specific paragraphs or visualizations

Key Concepts

- **Workspace**

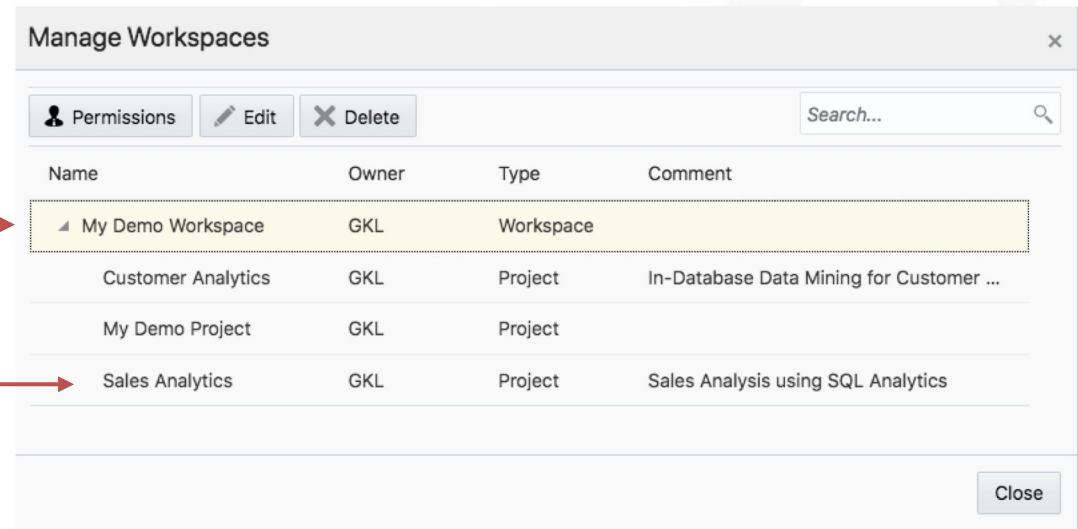
- Folder for organizing projects
- Controls user access to projects

- **Project**

- Folder for organizing and storing SQL notebooks, SQL scripts and jobs

- **Notebook**

- Contains one or more paragraphs
- Includes data visualizations (tables and graphs)
- Two built-in shortcuts
 - SQL Query Scratchpad
 - SQL Script Scratchp



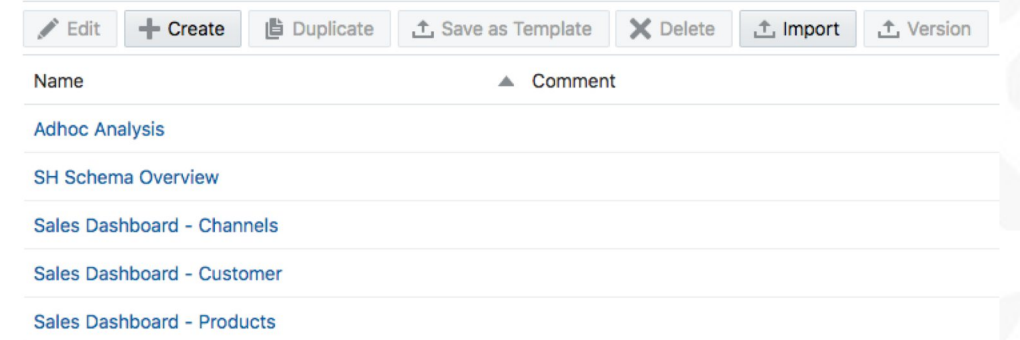
Manage Workspaces

Permissions Edit Delete Search...

Name	Owner	Type	Comment
My Demo Workspace	GKL	Workspace	
Customer Analytics	GKL	Project	In-Database Data Mining for Customer ...
My Demo Project	GKL	Project	
Sales Analytics	GKL	Project	Sales Analysis using SQL Analytics

Close

Notebooks



Edit Create Duplicate Save as Template Delete Import Version

Name	Comment
Adhoc Analysis	
SH Schema Overview	
Sales Dashboard - Channels	
Sales Dashboard - Customer	
Sales Dashboard - Products	

Key Concepts for Notebooks

- **Interpreters**
 - Bindings that connect a notebook to ADW resource group (high, medium, low)
 - Markdown is automatically enabled
- **Paragraph**
 - Contains a single SQL statement (default) or
 - SQL Query offers multiple data visualizations
 - Contains a SQL script (%script)
 - Contains markdown tags + text (%md)

SQL Script Scratchpad   default

Settings

Interpreter binding

Interpreter binding

Bind interpreter for this note. Click to Bind/Unbind interpreter. Drag and drop to reorder interpreters. The first interpreter on the list becomes default.

adwfinance_low %sql (default), %script

md %md (default)

adwfinance_medium %sql (default), %script

adwfinance_high %sql (default), %script



Oracle ML Home Page

• Pop-out main menu

• Shortcuts, links,

• Online help

The screenshot shows the Oracle Machine Learning interface. At the top left, a red dashed arrow points to the hamburger menu icon. The top right shows the user profile 'GKLEMO' and the workspace 'GKL Project [GKL Workspace]'. The main content area is divided into several sections:

- Quick Actions:** A row of five cards: 'Run SQL Statement' (Enter and run SQL statements), 'Run SQL Script' (Enter and run SQL scripts), 'Notebooks' (The place for data discovery and analytics), 'Jobs' (Schedule notebooks to run at certain times), and 'Examples' (Check out some examples). A red dashed arrow points to the 'Notebooks' card.
- Recent Activities:** A section titled 'yesterday' containing four activity entries, each with a notebook icon, the action (updated or created), the notebook name, and the workspace. A red dashed arrow points to the first entry.
- Learning Resources:** A section on the right with a 'Learning Resources' link.
- Recent Notebook:** A section on the right showing 'SQL Query Scratchpad' and 'SQL Script Scratchpad'.

