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NEW BOOK: Third Networks and Services

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This new reference provides a comprehensive understanding of current and future networking technologies. It offers insight into building end-to-end virtualized, cloud-based, and non-virtualized networks. Moreover, the book discusses services with Carrier Ethernet, Provider Backbone Transport (PBT), Multiprotocol Label Switching – Transport Profile (MPLS-TP), Virtual Private LAN Service (VPLS), and virtualized components. This resource includes use cases and explores the new Carrier Ethernet Network (CEN) specifications of the Metro Ethernet Forum (MEF), services, and applications. While providing a look into lifecycle service orchestration (LSO), virtualization, and cloud series, this book highlights the pros and cons of these technologies for service providers and enterprise network owners.

[1] <http://us.artechhouse.com/Third-Networks-and-Services-P1861.aspx>

ITU kicks off project G.mgfast

Earlier this year, a new project, G.mgfast (Multi-Gigabit FAST), has been started at the International

Telecommunications Union (ITU). The new project addresses functionality beyond G.fast, such as the exploitation of spectrum beyond 212 MHz over twisted pair and coax (e.g. up to 424 or 848 MHz); and full duplex operation through echo cancellation. The project targets aggregate data rates of 5 to 10 Gbps over a single twisted pair or coax link [1].

To a large extent, the project builds further on principles demonstrated by Nokia Bell Labs [2]. With a hardware proof-of-concept platform, 10 Gbps has been shown over a single copper pair using Full Duplex transmission. Multi-gigabit data transfer remains feasible over typical drop lengths from front yard to customer premises equipment of up to 130 m.

G.mgfast will make Fiber-to-the-Frontage and Fiber-to-the-Basement deployments highly competitive, while avoiding many of the hurdles accompanying a traditional FTTH roll-out. As such, G.mgfast will help accelerate a worldwide roll-out of fiber networks and services.

[1] F. Van der Putten, Rapporteur ITU-T Q4/SG15, 'Overview of ITU-T SG15 Q4 xDSL and G.(mg)fast,' presented at Ultrafast Broadband Seminar, The Hague, June, 2017.

[2] W. Coomans, et al., 'XG-FAST: The 5th Generation Broadband', IEEE Communications Magazine, Dec. 2015.

MIMO Equalization for Multi-Gbit/s Access Nodes Affected by Manufacturing Tolerances

Multiple-input multiple-output (MIMO) equalization at the transmitter and/or receiver has been shown to enable multi-Gbit/s communication over low-cost parallel electrical interconnects. Such solutions are especially attractive for applications where the device cost is of primary concern, while the requirements for delivering high throughputs increase exponentially with every generation of equipment, as is the case for access node hardware. Because of the high operating frequencies, the transfer functions of the interconnects become highly susceptible to manufacturing tolerances, implying that the equalization filters must be adjusted to the specific channel realization, to achieve optimal performance. To reduce the implementation complexity, a MIMO transceiver scheme is proposed where (part of) the equalizers depend on the channel statistics rather than the actual channel realization. More specifically, fixed MIMO linear pre-equalization (which avoids the need for feeding back the channel state information to the transmitter) is combined with either fixed or adjustable MIMO decision-feedback equalization (DFE). For a specific interconnect operating at 75 Gbit/s per line and a 26 dB signal-to-noise ratio, it is shown that the resulting bit error rate does not exceed 10^{-12} for tolerances up to 10.5% (fixed DFE) and 17.7% (adjustable DFE) of the nominal line width.

[1] L. Jacobs, J. Bailleul, P. Manfredi, M. Guenach, D. Vande Ginste, and M. Moeneclaey, 'MIMO Equalization for Multi-Gbit/s Access Nodes Affected by Manufacturing Tolerances,' proceedings of IEEE Globecom, Singapore, December 2017.

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