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Cellular Backhaul Solutions

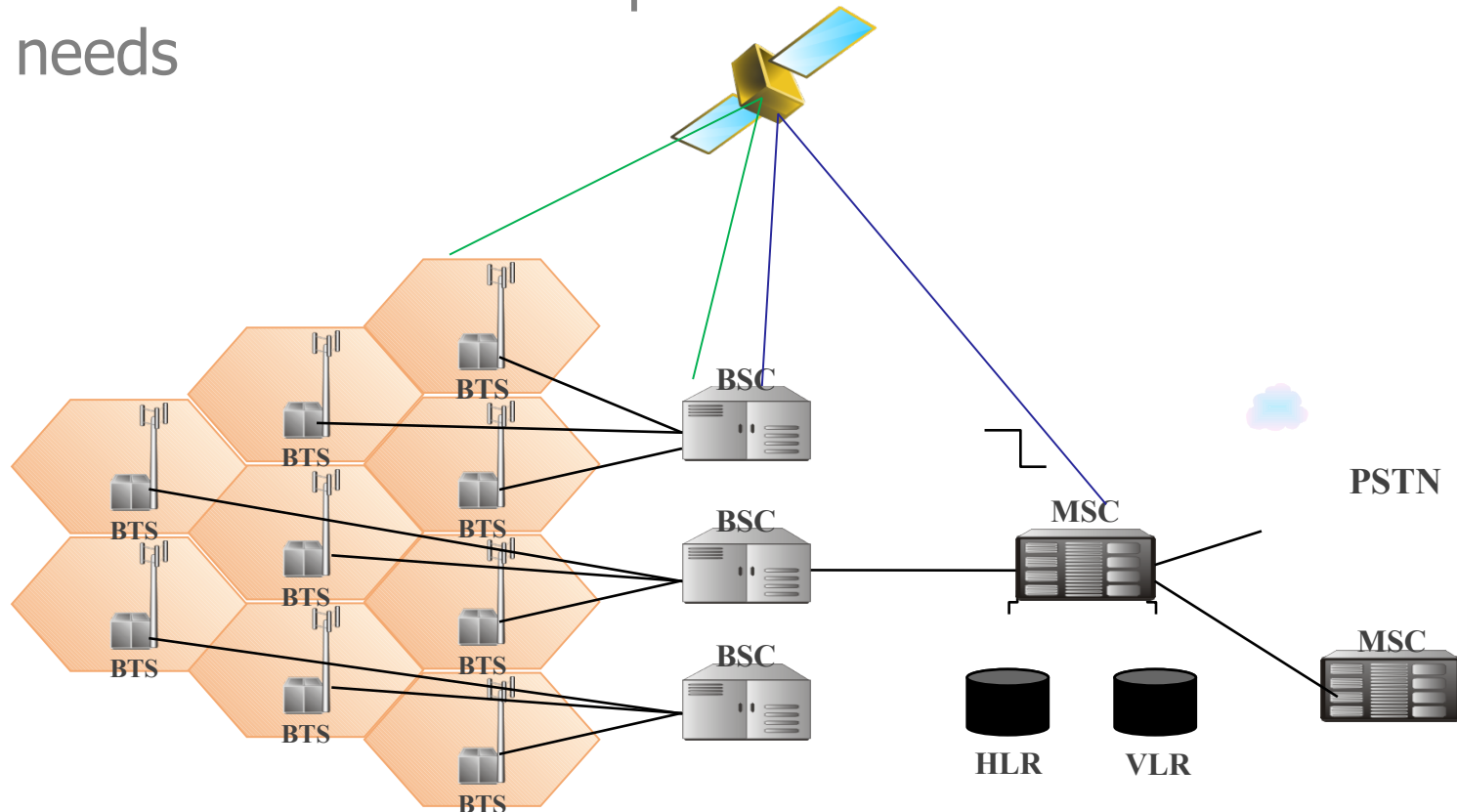
Growing need for cellular backhaul over satellite

