AI/ML made easy with Oracle Machine Learning

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Driving real business impact with ML

Reduce fraud

Identifies £1 billion in potential savings

Read More

Improve customer acquisition

52% reduction in cost of customer acquisition
25% revenue growth

Read More

Better track check cashing behaviour in real time. Reduce Risk.

10% reduction in fraud
Improved customer service with lower decline rate

Read More

Better understand customer segments & predict how an offer will fare

3X increased ad / offer conversion

Read More

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If you are an Oracle DB user, leveraging ML is easier to implement than you think

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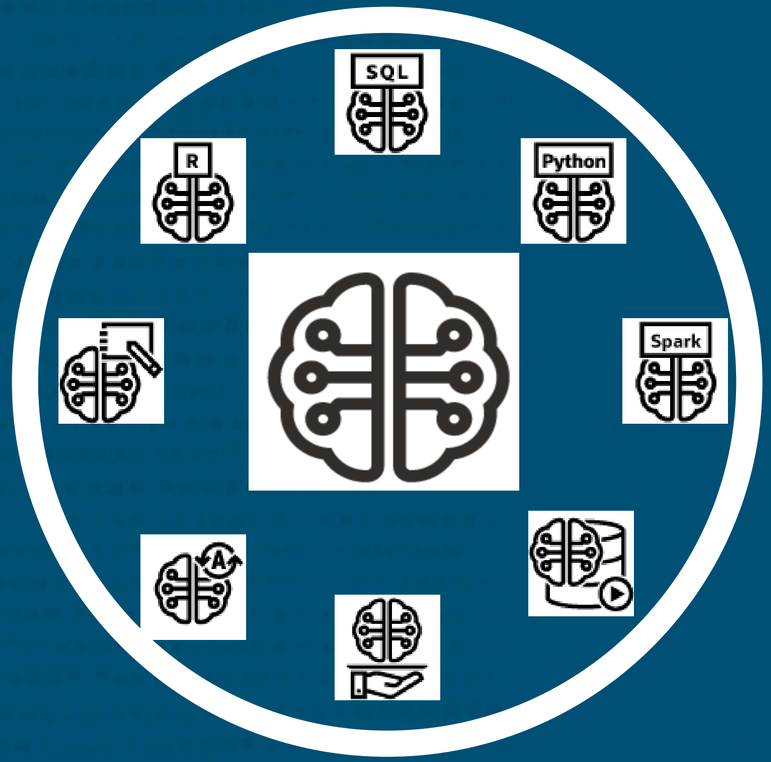
Bring the algorithms where the data is

Machine learning algorithms in the database kernel software
- Eliminate data movement
- Simplify solution architecture
- Accelerate solution development and deployment
- Augment applications and dashboards with ML

Over 30 scalable in-database ML algorithms
Accessible via SQL, R and Python APIs
Accessible via Automated no-code user interfaces

Oracle Machine Learning database features included with Oracle Database & Oracle Autonomous Database



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Oracle Machine Learning In-Database Algorithms

Address a wide range of business problems

Classification

- Customer lifetime value prediction
- Loan prepayment prediction
- Probability of default
- Customer loyalty
- Churn prediction
- Customer acquisition

Survival Analysis

- Churn prediction

Row Importance

- Influence prediction

Ranking

- Churn prediction

Regression

- Demand forecasting
- Sales and revenue forecasting
- ATM withdrawal forecasting
- Customer lifetime value prediction

Feature Extraction

- Pattern recognition
- Image processing

Attribute Importance

- Next best offer
- Churn prediction
- Customer acquisition

Time Series

- Demand forecasting
- Sales and revenue forecasting
- ATM withdrawal forecasting

Clustering

- Customer segmentation
- Document classification
- Location-based house value analysis

Anomaly Detection

- Fraud detection
- Network intrusion detection
- Unusual case identification

Association Rules

- Product cross sell and upsell
- Product bundling

OML Algorithm Cheat Sheet
Algorithm Documentation

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Build in-database models using SQL, R, Python

Build a ML model with OML APIs to determine which customers are likely buy travel insurance

