P802.1CM OAM & SLA CONSIDERATIONS

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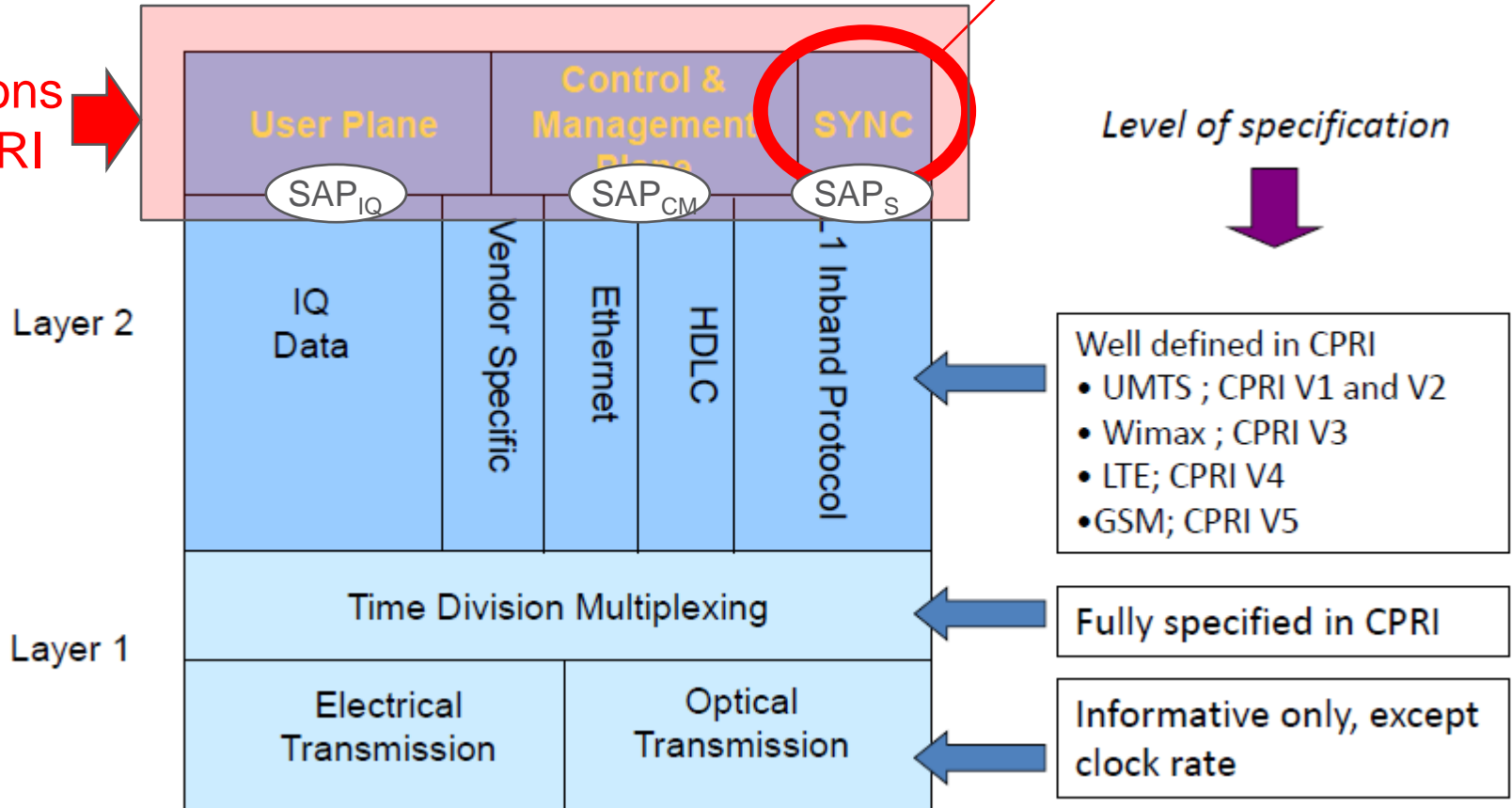
ERICSSON

CPRI
BUILT IN OAM (& SLA)

Sync is embedded

Applications over CPRI

User Plane

Control & Management Plane

SYNC

SAP_{IQ} SAP_{CM} SAP_S

Level of specification

Layer 2

IQ Data

Vendor Specific

Ethernet

HDLC

L-1 Inband Protocol

Well defined in CPRI
- UMTS ; CPRI V1 and V2
- Wimax ; CPRI V3
- LTE; CPRI V4
- GSM; CPRI V5

