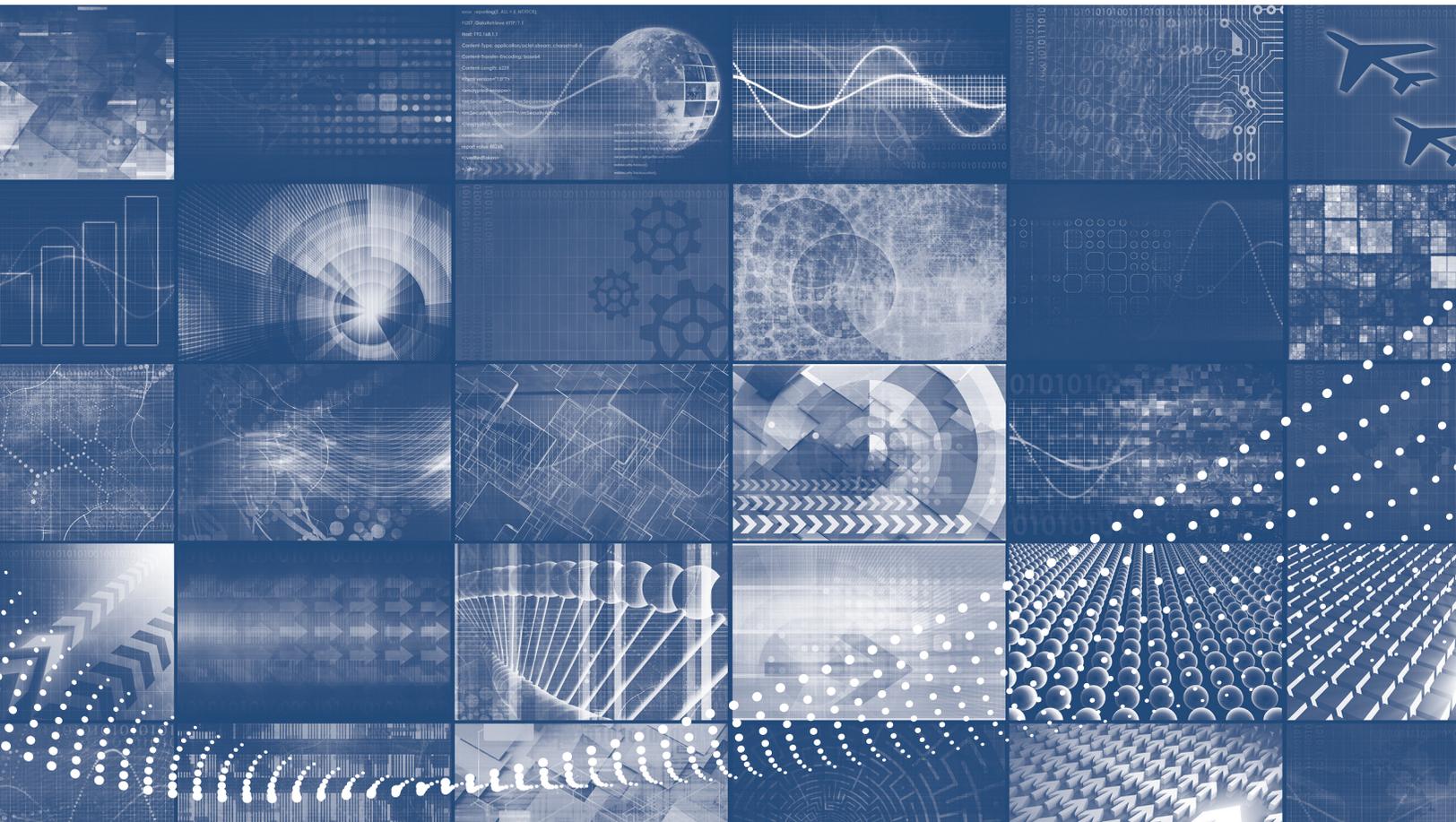


MAJOR CHANGES COMING TO YOUR NETWORK?

