ORI Overview

Richard Maiden
Altera Corporation
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ORI Activity

Vendor Code	Organization Name
ALU	Alcatel-Lucent
FBM	Focubeam GmbH
FJT	Fujitsu
FSL	Freescale Semiconductor SA
HWT	Huawei Technologies Co. Ltd
KAT	Kathrein-Werke KG
UBD	Ubidyne GmbH
ZTE	ZTE Corporation

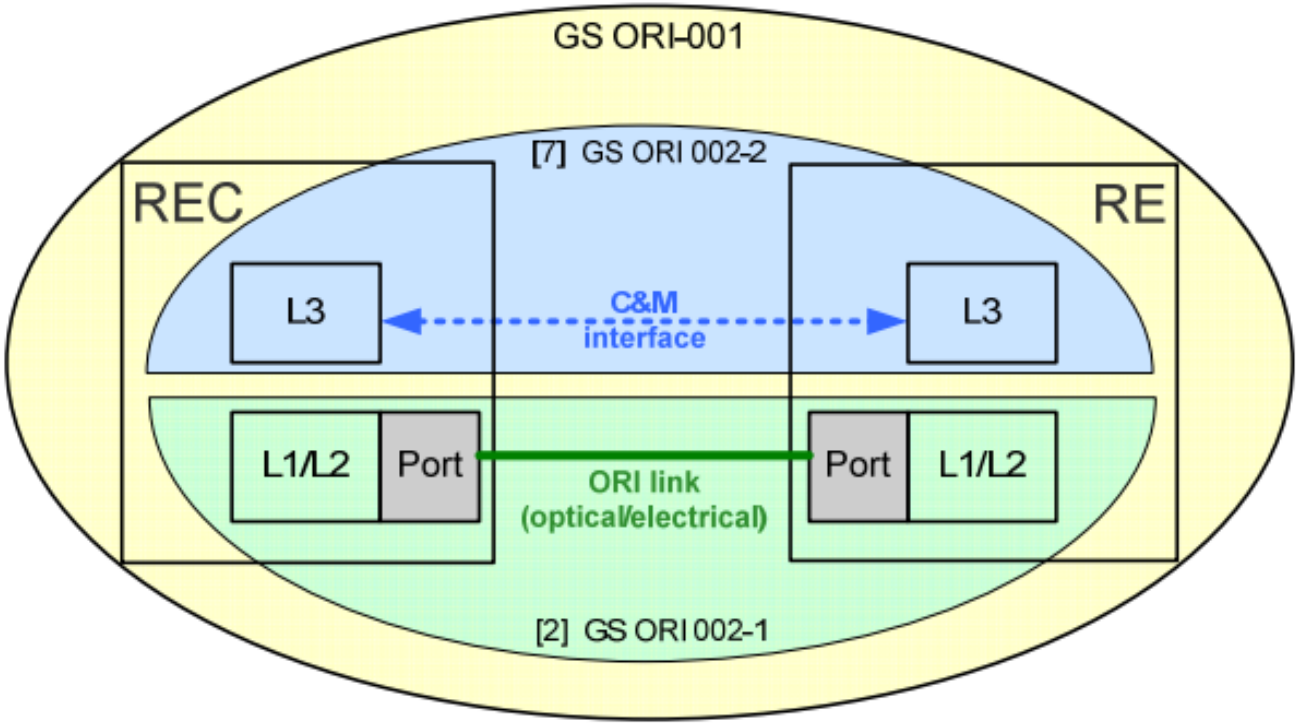
- The ORI interface is built on top of the interface already defined by the CPRI (Common Public Radio Interface) group. However, options are removed and functions are added with the objective of making the interface fully interoperable.

