

Meet Market Needs with Software-Enabled Solutions

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INTRODUCTION

The cable industry is at an inflection point. The pandemic-fueled demand that had propelled the industry forward over the past two years has tapered off, even if the pandemic shows no signs of abating. However, the conditions resulting from the pandemic have unleashed a digitization of an unprecedented scale and scope. Digital transformation, a trend over the past few years, has given way to a digital acceleration in many industries, with companies adopting digital business models almost overnight. At the same time, governments worldwide are investing heavily to promote broadband accessibility and equity. These opportunities are driving existing and new competitors to claim a stake in this developing opportunity. The competitive market, global scale, and new industry dynamics are evolving with a backdrop of disrupted supply chains, higher input costs, and tight labor markets. Furthermore, analysts are warning about the added uncertainty of a recession, or even stagflation, which could pressure existing and emerging areas of growth for cable operators.

Cable operators are well equipped to capitalize on these major opportunities. Their expansive networks give them an important beachhead to service existing and new markets; their established footprint in the residential market with “feet on the street” and a massive access network position them well to offer the services needed today and tomorrow, and their business services continue to be a major area of growth.

However, cable operators cannot capitalize on these massive opportunities if they do not deliberately modernize their networks. Traditional network and operating environments, based on hardware infrastructures and largely manual interventions, are ill-suited for today’s services and market requirements, which can only be met with software-based solutions with automation and state-of-the-art technologies such as ML and AI.

Challenging Market Conditions

Massive broadband growth tapering

The pandemic caused people to subscribe to broadband services at unprecedented rates, fueling extensive growth for broadband providers. However, the growth rate has tapered significantly in the recent quarters, down to 0.5% from 3.5% at the height of the pandemic. Investors have reacted by punishing cable stocks.

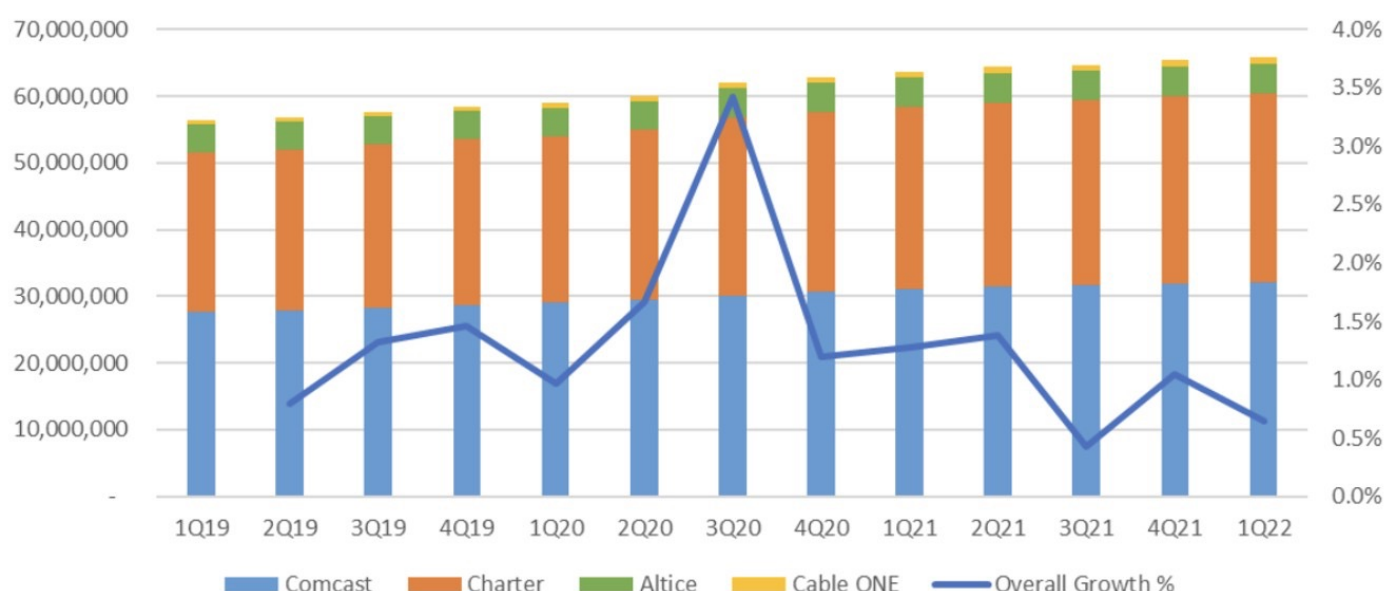


Figure 1. Cable Broadband Subscribers' Trends

Worsening economic conditions

High energy prices, largely caused by geopolitical conditions, have created an inflationary environment worldwide. In the US, inflation reached 9.1% in June 2022, the highest level in four decades.

