COMTECH

The MNO Tech Checklist to Extend Reach Cost Effectively

Synopsis

Nearly half the planet remains unconnected at a time when COVID-19 has forced people's reliance on the Internet and digital technologies higher than ever before. Bridging the digital divide to provide mobile Internet access – the main driver of digital inclusion – is exceedingly important in the current context. Overcoming this connectivity crisis represents a growth opportunity for Mobile Network Operators (MNO) to expand their services outside of the crowded, highly competitive urban markets. But, even with mobile backhaul over satellite solutions readily available, which can offer a lower-cost solution than terrestrial and microwave expansion, this is no simple task. MNOs still face major CAPEX and OPEX investments and specialized network expertise to extend their network reach into remote and rural areas to gain new subscribers. At the same time, they have to contend with risks associated with the usage gap, where people are restricted from the Internet because of financial, awareness, literacy and digital skill factors among others. Going after price-sensitive subscribers scattered across often expansive areas is challenging even before consideration of the network demands. These remote users want the Internet not just for voice, but increasingly for data-explosive applications such as video and social media. Considering the deployment costs against expected revenues, MNOs need quality solutions that are reliable and affordable in equal measure. This is exactly what Comtech EF Data is now able to provide. This shortlist will enable MNOs to cost-effectively extend their network reach.

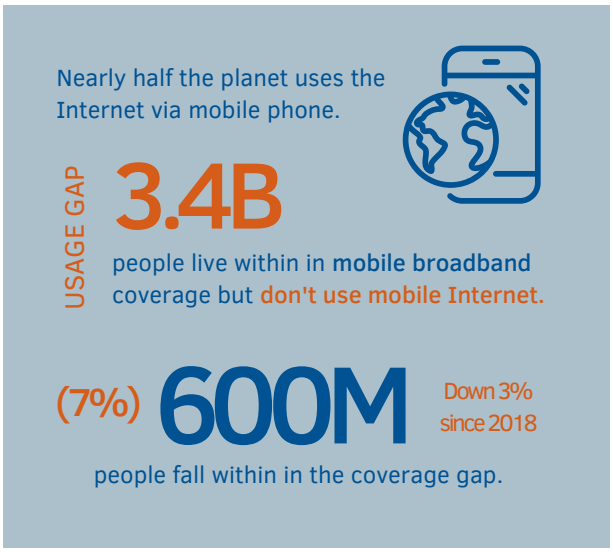
Social distancing and working remotely have been dubbed as “the new normal” but we are in an extraordinary point in time. Before the COVID-19 backdrop, there are numerous restrictions to everyday life, and new ways of doing things have emerged. The way we work, live and play has changed, and supporting this change is the Internet. The world is more reliant on the use of digital technologies than ever before, and the challenges facing MNOs are front and center.

Billions of people around the world now operate almost exclusively in the digital realm. Due to lockdowns or by choice, people use the Internet to work remotely, connect with friends and family, access academic instruction and avail healthcare. These activities together with usage trends, from mobile banking and mobile commerce to mobile social and mobile media, make it clear: Mobile is not a convenience but an indispensable lifeline.

