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Going Beyond Connectivity in an Evolving IoT Ecosystem

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As Internet of Things (IoT) deployments continue to proliferate worldwide, more service providers seek to derive value from this digital revolution by delivering business services that address different verticals and geographic markets. However, given the massive volumes of devices, connections, and partners associated with IoT projects, several elements need to be addressed when setting up and managing all the parts of such a complex digital ecosystem. Fundamentally, an IoT program's success depends on the ability to establish reliable operations, deliver complete end-to-end solutions, and have the right network and device management solution in place to mitigate costs and scale services.



A proper IoT deployment goes far beyond simply installing a connected device. Leading operators understand they need to bundle additional products and services around their managed connectivity to foster business growth.

Complexity in IoT service delivery

When it comes to the types of services enabled by IoT, operators have the opportunity to serve a wide array of end users, spanning verticals such as healthcare, manufacturing, utilities, and more. This changing landscape means that operators will have a pivotal role to play in providing the underlying end-to-end solutions that support B2B2X (business-to-business-to-any) service delivery. With the B2B2X business model, the goal is to integrate telecom and IT services with

enterprise applications to enable vertical-specific solutions. While this approach can allow telecom operators to climb further up the value chain, B2B2X environments are far more complex than those typically found with B2B or B2C services as they feature more facets, including network infrastructure, third-party applications, and partners, which require unique operational strategies to orchestrate.

The building blocks of any IoT technology stack are protocols as they provide the foundation for how devices, sensors, and applications interact and exchange information. Unfortunately, this environment is still a wild west for operators. With so many devices using different protocols that need to be integrated into the network, managing performance and interoperability can be challenging, especially for operators with multiple access technologies and a variety of IoT verticals. Further complicating the issue is the reality that IoT deployments typically include a massive number of connected devices, often from various vendors. All of these devices must be monitored to proactively manage performance and ensure service level agreements (SLAs) are met. Ultimately, with so many unique end users to support, each with their own set of needs, and working with an ecosystem of partners with different models, integrations, and interfaces, things can get messy fast.

The next challenge service providers face stems from the conundrum of choosing between building or buying a go-to-market IoT platform. Depending on which option an operator chooses, the previously highlighted challenges may differ in impact and priority based on the size of their organization. For example, a tier 3 or smaller operator may require a turnkey solution that is pre-packaged and ready to sell directly to an enterprise or consumer. Meanwhile, a more prominent operator may seek to build an end-to-end IoT platform themselves. In the end, what enterprises and consumers want are ready-made IoT solutions that address their evolving business and connectivity needs and can be purchased from a single source. Therefore, if service providers want to maximize their value in IoT, they must create holistic platforms that integrate connectivity, applications, and customer-specific needs.

Another major hurdle with IoT deployments is moving beyond connectivity further up the value chain. According to a [GSMA report](#), by 2025, the share of connectivity revenue in total IoT revenue will decline to 17 percent, while service enablement, including applications and platforms, is forecast to generate 57 percent of the total, with professional services and business solutions accounting for 26 percent. Beyond connectivity, service providers have a real opportunity to provide robust device management, value-added services, data collection and analytics for various enterprise verticals. These capabilities can help end users drive business decisions, gain valuable insights into connected devices, and realize CAPEX savings.

Given the sheer number of B2B2X applications and various maturity of the devices on the network, security and upgradability at each layer of the solution will need to be considered as part of the design. IoT security will need to consider both aspects of the physical and logical connectivity needs to create isolation layers and leverage AI to detect when aspects of the connectivity are not as they should be.

Operators prepare for IoT

While 5G is garnering most of the headlines when it comes to enabling IoT connectivity, there are other access technologies available for operators to leverage in their IoT deployments. Let's examine the best practices and common themes operators face in their evolution beyond connectivity in the pursuit of new revenue models.

5G network operators

The flexibility of 5G and its ability to support enormous device versatility, massive bandwidth throughput, and ultra-low latency provide the perfect conditions to underpin new IoT services.

First, operators in this scenario should determine the IoT use cases and business verticals they wish to address. Taking the time to properly evaluate which use cases to pursue based on market demand and the necessary technology is critical to avoid fragmentation, reduce upfront costs, and accelerate time to market. It is imperative to avoid building vertical-specific solutions that lack reuse for other applications. For example, the needs for fleet management may differ entirely from the needs in smart agriculture. A pre-packaged solution with an easily customizable user interface that can be adapted to multiple IoT verticals on a shared infrastructure is key to boosting the end-user experience and service uptake.