PL/SQL

```
DECLARE
    v_setlst DBMS_DATA_MINING.SETTING_LIST;
BEGIN
    v_setlst('ALGO_NAME')   := 'ALGO_SUPPORT_VECTOR_MACHINES';
    V_setlst('PREP_AUTO')   := 'ON';
    DBMS_ .CREATE_MODEL2(
        MODEL_NAME           => 'BUY_TRAVEL_INSUR',
        MINING_FUNCTION      => 'CLASSIFICATION',
        DATA_QUERY           => 'select * from CUSTOMERS',
        SET_LIST             => v_setlst,
        CASE_ID_COLUMN_NAME => 'CUST_ID',
        TARGET_COLUMN_NAME   => 'BUY_TRAVEL_INSURANCE');
END;
```

```
ore.sync(table="CUSTOMERS")

settings = list(model_name="BUY_TRAVEL_INSUR")
svm.mod <- ore.odmSVM(Species~.,train.dat,
                      odm.settigs = settings)
```

```
CUSTOMERS = oml.sync(table="CUSTOMERS")
X = CUSTOMERS.drop(" BUY_TRAVEL_INSURANCE")
y = CUSTOMERS["BUY_TRAVEL_INSURANCE"]

svm_mod = svm()
svm_mod = svm_mod.fit(X, y,
                      model_name = 'BUY_TRAVEL_INSUR')
```

Apply a machine learning model to predict probability that individual customer is likely to buy

```
SELECT prediction_probability(BUY_TRAVEL_INSUR, 'Yes'
  USING 98400 as income, 45 as age, 'Married' as marital_status, 2 as num_previous_cruises)
FROM dual;
```

SQL | All Rows Fetched: 1 in 0.043 seconds

	PREDICTION_PROBABILITY(BUY_INSUR1,'YES'USING3
1	0.9276956709910801

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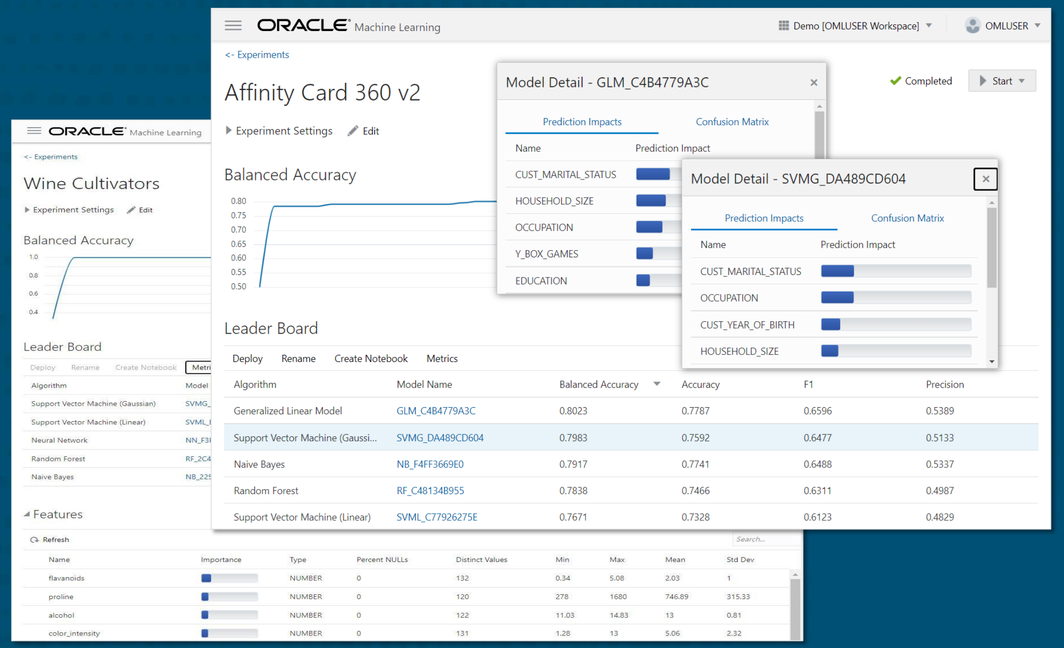
Click your way to ML models

Accelerate model build with a no-code interface → OML AutoML UI

- Select the prepared data table and the column you want to predict
- Start automated build and compare of multiple models with model quality metrics
- Generate editable notebooks for desired models with AutoML-selected hyperparameter values
- Rename models to easily recognize models in model repository
- Deploy models immediately using SQL or deploy to OML Services as REST endpoints



