

Capability Models for Nodes and Dynamic Behavior of CNCs & CUCs

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Agenda

1. Need for end station and bridges capabilities model
2. Behavior of CNCs and CUCs (Dynamics)

Need for End Station and Bridges Capabilities Model

Motivation

- Nodes need not to support the same capabilities, e.g. some may not support: arbitrary time aware offset, constant IPG
- Knowing the capabilities of the end stations and bridge is a pre-requirement for consistent configuration of the domain
 - How can CNC plan streams if it doesn't know what capabilities are supported/ configured for each node in the stream path?
- Information needed both offline (engineering tool) and online (CNC)
- Available in a machine readable format

Motivation

Need

- Means to describe supported **relevant capabilities of each node** in the domain to allow for the **CNC to correctly plan streams**

Also previously addressed in <https://www.ieee802.org/1/files/public/docs2021/new-specht-dev-caps-and-limits-1121-v01.pdf>

Profiles

Capability/Limitation	IEEE 802.1 Stds References
Guaranteed maximum gate control list size	12.29.1.5 of IEEE Std 802.1Q-2018
Supported transmission selection algorithms	None
Guaranteed FDB capacity	None
Guaranteed frame buffer capacities	None
Guaranteed end station transmission performance (e.g., minimum frames sent back-to-back)	None

802.1 Profile Projects

Similar to the previous slide, with the following additions:

- Resolution is higher (e.g., different markets), which may mitigate the risk for oversizing to certain extent.
- Adding requirements for elements not standardized in a core Standard (e.g., buffer capacities) is an issue, because defining such elements is typically beyond the scope of profile projects and needs to be done in technical core Standards first.

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Unified Models

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Guaranteed maximum gate control list size	12.29.1.5 of IEEE Std 802.1Q-2018
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Guaranteed FDB capacity	None
Guaranteed frame buffer capacities	None
Guaranteed end station transmission performance (e.g., minimum frames sent back-to-back)	None

Unified Models for Device Capabilities and Resource Limits in core 802.1 Standards (e.g., IEEE Std 802.1Q)

More versatile, if available via management/YANG/MIB (CNC) and for offline engineering. However:

- Providing device capabilities and resource limitations may not always be desired. But providing these is already a requirement for certain application areas/markets, then ...
- ... finding **the right abstraction level** appears important:
 - Overpessimism/cuts in device capabilities and resource limitations can be assumed to be low in generic and detailed models, but higher complexity can be expected.
 - The opposite appears to be true for rather simple models.
 - One option is to go for generic and detailed models that allow reduction to simpler models when used.

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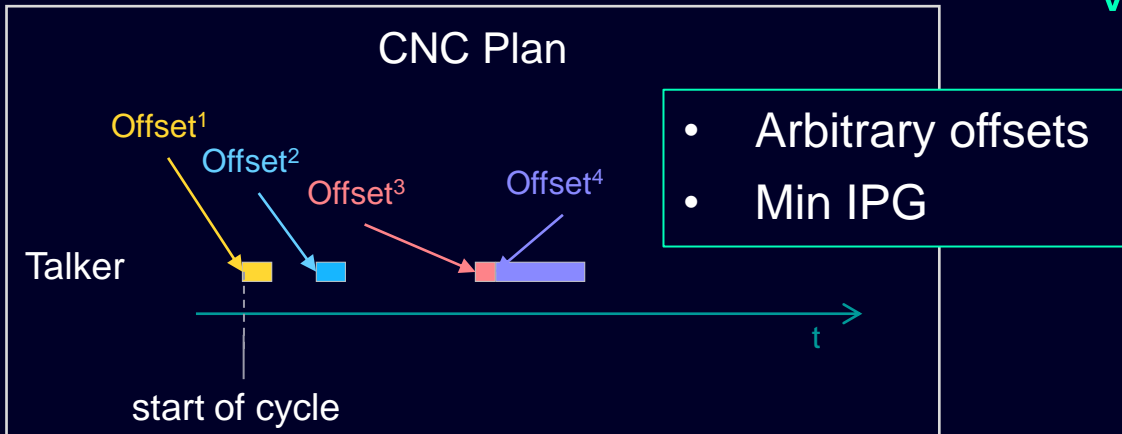
Extracted from new-specht-dev-caps-and-limits-1121-v01.pdf

Motivation

Need

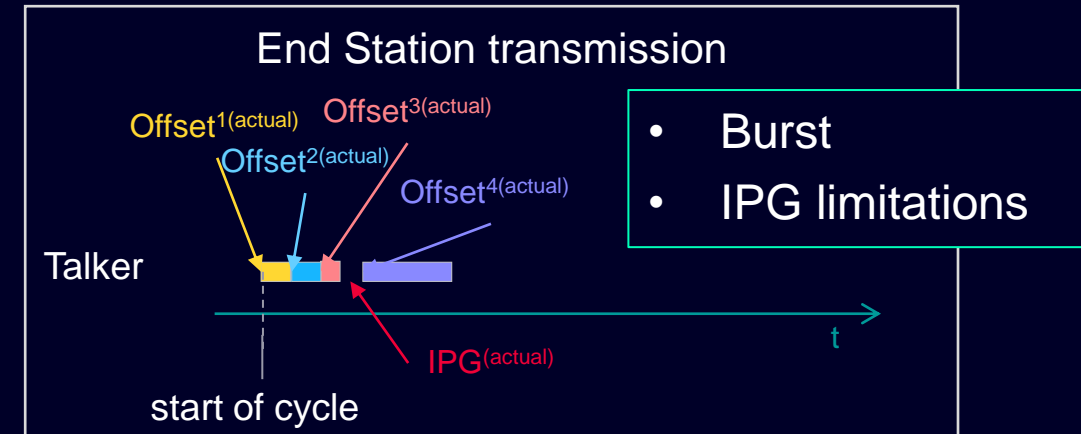
- Means to describe supported **relevant capabilities of each node** in the domain to allow for the **CNC to correctly plan streams**

CNC Assumptions



VS.

