



SOLUTION BUSINESS CASE

SATELLITE BACKHAUL OPTIMIZATION FOR GSM AND UMTS WITH CISCO RAN OPTIMIZATION SOLUTION

EXECUTIVE SUMMARY

Satellite backhaul links can be expensive, for both Global System for Mobile Communications (GSM) networks and Universal Mobile Telecommunications Service (UMTS) networks in remote regions. The Cisco® RAN Optimization solution allows wireless mobile operators to reduce their operating expenses (OpEx) while providing additional bandwidth over satellite backhaul links. This solution business case explains the business benefits and the returns in terms of OpEx savings and total cost of ownership (TCO) reduction that mobile operators can achieve with satellite backhaul optimization.

Cisco RAN Optimization offers an efficient solution to satellite backhaul transport costs, enabling mobile operators to reduce satellite backhaul OpEx and increase their available cell-site bandwidth.

SUMMARY

Mobile operators need to connect their remote cell-site base transceiver station (BTS nodes with regional base station controllers (BSCs) over a reliable connection. For long-distance links or for remote areas where landlines are not available, the only choice is using satellite links, which can be much more expensive than terrestrial lines. In addition, technological advancements demand for new services, and competitive pressure require mobile operators to continuously expand their networks and increase bandwidth capacity at cell sites, and thus their operating expenses (OpEx).

Network operating expense represents about 20 to 30 percent—and up to 70 percent in some cases—of total OpEx for a mobile operator. Keeping OpEx under control is therefore a priority in today's competitive and cost-sensitive business environment. In addition, any means to expand

the network as the number of subscribers increases and to provide additional services—without requiring an increase in OpEx—represents a competitive advantage that cannot be underestimated.

The Cisco® RAN Optimization solution offers multiple advantages to mobile operators seeking to reduce their network operating expenses while expanding their infrastructure and providing innovative services. It allows for immediate savings on expensive satellite bandwidth by employing a Cisco Systems® unique technology that compresses and optimizes Global System for Mobile Communication (GSM) and Universal Mobile Telecommunications Service (UMTS) traffic with compression efficiency between 30 and 50 percent. It also allows using excess bandwidth on existing links to add additional channels or deploy new services—without any increase in OpEx.

CHALLENGE

The Cisco RAN Optimization solution allows mobile operators to achieve three main goals:

- **Reduce OpEx**—Reduce OpEx for radio access network (RAN) satellite backhaul links by optimizing and aggregating backhaul bandwidth for both GSM Abis and UMTS Iub interfaces. This solution enables mobile operators to carry both GSM and UMTS traffic over a single backhaul satellite connection, saving on satellite costs and avoiding the necessity to deploy additional links for UMTS expansion.
- **Expand the Network**—The excess bandwidth saved with optimization can now be used for two purposes:
 - Increase the number of voice and data channels supported at the cell site, up to an additional full E1's worth of bandwidth (120 full-rate or 240 half-rate GSM channels) for expanded radio coverage or new technology support.
 - Deploy new technologies at cell sites without the need to add additional backhaul bandwidth. For example, UMTS support can be added to existing GSM cell sites by transporting UMTS voice and data traffic over optimized GSM backhaul links. This allows for quicker and less expensive deployment of new technologies.

- **Introduce Advanced IP Services**—Cisco mobile wireless routers employ industry-standard Cisco IOS® Software and allow deployment of IP-based advanced services at the cell site, such as IP Internet connection for remote areas, WLAN, IP telephony, and camera monitoring. Cisco IP Connected RAN is the only RAN optimization solution that delivers advanced IP-based services to mobile customers at remote cell sites and creates new revenue-generating opportunities for mobile operators.