SQL Query Scratchpad



FINISHED

**Editor Area
(Show/Hide)**



SQL Query Scratchpad



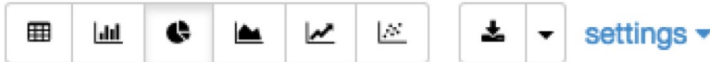
Notebook menu area

- Run/refresh all paragraphs
- Show/hide code
- Show/output
- Clear output
- Clear notebook
- Export notebook

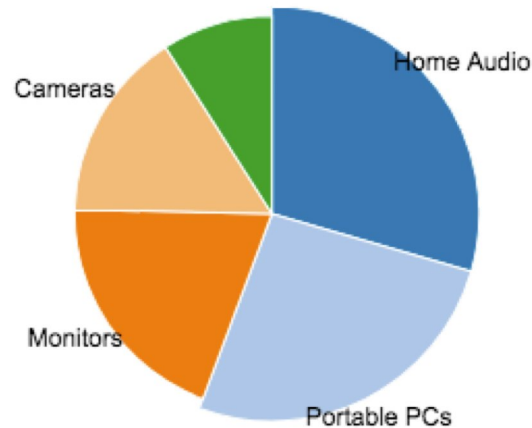
- List of Shortcuts
- Interpreter bindings
- Report type

```
SELECT
  prod_subcategory_desc,
  SUM(amount_sold) AS tot_revenue
FROM sh.sales s, sh.times t, sh.products p
WHERE t.calendar_year='2000'
AND s.time_id = t.time_id
AND s.prod_id = p.prod_id
GROUP BY prod_subcategory_desc
ORDER BY 2 desc
FETCH FIRST 5 ROWS ONLY;
```

FINISHED ▶ ❌ 📄 ⚙️



● Home Audio ● Portable PCs ● Monitors ● Cameras ● Memory



Paragraph menu area

- Run/refresh paragraphs
- Show/hide code
- Show/output
- Settings

Took 1 sec. Last updated by GKLEMO at July 24 2018, 3:16:30 PM. (outdated)

ADW Resource Interpreters

- Three interpreters linked to three ADW resource groups:
 - High
 - Medium
 - Low
- Normally only need to select two interpreters:
 - md – to access markdown tags
 - ADW resource group interpreter

SQL Script Scratchpad



Interpreter binding

Settings

Interpreter binding

Bind interpreter for this note. Click to Bind/Unbind interpreter. Drag and drop to reorder interpreters. The first interpreter on the list becomes default.

adwfinance_low %sql (default), %script

md %md (default)

adwfinance_medium %sql (default), %script

adwfinance_high %sql (default), %script

Interpreters Linked to Database Resource Groups

- 3 pre-defined database services
 - Choice of performance and concurrency
- HIGH
 - Highest resources, lowest concurrency
 - Queries run in parallel
- MEDIUM
 - Less resources, higher concurrency
 - Queries run in parallel
- LOW
 - Least resources, highest concurrency
 - Queries run serially

Example for a database with 16 OCPUs

	No of concurrent queries	Max idle time	CPU shares
HIGH	3	5 mins	4
MEDIUM	20	5 mins	2
LOW	32	1 hour	1

SQL Query Scratchpad

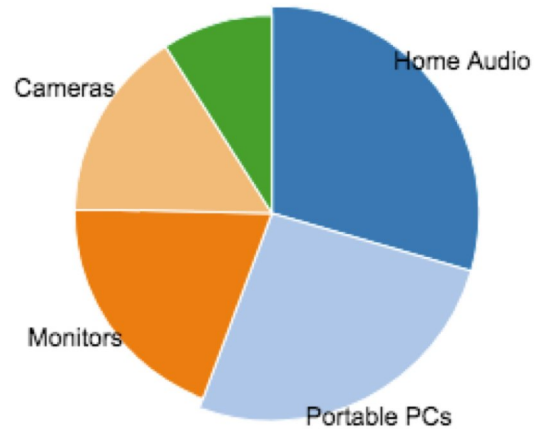


```
SELECT
  prod_subcategory_desc,
  SUM(amount_sold) AS tot_revenue
FROM sh.sales s, sh.times t, sh.products p
WHERE t.calendar_year='2000'
AND s.time_id = t.time_id
AND s.prod_id = p.prod_id
GROUP BY prod_subcategory_desc
ORDER BY 2 desc
FETCH FIRST 5 ROWS ONLY;
```

FINISHED    



● Home Audio ● Portable PCs ● Monitors ● Cameras ● Memory



Took 1 sec. Last updated by GKLDEMO at July 24 2018, 3:16:30 PM. (outdated)

SQL Editor Area
(Show/Hide)

Paragraph

Output Area
(Show/Hide)

OML Markdown Key Concepts

- **Set of predefined markdown tags**
 - **Includes basic HTML tags, e.g. <H1>, <H2>...**
- Markdown tags can be used in:
 - Column selection
 - Setting aggregation methods
 - WHERE, GROUP BY, ORDER BY clause
 - FROM clause
- Note: Markdown is always parsed before SQL is executed
 - *Can't create dynamic input to populate structure of markdown tag*

Simple Documentation Markdown Tags

- Useful tags for dynamic content generation
 - https://sourceforge.net/p/zeppelin/wiki/markdown_syntax/
 - Links
 - [click here for more information](<http://your-specific-url>)
 - Reference Links
 - Use references to [link first URL][1] and like to another URL like [this][2] with hover-text
 - [1]: <http://url-link-1>
 - [2]: <http://url-link-2> "My hover-over text message"
 - Images
 - ![alternate-text-for-image](ImageURL)
 - Basic formatting tags includes HTML heading tags and font-format tags:
 - **use this for italic**
 - ****use this for bold****
 - ******use this for bold and italic******

