



Quality of Service (QoS)

- Quality of Service is an integrated part of Carrier Ethernet
- The purchased bandwidth is always available, i.e. "100% Quality of Service"
- Traffic forms are separated at physical or logical level
- Ensure QoS within mixed traffic forms such as IP telephony, ERP, backup, software up-load etc.
- No need for co-ordination of IP addresses with external parties
- Works together with all Carrier Ethernet products



When a network connection is used for different traffic forms at the same time, e.g. IP Telephony, Web browsing and Enterprise Resource Planning (ERP) applications, it is advantageous to be able to share one communication channel between the applications, and at the same time make sure that IP Telephony and the ERP application do not get blocked by e.g. a file download running on the internet connection or a software upload to the user's pc.

GlobalConnect's Carrier Ethernet services combine simplicity and user-friendliness with advanced Quality of Service (QoS) capabilities.

100% Quality of Service is standard

All Carrier Ethernet products from GlobalConnect provide top level QoS as default. This is possible by deploying a non-overbooked backbone based on state-of-the-art Ethernet equipment, non-blocking and operating at line speed. This ensures no bottlenecks in the network, and establishes the conditions necessary to provide a service level which is close to the theoretically best possible.

This means that a 50 Mbit/s Ethernet Private Line provides 50 Mbit/s effective speed at all times, and showing best-in-class figures of delay, jitter and packet loss.

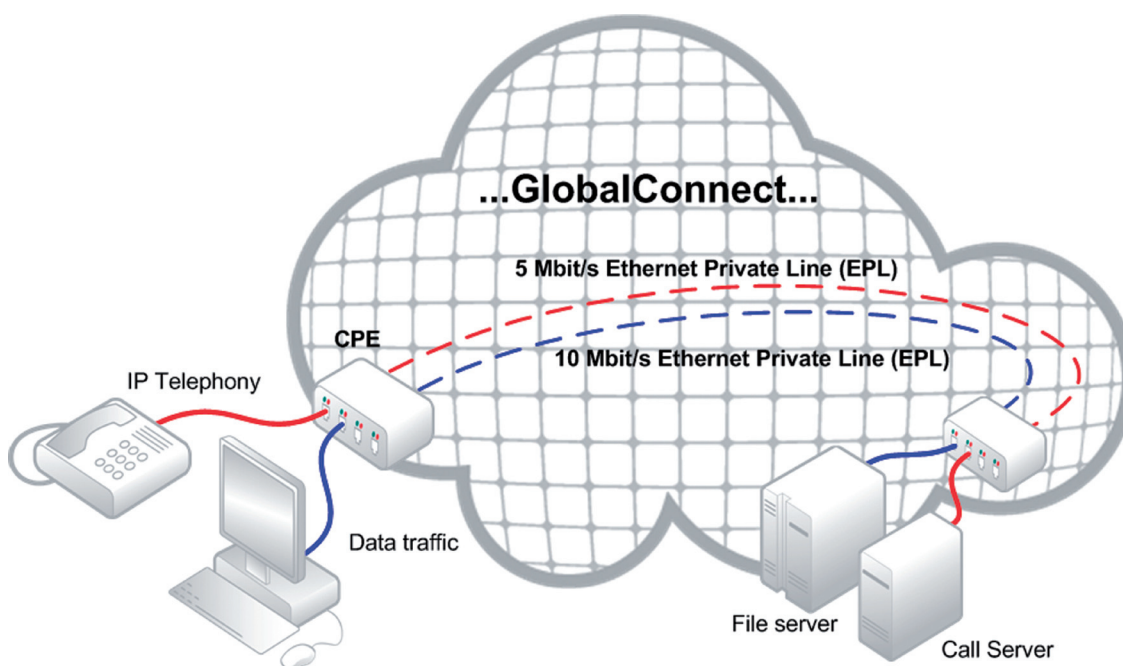


Figure 1: Distinguishing traffic class by physical port

With Carrier Ethernet, it is always possible to establish a number of independent Ethernet Private Lines or Private LANs, which are accessed via separate Ethernet ports at the Customer Premises Equipment supplied by GlobalConnect. This can be used to manage the traffic quality, simply by sending different kinds of traffic via different ports at the CPE.

Sending traffic via separate circuits

Since the traffic quality in each Private Line or Private LAN is the highest possible, each traffic form is only limited by the speed chosen on each Ethernet Port. As an example, IP Telephony can be carried in a separate Private LAN between various locations, e.g. with a 2 Mbit/s speed at each port. The traffic is separated at physical port level, and no other traffic will interfere with the speech traffic, thus ensuring the quality (see figure 1).