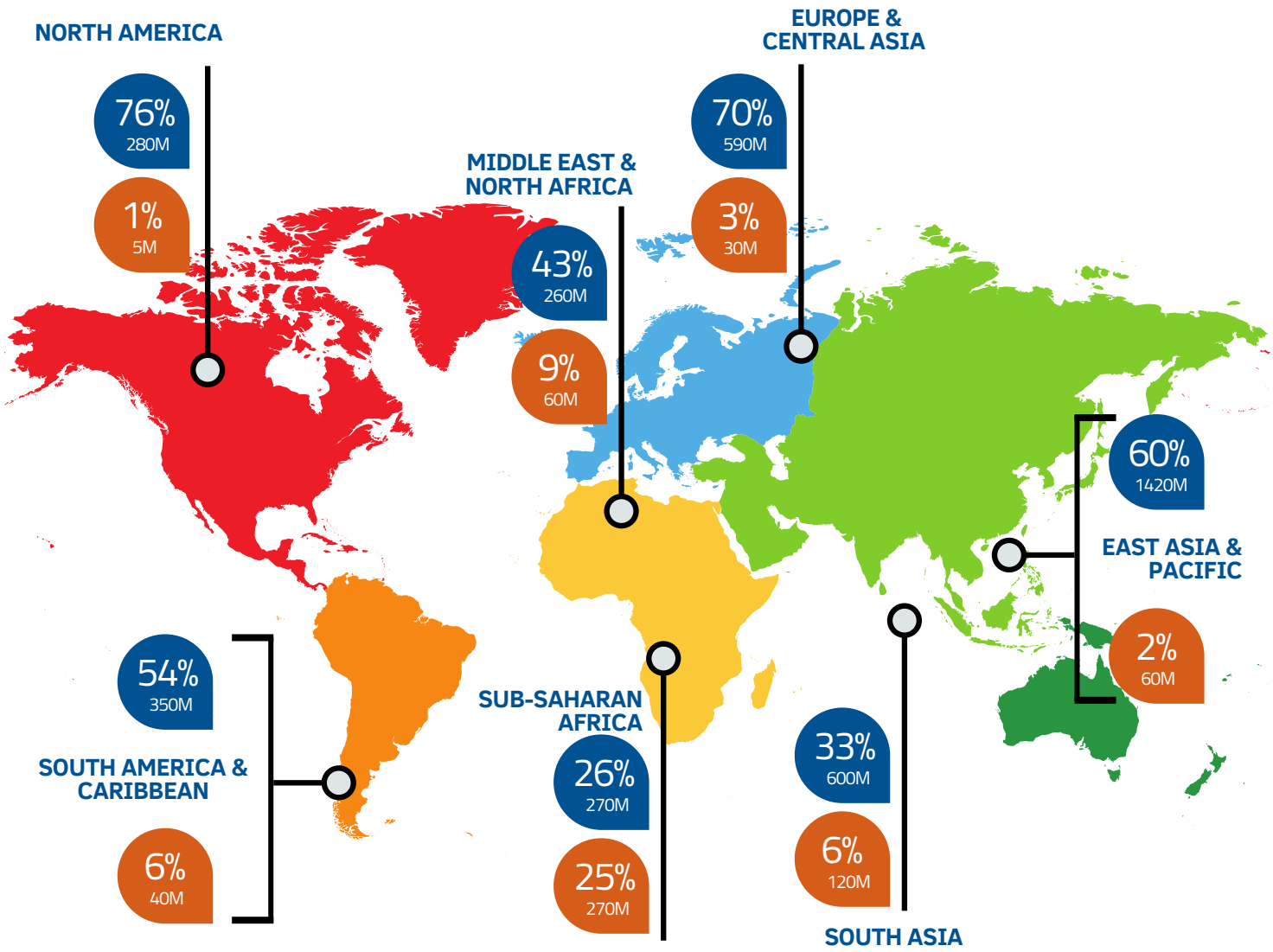
There are approximately 3.8 billion mobile Internet users, a number that is almost half of the world population. While MNOs have to contend with this half’s surging data traffic and prove network resilience, they are also faced with the question: What about the rest of the planet? What about the other 4 billion? Bridging the digital divide to provide mobile Internet access is exceedingly important in the current context. And here, the burden that MNOs carry is made even heavier. Even with mobile backhaul over satellite solutions readily available, which can offer a lower-cost solution than terrestrial and microwave expansion, this is still no simple task. MNOs typically face major CAPEX and OPEX investments and specialized network expertise to extend their network reach into remote and rural areas to bring the unconnected online.

The unconnected world can be viewed with two lenses: The “coverage gap” and the “usage gap”. The first; the people who live outside of the areas covered by mobile broadband networks. The latter; those who are restricted from the Internet not because they’re located too far from a base station, but for economic, literacy, digital skill, awareness and content relevance factors to name but a few. This means that those within the usage gap have coverage, but still don’t connect to the Internet. This unconnected world comprises approximately 3.4 billion people within the usage gap, and just under 600 million people within the coverage gap. Therefore, the usage gap is six times larger than the coverage gap.

While the usage gap is expected to close over time, the coverage gap continues to narrow at a greater rate. Currently, the 600 million represent 7%, down from 10% in 2018 when some 750 million people within the coverage gap were left unable to connect. A significant portion of this growth in coverage is attributable to South Asia, most notably India, where around 99% of the population has 4G coverage, and Sub-Saharan Africa, where 2G sites have been upgraded to 3G and 4G.



Connected Vs. Coverage Gap



Global Figures

49% 3.8B **Online**

7% 600M **Coverage Gap**

Base is the total population.
Sum of totals does not reach 100% as usage gap is not included.
Source: GSMA Intelligence

Economics is Key

The growth in mobile Internet use is encouraging. Since 2015, 1 billion people have gained access to the Internet via a mobile phone, showing that mobile continues to accelerate digital inclusion, and helping to tilt the scale close to the halfway mark of the world population seen today. But, when looking back to the unconnected world, there is a third and very important lens: Socio-economics.

The fact that the unconnected tend to be poorer, typically have lower levels of education and many live in rural areas make this challenge increasingly difficult.