Building ML Model

1. Algorithm selection
2. Adaptive Sampling
3. Feature Selection
4. Model Tuning
5. Feature prediction impact

Enhance data scientist productivity and help non-experts produce ML models

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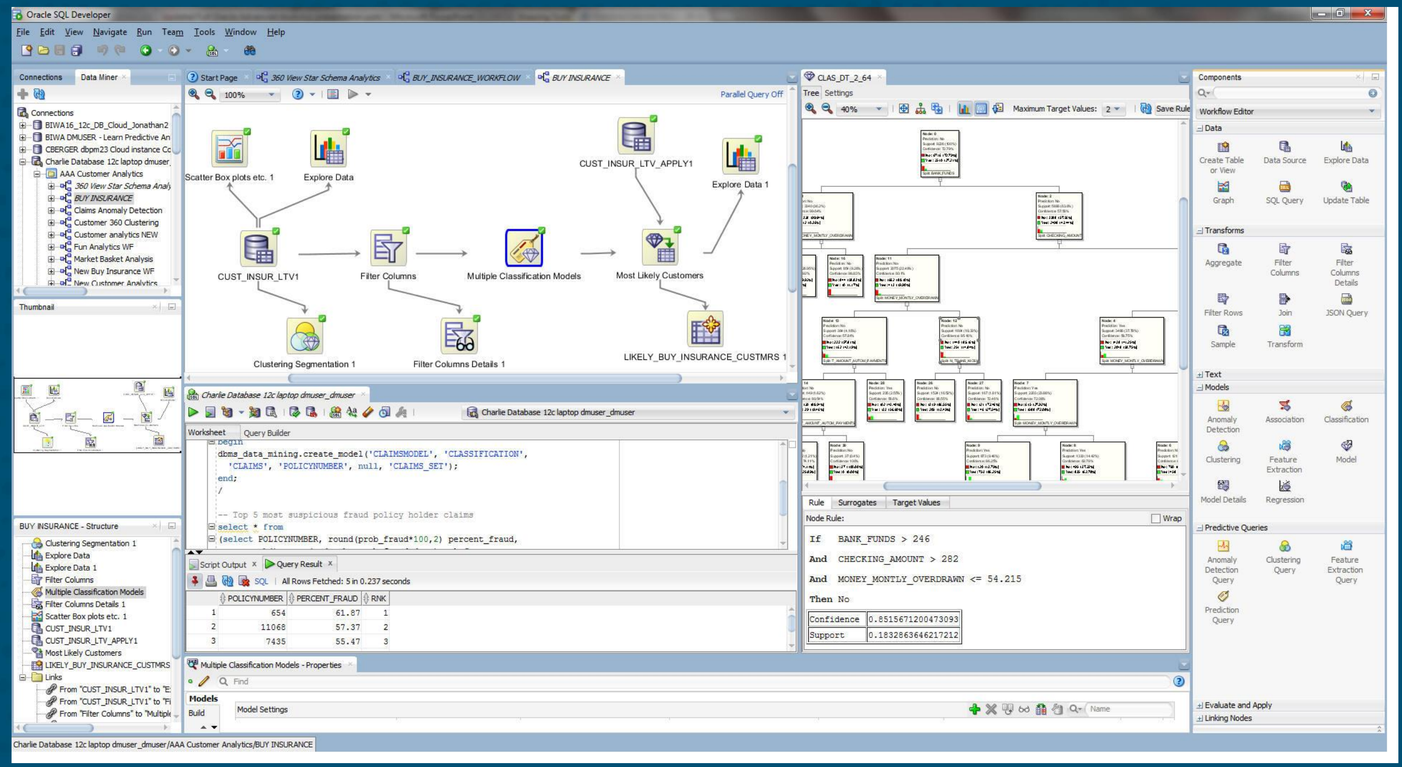
Create analytical workflows

Enhance data scientist productivity. Enable citizen data scientists with Oracle Data Miner UI

- SQL Developer Extension for Oracle Database and Autonomous Database
- Automates typical ML steps
- Easy to use drag-and-drop interface
- Analytical workflows quickly defined and shared
- Generate SQL code for immediate deployment



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Leverage your preferred third-party packages

