

**ORACLE**  **LIVE**

# Oracle Autonomous Data Warehouse

Empowering business innovators on the cloud

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# NEW Expanded Vision for Autonomous Data Warehouse

Empowering innovators with new self-service data management tools

## Data Analysts



## Data Scientists



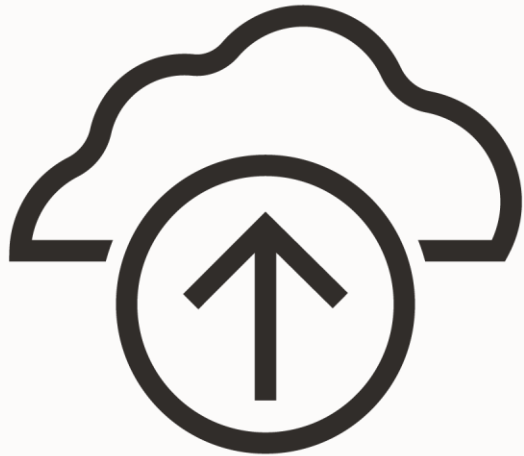
## LoB Developers



# NEW Self-Service Tools for Data Analysts

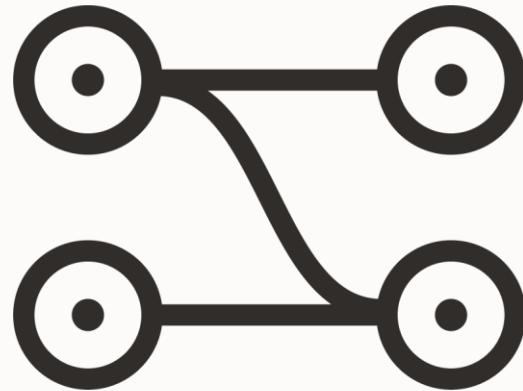
From data to insights with built-in self-service data tools

## NEW Load



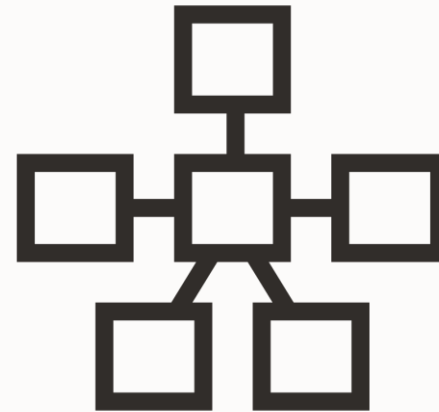
Simple drag & drop loading

## NEW Transforms



Declarative transformations and data cleansing

## NEW Business Model



Automatically create powerful business models

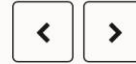
## NEW Insights



Guided discovery of hidden patterns and anomalies

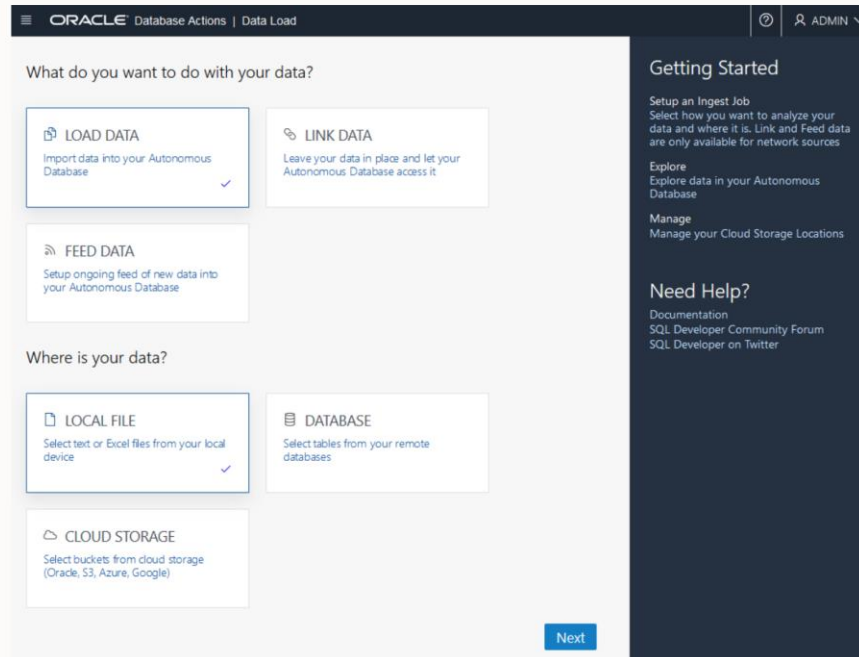
# Loading data warehouse tables – Autonomous Data Warehouse

## Load Data with Oracle Database Actions



Oracle Database Actions provides a web-based interface that provides development, data tools, administration, and monitoring features and lets you load or access data from local files or remote databases.