- ◆ Most urban areas in developing countries have good mobile service coverage
- ◆ USO & Operators are now looking at expanding service in rural and remote areas to reach new subscribers
- ◆ This presents challenges as these regions are less accessible, have smaller populations and generate less revenue with higher operating costs
- ◆ New satellite based backhaul solutions introduce efficiency and cost effectiveness – helping the operators minimize the CAPEX and OPEX required for extending their networks

Milano Teleport provides a portfolio of solutions for the cellular industry

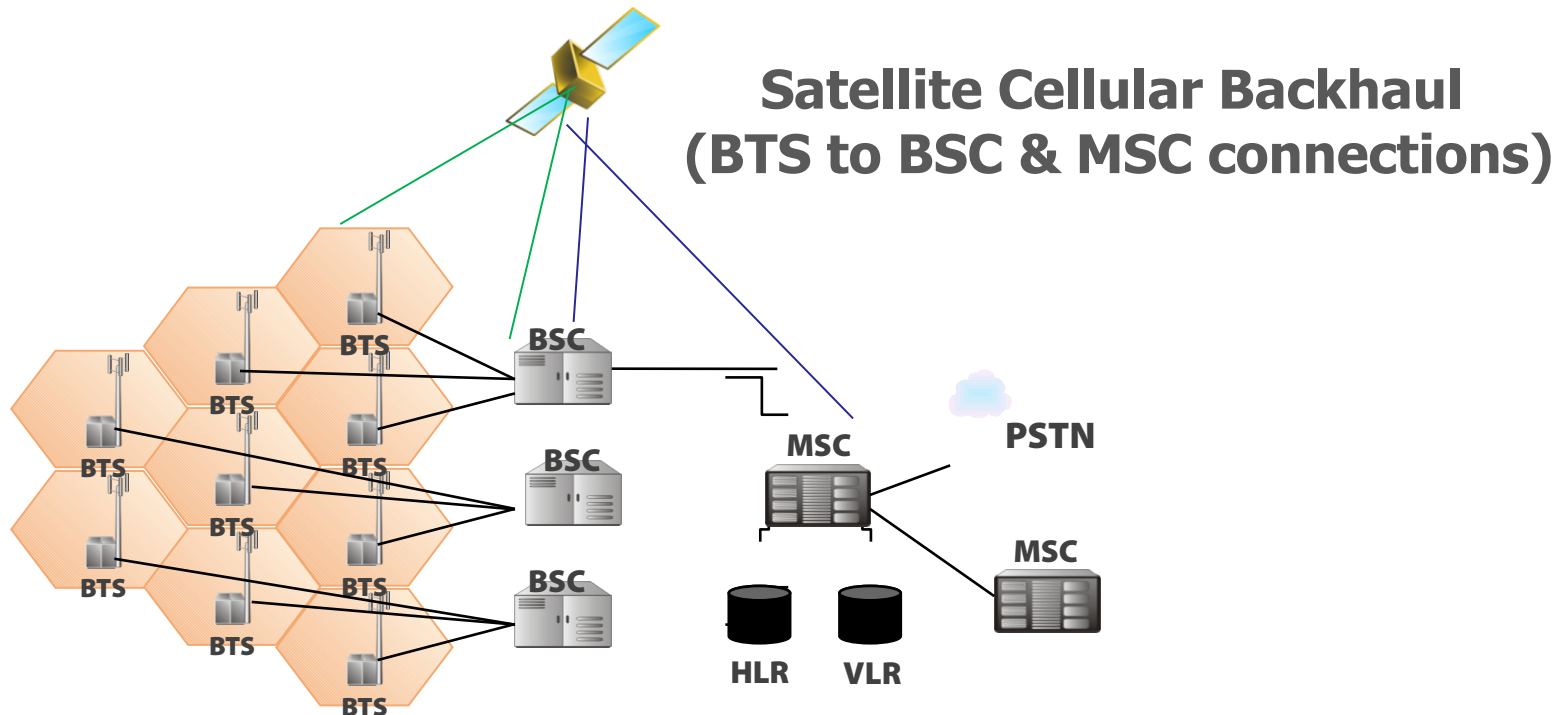
Satellite cellular backhaul

- ◆ Connecting the network elements via a satellite
- ◆ TDMA and SCPC links provide solutions for different needs