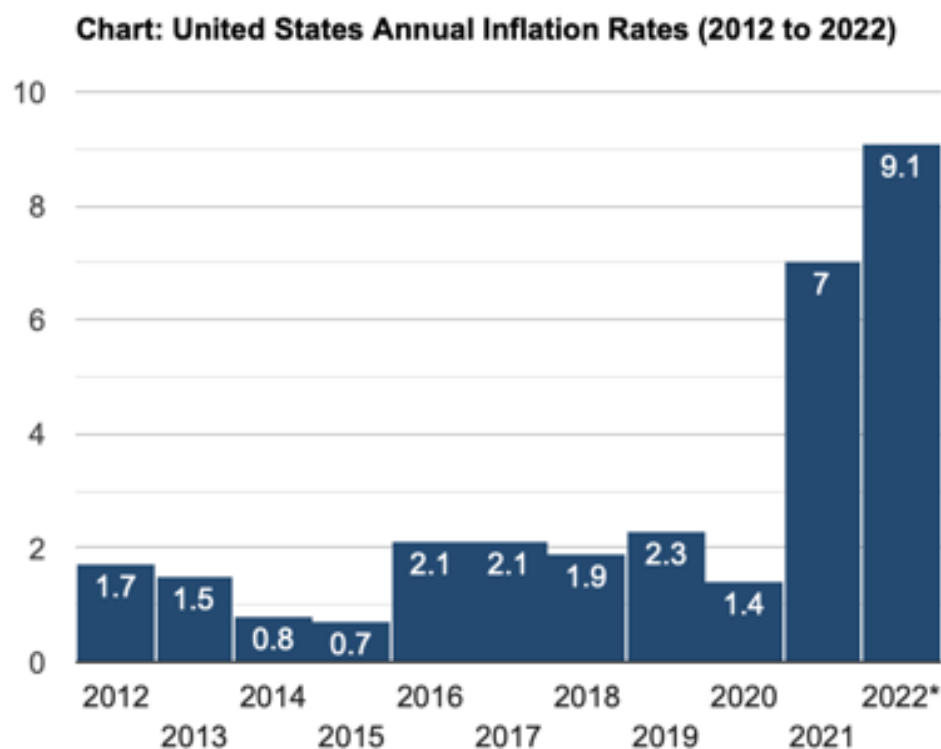


Figure 2. US Inflation¹

Central bankers are trying to tame inflation by increasing interest rates, often aggressively. At its June 2022 meeting, the US Federal Reserve increased its benchmark rate by 0.75%, with more rate hikes expected. There are fears that the aggressive tightening may lead to a recession or worse yet, stagflation. Rising interest rates increase the cost of capital for firms, and put pressure on market demand.

Supply chain disruptions

Lockdowns, stimulus spending, and just-in-time, lean supply chains have caused enormous disruptions that continue to plague firms, leading to increased input costs, delays, and in some cases, inventory build ups. The Federal Reserve Bank of the NY Global Supply Chain Pressure Index has receded somewhat since May of 2022, largely due to improvements in China, but continues to be significantly elevated by historical standards.