Paragraph title

Overview - Click 'Show output' to view

FINISHED

Markdown binding

```
%md
The purpose of these reports is to showcase Oracle's unique in-database analytical SQL's features. In these examples,
window functions to create moving averages for 3, 6 and 12 months to make it easier to identify trends in our sales. For
more examples of how to use Oracle's analytic SQL functions please visit our free [liveSQL](http://livesql.oracle.com)
service which runs the very latest version of Oracle Database 18c and checkout our [Analytic SQL]
(http://www.oracle.com/technetwork/database/database-technologies/sql-analytics/overview/index.html) product page on
[OTN](http://www.oracle.com/technetwork/database/database-technologies/sql-analytics/overview/index.html).
```

HTML tag

```
<h5>Top 5 and Next Top 5 Reports</h5>
This report and the one alongside uses the new FETCH FIRST syntax to return just the top five products. This type of
query is often called a Top-N query, and it offers a straightforward way of creating reports or just a simple view of
basic questions, such as "Which are my top selling products?" When you issue a Top-N query, you may also want to specify
an offset: the offset excludes the leading rows of the query result set. The query then returns the specified number or
percent of rows starting with the first row after the offset. An offset enables you to modify typical questions, so that
the question about the most profitable products might skip the top ten products and return only those from eleventh to
twentieth place in the sales rankings. In a similar manner, you could query the products by sales, skip the top ten
products and then return the top 10% of the remaining products.
```

Reference link tag

```
Watch a video by Tom Kyte on [Oracle Database 12c: Easy Top N and Pagination
Queries](https://www.youtube.com/watch?v=FRT1G4gBh7s&autoplay=0&html5=1) where Tom explains about pagination queries
using the row limiting clause to fetch N rows or a percentage of rows in a table. For more information, see the following
links:
```

URL link tag

```
<ul>
<li> [Limiting SQL Rows][4]</li>
<li> [row_limiting_clause][5]</li>
</ul>
```

Image tag

```
[4]:http://www.oracle.com/pls/topic/lookup?ctx=db121&id=DWHSG9188 "This links to an overview of limiting rows within the
data warehousing guide"
[5]:http://www.oracle.com/pls/topic/lookup?ctx=db121&id=SQLRF55636 "This links to the entry for tge SQL Database SQL
Language Reference manual"
<br><br>
![Top-N Queries][TopN]
[TopN]: https://i.ytimg.com/vi/FRT1G4gBh7s/mqdefault.jpg
<br><br>
```

Overview - Click 'Show output' to view

FINISHED

The purpose of these reports is to showcase Oracle's unique in-database analytical SQL's features. In these examples, window functions to create moving averages for 3, 6 and 12 months to make it easier to identify trends in our sales. For more examples of how to use Oracle's analytic SQL functions please visit our free [liveSQL](#) service which runs the very latest version of Oracle Database 18c and checkout our [Analytic SQL](#) product page on [OTN](#).

Top 5 and Next Top 5 Reports

This report and the one alongside uses the new FETCH FIRST syntax to return just the top five products. This type of query is often called a Top-N query, and it offers a straightforward way of creating reports or just a simple view of basic questions, such as "Which are my top selling products?" When you issue a Top-N query, you may also want to specify an offset: the offset excludes the leading rows of the query result set. The query then returns the specified number or percent of rows starting with the first row after the offset. An offset enables you to modify typical questions, so that the question about the most profitable products might skip the top ten products and return only those from eleventh to twentieth place in the sales rankings. In a similar manner, you could query the products by sales, skip the top ten products and then return the top 10% of the remaining products.

Watch a video by Tom Kyte on [Oracle Database 12c: Easy Top N and Pagination Queries](#) where Tom explains about pagination queries using the row limiting clause to fetch N rows or a percentage of rows in a table. For more information, see the following links:

- [Limiting SQL Rows](#)
- [row_limiting_clause](#)



Top-N and Pagination Queries

Now with Oracle Database 12c:

The row_limiting_clause allows you to limit the rows returned by the query.

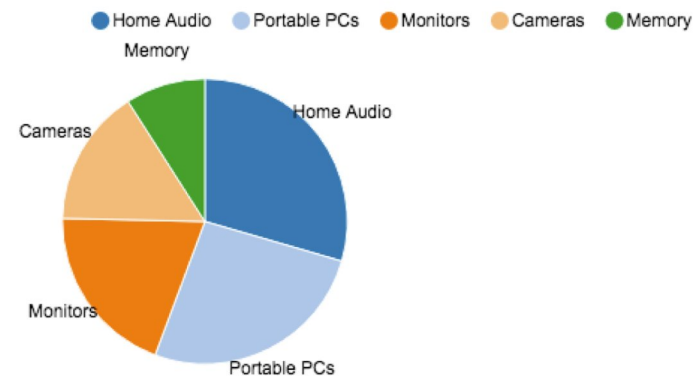


Took 0 sec. Last updated by GKLEMO at July 24 2018, 3:28:01 PM.

Top 5 Selling Subcategories This Year

FINISHED

settings



Took 1 sec. Last updated by GKLEMO at July 24 2018, 3:16:30 PM. (outdated)

OML Markdown Additional Key Concepts

- Set of predefined markdown tags
 - Includes basic HTML tags, e.g. <H1>, <H2>...
- **Markdown tags can be used in:**
 - **Column selection**
 - **Setting aggregation methods**
 - **WHERE, GROUP BY, ORDER BY clause**
 - **FROM clause**
- **Note: Markdown is always parsed before SQL is executed**
 - *Can't create dynamic input to populate structure of markdown tag*

More Sophisticated Markdown Tags

- Useful tags for dynamic content generation
 - <https://zeppelin.apache.org/docs/latest/manual/dynamicform.html#select-form>
 - Simple input box
 - `${formName}` templates.
 - Select form/pulldown selection
 - `${formName=defaultValue,option1(DisplayName)|option2(DisplayName)...}`
 - Checkbox
 - `${checkbox:formName=defaultValue1|defaultValue2...,option1|option2...}`
 - URL Links
 - `[text-for-link] <http://url-to-content>`