On the Database Actions Data Load page, you can choose to load data from a file on your local device or from a database. You can also choose to explore the data in your Oracle Autonomous Database. See [The Data Load Page](#) for detailed information on the data loading options using Database Actions.







<https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/load-data-database-actions.html>



## Development

 SQL Execute queries and scripts, and create database objects	 DATA MODELER Create relational diagrams for database objects
 REST Deploy REST APIs for your database	 JSON Manage your JSON Document Database

## Data Tools

 DATA LOAD Load or access data from local files or remote databases	 CATALOG Understand data dependencies and the impact of changes
 DATA INSIGHTS Discover anomalies, outliers and hidden patterns in your data	 BUSINESS MODELS Create business models for performance and analysis

## Getting Started

**RESTful Web Services**

Deploy REST APIs for your Oracle database - GET, PUT, POST 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.

**Available On-Premises**

SQL Developer Web is now available for your On-Premises Oracle Databases too!

## Need Help?

[Documentation](#)

[SQL Developer Community Forum](#)

[SQL Developer on Twitter](#)

# Data Load

## Simple “drag-and-drop” data loading

- Files on local computer
- Files in Cloud Storage (including AWS S3 & Azure Blob Storage)
- Oracle Databases (on-premises and in cloud)

ORACLE Database Actions | Data Load

What do you want to do with your data?

- LOAD DATA**  
Import data into your Autonomous Database ✓
- LINK DATA**  
Leave your data in place and let your Autonomous Database access it
- FEED DATA**  
Setup ongoing feed of new data into your Autonomous Database

Where is your data?

- LOCAL FILE**  
Select text or Excel files from your local device ✓
- DATABASE**  
Select tables from your remote databases
- CLOUD STORAGE**  
Select buckets from cloud storage (Oracle, S3, Azure, Google)

Next

Explore and Connect

- EXPLORE**  
Inspect data in your Autonomous Database
- CLOUD LOCATIONS**  
Manage connections to your cloud storage (Oracle, S3, Azure, Google)

**Getting Started**

- Setup an Ingest Job**  
Select how you want to analyze your data and where it is. Link and Feed data are only available for network sources
- Explore**  
Explore data in your Autonomous Database
- Manage**  
Manage your Cloud Storage Locations

**Need Help?**

- Documentation
- SQL Developer Community Forum
- SQL Developer on Twitter

# Data Transforms

## Simple “drag-and-drop” data transformations

- Auto code generation for all ODI sources and targets including Fusion, NetSuite and Salesforce
- Built-in data quality

## Based upon Oracle Data Integrator

- New, easy-to-use web UI
- Simple migration to ADB for ODI customers
- Exposes all built-in database operators

The screenshot displays the Oracle Data Transforms web interface. The top navigation bar includes the Oracle logo and the text 'Data Transforms Powered by Oracle Data Integrator'. The main header shows the project path 'Projects » MovieStream » Data Flow Details' and the specific project name 'MovieStream\_Q2FY2020'. On the left, there is a 'Data Entities' panel with dropdown menus for 'Connection' (set to 'All') and 'Schema' (set to 'All'), and a search field. Below this is a tree view showing a folder named 'QTEAM'. The central workspace is a grid-based canvas where a data flow diagram is being constructed. It features four data entity nodes: 'MOVIE\_SALES\_...' (top left), 'Q2\_Only' (top right), 'Fix\_AllCap\_Days' (bottom left), and another 'MOVIE\_SALES\_...' (bottom right). Arrows indicate the flow: from the top-left node to the top-right node, from the bottom-left node to the bottom-right node, and from the bottom-left node to the top-right node. Above the canvas, there are tabs for 'DATA TRANSFORM' and 'DATA PREPARATION', with the latter being active. Below these tabs are icons for various operators: 'Data Cleanse', 'Binning', 'Lead', 'Lag', and 'Replace'. On the right side, a metadata panel for 'MovieStream\_Q2FY2020' is visible, showing the name and a description: 'Extract & fix data for Q2 FY2020'. The bottom right corner of the slide features the Oracle logo.

