

Converging and Automating 5G Networks

The aspirational promise of 5G mobile networks

As mobile networks evolve from 4G to 5G, significant leaps in network performance gains are being promoted across the industry. When compared to today's 4G LTE networks, touted 5G aspirational goals include order of magnitude improvements in speed, capacity, latency, and connected devices (mainly IoT-related machines). But the actual 5G network performance that subscribers—humans and machines—will actually experience ultimately will depend on the Mobile Network Operator's (MNOs) performance goals, supported applications, targeted subscriber base, technology limitations, financial constraints, and other interrelated factors.

End-users will experience significantly improved performance compared to what they see today—a requirement, if MNOs are to migrate existing subscribers (and attract new subscribers) to their 5G networks and the new applications and use-cases this new mobile network will enable. This means the mobile networking industry must stretch its aspirational performance goals and push technology to its physical limits.

Three categories of 5G services

5G will enable three categories of 5G services and associated applications, which are based on end-to-end network performance requirements over wireless and wireline domains. These are referred to as enhanced Mobile Broadband (eMBB), massive Machine-Type Communications (mMTC), and ultra-reliable Low-Latency Communications (urLLC), illustrated in Figure 1. Each category will have a direct impact on how wireline technology and network architecture will be designed, deployed, and managed, as summarized below:

- eMBB requires significant increases in wireline capacity
- mMTC requires automation and analytics to best connect millions to billions more machines
- urLLC will require Multi-access Edge Computing (MEC) and deterministic packet-optical transport to achieve low latency targets

Benefits:

- Complete, open solution allowing MNOs and wholesale operators to build best-in-breed networks for competitive advantage while enjoying a broader and more secure vendor supply chain
- Vendor-agnostic network slicing and dynamic planning capabilities allowing service providers to leverage their multi-vendor networks and support a broad range of new and competitive 5G-centric use-cases and applications
- Converge 4G and 5G fronthaul, midhaul, and backhaul traffic onto a simpler and more cost-effective network designed from inception to support 5G network slicing
- Ciena's new Adaptive IP provides open, standards-based IP connectivity, albeit differently, by leveraging openness, Blue Planet automation software, and a lean IP protocol implementation