Building More Sophisticated Interactive Reports

Sales Dashboard - Channels

default

Distribution Channel Analysis - Table

FINISHED

```

SELECT
  ${checkbox:Columns=channel_total, channel_total(All Channels)|channel_class(Channel Class)|channel_desc(Channel)|calendar_year(Year)|calendar_quarter_desc(Quarter)|calendar_month_desc(Month)|Country_name(Country)|Country_Region(Region)|Country_SubRegion
  (Sub-Region)|country_total(All Countries)},
  SUM(amount_sold) AS sales,
  ${Select calc=Avg, Avg(Average)|Max(Maximum)|Min(Minimum)}(amount_sold) AS calc_sales,
  SUM(quantity_sold) AS qty,
  ${Select calc=Avg, Avg(Average)|Max(Maximum)|Min(Minimum)}(quantity_sold) AS calc_qty
FROM sh.sales s, sh.channels d, sh.times t, sh.customers c, sh.countries g
WHERE s.channel_id = d.channel_id
AND s.time_id = t.time_id
AND s.cust_id = c.cust_id
AND c.country_id = g.country_id
GROUP BY ${checkbox:Columns=channel_total, channel_total(All Channels)|channel_class(Channel Class)|channel_desc(Channel)|calendar_year(Year)|calendar_quarter_desc(Quarter)|calendar_month_desc(Month)|Country_name(Country)|Country_Region(Region)|Country_Sub
Region(Sub-Region)|country_total(All Countries)}
ORDER BY ${checkbox:Columns=channel_total, channel_total(All Channels)|channel_class(Channel Class)|channel_desc(Channel)|calendar_year(Year)|calendar_quarter_desc(Quarter)|calendar_month_desc(Month)|Country_name(Country)|Country_Region(Region)|Country_Sub
Region(Sub-Region)|country_total(All Countries)};
    
```

Select calc

Average

Columns

All Channels Channel Class Channel Year Quarter Month Country Region

Sub-Region All Countries



CHANNEL_TOTAL	CHANNEL_CLASS	CHANNEL_DESC	CALENDAR_YEAR	CALENDAR_QUARTER_DESC	CALENDAR_MONTH_DESC	COUNTRY_NAME	COUNTRY_REGION	COUNTRY_SUBREGION	COUNTRY_TOTAL	SALES	CALC_SALES	QTY	CALC_QTY
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Australia	Oceania	Australia	World total	72,791.98	165.81317	439	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Brazil	Americas	Southern America	World total	1,728.17	576.05667	3	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Canada	Americas	Northern America	World total	50,320.3	232.96435	216	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Denmark	Europe	Western Europe	World total	33,844.27	167.54589	202	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	France	Europe	Western Europe	World total	84,015.78	161.56881	520	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Germany	Europe	Western Europe	World total	166,120.41	151.29363	1,098	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Italy	Europe	Western Europe	World total	96,879.92	160.9301	602	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Japan	Asia	Asia	World total	115,928.17	183.43065	632	1
Channel total	Direct	Direct Sales	1,998	1998-01	1998-01	Singapore	Asia	Asia	World total	42,685.46	215.58313	198	1

Took 1 sec. Last updated by GKLAKE at March 12 2018, 4:40:02 PM. (outdated)

Documenting Interactive Reports

Sales Dashboard - Channels



Briefing Notes - Click 'Show output' to view

FINISHED ▶ ⌘ 📄 ⚙️

%md

The purpose of these reports is to showcase Oracle's unique in-database analytical SQL's features. In these examples we are using a range of different analytical techniques and functions...

<h5>52-Week Revenue Trend Analysis</h5>

The initial data set from the join of the sales fact table to the channel dimension and times dimension tables results in a sparse data set for 1998 in the channel class **Direct**. To create a fully dense report where all weeks are shown, even where there is no data we use a partitioned outer join with a dense set of time data. In the this query, you alias the original query as v and you select data from the times table, which you alias as t. You will find additional rows are added to the output for the missing time values (i.e. where no sales have been made) and these have 0 as their Sales value set to 0 by using the NVL function.

<h5>Quarterly Analysis of Sales by Channel</h5>

Aggregation is a fundamental part of data warehousing. In this report we are using the ROLLUP extension to the GROUP BY clause along with one of the GROUPING functions.

ROLLUP enables a SELECT statement to calculate multiple levels of subtotals across a specified group of dimensions. It also calculates a grand total. ROLLUP is a simple extension to the GROUP BY clause, so its syntax is extremely easy to use. The ROLLUP extension is highly efficient, adding minimal overhead to a query. The action of ROLLUP is straightforward: it creates subtotals that roll up from the most detailed level to a grand total, following a grouping list specified in the ROLLUP clause.

The GROUPING_ID function is used to determine to programmatically determine which result set rows are subtotals, and the exact level of aggregation for a given subtotal. This information is then used to substitute new descriptions for each dimension member, i.e. "All Quarters" and "All Channels".

For more information about the ROLLUP function [go here][6] and for more information Grouping Functions [go here][7].

