Deploy an XGBoost Model Using OML Services

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Future & Past TechCasts:

Jan 20th, 2022

Integrating Data Silos with Linked Data in Oracle Database

Presented by **Martien Vos**

Feb 15-17, 2022

Winter TechCast Days

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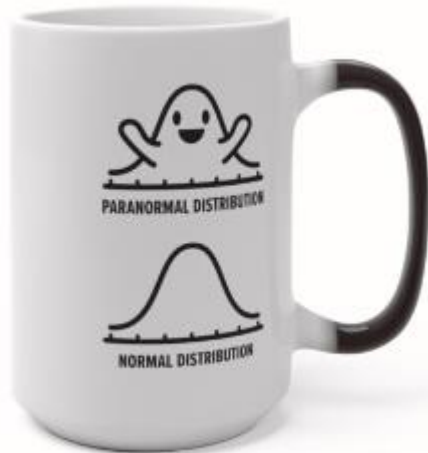ORACLE USER COMMUNITY

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Topics for today

- **Motivation**

- **Overview of OML Services**

- **Overview of ONNX**

- **Demo**

Train a Python XGBoost model

Materialize the model to ONNX format

Deploy the ONNX model using OML Services on Autonomous Database

- **Q&A**

Motivation

Motivation

Why deploy an ONNX model using OML Services?

Simplifies the task of putting models into production

Algorithm not available in-database

Very fast scoring

Cost-effective

Requirement to separate development and deployment environments, for example, web applications

OML Services contains ONNX support for classification and regression models

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OML Services

Oracle Machine Learning

OML4SQL   **OML Notebooks**

Collaborative notebook environment based on Apache Zeppelin with Autonomous Database

Interfaces for 3 popular data science languages: SQL, R, and Python

OML4R   **Oracle Data Miner**

SQL Developer extension to create, schedule, and deploy ML solutions through a drag-and-drop interface

OML4Py   **OML4Spark**

ML for the big data environment from R with scalable algorithms

Code-free AutoML interface on Autonomous Database

OML AutoML UI

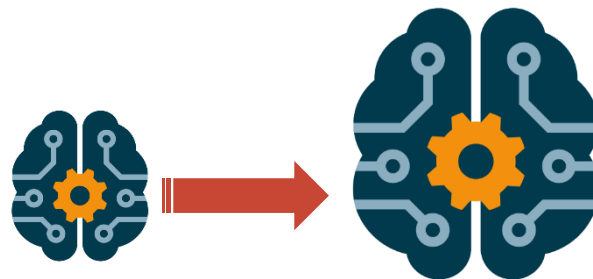Model Deployment and Management, Cognitive Text

OML Services
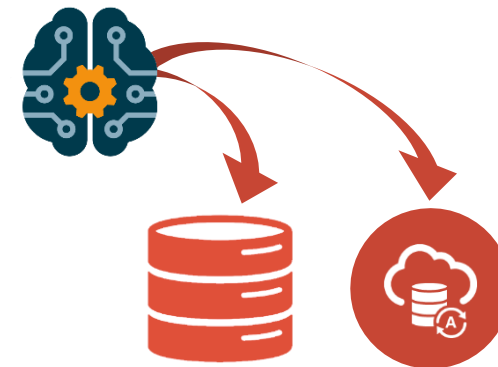
Oracle Machine Learning Key Attributes
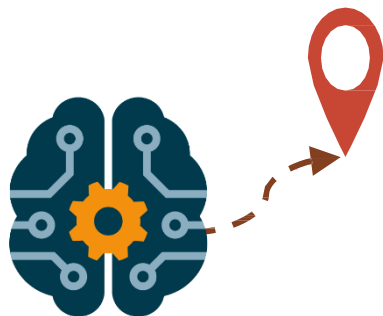
Automated

