802.1AS-2020-Rev Draft 1.0 Comments Rationale & Proposed Solutions

Rodrigo Ferreira Coelho, Günter Steindl [Siemens AG]

SIEMENS

BTCA as an optional feature: Agreed concept, but not clear in the standard

SIEMENS

Status quo

Existing consensus in this group

1. Support of BTCA in domains other than 0 is not mandatory
2. Support of domain 0 is not mandatory
3. Implementation of BTCA is not mandatory for a PTP instance that does not support domain 0

Domain0 support	At least one domain in the range between 1 to 127 requires BTCA	BTCA implementation required
True	True	**True**
True	False	**True**
False	True	**True**
False	False	**False**

Implementation of BTCA is not mandatory for a PTP instance that does not support domain 0

However, some clauses do not cover this conclusion

- 5.4.3 PTP Instance defaults and recommendations

"An implementation of a PTP Instance shall, by default, support the following best timeTransmitter clock algorithm (BTCA) requirements:

a) Implement the BTCA (10.3.1.1, 10.3.1.2, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.8, and 10.3.10).

An implementation of a PTP Instance shall, by default, support the following best timeTransmitter clock algorithm (BTCA) requirements:

a) Implement the BTCA (10.3.1.1, 10.3.1.2, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.8, and 10.3.10).

b) For domain 0, implement specifications for an externalPortConfigurationEnabled value of FALSE (10.3.1).

c) Implement the PortAnnounceReceive state machine (10.3.11).

d) Implement the PortAnnounceInformation state machine (10.3.12).

e) Implement the PortStateSelection state machine (10.3.13).

f) Have the BTCA as the default mode of operation, with externalPortConfigurationEnabled FALSE, on domain 0.

g) Implement at least one of the possibilities for externalPortConfigurationEnabled (i.e., FALSE, meaning the BTCA is used, and TRUE, meaning external port configuration is used) on domains other than domain 0.

Proposed change for this clause (in green)

- 5.4.3 PTP Instance defaults and recommendations

"An implementation of a PTP Instance shall, by default, support the following best timeTransmitter clock algorithm (BTCA) requirements:

a) For domain 0, implement the BTCA (10.3.1.1, 10.3.1.2, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.8, and 10.3.10).

SIEMENS

PICS proforma

Annex 9

Status of all 23 items must be changed to cover these conditions

Domain0 support	At least one domain in the range between 1 to 127 requires BTCA	BTCA implementation required
True	True	**True**
True	False	**True**
False	True	**True**
False	False	**False**
A	B	**A or B**

A.9 Best timeTransmitter clock

Item	Feature	Status	References	Support
BTC-1	Does the PTP Instance implement the functionality specified by the PortAnnounceReceive state machine in Figure 10-13 on each PTP Port in compliance with the requirements of 10.3.11?	M	10.3.11	Yes [ ]
BTC-2	Does the PTP Instance implement the functionality specified by the PortAnnounceInformation state machine in Figure 10-14 on each PTP Port in compliance with the requirements of 10.3.12?	M	10.3.12	Yes [ ]
BTC-3	Does the PTP Instance implement the functionality specified by the PortStateSelection state machine in Figure 10-15 on each PTP Port in compliance with the requirements of 10.3.13? NOTE—There is one instance of the PortStateSelection state machine for the PTP Instance, for each gPTP domain. Some of the PortStateSelection state machine computations are performed for each PTP Port, and some of the computations are performed for the PTP Instance as a whole (and all the computations are performed for each gPTP domain).	M	10.3.13	Yes [ ]
BTC-4	If the value of clockA's SystemIdentity is less than that of clockB, is clockA selected as Grandmaster PTP Instance in compliance with the requirements of 10.3.2?	M	10.3.2	Yes [ ]
BTC-5	Does the value of priority1 comply with the requirements of 8.6.2.1?	M	8.6.2.1	Yes [ ]