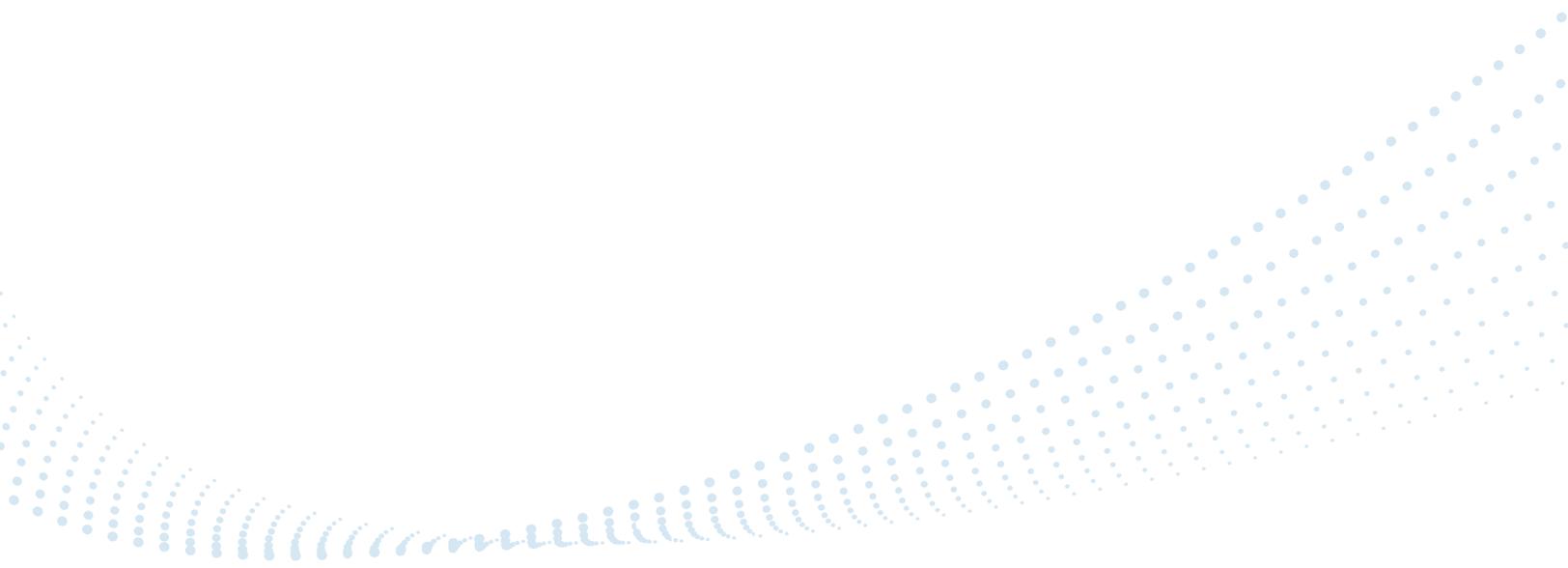
Consider these facts and options first!



INTRODUCTION

5G is all the buzz. Yet, questions abound for large-sized enterprises with multiple locations, like retail petroleum or franchise operations. Is it wise to consider 5G? How do other options like high-speed satellite compare? And how does a brand make critical network decisions with confidence, knowing it has analyzed key factors that might affect each branch?

Here we explore some pertinent considerations for any distributed organization making major changes to their network, such as transitioning to 5G.



What is 5G Anyway?

A January 2020 article in Digital Trends defines 5G as “the next generation of mobile broadband that will eventually replace, or at least augment, your 4G LTE connection. With 5G, you’ll see exponentially faster download and upload speeds. Latency, or the time it takes devices to communicate with wireless networks, will also drastically decrease.”

This fifth-generation technology has started to be rolled out in select cities across the country. Yet some of its inherent limitations mean that widespread access is still years away. For example, while the 5G millimeter wave is the fastest, waves associated with the high-band spectrum have difficulty penetrating walls, windows, and buildings. The result? Limited indoor coverage. Waves also have a short reach, so more cells are required.

