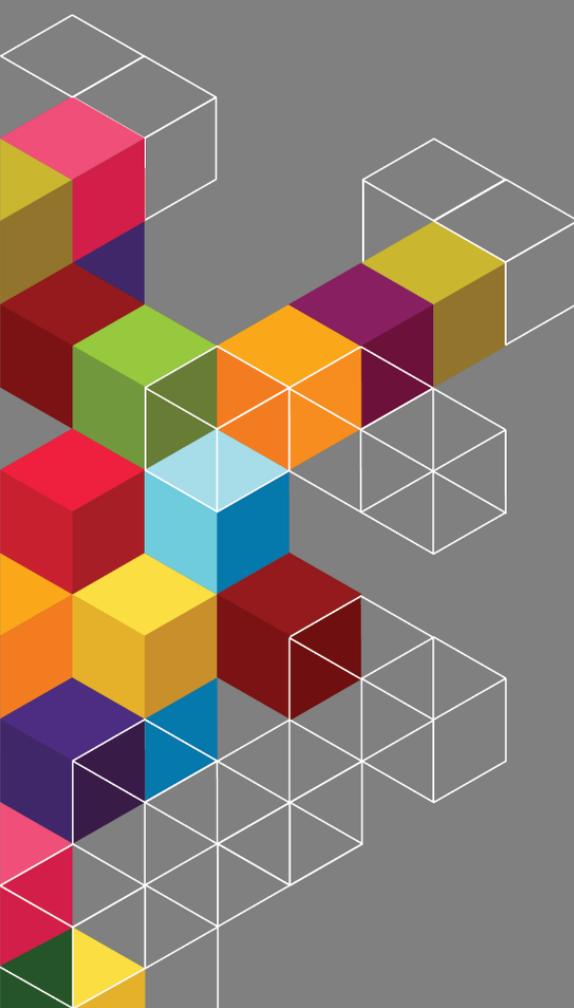


Calnex Paragon - *x*



Software Release 25X Drop 1 (X.10.38.xx) Sept 2017

NEW FUNCTIONALITY AND ENHANCEMENTS



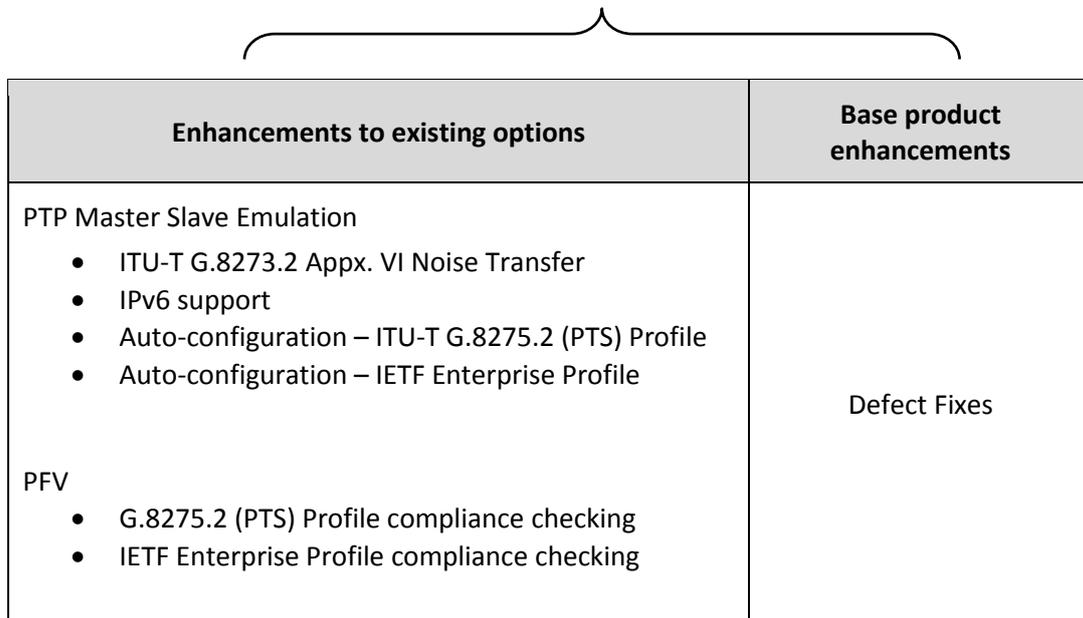
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1 Software Release Overview