¹ <https://www.usinflationcalculator.com/inflation/current-inflation-rates/>

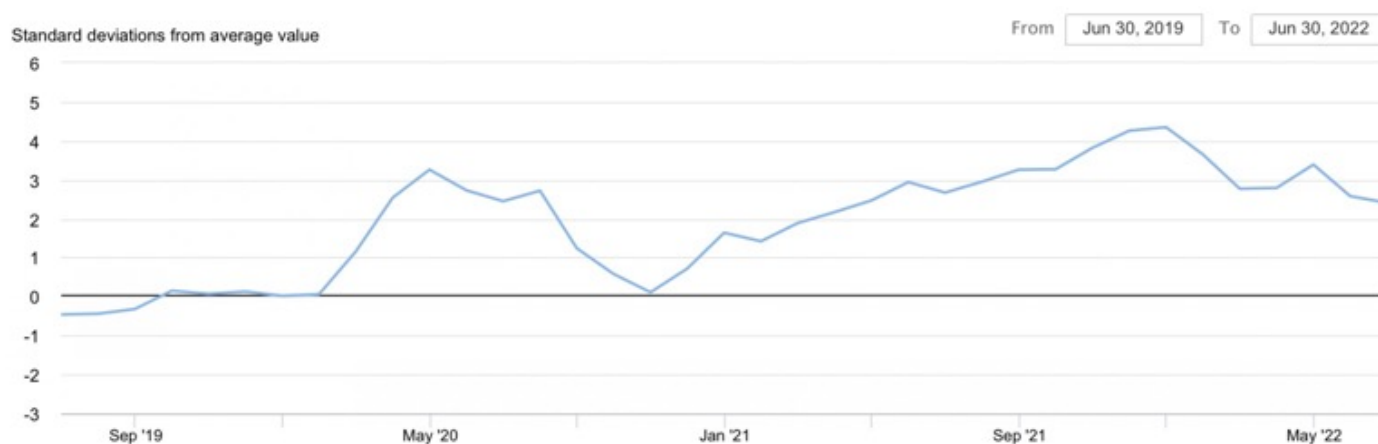


Figure 3. The NY Fed Global Supply Chain Pressure Index²

Tight labor markets

US unemployment was 3.6% in June 2022, and employers continue to struggle to fill open positions and to retain their employees. In Europe, the unemployment rate was 6.6%; while higher than the US, it is low by historical standards. China's rate stands at 5.5%, right on the target set by its government.

New Opportunities for Cable Operators

Although the cable industry is facing serious challenges, there are also significant business opportunities for cable operators. Investment in the last mile has never been greater, the home has emerged as the place of delivery for some of the most innovative digital services of the future, and business services continue to be a major source of revenue growth for operators.

Government-induced expansions

Broadband is now considered an essential utility the world over, leading governments to allocate impressive subsidies to improve broadband accessibility to previously unserved or underserved areas. This includes rural areas but also urban areas where penetration has not been adequate. In the US, substantial amounts of funding (over \$73 billion) have been allocated to broadband expansion under multiple programs, and additional funding (\$14.2 billion) is subsidizing broadband and equipment for eligible (lower income) people.

² <https://www.newyorkfed.org/research/policy/gscpi#/interactive>



Figure 4. Government Funding to Promote Broadband Equity³

The digital home

The pandemic has triggered a wave of digitization. Although some of the digital services adopted hastily were not new, the rate of adoption was staggering. As the world returns to some semblance of normalcy, some of these digital services are persisting and evolving to become an integral modality in many industries.

- **Work from home** has entered the daily lexicon overnight. While the concept of teleworking is not new, it became widely adopted during the pandemic, and today most companies offer some form of hybrid work arrangements. According to Forbes⁴, 25% of all professional jobs in North America will be remote by the end of 2022.
- **Healthcare at home** is emerging as one of the major innovations in the healthcare industry, or any industry. What started as adoption of home-based telehealth during the pandemic is fast evolving and speeding the industry's move toward its long-term goal of bringing care to the patient. To quote John Halamka, MD, head of the Mayo Clinic's virtual care arm, "Rarely

³ <https://dgtlinfra.com/broadband-investment-deployment-government-funding/>

⁴ <https://www.forbes.com/sites/bryanrobinson/2022/02/01/remote-work-is-here-to-stay-and-will-increase-into-2023-experts-say/?sh=6464efd020a6>

in the history of medicine do we see such a perfect alignment of policy, technology and cultural transformation converging to produce a new care paradigm like acute care at home⁵.” Notable areas of focus are home hospital, chronic care management, and age in place.

- **Streaming**, gaming, and ecommerce continue to grow and demand more bandwidth, upstream and downstream, reliability, and low latency. The Metaverse will increasingly drive new applications in the home.
- **Education** is experiencing significant innovation. It is true that K–12 online was a failure, but new models in post-secondary education are emerging.

