



SES White Paper December 2019

SIGNATURE ENTERPRISE SOLUTIONS

Introduction

The Enterprise market in the Americas is highly varied. This is reflective of the diverse market dynamics present within the region from both a technical requirement perspective and a demand profile point of view. As such, new solutions and offerings need to address variety and flexibility. In order

to plug market gaps brought forth by the lack of technical solutions and platform choices, innovative products and services need to be brought to the marketplace in both terrestrial and satellite communications services. By doing this, telcos, service providers, ISPs and other players within the value

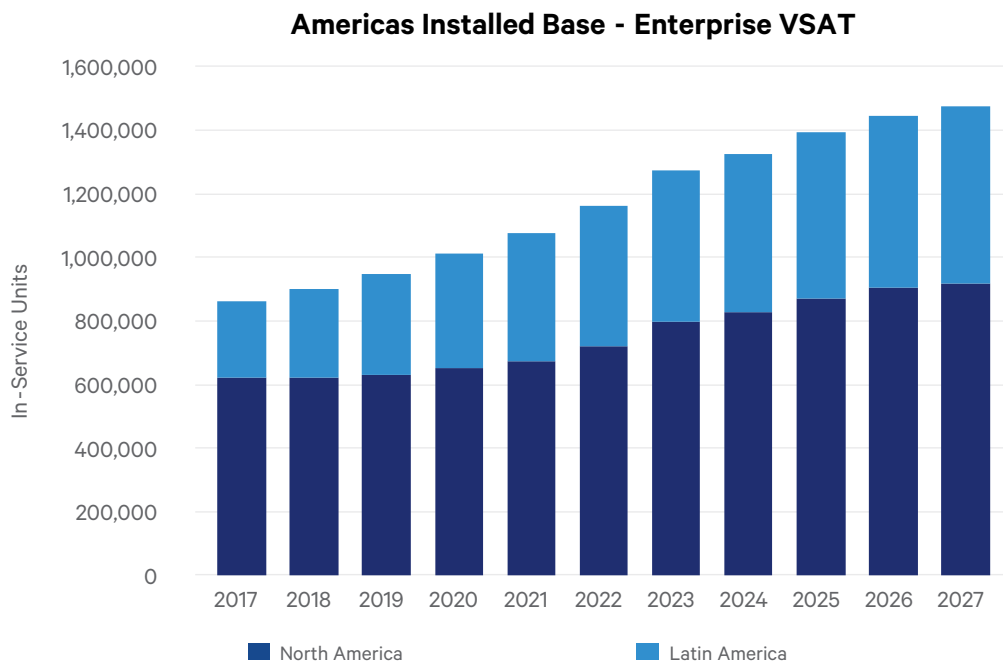
chain can tap into latent and emerging opportunities. New solution sets will enable the unleashing of demand elasticities in terms of cost savings as well as the flexibility to scale.



THE MARKET LANDSCAPE IN THE AMERICAS

Generating 1 of every 3 dollars in global Service Revenues, the Americas is a key global region for Satellite Enterprise connectivity. With the largest global installed base, this multi-faceted region comprising of North America and Latin America pioneered a multitude of mission-critical services, which were then expanded to international markets. While some of the traditional verticals might show some signs of saturation in this highly sophisticated market, the truth is that there are still attractive greenfield opportunities as technology evolves and new offers develop.

Enterprises are undoubtedly more dependent on connectivity in today's society, and this translates into a need for ubiquitous connectivity. From Governments extending connectivity into remote communities, corporations building resilient networks for their remote offices, or mining sites adopting cloud services and automation, the applications for satellite connectivity are limitless.



Source: NSR

The market in the Americas has been performing below its potential in the recent past due to a variety of factors including slow macroeconomic performance, political volatility, low prices of commodities or a wait-and-see attitude towards the arrival of HTS satellites. But renewed economical prosperity together with newly available capacity priced at attractive cost structures and service offerings that add greater value to customers' needs will rapidly trigger new growth in the region.

MARKET GAPS

While access to the Internet is oftentimes taken for granted, the reality is that there are still ample areas unserved or underserved in the region. According to the latest FCC analysis, 8% of the U.S. population is still unable to connect at speeds of 25/3 Mbps. The situation in Latin America is even more challenging with 4G networks only reaching 82% of the population.

In addition, the pace of expansion for terrestrial backbone deployment

is slowing down as the main urban areas have been already covered and deploying fiber networks further into rural areas is increasingly expensive and time consuming. Satellite is a quick and cost-effective alternative to offer connectivity everywhere, making it a "technological slam-dunk" in plugging the market gap.

Furthermore, many critical business operations cannot afford to have connectivity drop and services to go offline. Network availability is oftentimes under-optimal, especially as network sites move outside major

urban areas. It is common to see links dependent on a single path, where no real redundancy is available, creating a high-risk situation for critical communications. Again, satellite is a very effective alternative to offer an alternative path boosting network availability.

Terrestrial networks also present some limitations when the same content needs to be distributed to many locations. Because of their nature, ground communications work more effectively in unicast data transmissions. But a smart network

that routes traffic intelligently could leverage satellite to multicast content to as many locations as desired, which could otherwise saturate terrestrial links. The “broadcast economics advantage” that has prevailed in the video markets is thus now present in the data markets. For example, as estimated by NSR, for an average terrestrial transit cost of 20 USD/Mbps/month (very common in emerging countries), if the Content Delivery Network requires more than 10 locations (local servers from where content is redistributed to final users) satellite would be more cost effective than terrestrial (as reference, Netflix serves the Brazilian market from 34 locations).