As a result, carriers need to piggyback off 4G and LTE as they build out their nationwide networks. That means 5G networks are really a “network of networks or systems,” said Nelson Malaguti, at the Geneva-based International Telecommunication Union’s Radiocommunication Bureau in 2018. This higher level of interconnectedness, he noted, means factoring in all kinds of telecom infrastructure.





Internet's Future: High-Speed Satellite Service

While the buzz surrounds 5G, there is little real understanding of this “network of networks” approach. The fact is, this higher level of interconnectedness required for widespread and near term delivery of 5G wireless services is made possible over satellite.

“Large cellular wireless carriers (like Verizon and AT&T) can consider limited 5G implementations in select NFL-sized cities, yet those same companies still struggle to provide reliable 4G cellular wireless services in rural areas,” explains Steve Swartz, former Chief Engineer at a Fortune 500 retailer with more than 40 years’ experience. Why? Because, he says, beyond special implementations, coverage availability is an issue due to the need to replace existing cellular wireless infrastructure—a prospect with significant technology, logistical, and funding challenges.

High-speed satellite service eliminates those barriers.

While many who are unfamiliar with satellite have misconceptions based on old technologies, some of the most well-known and respected visionaries see satellite as the future of Internet. Companies like OneWeb, Amazon, and SpaceX are racing to provide a 5G-enabled “Internet in the Sky.” Their goal: bring high-speed Internet access to everyone around the globe and satisfy the growing demand for connectivity and high bandwidth applications, like streaming video.

Each of their visions rely on satellite. It offers the largest coverage footprint of all communications technologies and is the only reliable way of providing high-speed bandwidth to rural and remote areas. It’s easy to deploy and doesn’t require the same type of expensive (or extensive) infrastructure or capital investment.

A 2018 article in SpaceNews noted the ability of satellites to single handedly cover entire continents. It quoted Tom Stroup, president of the Washington-based Satellite Industry Association.

“You start with the advantages that satellite has, like ubiquitous coverage,” he said. Satellites can bring 5G to areas where terrestrial connectivity companies consider it too expensive to build fiber-optic cables. Rural areas especially stand to benefit from satellite connectivity, Stroup added.

That brings us back to the needs of the large distributed enterprise. When branches are located in areas unserved or underserved by broadband, rather than wait for a network of networks, perhaps their best option is to consider what’s at the core of the future: a satellite solution.

7 Key Advantages of Satellite

Satellite solutions come in a variety of shapes and sizes. As noted earlier, they can be part of a hybrid networking solution; used for high-speed Internet access; serve as a backup solution for greater network resiliency; or even as a cellular backhaul solution. Regardless, satellite solutions deliver some distinct advantages over 4G cellular wireless and terrestrial broadband services.