Of all the barriers to mobile Internet use in low- and middle-income countries, the biggest barrier is affordability. If MNOs are not able to overcome the challenge of extending their network reach in an economically viable manner, it means that more than 40% of the population in low- and middle-income countries will remain unconnected in 2025, based on the growth rates achieved since 2015.

Barriers to Mobile Internet

	AFFORDABILITY		SKILLS		RELEVANCE		COVERAGE	
	2018	2019	2018	2019	2018	2019	2018	2019
Algeria	19%	14%	50%	47%	9%	10%	5%	3%
Ivory Coast	32%		24%		5%		11%	
Kenya	49%	48%	28%	22%	3%	7%	2%	3%
Mozambique	36%	40%	27%	23%	1%	3%	9%	6%
Nigeria	48%	48%	27%	34%	10%	1%	9%	2%
Senegal		35%		26%		2%		10%
South Africa	45%	48%	18%	17%	4%	4%	5%	6%
Tanzania	64%		20%		7%		2%	
Uganda		48%		23%		3%		2%
Bangladesh	20%	8%	32%	52%	22%	16%	2%	4%
China	26%		22%		6%		7%	
India	26%	37%	31%	22%	10%	11%	4%	9%
Indonesia	32%	33%	31%	31%	12%	6%	8%	12%
Myanmar	25%	26%	36%	25%	29%	35%	1%	1%
Pakistan	19%	16%	40%	39%	7%	4%	5%	2%
Argentina	38%		17%		24%		2%	
Brazil	37%	35%	20%	36%	13%	7%	2%	2%
Dominican Republic	49%		17%		8%		4%	
Guatamala	29%	26%	23%	18%	5%	3%	3%	2%
Mexico	25%	35%	16%	17%	15%	4%	3%	6%

Lowest barrier

Highest barrier

A lot must happen to overcome the barriers to mobile Internet adoption. To start, digital skills need to be developed, and local digital ecosystems need to be fostered in order to make services more relevant. But, one of the most important factors is pricing. Access to not only affordable devices but also affordable data plans need to be improved. It is this last factor that is key to unlocking the heavy shackles weighing down the MNO.

Considering the deployment costs against expected revenues generated through price-sensitive subscribers, MNOs need quality solutions that are reliable and affordable in equal measure. They need to extend their reach, but it's imperative that it's done cost effectively so that hard investments costs are not carried over onto the consumer.

As an established player in communications, Comtech has been working on ways to help address the digital divide, and support MNOs to overcome the connectivity crisis by driving mobile Internet connectivity and accelerating digital inclusion. Today, we're able to provide MNOs with technologies that will help bring numerous communities online cost effectively.

This is the MNO tech shortlist to cost-effectively extend reach. These best-in-class technologies enable MNOs to tackle this crisis with confidence.

When Performance is Everything

Heights™ Dynamic Network Access – H-DNA

H-DNA technology is part of Comtech's industry leading Heights Networking Platform. H-DNA is a technology that enables dynamic bandwidth sharing by combining Time-Division Multiple Access (TDMA) acquisition with Single Carrier Per Channel (SCPC) level efficiency. Comtech's acquisition of UHP Networks Inc., a leading provider of innovative and disruptive satellite ground station technology solutions, allows Comtech to integrate UHP's revolutionary TDMA technology into Heights.

With higher data rate remotes with up to 200 Mbps on the return, as well as higher bits/Mhz and bits/watt than a typical TDMA system, H-DNA is ideal for highest capacity sites as well as small to medium size satellite backhaul networks. Its benefits include:

- Highest throughput
- Highest spectrum efficiency
- Superior latency, jitter and payload compression
- Field proven with Tier 1 MNOs

UHP

When affordability is as important as flexibility & scalability

UHP's innovative ground station technology solutions are the perfect complement to Comtech's existing portfolio. Scalability, flexibility and multi-service capabilities – MNOs are now able to extend their reach into unserved communities with confidence. Being offered economies of scale means MNOs can bring people online for the first time and be able to accommodate network expansion when bandwidth needs grow.

In addition to cost-effective reach, UHP also solves in-country traffic challenges and offers MNOs the convenience they need. UHP's nimble Network Management System (NMS) enables distributed networks to be centrally managed while landing traffic in-country. UHP's all-in-one platform allows for more than mobile backhaul, enabling MNOs to meet enterprise, mobility and mesh needs.

Multi Frequency TDMA – MF-TDMA

MF-TDMA technology enables a very rapid dynamic sharing of bandwidth resources in an over-the-air, two-way network. Multiple users share a frequency channel that gets divided into different time slots, with each one being used in quick succession to transmit data. This allows for efficient sharing of spectrum, greatly impacting the cost implications of a satellite network.

