Common bridge requirements

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Contributors

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Foreword

• This contribution demonstrates the point of the common bridge requirements, referring to IEEE standard 802.1CM.
Bridge requirements

• Common bridge requirements
  • Requirements of 802.1Q bridge
  • Requirements for time synchronization
  • Requirements for low latency

• Bridge options
Common bridge requirements

• A minimum set of features specified in IEEE standard 802.1Q are required for a bridge to support this Profile.

• That is, the bridge shall be a VLAN Bridge supporting the minimum set of features identified in this profile.

• The requirements of this profile do not imply that a VLAN Bridge implementation that conforms to the provisions of this standard has to support options specified in IEEE standard 802.1Q-2018 other than those identified in this profile.
Requirements of 802.1Q bridge (1/5)

A bridge implementation that conforms to the provisions of this standard shall:

a. Conform to the relevant standard for the MAC technology implemented at each port in support of the MAC Internal Sublayer Service (ISS), as specified in IEEE Std. 802.1AC;

b. Implement full duplex IEEE Std. 802.3 MAC with data rate of 10 Mbps or greater on each port;

c. Support the capability of 2000 octets maximum size MAC Protocol Data Unit (PDU) on each port;
Requirements of 802.1Q bridge (2/5)

d. Support the capability to disable MAC control PAUSE if it is implemented;

e. Support the capability not to assert Low Power Idle (LPI) on each port that supports Energy Efficient Ethernet (IEEE, specified in IEEE Std. 802.3);

f. Meet the VLAN Bridge requirements stated in items a) through f) in 5.4 of IEEE Std. 802.1Q-2018;

g. Support an active topology enforcement mechanism;
Requirements of 802.1Q bridge (3/5)

h. Meet the VLAN Bridge requirements stated in items g) and h) in 5.4 of IEEE Std. 802.1Q-2018 if the supported active topology enforcement mechanism is the Rapid Spanning Tree Protocol (RSTP);

i. Meet the VLAN Bridge requirements stated in items i) through n) in 5.4 of IEEE Std. 802.1Q-2018;

j. Support at least the Acceptable Frame Types parameter value of Admit All frames on each port [see item l) in 5.4 of IEEE Std. 802.1Q-2018]; implemented (Clause 36 of IEEE Std. 802.1Q-2018).

k. Support the use of at least one VLAN Identifier (VID);
Requirements of 802.1Q bridge (4/5)

I. Meet the VLAN Bridge requirements stated in items p) through r) in 5.4 of IEEE Std. 802.1Q-2018;

m. Support the ability to allocate the Port VID (PVID) and all other VIDs to the single Filtering Identifier (FID) if only a single FID is supported [item q) in 5.4 of IEEE Std. 802.1Q-2018], i.e., support shared VLAN learning (8.8.8 of IEEE Std. 802.1Q-2018);

n. Support a minimum of three traffic classes (3.268 of IEEE Std. 802.1Q-2018) on all ports;
Requirements of 802.1Q bridge (5/5)

o. Support the strict priority algorithm for transmission selection (8.6.8.1 of IEEE Std. 802.1Q-2018) on each port for each traffic class;

p. Support the capability to disable Priority-based flow control if it is implemented (Clause 36 of IEEE Std. 802.1Q-2018).

q. Support the capability to schedule traffics (IEEE Std. 802.1Qbv-2015)
Common Bridge requirements for time synchronization

Bridge requirements for synchronization A bridge implementation for which a claim of conformance to support synchronization in the bridged network is made, shall:

a. Support untagged frames on all ports;

b. Support the IEEE Std. 802.1AS-2018 profile and one (single gPTP Domain) or more (multiple gPTP Domain) of the related clocks.
## Traffic type support

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature</th>
<th>Status</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICR</td>
<td>Is isochronous cyclic real-time traffic type supported on at least one Port?</td>
<td>O. 1</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>CRT</td>
<td>Is cyclic real-time traffic type supported on at least one Port?</td>
<td>O. 1</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>NCL</td>
<td>Is network control traffic type supported on at least one Port?</td>
<td>M</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>AVD</td>
<td>Is audio/video traffic type supported on at least one Port?</td>
<td>O</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>BRW</td>
<td>Is Brownfield traffic type supported on at least one Port?</td>
<td>O</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>ALM</td>
<td>Is arms/ events traffic type supported on at least one Port?</td>
<td>O</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>CFG</td>
<td>Is configuration/ diagnostics traffic type supported on at least one Port?</td>
<td>M</td>
<td>Yes[ ] / No[ ]</td>
</tr>
<tr>
<td>BST</td>
<td>Is best effort traffic type supported on at least one Port?</td>
<td>M</td>
<td>Yes[ ] / No[ ]</td>
</tr>
</tbody>
</table>

Note: O.1 shows that at least one of ICR and CRT is mandatory.
Traffic types

• Mandatory stream classes inside TSN boundary
  • Isochronous cyclic real time
    • e.g. Machin control (Motion, I/O and etc.), Reactor control, etc.
  • Network control
    • e.g. Time synchronization
• Configuration / diagnostics
  • e.g. SNMP + LLDP and/or Application Specific Protocol etc.
• Best effort
  • Other IP communication
Traffic types (continue)

• Isochronous cyclic real time
  • e.g. Machin control (Motion, I/O and etc.), Reactor control, etc.
  • This contribution does not cover this stream, since it depends on the application.
Traffic types (continue)

• Network control
  • e.g. Time synchronization
Traffic types (continue)

• Configuration / diagnostics
  • e.g. SNMP + LLDP and/or Application Specific Protocol etc.
  • This contribution does not cover diagnostics, since it depends on the application.
Traffic types (continue)

• Best effort
  • Other IP communication
  • This contribution does not cover this stream, since it depends on the application.