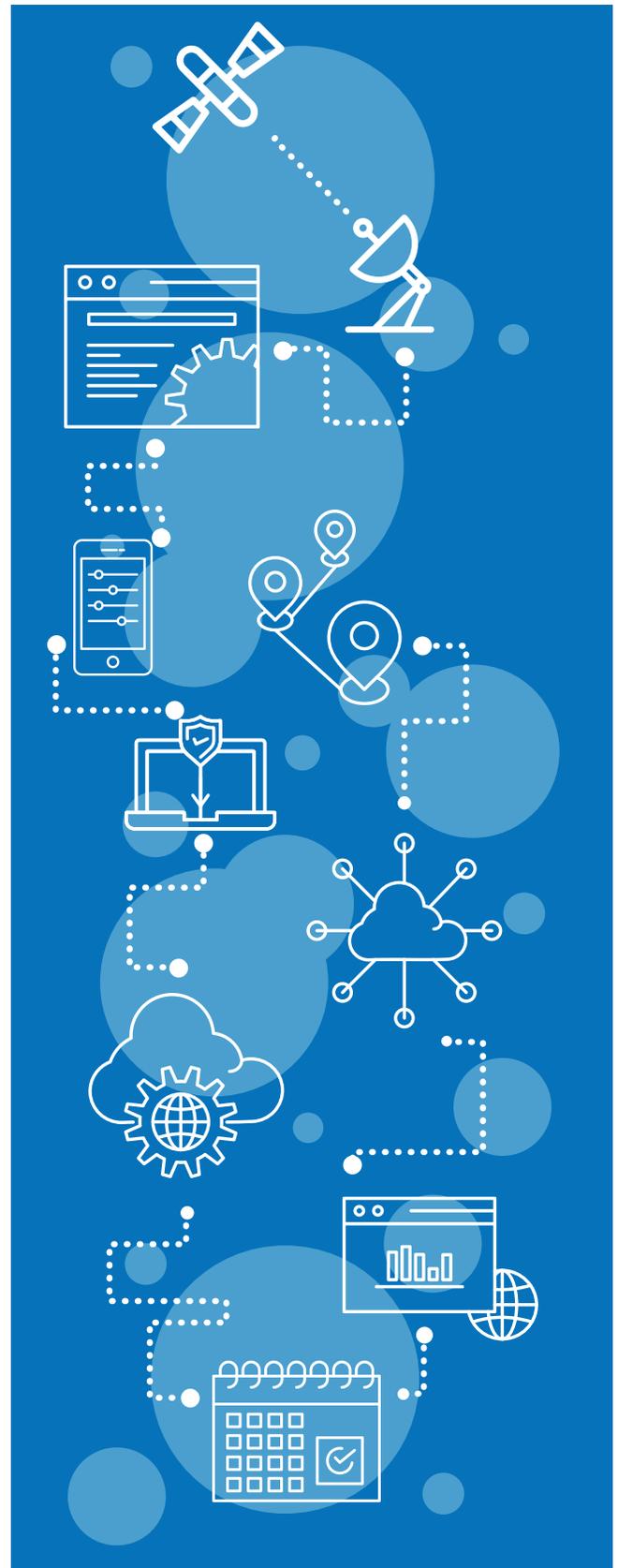
1. Low Monthly Expenses

Satellite solutions with software-defined networking capabilities coupled with a broadband service offer a low-price option for providing dual communication links at remote sites. Other expenses can also be reduced through automation if IT system updates are currently handled through a manual process which involves dispatching technicians to remote sites.

2. Faster IT System Updates

Satellite is uniquely capable of taking advantage of IP Multicast, which can simultaneously deliver common files to many or all remote IT systems (i.e., MS Windows workstations or servers). The dramatic impact of this can be seen in the process of IT systems updates. For example:

- With IT system antivirus full definitions and updates, this can reduce transmission time from days or weeks to mere minutes.
- For IT system OS full image and updates, transmission time can be reduced from months to days.
- It can also improve business requested application enhancements and changes, as well as common or full database updates and refreshes.





A Closer Look

Let's look closer at the impact of having faster IT system updates. Largely due to ever increasing file sizes, onsite technicians are often sent to branch locations with remote systems to perform system upgrades. Yet when using satellite multicast, this process can become an automated process over the network.

Here are two scenarios with side-by-side comparisons of satellite versus 4G. Each enterprise has 500 brand locations, with two IT systems per location operating over 1.5 Mbps links. Data transfers are run between midnight and 6 a.m. daily.

In the first example, the Symantec Endpoint Protection (SEP 14) antivirus definition file is sent to each remote system. The satellite multicast transmission will deliver the file in 20 minutes. But with the 4G network, the files are simply too large. Its unicast transmission method would take 52 days to complete!

For the network to achieve performance levels comparable to satellite, it would be too cost prohibitive; requiring infrastructure and speed upgrades involving 1.5 Gbps primary and backup links, 10 Gig switch ports, high end routers, high end firewalls, and SEP servers with 10 Gbps interfaces, more processing power and memory.