# Business Models

## Analytic Views

- Enable high-performance multi-dimensional analysis over relational data

## Automatic creation

- Business models embedded in ADW

## Automatic multi-dimensional cache

- For both local and remote data

## Use with any analytics tool

- Standard SQL queries
- No application changes required

The screenshot shows the Oracle Database Actions 'Create Business Model' interface. The central focus is a multi-dimensional model for the 'MOVIE\_SALES\_2020Q2' fact table. The model is defined by four dimensions: 'DAYS', 'MONTHS', 'COUNTRIES', and 'DEVICES'. Each dimension is represented by a box containing its constituent measures. The 'MOVIE\_SALES\_2020Q2' fact table is connected to these dimensions via lines, indicating the relationships between the fact and the dimension measures.

The interface includes a sidebar on the left with navigation options like 'Search', 'Schema', 'S', 'Wel', 'Busine', 'Your e', 'Busine', and 'You cr'. The top navigation bar shows 'ORACLE Database Actions | Business Models' and a user profile 'QTEAM'. The main area has tabs for 'General', 'Data Sources', 'Hierarchies', and 'Measures'. The 'Measures' tab is active, showing the model structure. At the bottom right, there are buttons for 'Previous', 'Next', 'Create', and 'Cancel'. The bottom status bar shows system icons and a message: '5:49:45 AM - REST call resolved successfully.'



