

The Future of 5G, Edge and AI is Here: Transforming Networks to Enable New Industry Applications





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“Telcos are making technology investments and tech decisions to be the platform provider or innovation catalyst for enterprises, so to me, the extent to which they can also innovate with enterprise ecosystems and services, that’s where magic is going to happen in the industry.”

-Craig Wilson

VP, Global Telecommunications Industry, IBM

Today, the telecommunications industry sits at a key inflection point. With the advent of 5G networks and the continued evolution of edge computing, communications service providers (CSPs) are offering modern, open, cloud-enabled networks that power enterprise and enable the possibilities of 5G.

This blending of 5G, edge, cloud computing and AI represents not only a unique foundation to support groundbreaking use cases in almost every industry, but it also provides a potent opportunity for CSPs to create new enterprise revenue streams.

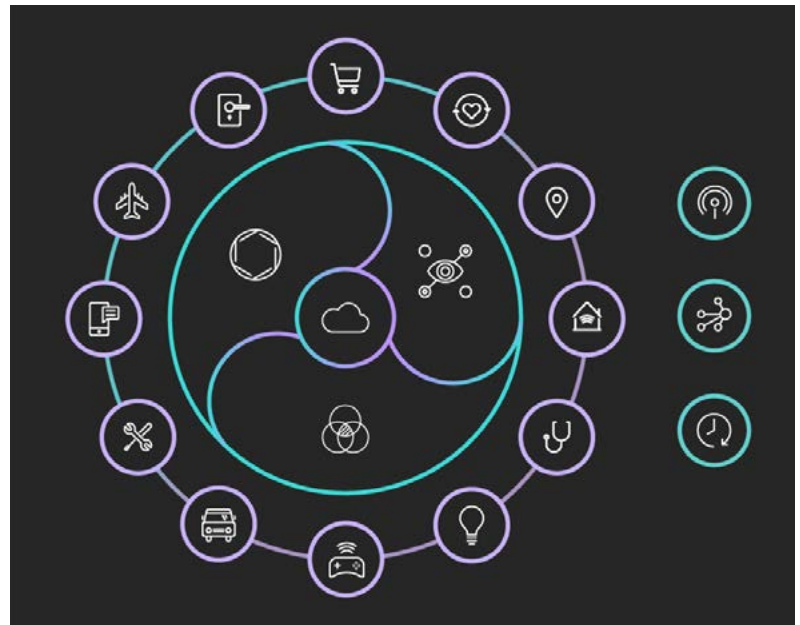
In an IBM survey, 94% of telecommunications executives said they expect edge computing implementations to improve operational responsiveness in the next five years. [Overall, 5G is expected to be a multitrillion-dollar market.](#)

“Enterprise is where the immediate edge opportunity is for CSPs,” said Bill Lambertson, IBM’s Global Director of Cloud, 5G, and Edge Computing for Telecommunications, Media, and Entertainment. “Operators have unique assets that make their networks and data centers attractive locations for edge solutions—essentially beachfront property.”