- ORI Release 1 provides support for UMTS, LTE and LTE-Advanced technologies.
- ORI Release 2 adds support for multi-hop topologies and RRU chaining, as well as 9.83 Gbit/s line bit rate, and is based upon CPRI version 4.2.
- ORI Release 3 extends support to GSM technology and is based on CPRI version 5.0.
- ORI Release 4, published in October 2014, is based on CPRI version 6.0. Release 4 adds IQ data compression for LTE and supports a line bit rate up to 10.14 Gbit/s.

http://www.etsi.org/technologies-clusters/technologies/ori

ORI Document Structure

- ORI-001 – Requirements
- ORI-002-1 – Interface Specification (Lower Layers)
- ORI-002-2 – Interface Specification (Control & Management)



Requirements ORI-001

- CPRI Specification is the baseline for lower layers
  - Restricted options
  - Interoperability between products from different vendors
- Topology
  - Single Hop & Multi-hop
  - Start, chain, tree & ring
- Standards
  - UTRA-FDD, E-UTRA-FDD & TDD & GSM
- C&M Procedures (Management)
  - Device, software, configuration, resource state, fault, performance & AISG
  - Fast C&M (Ethernet only – no HDLC)
- Compression
  - Maximum 3% EVM degradation over 10ms
  - Minimum 50% compression
  - Maximum Latency 100uS (compress & decompress) – 20uS preferred

Lower Layers – ORI 002-1

- Control Plane
  - CPRI Reserved words
  - Vendor specific area
  - ORI reserved area
  - Fast C&M
- User Plane
  - Limited mapping options compared to CPRI
  - E-UTRA : Method 3, 15bits I&Q, Vrms defined for UL & DL
  - UTRA-FDD : Option 2, 7/15bits I&Q on UL/DL, Vrms defined for UL & DL, UL AGC mechanism defined
  - GSM: Method 1, (14/12 mantisa/exponent) & 14bits I&Q on UL/DL, sampling rates for UL/DL defined.
- Synchronization and Timing
  - Adds GSM frame timing
- Start-up Sequence

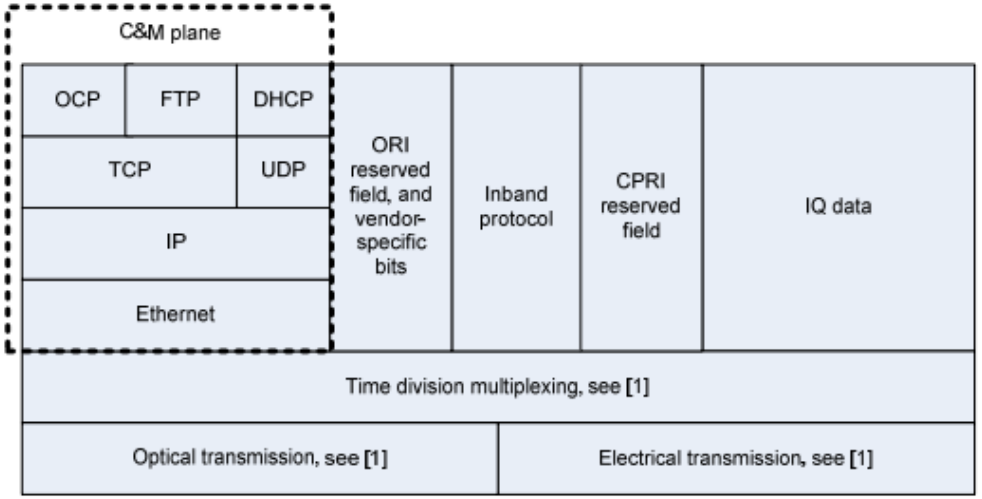
C&M – ORI 002-2

- This is where the bulk of content is…

- RE Resource model & functions
- OCP format & encoding structure
- OCP elementary functions & messages
- Specified object types/parameters & faults
- RE management procedures