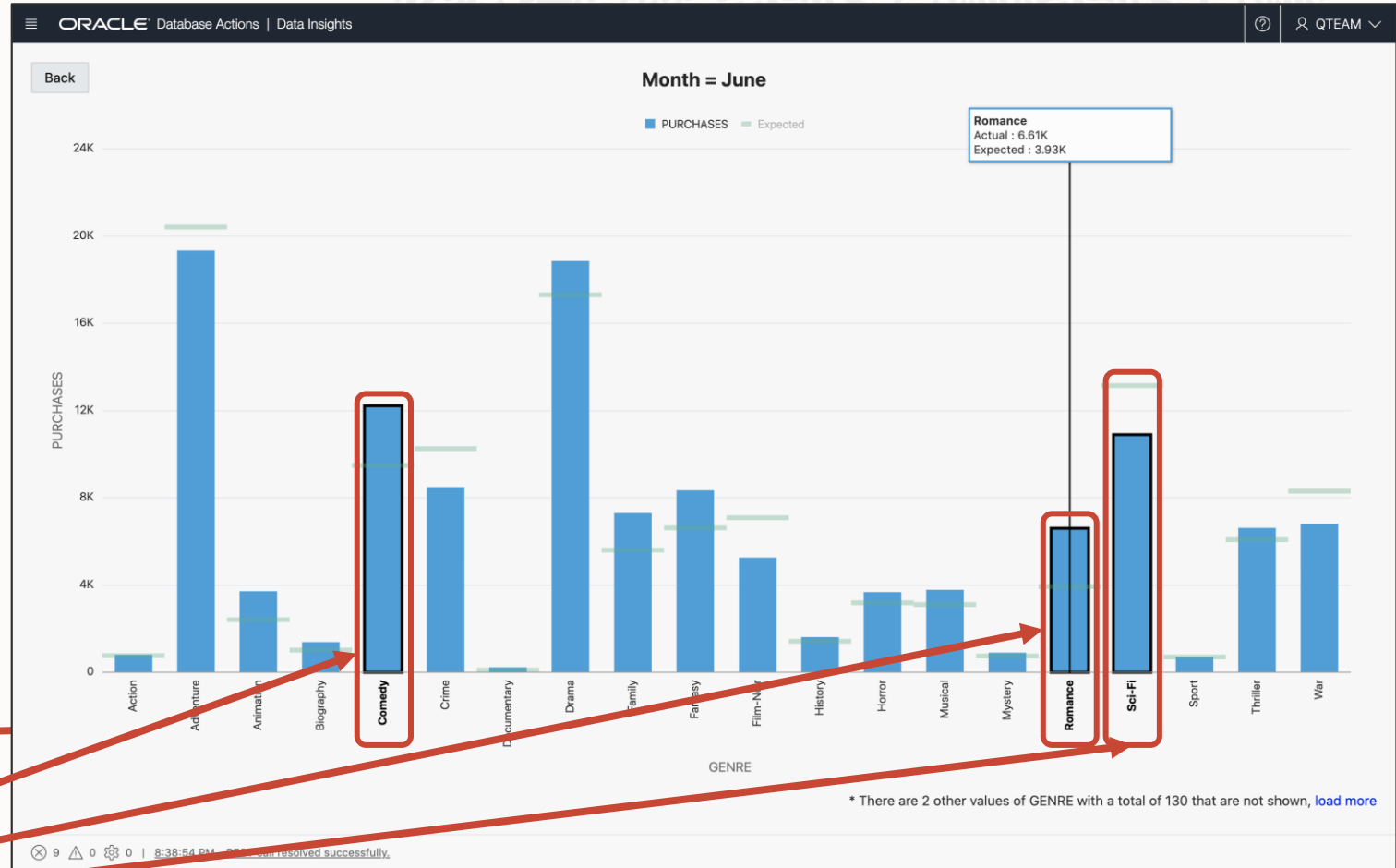
# Data Insights

## Automatic insight discovery

- Crawls over business model, running as background process
- Discovers hidden patterns, anomalies and outliers
- Variety of algorithms including regression slope

## Usage

1. Drill down on specific insight
2. Significant differences between predicted and actual values highlighted



# Catalog

## Data lineage and impact analysis

### Built-in metadata repository

- Shared across all components
- Future integration with OCI Data Catalog

### UI for data lineage and impact analysis

- Visible to all users
- SQL and PL/SQL interfaces

The screenshot displays the Oracle Database Actions Catalog interface. The main window shows a data lineage diagram for the schema MOVIE\_SALES\_2020Q2. The diagram illustrates the flow of data from source tables to various intermediate and final tables. A tooltip is visible over one of the tables, providing details:

- Name: MOVIE\_SALES\_2020Q2\_MODEL\_GEN\_RE\_HIER
- Application: DATABASE
- Type: HIERARCHY
- Path: "DB"."MOVIE\_SALES\_2020Q2\_MODEL\_GEN\_RE\_HIER"
- Schema: QTEAM

The diagram also shows a table structure for MOVIE\_SALES\_2020Q2\_MODEL\_GEN\_RE\_HIER with columns: DEPTH, GENRE\_ATTR, HIER\_ORDER, IS\_LEAF, LEVEL\_NAME, MEMBER\_CAPTION, MEMBER\_DESCRIPTION, MEMBER\_NAME, MEMBER\_UNIQUE\_NAME, PARENT\_LEVEL\_NAME, PARENT\_UNIQUE\_NAME, and GENRE.

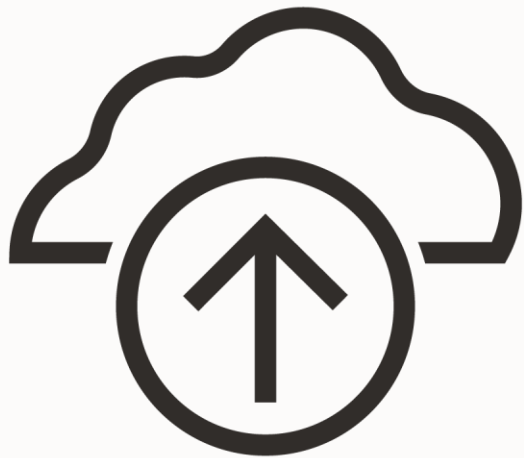
The interface includes a left sidebar with filters for Schema (QTEAM), Entity type (ANALYTIC\_VIEW), Sort by (Entity name), and Filters (Show system tables, Show private tables). The main window has tabs for Preview, Lineage, Impact, Statistics, and Data Definition.



# NEW Self-Service Tools for Citizen Data Scientists

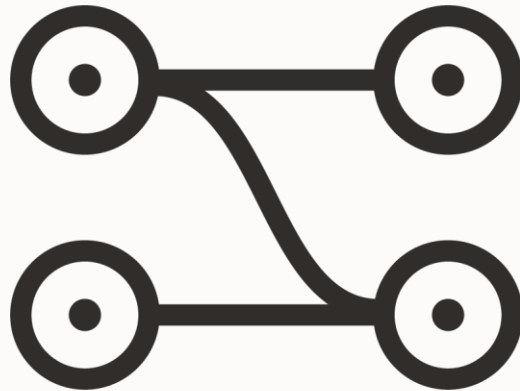
Build and deploy machine learning models quickly and easily

