P802.1CM TIME-SENSITIVE NETWORKING FOR FRONTHAUL

OVERVIEW

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AGENDA

- Role of Fronthaul in 5G
- Fronthaul
- IEEE P802.1CM
  - Scope, goals
  - Collaboration with the Common Public Radio Interface (CPRI) Cooperation
  - Current status
- Summary

5G CONCEPTS AND PRINCIPLES

5G Radio Access

Spectrum Flexibility — Larger BW — Higher Frequencies

3 GHz 10 GHz 30 GHz 100 GHz

Multi-antenna technologies

Inter-Site Cooperation

5G Core functionality

Flexible deployment of network functions

Service enablers and optimizations

Utilize NFV and DN Network programmability

5G Use Cases

- Broadband everywhere
- Smart vehicles transport & Infrastruct.
- Media everywhere
- Critical control of remote devices
- Interaction human IoT

Management

- Orchestration
- Network management
- Analytics

Fixed access

Legacy RATs

Cloud Infrastructure

Network integrated compute and storage

5G Transport

Backhaul

Optical enablers

Aggregation

Fronthaul

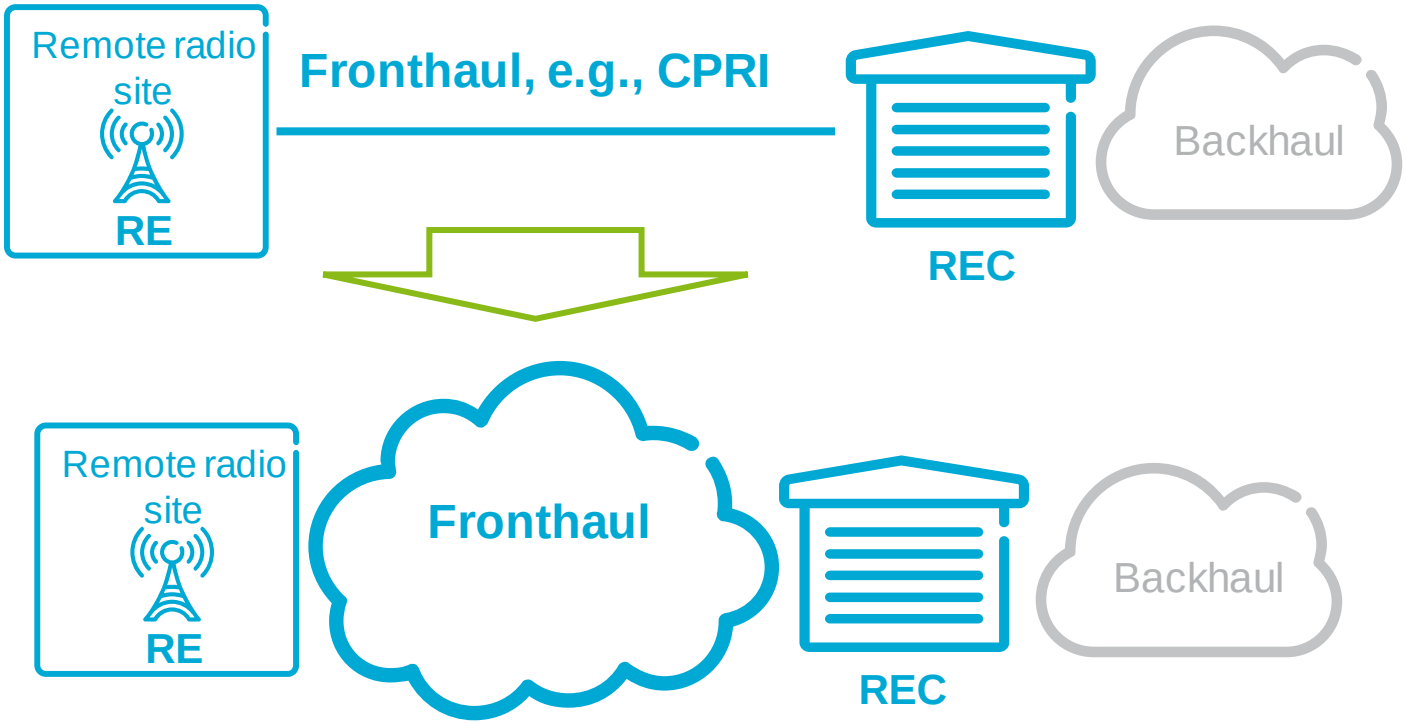
SDN

Network programmability

http://www.ericsson.com/res/docs/2015/5g-rev-c.pdf

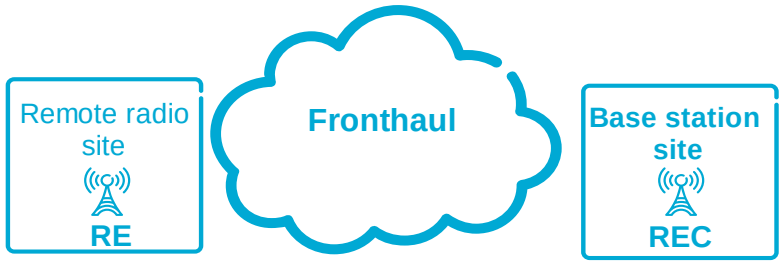
FRONTHAUL

- **Radio Base Station** is functionally split into **Radio Equipment (RE)** and **Radio Equipment Control (REC)**
- The **Common Public Radio Interface (CPRI)** is the most common radio interface for Fronthaul