[6]:<https://docs.oracle.com/en/database/oracle/oracle-database/18/dwhsg/sql-aggregation-data-warehouses.html#GUID-01BBD582-E149-47D7-A4F8-F50C1AAC66AA> "This links to the section on ROLLUP in the 18c Data Warehouse Guide"

[7]:<https://docs.oracle.com/en/database/oracle/oracle-database/18/dwhsg/sql-aggregation-data-warehouses.html#GUID-E4251C0F-8AD7-4826-BE35-845E5CE6C818> "This links to the section on Grouping Functions in the 18c Data Warehouse Guide"

<h5>Distribution Channel Analysis - Table</h5>

This report is designed to highlight how to use some of the Oracle ML markdown constructs such as **CHECKBOX** and **SELECT**. There is more information about the markdown tags:

- [Apache Zeppelin Documentation][8]

- [Zeppelin Wiki Page][9]

[8]:<https://zeppelin.apache.org/docs/0.7.0/manual/dynamicform.html> "This is the Zeppelin doumentation page for dynamic form markdown tags"

[9]:https://sourceforge.net/p/zeppelin/wiki/markdown_syntax/ "This is SourceForge Zeppelin Markdown Syntax Guide page which is managed by alisonobrien, pminev"

<h5>Using the Report Menu</h5>

All the graphs are interactive so you can drill down by clicking on a product label such as **Electronics** or **Hardware**. The trend analysis graph allows you to select the time period and the product category as filters for the graph data set.If you want to reset a grah simply press the triangle icon in the top-right menu ![ML Menu Icons][MenuIcons]

[MenuIcons]:https://lh3.googleusercontent.com/--tHD5Mo8n8M/WRxRE7wCSGI/AAAAAAAAADRs/VEv2DVwNVeo41QgveLQ1yJmtxseJeTo8wCHM/fullsizeoutput_1079.jpeg

Download Sample Notebooks

- Sales Analysis series of notebooks
 - Based on sales history schema (SH)
 - Includes 5 notebooks:
 - Overview, Channel Analysis Dashboard, Customer Analysis Dashboard, Product Analysis Dashboard, adhoc analysis
 - Download links - <https://www.dropbox.com/s/2if07dja88y8s1u/Sales-Analysis.zip?dl=0>
- Customer Insight Analytics series of notebooks
 - Machine learning using sales history schema (SH)
 - Includes 8 notebooks covering machine learning examples
 - Download links - <https://www.dropbox.com/s/47oj06yw4g0e654/Deep-Customer-Analytics.zip?dl=0>

It is all about Visualizing Data

- 🌐 Why Visualizing Data is so Important
- 🌐 Introduction to Autonomous Data Warehouse Cloud Service
- 🌐 Introduction to Oracle Data Visualization Desktop
- 🌐 Gain insights from data in the ADWC
- 🌐 **Conclusion**

Credit Score Predictions Simplified ...

▶ ⌂ 📄 🗑️ ⬇️ ⌨️ ⚙️ default ▾

Targeting Likely Good Credit Customers using Oracle Machine Learning's (OML) Classification Models

Heather has spent most of her time over the past couple of years extracting and preparing data for analysis. The large volumes of data need extracting and processing mean she spends most of her time waiting for jobs to finish and very little of her time analyzing the data. Demands from marketing are forcing a new approach whereby the data remains in the data warehouse and is processed there. The alternative cloud solution is more complex, and has no direct out of the box processes to analyze the data in place. She started taking a look at Oracle, and found the simple SQL commands in ADWC are familiar, and execute extremely fast, leveraging all the performance features of the platform. Further once she is done can can apply the learning models to incoming data on the fly, and allow end user analysts to immediately see mining results. This drastically reduces the cycle of data preparation, analysis, and publishing. It also means there is no change to analysis/reporting Data Visualization toolset that users are familiar with.

Scroll down this notebook and learn how to use OML to create predictive perspectives on data in ADWC, WITHOUT moving it. We will process a small 100k data set, but could use a 100M or billion row data set without worrying about processing time.

This is an extract of Alphaoffice customer information. We will first get acclimated to Apache Zeppelin, the open source interface for interactive collaboration in a team environment.

The Business Problem:

Increase Sales by Targeting our Best Customers; Good Credit Customers!

Heather has a hunch that weakening sales may be due to the company selling to non-optimal customers; customers who

FINISHED ▶ ⌂ 📄 ⚙️



Bank Name
1234 5678 9876 5432
1234 12/18
CARDHOLDER

Took 0 sec. Last updated by CHARLIE at July 16 2018, 12:58:40 PM. (outdated)

Credit Score Predictions Simplified ...

STEP 6: Review Data by Occupation

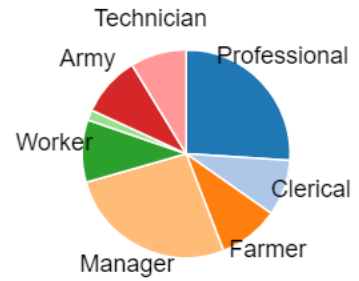
FINISHED

```
%sql
-- This shows an alternative presentation style - a pie chart. Note that Zeppelin
visualizations are limited. In lab 400 we will use Oracle Data Visualization to
create more more interesting perspectives.
```

```
select customer_id, age, income, tenure, loan_type, loan_amount, occupation,
marital_status
from credit_scoring_100k_v where rownum < 1000
```

settings

- Professional
- Clerical
- Farmer
- Manager
- Worker
- NaN
- Army
- Technician



Took 0 sec. Last updated by CHARLIE at July 30 2018, 3:41:48 PM.

Another Pie Chart Example

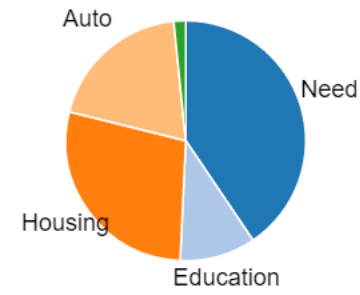
FINISHED

```
%sql
-- This shows an alternative presentation style - a pie chart. Note that Zeppelin
visualizations are limited. In lab 400 we will use Oracle Data Visualization to
create more more interesting perspectives.
```

```
select customer_id, age, income, tenure, loan_type, loan_amount, occupation,
marital_status
from credit_scoring_100k_v where rownum < 1000
```

settings

- Need
- Education
- Housing
- Auto
- NaN



Credit Score Predictions Simplified ...

