Newtec



# SATELLITE MOBILE BACKHAUL: FROM VOICE TO DOMINANT DATA

## Introduction

Mobile operators in emerging markets are under pressure to extend their services in rural areas. Either their markets are becoming mature, or governments are now willing to bridge the digital divide and ready to enforce Universal Service Obligation programs.

Satellite backhaul is often the only mobile transport available in these remote regions, providing reliability and quick service roll-out, but also bringing increased latency and operational costs which must be mitigated with the right solutions.

2G voice is still the main revenue source and primary mobile service deployed. However, 3G (voice and data) is also being rolled out. A few markets are even looking at 4G and small cells for a mobile broadband offering. At the same time, consumers' mobile usage habits are changing drastically, where the network permits, and have gone from voice centric to increasingly data-oriented (including video). This technology and usage shift has a direct impact on the evolution of the mobile backhaul solution.

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# Technology Disruption

If significant optimization has been achieved on the forward satellite channel, the return channel has been somehow overlooked. Here, for a long time, the industry has been entangled in the choice between SCPC and TDMA technology. SCPC provides efficient and dedicated capacity with lower jitter (ideal for 2G voice) but can be expensive for low traffic requirements. TDMA allows the bandwidth to be shared between the base stations and maximizes usage, but it cannot guarantee that voice calls will not be dropped during peak traffic conditions.

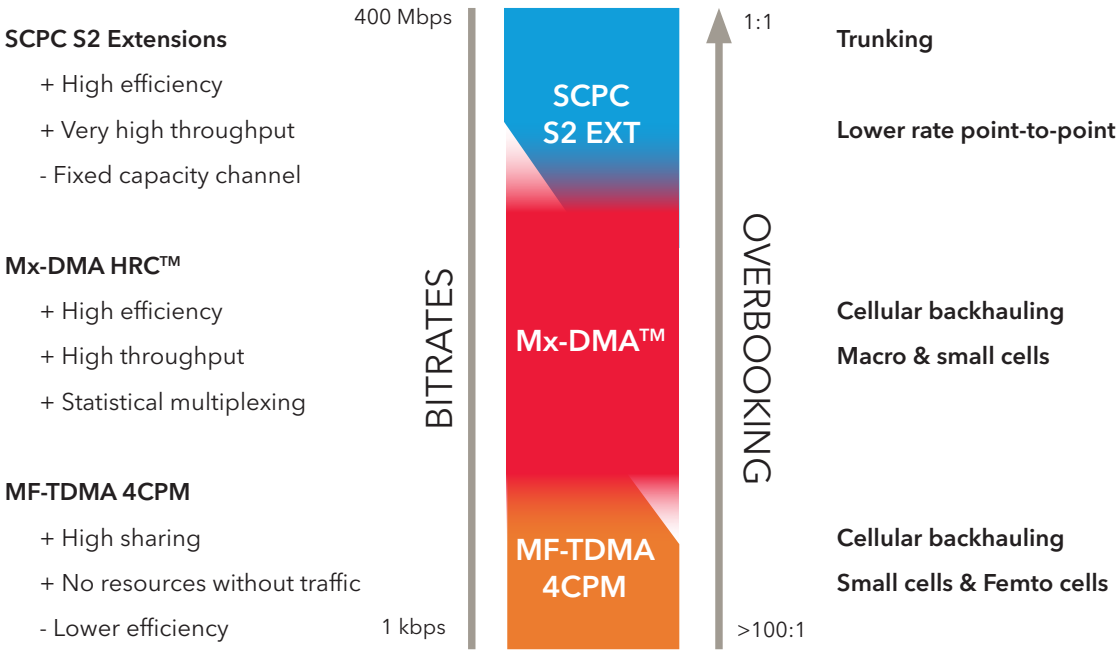
On the other hand, mobile traffic patterns are evolving from a symmetric voice centric to an asymmetric profile with increasing data, and the infrastructure is getting even more varied with the addition of small cells to the picture.

Mobile operators want to protect their voice traffic under any circumstances and do not want to be in a situation where there is not sufficient provision to guarantee it.