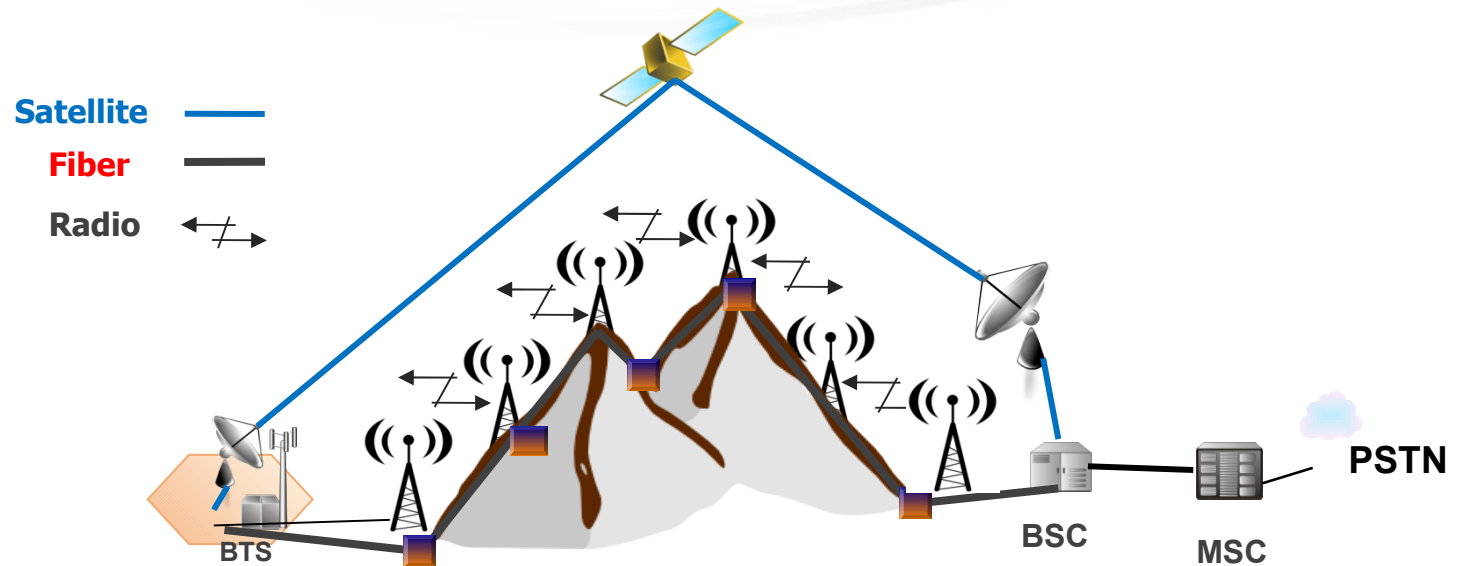


Main backhaul challenges

- A** **RURAL Network expansion to Small / Remote sites using BW ON DEMAND technology**
- B** **Up to 40% OPEX saving on BTS to BSC/MSB E1 transport**



Satellite vs terrestrial backhaul



- ◆ Overcome terrestrial obstacles
- ◆ No repeater stations requiring power and security costs
- ◆ Less points of failure ensures highest availability and service continuation
- ◆ Minimal hardware cost
- ◆ Min OPEX, no need for diesel, minimal manpower, ...

