MySQL HeatWave AutoML

Découvrez MySQL HeatWave AutoML: L'apprentissage automatique pour tous

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Agenda

1. MySQL HeatWave Overview
2. MySQL HeatWave AutoML
3. Demo
4. Summary

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MySQL HeatWave

Overview

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The MySQL HeatWave "Family"

... the MySQL Cloud services made by the MySQL Team

"MySQL HeatWave"

MySQL HeatWave for OLTP
a.k.a **MDS: (OLTP)**
General Purpose
Optimized for OLTP

MySQL HeatWave (Analytics / ML)
OLTP + Analytics (OLAP)
+ **Machine Learning**

MySQL HeatWave Lakehouse (Lakehouse)

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Rendez-vous

Lundi 25 septembre

- ***13h00 – 13h30*** */ Atelier salle* ***5***

De la requête élémentaire à l'analytique avancée et l'apprentissage automatique: La Révolution MySQL HeatWave Lakehouse

Mardi 26 septembre

- ***11h00 - 11h15*** */ Stand ORACLE* ***A28***

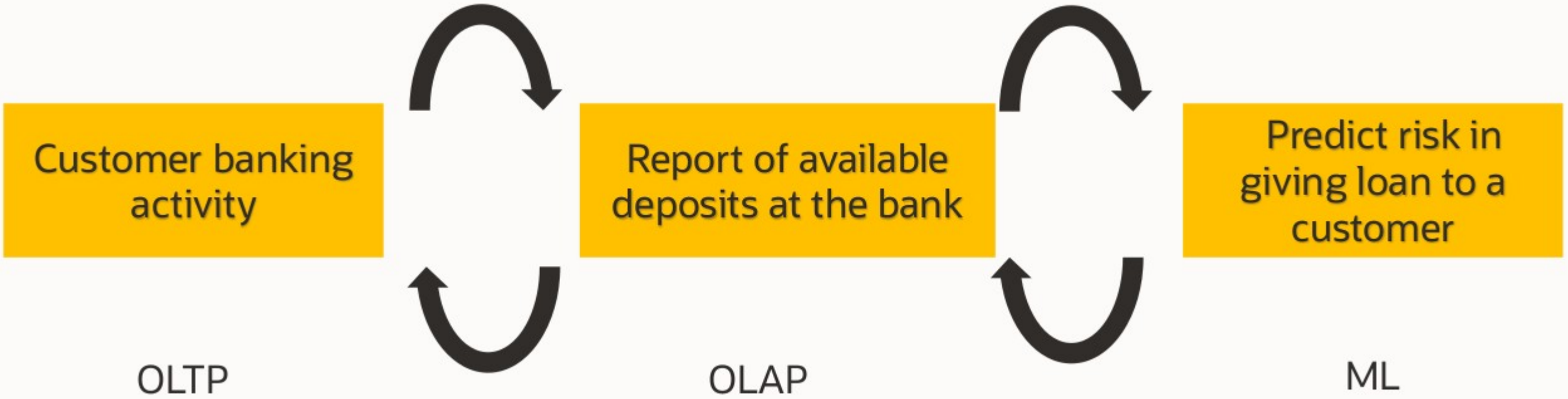
Découvrez MySQL HeatWave AutoML: l'apprentissage automatique pour tous

- **16h00 - 16h15** / Stand ORACLE **A28**

Déverrouillez le pouvoir de l'analyse Big Data avec MySQL HeatWave Lakehouse !

MySQL HeatWave - OLTP + OLAP + ML

Example : Loan Approval



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MySQL HeatWave

MySQL HeatWave AutoML

Build, train, deploy, & explain machine learning models within
MySQL HeatWave, at no additional cost