Release 25X Drop 1 (X.10.38) adds the following features to Paragon-X and PFV:

SUS (Software Upgrade Service)



Enhancements to existing options	Base product enhancements
<p>PTP Master Slave Emulation</p> <ul style="list-style-type: none">• ITU-T G.8273.2 Appx. VI Noise Transfer• IPv6 support• Auto-configuration – ITU-T G.8275.2 (PTS) Profile• Auto-configuration – IETF Enterprise Profile <p>PFV</p> <ul style="list-style-type: none">• G.8275.2 (PTS) Profile compliance checking• IETF Enterprise Profile compliance checking	<p>Defect Fixes</p>

 To check the current software version installed, select Help > About Paragon Remote Client on the Paragon-X GUI.

2 Features and Benefits

Paragon-X	Benefit
ITU-T G.8273.2 App. VI Noise Transfer	Test Noise Transfer characteristics fully, as per latest updated ITU-T recommendations
IPv6 support for PTP emulation	Use IPv6 encapsulation to more closely replicate real-world deployment scenarios, while performing PTP Time Error testing
PTP emulation auto-configuration – <ul style="list-style-type: none"> • ITU-T G.8275.2 (PTS) Profile • IETF Enterprise Profile 	Simplified process for PTP profile setting, avoids spending time on debugging misconfigurations
PFV	Benefit
ITU-T G.8275.2 PTS Profile compliance checking IETF Enterprise Profile compliance checking	Allows fast protocol analysis (and debug) for G.8275.2 and Enterprise PTP profiles, for devices using these - or multiple - profile configurations

3 Enhancements to Existing Options

3.1 PTP Master Slave Emulation: Noise Transfer testing to ITU-T G.8273.2 (Appendix VI)

Appendix VI of G.8273.2 (Amendment 1) addresses potential testability issues with the specific definition of Boundary Clock noise transfer as per clause 7.3.1. Further, suggestions are made to allow comprehensive testing of noise transfer characteristics. To allow users to test noise transfer in line with the updated ITU-T standard, Calnex has created an Enhanced Noise Transfer (ENT) Tcl script for Paragon-X, which has been further developed as part of this release.

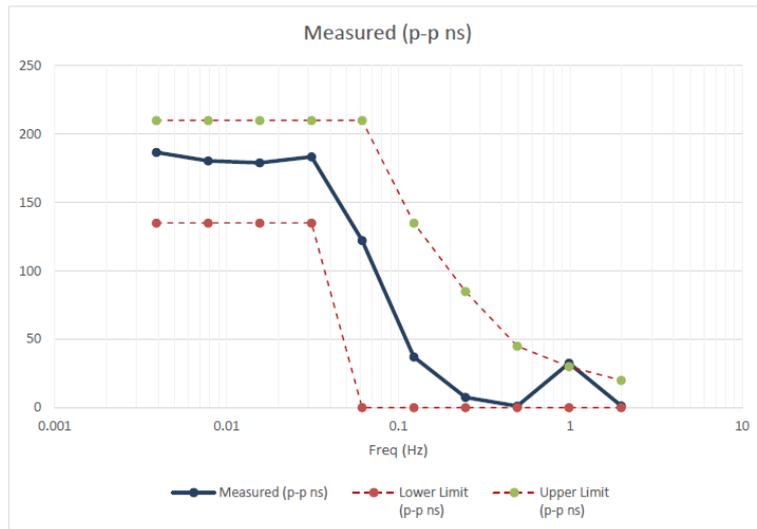


The script measures the filter response of a T-BC in the following scenarios:

- PTP to PTP
- SyncE to PTP
- PTP to 1PPS
- SyncE to 1PPS

The noise applied to the T-BC input is as suggested in G.8273.2 Amendment 1 (Appendix VI). The script (with associated profiles) controls Paragon-X to apply this noise and then measures the response of the DUT. **The applied noise is very carefully selected to avoid various aliasing issues and provide full measurement output within an efficient timeframe, and forms an integral part of the provided test bundle.**

For the cases where PTP is being measured, G.8273.2 Amendment 1 (Appendix VI) also suggests that a filter is applied to the measured output to address potential measurement uncertainty due to noise on the packet interface and the intrinsic noise generation of the T-BC. The script implements the filter using least-squares estimation (one of the filter techniques listed in Amendment 1).