Second, it will be vital for operators to coordinate all of the pieces that make up the IoT value chain. When launching IoT services, an operator will encounter various players who previously did not interact. Synergy among these IoT ecosystem players will be needed for the design, implementation, and market launch of an end-to-end IoT platform and the ongoing management of services and resources. When onboarding new IoT devices or performing service quality troubleshooting, ensuring collaboration among the players will help maximum SLA adherence. What's more, with this significant shift in architecture, service providers should consider impacts to customer management, partner management, product catalog, and analytics, and ensure 5G-ready policy and convergent charging systems.

Third, given the sheer volume of devices, geographic disparity of sensor locations, and strict SLAs, IoT deployments require complete hands-off process automation of device lifecycle management, including onboarding, zero-touch provisioning, remote configuration, and diagnostics, as well as service management to address service quality and faults, such as delayed telemetry, connectivity issues, and KPI threshold crossings. From an administrative point of view, not only is it about managing IoT service needs, but it is also important to consider regulatory and security requirements. Utilizing a multi-tenant architecture can help deliver self-care tools to your B2B customers and provide segmentation for customer support and network operations to limit control to only the resources for their allocated domain.

Operators delivering IoT services over 4G LTE

For operators currently delivering IoT over 4G today using LTE-M or NB-IoT that are planning to move to 5G, rolling out higher revenue-generating services and ensuring uptake will be critical to their business. Many operators in this scenario face the challenge of recouping their significant investment in 5G quickly, and as a result, are turning their focus to creating new B2B products. But to achieve those revenue targets, operators need to couple the high-value business telemetry produced in IoT services with solutions that drive operational efficiency for cost savings, such as the automation for resource management noted earlier. These same efficiency improvements can help optimize existing 4G IoT services and resource management to drive revenue further.

As discussed earlier, SLAs for IoT services and the verticals they serve, such as healthcare or autonomous vehicles, are stringent as they are mission-critical applications. To deliver the required level of service quality, operators need to think beyond SIM management and managed 4G connectivity, and instead propel themselves further up the value chain to offer fully managed IoT services. Mission-critical applications will have different connectivity requirements and demanding use cases requiring ultra-low latency, reliable connectivity, and in some cases, high sustained bandwidth. Operators can achieve this by further monetizing the business telemetry from IoT devices and sensors using real-time data collection. For example, service providers can configure alerts and notifications for IoT business data on behalf of end-users or include it as a turnkey offering to proactively execute business processes and enhance decision-making. If IoT data thresholds are configured to monitor temperature and vibration for a piece of machinery, predictive maintenance alerts can be triggered to notify the end user of issues to avoid costly machine downtime and ensure quality control. To offer such managed IoT services, operators need a customizable platform to satisfy end users' unique needs using business vertical data intelligence best practices.

Cable MSOs entering the IoT fray

Not to be overlooked, cable MSOs also have an opportunity to stake their claim in the IoT market segment thanks to the advent of the mobile virtual network operator (MVNO) business model. This allows cable operators to offer wireless connectivity by securing access to network services at wholesale rates from a mobile network operator. What's more, the availability of the Citizens Broadband Radio Service (CBRS) spectrum in the United States has also provided new, more cost-effective channels for cable operators to extend their reach into new markets and introduce new 5G and IoT services.

For operators in this scenario, it is crucial to recognize that IoT services are just one compelling application of 5G, and there are other solutions that can be offered to B2B customers, such as private networks. According to [ABI Research](#), 40 percent of private networks by 2030 will be enterprise-specific, where three out of five industrial manufacturers prefer a private network to be managed and operated by a third party. This presents a great opportunity for cable operators

to introduce value-added services such as IoT and ICT to mid-tier enterprises beyond 4G or 5G connectivity. Private networks begin with connectivity, but go well beyond that, becoming a pillar for upselling multiple technologies and solutions. Operators seeking to pursue such revenue models need to build expertise in IoT and ICT services and engage in the right partnerships that will help cement their IoT value.

Evolving the IoT Ecosystem

In the end, there is no one-size-fits-all IoT solution for operators. However, to achieve true scalability and profitability in IoT, operators must become an ecosystem enabler, orchestrating all the pieces that make up the IoT partner environment. Service providers should consider new operating models via a partner ecosystem serving multiple IoT verticals on a centralized solution that provides a high degree of closed-loop automation, customization, and seamless integration with existing infrastructure to speed time to market and capitalize on the IoT opportunity in front of them.