

## Solution Brief

# Assuring High-Performance 5G Services and Backhaul to the Edge

### Precision monitoring with zero footprint 10G SFPs

5G brings an explosion of new services for intelligent IoT devices (Internet of Things), communication for autonomous vehicles, logistics and transport, factory automation, augmented reality, and gaming, among others. Network functions will be virtualized and distributed and will leverage edge cloud computing, transforming the way services are delivered to customers.

Mobile network operators typically start with implementing non-standalone 5G access using the LTE/4G control plane and then start to install the backhaul and fronthaul physical networks required to support standalone 5G. Physical network visibility is even more important as 5G services are dynamic with diverse and stringent performance requirements for latency, reliability, and throughput.

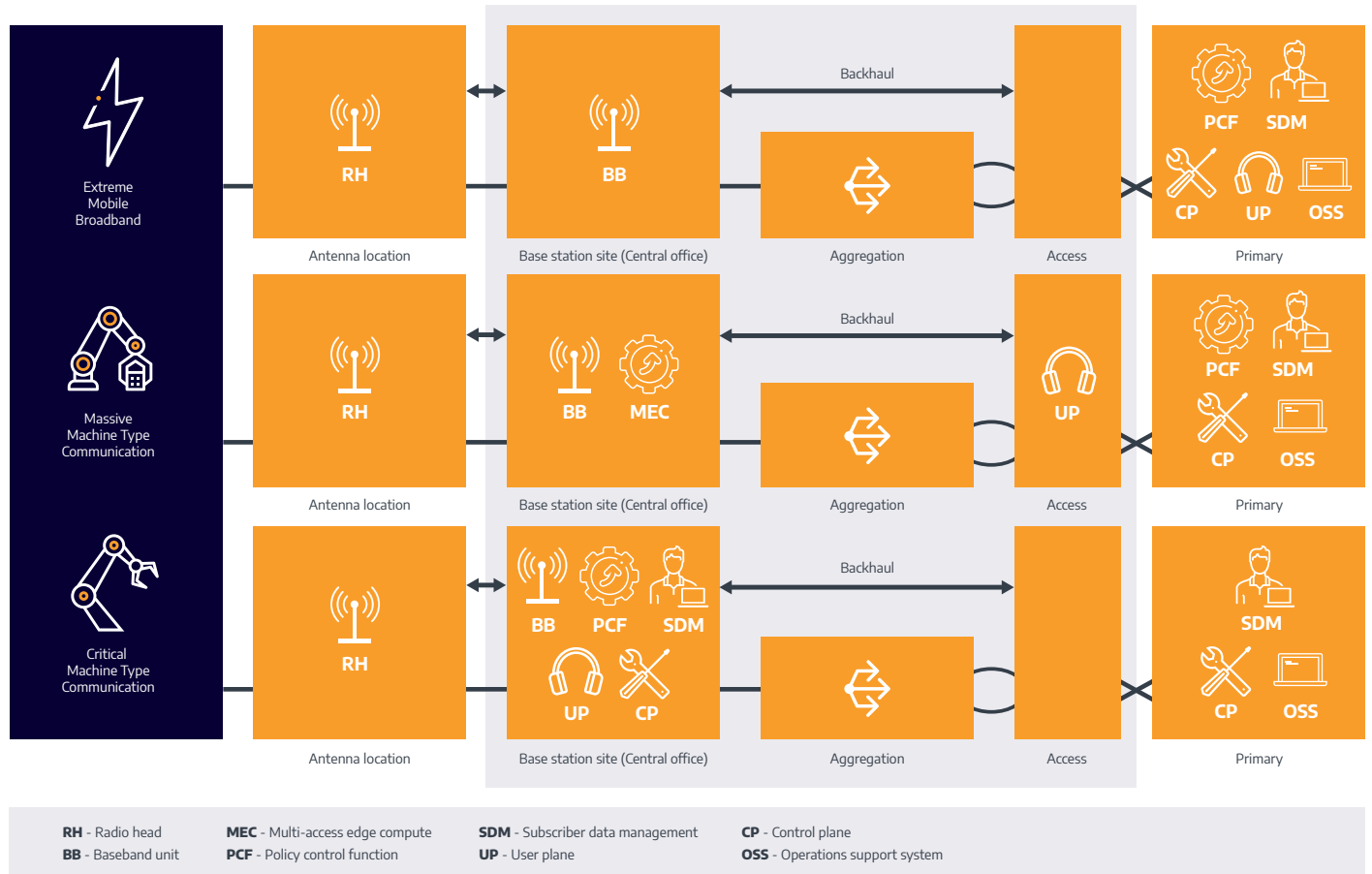
In short, 5G networks aim to deliver three distinct service types:

- **xMBB** – Enhanced, extreme, or extended mobile broadband with speeds in excess of 1 Gbps, as well as very low latency.
- **mMTC** – Massive machine-type communications, also known as the Internet of Things (IoT), brings network access to millions of connected devices (“things”) at a reasonable cost.
- **cMTC** – Critical machine-type communications, often referred to as ultra-reliable low latency communications (uRLLC).