## NEW Load



Simple drag & drop loading

## NEW Transform



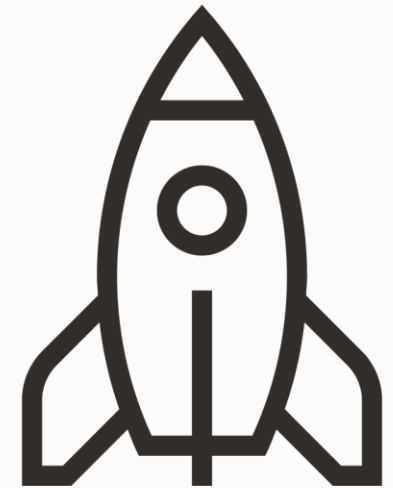
Explore, prepare and transform data sets

## NEW Model



Easily create models with AutoML

## NEW Deploy



Integrate ML models into apps via REST or SQL

# Built-in Machine Learning Algorithms and Functions

## Classification

- Naïve Bayes
- Logistic Regression
- Decision Tree
- Random Forest
- Neural Network
- Support Vector Machine
- Explicit Semantic Analysis
- **XGBoost\***

## 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

## Regression

- Linear Model
- Generalized Linear Model
- Support Vector Machine
- Stepwise Linear regression
- Neural Network
- **XGBoost\***

## 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
- 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 & Python