TECHNOLOGY AND SOLUTION NEEDS

Satellite has traditionally been a niche technology, requiring specialized skills and equipment, making it difficult in terms of adoption by ISPs and Telcos outside the Satcom sphere. Many connectivity providers lack the know-how on how to run satellite networks, thus missing attractive business opportunities.

Requiring very specialized equipment and facilities (Baseband equipment,

Gateways, Network Operation Centers, etc.), the initial CAPEX to offer satellite services is significant. The arrival of HTS, with a much higher number of beams and carriers, has only made the situation more challenging. Consequently, it was difficult for mainstream connectivity providers to add satellite to their portfolio of offerings. The good news is that with virtual network operation (VNO) and managed services, the satellite operator can now take the load of the CAPEX required to offer satellite services such that mainstream ISPs can easily include satellite to their offers, independent of the scale of their customer base. In fact, in addition to the traditional advantages of satellite, notably ubiquity and quick deployment among others, scale is now a pronounced advantage that satellite services bring to the table.

The cost of operating satellite networks is often underestimated. Network monitoring, troubleshooting, bandwidth and traffic optimization, need of highly trained technicians and sophisticated equipment are elements that add to cost structures. Adopting VNO or managed services can rapidly trigger network operation cost efficiencies, benefiting ISPs and other enterprises that currently, or plan to, offer satellite services. Scale favors

the emergence of cost savings like network management automation or CAPEX optimization. More importantly, managed services make financial planning easier as options such as “pay per use” or “pay as you grow” make upfront capital requirements minimal.

Adopting VNO and managed services models do not need to mean sacrificing flexibility. In fact, VNO models allow connectivity providers to tweak SLAs to satisfy their customer requirements, sometimes providing a combined SLA between terrestrial and satellite technologies.

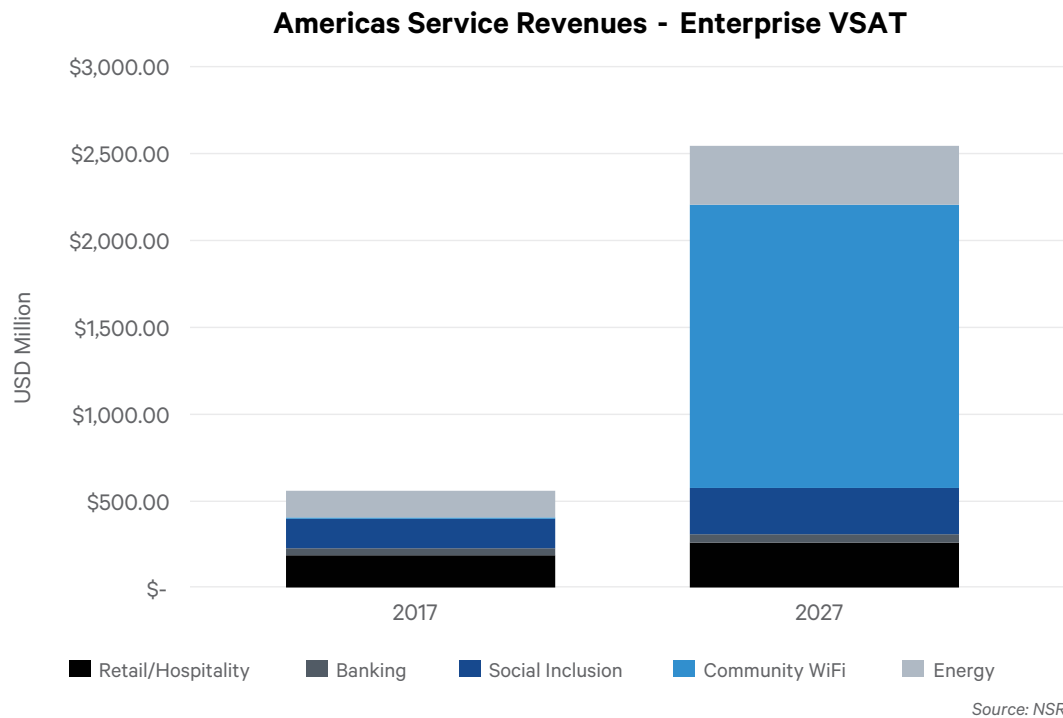
As many connectivity providers use a combination of technologies including fiber, mobile, satellite and others, the capacity to intelligently route traffic is essential in today’s multi-access technology environment. This sets the requirement for adopting standards and APIs that can orchestrate service offerings with terrestrial networks. With the advent of 5G, this multi-technology ecosystem will become even more dominant and it is essential to partner with a forward-looking operator to ensure that services are future proofed, incorporating the latest developments in software defined networks.



KEY MARKET OPPORTUNITIES

TOTAL ENTERPRISE MARKET FORECASTS

Enterprise VSAT continues to be a healthy business for ISPs and service integrators. As connectivity becomes critical for a wide variety of elements such as business operations or customer engagement, enterprises will continue to value the attributes of satellite connectivity. Furthermore, new technology trends such as SD-WAN or Cloud Services will make the satellite solution even more attractive.