STEP 9: Enough with Simple Charting; Let's Run Some OML Machine Learning Algorithms! FINISHED ▶ 🔄 📖 ⚙️

Create Attribute Importance Machine Learning Model for Good Credit Customers FINISHED ▶ 🔄 📖 ⚙️

```

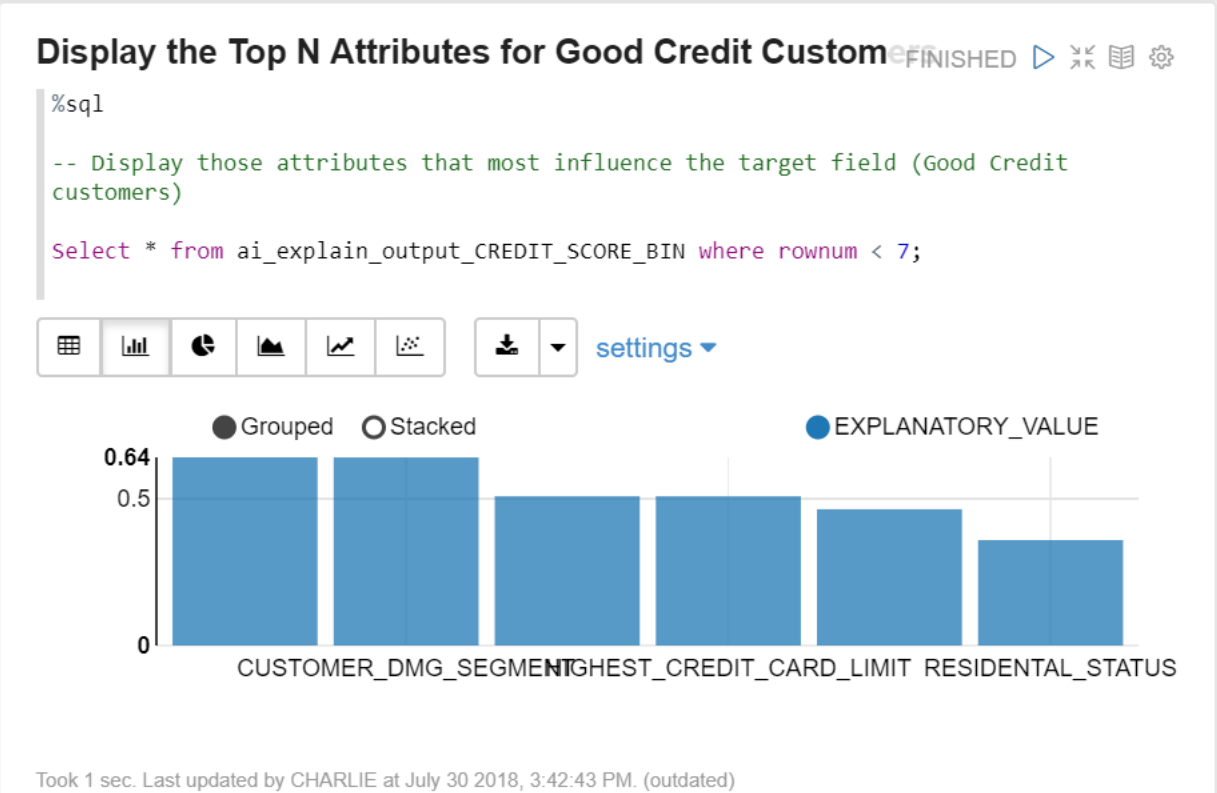
%script
-- Find the importance of attributes that independently impact the target attribute:
CREDIT_SCORE_BIN

DECLARE
v_sql varchar2(100);

BEGIN
BEGIN EXECUTE IMMEDIATE 'DROP TABLE ai_explain_output_credit_score_bin';
EXCEPTION WHEN OTHERS THEN NULL;
END;

BEGIN
  DBMS_PREDICTIVE_ANALYTICS.EXPLAIN(
    data_table_name      => 'CREDIT_SCORING_100K_V',
    explain_column_name => 'CREDIT_SCORE_BIN',
    result_table_name   => 'AI_EXPLAIN_OUTPUT_CREDIT_SCORE_BIN');
END;

End;
    
```



Credit Score Predictions Simplified ...

STEP 11: Create Predictive Model to Target Good Credit Customers

FINISHED

Now that Heather has found the key attributes that most influence finding more Good Credit customers and also making better Maximum Credit Card Amount decisions, she wants to leverage Oracle Machine Learning's powerful in-Database, parallelized algorithms to build predictive models that help her company to better target "the right customers" with the "right offers".

Lets' quickly review the machine learning process:

Problem Definition: Target Good Credit Customers

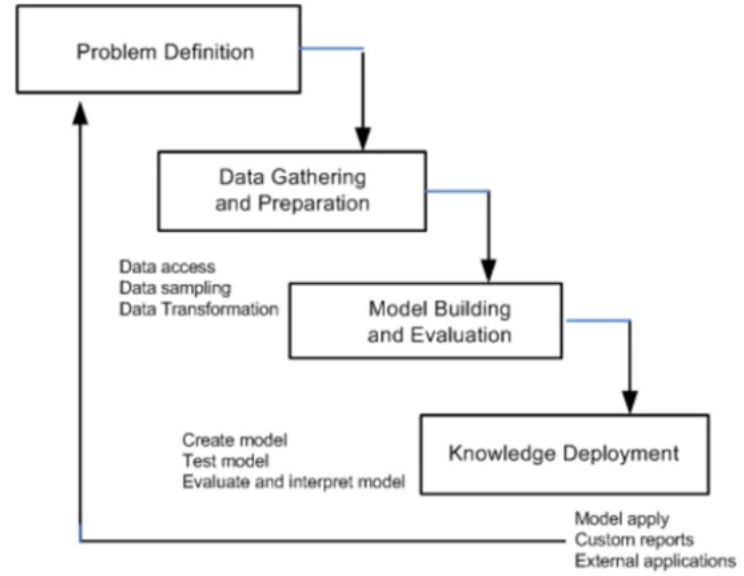
Data Gathering and Preparation: We've assembled 100K records with 100+ variable about each customer and have created a target field (Good Customer/Other Customer) so we can use OML's Supervised Algorithms, specifically let's start by using a decision tree algorithm.