The digital home is a growing area of opportunity. Operators can offer value-added services that generate revenue not only from subscribers, but potentially from enterprises that are subsidizing services delivered in the home, such as patient monitoring and treatment. This is in addition to services such as gaming and other low latency services, enhanced video, IoT management and protection, security, managed WiFi, and guaranteed bandwidth with wireless backup, just to name a few.

Business services continue to grow

Cable operators are seeing significant increase in their business services segment. The SMB market continues to grow, and the large operators are making inroads into the enterprise market, traditionally the sweet spot of major telcos. These markets demand more high-end services, including resilient, symmetric gigabit Internet, SD-WAN, security, and other services that require resilient networks with automated operations.

Delivering these services will require modern, software-based solutions, that enable agility, and automation, and that increasingly use ML and AI capabilities.

Meeting Market Demand and Staying Competitive

Cable operators have a dual mandate: Tap into the emerging market opportunity and defend their businesses against strong competition.

⁵ <https://www.healthcareitnews.com/news/clinic-cleveland-clinic-ceo-points-telehealths-future>

The competition

The substantial government funding for broadband has energized existing players and new entrants. In the US, the major telcos are investing heavily in fiber deployments. AT&T is planning to double its fiber footprint to 30 million homes by 2025⁶. Municipalities are also using the funding to deploy fiber independently from the broadband operators; one such example is the city of Baltimore⁷. Companies such as Starry are utilizing over-the-air technologies to deliver broadband.

This is not the first-time cable companies face competition from telcos. In the US, a couple of decades ago, the major telcos entered the broadband market in a big way, upgrading their infrastructure from DSL. Verizon introduced FiOS (a fiber to the home service) in 2005; AT&T introduced U-Verse (a VDSL service) in 2006. At the time, cable companies did not immediately react, as they had strong relationships with local municipalities and an extensive HFC network, which they felt would underpin their defensive strategy; however, as the telcos grabbed market share, cable operators were quick to react and to maintain their leadership position.

Today, the telcos are aggressively deploying fiber again. AT&T added 316,000 fiber subscribers in 2Q 2022. The telcos' broadband growth in the 1Q 2022 quarter exceed cable's (1.7% for telcos versus for 0.6% for cable.

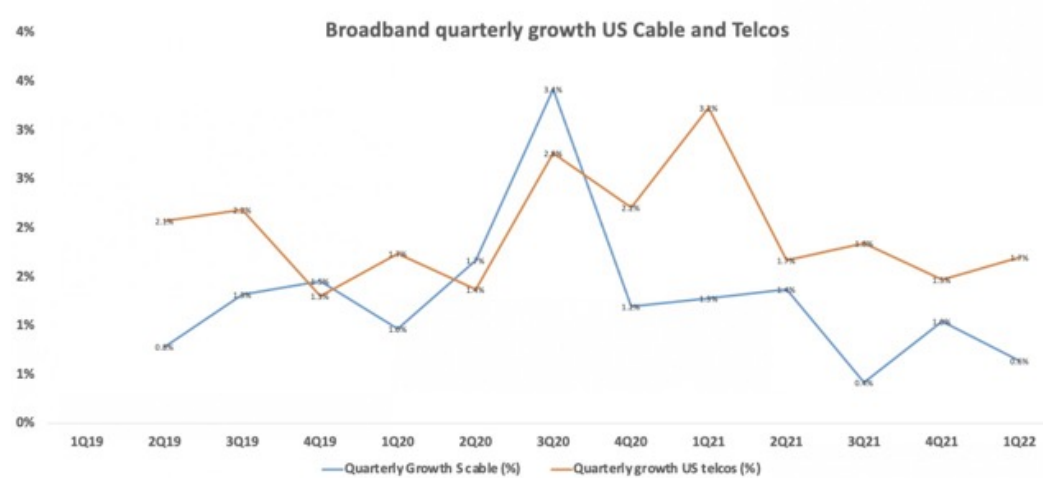


Figure 5. Quarterly Broadband Growth (Source: ACG Research)

⁶ <https://www.fiercetelecom.com/operators/at-t-targets-fiber-boost-after-warnermedia-deal>

⁷ <https://www.bloomberg.com/news/articles/2022-06-07/baltimore-eyes-federal-funds-for-municipal-broadband>

However, this time, cable operators have the right tools to remain competitive. Software-based solutions combined with DAA will enable them to offer the gigabit speeds the market demands, thereby empowering them to have an effective, competitive strategy to meet competition head on.