End Station Capabilities



**Actual stream behavior
completely different from planned**

Issue to be addressed

Required: **Capability model for nodes**

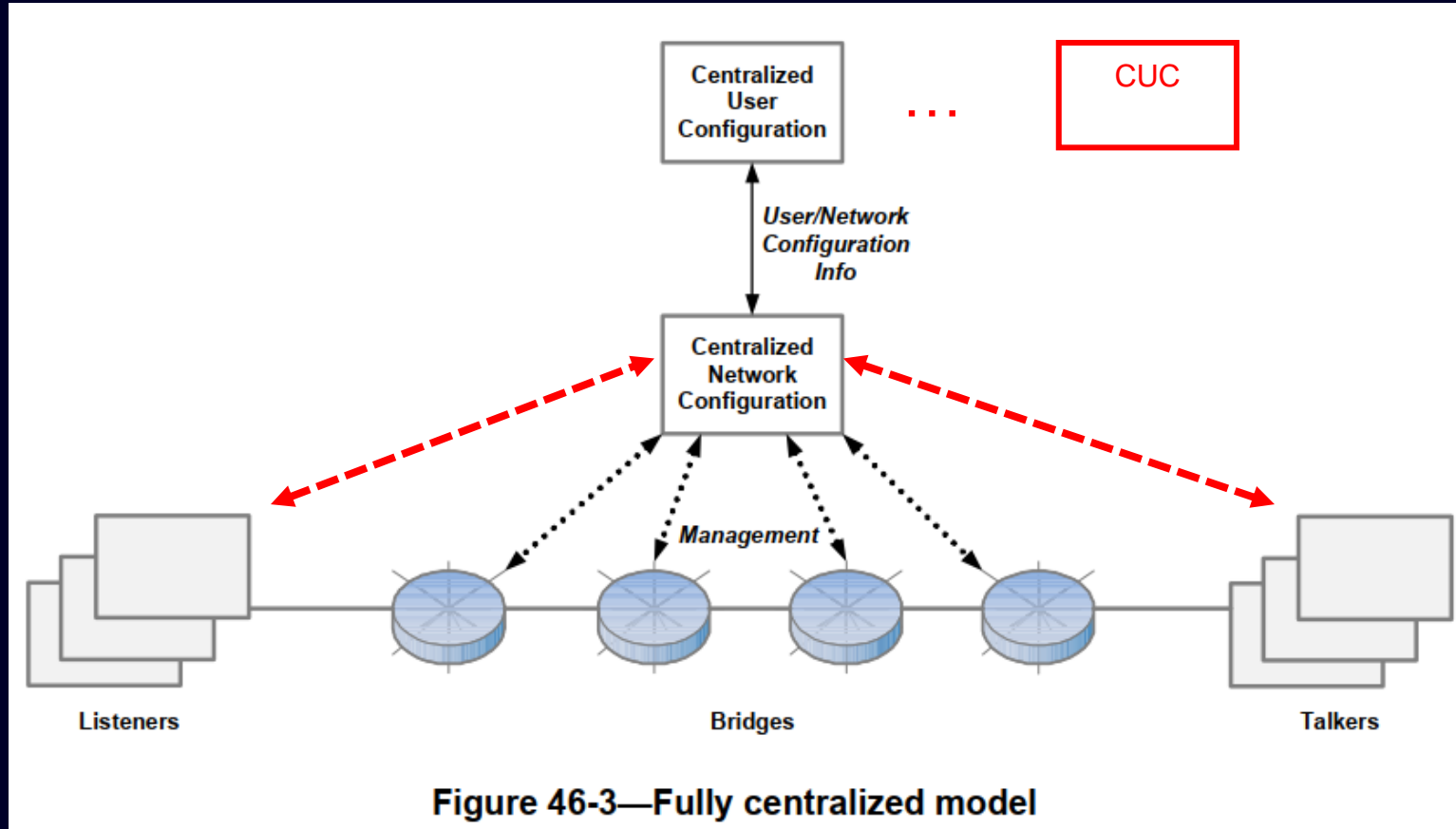
Proposal

- Parameters should be described where the use of these parameters is described
- Qdj: CNC collects all required parameters (no details)
- Profile: describe parameters and respective use

Where should they be addressed

- Qdj ?
- 60802 ?
- ...?

Qdj should update this figure



Behavior of CNCs and CUCs (Dynamics) E.g. CUC Removal

Motivation

Need for standardized behavior to ensure

- Multivendor
- Plug & Produce
- Converged network

Further open issues

Currently not described in Qdj (or other Q standards)

- Power-on behavior of CNC
- On-boarding procedure
- Behavior in error detection
 - too many CUCs, CNCs, stream requests ...
- Overall **dynamic behavior**
- **Reaction to capabilities and quantities** derived from stations (slide 7)

Where should they be addressed

- Qdj ?
- 60802 ?
- ...?

Further open issues

Proposal

- Qdj
 - lists general statements about CNC and CUC behavior
 - Some description exists, should be extended
- Profile
 - Definition of required information provided by stations
 - Required configuration elements
 - Behavior of CNC and CUC

| Further questions?

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