Introduction ORI 002-2

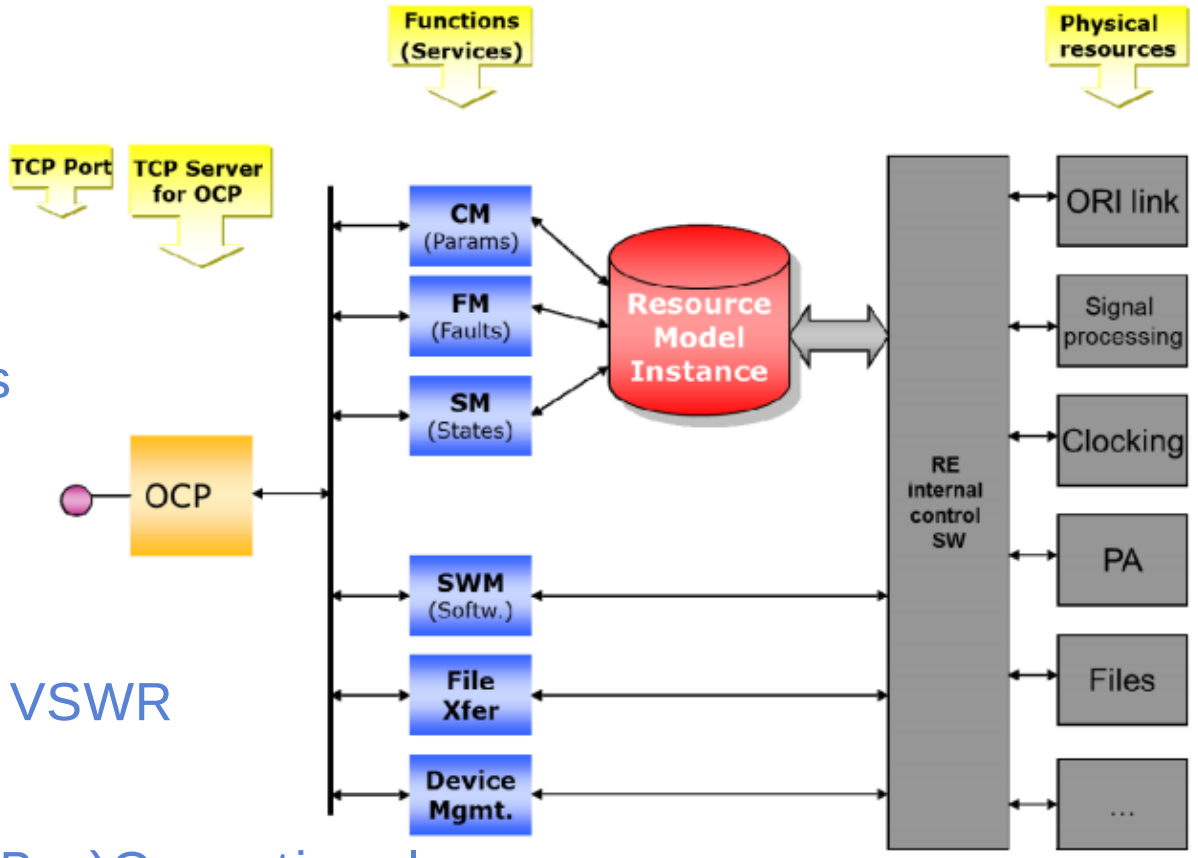
- Protocol Stack
  - RE has Universally unique MAC
- OCP (**O**RI **C**&M **P**rotocol)
  - Link establishment
  - DHCP for IP address
  - TCP/IP for OCP
  - FTP Passive Services
  - AISG transport



