

# 802.1CB improvements



## FRER

### Improvements on R-Tag (... and its usage)

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# Topics



- State-of-the-art
- Proposal
  - Improvements of R-Tag
- Use-case examples

# R-Tag as per 802.1CB-2017

## State-of-the-art



### R-Tag history:

- 802.1CB-2017 defines the Redundancy Tag
  - Used by Sequence encode/decode function
  - R-Tag EtherType: F1-C1
  - Note: Ethernet frame may contain multiple R-Tags
- Purpose:
  - add information to frames required by FRER functions (low-order 16 bits from “sequence\_number” subparameter)
- Reserved fields:
  - This field shall be transmitted with all zeros and shall be ignored on receipt.
  - It is intended that future revisions of this standard can use the most-significant bits of the Reserved field for sub-typing purposes, as described in 9.2.1 of IEEE Std 802-2014.

Table 7-1—R-TAG EtherType

Purpose	EtherType
Redundancy tag (R-TAG)	F1-C1

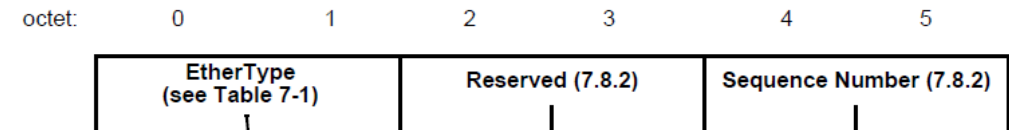


Figure 7-4—R-TAG format

# Moving towards a generalized R-Tag Usage by extended FRER (and other) functions



## Scenario: Extending FRER functions

- 9.2.1 (and 9.2.3) of IEEE Std 802-2014

- Describes sub-typing: sub-type + protocol version

- Example: FRER related enhancements

- (n)-bit: sub-type field (e.g., FRER = 0)

- Defines for what purposes the R-Tag is used

- (16-n)-bit: protocol version (+ Flags) (e.g., Seq.Num.Space.ID, Flags, ...)

- Purpose specific further information

- Note: to be backward compatible, "reserved = all zero" means FRER as per IEEE 802.1CB-2017

- Note: Other than FRER purposes may use the Sequence Number field as well

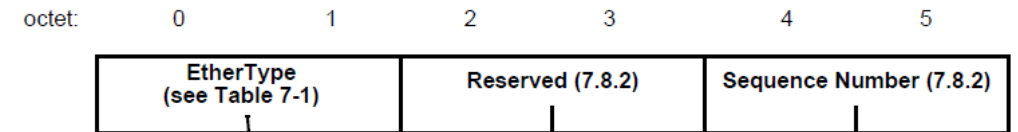


Figure 7-4—R-TAG format

# Moving towards a generalized R-Tag Usage by extended FRER functions



- FRER related improvements proposed (so far):
  - <https://www.ieee802.org/1/files/public/docs2019/new-varga-FRER-improvements-0719-v01.pdf>
  - <https://www.ieee802.org/1/files/public/docs2020/new-varga-FRER-seamless-reset-0320-v02.pdf>
  - They require
    - Improved FRER functions
    - Some new indicators traveling with the frames
- Example of using the reserved field
  - (n)-bit: sub-type field (FRER = "0")
  - (16-n)-bit: protocol version (+ Flags)
    - FRER protocol version: "1" (Seamless-FRER)
    - Flags: "SeqResetFlag", "InitSeqFlag"

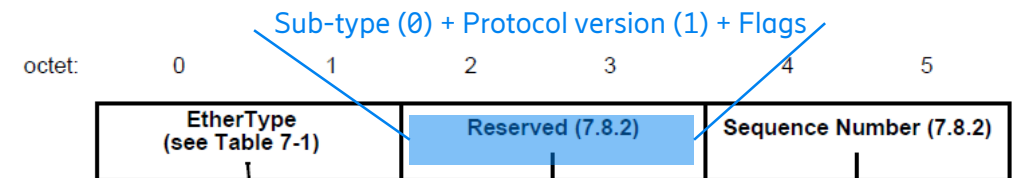


Figure 7-4—R-TAG format

# Moving towards a generalized R-Tag Usage by other functions



- R-Tag could be used for other purposes as well
  - Timing related information / “Timestamping”
  - Extended QoS information (e.g., advanced drop precedence)
  - Etc.

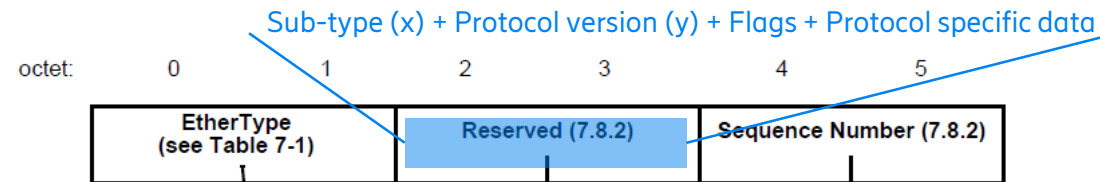


Figure 7-4—R-TAG format

- Note: to be backward compatible, “reserved field = all zero” means FRER as per IEEE 802.1CB-2017
- Note: Other than FRER purposes may use the Sequence Number field as well



# 802.1CB impact

## What needs to be changed/added ...

- When/If 802.1CB-2017 updated
  - then allow usage of reserved field in R-Tag
  - define backward compatible sub-type / protocol version values (i.e., all zeros for FRER as per 802.1CB-2017)



# Questions ...