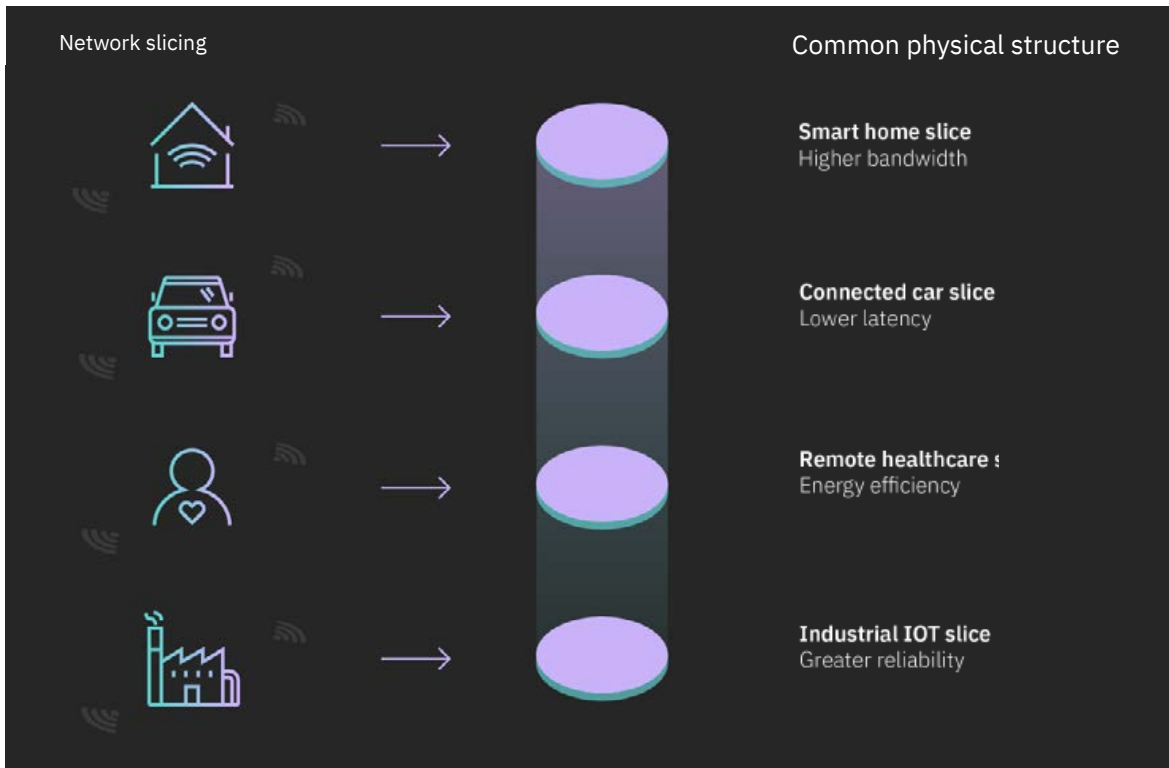
Look at what's happening at [IBM client Vodafone UK](#). Now more than ever, industries of all kinds are focused on worker safety. Vodafone Business and IBM are using mobile private networks (MPNs) for industrial enterprise solutions, combining an edge computing stack on the premises with an IBM and Microsoft Azure cloud. Thousands of sensors, attached to heavy equipment on the plant floor and workers' helmets, generate reams of useful data that are efficiently and consistently processed at the edge with ultralow latency. IBM® Watson IoT® supplies the AI that analyzes the data in real time. When the data reveals some kind of anomaly or incident, immediate, automated actions can be taken. The network isn't just providing connectivity anymore—it's enabling wholesale digital transformation for the enterprise, with Vodafone operating now as a platform business, offering new digital services.

This scenario isn't hypothetical or on the long-term horizon: It's happening today. While CSPs are at different stages of building out 5G networks, they're rapidly moving toward the future, where possibilities like the one above are mainstream use cases.

Realizing the full benefits of opportunities like these examples requires a virtualized container-and-microservices-based cloud-native architecture and operating model, allowing for optimization through rapid scaling and descaling, resource sharing, and agility. To manage use cases in real time, the network must be automated and intelligent, and able to dynamically compose and partition network resources, also known as "network slicing."



Open, modern-cloud network, infused with AI, 5G and edge, will propel industries of all kind.



The greater bandwidth a modern 5G network will allow carriers to segment their signal by user needs.

There are key challenges, however, that CSPs face in their journeys to full network modernization. Deploying 5G is a huge undertaking. Millimeter wave 5G offers high bandwidth but very limited coverage, meaning that CSPs will have to build cell sites within individual buildings like office complexes. The capital expenditures required to build this infrastructure are large and must be aligned with the revenues that CSPs are generating. Solutions, such as the IBM Cloud Satellite™ offering, can simplify this undertaking: CSPs using it can run applications consistently across all on-premises, edge computing and public cloud environments. The operator has full visibility across all environments through a single pane of glass.

To offset new infrastructure costs, CSPs are looking to innovate with new revenue streams, enabled by multiple 5G and edge industry use cases through the adoption of an open, multicloud environment that allows operators to scale, share, automate, repair, analyze and adapt their networks seamlessly.



IBM Cloud for Telecommunications

Enter IBM Cloud® for Telecommunications. This open, hybrid cloud platform gives CSPs flexibility in choosing where they create and offer services and is launching with an ecosystem of more than 35 partners. Built on a unified architecture, this platform enables CSPs to “build once, run anywhere” due to the open nature of the offering. The IBM Cloud for Telecommunications ecosystem of partners provides innovative tools and solutions covering all aspects of an open hybrid platform, from operations support systems (OSS) to front office business support systems (BSS) and the mobile network, which is core to edge computing and security. It also includes advanced automation and AI tools that help make deployment more efficient while reducing costs. And IBM’s leading security encryption capabilities help give clients peace of mind about the integrity of their data. In addition to deployment flexibility and data control, IBM Cloud for Telecommunications allows for consistent management of the network, from the core to the edge.

