YOUR PATH TO DIGITAL INCLUSION

Determining your optimal last-mile and middle-mile technologies

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PLANNING GUIDE

SES

ACHIEVING DIGITAL EQUITY

With different technologies available for middle-mile and last-mile connectivity, it can be challenging to determine how best to connect your rural and remote populations. Follow the prompts at the bottom of each page to chart your path to digital inclusion.

As digital transformation gains speed, the digital divide persists—threatening to grow with the rollout of 5G focused mainly on urban and suburban areas. Today, 4.66 billion people are connected to the Internet,[1] leaving 40% of the global population unconnected. Yet, studies show that increased broadband penetration positively impacts GDP and quality of life.[2]

Those left behind are often in rural and remote regions that are difficult to connect via terrestrial Internet—and it's often unclear if investments in connectivity will be recouped in areas with low population density. This is as true in developed nations, where 87% of the population is connected, as in developing and the least developed nations, where internet penetration only reaches 47% and 19%, respectively.[3] United Nations targets are pushing for 75% penetration globally by 2025, to improve access to information, healthcare, education, and employment.

Governments are now focused on issuing universal service obligations (USO) to provide broadband internet access to all citizens. As of 2019, 164 countries had introduced national broadband plans, digital strategies, or ICT plans that include broadband to achieve their universal connectivity goals.[4]

Organizations like yours, whether contracted to extend your network to cover rural populations, seeking new subscribers, or connecting remote industries, have a number of considerations when it comes to selecting both your last-mile and middle-mile technologies. We can help you find your path to digital inclusion.

FIND YOUR LAST-MILE TECHNOLOGY

1. Kemp, Simon. "Digital 2020: October Global Statshot", Dataportal. Hootsuite. Retrieved March 17, 2021.
2. Muftawu Dzang Alhassan, Ibrahim Osman Adam. "The effects of digital inclusion and ICT access on the quality of life: A global perspective", Technology in Society, Volume 64, 2021.
3. "Measuring Digital Development: Facts and Figures," International Telecommunications Union. 2019.
4. "The State of Broadband: Broadband as a Foundation for Sustainable Development," International Telecommunication Union. September, 2019.
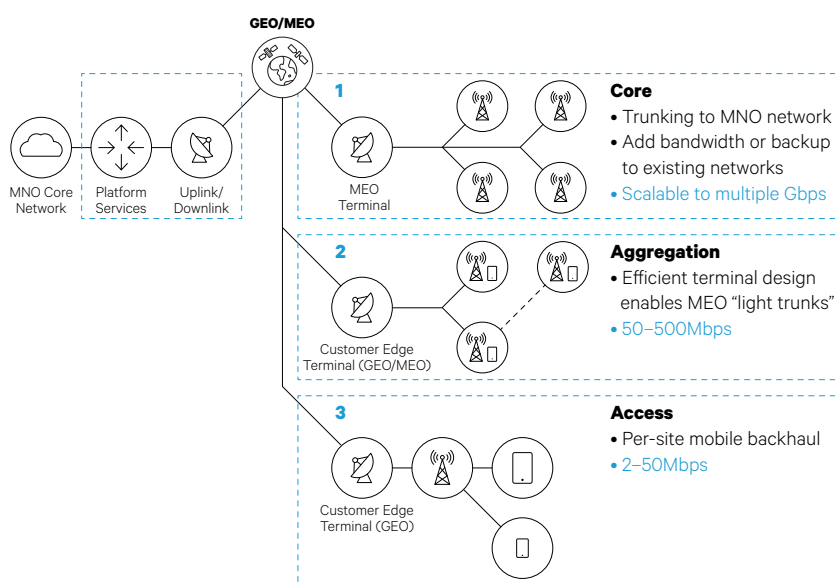
EXTENDING YOUR CELLULAR NETWORK

Today, smartphones and cellular-connected tablets are more popular than computers. The number of unique mobile subscribers is expected to grow to 5.8 billion by 2025, reaching a global penetration of 70%. They also represent an increasing share of all Internet connections—from 65% in 2019 to 80% in 2025.[5]

With such high penetration of cell-connected devices, you can use your licensed and protected spectrum to extend your network to rural and remote regions. Cell sites can be built to scale depending on population density—reaching users as far as 50 kilometres away, or built on lightweight, shorter masts when users are closer together. This allows you to size your investment to your opportunity to tap unconnected markets, growing your subscriber base using your existing spectrum.