Model Building and Evaluation: We'll create a randomly selected sample from our Credit_Scoring_100k historical data and use 60% as training data for the machine learning model building phase. Then, we'll use the remaining 40% as a holdout sample to test our model's accuracy using various model evaluation tools such as a "lift chart".

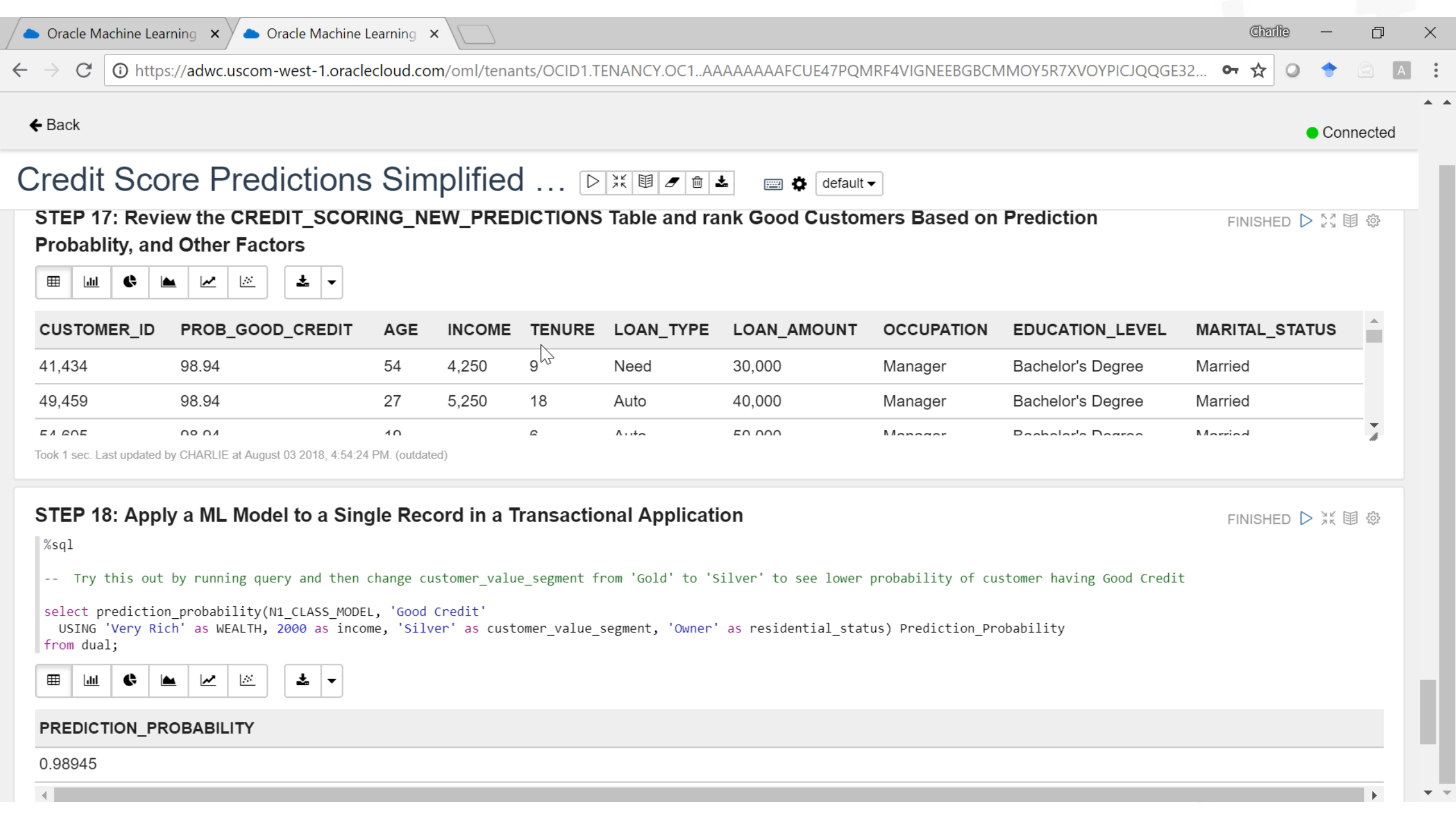
Knowledge Deployment: Once we're satisfied that we have a useful ML model that can predict with some accuracy which customers we should target (Good Credit customers), we want to apply our OML model to new customer data inside ADWC and then take a deeper look a them. Lastly, we'll jump over to Oracle Analytics Cloud for a more interactive, exploratory data analysis experience but now focusing on our customers of interest (Good Credit customers).

Took 0 sec. Last updated by CHARLIE at July 19 2018, 3:06:35 PM. (outdated)

Data Mining and Machine Learning Process



Took 0 sec. Last updated by CHARLIE at July 16 2018, 5:31:12 PM. (outdated)



Credit Score Predictions Simplified ...