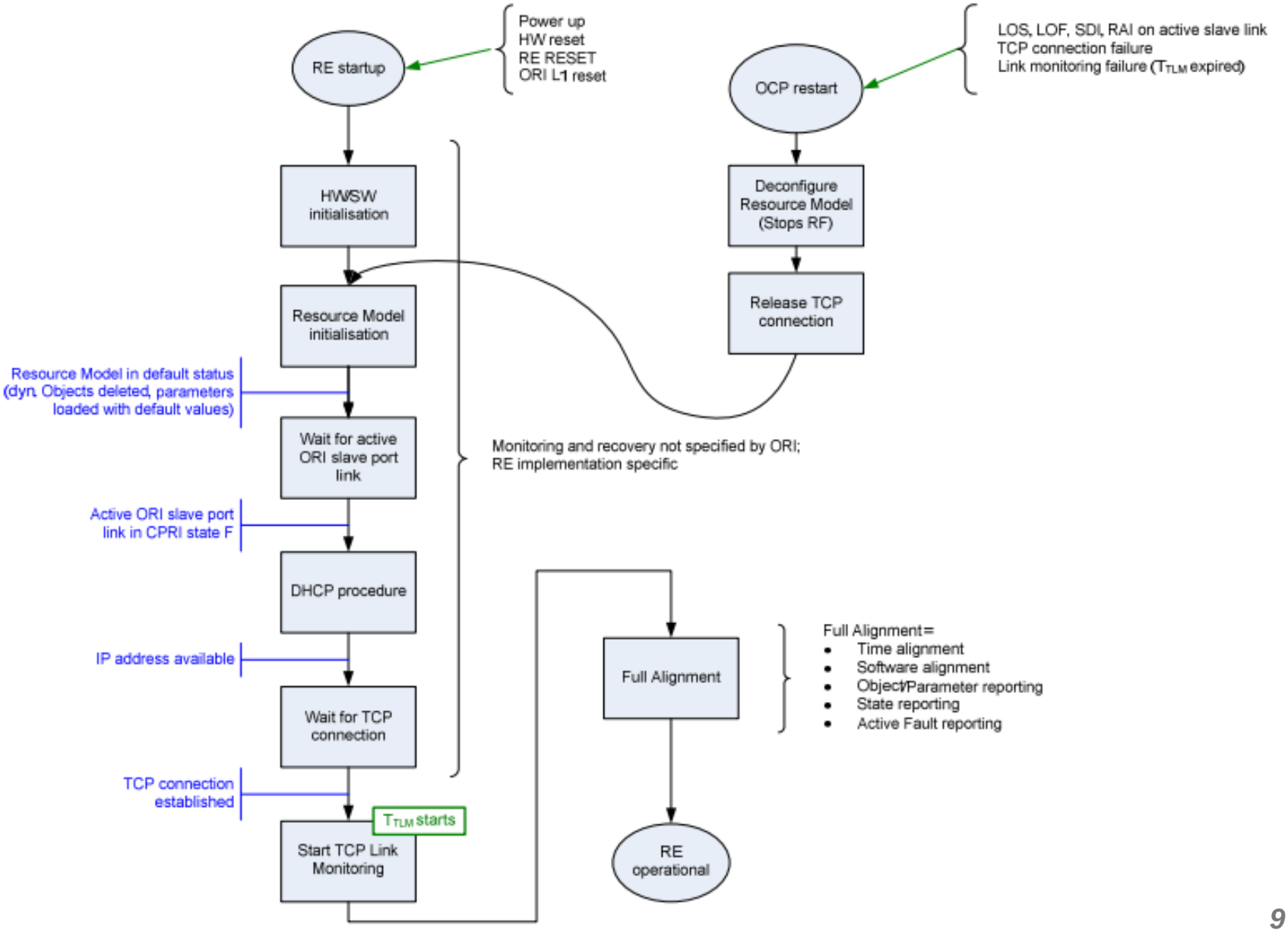
- Vendor specific extensions
  - Shall not remove override or redefine ORI specified parts
  - Shall be tolerated without failure