They also want to reduce their OPEX and ensure that a sound utilization of capacity is performed since newer types of data traffic are bandwidth hungry. Both SCPC with its service guarantee and efficiency, and TDMA with its flexibility could help, but they would have to operate almost simultaneously!

Newtec Dialog® can leverage both these technologies depending on traffic conditions as well as provide the revolutionary Mx-DMA technology. Mx-DMA combines the benefits of SCPC and TDMA, ensuring that all the traffic is accommodated at each remote base station while multiplexing the bandwidth very efficiently between these remotes to **decrease the backhaul operating costs**.

With the advent of this game changer, the technology for satellite backhaul has to be repositioned for **maximized efficiency**. SCPC is then focused on very high speed services, with MF-TDMA providing the lower end while Mx-DMA covers the largest range of dynamic services.



# Quality of Service

Mobile operators usually assign a higher priority to voice and signaling compared to data. However, the ability to **differentiate traffic, manage the peak requirements and get a service level commitment** is equally important in newer backhaul solutions where data occupies a substantial share of the overall service.

The dynamic reactivity of Mx-DMA is based on a seamless and continuous adjustment of the whole carrier plan to adapt to the network conditions and ensure that the highest Quality of Service (QoS) is available at all mobile base stations with the lowest jitter and delay. Therefore, **any mobile traffic is guaranteed the best service at any time.**

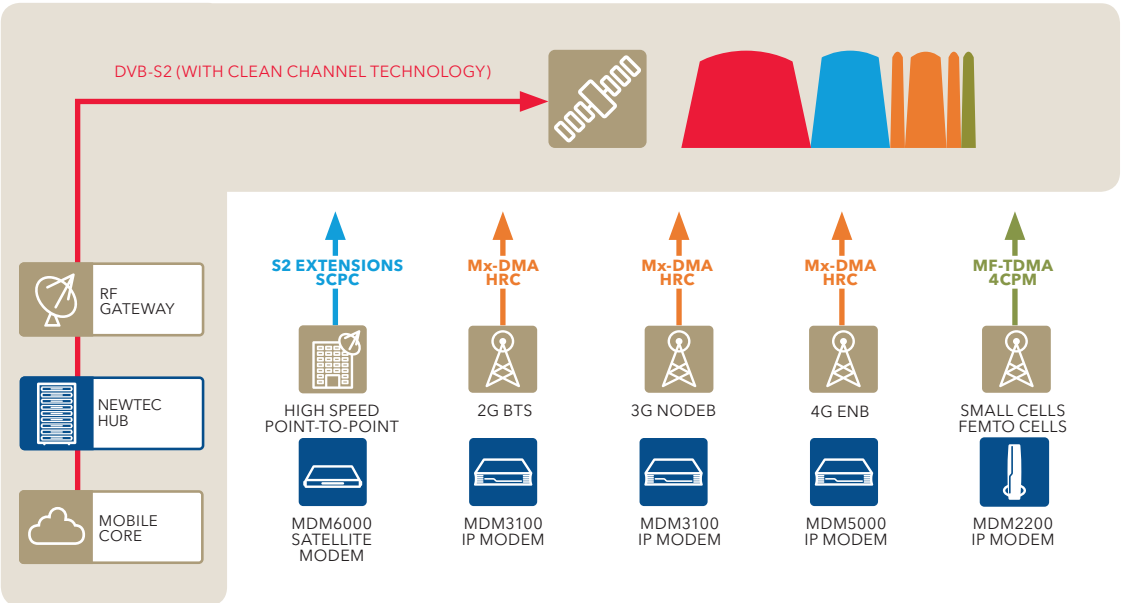
Additionally, Mx-DMA implements a smart management of link margins which is particularly useful with High Throughput Satellites that typically leverage Ku- or Ka-bands which are more sensitive to rain fade. Furthermore, Mx-DMA guarantees maximum throughput while constantly adapting to the rain effect.

# Newtec Solutions: Efficient, Scalable and Flexible

Newer backhaul solutions also have to be extremely flexible and must be able to serve all mobile technologies (2G, 3G, 4G, small cells), applications (voice, data, signaling), architectures (point-to-multipoint, point-to-point, trunking) and satellite services.