Get better results faster
with less effort –
even non-expert users

Scalable

Handle big data volumes using
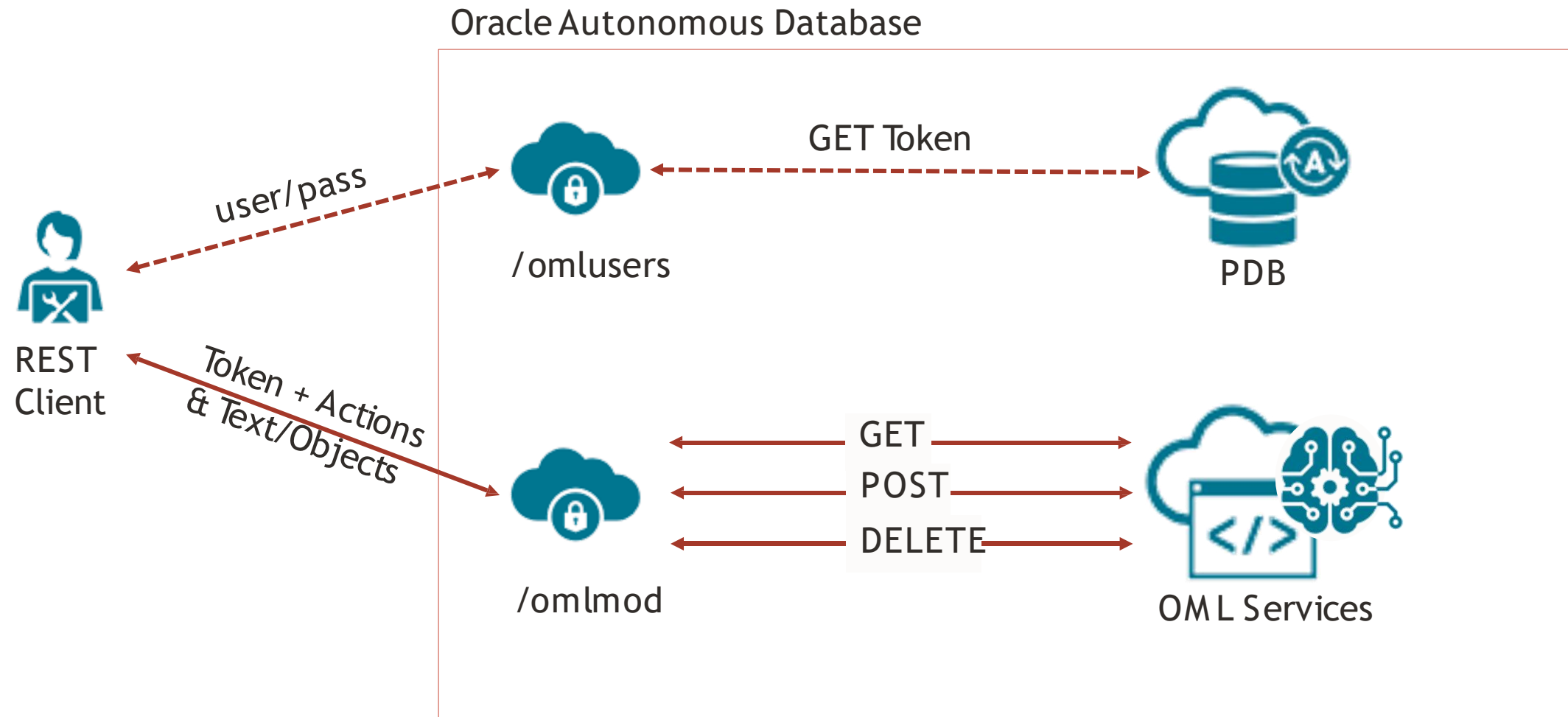parallel, distributed algorithms –
no data movement

Production-ready

Deploy and update data
science solutions faster with
integrated ML platform

Increase productivity, Achieve enterprise goals, Innovate more

Oracle Machine Learning Services architecture
Connectivity and use from Client

Oracle Autonomous Database

GET Token

user/pass

/omlusers

PDB

REST
Client

Token + Actions
& Text/Objects

/omlmod

GET
POST
DELETE

OML Services

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Oracle Machine Learning Services - Methods
Components with built-in Oracle Machine Learning

