

## Rolling out HSPA+ Services Over Wire-Line Access Networks

### Using Celtro's Virtual Bonding™ technology to empower backhaul HSPA+ services over a copper-based access network

A leading European mobile operator chose Celtro's mobile backhaul switching solutions to roll out new HSPA+ based high-speed mobile broadband services. Leveraging its existing DSL-based access network, the operator was able to increase backhaul capacity while minimizing CAPEX. With Celtro's Virtual Bonding technology, the operator was also able to benefit from a reliable solution that improves service delivery and enhances the quality-of-experience of his mobile subscribers. Finally, Virtual Bonding's flexibility makes it ideal for use in a wide variety of deployment scenarios, and offers a future-ready solution for tomorrow's mobile backhauling challenges.

#### The Challenge

One of Europe's largest mobile operators planned to deploy an HSPA+ network to provide its 30 million mobile subscribers with high-speed data-rich services. The mobile operator needed to expand backhauling capacity, while keeping new infrastructure costs down. The operator decided to leverage the existing copper infrastructure, using available and inexpensive ADSL2+/VDSL2 links to backhaul data traffic.

The access network implements a variety of DSL flavors, such as ADSL2+ and VDSL2. These DSL technologies do not support the range and rate required to offer HSPA+ bandwidths, nor are they robust enough to guarantee carrier-class service availability levels, making standard bonding solutions (e.g. EFM bonding) inadequate.

To meet the challenge, the operator needed a smart and flexible bonding solution that would allow it to leverage the large broadband access network to expand backhaul capacity and ensure service delivery while minimizing CAPEX.

#### The Solution

To maximize backhaul network capacity and service delivery capabilities at the lowest possible cost, the operator chose to implement Celtro's unique **Virtual Bonding™** technology. Virtual Bonding, which allows the aggregation of traffic over a variety of distinct links employing dissimilar technologies, forms a single virtual pipe in the mobile backhaul network.

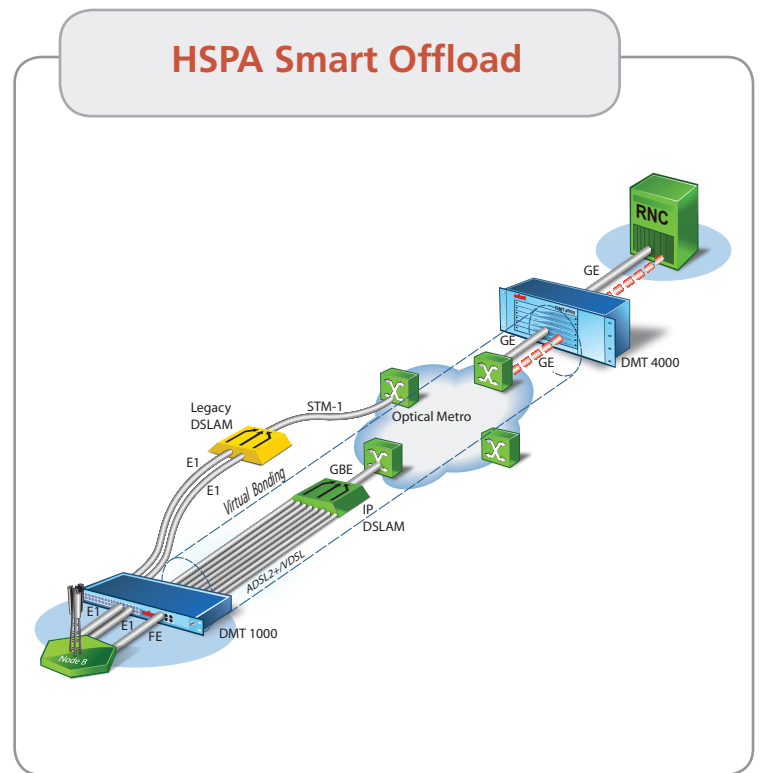
Celtro's **Virtual Bonding™** technology, which runs on Celtro's DynaMate portfolio of innovative mobile backhaul switches, increases capacity and improves service quality. Using the DMT1000 family at the cell-site and the DMT4000 at the aggregation point, Celtro's **Virtual Bonding™** provides the flexibility that enabled the operator to perform the deployment without having to make significant changes in the existing access and Optical Packet Metro (OPM) networks.

With Celtro's **Virtual Bonding™**, the operator was able to bond up to 8 VDSL2 or ADSL2+ links to achieve the data rates required for HSPA+ rollout. Celtro's Virtual Bonding enhanced the network's availability and service delivery and provided support for intelligent load sharing and protection mechanisms.

**STAY ONE STEP AHEAD**

## Solution Merits

- **Increased Capacity:** Virtual Bonding provides increased backhaul capacity at minimal cost, enabling the rollout of advanced mobile broadband technologies and services. Operators can utilize existing copper-based access networks to provide fiber-optic equivalent rates (50/10 Mbps) and reliability, at a lower cost.
- **Reliability and QoE:** Virtual Bonding bonds existing backhaul links between the cell sites and the RNC into a single virtual entity. The bond employs a load-balancing mechanism for protection in the event of a link failure, and flow control mechanisms to reduce network congestion. Thus, carrier-class reliability is ensured, and subscriber quality-of-experience is enhanced.
- **Network Flexibility:** Celtro's Virtual Bonding technology allows operators to use available network infrastructure – DSL lines, microwave links, or a combination of the two – to backhaul mobile broadband services, reducing costs and increasing network reliability.
- **Migration to LTE:** An unlimited number of links, based on a variety of technologies, can be bonded into a single virtual entity, supporting 100/50 Mbps rates, thus paving the way for an effortless migration to LTE.



**To summarize:** Celtro's unique Virtual Bonding technology enables operators to increase backhaul capacity for HSPA+ rollout, while minimizing new capital expenditures and maximizing use of existing access network assets. The flexibility of the DynaMate switching platform, with its unique Virtual Bonding technology, makes it an ideal solution for deployment in a wide variety of mobile backhaul networks, and provides a future-proof platform ready to meet tomorrow's mobile backhauling requirements.

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