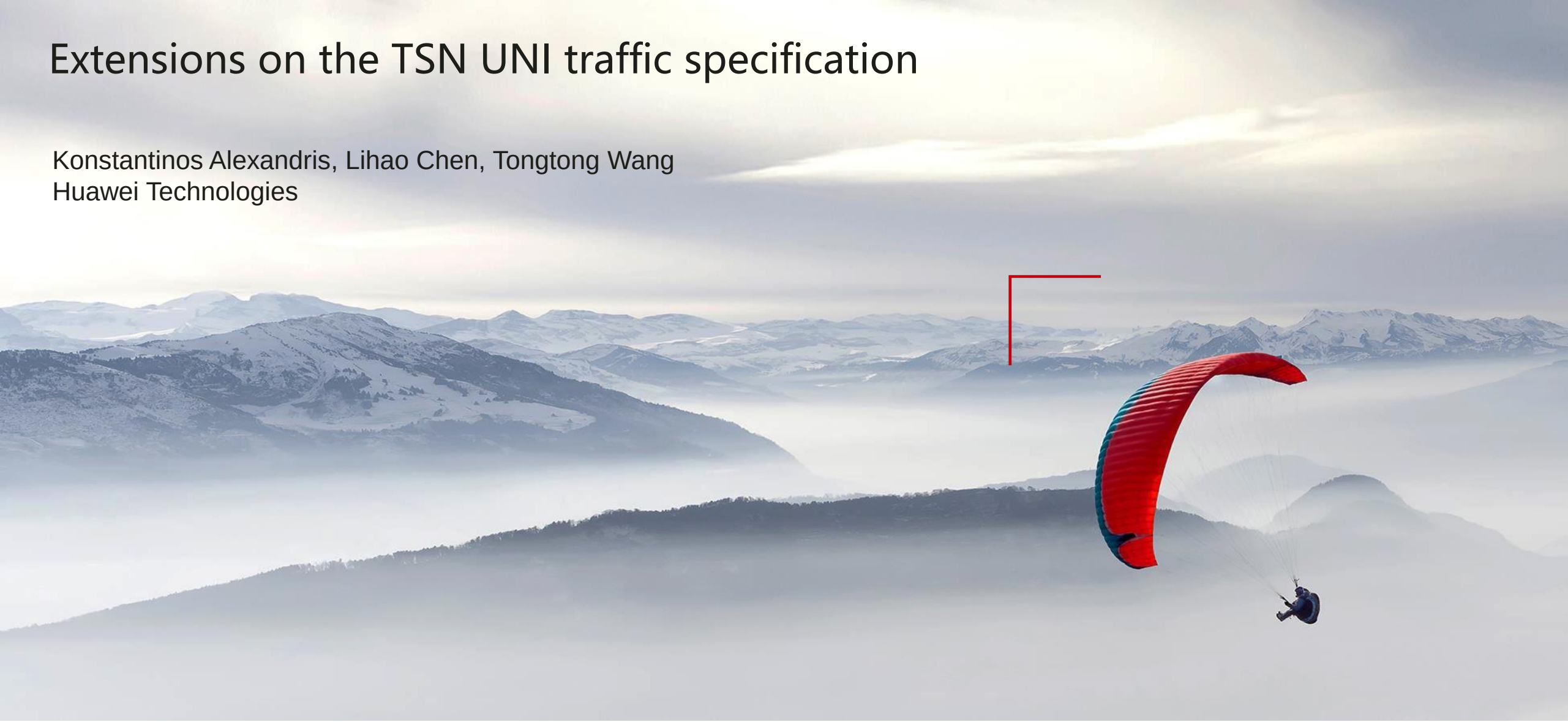
Extensions on the TSN UNI traffic specification

Konstantinos Alexandris, Lihao Chen, Tongtong Wang
Huawei Technologies



IEEE 802.1, 2023 Nendica Meeting, 15-06-23

HUAWEI

Objective

- TSN UNI TSpec to handle TokenBucket traffic model [1,2]
  - Need for a standard way to receive stream requirements
  - Only basic and TimeAware Tspec elements are included in 802.1Q-2022
- Enable TSN UNI to support the TokenBucket traffic model in conjunction with centralized configuration [*]
  - End-station/CUC needs to send the TokenBucket Tspec via TSN UNI
  - Current projects and standards do not define specific YANG models
  - Centralized configuration involves CNC assistance support
  - To be complementary to RAP (P802.1Qdd) that uses distributed configuration