This makes MF-TDMA ideal for lower capacity sites. Its benefits include:

- Best-in-class TDMA performance
- Innovative MF-TDMA protocol with proven efficiency of 96% versus SCPC
- Layer 2 (L2) Bridge and advanced Internet Protocol (IP) router with throughput of up to 190,000 packets per second
- Virtualized distributed hubs
- Field proven with Tier 1 MNOs
- High interoperability with large Radio Access Network (RAN) vendors as well as with OpenRAN
- Easy and cost-effective scalability up to 254 TDMA inbound channels as well as 500,000 terminals
- Ultra-low latency Very Small Aperture Terminal (VSAT) system with a round-trip delay of about 570 ms for TDMA mode of operations
- Supports Virtual Large Area Networks (VLAN), multi-level Quality of Service (QoS) and Telephone Consumer Protection Act (TCPA)
- High-throughput Mesh MF-TDMA of up to four carriers of 11 Msps aggregate
- Minimum required bandwidth is just 120 kHz and is able to be shared by up to 2,000 stations

Best-in-Class TDMA

While TDMA has played a revolutionary role in satellite by greatly impacting the cost implications of VSAT, it is best to know that not all TMDA technologies are created equally. It is important to understand what best-in-class TMDA means and how it impacts your networks. Its benefits include:

- Lowest overhead
- True Adaptive Coding Modulation (ACM)
- Tightly controlled jitter
- 5% roll off
- Supports mesh or star topology
- Highest packets per second
- Robust L2 interface

The UHP Software-Enabled VSAT Platform

The universal high-throughput VSAT platform comprises hubs, terminals, local web-console and a powerful NMS. The system is based on satellite routers with software-definable functionality supporting SCPC links, hub-centric TDM/TDMA and hubless TDMA networking. The system can support satellite networks of any topology including Point-to-Point, star, mesh or a complex hierarchy. The UHP software-enabled VSAT platform is based on the latest modulation and coding technologies, ensuring highly efficient utilization of satellite bandwidth.

Its benefits include:

- High performance
- Highly flexible and easy to upgrade
- Convergence of TDMA and H-DNA on one platform in future product releases

- Supports SCPC, SCPC DAMA, TDM/SCPC, TDM/TDMA and hubless TDMA
- Aggregate throughput of up to 450 Mbps and 190,000 packets per second
- DVB-S2/S2X VSAT outbound carrier
- Innovative MF-TDMA return carriers with proven efficiency of 96% versus SCPC
- Automatic Power Control and ACM
- 1:1 redundancy option
- Hierarchical multi-channel traffic shaper designed for VSAT
- Ultra-low latency VSAT system with a round-trip delay 570 ms
- Up to 250 TDMA channels and 500,000 terminals per network
- Supports VLAN, QoS, Differentiated Services Code Point (DSCP), Internet Group Management Protocol (IGMP), L2, proxy Address Resolution Protocol (ARP), Routing Information Protocol (RIP), Compressed Real-Time Transport Protocol (CRTP), as well as TCPA

Distributed and Virtualized Hubs

Distributed and virtualized hubs can be installed in every country or region ensuring that traffic be landed locally. Hubs have a high-availability modular design, based on principles of distributed computing, using Software-Defined (SD) architecture pioneered by UHP at the core.

The hubs are composed of Universal Controllers (UC), interconnected with Gigabit Ethernet links and Intermediate Frequency (IF) splitters or combiners. Each UC is a single UHP-200 module, and has two IF interfaces and two Gigabit Ethernet interfaces. Depending on the software license installed, a specific UC can operate as an Outroute Controller (OC), generating a single Outroute Time-Division Multiplexing (TDM) Digital Video Broadcasting (DVB) standard carrier, Multi-Carrier (MCD) Inroute Controller (IC) capable of receiving up to four TDMA carriers, and an SCPC transmitter or receiver. In the case that the UC has no specific license installed, it serves as a standby resource in the UHP Smart Redundancy scheme.

Benefits include:

- Compact and reliable
- High performance
- Enables traffic to be landed locally
- Software-enabled architecture facilitates growth
- Supported by virtualized network management with local backup

Tackle the Coverage Gap Crisis with Confidence

The humanitarian demand to close the coverage gap is adding to the already mounting pressures that MNOs face. Thankfully, MNOs can now cost-effectively extend their reach with confidence using best-in-class technologies that enable reliability, scalability, flexibility and multi-service capabilities.

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Comtech EF Data is a leading provider of innovative and optimized satellite communications solutions. Our efficient and reliable ground equipment portfolio meets the unique demands of our mobile backhaul, government, mobility and enterprise customers on every continent, in 160+ countries and across every ocean.

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