Centralized Network Configuration

View from the End (Node)

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Network Configuration Assumption

- We will support peer-to-peer configuration (AVB)
- We will also support a centralized computation configuration
Vision for Centralized Network Configuration

C. Network built with Central Computation and Control function (CCC)

Registration C6 → C3 Advertisement to all potential listeners
Registration C9 → C2 Advertisement
C7: CCC computes answers
Path & scheduling info:
CCC New prot. of L2 or L3 SNMP
L2 1 2 3 4 5 T

CCC Prot
Net Conf
Net Conf
Net Conf
Net Conf
CCC Prot

Path Planning
Explicit Routing
Latency Calc
Timing Slot Assignment
Redundancy

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Vision for Centralized Network Configuration
Vision for Centralized Network Configuration
End Node Protocols
Vision for Centralized Network Configuration

- IO Timing
- Algorithm Scheduling
- Algorithm Distribution
- Application Redundancy
- Data Connections

Diagram:
- OT Config
- CCC
- L1
- B1
- B2
- B3
- B4
- T1

Protocols:
- UNI
- Net Conf
- OT Protocol
- CCC Protocol

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Vision for Centralized Network Configuration

1. OT Config Tool Identified Devices and Determines Application Logic and IO Connections and Timing
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2. OT Config Tool Sends Desired Configuration to End Devices for Logic, IO, Connections, and Timing
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3. End Devices Request Routing and Timing to CCC
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4. CCC Distributed Routes and Schedules
Vision for Centralized Network Configuration

5. End Nodes Confirm success with OT and OT brings-up application
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4. CCC Distributed Routes and Schedules
Vision for Centralized Network Configuration

5. End Node Indicates Failure.
6. OT tells end nodes to tear down
7. End Nodes tell CCC to tear down
8. CCC tears down
9. Restart at step 1-2
Enhanced Vision for Centralized System Configuration

1. OT Config Tool Identified Devices and Determines Application Logic and IO Connections and Timing
Enhanced Vision for Centralized System Configuration

2. OT Config Tool Request Routing and Timing to CCC
Enhanced Vision for Centralized System Configuration

3. CCC Distributed Routes and Schedules
Enhanced Vision for Centralized System Configuration

4. OT Config Tool Sends Configuration to End Devices for Logic, IO, Connections, and Timing and starts application
Enhanced Vision for Centralized System Configuration

3. CCC Communicates Failure
Enhanced Vision for Centralized System Configuration

2. OT Config Tool Requests Different Routing and Timing to CCC
Enhanced Vision for Centralized System Configuration

3. CCC Distributed Routes and Schedules

OT Config

CCC

L1

B1

B2

B3

B4

T1

L1

Net Conf

OT Protocol

CCC Protocol

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Enhanced Vision for Centralized System Configuration

4. OT Config Tool Sends Configuration to End Devices for Logic, IO, Connections, and Timing and starts application
Combined Vision for Centralized System Configuration

- **T/L1 – Classic End Node**
  - Communicates TLVs to CCC via bridge proxy (SRP)

- **T/L2 – “Centralized End Node”**
  - Communicates TLVs to CCC via OT Config proxy (OT Protocol)

- **CCC**
  - Gets requests and sets end parameters via CCC proto
  - Gets network information and configures bridges via Net Conf
Recommended Next Steps

- Define TLVs from end stations needed by CCC
  - Could be carried by SRP or OT Config

- Design CCC algorithm to work with:
  - Individual commands coming from bridges
  - “Batch” commands coming from OT config

- Determine other network information needed by CCC and determine appropriate mechanisms (NetConf, LLDP, ISIS, etc)
  - Already proposed: