POINT OF VIEW

Deploy and Manage Your Industrial IoT Edge Solutions In Weeks With EdgeOps

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If you are an Industry 4.0 leader,

Accelerated EdgeOps frameworks can help you scale your IoT solution deployments and orchestrate your AI models on the edge within a matter of weeks. This article is designed to provide inspiration and food for thought in equal measure for leaders on their journey. Sit tight and read on!

First, some context.

Edge computing is a distributed computing paradigm for running critical AI models or applications on IoT Edge devices, connected to bounded (manufacturing plants) assets or distributed (telecom infrastructure, oil pipelines) assets. This insightful write-up explains the fundamentals of the IoT-Edge in great detail.

AI-IoT solutions are increasingly a part of every digital transformation effort across multiple functional areas and industries, including manufacturing, supply chain, telecom, oil and gas, and more. Understanding the drivers and enablers is critical to unlocking value.

While industries have long realized the importance of data-driven decisions and their impact on business, IoT devices & data are proving to be critical source of operational intelligence. The chief reason why the IoT and Edge solutions are gaining prominence is a set of inherent limitations with traditional cloud-based AI solutions. These include:

▸ **Long(er) latencies:** To ingest data into the cloud, process and extract insights, and deliver them to the plant engineers **for real-time or near realtime decision support systems.**

▸ **Huge infrastructure** required to support large data volumes/frequencies and training requirements.

▸ **Remote locations** where internet service is not reliable

▸ **Security:** Sensitive plant data can be intercepted or abused on the way to the cloud, which may compromise OT networks.

IoT and AI can work in harmony to help address critical issues while solving these limitations.

- **Equipment uptime improvement** using predictive maintenance at plants and remote sites (common to industries such as telecom, and oil and gas, among others)

- **Process and quality optimization** in manufacturing environments

- **Energy footprint reduction** across the supply chain

Across all these use cases, Edge computing enables some key advantages:

- Sub-second insights and actions

- Suitable for integration and scale up across multiple processes, assets, and sites

- Less dependency on the internet and cloud

- Increased security since data transmission is limited and localized

- Reduction in data load on the cloud

Due to these reasons and more, many enterprises and industries today are turning to Edge asthe next source of competitive advantage. **Gartner predicts that 75% of enterprise data willbe handled by Edge devices by 2025.**

The key to unlocking the power of Edge lies in design thinking.

Organizations' Edge ecosystems can quickly get out of hand if not architected, designed and executed in a comprehensive and streamlined manner. This can be covered by addressing two key, closely integrated requirements.
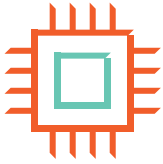
IoT-Edge Infra Orchestration

IoT technology has already connected millions of enterprise assets to IT/cloud platforms, which are pumping massive amounts of data. However, despite the potential of IoT and real-time connectivity, organizations face various obstacles on the way to scale their pilot projects into production.

Some of the key challenges and bottlenecks in expanding IoT solutions include:

- Asset connectivity to IoT devices

- IoT device provisioning

- IoT device health and performance monitoring

- IoT device firmware updates

- Network/cloud dependency Device and data security

Edge-AI Workload Orchestration

In the Edge computing approach, we are moving AI models and other apps to IoT devices, which can increase the complexity in the implementation and management of IoT Edge-based solutions.

The key challenges with Edge analytics are:

- Building AI models to be compatible with Edge computing

- Deploying workloads to multiple Edge devices from the cloud

- Managing the deployed workloads efficiently

- Updating and managing Edge runtimes

- Managing the security of the AI models and Edge devices

Fortunately, proper planning, the right architecture and design frameworks can lead to positive outcomes from IoT Edge solutions. **This is where EdgeOps can be the answer.**
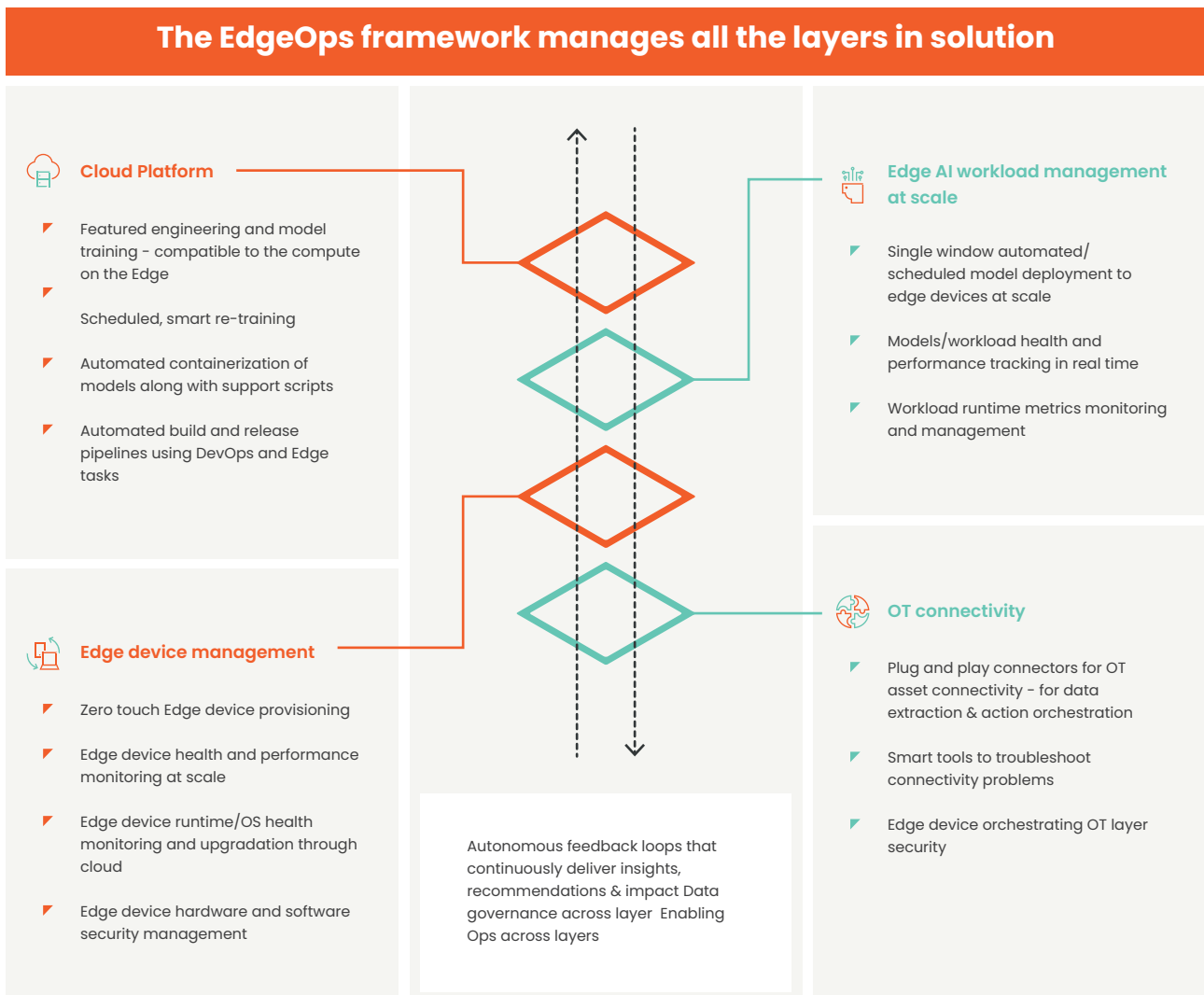
EdgeOps