The script also provides a pass / fail result – again based on the limits suggested in G.8273.2 Amendment 1 (Appendix VI).

The test solution bundle is available for entitled users from the Paragon-X user SW download section of the calnexsol.com website. As long as the user has a tcl shell available on the PC connected to Paragon-X, the script can be run (note: tcl version 8.6 or above is required).

The contents of the bundle are self referential: the folder can be installed at any user-defined location, but to function correctly all contents must remain in the same folder.

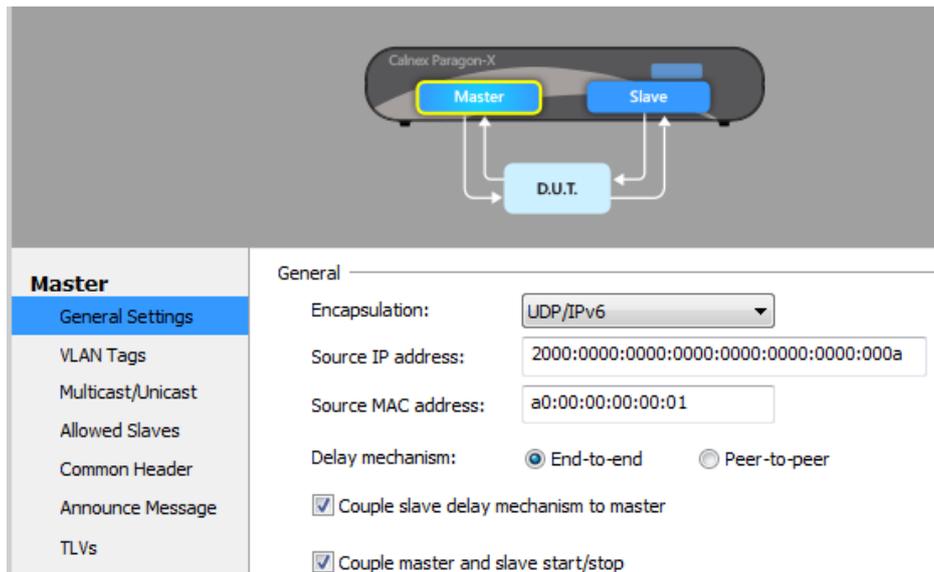
Further information on use of the testing script - and variables which can be modified by the user - is available from the user guide installed with the tool bundle.

A detailed summary of noise transfer testing for boundary clocks to G.8273.2 is available in the document **Time Error Transfer for BCs** available from the Technology Library at Calnexsol.com

3.2 PTP Master Slave Emulation: IPv6 support

The flexibility and range of configurable parameters available in Paragon-X PTP emulation has been extended to include IPv6 addressing, to increase the range of user scenarios that can be fully tested.

From the PTP emulation application within P-X GUI, selecting **Master** or **Slave** settings allows configuration of encapsulation as shown below:



Further information on IPv6 configuration and display settings is available in the software advisory notes at the end of this document.

3.3 PTP Master Slave Emulation (End-to-End): Auto-configuration for ITU-T G.8275.2 PTS Profile, IETF Enterprise Profile

To deliver the specific synchronisation performance requirements for Partial Timing support (PTS) applications, ITU-T G.8275.2 (PTS) profile is used.

For Enterprise applications the IETF defines the use of an industry specific PTP Enterprise Profile.

As of this release, the Master/Slave Emulation implementation in Paragon-X has additional support for configuration and testing to these profiles.

G.8275.2 PTS and **Enterprise Profile** are now available as ‘auto-configuration’ options in the MSE window – logical default values will be set, and you can manipulate fields as desired. The SW will indicate if you have changed any setting to be non-compliant to the profile by changing the indicated profile to ‘**Custom Profile**’:



4 Enhancements to PFV

4.1 ITU-T G.8275.2 PTS Profile and IETF Enterprise Profile compliance checking

In addition to existing PTP profile and custom options, PFV can now be used to analyse captured protocol exchanges and indicate Pass/Fail to ITU-T G.8275.2 - PTS Profile and IETF Enterprise Profile. All PFV features such as automatic highlighting of non-compliance and report generation capability are available. For more information on PFV, please see 18X Release Notes.