[*] Both fully centralized and centralized network/distributed user configuration models

[1] https://standards.ieee.org/ieee/802.1Q/10323/
[2] https://www.ieee802.org/1/files/public/docs2021/new-specht-onats-0921-v01.pdf

HUAWEI

Proposal (1/2)

Tspec definition is not **complete**: Addition of parameters for the TokenBucket model

Sub-clauses to be extended:

- **46.2.3.5:** Extension of the existing Tspec incorporating the relevant parameters (currently missing)

Table 46-10−TspecTokenBucket elements

Name	Data type	Reference
MaxFrameSize	uint16	46.2.3.5.3
MinFrameSize	uint16	46.2.3.5.8
CommittedInformationRate	uint64	46.2.3.5.9
CommittedBurstSize	uint32	46.2.3.5.10

- **46.2.3.5.8 - 10:** Explanatory text related to Table 46-10 parameters to be added (currently missing)

Proposal (2/2)

Existing YANG models do not support centralized configuration including the TokenBucket Tspec

Sub-clauses to be extended:

- **48.5.23:** Extension of the respective YANG schema tree related to the `ieee802-dot1q-tsn-config-uni` YANG module (currently missing)
  - `traffic-specification` [3]: To include TokenBucket TLV parameters [TokenBucket Tspec]
- **48.6.3:** Extension of the `ieee802-dot1q-tsn-types` YANG module (currently missing)
  - `container token-bucket`: To be added under `container traffic-specification` including the relevant parameters as `leaf` statement:

`min-frame-size, committed-information-rate, committed-burst-size`

[3] https://1.ieee802.org/tsn/802-1qdj/

HUAWEI

Extensions on TSN UNI YANG schema tree – Proposal #1

Updates on schema for the ieee802-dot1q-tsn-config-uni YANG module [*]

```
module: ieee802-dot1q-tsn-config-uni
                    :
      +--rw traffic-specification
      |  +--rw (tspec-options)
      |  |  +--: (tspec-option-1)
      |  |  |  +--rw interval
      |  |  |  |  +--rw numerator uint32
      |  |  |  |  +--rw denominator uint32
      |  |  |  +--rw max-frames-per-interval uint16
      |  |  |  +--rw time-aware!
      |  |  |     +--rw earliest-transmit-offset uint32
      |  |  |     +--rw latest-transmit-offset uint32
      |  |  |     +--rw jitter uint32
      |  |  +--: (tspec-option-2)
      |  |     +--rw token-bucket
      |  |        +--rw committed-information-rate uint64
      |  |        +--rw committed-burst-size uint32
      |  |        +--rw min-frame-size uint16
      |  +--rw max-frame-size uint16
      |  +--rw transmission-selection uint8
```

Tspec Option 1 “xor” 2

- Isolation of Tspec models (token bucket and others) in case of parameters dependency.
- What about introducing “choice” nodes in the respective YANG module ?
- The objective is to exclude any correlation while extending the existing YANG module.

[*] Similar changes apply to `ieee802-dot1q-tsn-types` YANG module.

