ERICSSON REINVENTED

SIMPLIFYING NEXT-GENERATION NETWORK DEPLOYMENTS AND NETWORK OPERATIONS

EXECUTIVE SUMMARY

The wireless wide area networking (WWAN) infrastructure landscape is changing radically. Once dominated by closed and proprietary architectures, vendors now embrace open source, software-defined networking (SDN), federated network slicing, and network function virtualization (NFV) to speed 5G deployments. End-to-end network complexity grows in parallel with 5G given carriers' limited experience with both unlicensed and higher frequency spectrum above 6 GHz. This is further exacerbated by an expected proliferation of transmission points and the fundamentally evolved architecture of 5G Radio Access Network (RAN). For operators, a new focus on moving core network functions to the edge to improve subscriber experience is also occurring.

It can therefore be difficult and confusing to navigate the myriad of edge networking solutions that are available. The expected proliferation of Internet of Things (IoT) devices and sensors will tax networks and dramatically increase operating expenses (OpEx) unless operators apply intelligent, proactive management. By employing artificial intelligence (AI) and machine learning (ML), automation and orchestration will likely emerge as key tools to manage this complexity. If operators apply these technologies correctly and consistently, they should not only improve the efficiency of their network engineering resources, but also enable mobile network self-healing. Operators can ill afford the subscriber churn and loss of business caused by poor quality of service or downtime.

Ericsson delivers a unified approach across centralized, distributed, and edge resources to address the challenges faced by operators. Cloudification provides enhanced flexibility and richer insights from analytics to fine-tune network performance, ensure higher quality of service (QoS), and identify new service revenue opportunities. In parallel, Ericsson's support services simplify tasks for operators and facilitate a more efficient and proactive approach to technology adoption and network operations. Additionally, new digitalized operating models leverage AI and data driven insights to enable operator transformation. Carriers and operators of all sizes need help to navigate the complexity of next generation wireless networks such as 5G. We believe Ericsson not only has the experience, but also the solutions and services to guide and assist operators of any size.

A Zero-Defect Network Vision

Ericsson anticipates the challenges in deploying 5G infrastructure and is leveraging a software-defined, cloud-native approach to deliver enhanced scale and flexibility. The company claims it is the first provider to harmonize and orchestrate both the cloud and network end-to-end from central sites to the edge. We believe this distributed cloud approach could deliver several benefits including low latency, massive scalability, and enhanced security, which is an ever-growing concern given recent data breach incidents.

Additionally, Ericsson offers new disruptive technologies that support the increased densification requirements of 5G RAN without adding network operations staff. The underlying architecture efficiently scales out and leverages augmented human intelligence to deliver Ericsson's "Network Intelligence. Engineered" vision.

There are only a handful of infrastructure providers such as Ericsson that can deliver the hardware, software, and services necessary to make cellular networks run. However, Ericsson is further differentiated by its numerous service offerings, which enable operators to be more proactive and efficient and speed the adoption of 5G wireless infrastructure.

Ericsson claims its operator support expertise covers 3 billion subscribers on networks with the end goal of ensuring the best mobile user experience. This expertise helps operators achieve a "zero-defect network vision", which enable an intelligent network that leverages augmented machine learning, anticipates issues, and proactively self-heals before issues arise. Ericsson's approach divides this vision into three objectives:

- Anticipate possible network issues and prevent them before they occur (versus the historical, reactionary, alarm-driven approach).
- Continuously apply intelligence and validation against big data and anticipate network fine-tuning.
- Quarantine and implement corrective action to resolve problems quickly and efficiently, when issues do occur.

This philosophy is similar to intent-based networking, which Cisco Systems and other vendors employ within large enterprise networks. With Ericsson's guidance, operators can use this approach to facilitate a better user experience and improve network operational efficiency, agility, and reliability.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING INITIATIVES

Many infrastructure providers speak to network intelligence, but Ericsson is actively deploying AI, ML and machine-to-machine (M2M). Some examples are:

- Ericsson is working directly with operators to apply ML and M2M as part of its 5G Transformation Project. Ericsson claims that earlier this year it concluded an initial successful trial of the first advanced ML algorithm for network load balancing.
- The embedding of intelligent algorithms in base stations and edge infrastructure to improve overall performance and lower OpEx.
- The equipping of field technicians with augment reality/virtual reality (AR/VR) cognitive assistance and voice assistants that possess extensive knowledge bases and technical manuals for fast troubleshooting.
- Predictive support that automatically scans the network, detects issues prior to escalation, and provides preventive actions.

The network infrastructure market is expected to dramatically ramp up new products and services that take advantage of AI techniques over the next two to three years which we believe will result in new emerging operating models for operators. Ericsson is demonstrating early leadership on this front that should help propel the telecommunications industry into an age of advanced machine intelligence, blended virtual and physical realities, and complete network connectivity.

ERICSSON STRENGTHS AND CAPABILITIES

Ericsson is making significant investments in many areas to maintain a leadership position in the industry. Among these are:

- Widespread industry collaboration with more than 20 industry partners and more than 40 universities and technology institutes to ensure interoperability, high levels of network resilience, and exceptional QoS. Developing this ecosystem is essential to 5G.
- Multiple global development centers with more than 23,600 R&D employees.
- A commitment to developing leading technology underlined by more than 45,000 patents – one of the information and communications technology (ICT) industry's strongest portfolios. Notably, Ericsson has a comprehensive end-to-end 5G patent portfolio, including a landmark 5G patent application that was the largest ever in the industry in terms of inventors.

- A strong leadership position and voice within standards bodies such as the 3rd Generation Partner Project (3GPP), Linux Foundation/Open Networking Automation Platform (ONAP), and mobile operator associations around the world.
- A services organization with more than 55,000 engineers that provides global scale and local collaboration in more than 180 countries.
- Deep relationships with tier one carriers globally, including participation in labs such as the AT&T Foundry program, which result in faster time to deployment for next generation networking solutions.

Final Conclusions

Next generation WWAN deployments are complex and will tax networks beyond anything seen in the past with 3G and 4G. We believe Ericsson has made many strides to move its architecture from closed and on-premise to open and disaggregated. The benefits for operators are numerous: easier, faster deployment and management; lower OpEx; a self-healing network that ensures an exceptional mobile user experience; and mitigates subscriber churn and loss of revenue.

By applying M2M, AI, ML, cloudification, edge computing, and automation to wireless networks, Ericsson helps operators deliver greater operational efficiency, enable new operating models, and achieve operational transformation towards a zero-defect network vision. When realized, we believe this vision has the potential to make better use of network engineering expertise through automation, ML, and AI techniques. This is a strong value proposition to any operator regardless of size or geography.

In addition to Ericsson's broad solution portfolio and wealth of experience, the company brings deep industry collaboration, global development, expansive tier one carrier relationships, and a strong end-to-end 5G patent portfolio to the table. Ericsson can facilitate the operator transition to 5G and help manage the complexities of a 5G ecosystem post-deployment, all backed by a world-class global services and support organization with a long-term investment strategy in place.

Given these numerous capabilities, we believe Ericsson should be considered by any operator wanting to efficiently deploy and operate next generation WWAN infrastructure and leverage the resulting scalability, agility, reliability, and incremental monetization opportunities.

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