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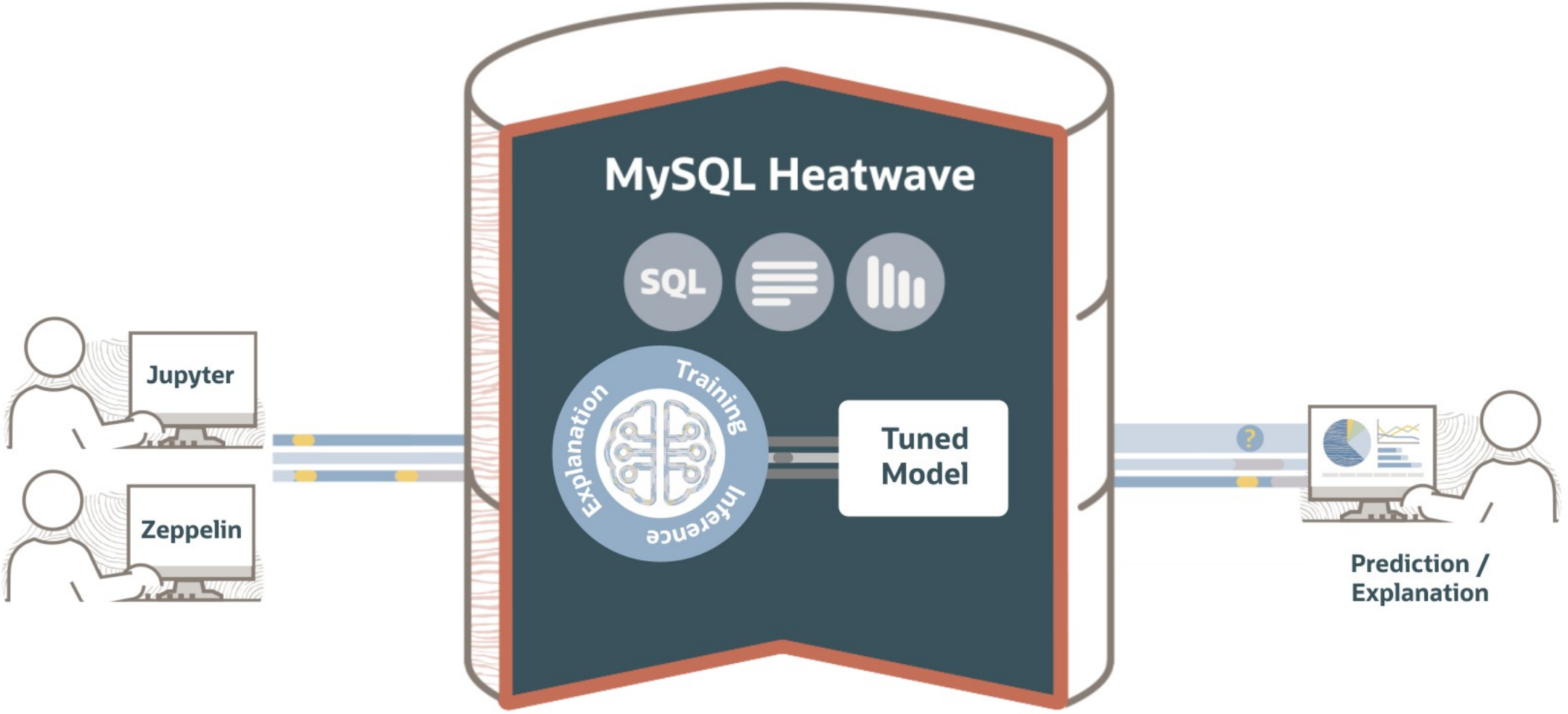
In-database machine learning with MySQL HeatWave



Accelerate ML initiatives, increase security, and reduce costs

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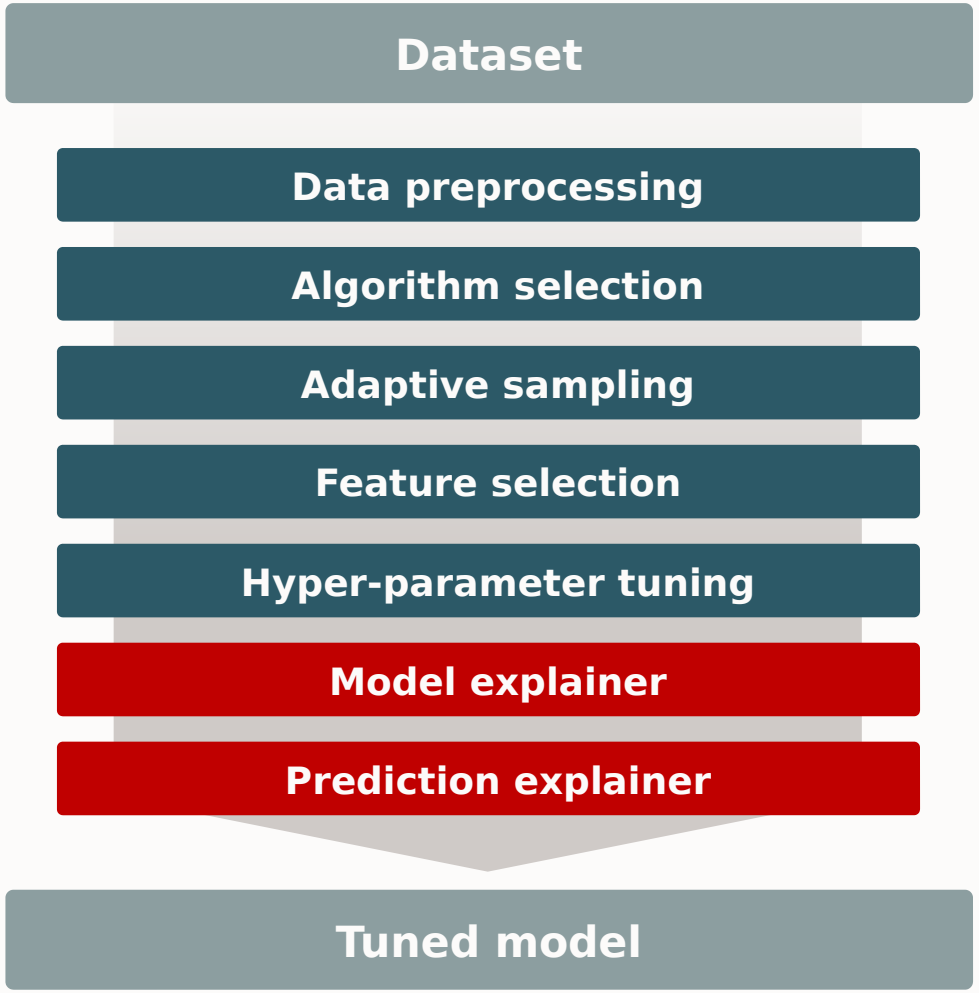
HeatWave AutoML automates the ML lifecycle & all models can be explained