EdgeOps encompasses the overall framework and principles to be put in place so that all aspects of Edge solutions are managed efficiently to achieve a few important outcomes:
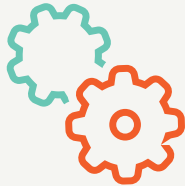

| Build and deploy through best-in-class architectures | Govern through a comprehensive framework and set of tools | Seamless and efficient performance management |
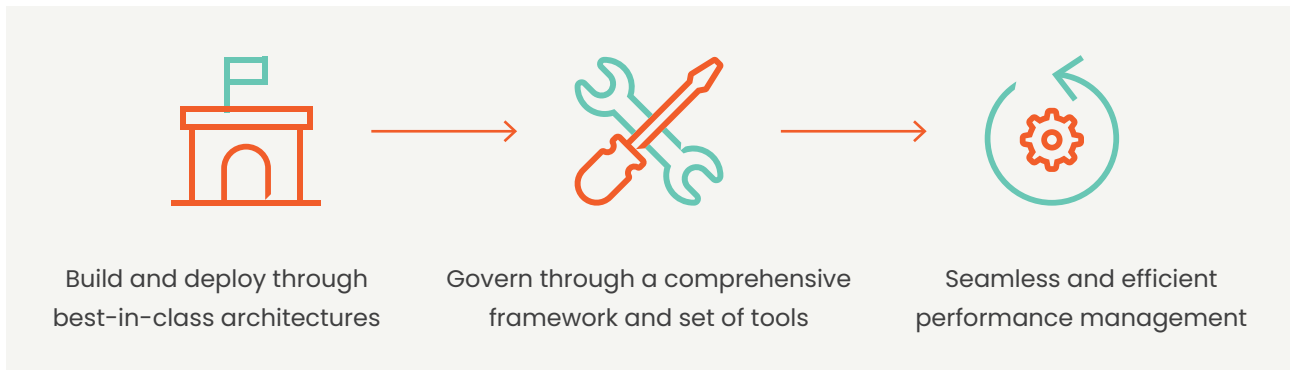
The below EdgeOps framework showcases some best practices, gleaned through our experience working with customers across industries.

The EdgeOps framework manages all the layers in solution

Cloud Platform

- Featured engineering and model training - compatible to the compute on the Edge
- Scheduled, smart re-training
- Automated containerization of models along with support scripts
- Automated build and release pipelines using DevOps and Edge tasks

Edge AI workload management at scale

- Single window automated/ scheduled model deployment to edge devices at scale
- Models/workload health and performance tracking in real time
- Workload runtime metrics monitoring and management

Edge device management

- Zero touch Edge device provisioning
- Edge device health and performance monitoring at scale
- Edge device runtime/OS health monitoring and upgradation through cloud
- Edge device hardware and software security management

OT connectivity

- Plug and play connectors for OT asset connectivity - for data extraction & action orchestration
- Smart tools to troubleshoot connectivity problems
- Edge device orchestrating OT layer security

Autonomous feedback loops that continuously deliver insights, recommendations & impact Data governance across layer Enabling Ops across layers

Here are some great examples of how EdgeOps is making life easier for our customers.

Manufacturing

Product quality prediction and improvement through AI-enabled MachineOps

- A building materials manufacturer is using EdgeOps principles to quickly build AI models on cloud and deploy on Edge devices, helping mitigate cycle time losses, and manage quality variance in near real time.

Telecom

Site uptime improvement and maintenance optimization using Edgebased Predictive Maintenance (PdM)

- Telecom giant has built an AI model to predict the faults and forecast remaining useful life of the asset. This model is quickly tested in cloud and in select sites. The solution is then scaled to various sites seamlessly through EdgeOps.

In both cases, EdgeOps frameworks are helping scale deployments across sites within weeks, while streamlining governance, reducing solution support requirements by 60%.

Whether you are an organization taking tentative steps into the world of industrial IoT or you are an experienced practitioner looking to learn more and exchange notes, we are happy to discuss the benefits and value of EdgeOps.

Contact the authors here on Linkedin or reach out to us at Info@tredence.com

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Both Ashwin and Vamshi are part of the Industry X Practice - helping customers embrace AI- IoT driven solutions to drive operational excellence.

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