

TRANSPORT NETWORK DESIGN

Delivering services and technical evaluations for network operators worldwide



Qualcomm Engineering Services Group (ESG) accelerates the adoption of mobile technologies through initiatives, professional services and technical education. By analyzing and recommending technology evolution solutions, optimizing network design and deployments, educating via technical training and customized workshops, and collaborating with key industry groups,

Qualcomm ESG enables operators to efficiently migrate to next-gen technologies. The following is a case study indicating how ESG analyzed an operator’s backhaul dimensioning challenges and recommended a solution.

AT ISSUE

Improving network design improves the bottom line

In the past several years 3G network data services have shown rapid growth. Previously, increased usage caused an air interface bottleneck. With the arrival of HSPA, the system bottlenecks have shifted onto transportation networks. As a result, operators have needed to invest more money into those networks, and operators have use additional intelligent dimensioning processes to better control operating costs.

THE CHALLENGE

Reigning in CAPEX and future OPEX

After the nationwide launch of HSPA services, a Tier 1 operator faced the challenge of developing a standardized process for backhaul dimensioning and management.

The operator’s existing backhaul dimensioning process primarily forecasted increased data volume. Often the market overestimates the actual growth, which results in large amounts of under-utilized backhaul capacity. This under utilization translates into unnecessary CAPEX / OPEX expenditure on the transport network. Further challenges arouse from limited visibility of backhaul capacity on each site.

Collaborating with the operator’s engineering team, Qualcomm ESG analyzed and evaluated the situation and recommended a comprehensive backhaul monitoring and dimensioning process.

COMPANY

- Tier 1 operator
- Nationwide deployment of HSPA
- Project targeted a region of 18 major markets covering more than 7,500 sites

SITUATION

- ▶ Inaccurate inventory and insufficient process to track backhaul resources
- ▶ Aggressive backhaul upgrade decisions due to an undeveloped process
- ▶ Unnecessary CAPEX / OPEX expenditures based on marketing projections
- ▶ Solution must support multiple UTRAN infrastructure equipment suppliers

SOLUTION

- ▶ Use existing UTRAN performance management counters
- ▶ Develop specialized backhaul capacity audit and usage reports
- ▶ Improve dimensioning process using detailed decision flows
- ▶ Recommend processes to streamline operator’s internal tools

RESULTS

- ▶ Improved dimensioning process
- ▶ Reduced “over dimensioning” of backhaul resources
- ▶ Potential CAPEX savings of \$1.5M and annual OPEX savings of \$18M



TRANSPORT NETWORK DESIGN | CASE STUDY

THE SOLUTION

Collaborating with Qualcomm’s team

The execution of this project required close coordination with the operator’s engineering team. To ensure smooth communication, mutual understanding, and ultimate success, a Qualcomm ESG subject matter expert (SME) worked at the operator’s site for several months.

The SME worked with the operator’s team to quickly understand their existing processes, identify potential deficiencies, and determine available internal tools and automation frameworks.

The team’s first priority was to accurately assess the current capacity and actual usage of the backhaul. Performance management (PM) counters available from UTRAN vendors typically provide useful information about backhaul and air interface use. Analyzing data primarily from these PM counters, the Qualcomm ESG team developed a series of customized reports for the operator. Separate reports were designed for determining deployed/in-use backhaul capacity; use of backhaul resources; voice and data activity on the Node-B being served by the backhaul resources; and other air interface performance measurements that could be impacted by backhaul. These reports were incorporated into the operator’s automation schedule, ensuring a weekly delivery of vital information to the responsible engineer.

In the next stage of the project, Qualcomm ESG leveraged these reports to perform a comprehensive study on some of the key markets served, comparing forecasted backhaul capacity requirements with actual network traffic use.

This analysis yielded a step-by-step decision flow process for backhaul growth in the transport network (see Figure 1). The decision flow was streamlined and incorporated into the operator’s automation framework.

The decision flow based on PM counters was designed to complement the operators existing processes, using market forecasts on data volume growth. The design interjected a second step in the process, making certain that backhaul capacity only increased when current backhaul reached a specific threshold. Anomalies, such as “over consuming” data services by an atypical subscriber, were easily identified and did not trigger expansion.

RESULTS

The solutions developed by Qualcomm ESG allowed the operator to improve its backhaul monitoring and dimensioning process by correlating market-forecast network growth with actual traffic demand.

The operator quickly implemented new decision processes to its automation framework. In addition, the customized reports brought visibility and easy access to network information and empowered management to make better operational decisions.

This improved process allowed the operator to refine its transport network capacity growth plans. The analysis performed during this project resulted in an estimated savings to the operator’s CAPEX budget of \$1.5M. An additional \$18M OPEX savings was realized by avoiding an unnecessary deployment of overestimated backhaul capacity (see Figure 2).

Figure 1: High-level Backhaul Dimensioning Process

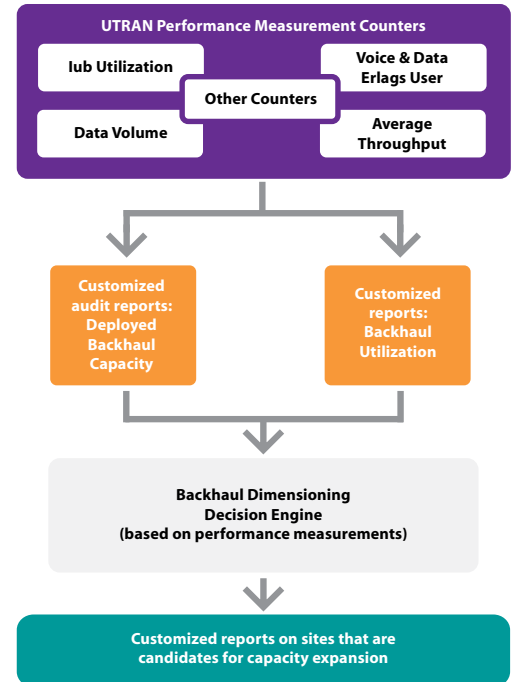


Figure 2: Backhaul Savings Example