SEP 14 Scenario: 170 MB File to 1,000 Windows Workstations		
	Satellite	4G
Transmission Size	170 MB	170 GB
Duration	20 min	52 days

In the second example, a fully embedded Microsoft Windows 10 OS image (MS Win10) is sent. Here, only satellite multicast has the ability to deliver files of this magnitude. With 4G unicast transmission, the upgrades required to achieve comparable performance are simply not available.

MS Win10 Scenario - 10.5 GB File to 1,000 Windows Workstations		
	Satellite	4G
Transmission Size	10.5 GB	10.5 TB
Duration	3 days	8.9 years

3. Highest Network Availability

Any reliable communications service offering will offer end-to-end availability guarantees. This is true for frame relay and T1 providers which set availability at 99.5%. (This equates to approximately 3.6 hours of downtime per month.) 4G cellular services are unable to offer guarantees for underlying technology, performance, and capacity. Yet combined broadband and satellite networks routinely report overall availability at 99.999%—which equates to less than one minute of downtime per month.

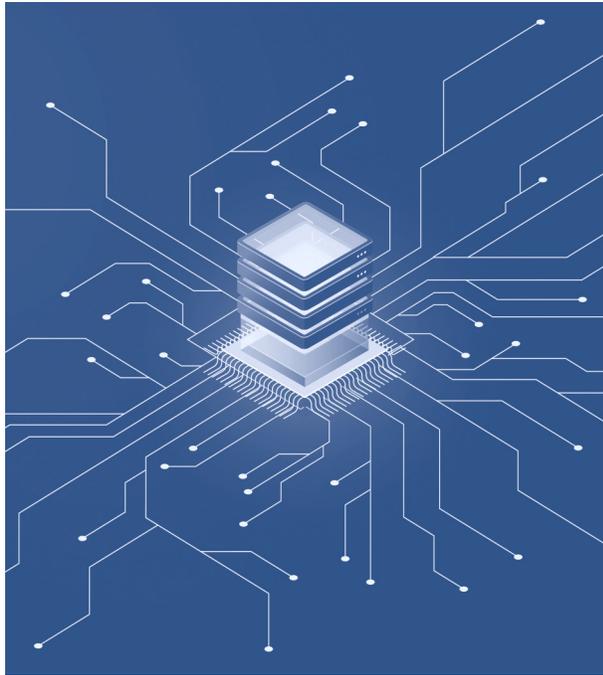
4. Reliable Link Speeds

Satellite speeds are preset and predictable. In comparison, DSL “may” be provisioned at an ordered speed but has a history of automatically reducing speed daily to substandard rates. 4G cellular may indicate availability for a given site but the speed and stability are not consistent given it may frequently transition to/from 3G.



5. Rapid Deployment

Frame relay, T1, cable, or DSL will all typically take “60–120 day lead time” at best for installation. This “installation window” can be unpredictable, especially if “last mile” problems are encountered. This occurs when infrastructure is deployed in more densely populated areas, but is never extended to the last mile where more remote businesses and homeowners reside in the outskirts or an exurban area just beyond the suburbs. Consequently, this can wreak havoc on a business. Retail stores may advertise grand opening dates, but not have the infrastructure in place to be truly operational. Satellite, by its very nature is reliable and predictable, with “installation dates” that can be scheduled and promised with far less lead time. In cases of emergency, installs can happen in less than one week.



6. Largest Coverage Footprint

Satellite coverage in the U.S. is only limited by view of the southwestern sky. Other communications services are limited by where they have an installed infrastructure which meets maximum distance restrictions of each technology, including 4G or 5G cellular.

7. Greater Resilience

Satellite is unique in its ability to recover as soon as power is restored, typically within 24 hours or immediately if generators are available. 4G cellular offers far less resiliency due to capacity limitations and its many wired failure points. For this reason, satellite solutions often serve as backups for cellular networks.