The emerging market requirements

The digital home and connected services will impose new requirements on last-mile broadband operators. For some mission-critical applications (for example, in healthcare), the stakes can be very high. The following figure highlights some of the requirements of the home delivered solutions:



Figure 6. Emerging Requirements of the Digital Home (Source: ACG Research)

Cable operators need to deliver a superior customer experience, and some services may even require service level agreements (SLAs) for enterprise-level services delivered in the home. They also need to deliver efficiency, feature velocity, and agility given the fast-evolving market needs.

Cable operators must also continue to innovate and offer competitive services to grow their business services, a significant area of growth for them.

Cable's Traditional Tools Are no Match for Today's Market Reality

Cable operators have built substantial and successful businesses using largely hardware-based infrastructures with traditional network management tools that rely on human intervention and that leverage an extensive hybrid fiber coax-based (HFC) footprint. These capabilities have propelled operators to significant market penetration, and they have largely met market needs with those tools to date. However, the market parameters have changed; we are at an inflection point.

Here are some reasons why legacy technologies are no longer adequate:

- **Speed:** Gigabit speeds have become a salient selling point for broadband in most developed markets. This is because residential and business customers are demanding more speed. The cable industry has recognized this need and has been working toward its 10G initiative. The industry has also recognized that the traditional centralized architecture was ill-suited for 10G and has been working on defining and introducing distributed access architectures (DAA)s. The industry is also supplementing its HFC infrastructure with passive optical networking technologies and getting ready to deploy DOCSIS 4.0 over the next few years.
- **Symmetric broadband:** More video conferencing, gaming, mining, and other applications are driving the demand for more symmetric speeds. Symmetrical broadband will grow as home-based digital applications, such as work from home, telehealth, and even home hospital, become more prevalent. Although cable operators have been adding upstream capacity (mid split, high split), in order to truly meet the long-term needs of the market, more broadband upstream and downstream will be needed. The industry is working on those solutions (DOCSIS 4.0), but again, symmetric capacity will not be met with today's centralized, hardware-based architectures.
- **Edge compute:** Some future applications will require processing closer to the customers' premises. A centralized, hardware-based infrastructure is insufficient to deliver this capability.
- **Resilience and reliability:** In order to serve the residential market in today's ultra-connected context, traditional networks will need to evolve. As people work from home or receive acute healthcare services in the home, the requirements for reliability of broadband connectivity and availability will become more rigorous, and it is entirely likely that even in residential settings, service providers will need to satisfy stringent SLAs (for example, for a healthcare provider). This means that cable operators need a software-based operating environment with the ability to proactively address service degradation before it escalates into outages. "Alops is the new ops⁸." Only a software-based solution can enable such capabilities.
- **Operational efficiency:** The increasingly sophisticated services required cannot be managed efficiently without automation. There would be just too much human error and not nearly enough resources to be sustainable. It is not only the level of service reliability that cannot be

⁸ [ACG Research](#)

met with manual interventions, but also automation has become an essential enabler in the network, empowering technicians to focus on more complex tasks while relying on machine language to handle more repeatable tasks. It is a paradigm where machines do the work under the supervision of humans. Not only is this more operationally efficient, but in constrained labor markets, reducing the need to hire is necessary. It is essential that the new tools are easy enough to use so that technicians can be reskilled. More automation and intelligence also reduce the need for truck rolls, onsite maintenance, and so on.

- **Supply chain challenges:** With legacy networks, cable operators often rely on industry-specific components. Yet, many of the legacy network components are becoming harder if not impossible to source. Given supply chain challenges and the increased cost of raw materials, relying on these components has become problematic. Moving to a software environment enables operators to use more mainstream components, for which there are more vendors and thus more leverage on price. Of course, last-mile industry components continue to be industry-specific to a large extent.
- **Sustainability:** Energy prices have risen significantly recently, bringing new urgency for operators to reduce power usage. Sustainability is no longer a buzzword but essential to the bottom line and increasingly important to shareholders and other stakeholders alike. Traditional, hardware-based equipment is notoriously power hungry and requires a large power budget for cooling. While it is true that with DAAs some power consumption moves to the edge, the overall power budget for DAAs is lower.

