

# IEEE 1914.1 Wikipedia entry

[IEEE 1914.1](#) is a Standard for Packet-based Fronthaul Transport Networks developed under [IEEE 1914](#) Next Generation Fronthaul Interface – NGFI (xhaul) Working Group. It standardizes architecture and requirements for mobile [fronthaul](#) network – spanning between cell sites and centralized baseband locations in Cloud Radio Access Network ([C-RAN](#)) or Virtualized RAN.

## Introduction

Base station architecture evolved from all-in-one base stations, through baseband units and RRH, to [C-RAN](#) or V-RAN architectures where equipment located at the cell sites (RU or RU+DU) connects via fronthaul network to centralized baseband locations (CU).

On the road towards future 5G networks, it is clear that an efficient transport network is necessary and traditional fronthaul solutions are not suitable for 5G evolution. The current mobile networks are comprised of multiple separate network domains. This creates serious challenges for network operators, such as low scalability, inflexible management and control solutions, slow and difficult upgrades, poor resource utilization, and high cost.

IEEE 1914.1 project was established to facilitate the implementation of key 5G technologies especially Cloud-RAN and Massive multiple-input-multiple-output (MIMO) from fronthaul networking perspective, and describe the required networking architecture to enable migration to 5G and C-RAN/V-RAN solutions.

## Goals

The Fronthaul Packet Transport standard enables the implementation of critical 5G technologies, such as massive Multiple-Input-Multiple-Output (massive MIMO), Coordinated Multi-Point (CoMP) transmission and reception, and scalable Centralized/Virtual Radio Access Network (C-RAN/V-RAN) functions.

This standard simplifies network design and operation, increases network flexibility and resource utilization, and lowers cost by leveraging existing, mature Ethernet-based solutions for vital functions, such as quality of service, synchronization, and data security.

The fronthaul architecture provides unified management and control solution, common networking protocols, and universal network elements, thus facilitating migration to future C-RAN/V-RAN mobile networks.

## Scope

This standard specifies:

- 1) Architecture for the transport of mobile fronthaul traffic (e.g., Ethernet-based), including deployment scenarios, user data traffic, and management and control plane traffic.

2) Requirements and definitions for the fronthaul networks, including data rates, timing and synchronization, network slicing, and quality of service.

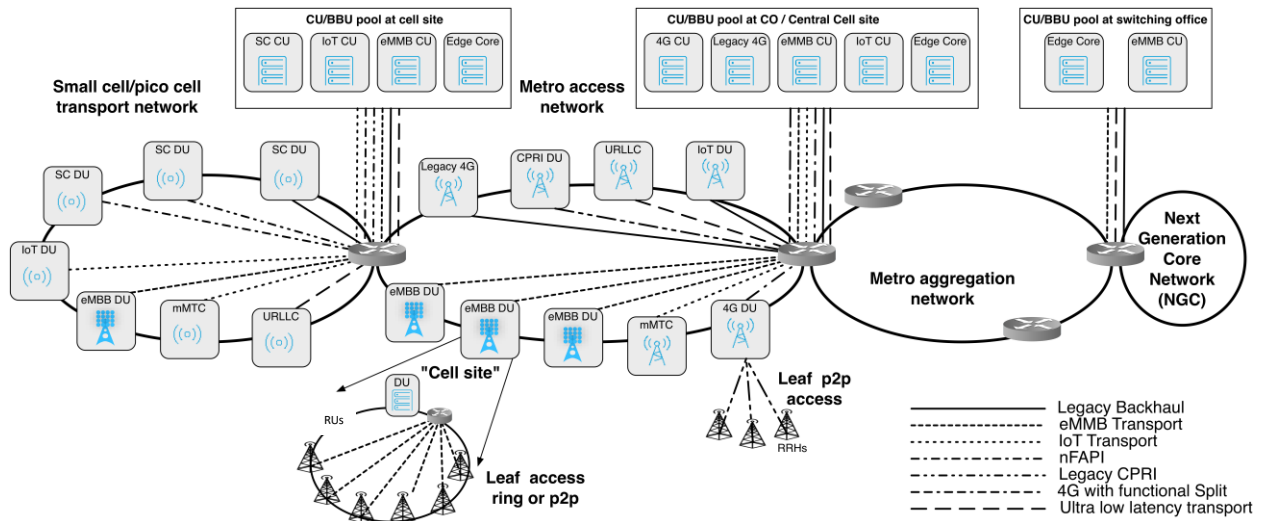


Figure 1 Reference high level network architecture and interfaces. Source: IEEE 1914.1 D0.6

The standard also analyzes functional partitioning schemes between Remote Radio Units (RRUs) and Base-Band Units (BBUs) that improve fronthaul link efficiency and interoperability on the transport level, and that facilitate the realization of cooperative radio functions, such as massive Multiple-Input-Multiple-Output (massive MIMO) operational modes, Coordinated Multi-Point (CoMP) transmission and reception.

## Members

Working Group consists of major mobile network operators like China Mobile, AT&T and Verizon, telecom vendors like Nokia, NEC, MTI, Microsemi, SM Optics, Comcores, Anritsu, Intel, CommScope, Fujitsu, as well as academia. Complete list of members is available [here](#).

## Timeline

Key milestones are:

- Project Authorization Request (PAR) Date: 14-Oct-2015
- PAR Approval Date: 05-Feb-2016
- PAR Expiration Date: 31-Dec-2020

Draft 1.0 is targeted for 2018.

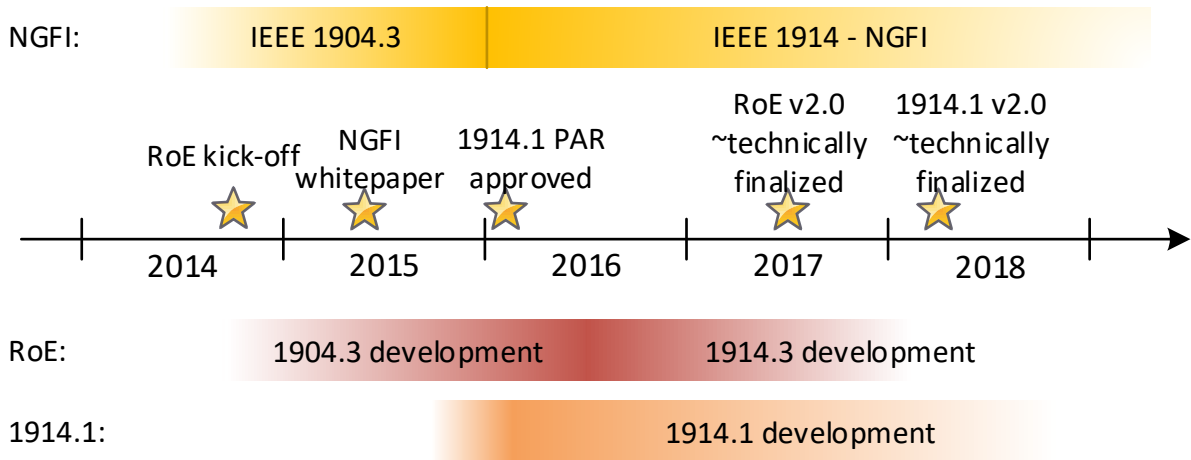


Figure 2 NGFI timeline. Source: A. Checko "[IEEE 1914 NGFI \(xhaul\): efficient and scalable fronthaul transport for 5G](#)", IEEE VTC Fall 2017