NSR forecasts Enterprise VSAT to generate **\$16 Billion in 2017-2027 cumulative service revenues**. In a market characterized with fast paced technology evolution, customers are constantly seeking the best economical and technological option. **Integrators that optimize their offers can rapidly claim larger market shares.** Moreover, with satellite seamlessly integrating with terrestrial technologies, it is becoming a perfect complement to enhance network resiliency, optimize content management and reach new locations and markets.

Raw bandwidth might be commoditizing, but it is the essential foundation from where to build **lucrative Value Added Services**. Integrators can generate healthy margins by incorporating additional layers of OTT applications ranging from Big Data, IoT, Retail Analytics or Cybersecurity, among others.

RETAIL/HOSPITALITY

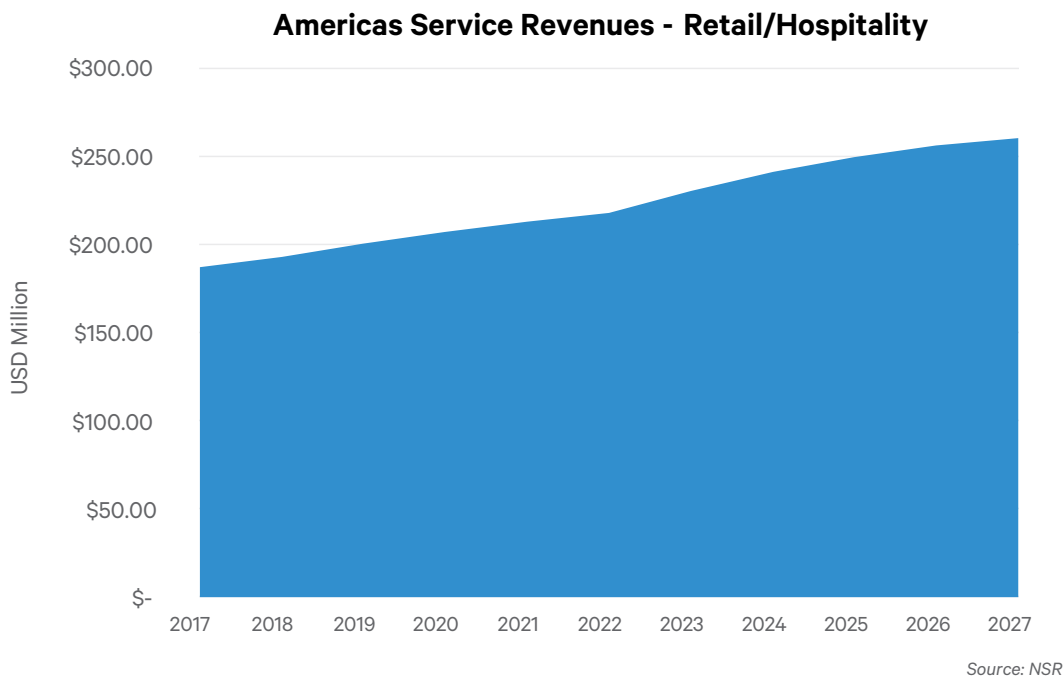
Retail and hospitality continue to generate the largest installed base coming from a variety of subscribers including retail stores and outlets, gas stations, convenience stores, lodging or food and drink services. **NSR estimates \$2.5 Billion 2017-2027 cumulative service revenues to be generated from Retail/Hospitality** as connectivity becomes a vital element of day-to-day business operations and customer engagement.

The use cases are evolving rapidly with new waves of technology generating a renewal of the installed base. This will certainly create **opportunities for service providers matching new customer expectations** to capture market share. While the most traditional segments of the market, like corporate networks in North America, do show some saturation, emerging markets such as tourism and convenience stores in Latin America or SD-WAN and backup services will experience fast growth.

NSR estimates

\$2.5 BILLION

2017-2027



Legacy applications like Point-of-Sale or Digital Signage are becoming more sophisticated. From enterprises incorporating cloud applications to their business management tools or enhancing customer satisfaction through complimentary broadband services, **having an always-on internet access is no longer accessory.**

Service Providers can now be a key tool for their customer's operations by offering advanced services. From Business Analytics, inventory management, to content multicast and management for digital signage, the opportunities are endless.

Serving this wide spectrum of use cases, each with very specific technological requirements, is not always easy for service integrators which might lack the scale and skills to develop custom solutions.

Be it in retail stores, food services or lodging, Wi-Fi connectivity is now something that end-customers take for granted. But managing the solution is not straightforward. Serving multiple concurrent sessions, oftentimes with different access policies assigned, and maintaining a reliable service at attractive speeds requires a **powerful Wi-Fi management system**. Similarly, the same satellite link is usually shared between critical business applications and end-customers. The service provider should be able to discriminate between different traffic types and prioritize critical data in cases of link saturation.

Bandwidth requirements, as in any other corner of the internet world, are growing exponentially. There is a step change from serving Point-of-Sale, which uses just a few tens of Kbps, to offering complimentary Wi-Fi and serving cloud applications which can generate peak traffic consumption upwards of 100 Mbps. But at the same time, this traffic is very peaky, and the platform must be able to statistically share traffic among multiple users to minimize bandwidth allocation. Again, scale is critical to achieve the efficiencies of **bandwidth pooling**.

Content management is another method to optimize the link. Downloading popular content on a **local cache or even using satellite to multicast OTT streams** to a Wi-Fi hotspot can rapidly boost customer satisfaction, enhance streaming quality and minimize bandwidth costs.