Milano **Teleport** Benefits

Milano **Teleport Cellular Backhaul Solutions are customized to fit your specific network needs**

- ◆ Professional solution design and planning
- ◆ Low-latency, high availability, Optimal network performance
- ◆ Variety of platforms and technological solutions
- ◆ Hosting of equipment at customer premises
- ◆ Option to buy or lease equipment
- ◆ Financial flexibility

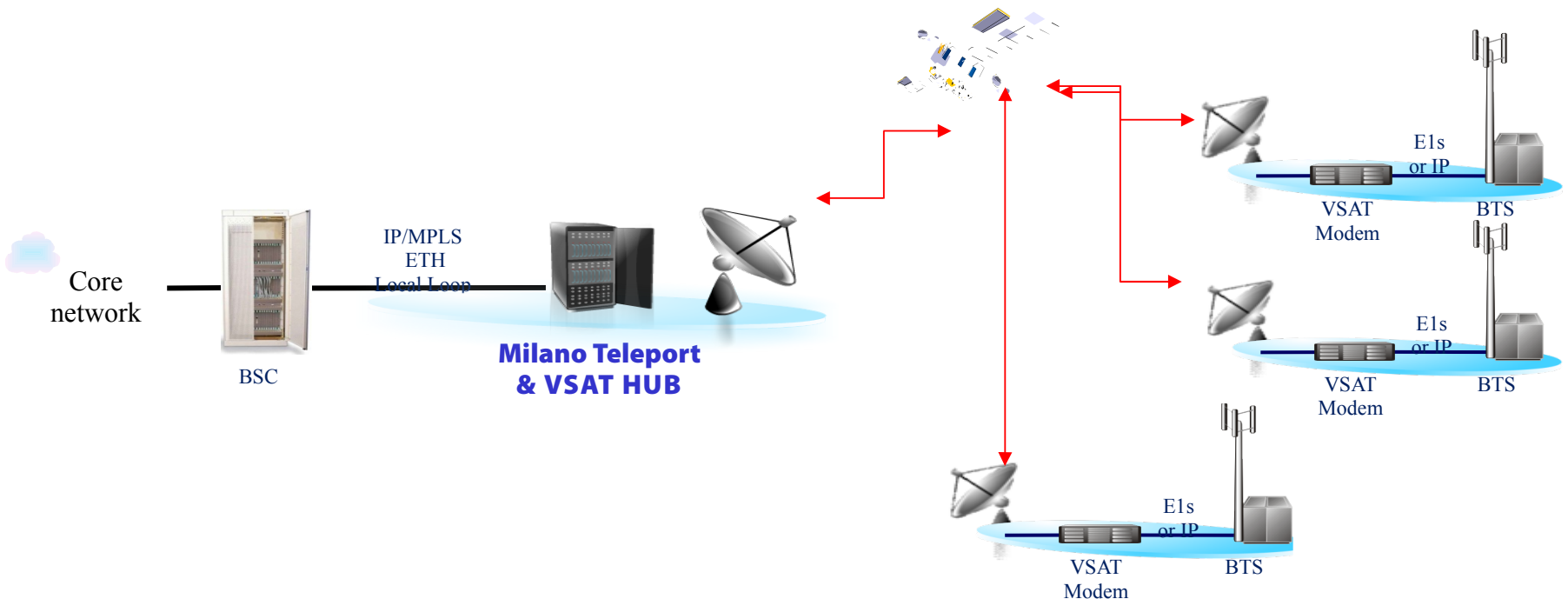
Milano Teleport VSAT based cellular backhaul solution

THE NEED

Extending the network to rural areas while keep the cost of satellite transport as low as possible

THE SOLUTION

HUB (DAMA) based VSAT network with dynamic allocation of unused bandwidth between all BTSs in the network