Leverages **Oracle AutoML** technology to automate the process of training a machine learning model



- Regulatory compliance
- Fairness
- Repeatability
- Causality
- Trust

https://dev.mysql.com/doc/heatwave/en/heatwave-machine-learning.html

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MySQL HeatWave AutoML uses a set of SQL routines

Machine Learning with MySQL HeatWave is so simple

- You only need to use a limited set of SQL routines:
  - **ML_TRAIN**: Trains a machine learning model for a given training dataset
  - **ML_PREDICT_ROW**: Makes predictions for one or more rows of data
  - **ML_PREDICT_TABLE**: Makes predictions for a table of data
  - **ML_EXPLAIN_ROW**: Explains predictions for one or more rows of data
  - **ML_EXPLAIN_TABLE**: Explains predictions for a table of data
  - **ML_SCORE**: Computes the quality of a model
  - **ML_MODEL_LOAD**: Loads a machine learning model for predictions and explanations
  - **ML_MODEL_UNLOAD**: Unloads a machine learning model
- In addition, with MySQL HeatWave ML, there is no need to move or reformat your data
- Data and machine learning models **never leave** the MySQL HeatWave Database Service, which saves you time and effort while **keeping your data and models secure**

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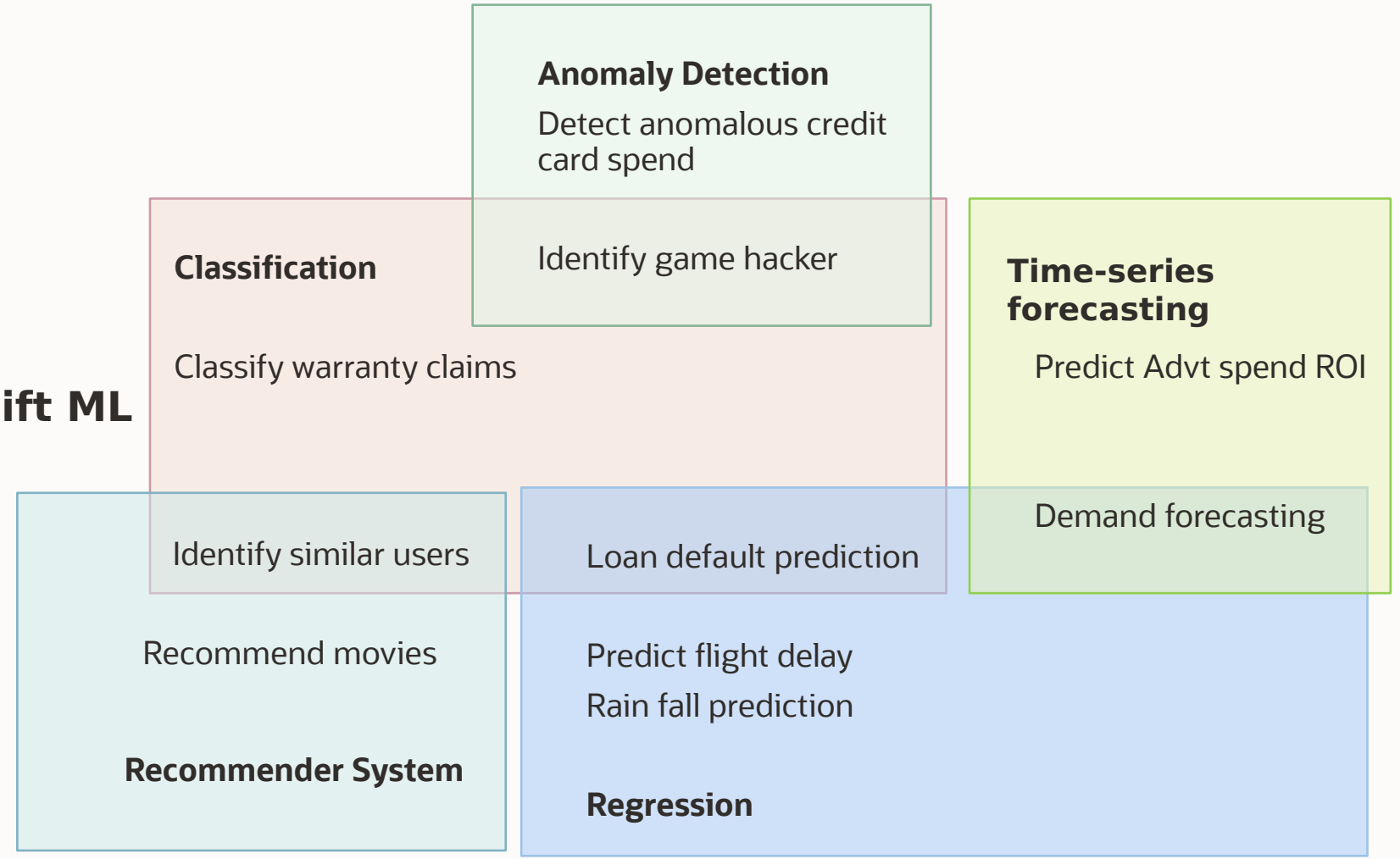
Fully automated in-database machine learning

