TimeProvider 4100

Gateway Clock

TimeProvider 4100 – Gateway Clock

DISTRIBUTES TIMING FLOWS

MULTIPLE INPUTS

LAYERED PROTECTION

NTP
PTP
1PPS ToD
1PPS 10 MHz
E1/T1

GNSS
1PPS 10 MHz
1PPS ToD
PTP
E1/T1

Core PTP
GM Network Redundancy
Extended Holdover (Rb)

GATEWAY CLOCK

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The Front….

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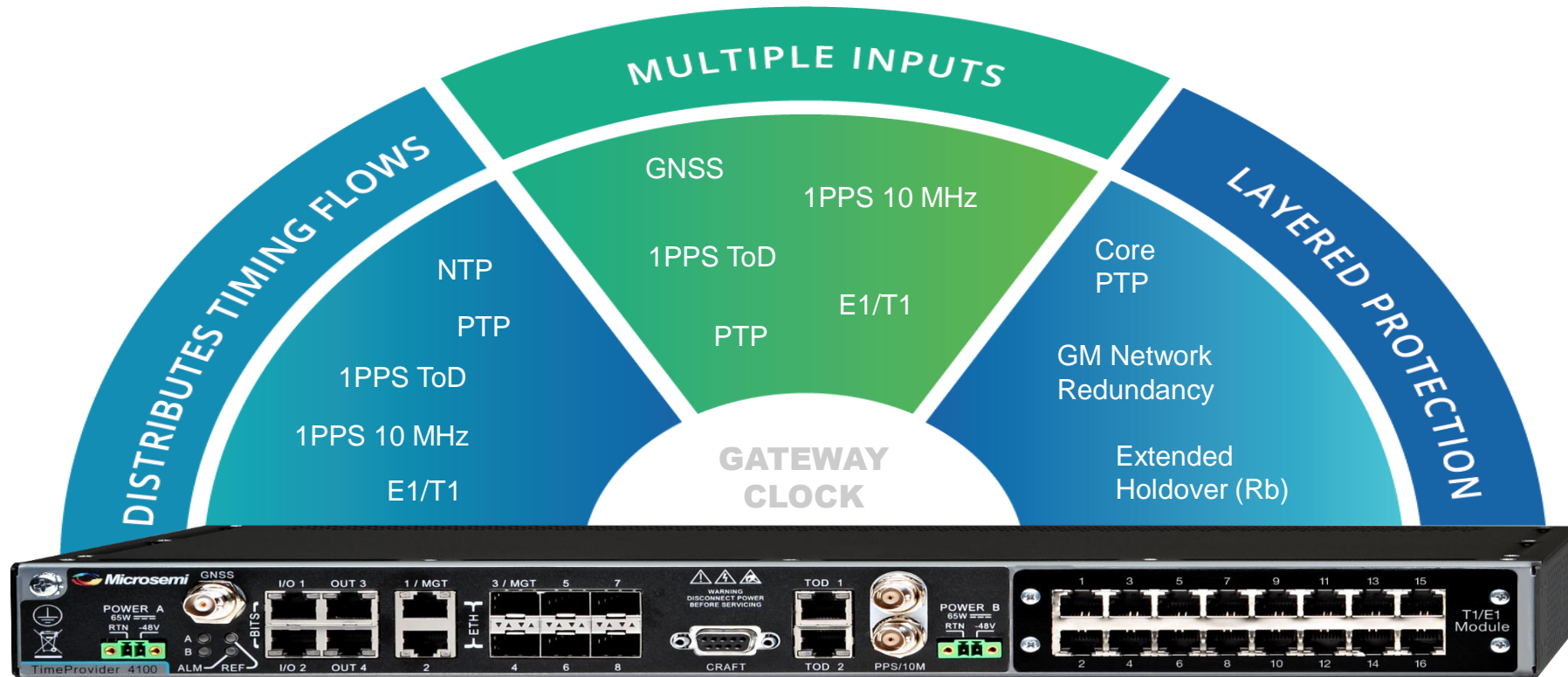
Under the Hood

Flexible – E1/T1, 1GbE, Electrical, Optical

**4x
E1/T1**
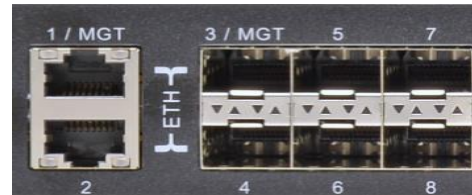
**8x ETH
2x RJ-45
6X SFP**

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Product – Physical Outline

GNSS

Craft Port RS232

Power B DC

16 x E1/T1/2.048Mhz/1.544Mhz Out internal Expansion RJ48c

4 E1/T1 Ports RJ48c 120 Ohm

8 ETH ports (6 SFP + 2 RJ45)

2 x 1pps/10Mhz In/Out

Power A DC

2x E1/T1/2.048Mhz/1.544Mhz In/Out (programmable)
2x E1/T1/2.048Mhz/1.544Mhz Out with SSU function