Admin

POST

- Token using ADB user and password

Generic

GET

- Metadata for all Versions: Version 1 Metadata
- Open API Specification

Repository

POST

- Store Model
- Update Model Namespace

GET

- Models list
- Model Info
- Model Metadata
- Model Content

DELETE

- Model

Deployment

POST

- Create Model Endpoint
- Score Model using Endpoint

GET

- Endpoints
- Endpoint Details
- Open API Specification for Endpoint

DELETE

- Endpoint

Cognitive Text

POST

- Get Most Relevant Topics
- Get Most Relevant Keywords
- Get Summaries
- Get Sentiments
- Get Semantic Similarities
- Numeric Features

GET

- Get Endpoints

ONNX

ONNX

ONNX (Open Neural Network Exchange) is an open standard format for representing and storing machine learning models. It is the basis of an open ecosystem with interchangeable ML models.

Benefits include:

- Promoting interoperability, portability, and efficiency
- Integration into different machine learning frameworks and tools
  - XGBoost, SciKit-Learn, PyTorch, TensorFlow, and others
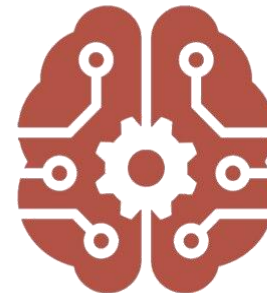- ONNX models run on a variety of ONNX compliant tools and frameworks for scoring

ONNX

Train	Export	Deploy

Train

scikit learn

XGBoost

TensorFlow

Export

ONNX

Deploy

Oracle Machine Learning Services

{REST:API}

Other Frameworks and Devices

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Architecture for today's demo