Training, inference, explanation with HeatWave AutoML

- In-database
- Secure
- Fully automated
- **25x faster** than **Redshift ML**
- Explainable
- No additional cost



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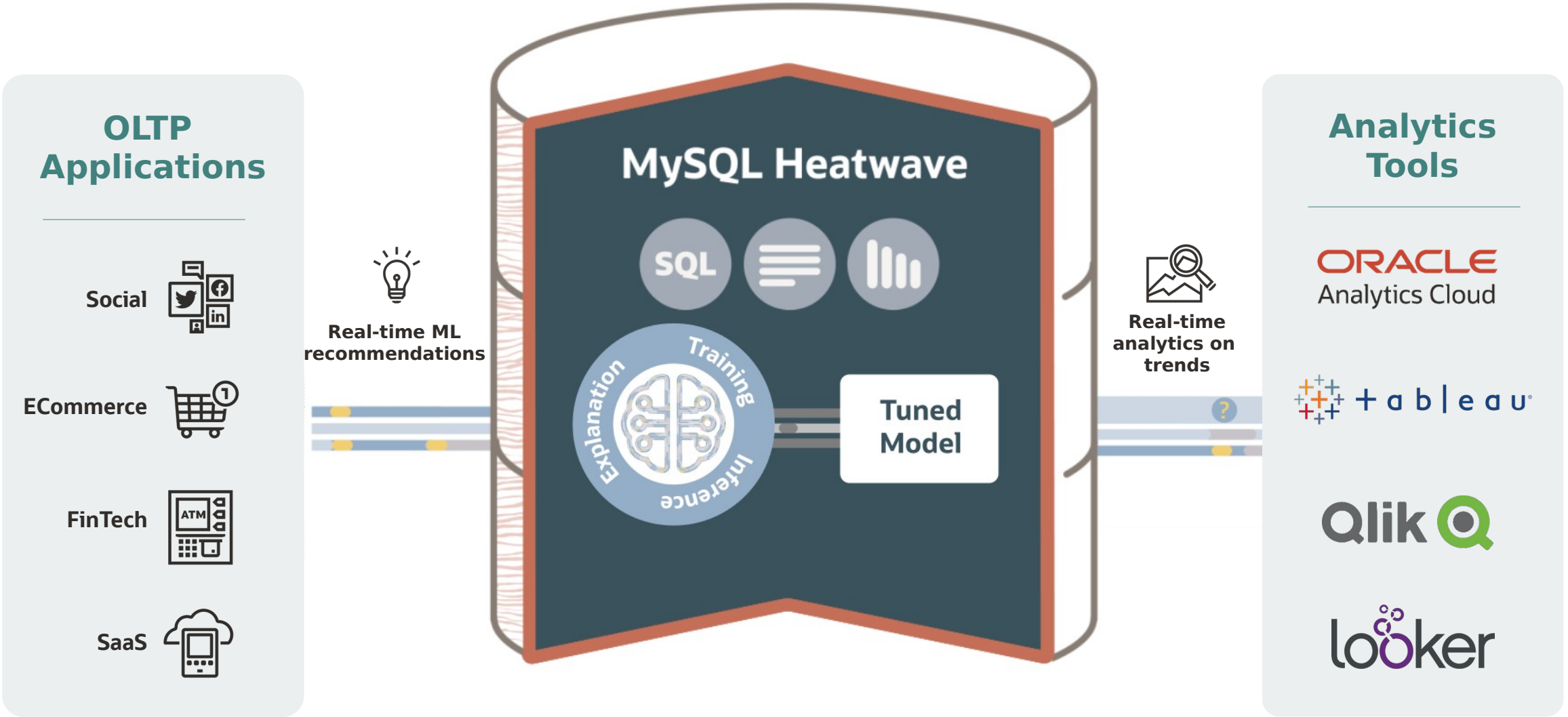
Machine learning in action with MySQL HeatWave