Resource Model & Management Functions - ORI 002-2

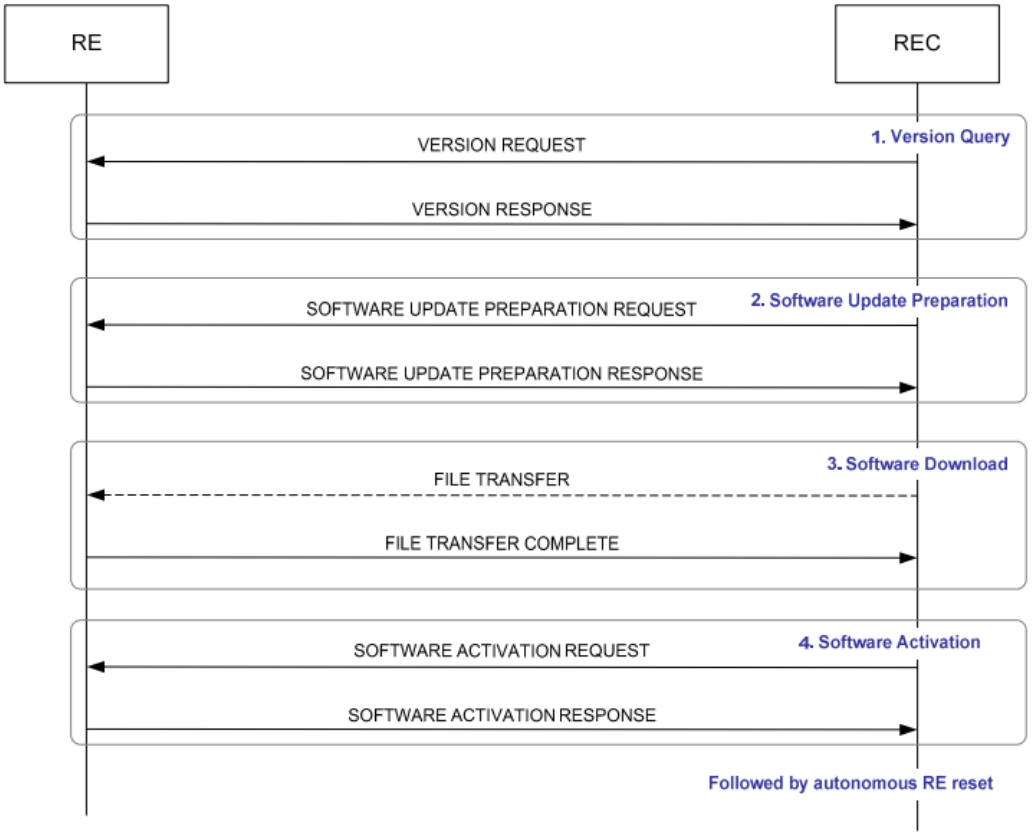
- Object types/parameters/states/fault management & logging
- XML encoded
- Parameters
  - Antenna ports
  - Tx/Rx signal paths
  - IQ routing
- Faults
  - PSU, temperature
  - Signal level, gain, VSWR
- States
  - (Un)Locked, (Not/Pre)Operational
  - Degraded, Failed