Augment ADB functionality with open source packages via OML Notebooks

- Support 3rd party Python and R package installation and conda environment creation
  - **conda** - open-source package & environment management system
  - Admins install third-party packages & manage conda environments
  - Users download & activate conda environments from Object Storage
  - Environments run in a separate container for security
- Use with Python and R interpreters in OML Notebooks
- Use with embedded execution in OML4Py and OML4R

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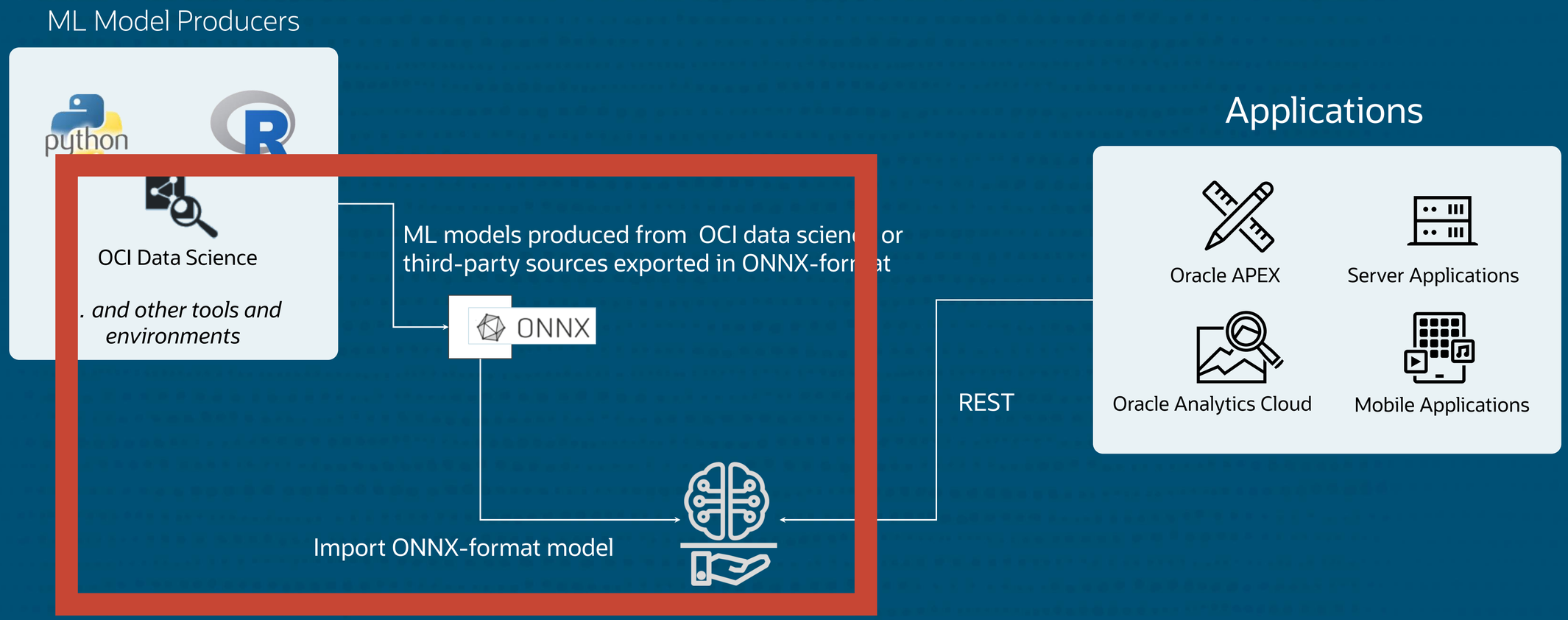
Deploy your existing Python & R native models