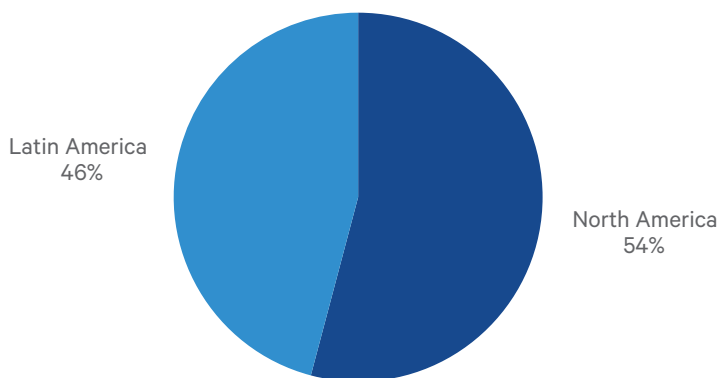
Business operations are increasingly dependent on connectivity. Consequently, enterprises require high levels of **reliability**. While terrestrial options are increasingly available, up-time continues to be a challenge in many circumstances (unreliable networks, natural disasters, etc.). Service providers can leverage satellite to boost network availability. SD-WAN protocols merging terrestrial and satellite connectivity can intelligently route traffic according to key parameters like latency, throughput or cost. While ISPs can continue focusing on their core terrestrial business, incorporating satellite can boost their business opportunities by improving network availability increasing market share among enterprise customers.

The flexibility of satellite is often underrated. In instances of seasonal traffic demand (tourism, special events, etc.) satellite can be a perfect tool to offload traffic demand without having to build expensive terrestrial networks that will remain underutilized most of the time. Similarly, the coverage of satellite is unmatched; it can easily connect corporate offices in international markets in a single network effortlessly.

BANKING

Financial services drive a significant portion of demand for VSAT services in the Americas. A variety of applications ranging from broadband connectivity for bank branches, stock and financial information dissemination, or narrowband connectivity for ATMs will generate \$480 Million in the 2017-2027 timeframe in terms of cumulative service revenues.

Americas Installed Base - Banking - 2027



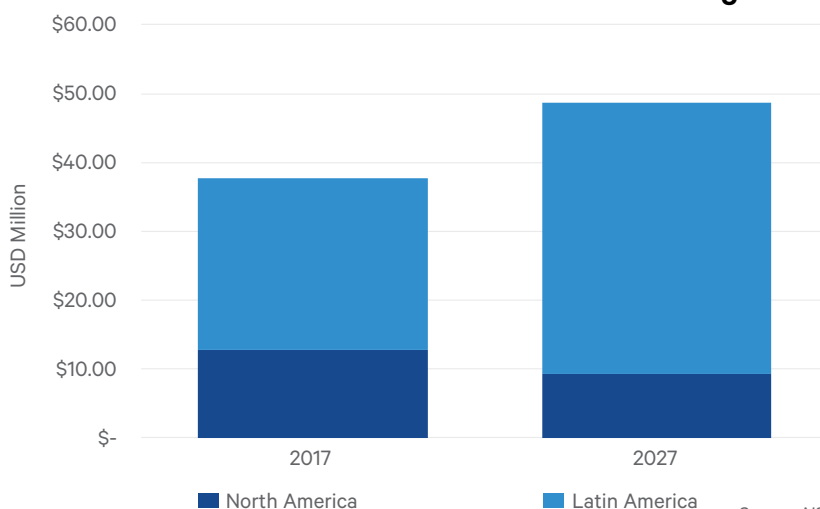
Source: NSR

Banking

\$480
MILLION

2017-2027

Americas Service Revenues - Banking



Source: NSR

Financial inclusion continues to be a major issue in the Americas. According to the FDIC, 25% of households in the U.S. are unbanked or underbanked, with 9.2% of the unbanked referring to inconvenient location as the reason for not having a bank account. This is even worse in Latin America, where, according to the World Bank, half of the region's population is underserved by the banking system, with about 33 percent of households in Brazil citing distance to the nearest bank as the main barrier. Consequently, **governments will continue to stimulate deployment of banking networks into rural areas to ensure financial inclusiveness, which indirectly creates opportunities for satellite connectivity.**

Satellite is the perfect partner to rapidly expand banking branches and ATMs with homogeneous connectivity procedures. Costs of connectivity are generally low compared with other operational expenditures for banking, so the benefit of speed, standardized solutions and cybersecurity outweigh the benefits of alternatives.

