P802.1DP Configuration Model

Abdul Jabbar
GE Research

Objective

- *Review TSN configuration model in the context of aerospace processes*

- *Discuss open areas – configuration aspects currently not defined in TSN standards*

- *Propose configuration elements for P802.1DP profile*

Configuration for Aerospace

Assumptions:

1. Fully engineered – topology and data flows known prior to configuration

2. Static network – during operation

3. Centralized configuration by system integrator

4. Multi-vendor equipment

5. Use of standard IEEE TSN processes and models is desired

Dual objectives:

1. Minimize system integration burden with interoperable devices and tools

2. Minimize restriction on devices/sub-systems allowing independent development
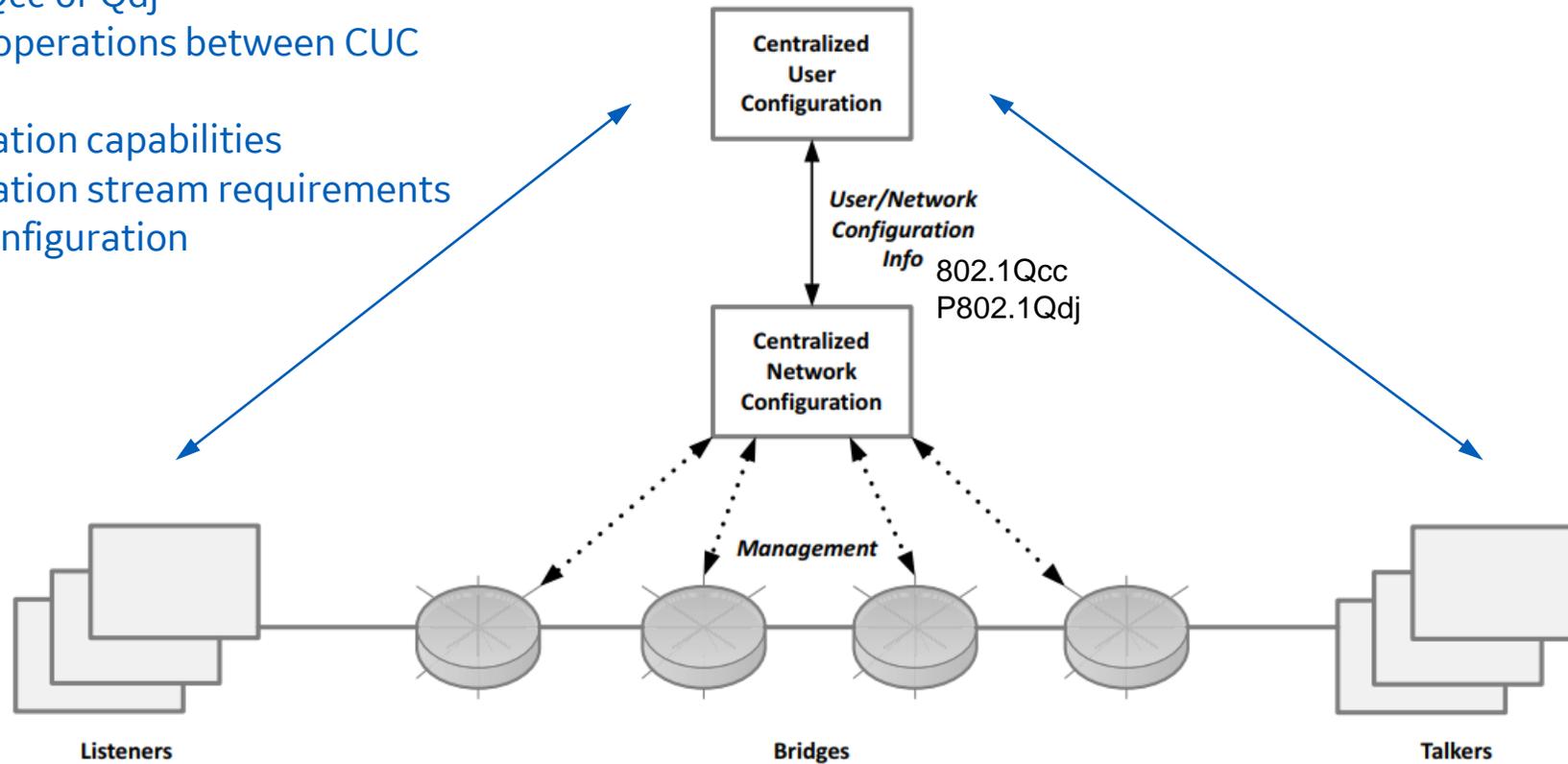
Centralized Configuration Model
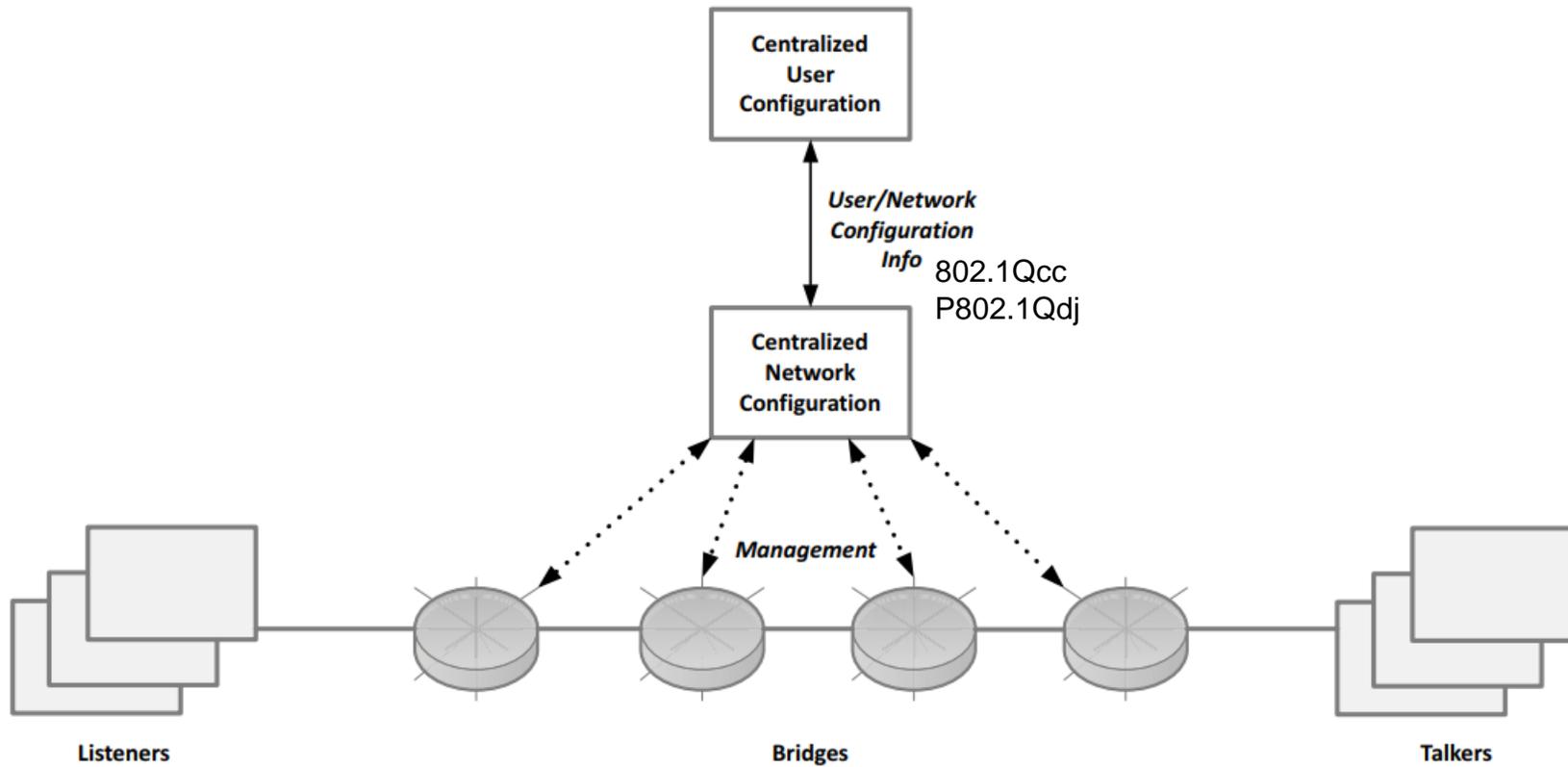
Centralized Configuration Model