IBM Cloud for Telecommunications is built on some of IBM’s fundamental technologies:

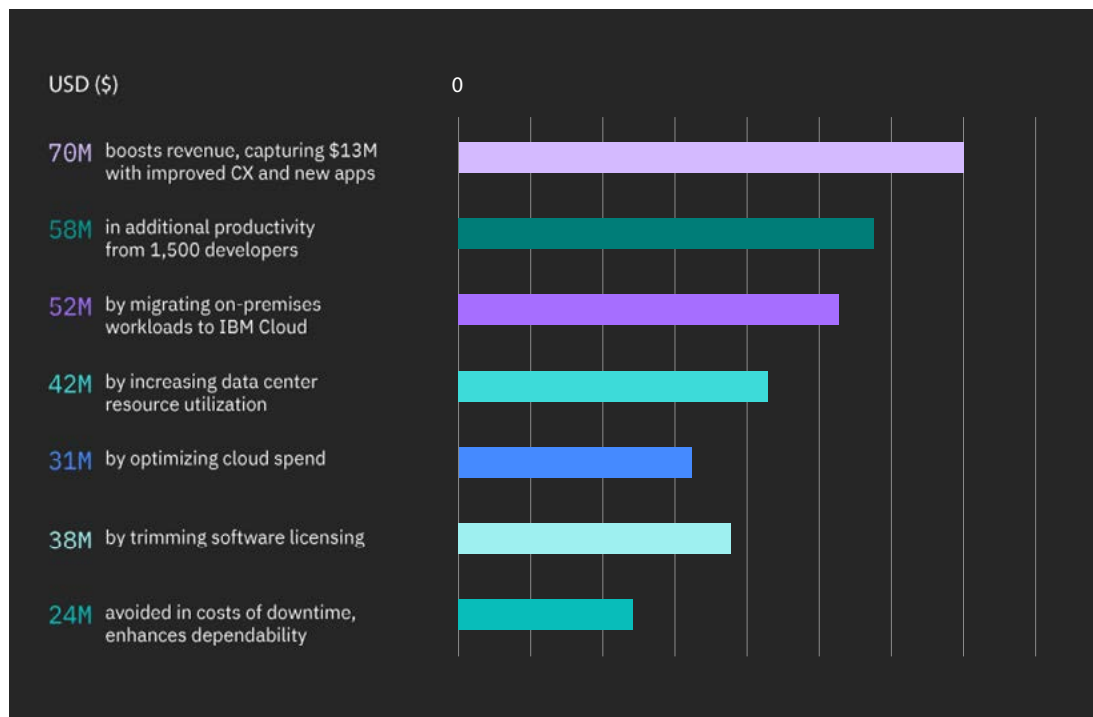
- IBM Cloud Pak® for Network Automation, the service assurance orchestration and lifecycle management tool
- IBM Edge Application Manager, the edge “fabric” that enables autonomous provisioning of data and AI workloads for ease of maintenance in delivering enterprise edge and device edge use cases
- The Red Hat® OpenShift® platform, making it a container-first offering that runs on any cloud
- The IBM Cloud Satellite solution, which extends the IBM public cloud and as a service offerings to the CSP’s network data center or other on-premises location

IBM Cloud for Telecommunications meets CSPs wherever they are on their network modernization journeys and kick-starts their ability to provide a myriad of co-created industry solutions to their enterprise customers.

[Learn more →](#)

Openness is key. The Red Hat Open Shift platform enables consistency, while the IBM Cloud Satellite solution offers the single point of management control across infrastructures. IBM Cloud for Telecommunications supports the needs of multigenerational networks with speed and lets CSPs modernize assets with low-cost hardware on demand. Openness also means minimal lock-in compared to existing proprietary systems, for example, and the ability to use existing virtualized network functions. The offering also uses agile DevOps capabilities to speed time to market for new edge and 5G applications. The resulting cloud-like experience can occur practically everywhere, helping automate updates, scaling and compliance.

IBM Cloud for Telecommunications is designed to let the operator easily manage across multiple environments and can be deployed on other cloud platforms from Amazon Web Services (AWS) Outposts to Azure and Google Anthos.



Quantified benefits over 5 years. Source: Forrester Total Economic Impact™ Of IBM And Red Hat For Telecommunications, June 2020

Another key benefit of IBM Cloud for Telecommunications is the ecosystem attached to it. IBM has been working extensively with more than 35 partners, including existing network equipment providers like Nokia and Samsung, as well as relative newcomers to extend the value of IBM Cloud for Telecommunications through a growing ecosystem. The ecosystem is not focused solely on network offerings but includes tools for data, AI, analytics, OSS and BSS. CSPs have access to the full range of this know-how and innovation—without vendor lock-in. They can mix and match based on their needs.