The Time Is Now to Modernize the Cable Network

Cable operators have the tools to defend their businesses and to tap into the emerging business opportunities. Although many have started to transition the network, they'll need to accelerate the pace if they want to keep up. Virtualization is the key to compete. When virtualization is combined with DAA operators set the path not only for DOCSIS 4.0, but they also take advantage right now of opportunities that will increase business success and ultimately ensure longevity. With virtualization and DAA, cable operators will be able to deliver the enhanced services the industry now requires with exceptional levels of service quality.

Cable operators have ramped up deployments of DAAs, an important precursor to virtualizing their infrastructures. With more operators deploying DAA solutions and addressing some of the initial operating challenges and as operators start to look long term again, having resorted to short-term solutions to deploy capacity in the last two years, the pace of DAA deployments, an essential component of an operator's strategy to meet the industry's 10G challenge, will pick up.

Fiber deployments to supplement the HFC network are the right solutions for greenfield deployments and plant extensions. Cable operators have a distinct advantage because they can leverage the existing infrastructure, including the extensive fiber network, the availability of power in the access network, and their relationships with local communities to deploy PON.

Cloud-native solutions are now widely available and have been largely deployed. These solutions enable feature velocity and agility and are more sustainable than traditional solutions because the cost to deploy and operate is lower. Cloud-native solutions are ideally suited for capacity expansions. Used as part of a DAA implementation, they enable operators to add significant capacity in the access network without adding racks of circuit boards in the headends and hubs. By bringing virtualization to network management, operators can significantly improve resiliency because these solutions can rely on AI principles and enable predictive fault detection and remediation.

Cloud-native solutions have now been deployed by many pioneering operators, generating best practices for the industry and paving the way for broad-scale deployments. It is important to also note that some vendors have taken great care to replicate the traditional operating environment technicians are familiar with (for example, CLI and SNMP), even while providing streaming telemetry and state-of-the-art tools such as NETCONF and YANG.

Although these solutions are built with innovative software-based technologies, these complexities are hidden from the technicians who are installing and operating them; they are easier to operate, and operators have proven that it is indeed possible to retrain personnel to use the new technologies. The vendors who have pioneered virtual CCAP (vCCAP) solutions have started seeing increasing marketplace traction and growing revenue as solutions have become mature, operational environments well-defined, and as major operators have started deploying this technology at scale.

Operators that have deployed them are demonstrating their impact on customers' satisfaction. Still, software solutions account for about 15% of the total market, but given market dynamics, the market share of these solutions is set to increase dramatically over the next few years as operators understand the essential role they play in to meet competitive pressures and to realize the significant market opportunity that lays ahead.

Conclusion

Geopolitical currents, government investment in broadband, and extensive digital acceleration have conspired to create an unprecedented environment for cable operators, one that will drive them to make far-reaching changes to their networks and operating environments. Adopting software-based technologies and deploying fiber are essential for operators to defend their businesses and to play a major role in capturing value as digital services are adopted at unprecedented rates.

Traditional solutions and methodologies will sustain operators in the near term (as indeed they did when they were able to meet the sudden demand for bandwidth during the pandemic), but the runway is short. Hardware-based solutions are simply ill-suited for a volatile, dynamic market environment. Software-based services and network management will propel them to play a major role in the digital home of the future, to grow business services offerings, and to meet the expanding demand of the market for symmetric broadband.



Liliane Offredo-Zreik is a Principal Analyst with ACG Research; her research and advisory efforts focus on the evolution of the broadband delivery infrastructure and on how broadband, and technology more broadly, are driving a profound change in healthcare and powering the fast evolution of digital health.

She has extensive telecommunications and cable industry experience with a focus on market dynamics, and product and go to market strategies. She brings to her research areas significant industry experience, having held leadership roles with many major service providers and industry vendors, and having been a Wall Street industry analyst. Liliane has an MBA from Harvard Business School, a master's in electrical engineering from Cornell University, and a BSEE from Syracuse University.

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