Import your existing R and Python models in enterprise database platform



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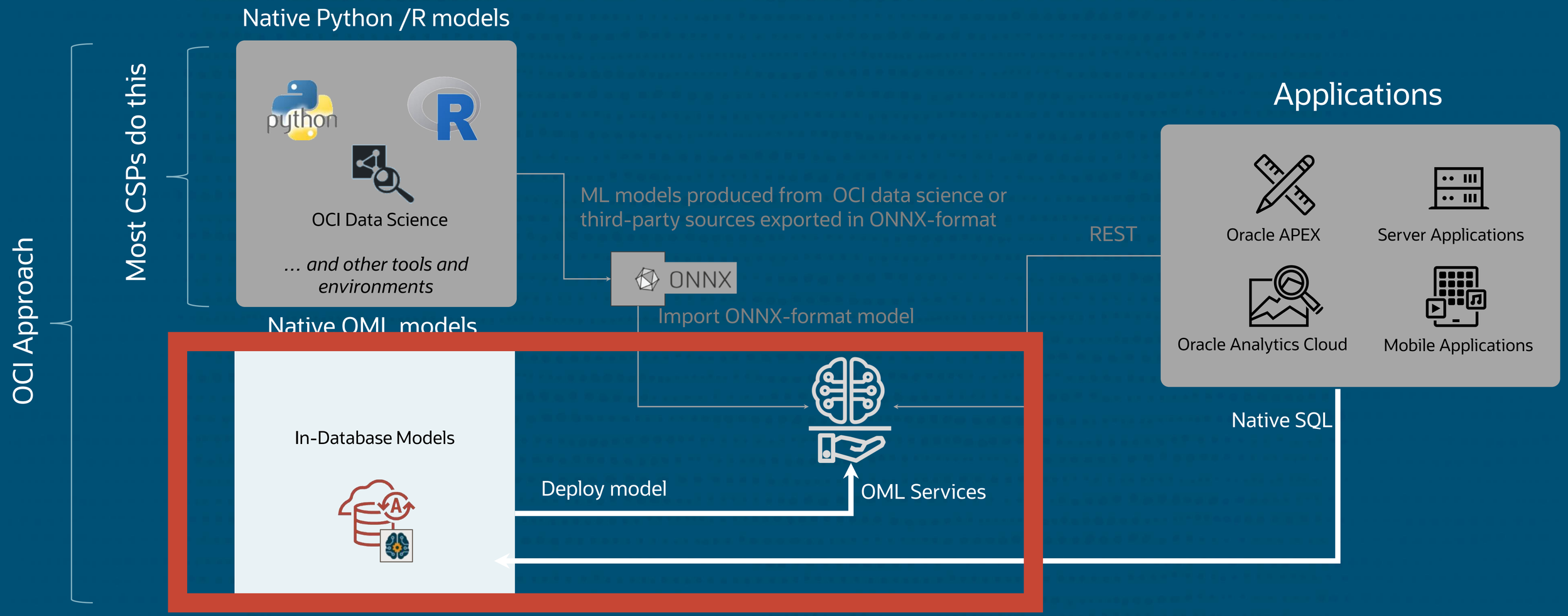
Easily leverage all your models in applications

Deploy In-Database OML models & access via REST



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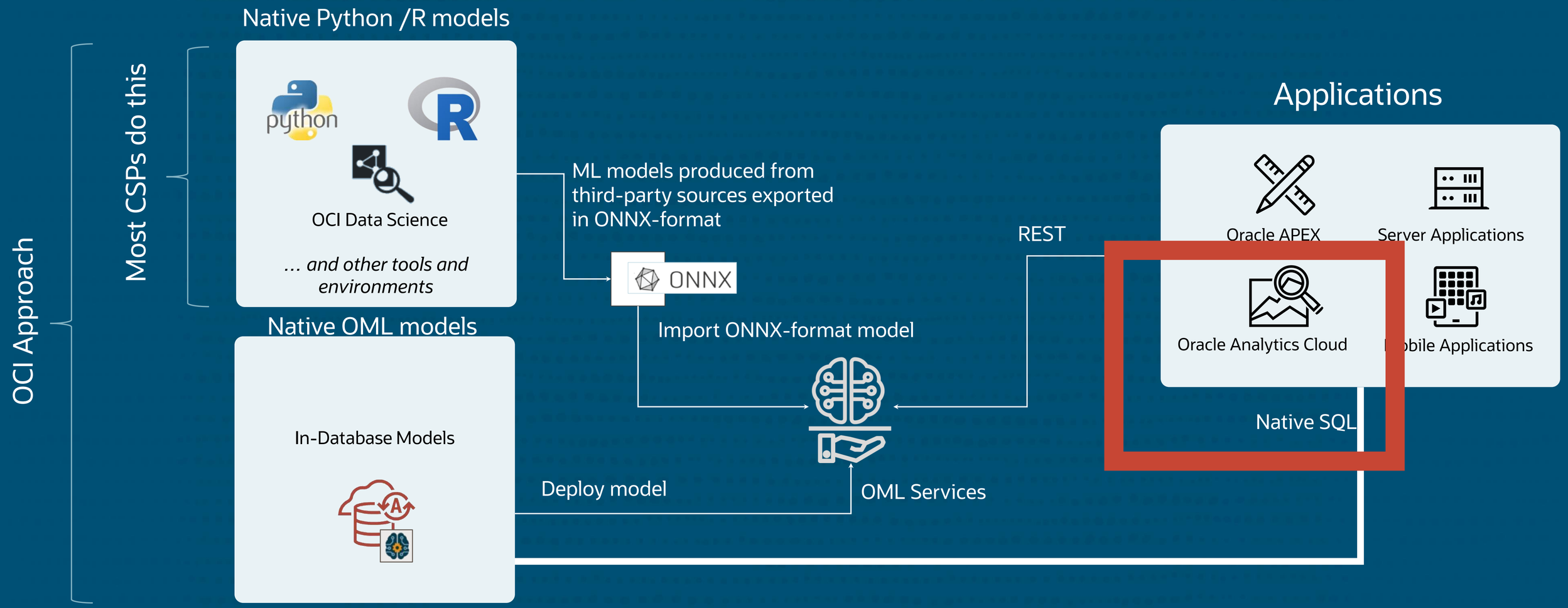
Easily leverage all your models in applications