Extensions on TSN UNI YANG schema tree – Proposal #2

Updates on schema for the ieee802-dot1q-tsn-config-uni YANG module

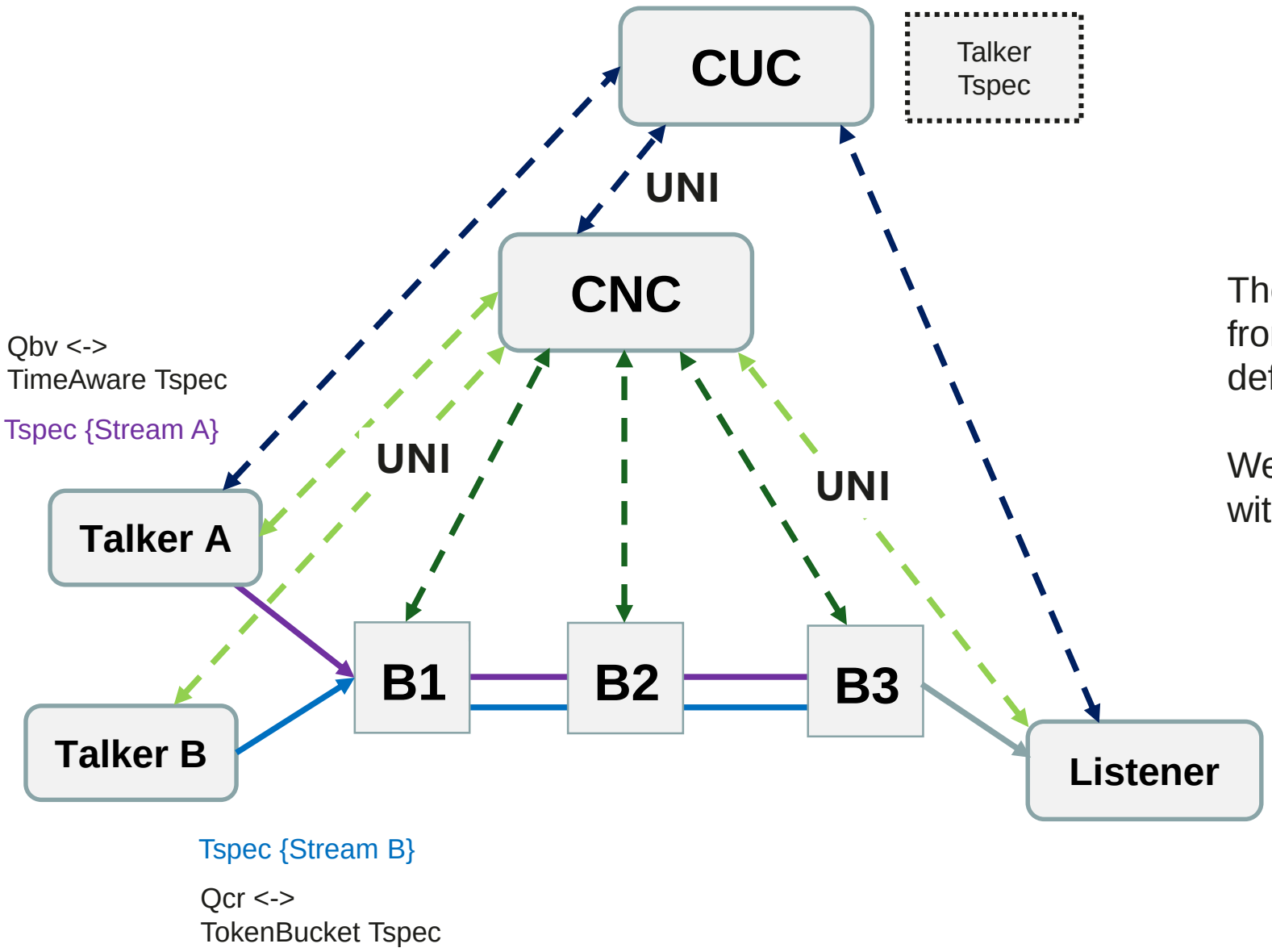
```
module: ieee802-dot1q-tsn-config-uni
                    :
     +--rw traffic-specification
     |  +--rw interval
     |  |  +--rw numerator uint32
     |  |  +--rw denominator uint32
     |  +--rw max-frames-per-interval uint16
     |  +--rw time-aware!
     |  |  +--rw earliest-transmit-offset uint32
     |  |  +--rw latest-transmit-offset uint32
     |  |  +--rw jitter uint32
     |  +--rw token-bucket!
     |  |  +--rw committed-information-rate uint64
     |  |  +--rw committed-burst-size uint32
     |  |  +--rw min-frame-size uint16
     |  +--rw max-frame-size uint16
     |  +--rw transmission-selection uint8
```

- Other way is to introduce the token bucket model as a “presence container” in the YANG module [4].
- Following that methodology, redundancy may be introduced.

Open discussion: What is the best way to implement it ?

[4] RFC 8340: YANG Tree Diagrams.

Configuration Model & Tspec



The way TimeAware Tspec is conveyed from user to CNC has already been defined.

We should follow the same methodology with TokenBucket Tspec.

Conclusion

Need to extend TSN UNI

1. Motion for new PAR development in 2023 July Plenary meeting.
2. Any questions ?

Thank you.