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



# Self-Service Tools for **LoB Developers**

Modern tools to build data-driven apps fast

## Low-Code AppDev

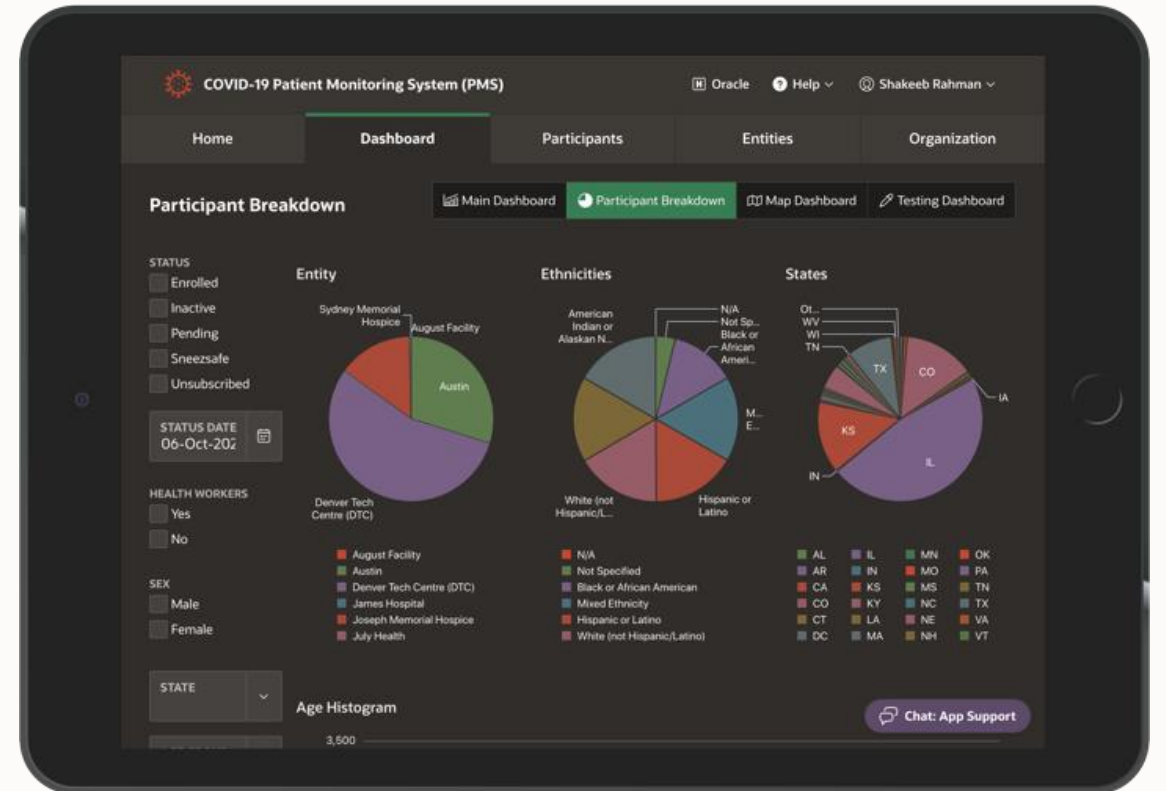


Build, deploy and manage data-driven applications

## API Driven Development



RESTful Services and open standard APIs



# MineSense accelerates time to value

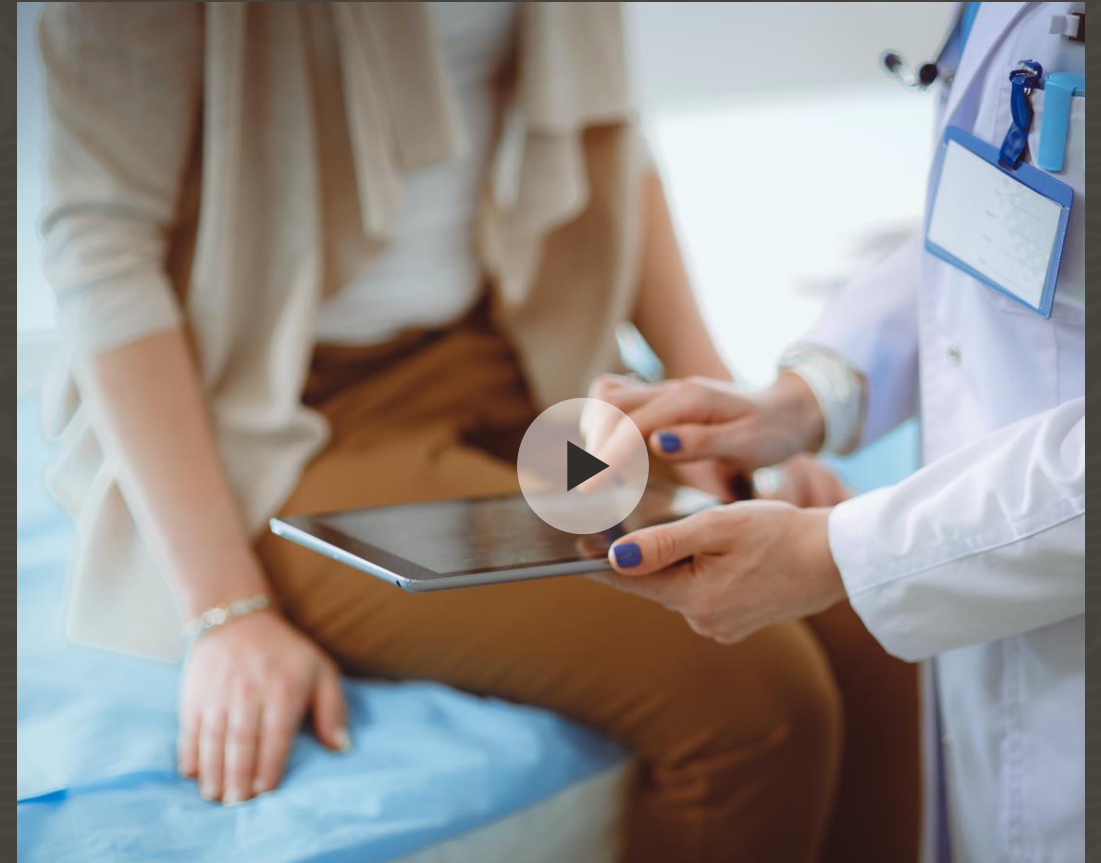
- Leader in intelligent digital mining improves operational profitability and sustainability
- ADW ingests GBs of daily IoT sensor data at 2X faster performance and with flexible auto-scaling
- 65% reduction in DBA workloads increases productivity on development and reporting
- Built-in APEX speeds development to deployment of new low code apps from 6 weeks to 1 week





## Sensa Analytics speeds healthcare intelligence

- Leading analytics firm helps hospitals and surgery centers become more efficient
- ADW securely and easily gathers data from multiple EMR, accounting, and patient systems
- Created COVID-19 testing app with built-in APEX in 1 month compared to 4-5X longer in Python
- Analytics allows physicians and to visualize insurance rates with surgery costs
- Medical institutions and professionals focus less on administration and more on patient care