These 5G services change the requirements for the underlying network in terms of bitrates, number of connections, resilience, and quality of service. Different performance monitoring mechanisms are needed to quantify how well a particular service is working. In addition, the requirements of Multi-Access Edge Compute (MEC), to provide cloud services to end users, as well as cloud workloads for operators, will introduce new networks that have to be monitored for performance.

In order to satisfy the needs of different service types (xMBB, mMTC, or cMTC), the mobile network will be transformed across all layers. Depending on the service type and communication path, the underlying physical network has to fulfill different criteria.

### Mobile network transformation for diverse 5G service types



While services and networking functions may be dynamic, the physical network topology still consists of fibers, microwave links, and cables, with termination devices to enable communication; however, this infrastructure must be able to adapt dynamically to bandwidth throughput changes.

Being able to flexibly adapt and monitor the 5G physical layer is critical in order to deliver high quality services. Performance monitoring precision and accuracy must meet the most stringent requirements for 5G physical mobile backhaul. Applications such as augmented reality require latency below 1 millisecond. Monitoring precision and accuracy must exceed 1ms by a significant factor.

The 5G network layer also requires more stringent synchronization requirements. Any network element must comply with the latest standards for SyncE and Precision Time Protocol (PTP). Typically, a 5G mobile backhaul physical network contains a baseband unit (BB), cell site router (CSR), aggregator, access core routers and a timing source. All network elements must comply with 5G synchronization requirements.



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Service activation testing (SAT) and assurance are also important. Mobile operators typically run a SAT test for service turn-up but also for troubleshooting or network configuration changes. In some cases, SAT tests are run periodically to validate performance on parts of the backhaul network provided by a third-party operator.