The screenshot displays the PFV application interface. At the top, there are menu options: Files, PTP, ToD, Report, System, and Help. Below the menu, the Ruleset File is set to 'G.8275.2_PTS_Profile.xml' and there is a 'View Rules' button. A 'Selected packet #' field is also present.

The main area contains a table of captured messages. The table has the following columns: Direction, Packet#, Arrival Time, Message Type, transportSpecific, versionPTP, reservedField0, messageLength, domainNumber, and reservedField1. The messages are listed in a scrollable view, showing various SYNC and DEL-REQ/RESP packets.

At the bottom of the interface, there is a summary dashboard. On the left, the Calnex logo is visible. The dashboard shows the Average Message Rate (msg/sec) for SYNC (64.00), FOLLOW-UP (N/A), and DEL-REQ (64.00). It also shows DEL-RESP (64.00) and ANNOUNCE (8.00). On the right, the Total Counts are displayed: Packets (3119) and Errored Packets (0). A large green box indicates a 'PASS' result with a Total Pass Rate of 100.00%.

Direction	Packet#	Arrival Time	Message Type	transportSpecific	versionPTP	reservedField0	messageLength	domainNumber	reservedField1
2	3095	15.468781290	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3096	15.468821130	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3097	15.484375040	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3098	15.484406250	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3099	15.484446090	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3100	15.500000000	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3101	15.500031370	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3102	15.500071050	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3103	15.515625120	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3104	15.515656330	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3105	15.515696170	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3106	15.531250080	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3107	15.531281290	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3108	15.531321130	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3109	15.546875040	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3110	15.546906250	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3111	15.546946090	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3112	15.562500000	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3113	15.562531370	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3114	15.562571050	DEL-RESP	0x0	0x2	0x0	0x36	0x2c	0x0
2	3115	15.578125120	DEL-REQ	0x0	0x2	0x0	0x2c	0x2c	0x0
2	3116	15.578156330	SYNC	0x0	0x2	0x0	0x2c	0x2c	0x0

Summary Dashboard:

- Average Message Rate (msg/sec): SYNC (64.00), FOLLOW-UP (N/A), DEL-REQ (64.00), DEL-RESP (64.00), ANNOUNCE (8.00)
- Total Counts: Packets (3119), Errored Packets (0)
- Result: **PASS** (Total Pass Rate: 100.00%)

Appendix A: Software Advisory Notes

- An issue was detected in the previous SW release that prevented the display of calculated metrics for NTP – this has been resolved in this release.
- For IPv6 settings in Master/Slave emulation mode, when using Network Discovery request (ND request) to auto-configure MAC addresses note that the Paragon-X should be directly connected to the DUT.
- In IPv6 operation, when specifying the Paragon-X Master Source IP Address and the Slave Source IP Address in the MSE configuration, ***the complete 16 byte address must be entered***. Compressed format addresses such as 2000::000a are not accepted ***in the user data entry section*** of the configuration screen.

Displayed IPv6 addresses may be subject to presentation in the compressed format, subject to the rules below:

- When PTP Unicast operation is chosen, the connected Master and Connected Slave IPv6 addresses are shown either in the full format (eg 1111:2222:3333:4444:5555:6666:7777:8888) or compressed format (eg 2000::a).
- When PTP Multicast operation chosen, the connected Master and Connected Slave IPv6 addresses have only the six least significant address bytes displayed. The ten most significant bytes of the IPv6 multicast address are not used in the multicast address comparison in the current software release and they are displayed as “-” (eg -::-::-::-:6666:7777:8888). Please contact the Calnex support team if this causes specific problems.
- Within emulated PTP settings, the range of possible domain numbers has been extended to 0-255 (from 0-127 previously). This allows configuration as required for certain applications, for example when using Paragon-X Master Slave emulation for the PTP Power Profile.
- Script recorder does not support manual setting of filters through ‘flow filter’ in Through Mode operation. This can be addressed by saving filter settings and then recalling the saved settings in your script.

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