For example, bursty and lower traffic volumes which can be expected in rural small cells can be conveyed through the appropriate MF-TDMA technology. Increasing volumes with video shall leverage the disruptive Mx-DMA while trunking to international gateways or point-to-point applications for dedicated voice can utilize SCPC. Newer networks are also looking at aggregating the traffic of thousands of small cells, making scalability key!

On the other hand, efficiency cannot be left aside and satellite bandwidth must be spared. The Newtec Dialog platform encompasses the advanced Mx-DMA, FlexACM® and Clean Channel Technology® **efficiency features and performances for lower operating costs without the introduction of any additional jitter.**

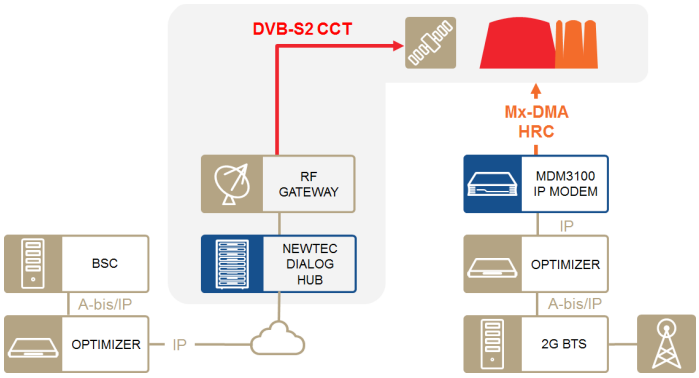



**MDM6000 Connected to HUB6000 using shared forward**

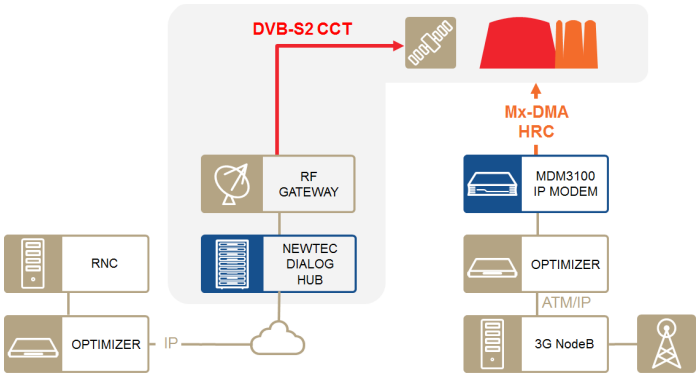
# Bandwidth Optimization: Reduce OPEX and Enhance User Experience

Different bandwidth optimization solutions also need to be integrated in backhaul deployments to increase efficiency and service offering. For 2G E1, Abis optimization removes unnecessary information and gains additional capacity. Bandwidth cancellation helps reducing the OPEX but only for point-to-point configurations, while for 2G IP and 3G IUB, advanced compression techniques subsequently reduce the bandwidth requirements. For 4G, acceleration, compression, caching and traffic shaping help **enhance the user experience, which becomes key** as the traffic becomes more data/video centric.

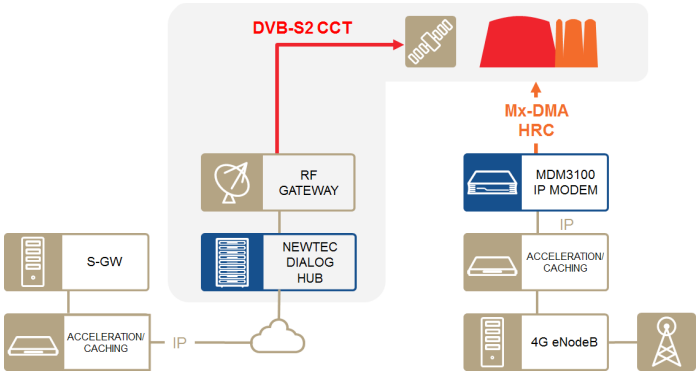
Newtec works with trusted partners and leverages its award winning software solution for acceleration and shaping.