Handling different traffic classes

When handling different traffic classes, it is necessary to indicate to the network what traffic class is being received at a given port. This can be done in two ways:

1. Distinguishing traffic class by physical port
2. Distinguishing traffic class by the value of the DSCP-field in the IP header

The port-based traffic separation method is well suited to situations, where the various traffic classes are generated in physical separate equipment. One example is IP telephony, which is often handled in stand alone IP phones and stand alone servers (see figure 1).

However, in some cases it may be difficult to send different traffic forms via separate physical ports. In such cases it is advantageous to send all the traffic to one port, and then let the network distribute bandwidth between the applications. This is done by indicating traffic type using the DSCP-field in the IP header (part of the concept known as DiffServ). This only requires that the application software is capable of setting the DSCP-field to the agreed values for various traffic classes (see figure 2).

Basic specifications for Carrier Ethernet:

Delay:	Max 10 msec
Packet loss:	Max 0,01%
Jitter:	Max 1 msec

How is it implemented?

GlobalConnect’s transmission services are based on a fibre backbone with extremely high capacity. On main stretches, Dense Wave Division Multiplexing (DWDM) provides a capacity per fibre pair of up to 40 times 10 Gbit/s. On top of this, a non-overbooked Carrier Class Ethernet switching network is deployed, capable of decoding QoS related information at the Ethernet level as well as the IP level.

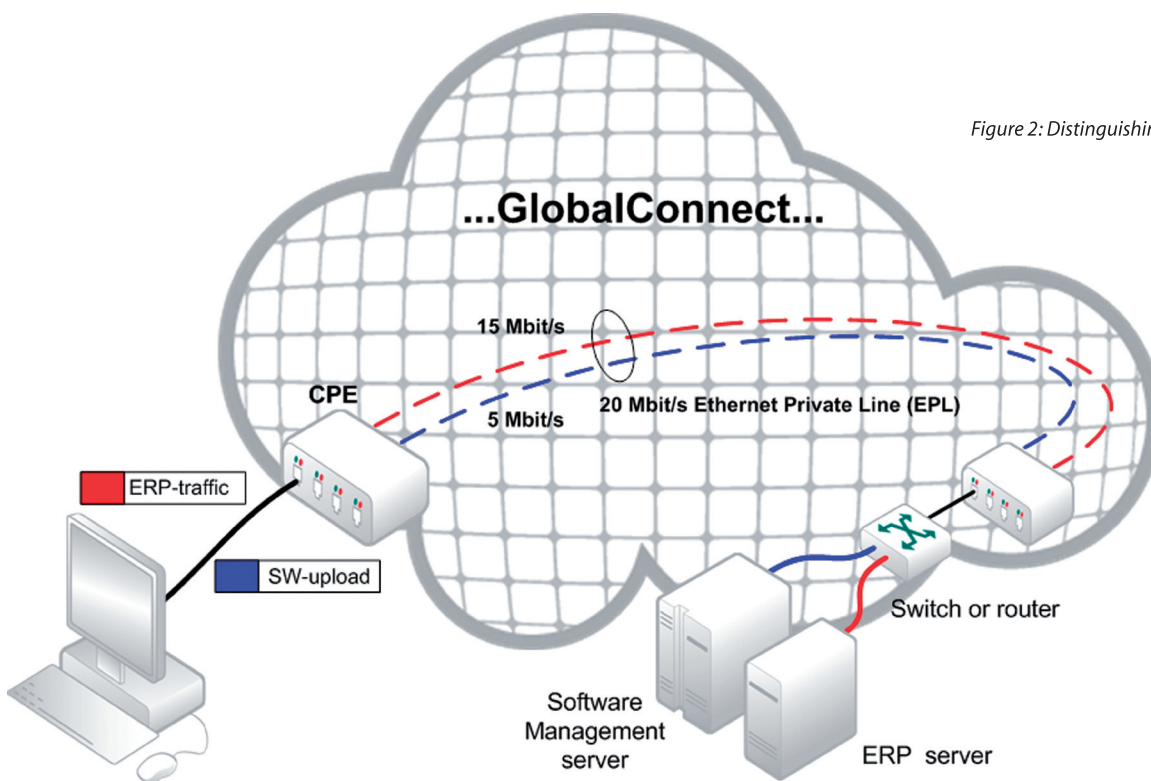


Figure 2: Distinguishing traffic class by DSCP header