SIEMENS

PICS proforma

Annex 9

Status of all 23 items must be changed to cover these conditions

Domain0 support	At least one domain in the range between 1 to 127 requires BTCA	BTCA implementation required
True	True	**True**
True	False	**True**
False	True	**True**
False	False	**False**
A	B	**A or B**

A.9 Best timeTransmitter clock *(continued)*

Item	Feature	Status	References	Support
BTC-6	Does the value of clockClass comply with the requirements of 8.6.2.2?	M	8.6.2.2	Yes [ ]
BTC-7	Does the value of priority2 comply with the requirements of 8.6.2.5?	M	8.6.2.5	Yes [ ]
BTC-8	Does the value of clockAccuracy comply with requirements of 8.6.2.3?	M	8.6.2.3	Yes [ ]
BTC-9	Does the value of offsetScaledVariance comply with the requirements of 8.6.2.4?	M	8.6.2.4	Yes [ ]
BTC-10	Does the value of timeSource comply with requirements of 8.6.2.7 and Table 8-2?	M	8.6.2.7	Yes [ ]
BTC-11	Is the PTP Port number equal to 1 in compliance with the requirements of 8.5.2.3?	¬BRDG:M	8.5.2.3	Yes [ ] N/A [ ]
BTC-12	Are the PTP Ports numbered 1 through N for each of N PTP Ports in compliance with the requirements of 8.5.2.3?	M	8.5.2.3	Yes [ ]
BTC-13	Does the clockIdentity field comply with the requirements of 8.5.2.2?	M	8.5.2.2	Yes [ ]
BTC-14	When no grandmaster-capable PTP Instance is available does the behavior of the PTP Instance comply with the requirements of 10.2.13.2, i.e., the clockTimeReceiverTime should be provided by the local clock?	M	10.2.13.2	Yes [ ]
BTC-15	Does the value of announceReceiptTimeout comply with the requirements of 10.7.3.2?	M	10.7.3.2	Yes [ ]
BTC-16	Does the TimeReceiverPort remove the PTP Port from the BTC selection after announceReceiptTimeout expires in compliance with the requirements of 10.7.3.2?	M	10.7.3.2	Yes [ ]
BTC-17	Does the value of syncReceiptTimeout comply with the requirements of 10.7.3.1?	M	10.7.3.1	Yes [ ]
BTC-18	Does the TimeReceiverPort remove the PTP Port from the BTC selection after syncReceiptTimeout expires in compliance with 10.7.3.1?	M	10.7.3.1	Yes [ ]
BTC-19	Does the PTP Port sending a message interval request Signaling message adjust its announceReceiptTimeoutTimeInterval in compliance with the requirements of 10.6.4.3.8 and Table 10-17?	SIG:M	10.6.4.3.8	Yes [ ]
BTC-20	If the PTP Instance implements the ClockSourceTime interface, does the value of lastGmPhaseChange comply with the requirements of 9.2.2 and 6.4.3.3?	O	9.2.2	Yes [ ] No [ ]

PICS proforma

Annex 9

Status of all 23 items must be changed to cover these conditions

Domain0 support	At least one domain in the range between 1 to 127 requires BTCA	BTCA implementation required
True	True	**True**
True	False	**True**
False	True	**True**
False	False	**False**
A	B	**A or B**

A.9 Best timeTransmitter clock *(continued)*

Item	Feature	Status	References	Support
BTC-21	Does the transmitted timing information comply with the requirements of 10.3.1, including specifications for externalPortConfigurationEnabled value of false?	GMCAP:M	10.3.1	Yes [ ] N/A [ ]
BTC-22	Does the PTP Instance implement BTCA requirements that are not listed in the preceding BTC rows?	M	10.3.2, 10.3.3 10.3.4, 10.3.5, 10.3.6, 10.3.8, 10.3.10	Yes [ ]
BTC-23	Do the TimeTransmitterPorts of this PTP Instance implement the functionality of the AnnounceIntervalSetting state machine in compliance with the requirements of 10.3.17 and Figure 10-19?	BTC:O	10.3.17, item g) of 5.4.2, item h) of 5.4.1	Yes [ ] No [ ]