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MySQL HeatWave

Demo

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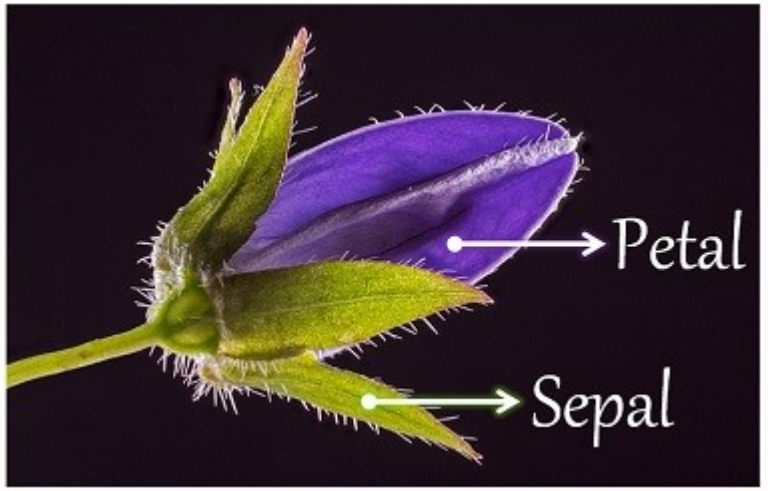
Live Demo

Classification task – Iris dataset

Some domain expertise – a little botany!

An Iris

- Variant shown is an Iris **Versicolor**
- Iris **Virginica** & Iris **Setosa** also available in the dataset



The parts of an iris that we believe might help identify the iris variant:

- Petal length
- Petal width
- Sepal length
- Sepal width

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MySQL HeatWave AutoML

Usage Overview

Set up the environment

- MySQL HeatWave

Create Model

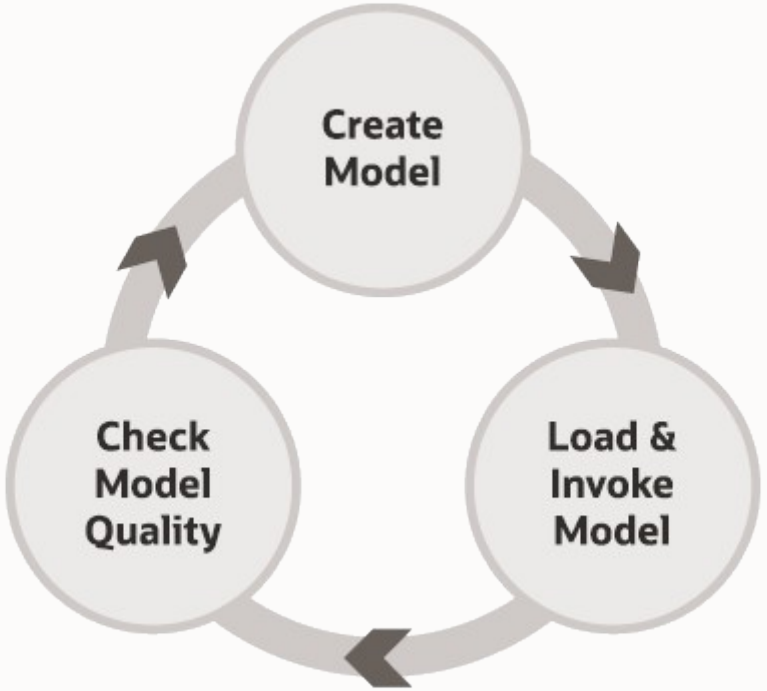
- Prepare and load data
- Train a machine learning model (use training data)
- Explain how the model works & score it for accuracy (use validation data)

Load & Invoke Model

- Load the model into HeatWave
- Make predictions on new sets of data
- Explain the reasons for the predictions

Check Model Quality

- With new current validation data
  - Score the model for accuracy
- If the score has deteriorated
  - Revisit model training, etc.