By moving to a cloud-native environment, using the Red Hat Open Shift platform and containerization, IBM Cloud for Telecommunications is designed to provide CSPs with the ability to easily and rapidly scale to meet business demands. It also offers the consistency that comes from a single point of control. Operators can monitor not only the assets running on IBM public cloud properties, but also instances and services that are running on operators' local facilities, in data centers or in customer environments. Lambertson says, "The key value is the end-to-end service assurance and orchestration provided for network functions."

Overall, IBM Cloud for Telecommunications meets CSPs wherever they are on their network modernization journeys and kick-starts their ability to provide a myriad of co-created industry solutions, including Industry 4.0, to their enterprise customers. And herein lies the opportunity for new revenue streams that offset new infrastructure costs and speed adoption of 5G.





Industry 4.0 Dawns

Perhaps IBM Cloud for Telecommunications’ most significant feature is how it helps accelerate the dawning of Industry 4.0, “that vision of cyber-physical systems interoperating in a mechanized way with compute resources run at the edge,” as described by Valerie Clark, IBM’s Global Lead for Edge Computing Services. The Vodafone use case mentioned earlier is just one of seemingly infinite possibilities for “smart” factories centered on an Internet of Things (IoT) foundation on the factory floor. It’s where sensors, smart machines and devices are able to monitor and even run AI at the edge—eventually, all on a 5G wireless network—to improve production quality and throughput thus reducing production operating costs.



An example cited by Clark is an auto parts manufacturer that used visual or auditory AI, hosted at the edge on the assembly line, to examine and listen for anomalies that might affect quality. The auto parts manufacturer stands to save USD 18 million per year per plant—an astronomical figure when multiplied over the dozens of plants operated by the manufacturer. Whether focusing on production optimization or asset optimization, AI run at the edge serves to “unlock dark data” that operators can’t see until the product or asset is already compromised. As in the Vodafone example, industry-trained AI use cases run at the edge allow the manufacturer to detect potential anomalies faster and notify the operator with remediation actions. That simple process alone allows for the potential of a significant increase in advanced prediction of asset downtime, saving money, increasing resilience and protecting the supply chain.

Most manufacturers have automated the discrete or simple processes in their production plants. All that is left now to further automation and take-out cost are processes that require some flexibility in judgement. As plant operators gain confidence in AI and reap the benefits from taking action on the recommendations, they’ll gain confidence to further automate more complex processes based on the decisions of the AI model.

Serving a manufacturer on its journey to Industry 4.0 requires a flexible, open, hybrid cloud platform using containerization, like IBM Cloud for Telecommunications, and IBM Edge Application Manager to manage the deployment and ongoing maintenance of the AI and data workloads. The solution can be adapted to each specific configuration on the ground.

Whether focusing on production optimization or asset optimization, AI run at the edge serves to “unlock dark data” that operators can’t see until the product or asset is already compromised. Learn more about the power of edge computing.

[Learn more →](#)





Conclusion

The smart factories of Industry 4.0 make up just one of the many dazzling potential use cases for modern, intelligent workflows that combine elements like 5G, edge computing and industry-trained AI models. For instance, the autonomous vehicle has never been closer to reality because we can deploy thousands of sensors on the vehicle, generating real-time data that's processed almost instantly at the edge, for example, in the car, and respond in milliseconds to changing road conditions. Other use cases include robotic process automation (RPA) in factories or retail scenarios, and healthcare applications like remote surgery and embedded device communication.

IBM Cloud for Telecommunications showcases a unique combination of industry expertise, advanced technology innovation and the critical importance of an open, cooperative ecosystem. IBM is uniquely differentiated as the partner that has the capabilities to innovate and scale solutions seamlessly across essentially any enterprise in a security-rich environment that's designed to be easy to manage. Unlike web-scale solutions that are extensions of a specific public cloud, IBM Cloud for Telecommunications works across virtually any configuration and cloud and delivers the benefits of edge computing. The openness of the platform gives CSPs the ability to keep their own security keys and control all operational data. It's the lynchpin for telecoms looking to make the leap today to network modernization so they can reap the full benefits of edge computing, 5G and cloud.

Engage with IBM to take the next steps with a free virtual Framing Session with our team so you can experience first-hand how the people and practices of IBM Garage can accelerate your innovation and transformation.

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