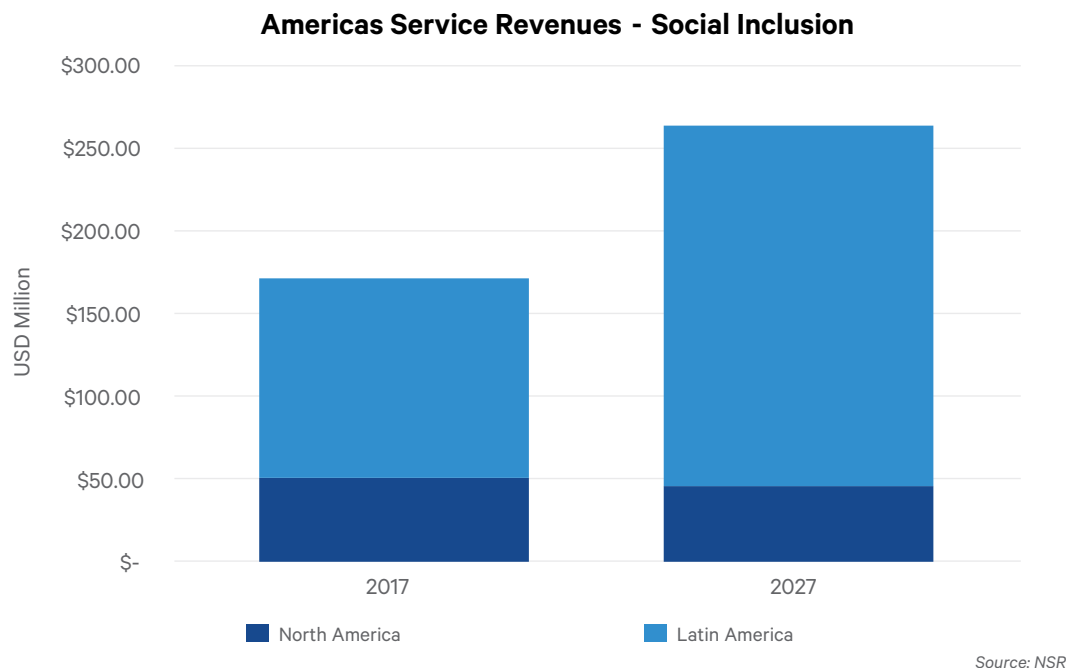
While terrestrial networks do generate pressure on the market, banking requires high levels of availability that many times can't be met by terrestrial networks solely. An integrated solution that intelligently routes traffic depending on availability and other metrics can be very attractive for financial services.

The technical solution for financial services has unique attributes and non-negotiable feature sets. **Cybersecurity is obviously of primary importance** and service providers targeting the market should meet the most stringent requirements. The same link might be shared between critical operations communications and complimentary communications for customers. Consequently, a management system that controls and prioritizes the different communications flow is necessary. While ATM networks traditionally required very small bandwidth, it is common to see rich multimedia content now being broadcasted to branches, thus **expanding throughput requirements**, which then creates opportunities for sophisticated content management tools.

Again, the application layer over connectivity brings multiple opportunities for ISPs. From setting Virtual Private Networks, enhanced digital security, content management or cloud services, integrators can leverage connectivity to lock in customers with value added services.

SOCIAL INCLUSION

Government-backed or mandated projects aiming to close the digital divide are one of the fastest growing opportunities for VSAT connectivity. NSR expects **Social Inclusion opportunities to generate \$2.5 Billion in 2017-2027 cumulative service revenues**. Typical use cases include rural connectivity projects, school networks or broadband for hospitals and health centers.



The dependency on connectivity will only accelerate in the transition to a digital society. In the U.S. for example, the [FCC's E-rate program](#) has ambitious goals for connectivity of schools and libraries, aiming at 1 Gbps internet access per 1,000 students. Today, however, there are still [2.3 million students in schools experiencing speeds below the 100 Kbps/student threshold](#). Satellite traditionally played a key role in connecting remote schools, libraries and healthcare centers across the Americas. Moving forward, NSR expects this to accelerate as digital skills and digital tools become a key element in the education of the future.

Bandwidth requirements in the Social Inclusion segment tend to be very high as sites usually need to support many students, teachers and staff, sometimes downloading heavy files like educational videos.

These kinds of deployments require high levels of support and integrators can extract attractive margins from value added services. With many schools consuming the same content, it would be logical to install a content management tool that optimizes data traffic making use of satellite multicasting and local caches.

In many occasions, the same link to the school is used for public internet access during non-school hours. A Wi-Fi management system then becomes essential to manage the different user profiles and priorities, which then creates an additional opportunity for the service provider to monetize the installation of the terminal.

A typical use cases for these deployments include remote classes or remote health support. Video and Voice over IP are consequently critical elements with which the integrator can enhance the customer experience with its expertise.

