

## **FUTURE SOLUTIONS FOR TBIT/S ETHERNET**

Chairs: Daniel J. Blumenthal, University of California, Santa Barbara, USA; Leif K. Oxenløwe, Technical University of Denmark, Denmark

### **Workshop 14**

Sunday, 18 September, 2011

14:30 - 18:00

Room Le Saleve

### **Abstract**

Data Centre services have constituted themselves as the fastest growing part of the Internet today, resulting in a 7% CO2 emission growth rate per year. There is therefore a more and more evident strong need for developing new technologies that will enable higher bandwidths at lower energy consumption.

Ethernet data links running at 10 Gbit/s, so called 10GbE, is becoming common in Data Centres, and there will soon be a need for links with much higher aggregate bandwidth, approaching Tbit/s. This coming generation of high-capacity links will also be needed to accommodate for telecom backbone networks, cloud computing services, wireless backhaul, supercomputing, video networks and many other applications.

To embrace the future needs we need to address the challenges now, and explore possible routes leading to viable solutions for Tbit/s transmission of Ethernet data for future power efficient data centres. We will possibly need to design new network structures optimally taking advantage of new physical layer technologies, we will certainly need to develop new hardware and new switching techniques and components and be open-minded about which technologies and materials to consider in order to achieve the highest capacity-to-power ratio. We will also need to make new standards, new signaling methods, new test equipment, new cabling and connectors and generally embrace new power reduction approaches.

This workshop will address the future challenges for terabit per second Ethernet, by gathering the following experts and outstanding researchers, who will come and shed light on their parts of the puzzle. The Workshop will address challenges ranging from the physical materials and devices over sub-systems / advanced systems including packet switching and multiplexing technologies to network planning and Data Centre requirements and urgent needs.

### **Presentations:**

#### **On Silicon Photonics for Terabit Communications**

*John Bowers, University of California Santa Barbara, USA, Director Institute for Energy Efficiency, Kavli Professor*

#### **Photonic integration for high spectral density Tb/s solutions**

*Frank Peters, University College Cork, Ireland (and Tyndall National Institute), Head of Integrated Photonics Group*

#### **On ultra-high bit rates on serial Tbaud data pulses using coherent modulation formats**

*Carsten Schmidt-Langhorst, Fraunhofer Heinrich Hertz Institute HHI, Germany, Senior Scientist, Project Manager, Submarine & Core Systems Group, Department of Photonic Networks and Systems*

#### **On ultra-high bit rates obtainable with OFDM based on a single pulse source and passive FFT-based receiver**

*Juerg Leuthold, Karlsruhe Institute of Technology, Germany, Inst. of Photonics & Quantum Electronics and -Institute of Microstructure Technology, Head of Institute*

#### **On packet-switching of ultra-high bit rate data packets**

*Harm Dorren, the COBRA Institute, Technical University of Eindhoven, The Netherlands, Director of COBRA*

#### **On network perspectives for TbE considering ultra-fast serial data signals and other multiplexing technologies**

*Lars Dittmann, DTU Fotonik, Technical University of Denmark, Group Leader and Research Cluster Head, Networks Technology and Service Platforms Group and the Communication Technology Research Cluster*

**On the topic of towards terabit transmission for intra data warehouse communications**

*Bikash Koley, Google, Technical Lead, Network Architecture and Capacity Planning Sr. Network Architect, Network Architecture and Capacity Planning*

**What are the pushes and pulls for 400G and 1TB Ethernet**

*Kapil Shrikhande, Sr. Principal Engineer in the CTO Office at Force10 Networks, Force10 representative in IEEE standards activities*

**400 Gbit/s is for Engineers and 1 Tbit/s is for Dreamers**

*Christopher R. Cole, Finisar Corp., Director Transceiver Engineering, USA*

**Final panel discussion with all speakers and audience.**