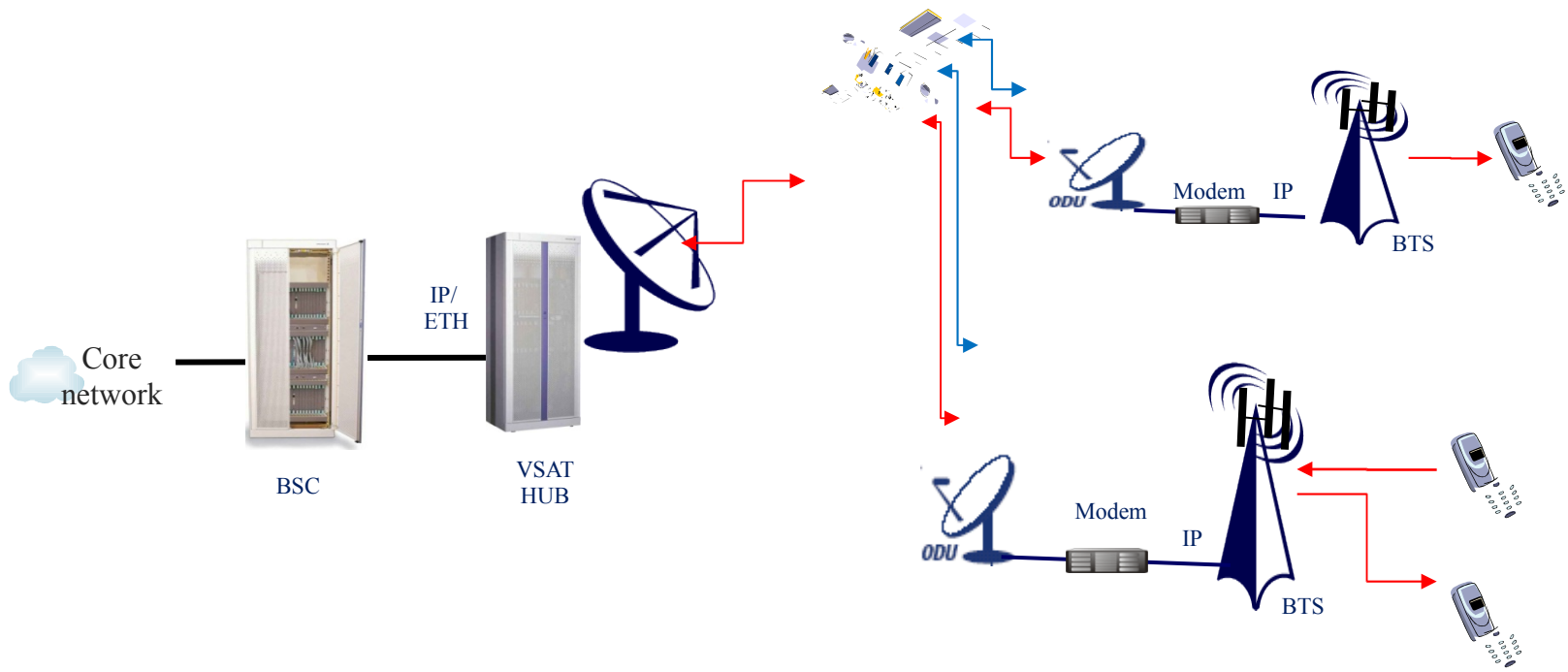


Milano Teleport DAMA based cellular backhaul solutions

- ◆ Milano **Teleport** is **Sensitive** to the cellular operator operational costs on bandwidth and other expenses
- ◆ Milano **Teleport IP based DAMA** solutions provides dynamic bandwidth allocation, Scalability, efficacy and cost effectiveness
- ◆ Low cost remotes. Lower opex as BW is **dynamically allocated**
- ◆ Excellent integration with **rural IP based base stations** (Picocell)
- ◆ Reduce remote site power consumption by using VSATs with **power-saving features**
- ◆ Milano **Teleport** provides Private or Hosted HUB based solutions for service providers

Milano **Teleport** VSAT based cellular backhaul solution

THE NEED	Extending the network to the remotest rural areas Allow direct connection between BTSs
THE SOLUTION	HUB (DAMA) based VSAT network with Mesh capabilities for enabling direct calls between BTS/Node Bs . Real time Dynamic bandwidth allocation.