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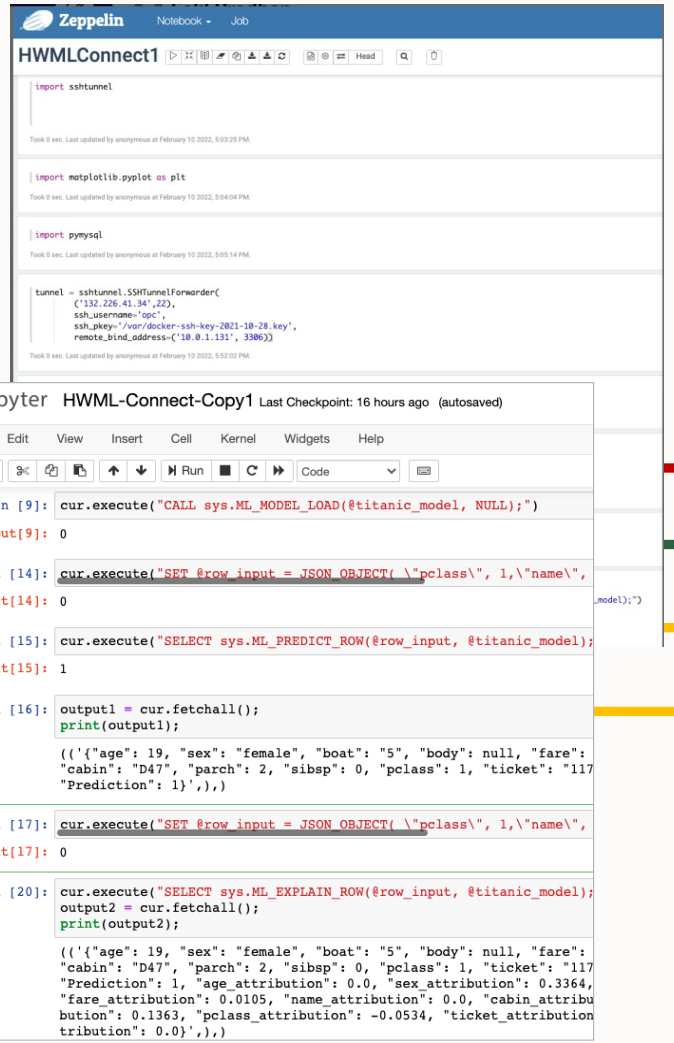
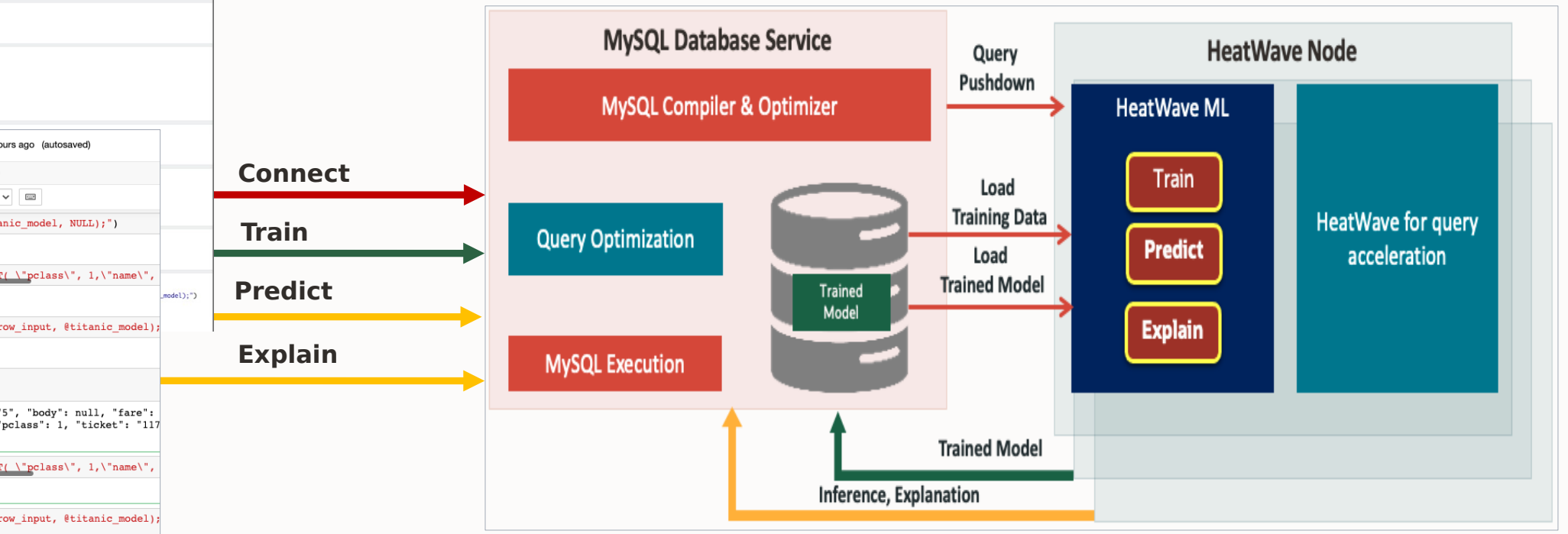
Environment Setup

Client Connectivity



- Interactive data science environments such as **Zeppelin** or **Jupyter** can be used
- Alternatively just use **MySQL Shell** (or any MySQL Client)