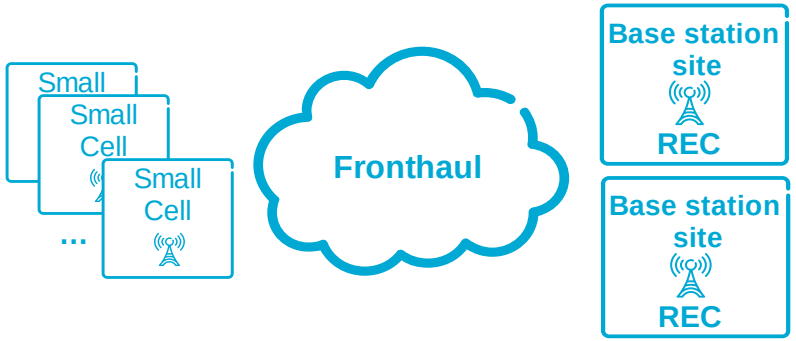


USE CASES, E.G.,

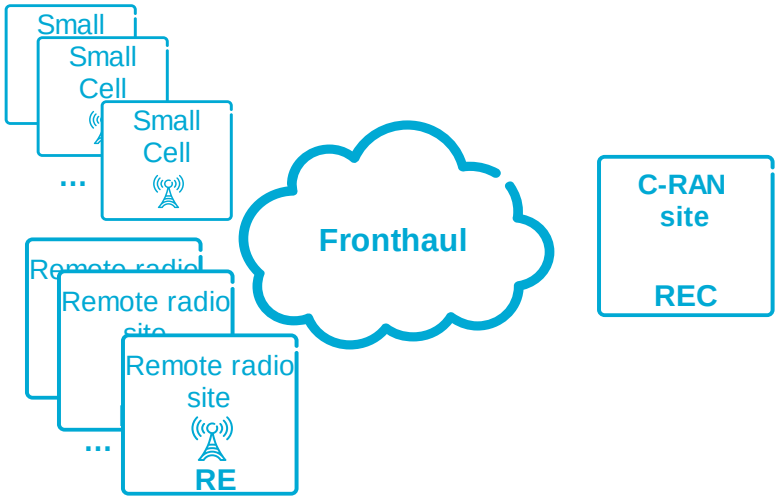
- Main-Remote



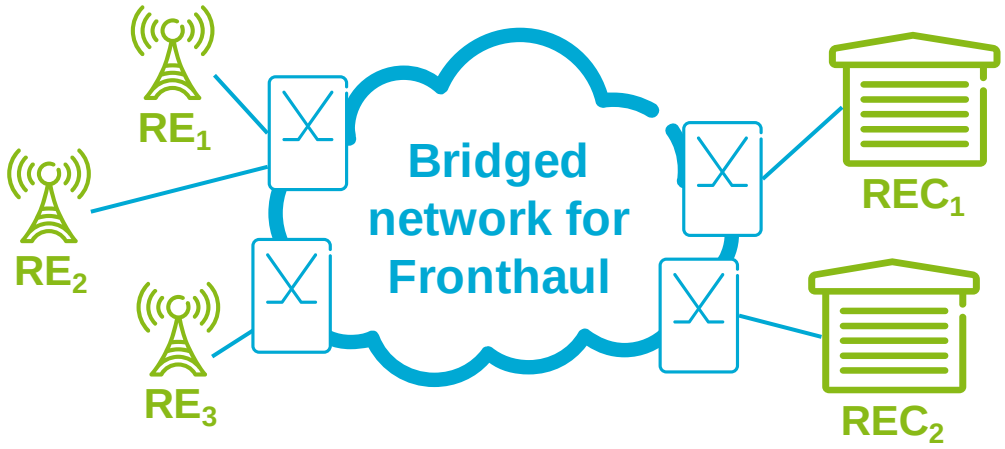
- Small Cells
  - dense Fronthaul network
  - indoor deployments too



- Centralized RAN (C-RAN)
  - extensive Fronthaul network
  - indoor deployments too



P802.1CM TSN FOR FRONTHAUL PROJECT



- Develop standard TSN profiles for Fronthaul in order to enable the transport of Fronthaul streams in a bridged network
- A Profile is a set of feature and option selections that specifies aspects of bridge and end station operation, and states the conformance requirements for support of a specific class of user applications
  - e.g. 802.1BA Audio Video Bridging Systems; also provides architecture

http://www.ieee802.org/1/pages/802.1cm.html

P802.1CM TSN FOR FRONTHAUL DOCUMENT

- Collects requirements for Fronthaul networks
  - CPRI functional decomposition requirements
  - The different CPRI information flows are supported separate from each other
  - CPRI “as is” over Ethernet is **NOT** in scope
  - Placeholder for further Fronthaul requirements
- Provides guidance for meeting Fronthaul requirements, which includes
  - Selects features, e.g. 802.1 TSN features, in order to build networks capable of transmitting Fronthaul streams, e.g., the requirements of the CPRI information flows
  - Describes how the selected features and components can be combined, configured and used in order to meet Fronthaul requirements