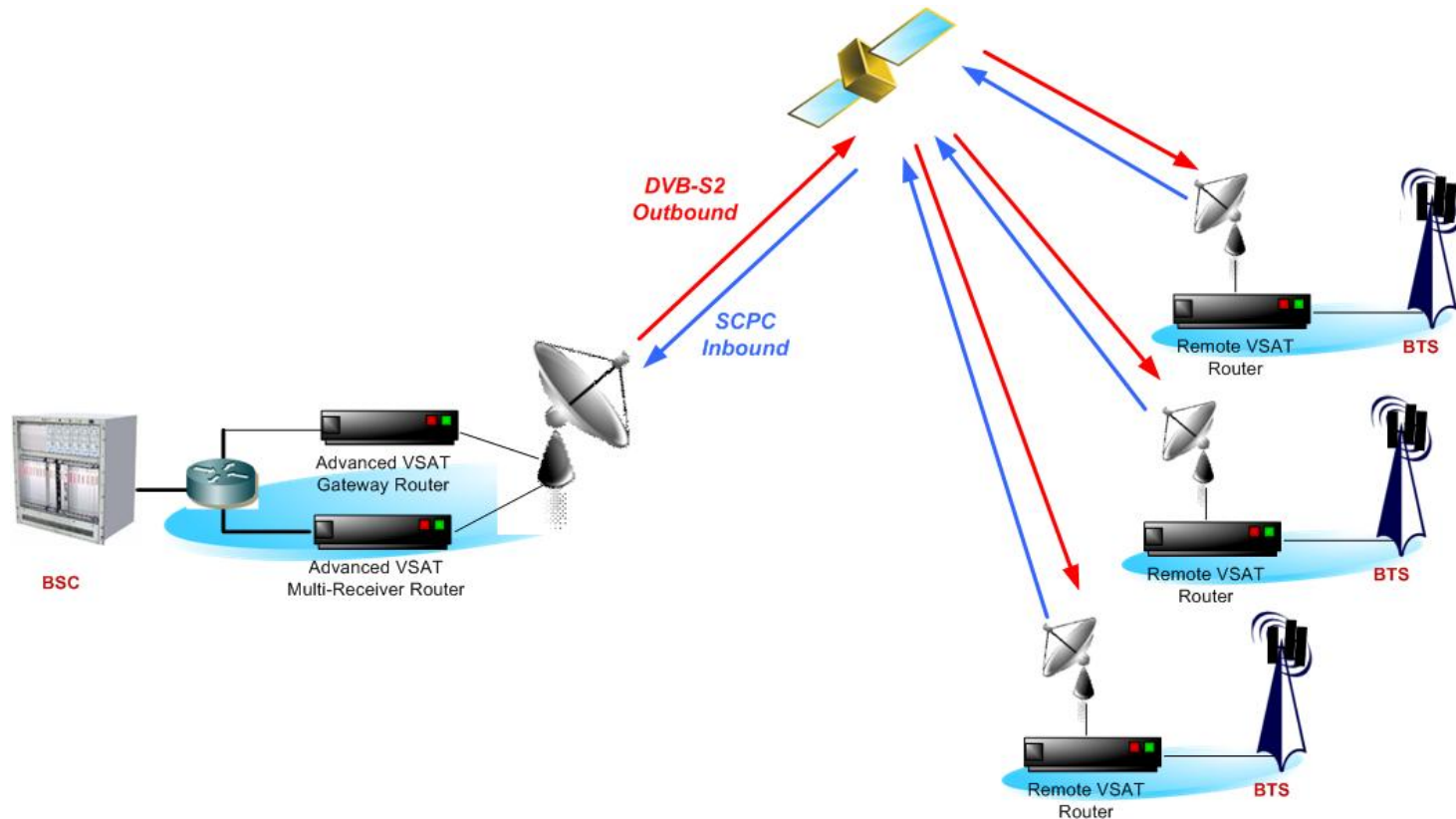
Milano **Teleport** solution for Mobile operator

THE NEED

Satellite backhaul of E1s between BSC to BTS for transporting voice and data (EDGE)