Use ML model in Oracle Analytics Cloud (OAC)



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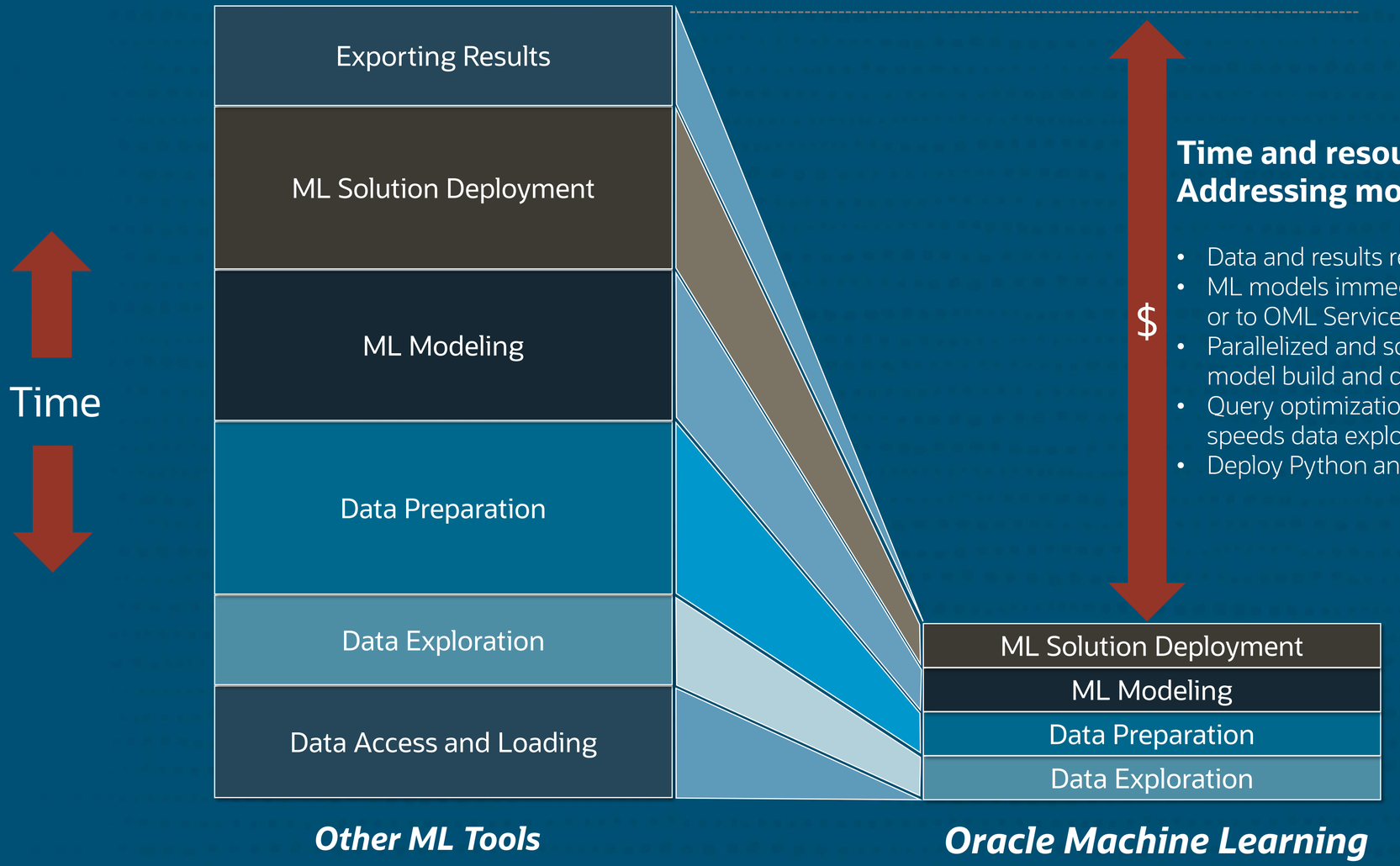
Reduce ML project time-to-production