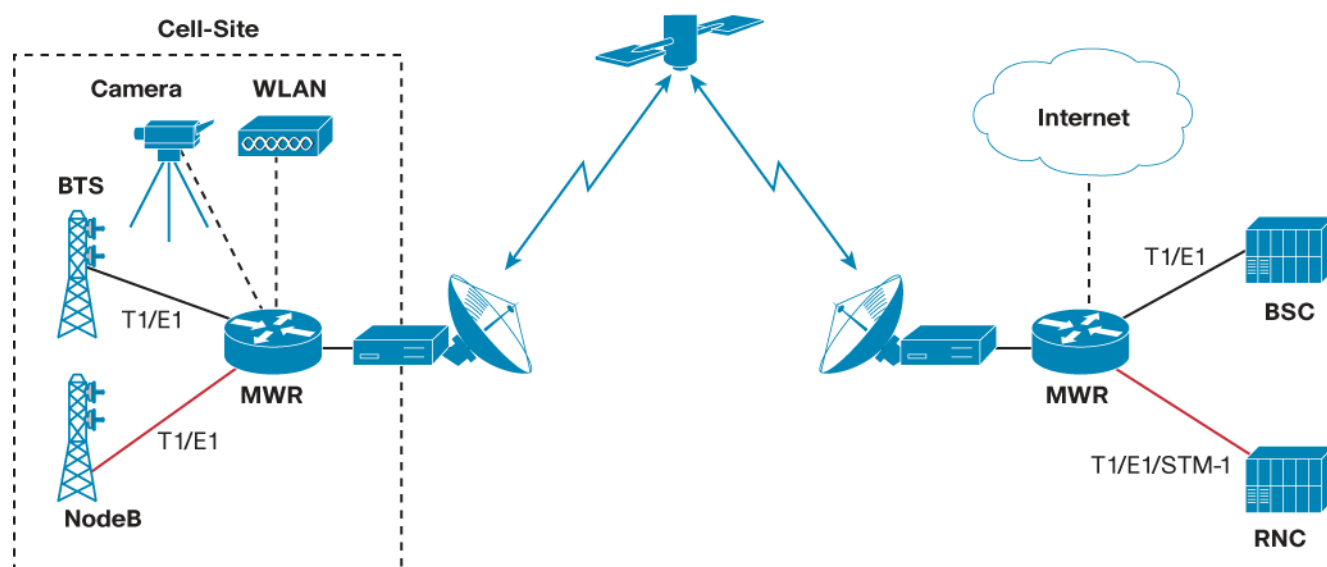
SOLUTION

The Cisco MWR 1900 Series is the aggregation and optimization platform suited for satellite point-to-point backhaul links. The Cisco MWR 1941-DC-A Mobile Wireless Edge Router features an environmentally robust chassis, support for up to four Abis and Iub input interfaces, a wide range of operating temperatures, and a small footprint (1 RU), making it suitable for even the most remote deployments.

Cisco mobile wireless routers can be deployed in a back-to-back configuration, on both sides of the satellite link, to provide for point-to-point network optimization

Figure 1 shows an overview of a sample point-to-point deployment for satellite optimization for a GSM and a UMTS link.

Figure 1. Satellite Backhaul Optimization for GSM and UMTS over IP



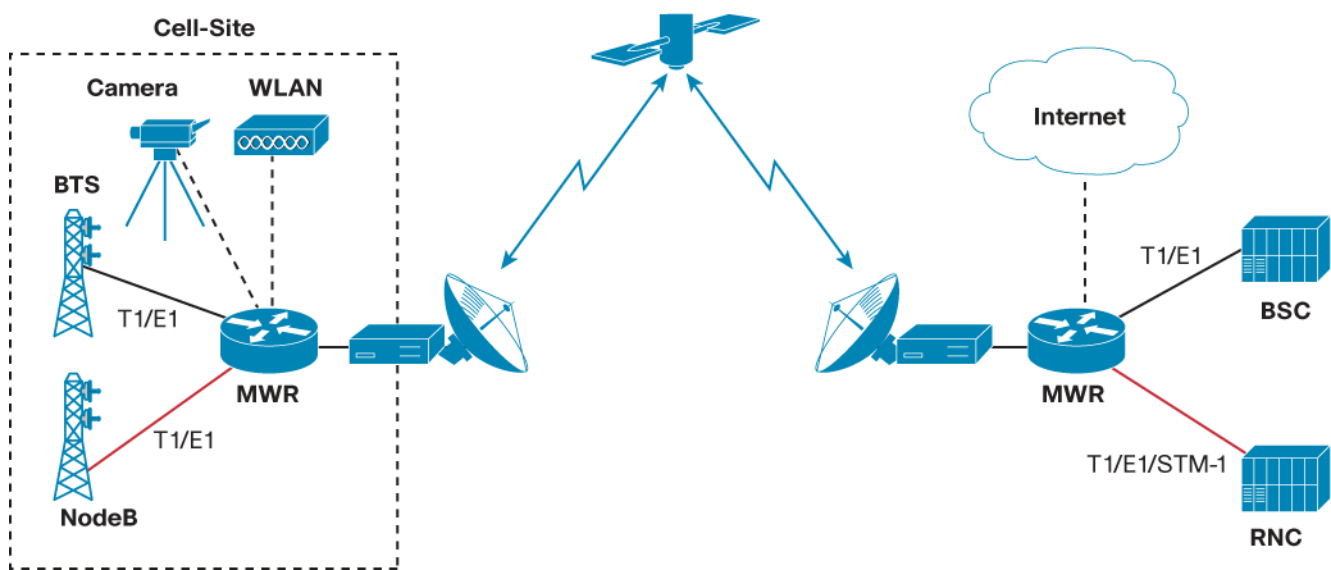
Cisco IP Connected RAN provides the following features:

- **GSM and UMTS Optimization**—Reduce operating expenses for RAN satellite backhaul links by optimizing and aggregating backhaul bandwidth for both GSM Abis and UMTS Iub interfaces. GSM traffic can be compressed with efficiency between 30 and 50 percent, depending on link usage rate, by removing idle channels and repeating patterns on the time-division multiplexing (TDM) link. UMTS traffic can be compressed up to 30 percent by removing idle cells, removing unused operations and maintenance, and multiplexing small payloads into single cells.
- **Efficient Backhaul Transport**—Optimized GSM and UMTS traffic is transported using a compressed Internet protocol and Cisco IOS Software quality-of-service (QoS) prioritization, achieving end-to-end latency of between 10 and 16 ms (depending on user-adjustable jitter buffer settings).
- **Voice Quality Transparency**—Cisco MWR products employ unique, RAN vendor-independent no-loss compression and optimization techniques that do not alter the Abis and Iub bit streams and do not affect voice quality and data services. Multiple tests performed in live networks around the world have demonstrated full compatibility with all major RAN vendors and full transparency of BTS and BSC software operations across the solution.