Social Inclusion

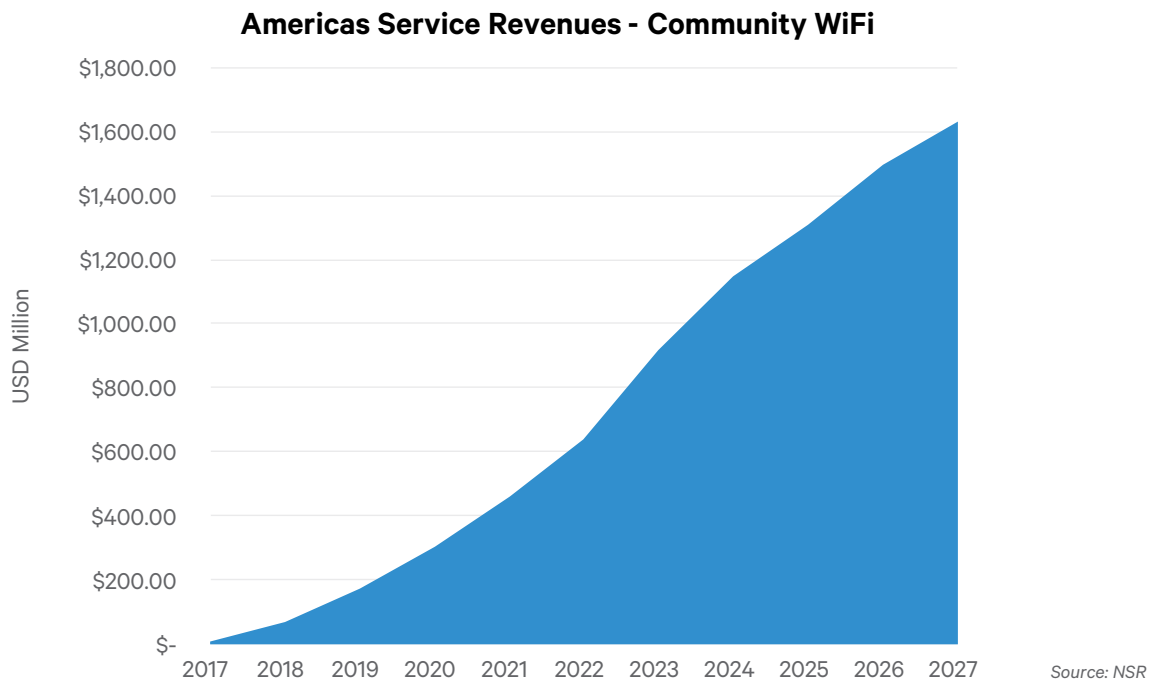
**\$2.5
BILLION**

2017-2027



COMMUNITY WI-FI

The fastest growing opportunity will be Community Wi-Fi deployments, combining both government-sponsored sites and commercially-driven initiatives. According to the ITU, [more than 30% of the population in the Americas still do not use the Internet](#), with the most prevalent barriers being underdeveloped infrastructure and affordability. However, satellite-enabled Wi-Fi hotspots will bring down these barriers, **unlocking a \$1.6 billion market by 2027**.



Supply and demand trends are aligning for the Community Wi-Fi market to thrive. On one hand, customer readiness is improving with abundant Wi-Fi-enabled devices and a growing eagerness to get online. On the other, the development of inexpensive Wi-Fi small cells capable of serving entire villages together with cost-competitive satellite backhaul, make these services affordable even in the most remote locations. This has triggered a rapid expansion of the market both with the support from governments, which see this as a more effective way to reach out to more people, as well as from purely commercial initiatives that find a “blue ocean” opportunity to generate attractive returns.

With numerous users connecting through the same backhaul link, bandwidth requirements are significant. Moreover, network requirements tend to be sophisticated, with tens or hundreds of concurrent sessions (usually with different levels of service), oftentimes bundled with content filtering or content pre-positioning in local caches. All in all, integrators have many possibilities to add value and extract healthy margins.

Community Wi-Fi

\$1.6

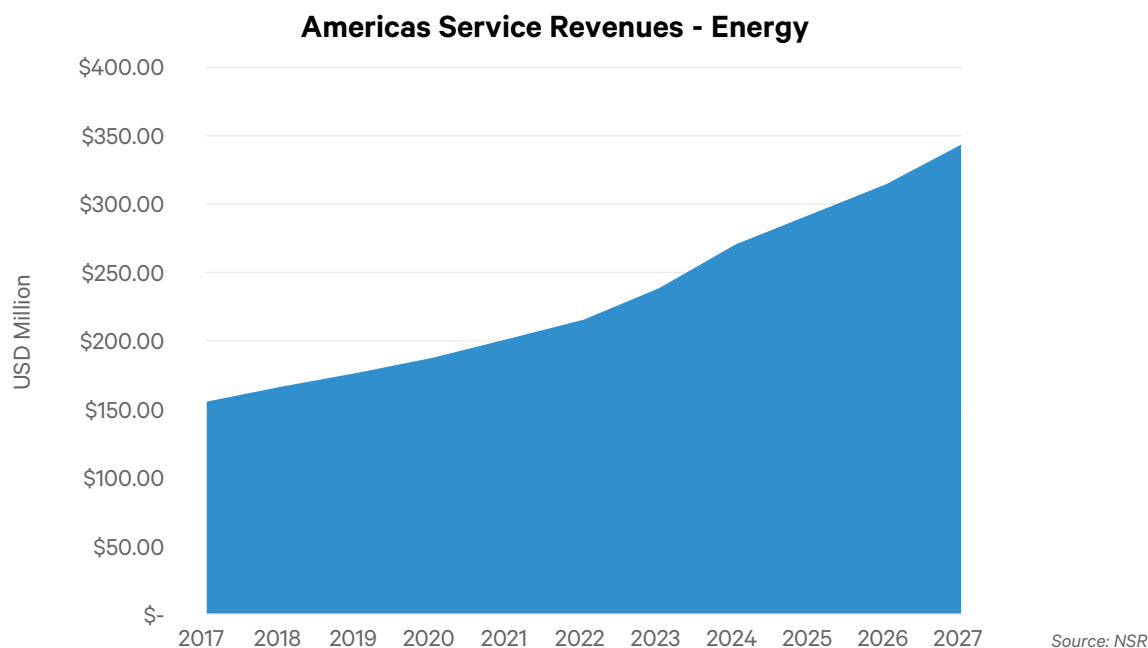
BILLION

2027



ENERGY

The opportunities for Satcom connectivity in the Energy segment are growing at promising rates, generating over **\$2.6 Billion in cumulative 2017-2027 service revenues**. Monitoring and controlling public utilities, connecting oil & gas exploration expeditions, drilling facilities, pumping and pipelines, or bringing online mining sites are some of the most popular applications for VSATs in the Energy markets.