Benefit from in-database data access, performance, and scalability



Time and resource savings
Addressing more business problems

- Data and results remain in the database
- ML models immediately deployed through SQL queries or to OML Services
- Parallelized and scalable algorithms reduce model build and data scoring time
- Query optimization, parallelism, column indexes, partitioning speeds data exploration and preparation from SQL, R, Python
- Deploy Python and R-based solutions with embedded execution

No longer a factor

Exporting Results

Data Access and Loading

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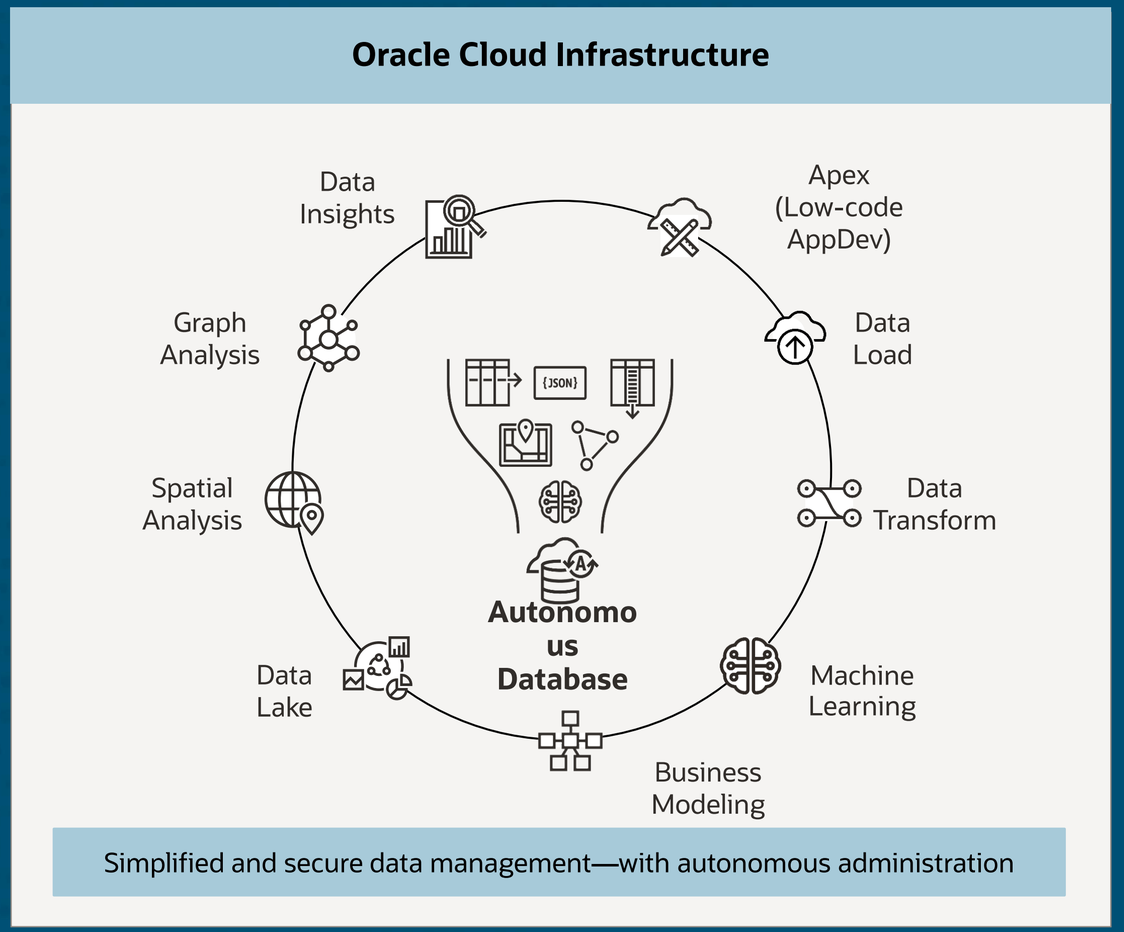
Inherit all DB advantages

