

Network Transformation - Driven by Disaggregation

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The telecom industry is undergoing another major network transformation. While the transformation of TDM to IP has ushered in innovation, mobile operators and broadband service providers are now struggling to keep up with bandwidth and performance demands of a massive number of connected devices—and with user expectations for digital service experience.



According to Strategy Analytics' May 2019 report "*IoT Strategies, Connected Home Devices, Connected Computing Devices, Wireless Smartphone Strategies, Wearable Device Ecosystem, Smart Home Strategies*" there were 22 billion devices connected to the Internet by the end of 2018, with predicted growth to 38.6 billion connected devices by 2025 and 50 billion by 2030. At the same time, mobile operators and broadband service providers must seek to reduce costs while overall ARPU (average revenue per user) growth continues to slow down or remain flat.

As such, these service providers are increasingly looking to disaggregate their networks in order to leverage a growing ecosystem of open software and hardware components from a multi-vendor ecosystem to reduce CapEx costs, to accelerate time to market, and to monetize new service introduction. The traditional model of sourcing proprietary and expensive equipment from a single, monolithic vendor doesn't hold up in this new telecom world. Next-generation networks must be disaggregated, open, virtualized, and flexible enough to support demand while also enable new business efficiencies and economies.

Open Ecosystems—Drivers of Disaggregation

There are a number of open ecosystem organizations that have emerged to drive this disaggregation for both mobile Radio Access Networks (RAN) and fixed broadband access networks.

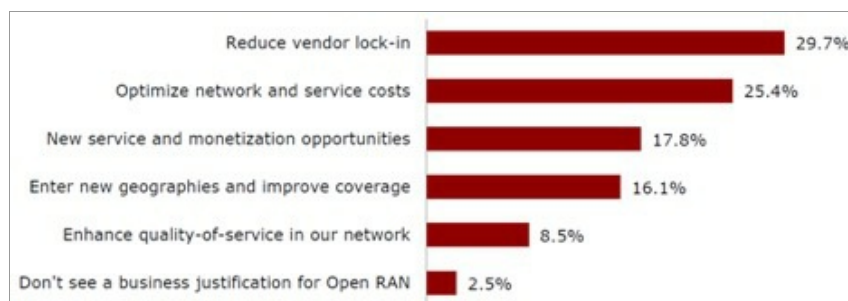


Figure 1 - Business justification for Open RAN initiatives.
Source: Heavy Reading's 2018 Open RAN Operator Survey

For 4G and 5G RAN, the O-RAN Alliance is driving disaggregation through the delivery of open reference architectures and standardized interfaces that align with its core principles of openness and intelligence. The O-RAN Alliance is a mobile operator-led initiative with broad support from the global vendor community. It has many working groups, including the Stack Reference Design Workgroup (WG8) co-chaired by Radisys

and Intel. This working group is focused on providing fully operable multi-vendor profile reference specification and interface documentation. The O-RAN Alliance's Test and Infrastructure Group is tasked with delivering end-to-end test specifications to help drive interoperability in a multi-vendor ecosystem.

The Telecom Infra Project (TIP) was founded to accelerate the pace of innovation in telecom and it supports projects for the access network, transport, and core. In addition to disaggregation, its driving principle is to simplify the network. On the RAN side, this translates into initiatives that are focused on enabling simplified, flexible, and efficient RAN technologies that are commercially deployable.

Disaggregation is critical to the Open RAN evolution, as it enables mobile operators to truly open their radio infrastructure—the last part of the network to embrace “open”—to leverage solutions from multiple vendors. Heavy Reading's recent report “2018 Open RAN Operator Survey” found that a majority of global mobile operator respondents believe that Open RAN is strategic to their business over the next three years (Figure 1, above). The primary business benefit cited by mobile operators for transitioning to Open RAN was to reduce vendor lock-in, followed closely by optimizing network and service costs. Disaggregation is critical for these benefits to be realized. In fact, only 2.5 percent of all global operators surveyed did not see Open RAN as a critical business strategy.