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MySQL HeatWave

Summary

MySQL HeatWave AutoML democratizes ML

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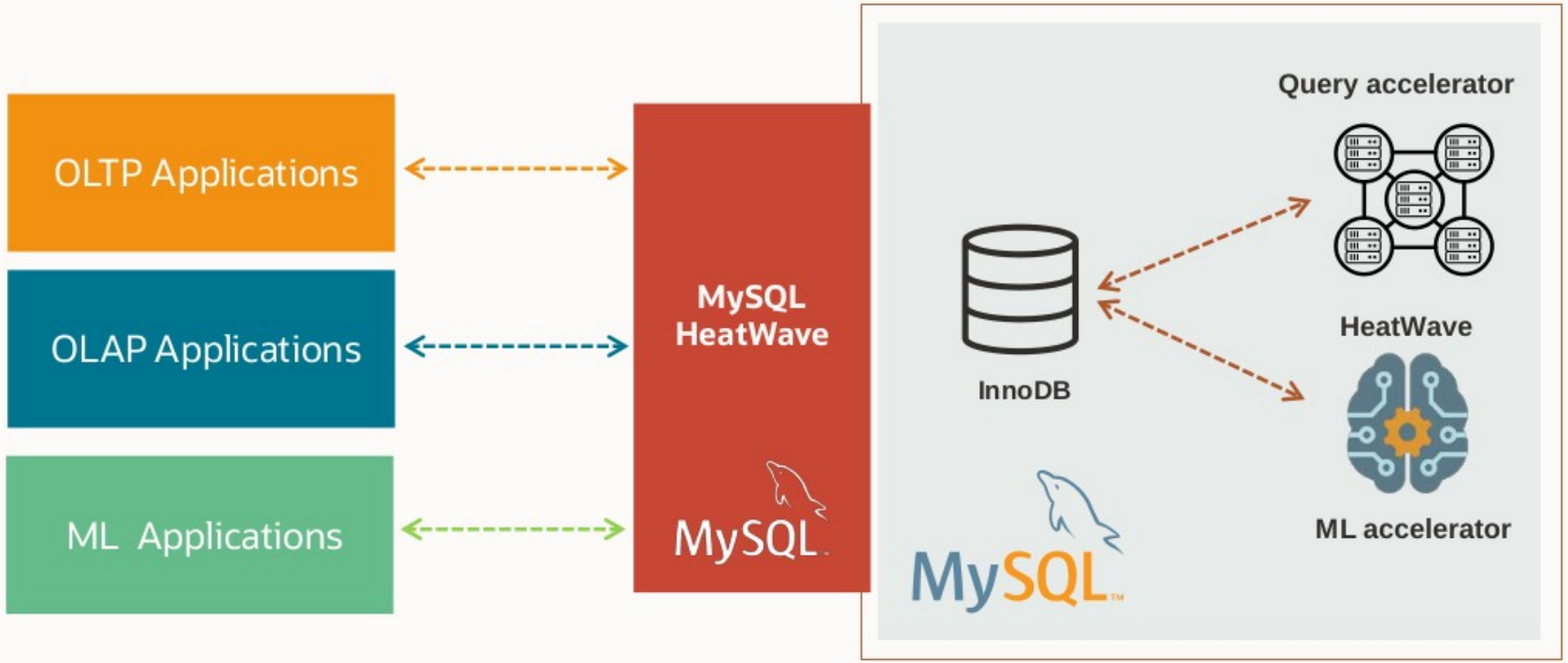
MySQL HeatWave AutoML – Run Machine Learning on existing cluster

Build, train, deploy, & explain ML models within MySQL HeatWave, at no additional cost



Single **MySQL** database **for all applications**

All existing applications **work without any changes**

Train, inference & explain **within the database**

No need to learn new language or ML packages

Standalone	High Availability	HeatWave
Single-instance MySQL DB System	Run 3-instance MySQL DB System providing automatic failover and zero data loss	DB System that allows you to enable HeatWave for accelerated query processing, suitable for running both OLTP and OLAP workloads ✓

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Summary

MySQL HeatWave AutoML democratizes machine learning

- **Fully automated training enables citizen data scientists**
- **Keeping everything in the database simplifies the solution and reduces cost**
  - No ETL to implement and maintain
  - No additional licenses
  - No dependency matrix of software versions
- **MySQL HeatWave AutoML is affordable**
  - New customers pay 1-2% compared to RedShift ML
  - Customers already using MySQL HeatWave effectively get it for free
  - Enables small-medium sized business to gain competitive advantage from machine learning
- **MySQL HeatWave AutoML is explainable**
  - Both model and predictions
  - Consumers will trust and regulators will approve of
- **MySQL HeatWave is secure**
  - Data remains in the database