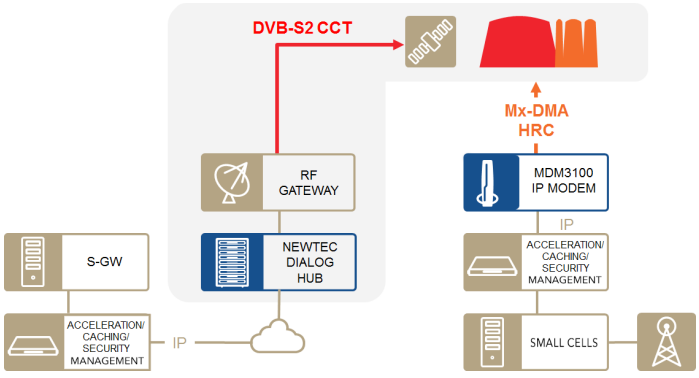

2G Backhauling with Abis Optimization/Pseudowire




Backhauling with Iub Optimization



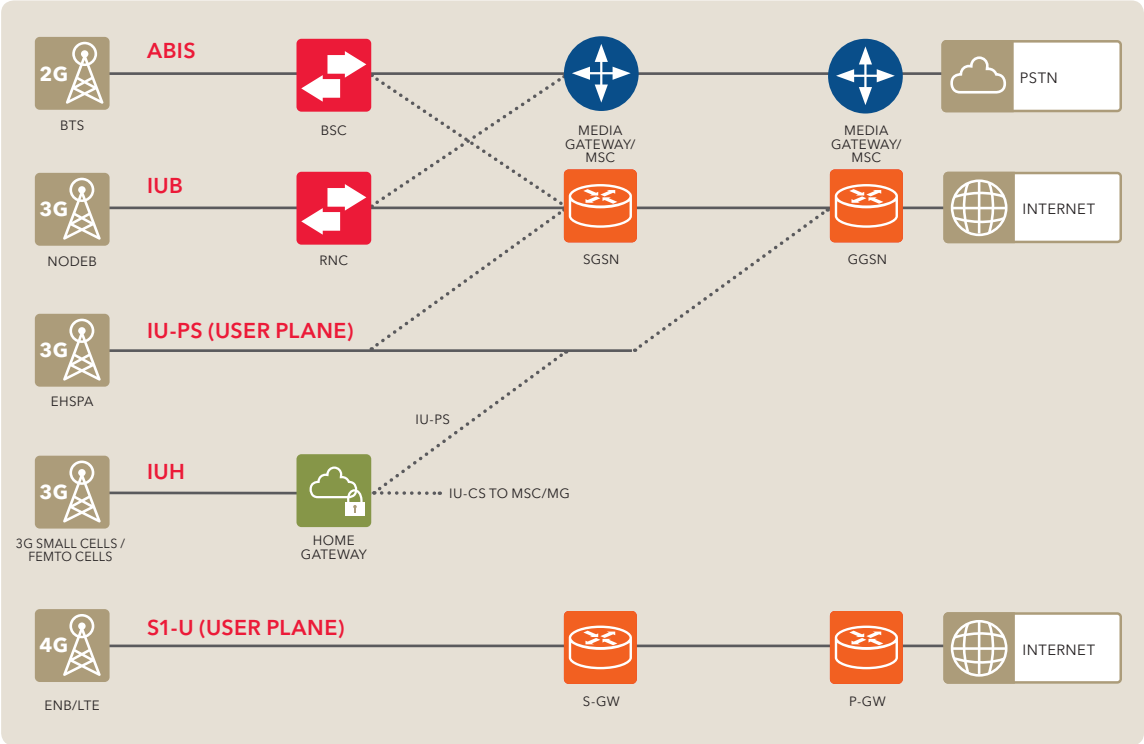

Backhauling with S1 Optimization/Acceleration/Caching




Small cells backhauling with IUH/S1 Optimization/
Acceleration/Caching and Security Credentials Management

# Typical Deployment

The mobile infrastructure is driven by the standards defined by the 3GPP organization. It typically leverages different types of interfaces for the different technologies. These interfaces can also have different variants (TDM/IP) and protocols (Abis/iub/iu-ps/iuh/S1). The satellite solution can operate at the access (e.g. Abis), between the BSC and MSC or even for trunking (e.g. between the media gateways).