After a challenging period in this segment, demand appears to be back on the growth track. Oil & Gas has traditionally been the most active source of demand and after some readjustments, the sector is beginning to see new deployments. In parallel, new markets like renewable energy, mining and utilities are starting to generate meaningful levels of demand. Furthermore, certain countries in the Americas are establishing favorable conditions for growth through market liberalization and deregulation, as well as incentives for investments.

Connectivity is becoming a key instrument for achieving operational and cost efficiencies in this sector. With companies embracing automation, the links are essential for running the business, and the Energy market is **very demanding in terms of network availability** requirements.

There is little doubt that cloudification is a major theme in the Energy segment. Essential digital processes for operations are now run on the cloud. Consequently, sophisticated data management tools are essential to preserve critical data flows, especially when the same link is shared with other applications such as crew welfare. Additionally, this increased dependency and the growth in sophisticated use cases, primarily involving Video, make throughput requirements climb rapidly.

Optimizing network resources for Energy markets is not trivial. It is common to see intermittent patterns of demand making it difficult to plan bandwidth resources. Another typical case is when SCADA networks for monitoring assets trigger an alarm and bandwidth resources suddenly climb to serve full monitoring capabilities (Video, complete sensor mapping information, etc.) or even take remote corrective actions.

All in all, it is clear that connectivity is becoming a critical tool for the Energy segment and any disruption of the service could have a big material impact on operations. Consequently, **cybersecurity is another major focus point** for this market.

Energy

\$2.6

BILLION

2017-2027

THE SES SOLUTION

SES's Signature Enterprise Solutions help capitalize on the growth in enterprise services and social inclusion with turnkey managed network solutions underpinned by a flexible range of connectivity service packages.

TURNKEY MANAGED VNO SERVICES

Leveraging our proven success delivering managed network solutions, our VNO service removes the complexity associated with network expansion. Signature Enterprise allows you to focus on what you do best—executing on your core business of selling competitive services and providing superior customer service.

Simple Service Management

Powered by our Skala Global Platform, the software-based VNO solution provides you with a feature-rich suite of network and service management tools, enabling full network visibility, simple service provisioning, remote terminal configuration and control, and network monitoring and troubleshooting capabilities.

Lower Cost of Ownership

Our turnkey VNO solution eliminates the capital expenditure and operating cost associated with the satellite gateway. With no need to deploy gateway hardware, you can accelerate time to revenue, and reduce overall business risk.

MANAGED PARTNER SOLUTIONS

Our Signature Enterprise Solutions deliver value beyond satellite capacity.

Network Extension with Managed Wi-Fi as a Service

Many rural and remote areas require a solution for extending internet connectivity in a way that justifies the business case of serving a low-density population. For these cases, we offer a low-cost Wi-Fi solution that integrates satellite backhaul, Wi-Fi access point, tower, solar power, billing management software, and a local content server for caching a selected range of applications. This turnkey solution offers a range of coverage capabilities, from to a single site to larger, semi-urban areas.

Cloud Direct Connect

Our partnerships with top-tier cloud service providers enable us to optimise the performance of critical cloud services and applications for your end-users. For telcos, we make it simple to interconnect with cloud operators, using standards-based Layer 2 interconnection that meets MEF service level agreement (SLA) thresholds from end to end.

SD-WAN-Based Intelligence

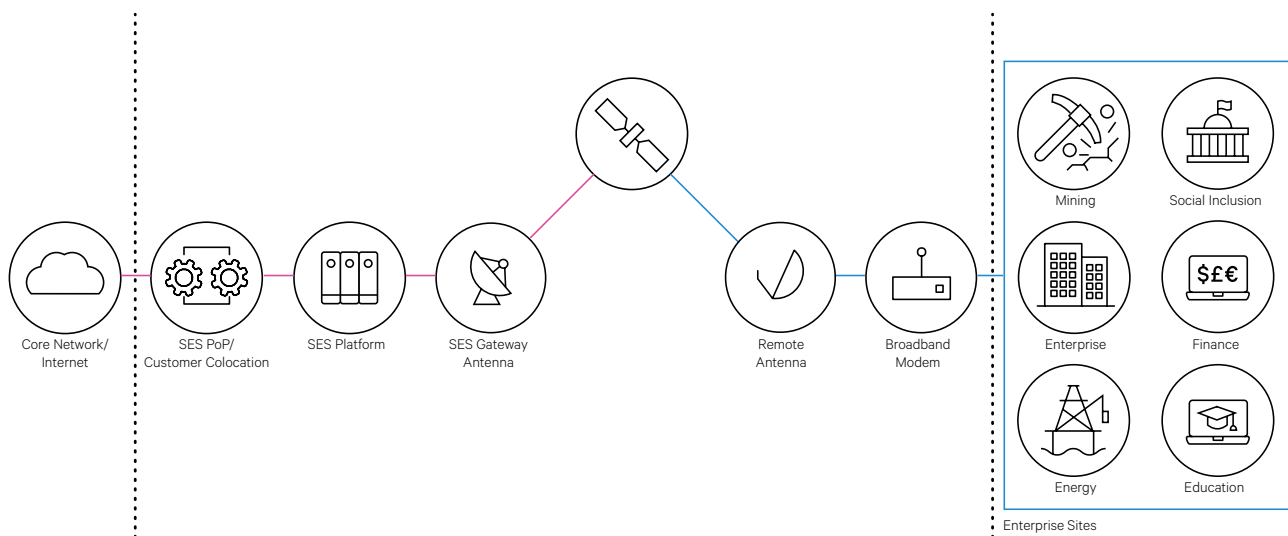
Deploying our software-defined wide-area networking (SD-WAN) lets you create resilient, application-aware enterprise connectivity solutions with multiple access points. SD-WAN strengthens Signature Enterprise with application-based traffic steering over multiple access connections, with any combination of satellite, terrestrial and mobile access. This improves network uptime, economises on bandwidth, and improves the end user's quality of experience through better application performance.