- Enterprise performance, scalability, resilience & security
- Converged database
  Multi-model, multi-workload and multi-tenant
- Graph
  Complete graph database and analytics with scalability
- Spatial
  Native spatial data storage and analysis
- Document
  Native JSON support
- Data tools
  Self-service for data loading, transformation, insights & model devops
- ML in Oracle Database
  High-performance in-database algorithms
- Data safe
  Keeps your data safe in cloud



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Summary

If you are an Oracle DB user, leveraging ML is easier to implement than you think

- No data movement
- Quick deployment
- Scalable and secure

- Use preferred language (SQL, R, Python)
- Or go No Code with AutoML UI

- Use third-party models exported in ONNX
- Easily integrate ML models in applications

- Reduce cost, maintenance, and complexity
- Increase scalability, security, performance, reliability & resilience

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The right AI/ML solution for you on OCI

Application
End Users

Application
Front End

API Access

SQL, Python, R, and REST APIs

Code

- Oracle Machine Learning Notebook

No Code

- AutoML UI with ADB
- Oracle Data Miner
- Oracle Analytics Cloud

Oracle Machine Learning (OML)

Data in Oracle DB

REST APIs

MySQL Heatwave with OML

MySQL
ORACLE

Data in MySQL DB

Python and REST APIs

OCI Data Science

Data in Data Lake

Custom ML Models

REST APIs

AI Services

Digital Assistant

OCI Language

OCI Speech

OCI Vision

OCI Anomaly Detection

OCI Forecasting

Pre Built AI Services

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Next Step : Try it yourself – Hands on Labs

Learn Analytics and Machine Learning with Red Bull Racing

Data in Oracle DB

Get started with MySQL HeatWave Machine Learning

Data in MySQL DB

Getting started with OCI Data Science

Data in Data Lake

AI Services: Introduction to OCI Vision

Custom ML Models

Pre Built AI Services

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For more information…

Online

Webpage
https://oracle.com/machine-learning

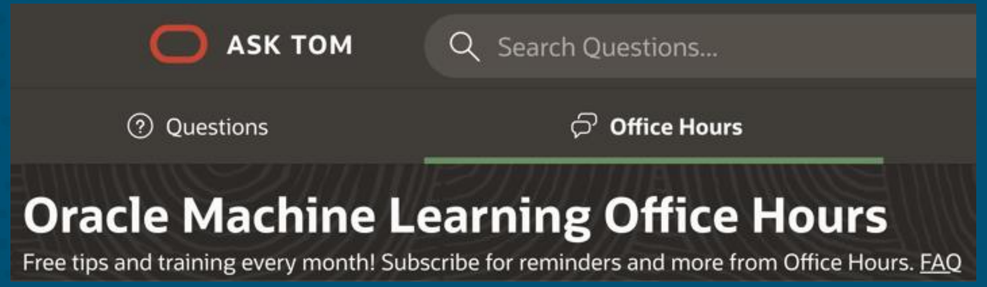
Blog
https://bit.ly/omlblogs

GitHub Repository
https://bit.ly/omlgithub

Documentation
https://docs.oracle.com/en/database/oracle/machine-learning/index.html

OML Office Hours

https://bit.ly/omlofficehours



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Thank you

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