THE SOLUTION

A turnkey managed DVB/SCPC cellular backhaul service using a new advanced VSAT platform



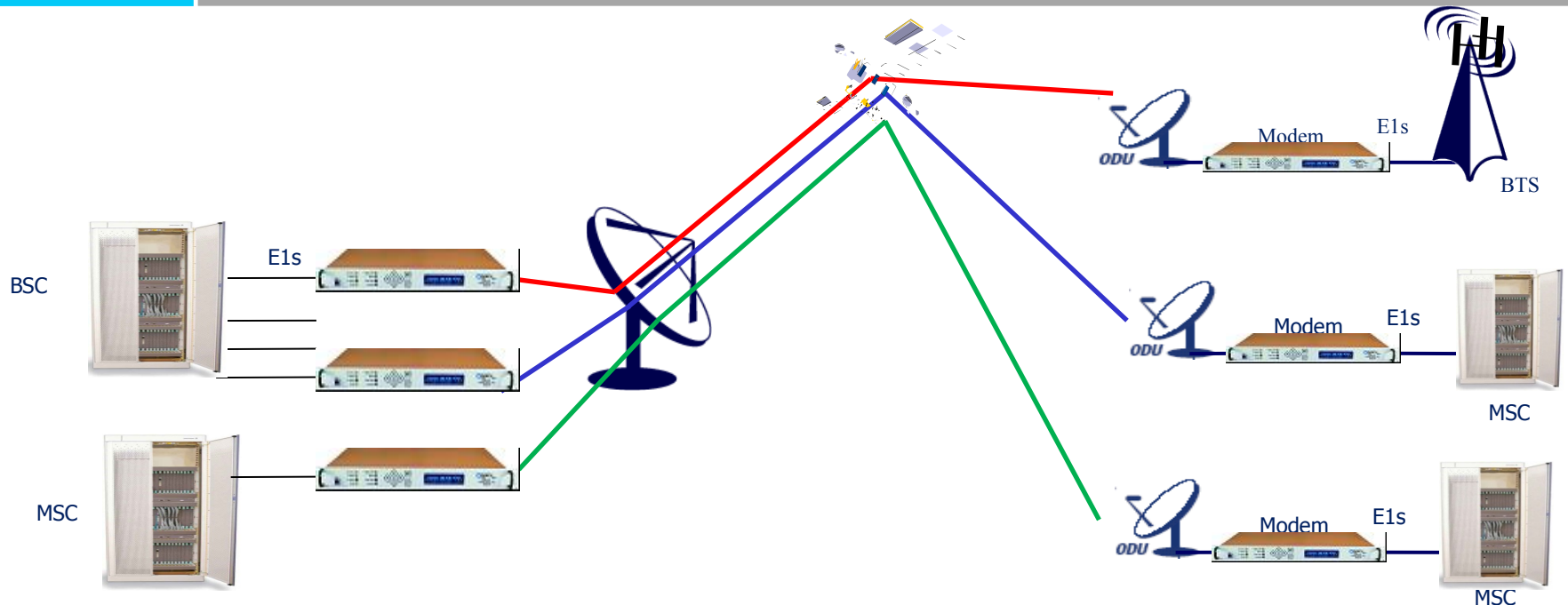
Milano **Teleport** SCPC based solution for Etisalat Nigeria

THE NEED

Satellite backhaul of E1s between MSCs, MSC to BSC and BSC to BTS all over Nigeria

THE SOLUTION

Dedicated connectivity for high volume core network links.
Optimization of unused time slot and Carrier In Carrier achieve 50% bandwidth reduction. Automatic power control to accommodate rain fade.
Fully managed and controlled by Milano **Teleport**