ASCENT LIFECYCLE SERVICES

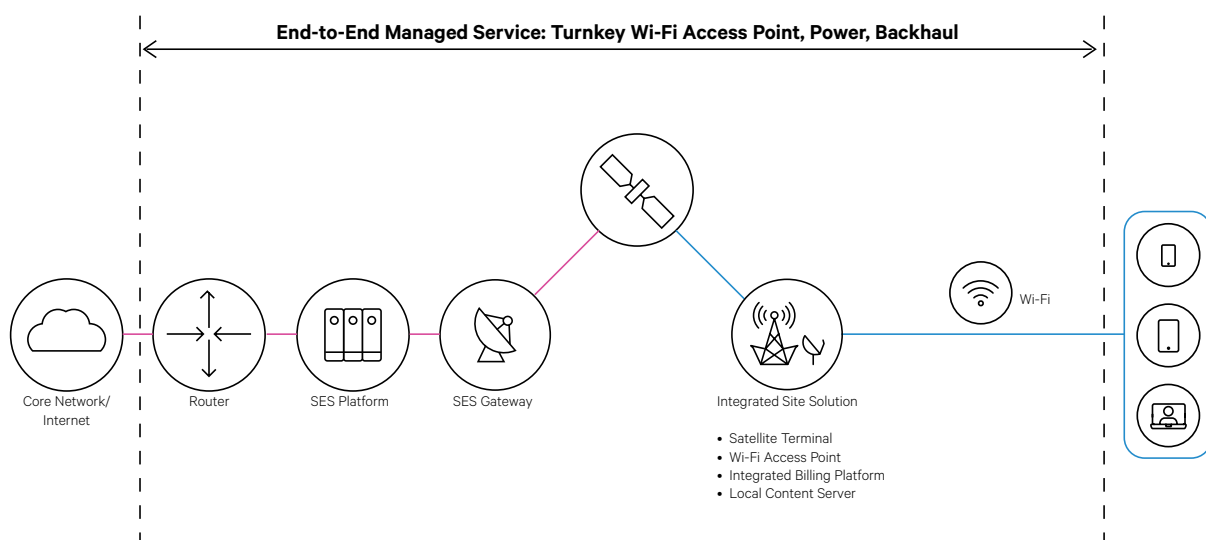
A critical part of our Signature Enterprise solutions, Ascent Lifecycle Services include an extensive suite of network implementation, operations, and maintenance services. Network implementation services include project management, site survey, installation, and commissioning. For telcos activating business site connectivity, these services are central to accelerating time to revenue, and de-risking network deployment.

Ascent Lifecycle Services offer a full suite of operations and maintenance services, including 24/7 network monitoring, system management, spares management, and field-level maintenance. Operations and maintenance services are used to troubleshoot, and we also take proactive steps to further optimise network performance.

End-to-End Managed Network Service



Wi-Fi Network as a Service Diagram



BOTTOM LINE

The market opportunity in the Americas has great potential from a service provisioning and equipment deployment perspective. The question is not a matter of “if” but a matter of “how” this opportunity can be realized. Ecosystem development, risk-taking and innovation are some of the key elements that will enable the Enterprise markets to reach full potential. The key value proposition is to offer a highly flexible, affordable and robust platform that can support scale in terms of applications that can be bundled as well as intelligently manage the bandwidth requirements in the increasing number of sites and users within a growing network.

ABOUT SES

SES is the world's leading satellite operator with over 70 satellites in two different orbits, Geostationary Orbit (GEO) and Medium Earth Orbit (MEO). It provides a diverse range of customers with global video distribution and data connectivity services through two business units: SES Video and SES Networks. SES Video reaches over 355 million TV homes, through Direct-to-Home (DTH) platforms and cable, terrestrial, and IPTV networks globally. The SES Video portfolio includes MX1, a leading media service provider offering a full suite of innovative services for both linear and digital distribution, and the ASTRA satellite system, which has the largest DTH television reach in Europe. SES Networks provides global managed data services, connecting people in a variety of sectors including telecommunications, maritime, aeronautical, and energy, as well as governments and institutions across the world. The SES Networks portfolio includes GovSat, a 50/50 public-private partnership between SES and the Luxembourg government, and O3b, the only non-geostationary system delivering fibre-like broadband services today. Further information is available at: www.ses.com

ABOUT NSR

NSR is the leading global market research and consulting firm focused on the satellite and space sectors. NSR's global team, unparalleled coverage, and anticipation of trends with a higher degree of confidence and precision than the competition is the cornerstone of all NSR offerings. First to market coverage and a transparent, dependable approach sets NSR apart as the key provider of critical insight to the satellite and space industries. Contact us at info@nsr.com to discuss how we can assist your business.

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