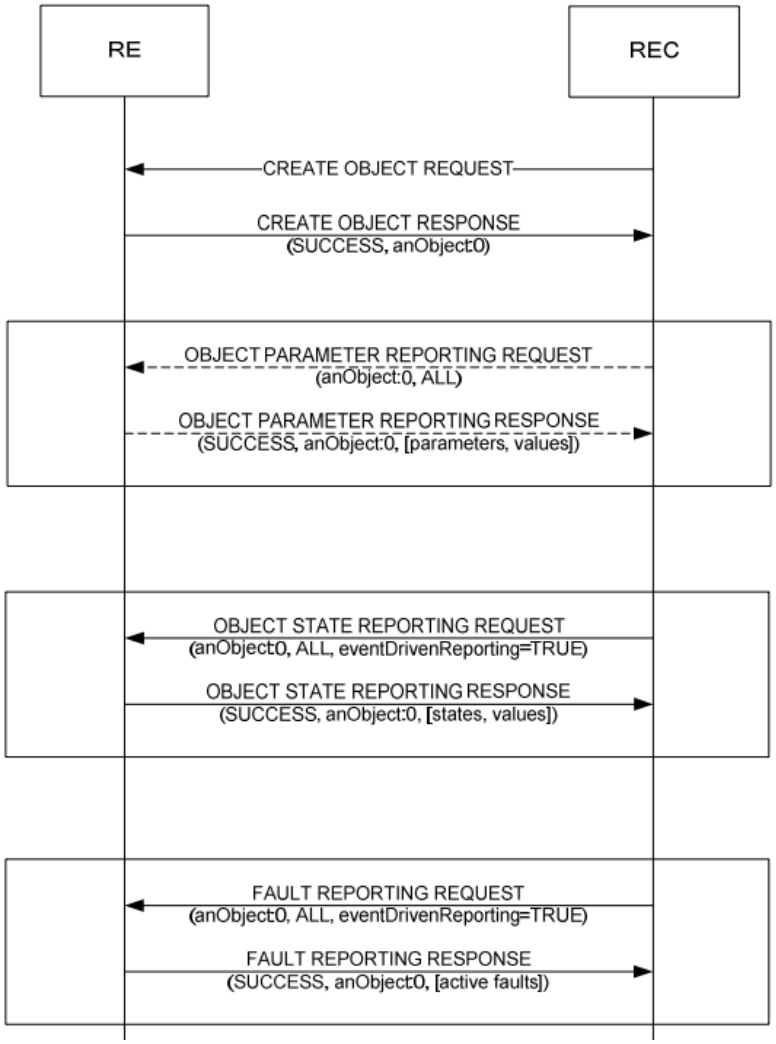
ORI layer establishment - ORI 002-2



Software Alignment

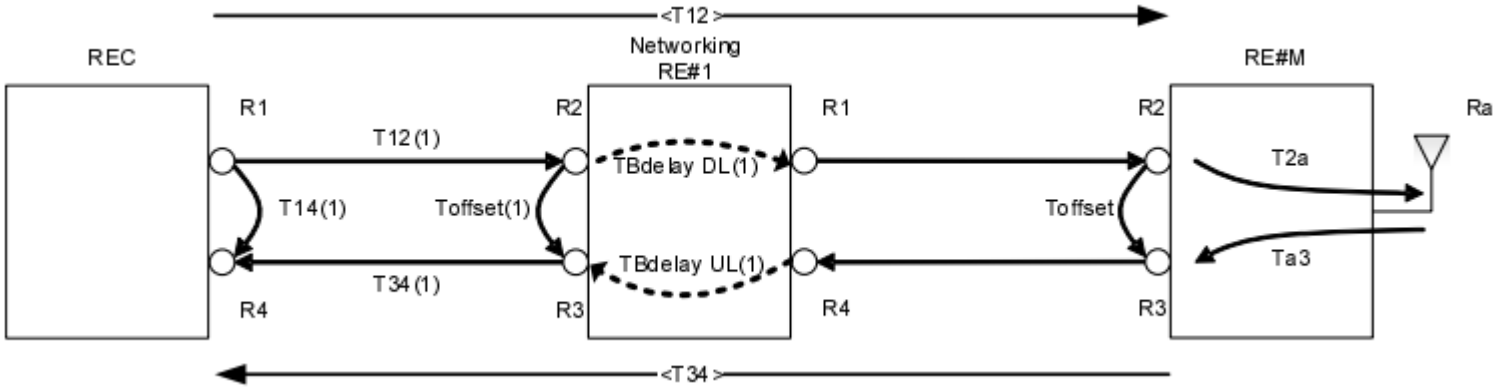


Object Alignment



Timing Alignment

- Delay calibration
  - Single & Multi-hop configurations



  - Calculation of delay calibration parameters
  - Procedure of delay calibration

Common Themes with IEEE1904.3TF

- Builds on CPRI (at least in some modes)
- More focused on the layer above CPRI physical layer
- Similar topologies, technologies

- Have thought through
  - Unknown resource model/capabilities/parameters
  - Description mechanism (XML)
  - Alignment Procedures & Protocols
    - Link
    - Timing
    - Version
    - Etc.

Thank-you