Satellite has long established itself as a key infrastructure to reach end users in the most challenging geographies on Earth—whether you're launching 3G services in a landlocked country with difficult terrain, meeting a USO to a high mountain village in the heart of Europe, or providing robust LTE services to an island nation with its population scattered across a vast area. When it proves difficult to dig fibre or find line-of-sight for microwave transmitters that require regular maintenance, a modern satellite solution can meet your requirements and help reach your ROI. Looking at your specific use case, you need to carefully consider which middle-mile technology will best connect your cell towers.

GEO/MEO

1 **Core**
- Trunking to MNO network
- Add bandwidth or backup to existing networks
- Scalable to multiple Gbps

MEO Terminal

MNO Core Network | Platform Services | Uplink/ Downlink

2 **Aggregation**
- Efficient terminal design enables MEO "light trunks"
- 50–500Mbps

Customer Edge Terminal (GEO/MEO)

3 **Access**
- Per-site mobile backhaul
- 2–50Mbps

Customer Edge Terminal (GEO)

To successfully extend your cellular network, you need:

- Towers connected with adequate throughput
- Low latency
- Low jitter to prevent dropped calls
- A secured space to raise a mast and host the equipment
- Reliable power from local grid, generators, solar, etc.

FIND YOUR MIDDLE-MILE TECHNOLOGY

5. "The Mobile Economy, 2020," GSMA. 2020.

EXTENDING YOUR NETWORK VIA WI-FI HOTSPOTS

Wi-Fi hotspots will grow by a factor of four from 2018, reaching 628 million public Wi-Fi hotspots globally by 2023.[6] While the number of SIM connections is considerably higher, expected to reach 8.8 billion by 2025,[7] almost all cell-connected devices are capable of connecting to Wi-Fi, as are devices such as computers, tablets, and the smart devices increasingly deployed across industries and health services. Many mobile subscribers only use cellular data for certain applications, limiting streaming or social media use to Wi-Fi so they stay within their cellular data plan and avoid costly overage fees—or because data plans themselves are too costly. For the many more connected devices used by businesses, industries, and healthcare units, Wi-Fi hotspots are a more attractive option than cellular networks.

Since Wi-Fi standards use unlicensed spectrum, any internet service provider (ISP) can establish hotspots, and the cost of building a Wi-Fi hotspot is very low compared with other last-mile technologies.

Satellite easily connects your remote Wi-Fi hotspots to the Internet to help you meet USOs or connect remote businesses, virtually eliminating hefty CapEx investments. Looking at your specific use case, you need to carefully consider which middle-mile technology will best connect your Wi-Fi hotspots.

GEO/MEO

Internet/ PoP/IxP
Platform Services
Uplink/ Downlink

2
Customer Edge Terminal (GEO/MEO)

Aggregation
• Efficient terminal design enables MEO "light trunks"
• 50–500Mbps

3
Customer Edge Terminal (GEO)

Access
• Per-site backhaul
• 2–50Mbps

To successfully extend your network via Wi-Fi hotspots, you need:

• Sufficient throughput with a reliable connection to the Internet backbone

• Low but reliable power via local grid, wind, solar, etc.

• A central public location that is a natural gathering spot for users
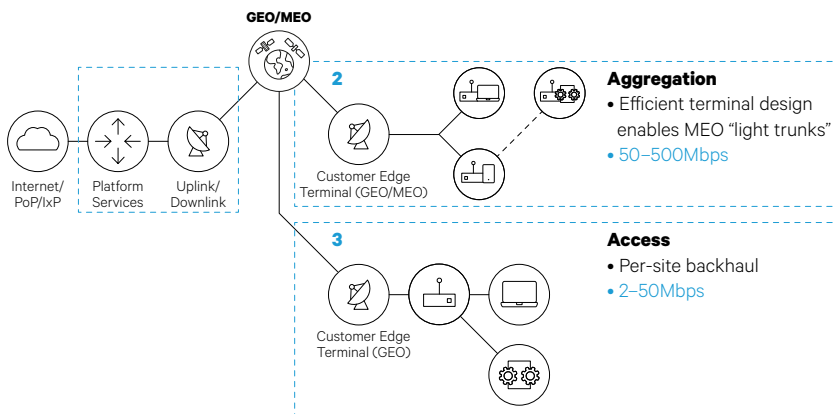
FIND YOUR MIDDLE-MILE TECHNOLOGY