# Autonomous Data Warehouse **Is Open**

Strong integration with third-party tools and other clouds

## Use with **your choice of tools**

### Business Analytics

**ORACLE**  
Analytics Cloud



### Data Integration

**ORACLE**  
GoldenGate  
Data Integrator  
OCI Data Integration



## Easily use with data and tools in **other clouds**

### Load from **AWS, Azure, Google**

- Built-in loading from object storage

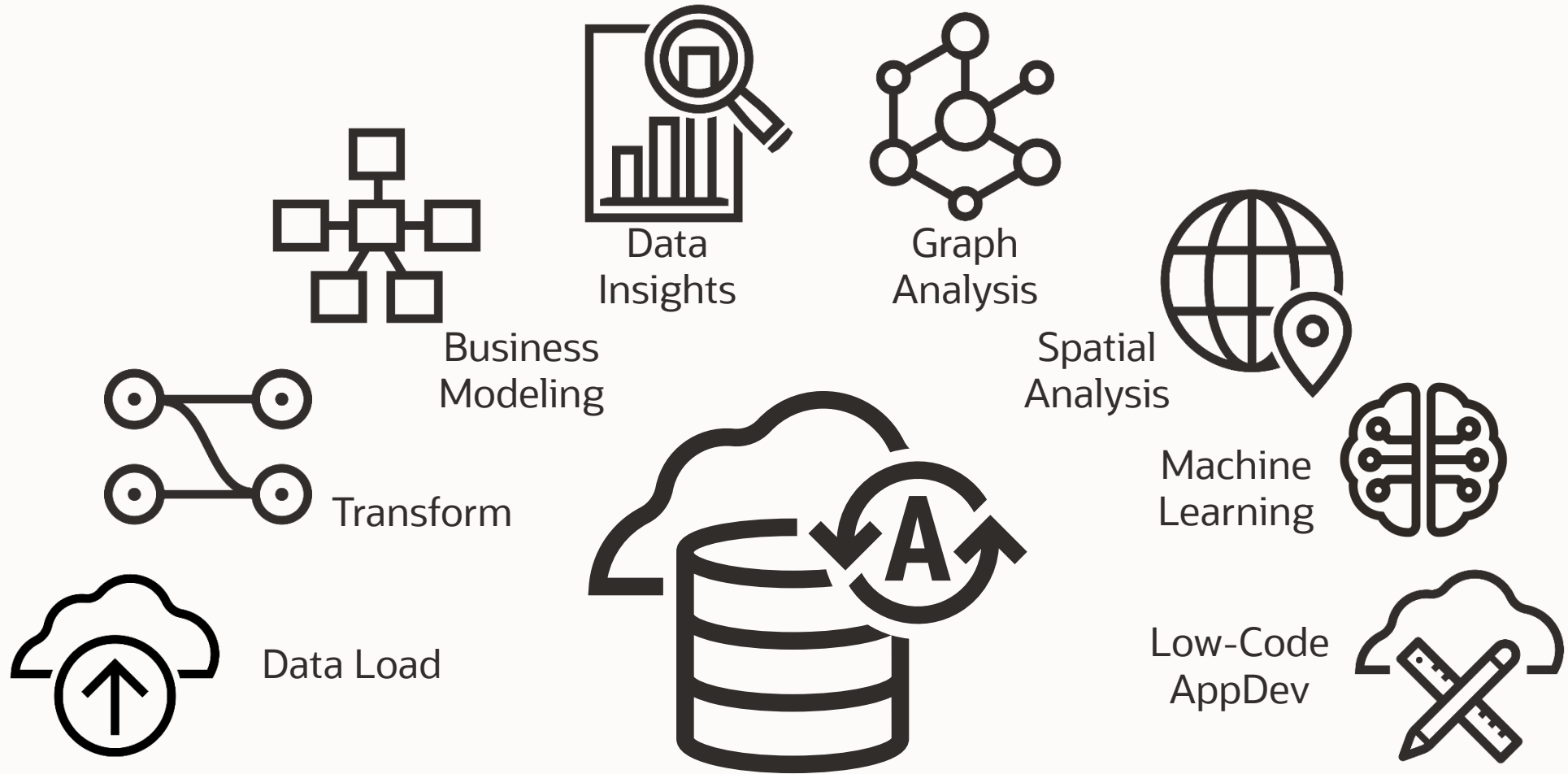
### Cross-cloud interconnect between **Oracle and Microsoft Azure regions**

- Simpler integration of Azure-based systems with Autonomous Data Warehouse



# Oracle Autonomous Data Warehouse

Empowering innovators with new self-service data management tools



ORACLE