For broadband access disaggregation, the Open Networking Foundation (ONF) is a key ecosystem driver. One of the organization's newer initiatives is the SDN Enabled Broadband Access Initiative, also known as SEBA™. Radisys has been collaborating with ONF and its service provider and vendor community to advance SEBA, which enables broadband service providers to use mature open source software like ONOS™ (Open Network Operating System) and bare metal hardware to reduce costs and accelerate time-to-market. The ONF ecosystem is also supporting the Virtual OLT Hardware Abstraction (VOLTHA™) open source project, which focuses on hardware abstraction for broadband access equipment.

In November 2019, ONF and TIP announced further collaboration in the areas of mobile and fixed access, with ONF focused on open software and TIP focused on open hardware. Under this collaboration for the fixed access domain, ONF and TIP are working together to add mmWave as an access option to the SEBA platform. For mobile operators' 5G networks, the two organizations are working on pairing ONF's software with white-box hardware defined by TIP.

Bringing It All Together: Systems Integrators Play Key Role

When a network is disaggregated and open, the software and hardware are separated, and best-of-breed solutions can be used. However, these new open multi-vendor components need to be brought back together and integrated as a commercially deployable end-to-end network. Mobile operators and broadband service providers may not have this systems integration expertise in-house, as they have long been reliant on single-source vendors. This reality opens the door for new market entrants—systems integrators—and new business models.

Systems integrators have a huge part to play in network transformation, as they can deliver pre-integrated, pre-validated solutions. By taking responsibility for integrating open software and white-box hardware and delivering a complete end-to-end solution, systems integrators are critical. Their role in the ecosystem allows mobile operators and broadband service providers to reap the benefits of disaggregated components without having to strike deals with multiple vendors—and have the peace of mind that their network will work.

Making Open and Disaggregated Solutions a Commercial Reality

Ensuring interoperability is critical for a multi-vendor ecosystem to be commercially viable and deployable. Operators are committed to disaggregation, as shown by their support and active participation in the various open ecosystems outlined above.

China Mobile and Reliance Jio have taken this commitment to the next level with the launch of the OTIC (Open Test and Integration Center) initiative, with additional support from China Telecom, China Unicom, Intel, Radisys, Airspan, Baicells, CertusNet, Mavenir, Lenovo, Ruijie Network, Inspur, Samsung Electronics, Sylincom, WindRiver, ArrayComm, and Chengdu NTS. OTIC is focused on facilitating product readiness and interoperability for next-generation 5G wireless networks based on the O-RAN Alliance architecture, specifications, and interfaces.

The initiative will establish multiple testing centers to validate that Open RAN component elements and solutions are compliant and interoperable. Each testing and validation facility will be sponsored by a mobile operator, with the initial OTICs to be hosted by China Mobile in Beijing and by Reliance Jio. The OTIC initiative is not formally associated with the O-RAN Alliance, but its overlapping membership has a shared vision to accelerate disaggregation and the Open RAN ecosystem. By testing and validating their products at an OTIC facility, solution providers can reliably demonstrate to the industry that their solutions are O-RAN compliant and interoperable. Mobile operators can have confidence that these solutions will work in a live network deployment.

The Telecom Infra Project has also established community labs with the goal to further the development and deployment of Open RAN 5G NR solutions. TIP projects can use the community labs to develop proof of concepts and test service provider use cases.

Summary

Disaggregation is a central tenet of the network transformation underway today in mobile and broadband networks. It is being driven by all players in the global telecom industry, from mobile operators and broadband service providers to the vendor community and system integrators.

By embracing disaggregation and an open ecosystem of hardware and software, service providers can reap the benefits of reduced costs, improved efficiencies, increased flexibility and accelerated time-to-market, all while ensuring their networks can scale to support future traffic growth on their networks.