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Request a guided workshop

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MySQL HeatWave

Learn more about MySQL HeatWave

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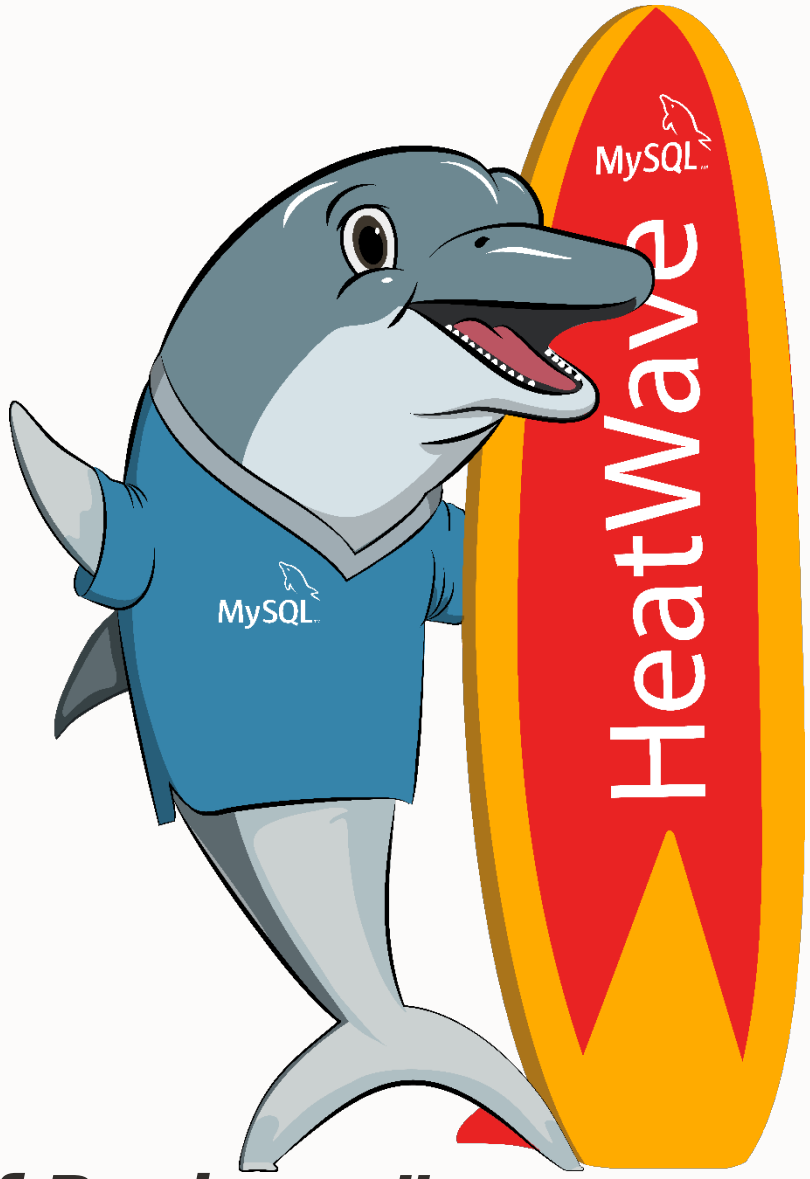

"Data is the Oxygen of Business"

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Merci!

Q&R

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ORACLE

Feedback from analysts

“Oracle announced MySQL HeatWave with Autopilot last August, which may very well have been the single greatest innovation in open source cloud databases in the last 20 years to that point. Now Oracle has gone beyond its original unifying of OLTP and OLAP in HeatWave, with MySQL HeatWave ML. Oracle is bringing all of the machine learning processing and models inside the database, so that customers not only avoid managing ML databases apart from the core database, but also eliminate the hassles of ETL, gaining speed, accuracy, and cost-effectiveness in the bargain.”

“This latest announcement from Oracle is the third major release of MySQL HeatWave in just over 12 months. Oracle has delivered more cloud database innovations during that timeframe than most cloud database vendors have delivered in the last decade. Not only does the in-database HeatWave ML make Redshift ML look like yesterday’s tech in terms of engineering, performance and cost, but the latest MySQL HeatWave TPC-DS benchmarks demonstrate that Amazon Redshift, Snowflake, Azure Synapse and Google BigQuery are all slower and more expensive. It’s rather clear who’s innovating in cloud databases and who’s being complacent.”

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Feedback from analysts, customers

"We recently had an opportunity to use the machine learning capabilities of HeatWave ML. We found it very innovative, easy to use, very fast and most important it is secure since the data or the model don’t leave the database. We believe that providing native in-database machine learning is of significant interest to our clients and will further accelerate the adoption of MySQL HeatWave“

Arvind Rajan, CEO

“To satisfy the growing need for explainability of ML models and outcomes, HeatWave ML delivers robust and comprehensive explanation capabilities focused on usability, interpretability, quality, performance, and repeatability at scale…it’s no wonder that enterprises continue to look to HeatWave to set themselves up for transformational data success.”

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