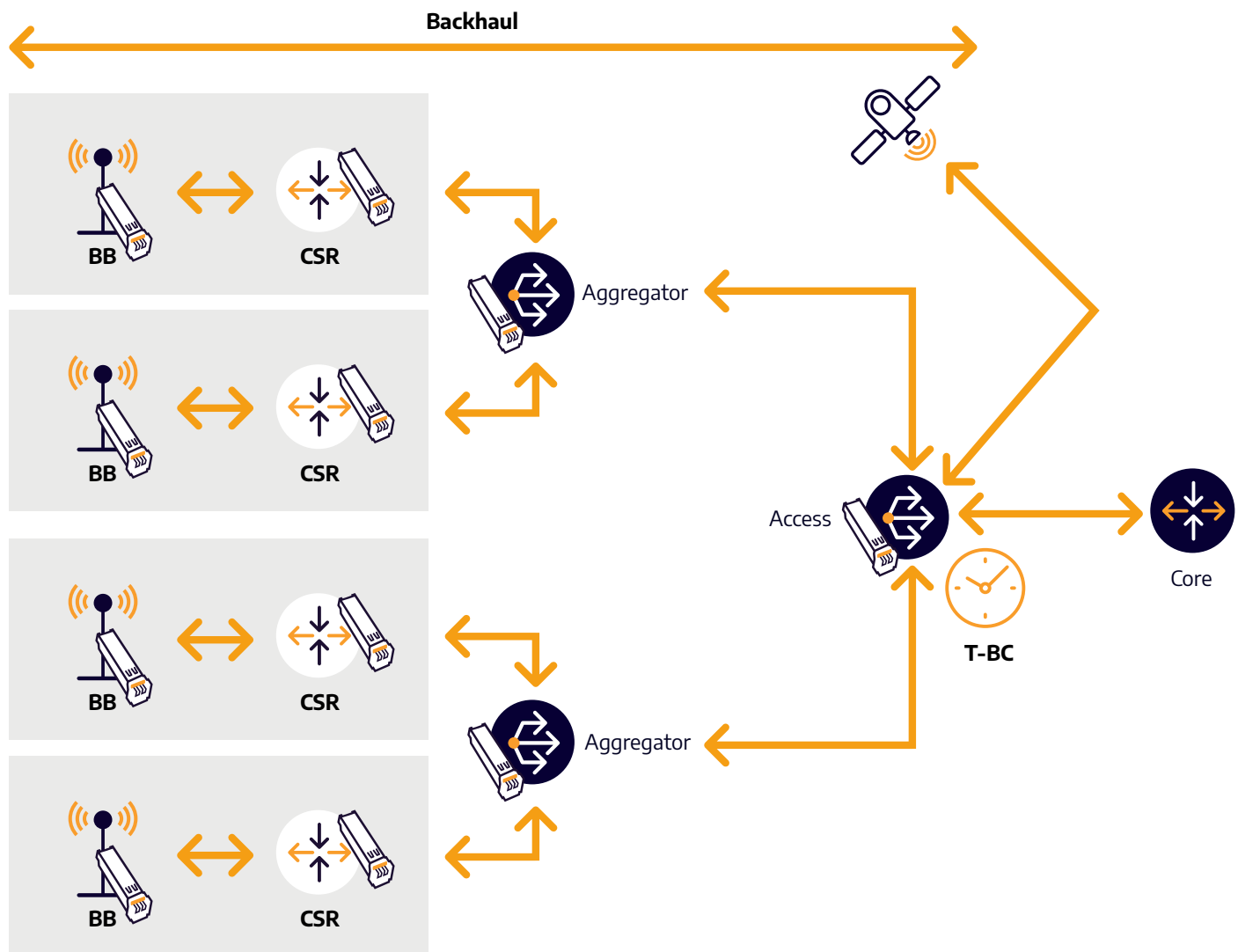


Figure 1: A typical 5G mobile backhaul network instrumented with 10G SFP compute

### Benefits of the Skylight 10G SFP compute sensor

- Excels at 4G class of service monitoring and is capable of monitoring all service types for both standalone and non-standalone 5G access
- Fully interoperable with multiple vendors, providing an independent termination point for service monitoring and assurance
- Integrated service assurance testing saves on external test equipment and technician costs at the cell site
- The zero footprint form is designed for space-constrained small cells and mobile backhaul
- Built-in precise synchronization and timing and FPGA base technology meets 5G requirements
- Reduced power consumption and cooling (3 watts vs. 100 watts of typical demarcation device)

Monitoring service performance between the access and baseband unit requires being able to monitor the physical connectivity's one-way delay, jitter, delay variation, packet loss, class of service, traffic burst and bandwidth throughput. The ability to monitor multiple services simultaneously validates the performance of each type of service on the same network.

Using active monitoring with small footprint SFP solutions, an operator can proactively monitor the mobile backhaul for potential service-impacting issues such as excessive delay and packet loss. Link capacity trending using flowmeter functionality can detect issues before they happen by baselining the link usage. This can be performed at each segment to determine where the link capacity is becoming an issue.

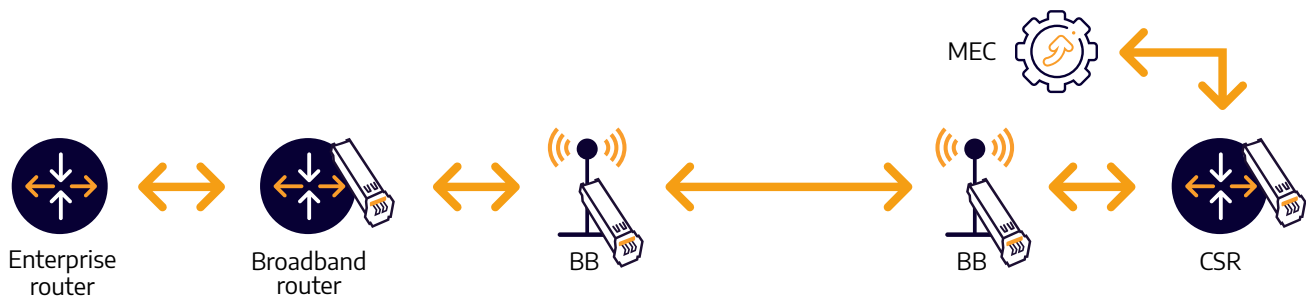


Figure 2: Instrumenting 5G mobile broadband with Skylight SFP compute sensors

A 10G SFP compute can be leveraged to perform end-to-end service assurance for an Enhanced Mobile BroadBand (eMBB) application. The service can be monitored including the MEC where enterprise applications are distributed. The 10G SFP compute can be located close to the MEC to provide full end-to-end service visibility.

## Accedian Skylight and 5G performance monitoring

Accedian Skylight components can instrument virtually any network infrastructure, and be deployed as pure software, pure hardware, or in a hybrid fashion. Skylight uses the latest technologies available to achieve unprecedented accuracy for software-based measurements. This includes microsecond-accurate timestamps from NFVi network ports and streaming protocols to deliver performance metrics in near real time. Skylight can handle huge amounts of KPI data with ease; our densest mobile deployment delivers more than 20 billion KPIs per day running on all-COTS (commercial off-the-shelf) servers.

Skylight APIs allow orchestration of all configurations in the monitoring topology, as well as intelligent auto-provisioning of the Accedian 10G SFP compute sensor and modules to ensure fully automated operations.

## About Accedian

Accedian is the leader in performance analytics and end user experience solutions, dedicated to providing our customers with the ability to assure their digital infrastructure, while helping them to unlock the full productivity of their users.

**Learn more at [accedian.com](https://accedian.com)**