PICS proforma

Proposed change for this clause (in green)

Ensure that each item in A.9 has the current semantic if BTCA is implemented:

1. as mandatory item whenever domain 0 is implemented, OR
2. if domain 0 is not implemented AND a domain in the range 1 to 127 decides to implement BTCA

Add the following to the status of items BTC-1 to BTC-23

- DOM0 OR BTCX
- E.g. DOM0 OR BTCX:M, (DOM0 or BTCX) and !BRDG:M

Conditions represented as Major capabilities

Proposed change for this clause in green
Existing text in white

- DOMADD: Does the time-aware system support one or more PTP Instances with domainNumber in the range 1 to 127?
- DOM0: Does the time-aware system support one or more PTP Instances with domainNumber 0
  - Status O
  - Support Yes, No
- BTCX: Does any PTP Instance with domainNumber in the range 1 to 127 implement the best timeTransmitter clock algorithm?
  - Status DOMADD:O
  - Support Yes, No, N/A

Typo in 5.4.3 line 28

2.5.4.3 line 28: rename PICS to PCS (assuming that a profile standard has a PCS rather than a PICS)

BTCA as a not-mandatory feature in conjunction with Hot Standby

SIEMENS

Scenario

Thesis: Hot Standby can work in conjunction with BTCA for some scenarios.

Therefore, the requirement “BTCA must be disabled” should be removed from 802.1AS-2020-Rev.

Assuming a scenario where:

1. Only one PTP instance is configured as gmCapable per domain
2. syncLocked := TRUE for all PTP Instances in the domain
    1. i.e. Sync Messages are only sent after a Sync message arrives

Then:

1. In case of a GM (or a link of the sync tree) fails
    1. BTCA does not find a new GM for that domain
    2. No Sync messages are sent beyond the “failure point” (GM or link)
2. This is the behavior expected by Hot Standby (described in 7.5.2 Time-aware network with hot standby)

Current Status and Proposed Changes [1]

Clause 18.1 General

Current status

“For time synchronization using hot standby, two distinct domains are statically configured in the network and the best timeTransmitter clock algorithm (BTCA) is disabled for these domains.“

Proposed change

“For time synchronization using hot standby, it is assumed that: a) two distinct domains are statically configured in the network and b) the best timeTransmitter clock algorithm (BTCA) is disabled for these domains. In cases where these assumptions do not hold, the system integrator is responsible to ensure that BTCA does not alter the Hot Standby functionality described in this Clause”

Current Status and Proposed Changes [2]

Clause 18.3 PTP Instance configuration

Current status

“b) For both PTP Instances, externalPortConfigurationEnabled is set to TRUE;

c) If a PTP Instance (primary or secondary) is grandmaster, externalPortConfigurationPortDS.desiredState is configured to TimeTransmitterPort or PassivePort for all PTP Ports (portNumber 1 and higher); otherwise, externalPortConfiguration.desiredState is configured to TimeReceiverPort for one PTP Port, and is configured to TimeTransmitterPort or PassivePort for other PTP Ports; and

d) Each PTP Instance shall have a corresponding PtpInstanceSyncStatus state machine (see 18.4).”

Proposed change

“ b) Each PTP Instance shall have a corresponding PtpInstanceSyncStatus state machine (see 18.4)

if BTCA is disabled:

c) For both PTP Instances, externalPortConfigurationEnabled is set to TRUE;

d) If a PTP Instance (primary or secondary) is grandmaster, externalPortConfigurationPortDS.desiredState is configured to TimeTransmitterPort or PassivePort for all PTP Ports (portNumber 1 and higher); otherwise, externalPortConfiguration.desiredState is configured to TimeReceiverPort for one PTP Port, and is configured to TimeTransmitterPort or PassivePort for other PTP Ports;”

Thanks

SIEMENS