Not specified in Qcc or Qdj
The "how" of the operations between CUC and end stations
- Collect end station capabilities
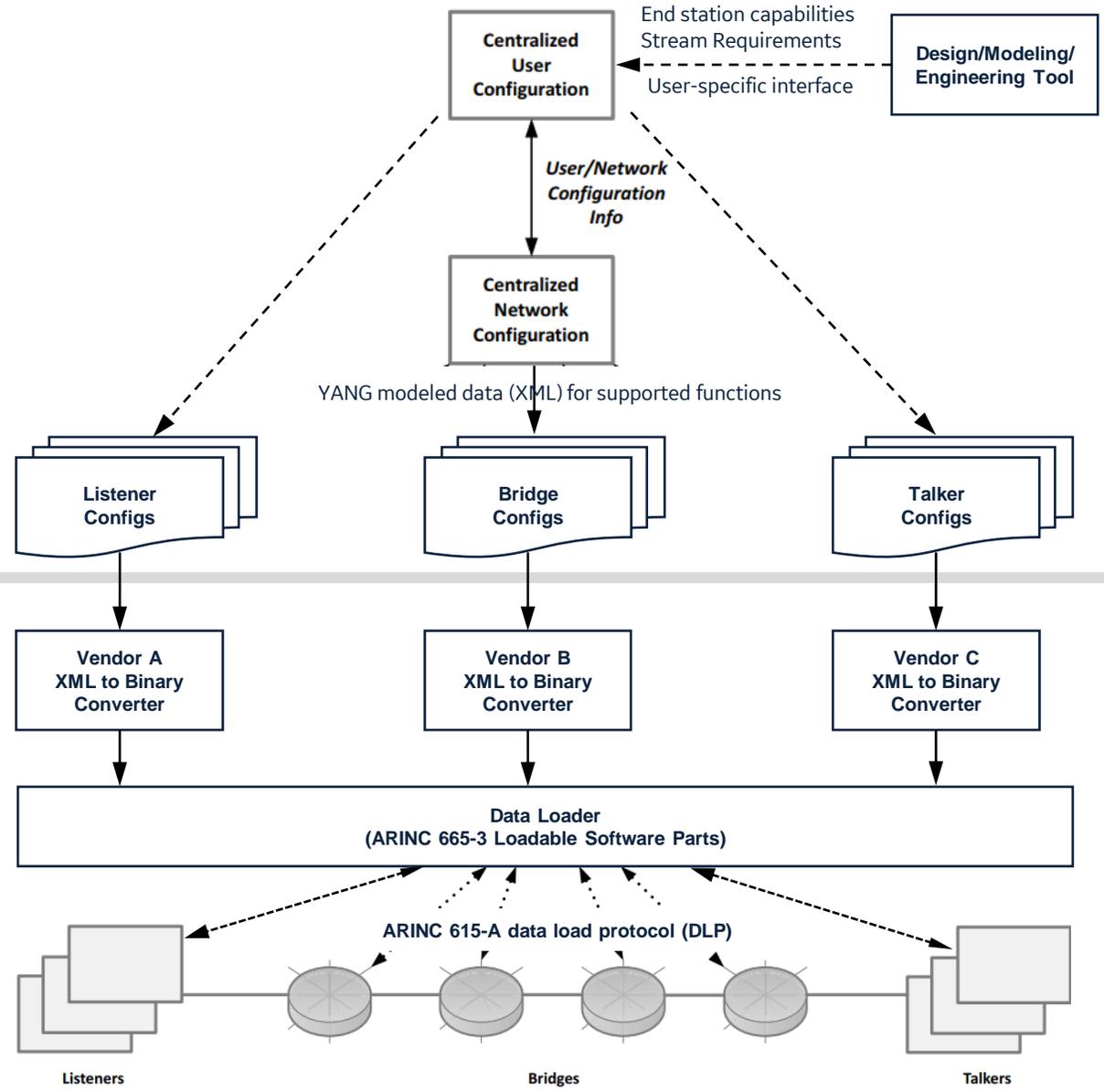- Collect end station stream requirements
- End station configuration