## Conclusion

Early satellite backhaul deployments were focused on voice only, but the landscape has radically changed since then. Newer habits and newer mobile technologies and devices are driving towards solutions which have to be the best in efficiency, scalability and flexibility. 5G will provide **even higher speeds and more services** in a Cloud environment and with demanding QoS. Mobile operators have to invest in solutions which can best serve them today and are also geared towards their fast evolving environment!

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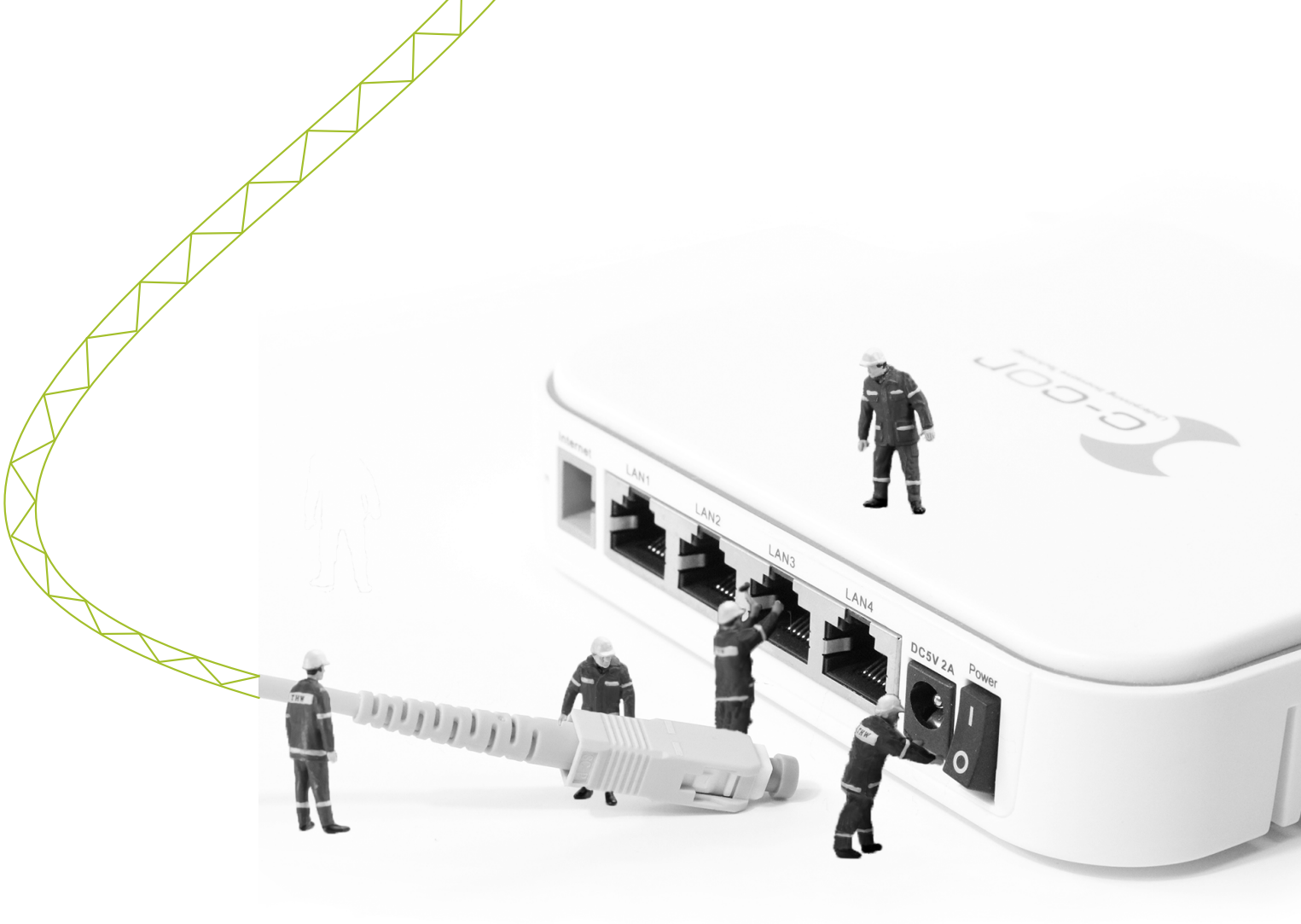
Application Note
Satellite Mobile Backhaul

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