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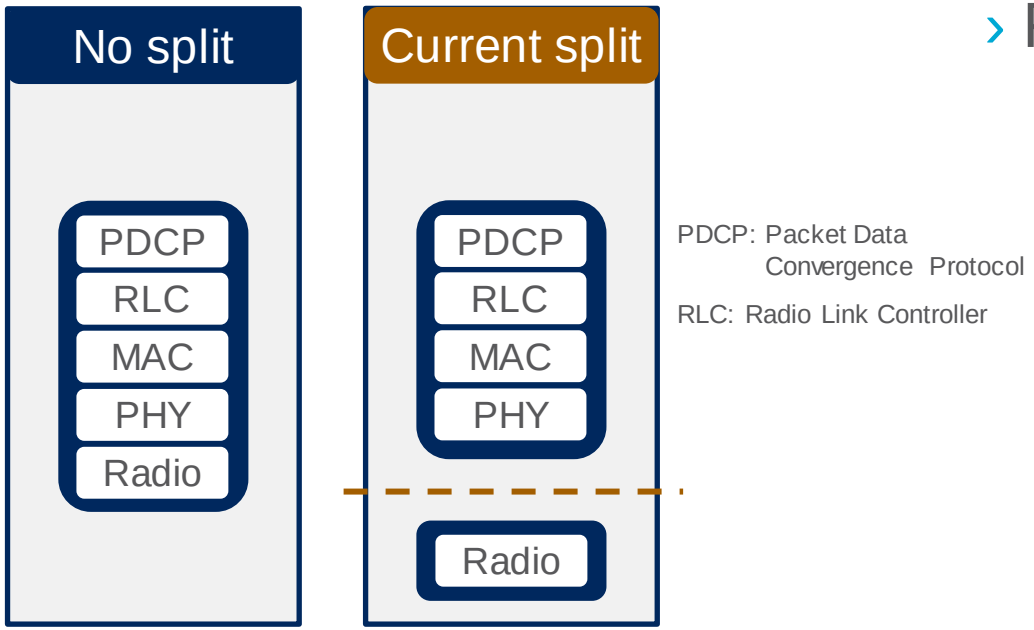
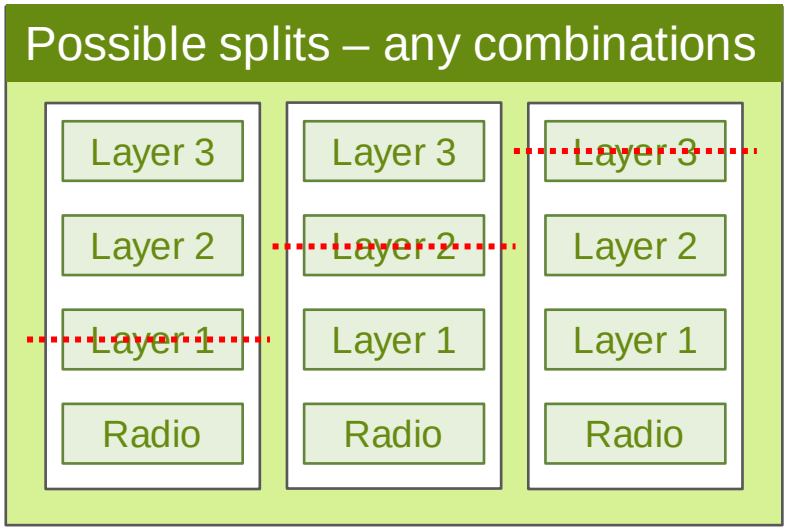
RADIO BASE STATION SPLIT

› Current focus of P802.1CM is the functional split specified by CPRI 7.0



› Further splits are possible



› It is in scope of 802.1CM to define profile(s) for further split(s)

P802.1CM CURRENT STATUS

- Collaboration with CPRI Cooperation
- Gathering requirements for CPRI information flows
  - IQ data (IQ: In-Phase and Quadrature modulation)
  - Control and Management (C&M)
  - Synchronization
- Evaluating TSN tools
  - Frame preemption [802.3br and 802.1Qbu]
  - Enhancements for Scheduled Traffic (time-gated queues) [802.1Qbv]
  - http://www.ieee802.org/1/files/public/docs2016/cm-farkas-intro-0316-v01.pdf
- Drafts capture progress

http://www.ieee802.org/1/pages/802.1cm.html

SUMMARY

- Current focus is the radio base station split specified by CPRI 7.0
- Profile(s) for further splits are also in scope of P802.1CM
- P802.1CM specifies packet transport for Fronthaul
  - Collaboration with CPRI Cooperation
  - Collects Fronthaul requirements
  - Specifies architecture for packet transport of Fronthaul, i.e., Ethernet-based
- Fronthaul is part of 5G transport

http://www.ieee802.org/1/pages/802.1cm.html