Layer 1

Time Division Multiplexing

Fully specified in CPRI

Electrical Transmission

Optical Transmission

Informative only, except clock rate

CPRI
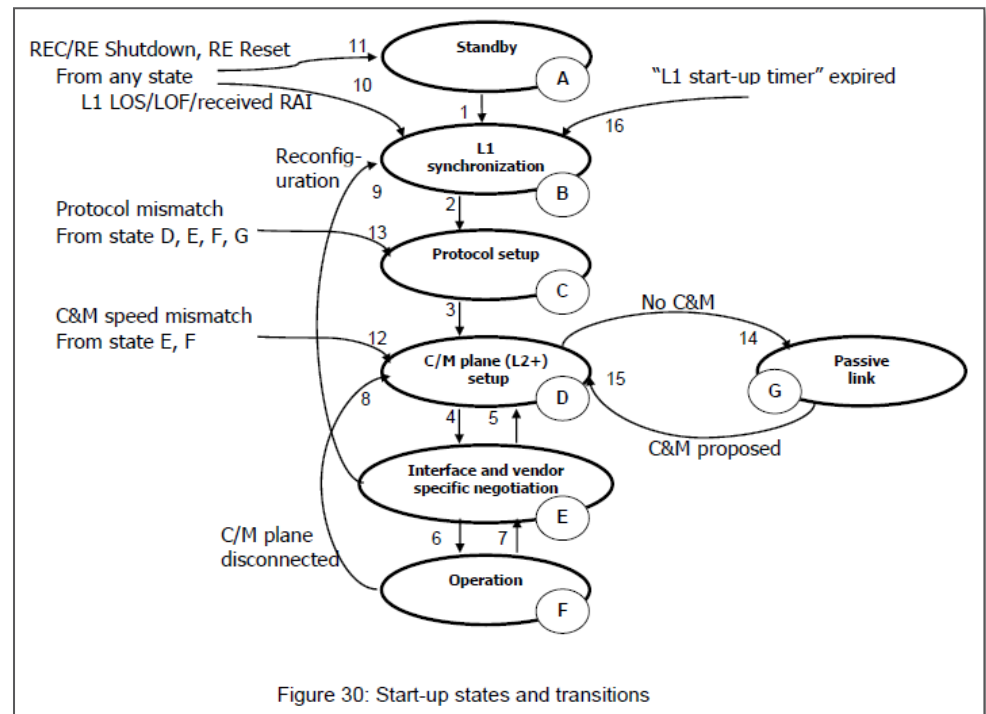# EMBEDDED TOOLS

› Link Maintenance of Physical Layer
  – Loss of Signal (LOS)
  – Loss of Frame (LOF)
  – Remote Alarm Indication (RAI)
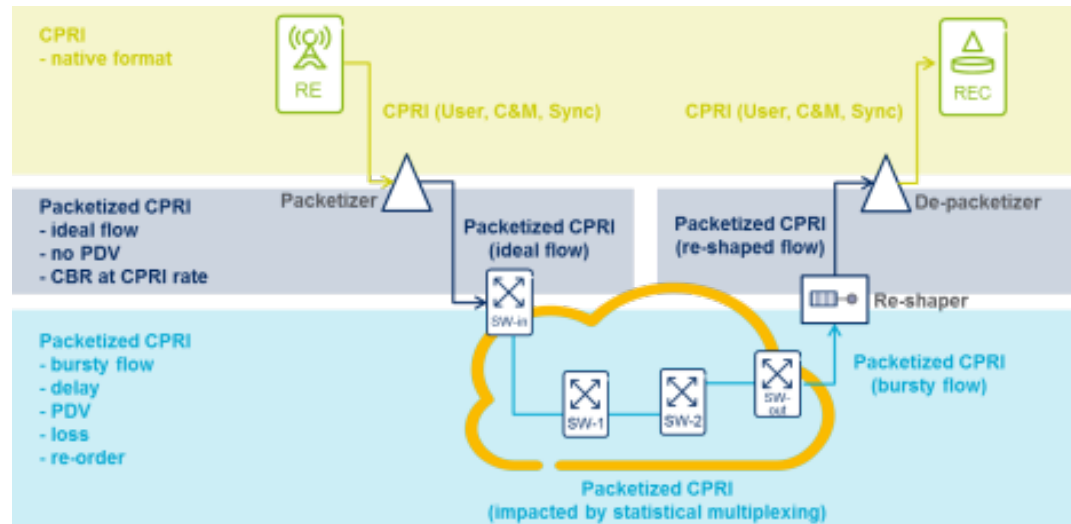 – SAP Defect Indication (SDI)

› Quality of Service
  – Maximum Delay
    (Maximum absolute round trip delay
    per link excluding cable length)
  – Bit Error Ratio U-plane
  – Bit Error Ratio C&M-plane
  – CPRI Link Quality Monitoring

Figure 30: Start-up states and transitions

PACKETIZED CPRI
OAM

› Packetized CPRI
has different and new requirements

  – How to ensure proper operation?