STEP 17: Review the CREDIT_SCORING_NEW_PREDICTIONS Table and rank Good Customers Based on Prediction Probability, and Other Factors

FINISHED

Grid, Bar, Pie, Line, Area, Scatter, Download, More

CUSTOMER_ID	PROB_GOOD_CREDIT	AGE	INCOME	TENURE	LOAN_TYPE	LOAN_AMOUNT	OCCUPATION	EDUCATION_LEVEL	MARITAL_STATUS
41,434	98.94	54	4,250	9	Need	30,000	Manager	Bachelor's Degree	Married
49,459	98.94	27	5,250	18	Auto	40,000	Manager	Bachelor's Degree	Married
51,605	98.94	40	6,000	6	Auto	50,000	Manager	Bachelor's Degree	Married

Took 1 sec. Last updated by CHARLIE at August 03 2018, 4:54:24 PM. (outdated)

STEP 18: Apply a ML Model to a Single Record in a Transactional Application

FINISHED

```
%sql
-- Try this out by running query and then change customer_value_segment from 'Gold' to 'Silver' to see lower probability of customer having Good Credit
select prediction_probability(N1_CLASS_MODEL, 'Good Credit'
  USING 'Very Rich' as WEALTH, 2000 as income, 'Silver' as customer_value_segment, 'Owner' as residential_status) Prediction_Probability
from dual;
```

Grid, Bar, Pie, Line, Area, Scatter, Download, More

PREDICTION_PROBABILITY

0.98945

Targeting High Credit Customers - Project

Prepare Visualize Narrate Save

ATTRIBUTE_NAME
CONSUMER_FINDE... WEALTH, +15

Pivot

Columns

Rows
ATTRIBUTE_...

Values
IMPORTANC...
RANK

Color

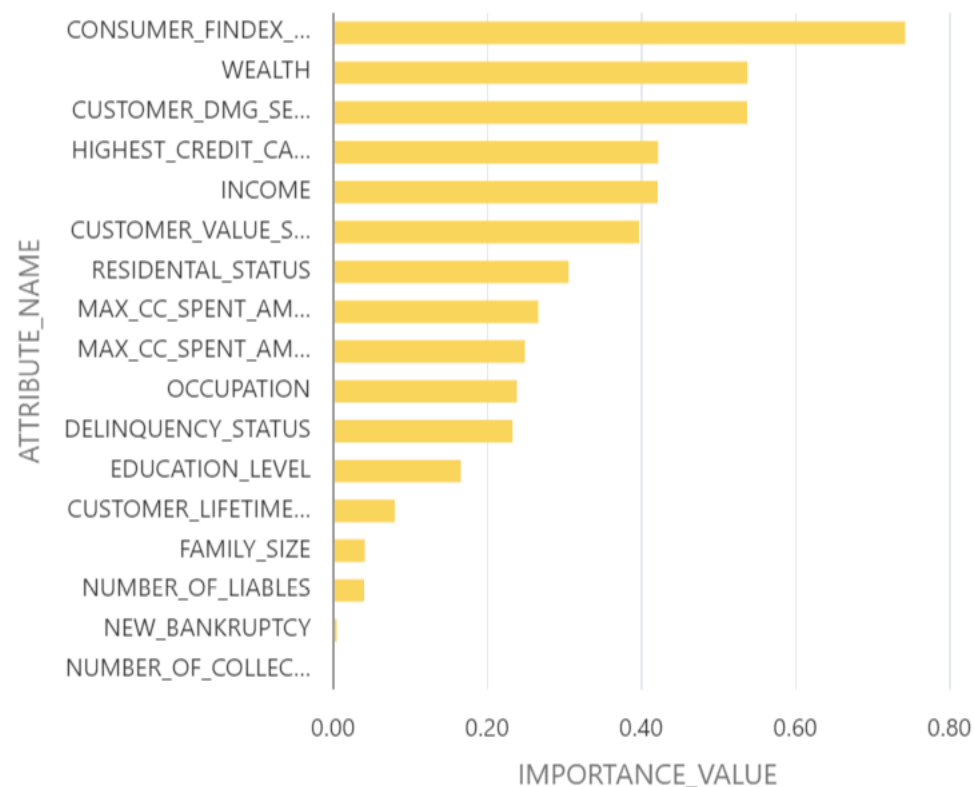
Size

Shape

IMPORTANCE_VALUE, RANK by ATTRIBUTE_NAME

	IMPORTANCE_VALUE	RANK
CONSUMER_FINDE...	0.74	1
CUSTOMER_DM...	0.54	3
CUSTOMER_LIFETIME...	0.08	13
CUSTOMER_VAL...	0.40	6
DELINQUENCY...	0.23	11
EDUCATION_L...	0.17	12
FAMILY_SIZE	0.04	14
HIGHEST_CREDI...	0.42	4
INCOME	0.42	5
MAX_CC_SPEN...	0.25	9
MAX_CC_SPEN...	0.27	8
NEW_BANKRUPTCY	0.00	16
NUMBER_OF_C...	0.00	17
NUMBER_OF_LI...	0.04	15
OCCUPATION	0.24	10

IMPORTANCE_VALUE by ATTRIBUTE_NAME



Where to get more information

- Product information: cloud.oracle.com/datawarehouse
- **Documentation**
 - ADW: <https://docs.oracle.com/en/cloud/paas/autonomous-data-warehouse-cloud/index.html>
 - Oracle ML: <https://docs.oracle.com/en/cloud/paas/autonomous-data-warehouse-cloud/omlug/getting-started-oracle-machine-learning1.html>
- Hands-on **Workshop**
 - <https://oracle.github.io/learning-library/workshops/journey4-adwc>

Where to get more information

- New **Q&A Forum** on Cloud Customer Connect
 - <https://cloudcustomerconnect.oracle.com/resources/32a53f8587/summary>
- **Forbes**: Autonomous Capabilities Will Make DBAs More Valuable
 - <https://www.forbes.com/sites/oracle/2018/03/21/autonomous-capabilities-will-make-data-warehouses-and-dbas-more-valuable/#73b134c6624e>
- **Oracle Analytics Library (Example and Tutorials)**
 - <https://www.oracle.com/solutions/business-analytics/data-visualization/library-overview.html>
- **Oracle Data Visualization Desktop (Download)**
 - <https://www.oracle.com/middleware/technologies/oracle-data-visualization-desktop.html>



COLLABORATE 19

TECHNOLOGY AND APPLICATIONS FORUM
FOR THE ORACLE COMMUNITY

fmunozalvarez@dataintensity.com

Session ID:

10730

Remember to complete your evaluation for this session within the app!

#C19TX