6. "The Annual Internet Report (2018-2023)," CISCO. Updated March 9, 2020.
7. "The Mobile Economy, 2020," GSMA. 2020.

CONNECTING VIA GEO

When you need to reach many low- to mid-bandwidth sites, GEO is your best option. Our GEO fleet of more than 50 satellites provides coverage over 99% of the world's population—helping you meet your USO anywhere on the planet. A single GEO satellite beam can connect thousands of endpoints, and enable dynamic bandwidth allocation so your sites can optimally share bandwidth—bursting during busy periods and relinquishing capacity to busier sites during lulls in traffic. This helps you avoid overpaying for bandwidth when it's not in use, and improve end-user experiences. Lower-cost terminals greatly reduce up-front CapEx investment, so you can get your services up and running quickly, while setting your course to profitability.

50+
GEO satellites provide coverage over

99%
of the worlds population

BRINGING HIGH-QUALITY INTERNET TO GREENLAND'S EAST COAST
SES + TELE Greenland

Harsh Arctic conditions, vast distances with no roads, and low population density make it difficult and costly to connect Greenland outside of its biggest cities. Together with TELE Greenland, we delivered over 1Gbps to Greenland's east coast—the next step towards better Internet connectivity for 100% of Greenland's population.

Read more

DELIVERING THE DIGITAL FUTURE TO COLOMBIA'S UNCONNECTED
SES + INRED

In the Colombian government's first initiative as part of its digital inclusion policy, the country contracted INRED to install, operate, and maintain Wi-Fi hotspots in rural areas across the country. Within four months, the mandate's 1,000 remote sites were connected at 450Mbps, providing residents with free Internet access via centrally located community access centres.

Read more

CONNECTING VIA MEO

When you need to deliver robust LTE or 5G experiences, you are aggregating a number of sites to one location, or you have a remote industrial customer that provides guaranteed revenues and generates sufficient traffic for a bigger link, MEO is your best option. Field tested and commercially proven since 2014, the O3b MEO constellation offers several advantages over other middle-mile choices. By orbiting much closer to the Earth than GEO satellites, MEO offers much higher throughputs and lower latency and jitter, like pulling a fibre optic cable from the sky to your next project.

The Future of Networking
Launching at the end of 2021, O3b mPOWER is built on the commercial success of our current O3b MEO constellation, and will deliver more flexibility, more capacity, more scale, and improving economics through strategic partnerships with terminal manufacturers to develop lower-cost flat-panel antennas. The investment in terminals will deliver value over the long term, as you grow your bandwidth pool with growing user demand and future-proof your network.

CONNECTING EASTER ISLAND
SES + Entel

The 6,600 inhabitants of Easter Island live more than 3,500 kilometres off the coast of Chile, and their closest inhabited neighbour is more than 2,600 kilometres away. Bringing a high-quality experience to this remote island would be impossible without satellite. Our O3b MEO constellation enables 3G and LTE services, as well as providing broadband internet access.

Read more

DE-RISKING DEPLOYMENT OF RURAL MOBILE NETWORKS
SES + Orbiter Engenharia & Consultoria

Expanding to under-served regions provides opportunities to tap new markets, as well as financial and operational risks associated to geographic challenges and low density. Working together with Orbiter Engenharia, we deployed carrier-neutral MEO terminals to Brazil's northern communities. The solution aggregated data at high-demand sites, scaling to 2Gbps across 23 locations, which Orbiter made available to local MNOs and ISPs to connect both cell towers and Wi-Fi hotspots.

Read more

Let's reimagine your path to digital inclusion.

LEARN MORE

Request a
quote today

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