    › Find problems (troubleshooting)

    › Prove SLA, check functions

    › Etc.
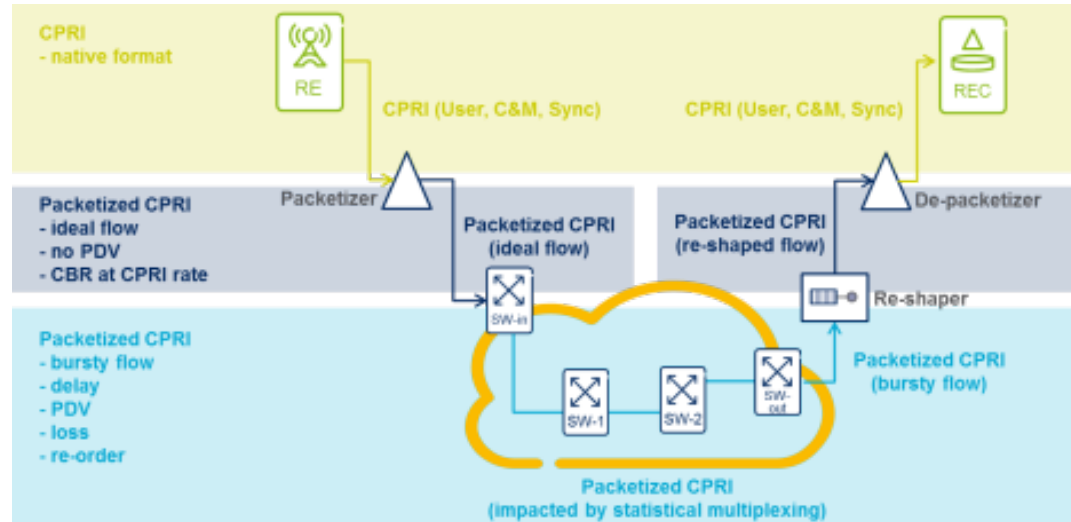
› OAM functions:

  – FM: 802.1ag (+ Y.1731)

    › Traditional FM tools are not time critical (CC, LT, LB) from execution perspective

    › What about CC frequency? (current maximum is 3 1/3 msec)

      ‑ Usual SLA (e.g. availability) measurements are at different time scale (sec-min)

      ‑ Can be used for triggering e.g. protection functions

  – PM: 802.1ag + Y.1731

    › Delay, Loss measurements (frequency of measurement is not time critical (every sec))

    › Timestamp format: resolution = nsec

PACKETIZED CPRI
OAM

› Packetized CPRI
has different and new requirements
  − How to ensure proper operation?
    › Find problems (troubleshooting)
    › Prove SLA, check functions
    › Etc.

› Open questions
  − Delay measurement: One-way vs. Round trip is preferred?
  − Are the current OAM tools good enough for fronthaul scenarios?
  − Need for any special OAM function (due to CPRI nature)?

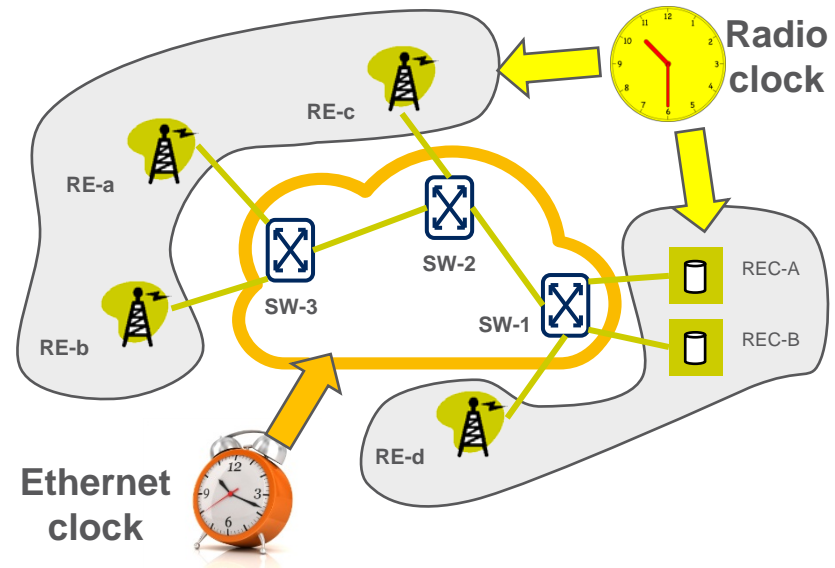 − Reset of packetized CPRI link (to be defined)?

  − What OAM / SLA are needed for redundancy solution?

SYNC AS A SERVICE
OAM & SLA

› Sync inside transport domain:
  – Required by TSN tools (e.g. Time gated queuing)
  – Required for OAM tools (e.g. Delay measurement)

› Sync as a Service:
  – Sync for the radio domain
  – Transport network provides Sync for RE and REC
  – Accuracy: defined by CPRI Cooperation's recent contribution

› Some open questions:
  – How to define SLA for Sync?

Radio clock

RE-c

RE-a

SW-2

SW-3

SW-1

RE-b

REC-A

REC-B

RE-d

Ethernet clock