Hewlett Packard Enterprise

HPE Machine Learning Ops

DevOps speed and agility for machine learning

The ability to apply artificial intelligence (AI) and machine learning (ML) to unlock insights from data is a key competitive advantage for businesses today. However, as enterprises move beyond experimentation with AI/ML to operationalize their ML models, they are running into **last mile** problems related to model deployment and management.[1] Hewlett Packard Enterprise empowers large enterprises to overcome the barriers in deploying and operationalizing AI/ML across the organization. HPE ML Ops brings DevOps-like speed and agility to the ML lifecycle.

The challenges to operationalizing ML models

Much like pre-DevOps software development, most data science organizations today lack streamlined processes for their ML workflows.

It may seem like a straightforward solution to use DevOps tools and practices for the ML lifecycle. However, ML workflows are very iterative in nature and off-the-shelf software development tools and methodologies will not work.

HPE ML Ops is one of the few solutions to address the challenges of operationalizing ML models. Public cloud service providers offer disjointed services, and users are required to cobble together an end-to-end ML workflow. Also, the public cloud may not be an option for many organizations with workload requirements that require on-premises deployments due to considerations involving vendor lock-in, security, performance, or data gravity.

Complete ML lifecycle coverage

The HPE ML Ops solution supports every stage of ML lifecycle—data preparation, model build, model training, model deployment, collaboration, and monitoring. HPE ML Ops is an end-to-end data science solution with the flexibility to run on-premises, in multiple public clouds, or in a hybrid model and respond to dynamic business requirements in a variety of use cases.

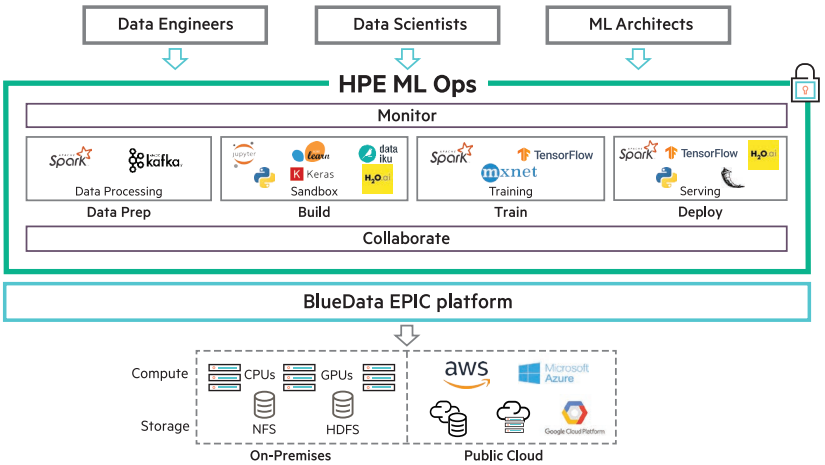

Figure 1. HPE ML Ops platform architecture

[1] "Don't Stumble at the Last Mile: Leveraging MLOps and DataOps to Operationalize ML and AI", Gartner; **gartner.com/en/conferences/emea/catalyst-uk/featured-topics/integration-data-management**

Key features

HPE ML Ops addresses the entire ML pipeline from data preparation, to model building, training, deployment, and monitoring.

Table 1. Key features of HPE ML Ops

Model building	**Prepackaged, self-service sandbox environments:** Sandbox environments with any preferred data science tools—such as TensorFlow, Apache Spark, Keras, PyTorch and more—to enable simultaneous experimentation with multiple ML or deep learning (DL) frameworks.
Model training	**Scalable training environments with secure access to Big Data:** On-demand access to scalable environments—single node or distributed multinode clusters—for development and test or production workloads. Patented innovations provide highly performant training environments—with compute and storage separation—that can securely access shared enterprise data sources on-premises or in cloud-based storage.
Model deployment	**Flexible, scalable, endpoint deployment:** HPE ML Ops deploys the model's native runtime image, such as Python, R, H2O, and so forth, into a secure, highly available, load-balanced, and containerized HTTP endpoint. An integrated model registry enables version tracking and seamless updates to models in production. Autoscaling from HPE ML Ops dynamically scales nodes for scoring engines.
Model monitoring	**End-to-end visibility across the ML pipeline:** Complete visibility into runtime resource usage such as GPU, CPU, and memory utilization. Ability to track, measure, and report model performance along with third-party integrations track accuracy and interpretability.
Collaboration	**Enable CI/CD workflows with code, model, and project repositories:** Project repository and GitHub integration of HPE ML Ops provides source control, eases collaboration, and enables lineage tracking for improved auditability. The model registry stores multiple models—including multiple versions with metadata—for various runtime engines in the model registry.
Security and control	**Secure multitenancy with integration to enterprise authentication mechanisms:** HPE ML Ops software provides multitenancy and data isolation to ensure logical separation between each project, group, or department within the organization. HPE ML Ops integrates with enterprise security and authentication mechanisms such as LDAP, Active Directory, and Kerberos.
Hybrid deployment	**On-premises, public cloud, or hybrid:** HPE ML Ops runs on-premises on any infrastructure, on multiple public clouds (Amazon® Web Services, Google™ Cloud Platform, or Microsoft® Azure), or in a hybrid model, providing effective utilization of resources and lower operating costs.

Key benefits

Faster time-to-value: You can manage and provision development, test, or production environments in minutes as opposed to days; and instantly onboard new data scientists with the preferred tools and languages without creating siloed development environments.

Improved productivity: Data scientists spend their time building models and analyzing results rather than waiting for training jobs to complete. HPE ML Ops helps ensure no loss of accuracy or performance degradation in multitenant environments. It increases collaboration and reproducibility with shared code, project, and model repositories.

Reduced risk: It provides enterprise-grade security and access controls on compute servers and data. Lineage tracking provides model governance and auditability for regulatory compliance. Integrations with third-party software provide interpretability. High availability deployments help ensure critical applications do not fail.

Flexibility and elasticity: You can deploy on-premises, cloud, or in a hybrid model to suit your business requirements. HPE ML Ops autoscales clusters to meet the requirements of dynamic workloads.

Learn more at
hpe.com/info/bluedata
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