On an external Python engine, build XGBoost model and export in ONNX format

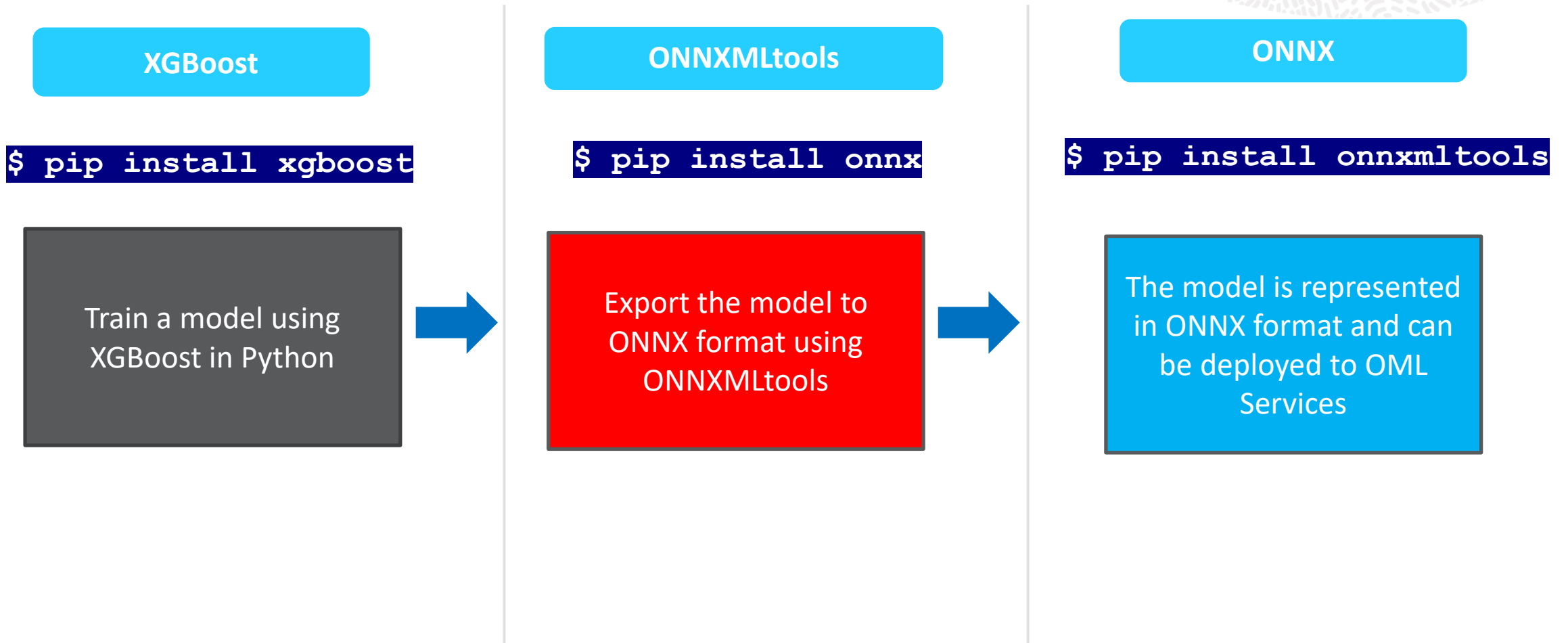**Deploy**

Oracle Machine Learning Services
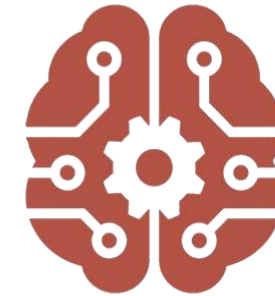
{REST:API}

Oracle Autonomous Database

Python dependencies on external Python engine

Package requirements

XGBoost

`$ pip install xgboost`

Train a model using XGBoost in Python

ONNXMLtools

`$ pip install onnx`

Export the model to ONNX format using ONNXMLtools

ONNX

`$ pip install onnxmltools`

The model is represented in ONNX format and can be deployed to OML Services

Demo

Where to go from here?

Helpful Links and Additional Resources

Webpage: https://oracle.com/goto/machine-learning
Blogs: https://bit.ly/omlblogs

Machine Learning LiveLabs

https://bit.ly/omllivelabs

OML Notebooks

70+ included template examples

https://bit.ly/omlgithub

OML Office Hours
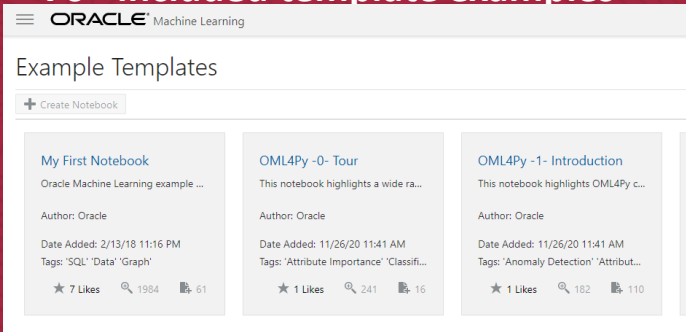
https://bit.ly/omlofficehours
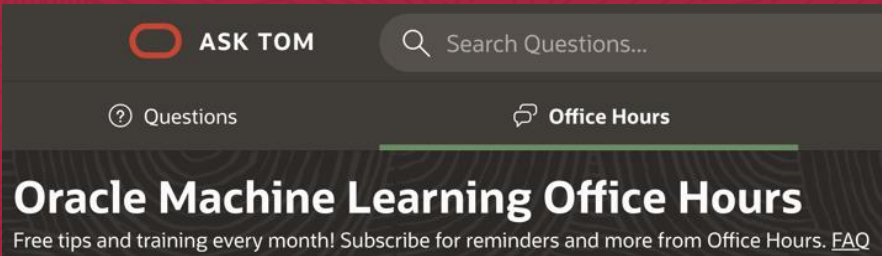
The ONNX Model Zoo is a collection of pre-trained models in the ONNX format contributed by community members. Accompanying each model are Jupyter notebooks for model training and running inference with the trained model.

Info page: https://github.com/onnx/sigs/tree/master/models-tutorials

Thank you

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