Enterprises that wish to bring OT data to the cloud and drive improved decision-making capabilities must understand its lifecycle. In this document, IDC outlines the essential technology requirements to carry OT data throughout its journey to and from the cloud.

OT Data Acquisition on the Path to Cloud

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Introduction

Operations is undergoing a fundamental transformation to further capabilities and drive enhanced productivity, resiliency, and savings. Remote and data-driven operations are two key trends underpinning this transformation. Connectivity of assets and operational systems is on the rise — devices and assets are getting more intelligent, and operational data is being used to improve decision-making by remote and local staff. According to IDC's Worldwide IT/OT Convergence Survey fielded in 2022, 65.1% of respondents expect their operational (OT) data in terabytes per day to grow by greater than 15% within 12 months.

Operational technology (OT) data and operations must now be cloud-connected for decision making and utilization in the remote culture for roles such as supply chain, engineering, and others who are not on site. Where this data has historically been reviewed or exported locally for analysis, it now needs to automatically be accessible and understood in cloud. In the same IDC Worldwide IT/OT Convergence Survey, over 37.3% of respondents anticipate that the majority of new operational data will be stored and processed in the cloud. For 26% of respondents, cloud-based operational data management and analytics is a top investment priority. It can be observed in this data that in virtually every organization, a growing percentage of their operational data will be stored and processed in the cloud.

These requirements have brought a slew of new challenges for enterprises in areas of sourcing, contextualizing, transporting, as well as securing operations and operational data on its way to and from the cloud.

AT A GLANCE

KEY TAKEAWAYS

» Remote and data-driven operations create new demands and requirements on the industrial network backbone.

» Enterprises must understand the requirements to preempt challenges and build a holistic strategy.

» Companies that can source, contextualize, transport, and secure operational data pipelines in a unified management method will be able to extract value from this data.

Connecting OT Data to the Cloud

For enterprises to successfully architect a data lifecycle that serves the needs of the business without creating unnecessary labor and risk, multiple competencies are necessary. The core technology requirements for connecting OT systems and data to cloud include:

» **Sourcing:** OT data today exists in many siloes. Historically, local staffing would refer to this data as necessary in isolated systems. As operational data is used for more advanced analytics, enterprises require the capability to acquire and translate diverse and vendor-specific OT data protocols such as Modbus and MQTT.

» **Contextualizing:** Translated OT data must then be pre-processed and suited to publish to cloud without disrupting local operations. This means that an enterprise cannot rely on the cloud alone to make sense of operational data. Data must be contextualized at the edge to be integrated and sent to the cloud.

» **Transporting:** OT data is inherently voluminous and high speed. OT assets and data are connected through a diverse set of networking capabilities — from time-sensitive networking to 5G, Wi-Fi, and wired connections. Expansion and management of this increasingly complex and robust network is an essential ability that enterprises must ensure they possess.

» **Securing:** The legacy approach to securing operations was to isolate it. Devices, networks, and management of security capabilities are non-negotiables for enterprises connecting operations and operational data to the cloud. As connections to the cloud become imperative, a new approach is needed. Security is now one of the top investment priorities related to IT/OT convergence for 26.7% of respondents, according to IDC's Worldwide IT/OT Convergence Survey, 2022.

With this rise in connected devices and new infrastructure to collect and transmit operational data, the secure industrial network backbone has become even more complex than ever before. In fact, an essential requirement is to be able to manage the devices and software systems in a unified and scalable way. The devices must be rugged to operate in harsh environments, and capable of multiple connectivity types including Wi-Fi, LTE, wired, and more. For the software components, they must be purpose-built for OT environments to meet the unique specifications that operations need. What many companies struggle with is managing these technology capabilities separately. But they operate well together and can be pre-integrated to ensure a smooth and scalable deployment and management.

Benefits

For organizations with a unified set of capabilities that connects OT data to the cloud, the benefits are considerable:

» Faster deployments of new connected devices that ensure IIoT and connected operations initiatives are not bottlenecked by technical resources.

» Merge data pipeline to the cloud regardless of data or connection type. This enables enterprises to have a complete data set and contextualized data that can be interpreted against one another.

» Secure connectivity that follows OT data wherever it goes without compromising operations. The value of these initiatives can be fully realized when it does not position against the potential risk it opens.

» Consolidate the management of new network devices so IT and operational teams focused on innovating instead of facing the increasing workload of managing an unwieldy network of assets and systems.

Considerations

Some considerations which companies should be prepared for:

» Companies may already have a lot of these capabilities through isolated deployments. As replacement cycles or new networking needs come up, consider the benefits of unified offerings.

» Devices may make their own independent connections to different clouds; for example, when taking advantage of asset reliability services offered by a third party. This can be contained by overlays that can deliver the necessary data competencies without requiring a full overhaul.

» Many new sources of data use common standard protocols, but there is still a multitude of legacy assets to account for. These assets and legacy systems will be in place for the foreseeable future and must be considered in a future-proof strategy.

» Consider the integration cost and challenges today and where they may be avoided through pre-integrated solutions. Many IT/OT initiatives become costly due to the need for services. Pre-integrated solutions can help defray these costs and complexities.

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Conclusion

IT teams are tasked with supporting many new connected devices and an even more complex network environment in operations than ever before. To succeed at scale and enable the business with cloud-ready operational data, companies must understand what requirements exist and ensure they are covered. Common architectures and integrations are now clear, and companies can pursue a templated approach to cloud-connecting operational data. This includes elements from the network to data ingestion, security, and management across all. Companies with a holistic and integrated strategy will be in a good position to reap the value potential of their operational data.

About the Analyst

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Jonathan Lang is Research Director for IDC Manufacturing Insights, responsible for the IT/OT Convergence Strategies practice. Mr. Lang's research focuses on digital transformation strategies in environments where operations technologies are deployed including Manufacturing, Utilities, Oil & Gas and Healthcare Provider settings. As IT capabilities redefine and extend the core value drivers of operations technologies, Mr. Lang's research examines strategies, roadmaps, and governance models to drive the convergence and manage the new data and processes it requires.

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