Centralized
User
Configuration

*User/Network
Configuration
Info* 802.1Qcc
P802.1Qdj

Centralized
Network
Configuration

Management

Listeners

Bridges

Talkers

Proposed Configuration Model for Aerospace

Above the line:
In scope of P802.1DP

Below the line:
System Integrator Process
Not in scope of P802.1DP

Centralized User Configuration

End station capabilities
Stream Requirements

Design/Modeling/Engineering Tool

User-specific interface

User/Network Configuration Info

Centralized Network Configuration

YANG modeled data (XML) for supported functions

Listener Configs

Bridge Configs

Talker Configs

Vendor A XML to Binary Converter

Vendor B XML to Binary Converter

Vendor C XML to Binary Converter

Data Loader
(ARINC 665-3 Loadable Software Parts)

ARINC 615-A data load protocol (DLP)

Target hardware on platform

Listeners

Bridges

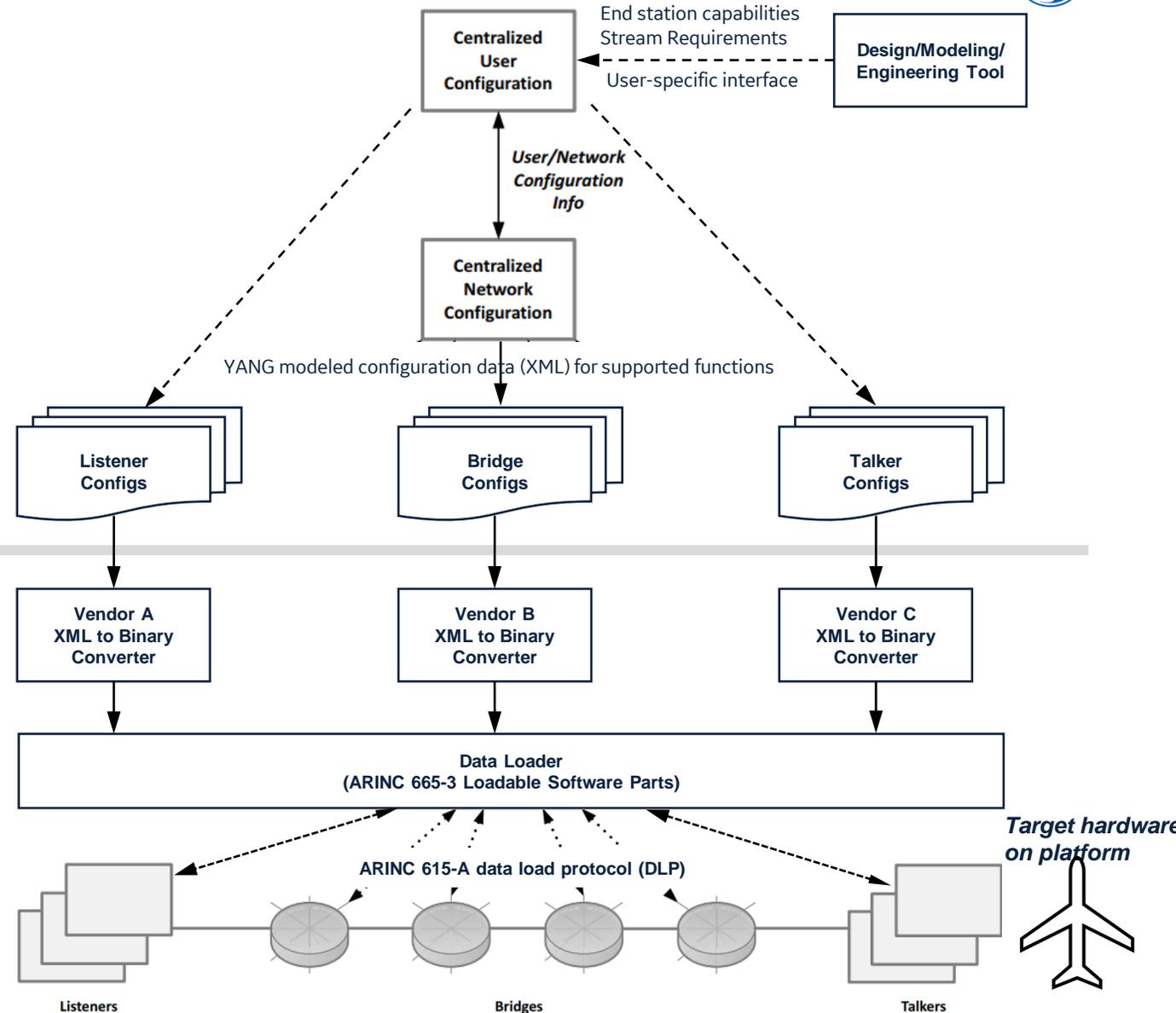Talkers

Discussion Topics

1. End Station configuration entity?
   - UNI only provides stream identification and Qbv configuration of the ES to CUC
   - CB configuration of the end station?
   - Qav configuration to the end station?
   - AS configuration to the ES?

2. Engineered Network
   - No direct comms between ES and Bridges and CUC/CNC.
   - Static network topology to be provided by engineering tool to CNC via user-specific interface
   - Similarity to 60802 work (clause 6.7.6.2 in D1.3). However, even in that case, IA calls for network to be configured via CNC and integrated CUCs.

3. YANG model availability in general for either Bridges or end stations (next slide)

Centralized User Configuration

End station capabilities
Stream Requirements

Design/Modeling/ Engineering Tool