Satellite VS. Microwave

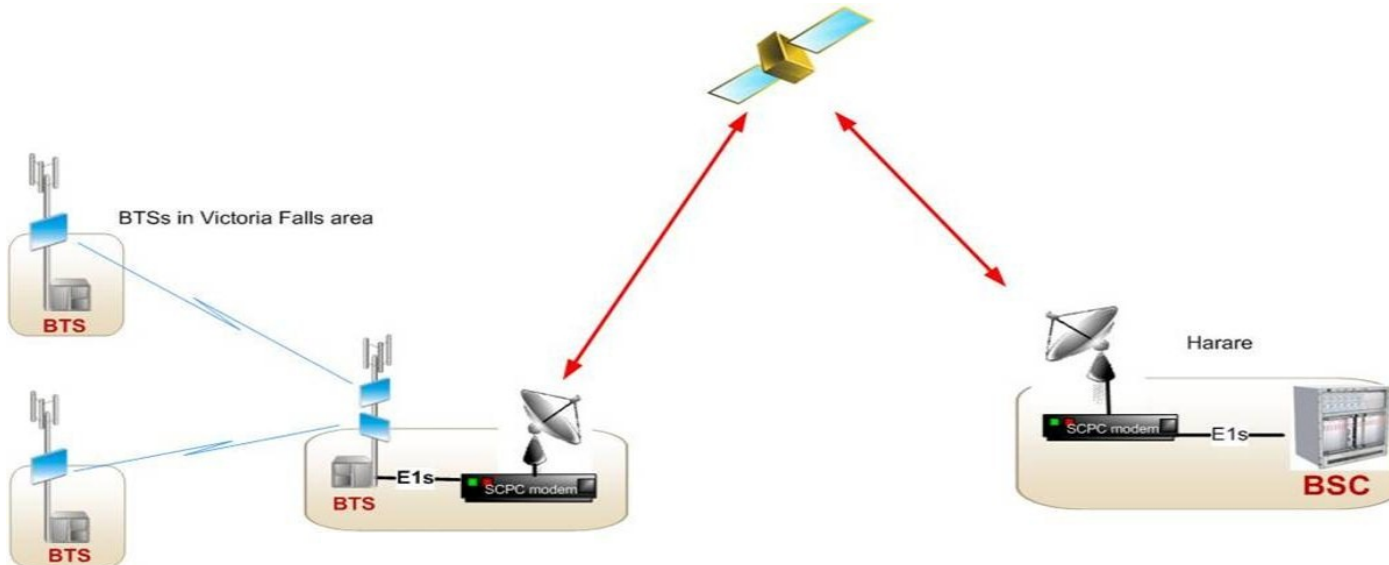
Low CAPEX
High OPEX

High CAPEX
Low OPEX

- ◆ CAPEX of microwave is related to distance, as repeaters need to be put in place every 50-60 km. Once the initial investment is made however, the OPEX stays minimal.
- ◆ Despite the lower CAPEX satellite will always have higher OPEX than microwave as bandwidth for transmission must be leased from third parties (satellite operators).
- ◆ Satellite as ideal to quickly establish connectivity to low traffic locations which are at a distance of 300 km or more from the MSC.
- ◆ As network traffic grows and begins to generate free cash flow, operators will often migrate to microwave links, which enable economies of scale when total traffic exceeds 4 E1s.

Milano **Teleport** Hybrid cellular backhaul solution

THE NEED	Extending the network to un covered remote areas Backhaul of 8 E1s over a satellite link
THE SOLUTION	Hybrid satellite/ microwave solution. Point to point SCPC link between the MSC and an aggregation site from which the E1s are distribute to 7 BTSs in the designated area over radio links.



- LEGENDA:
- ↔ Milano **Teleport** Cellular Backhaul connection (SCPC)
 - ↔ Microwave links between the aggregation site to other nearby BTSs

Milano **Teleport** provides the complete answer for Cellular Backhaul Solutions

- ◆ Tailor made solution in accordance with your specific needs
- ◆ Fully turn key solution:
 - ◆ Design & planning
 - ◆ Supply of all required hardware – utilizing the best products available in the market
 - ◆ Installation – by professional certified installers
 - ◆ Support, management and maintenance