

Executive Summary

Cable broadband technology is currently the primary means of providing broadband services to homes and businesses in most of the United States. Because of its inherent capacity, cable technology will always be able to provide more capacity than commercial wireless solutions and copper telephone lines. Because of its ubiquity, it will be the main pathway for broadband communications for most homes and businesses for the foreseeable future. Cable operators are pursuing several strategies to increase the capacity and performance of cable television infrastructure, and to optimize it for user applications.

There are a number of significant limitations inherent in cable systems relative to fully fiber optic technologies, as well as to communications systems that were designed from the outset to provide Internet-type broadband data services. These include the limitations in total capacity, a physical architecture that is optimized for broadcast communications, and a significant remaining migration path to full end-to-end Internet Protocol (IP) operations.

At the same time, cable system subscribers are using the systems in profoundly new ways that were not envisioned in the design of the systems or the near- to mid-term business plans of the operators. As an example, more users are seeking third-party, “over-the-top” (OTT) programming—streaming video content (both fully produced channels and programs, and consumer-produced media found on YouTube or social media sites)—delivered via a consumer’s Internet connection to a television, tablet, smartphone, or other compatible device. The change is technically challenging, because this content comes from outside the cable system and the cable operator’s programming arrangements, through external Internet connections, and is growing in a rapid and unpredictable way.

The only way to satisfy this demand is through the cable operator constantly and continuously increasing the IP data capacity and capabilities of the system, and maintaining an open and content-neutral approach to ensuring that users can reach their content and create content, as well as reach the content they might want from the cable provider itself. The cable operator must see that the capacity for both OTT and cable-provider content grows according to the needs and interests of the users. Furthermore, data capacity and capabilities must increase so that cable operators do not face

the temptation to favor transport for their own or affiliated content, to the detriment of the OTT content.

The need for growth, juxtaposed against the technical limitations of the cable systems, implies that cable operators nationwide will need to continually update their systems over the next five years and beyond to be able to support new consumer applications and remain competitive with other technologies such as fiber-to-the-premises (FTTP).

It is not possible to fully foresee the evolution of the various hardware and software strategies the cable companies will eventually pursue—just as it is impossible to accurately predict the exact growth of broadband demand. We know with some confidence, however, that the cable industry is seeking to avoid or at least delay the need to replace their networks with fully fiber infrastructure, because the cost of such an upgrade would be extremely high.

The likelihood is that, in the next five to 10 years, cable operators will introduce significant upgrades in electronics (as opposed to wholesale replacement of coax with fiber) such as DOCSIS 3.1 advanced cable modem technology, and will need to continue incremental improvements in the cable physical plant and the headend. Cable operators may reallocate spectrum between upstream and downstream directions to make the capacity more symmetrical. They may also attempt to increase the coaxial cable bandwidth (beyond 860 MHz and 1 GHz).

As cable operators continue down the path to IP convergence, they will develop new applications to meet consumers' demand for multi-screen video (i.e., a seamless ability to watch content on not just televisions, but also tablets, smartphones, and computers), OTT, and improved navigation among the variety of content options available to them.

Cable operators are also broadening their public and subscriber Wi-Fi offerings, as well as seeking ways to utilize their infrastructure to provide additional capacity to commercial wireless carriers (i.e., backhaul from cell sites).

In addition, advancements in video production technology have made the creation of high-quality content for public, educational, and governmental (PEG) channels increasingly cost-effective. The integration of Internet-based video and social networking are also becoming important elements in effectively catering to the needs of the local community.

