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## BACKHAUL TRENDS

Celtro Newsletter | March 2009

Dear Colleague,

I'm sure you will agree that even as the world is experiencing an economic downturn, the mobile industry is getting used to the idea that mobile data services are here to stay.

In fact, as we've all seen, the demand for mobile broadband services is constantly growing. And, as we've all experienced, one of the primary results of this growth is pressure on the mobile backhaul to supply more and more bandwidth.

However, even as operators expand backhaul capacity - data services still need to be affordably priced to remain competitive. To this end, operators are migrating to Ethernet/IP backhaul networks, which provide lower price-per-bit.

CAPEX and operational limitations suggest that the migration to IP-based networks will be gradual over few years, while operators utilize existing networks and transmission technologies.

Celtro has responded to the above trends by taking a unique migration approach. This newsletter is about Celtro's innovative approach towards IP/MPLS, which I hope you will find relevant. I would like to hear what you think, and better understand your needs. After all, Celtro is here to respond to your backhaul challenges.

Sincerely,  
**Ron Zor, CEO**

### NEWS

 **11 February 2009**  
Celtro Demonstrates  
IP/MPLS Environment

 **21 January 2009**  
Celtro Virtual Bonding

### WHITE PAPER

Migration to IP-based  
Backhaul 

### EVENTS

**11-14 May 2009**  
Transport Networks for  
Mobile Operators 2009  
Amsterdam, Holland



### WHY MIGRATE?

The evolution of mobile radio technologies has dramatically increased the bandwidth capacity of end user equipment – posing new challenges for the mobile backhaul network, owing to significant increase in traffic and asymmetric payload directions. Planning and dimensioning the RAN has become very difficult, given the new data-oriented mobile services that are characterized by high burstiness and complex statistical behavior.

So, what's the incentive of mobile operators to migrate to IP-based backhaul? The short answer is: to keep up with this sharp increase in traffic volume while lowering transmission cost per bit. With each successive generation of radio technology, over-the-air rates have increased dramatically, and with them the range of available end-user applications. HSPA (3G), and soon HSPA+ and 4G are opening the door to mobile broadband services that generate unprecedented volumes of data, exceeding the capabilities of the traditional networks that were designed to carry voice data.

### IP/MPLS SCENARIOS

Given the broad mix of technologies and architectures used by mobile carriers, there are numerous migration scenarios. Below, we cover three scenarios and their corresponding migration strategies:

#### SCENARIO : MPLS OVER NEW AND LEGACY TRANSPORT

Migrating the Radio Access Network (RAN) to packet-switched technology is one way that mobile operators increase network flexibility and reduce operating costs. Operators generally prefer to do it gradually, to avoid having to "forklift" their existing backhaul infrastructure. At the same time, they must protect the quality of their voice services, which still generate higher revenues than the data services despite the reverse ratio in traffic volumes.

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**SCENARIO 2 : GSM (ABIS/ATER) OVER IP**

Some operators migrate their backhaul to IP not only to accommodate high 3G data rates, but also to lower backhaul costs. This is the motivation of mobile operators who migrate their GSM backhaul to packet-switched solutions. With the rapid introduction of Ethernet leased lines and packet-switched infrastructure, the transport cost of packet-switched traffic has become more attractive, especially when the transport provider is a sister or parent company.

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**SCENARIO 3 : CARRIER ETHERNET**

Mobile operators often want to share the resources of a parent/sister company that has wireline network assets. This can produce significant savings because it eliminates the need to build and maintain two separate networks in parallel. Moreover, recently installed radio elements (NodeB/RNC) have native Ethernet switching capabilities that allow them to merge with the wireline networks that have already migrated to Ethernet.

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