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# How deep is the edge?

The ongoing evolution of the IIoT edge-network infrastructure tier

**AFTER A SOLID** decade of pursuing industrial IoT-enabled business process improvement and innovation, the value of the industrial Internet of Things (IIoT) edge tier within digitally transformed architectures is now widely recognized. Originally viewed as the point where information technology (IT) and increasingly cloud-based applications intersect with the operational technology (OT) environment, the edge functional definition continues to evolve in important areas such as edge-to-cloud integration, edge compute and the convergence of IT, OT and security.

Connectivity requirements continue to escalate as data-hungry analytics and other enterprise applications demand reliable, pervasive information from OT assets, processes, personnel and other components. Application requirements in key areas such as latency, security and on-premise execution are placing further emphasis on edge capabilities.

As this evolution continues, the role of the various edge components also evolves. This includes expanding compute and store capabilities in what ARC calls “thick edge” devices, as well as ongoing convergence of IT, OT and security at the network-centric “thin edge.”

Combined with the expanding capabilities of high-end endpoint devices, including increasingly mobile and autonomous devices such as robots and automated guided vehicles (AGVs), the choices of where to do what at the industrial IoT edge continue to expand.

ARC’s extensive primary research into the industrial IoT edge reveals that differing trends are developing within the thick versus thin components of the important industrial network infrastructure tier that customers should take into account when making decisions regarding edge implementations.

## Differing requirements at the industrial IoT edge

Customers pursuing digitally enabled business-improvement strategies understand the need for deeper and more extensive connectivity throughout the enterprise. Cloud-based solutions for analytics, machine learning, new service-oriented revenue streams and other applications need data from assets, processes, personnel and automation and control equipment resident at the industrial IoT edge to generate meaningful business value. This reality has led to widespread industry recognition of the importance of the industrial IoT edge in achieving desired business outcomes.

Edge capabilities are necessary to enable the full spectrum of connected products, processes and services and provide rapid time-to-value.

Edge functionality is relied on for important tasks such as reducing response latency when sending data to the cloud and insulating clouds from the data deluge driven by the ever-increasing volume of data available in edge devices.

Edge devices play a critical role in supporting the OT environment by providing integration with and insulation from higher levels of the architecture. This is manifested in ways such as support for northbound and southbound connectivity and OT-friendly visualization and security.

The industrial network infrastructure portion of the industrial IoT edge is the flashpoint for delivery and increasing conversion of data and information between physical assets and processes to digital transformation applications. Ongoing improvements in network performance, fueled by both standardization and innovation, along with an escalated emphasis on integrated operational security, are furthering the dynamic nature of this tier of the architecture.

This results in divergent functional emphases for the various categories of industrial IoT edge devices resident at the network infrastructure tier as well as careful consideration of where IoT functionality should reside. What ARC calls thick edge devices, such as IPCs, gateways and routers with significant compute and store capabilities, are increasingly focusing their emphasis on edge-to-cloud integration and edge compute.