- **Remote Management**—Cisco Mobile Wireless Transport Manager (MWTM) is a feature-rich application that provides tools for troubleshooting, capacity planning, and inventory reporting. These tools help to monitor and maintain network efficiency for your optimized mobile backhaul infrastructure, provided by the Cisco Radio Access Network (RAN) Optimization solution.
- **IP Services at Remote Cell Site**—By running Cisco IOS Software, the de facto IP network routing software, the MWR is able to provide advanced IP-based services to the cell site, thus allowing mobile operators to create cell-site points of presence and deploy revenue-generating services. For example, by providing IP access to remote areas served by backhaul satellite links, mobile operators can deploy WLAN services at cell sites using excess bandwidth on existing satellite backhaul links—creating new revenue-generating services without increasing operating expenses.

Figure 2 shows an overview of IP services that can be deployed at a remote cell site using the Cisco RAN Optimization solution.

Figure 2. Advanced IP Services at Cell Site



BUSINESS BENEFITS

To mobile operators looking for reductions in operating expenses and for new revenue-generating services, Cisco RAN Optimization offers the following benefits:

- Optimizes RAN traffic and reduces bandwidth requirements for satellite links, with GSM and UMTS traffic compression and aggregation. Aggregates multiple channels and different technologies over a single backhaul connection, thus providing bandwidth efficiency and cost reduction.
- Reduces RAN satellite backhaul OpEx. Cisco RAN Optimization is easy and quick to deploy, allowing mobile operators to reduce OpEx immediately.
- Does not affect voice quality or data transfer rates; uses a vendor-independent solution and does not change the proprietary bit stream in either the GSM Abis or UMTS Iub interfaces.
- Provides a centralized network management platform, based on the Cisco Mobile Wireless Transport Manager (MWTM) product, that tracks the status of each node—up to the cell-site nodes—and provides real-time data on backhaul utilization and efficiency gain. Through the use of intuitive, workflow-based monitoring and control capabilities, Cisco MWTM helps reduce TCO and onsite maintenance costs
- Provides short payback time, in most cases in less than 12 months, depending on actual satellite backhaul costs, the investment in a Cisco RAN Optimization infrastructure can be recovered by OpEx savings in a few months, and often in less than one year. Gradual, need-based, quick-to-market deployment of new technologies such as EDGE and UMTS at existing cell sites, using excess GSM bandwidth to carry new traffic.

Compression of GSM traffic frees up bandwidth on the satellite backhaul link that can be used to provide backhaul access for new technologies and therefore save on both operating expenses and deployment time.

- Delivers advanced IP services at the cell site, enabling the deployment of new revenue-generating services. For example, the excess bandwidth on the satellite RAN backhaul link can transport IP traffic for a remote WLAN spot, camera monitoring services, remote Internet access, or IP telephony services. The operator can deploy these IP-based services without additional OpEx in backhaul bandwidth and can create a new revenue stream from innovative services.

SUPPORTING SOLUTIONS, PRODUCTS, AND SERVICE OFFERINGS

The Cisco Satellite RAN Backhaul Optimization solution is part of a broader Cisco offering for RAN infrastructure optimization for both GSM and UMTS networks, as well as Code Division Multiple Access (CDMA) infrastructures. Supporting solutions, products, and service offerings are:

- Cisco MWR 1941-DC-A Mobile Wireless Edge Router
- Cisco MWTM management platform
- Cisco Advanced Services for RAN Optimization

WHY CISCO?

Cisco provides a complete IP-based RAN infrastructure optimization solution that increases efficiency, reduces costs, and enables additional IP-based services, where Cisco is the recognized market leader.

Worldwide leader in IP networking solutions:

- IP-based transport of RAN traffic, compliant with Third-Generation Partnership Project (3GPP) R5/R6
- IP end-to-end services at cell site

World-class reliable and expandable solution:

- RAN vendor-independent solution integrates with all major existing RANs
- Transparent RAN solution; does not affect voice quality and data throughput
- Wide range of interface choices for alternative backhaul

World-class network management products:

- Integrated management solution based on Simple Network Management Protocol (SNMP) allows for centralized management of remote sites
- Expertise and knowledge in deploying network management solutions to manage thousands of nodes

World-class technical support:

- Worldwide support organizations (Cisco Advanced Services, TAC)

FOR MORE INFORMATION

For more information about Cisco Satellite Backhaul Optimization solutions and products, visit the Cisco RAN Optimization Website at

<http://www.cisco.com/go/mobile>

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