Recovering from Natural Disasters

During regional disasters, like hurricanes, tornadoes or floods, local telecommunications outages from downed lines, fires and power interruptions, hamper communications of all types, including cellular and broadband. If the 4G network can survive an outage, it is often still at extreme risk of performance degradation due to abnormal traffic volumes.

During Hurricane Sandy, one Fortune 500 retailer with several locations in New Jersey lost their local wiring facility and 25% of the region's 4G cell towers were rendered inoperative. No cell phones would work. And there was no landline phone service either.

The retailer brought in tractor trailers with power generators so that stores could utilize Voice over IP (VoIP) service over satellite. This gave stores full data and voice services within hours. Sadly, because there is little profit or future for landline phones, the telecommunications company abandoned its efforts to restore phone lines in the area. And it took months for T1 and cable to be restored.



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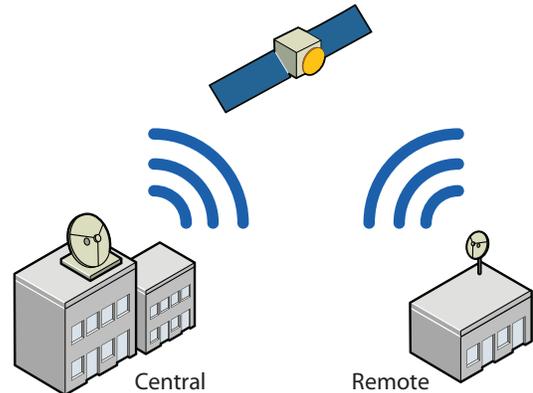
The Architectural Advantage

One of the primary reasons that satellite solutions can deliver so many advantages when compared to 4G networks is that there are far fewer touchpoints. Fewer transmission touchpoints mean greater reliability and less risk of degradation.

Satellite Architecture

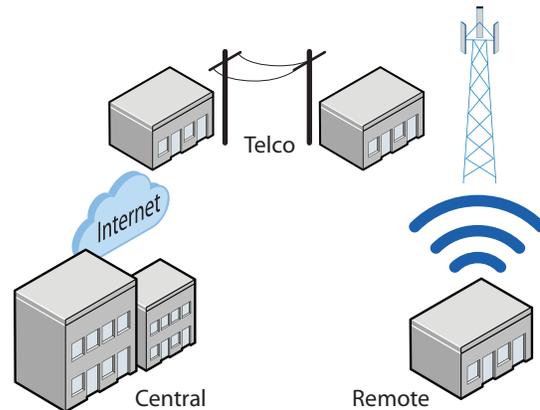
In this illustration, remote sites connect via satellite to a central data center. The number of potential failure points are limited. In this case: the remote site environment, satellite, and central site environment, as well as any extreme atmospheric conditions.

This architecture supports extremely reliable connectivity. Manageability and the time to restore an outage is also a significant advantage given the nature of satellite architecture and technologies.



4G Cellular Architecture

With 4G on the other hand, remote sites connect via cell tower/telco/Internet to the central data center. In this scenario, there are many potential failure points, including the remote site environment, seasonal signal obstruction, cell tower, remote site wiring to telco carrier facilities, long haul telco carrier service to 4G carrier data centers, Internet, and central site environment. Because 4G cellular is a shared service, other users can (and do) impact service performance. And troubleshooting and manageability are challenging given limitations in current 4G technology.



All This: Without the Wait

“It’s easy for those at headquarters to assume that the organization’s other sites or locations have the same type of online or networking experience. But because of these network architectural differences, that’s often not the case,” Swartz says. Plus, since the local telecommunications infrastructure will vary dramatically, that experience will differ between branches. Trying to create a uniform user experience across the network can only be achieved cost-effectively through satellite. The bottom line is if an organization has locations beyond the reach of cable, fiber, or DSL, or in areas where cell towers are few, executives would be well-advised to consider all the benefits that high-speed satellite can deliver today...well before the wait required by 5G.



**For additional information, please call 1-888-440-7126
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