IEEE 1914 NGFI (XHAUL): building the transport foundation for 5G

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Introduction to IEEE 1914 WG – NGFI (XHAUL)

• NGFI: Next Generation Fronthaul Interface
• Open standards effort approved by IEEE Feb. 2016
• Target: efficient & scalable fronthaul transport for 5G
• Website: http://sites.ieee.org/sagroups-1914/
• Extensive awareness with ~160 subscribers
• ~20 voting members, ~90 members
IEEE 1914 WG

P1914.1
- Standard for Packet-based Fronthaul Transport Networks
  - Use cases and scenarios
  - Architecture
  - Requirements
  - Functional split analysis
    ✓ Functional split analysis
    ✗ CU_DU functional split definition

P1914.3 (ex P1904.3)
- Standard for Radio Over Ethernet Encapsulations and Mappings (RoE)
  - IQ (CPRI/native RoE) encapsulations and mapping
  - IQ in time and frequency domain

Remote Radio Head (DU) → Fronthaul (e.g., Eth) → Baseband Processing (CU)
NGFI fundamentals

High scalability
• Enables C-RAN/V-RAN deployments
• Traffic dependent

High resource utilization
• On air interface: Support of cooperative functions: CoMP, MIMO
• On transport interface: Support for statistical multiplexing

High flexibility
• Radio interface technological neutrality
• Enabling SW upgrades of mobile nodes

Low costs
• Leveraging mature standard transport solutions, e.g. Ethernet-based, IEEE 1588, SyncE, TSN
• Unified management and control solution, common networking protocols, and universal network elements
Standardization and industry solutions for 4.5G/5G base stations and XHAUL

Functional splits

- Interfaces and transport protocols
  - F1 (3GPP)
  - FAPI/nFAPI (SCF)
  - eCPRIv1.0 (CPRI)
  - RoE (IEEE 1914.3)
  - CPRI

- Transport networks
  - TSN, Eth, OTN
  - Wireless & Wired

- Architecture, requirements
  - IEEE 1914.1
  - IEEE 802.1 TSN, MEF, CPRI, ITU-T
Where does 1914 fit?

1914.3 structure aware mapping of legacy CPRI to/from individually switchable component flows in an eNB for Ethernet-based eNBs.

1914.3 structure agnostic mapping and aggregation of legacy CPRI flows over Ethernet transport network to non-ethernet eNBs.

1914.3 native RoE mapping utilizing e.g., Option 7.x splits and transport over Ethernet transport network.

1914.1 Network requirements
- Transport CoS – latency is a key factor
- Throughput (informative)
- Transport network slicing
- Jitter
- Synchronization
- OAM
- Security

1914.1 Node requirements
- Latency
- Synchronization
- OAM
Thank you..