User-specific interface

User/Network Configuration Info

Centralized Network Configuration

YANG modeled configuration data (XML) for supported functions

Listener Configs

Bridge Configs

Talker Configs

Vendor A XML to Binary Converter

Vendor B XML to Binary Converter

Vendor C XML to Binary Converter

Data Loader (ARINC 665-3 Loadable Software Parts)

Target hardware on platform

ARINC 615-A data load protocol (DLP)

Listeners

Bridges

Talkers

Status of YANG Data Models

Functions	Yang Data Model	Bridge and/or ES	Status/Remarks
Time Synchronization (AS)	P802.1ASdn	Bridge?	D0.1
Time Aware Shaper (Qbv)	P802.1Qcw (scheduled Traffic)	Bridge and ES	D1.3
Credit Based Shaper (Qav)	*None*	*Bridge and ES*	*Consider a new PAR?*
Per Stream Filtering and Policing (Qci)	P802.1Qcw (PSFP)	Bridge only	D1.3
Frame Replication and Elimination for Reliability (CB)	802.1CBcv-2021	*Bridge and ES?*	Released
Stream Identification	802.1CBcv-2021 802.1CBdb-2021	Bridge only	Released
Explicit/Static Forwarding	*802.1 Qcp?*	*Bridge only*	*Released?*
CUC – CNC UNI	802.1Qcc 802.1Qdj	Neither – only for config utilities	Released Draft 0.2
End station interface (and stream) configuration	*None*	*End station only*	*Consider "configuration block" from Qdj UNI…listed separately for each talker and listener*
Static Topology Description	*None*	*Bridge only*	*Out of scope?*

Discussion

1. Proposal to standardize the TSN configuration of aerospace networks based on end station and bridge YANG models

2. Gaps in process for configuration of end stations

3. Gaps in YANG models for configuration of all features in aerospace TSN networks

4. Future topic to discuss – monitoring. Mandatory parameters and access protocols