

MLOps Foundations

AN AUTOMATED MACHINE LEARNING LIFECYCLE MANAGEMENT SOLUTION BUILT ON AWS

Companies are realizing the value of using ML models to drive better outcomes for their businesses. Harnessing the predictive power of their data with ML models to remain competitive is becoming more critical to business operations, yet 60% of ML models never make it to production. Successfully operationalizing AI and ML across the organization delivers a secure, trackable, testable and repeatable way to create, train, deploy and update machine learning models across different environments. This solution must combine data preprocessing, model training, deployment and model monitoring across multiple environments with strong governance and security controls to provide a foundation for successful model lifecycle management.

Operationalize ML Across Your Entire Business

With MLOps Foundations, we enable companies to accelerate operationalizing models in production to achieve the benefits of an automated machine learning lifecycle management by reducing the typical 25+ step lifecycle down 10 steps for a significantly faster delivery time.

Without MLOps Foundations

- ✗ Whole lifecycle could take months with 25+ steps between Local Dev > Dev Enc > Q/A > Prod
- ✗ Manual hand-offs between various data teams
- ✗ Cycles of troubleshooting between data scientist's local development & data engineers development environment

With MLOps Foundations

- ✓ Lifecycle reduced to just weeks with 10+ steps
- ✓ Automated deployment between environments with controlled access to data teams needed for specific steps
- ✓ One source of truth for experiment tracking, project packaging for easy source control and reproducibility



Premier
Consulting
Partner

Machine Learning
Competency

Data & Analytics
Competency

DevOps Competency

IoT Competency

SaaS Competency

MLOps Foundations Benefits

The Model Factory Framework is built using AWS services and open source tools that enables rapid development, training, scoring, and deployment of models. The MLOps Foundations Solution can be tailored to specific workflows and business needs through customization around the Model Factory Framework.

- **Tools for diagnostics, performance monitoring & addressing model drift:** The Model Factory Framework provides tools for data science teams to address model drift, model performance for debugging and troubleshooting, and pipeline management
- **Model explainability for governance and regulatory compliance:** Track models, data and parameters in the case where you need to show auditors that the proper protocols were employed
- **Platform for collaboration:** By combining DevOps tools and processes with machine learning workflows, teams can work closely together to develop complex models and pipelines and manage model progression through the different stages of development to production, with respective versions, annotations and history
- **Accelerated ROI:** Expedite operationalizing models in production and realize the benefits of an automated cloud-based machine learning lifecycle management solution with a pay for what you use model, complete with tools and services to help you monitor and optimize your compute resources
- **Standardized model development environment for your data science teams:** Our solution allows data science and engineering teams to develop models that support any machine learning framework
- **Automated model deployment across dev, Q/A and production environments:** The Model Factory Framework leverages hyperscale cloud automation to quickly take models from development to deployment, while addressing the production ready requirements of high availability, scalability, reliability and cost management
- **Reproducibility of models and predictions:** Track model versions and hyperparameters when deploying to different environments, ensuring model performance in development matches model performance in production

What you get with MLOps Foundations delivered by Onica & Rackspace

MLOps Foundations is delivered through a custom engagement. We'll work with you to determine your infrastructure needs and tailor your solution to meet your model development, operations and compliance requirements.

- **Discovery Session:** We start by working closely with you to understand your tooling, machine learning models and cloud landscape in order to define the problem space and develop a design solution
- **Design Decisions:** Based upon the discovery session, a detailed design for the Model Factory Framework is created utilizing the tooling that your team is familiar with to decrease the maintenance efforts
- **Implementation of the Model Factory Framework:** Once a design has been finalized the team will begin implementing the solution. The Model Factory Framework provides a CI/CD pipeline for your models with a UI to make it easy to deploy and track the models
- **Integrate ML models:** Once the solution has been deployed, Onica will help you integrate your models and get them into production

Rackspace Model Factory Framework Features

- ✓ CI/CD integration with automation and orchestration tools
- ✓ Experiment tracking
- ✓ Project packaging for easy source control and reproducibility
- ✓ Register, package, train and deploy models from anywhere
- ✓ Support for major ML frameworks such as TensorFlow, SCikit-Learn, Spark ML, spaCy, PyTorch, etc.
- ✓ Real-time inference endpoints
- ✓ Scalable scoring
- ✓ Model artifact storage
- ✓ Tracking user interface

ML Model Integration and Pipeline Development

- ✓ Integration of reproducible ML pipelines
- ✓ Integration of reusable software environments for training and deploying models
- ✓ Automated triggering
- ✓ End-to-end QA test and performance checks
- ✓ Guidance to team collaboration and best practices

The Advantages of Partnering with Onica and Rackspace

Onica, a Rackspace Technology Company, is the cloud native service company leading the most complex technology projects in the world. We leverage the innovative capabilities of the cloud to help customers build new revenue streams, increase efficiency, and deliver incredible experiences. Onica's proven accelerators and AWS native tools fast track the automation of your model development lifecycle. Our team leverages our wide range of expertise across data migration, data engineering, data science, machine learning, and operations to help turn your data into a tool for innovation.

Customer Success

Water & Power Co. automated training and deploying models to production.

The Customer: With several ML models implemented in various environments, the customer was seeking a consistent mechanism to quickly track the best experiment runs as well as a managed hosting platform with automated deployment and promotion pipelines.

What we did: Onica customized the Model Factory Framework by integrating AWS services (SageMaker, EMR, CodePipeline, CodeBuild, Athena, S3, ECR) and 3rd party applications and solutions (Python, MLflow, Tensorflow, Horovod, Petastorm).

Outcomes: By implementing the Model Factory Framework, the customer was able to package and deploy all the models they had consistently with a quick turnaround time to pre-processing, training and testing the models. They are now able to track and compare their parameters and accuracy metrics across different experiments irrespective of the ML framework utilized.