2 x 1pps/ToD In/out

1 x Packet Ethernet In + Management (with SyncE) - 1 x RJ45 or 1x SFP cage. Either in-band Mgmt. or Out-of-band.
6 x packet Ethernet Out (with SyncE) - 1 x RJ45 and 5 x SFP cage

Hardware Description
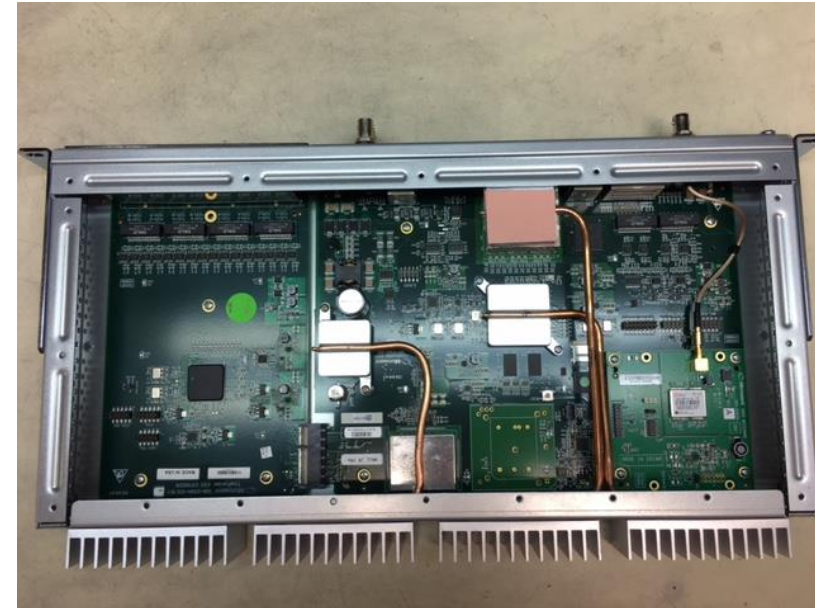
Feature	Description
Telecom Rack	1U, 300mm depth maximum
Power	DC – dual input
Oscillator choice	Standard oscillator on main PCB, Mini-OCXO Factory options – OCXO and Rubidium
GNSS Support	GPS, Glonass and Galileo QZSS, SBAS Beidou with specific antenna kit
SyncE	SyncE input – each PTP client port SyncE output - any other port maximum 2 SyncE inputs

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New Architecture – Futureproof "Plumbing"
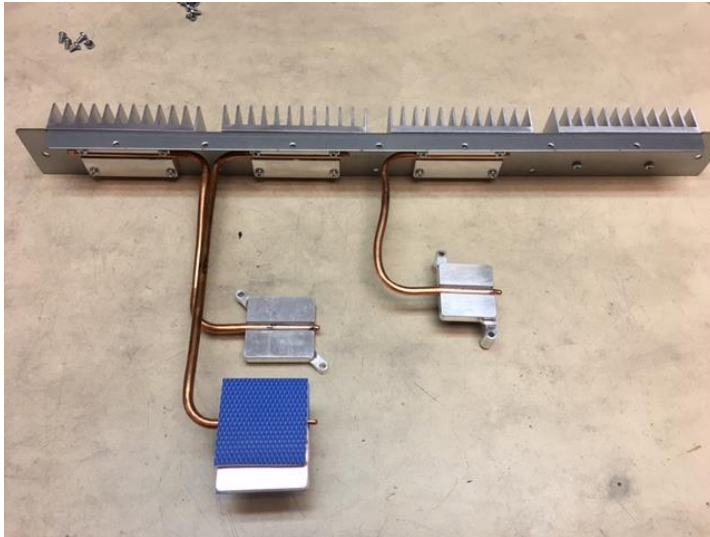
Leading with new technology adoption
Fanless Device
Benefits for product evolution

No Rotation
No Moving Parts
Passive heat sinks

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Multiple Constellations

Base Units – Many standard features

Software Capabilities – PTP, NTP

Feature	Description
PRTC	Meets ITU 100ns specification
PTP	
PTP GM - Frequency	Ethernet Default, Default (IPv4 only), Telecom-2008, ITU-G.8265.1
PTP GM - Phase	ITU-G.8275.1, ITU-G.8275.2
PTP Input (client) - Frequency	Telecom 2008, ITU-G.8265.1
PTP Input (client) - Phase	ITU-G.8275.1, ITU-G.8275.2
PTP Input (client)	BMCA and alternate BMCA support
PTP Profiles - Serving mix of clients	Multiple PTP profiles support for box
NTP Reflector	
NTPr Support	V4 and V6 NTP reflector - FPGA implementation, more secured, 20,000 tps

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Scalability

512 PTP clients
at 128 pps Unicast

515 Total VLANs
512 VLANs GM IPv4 & IPv6
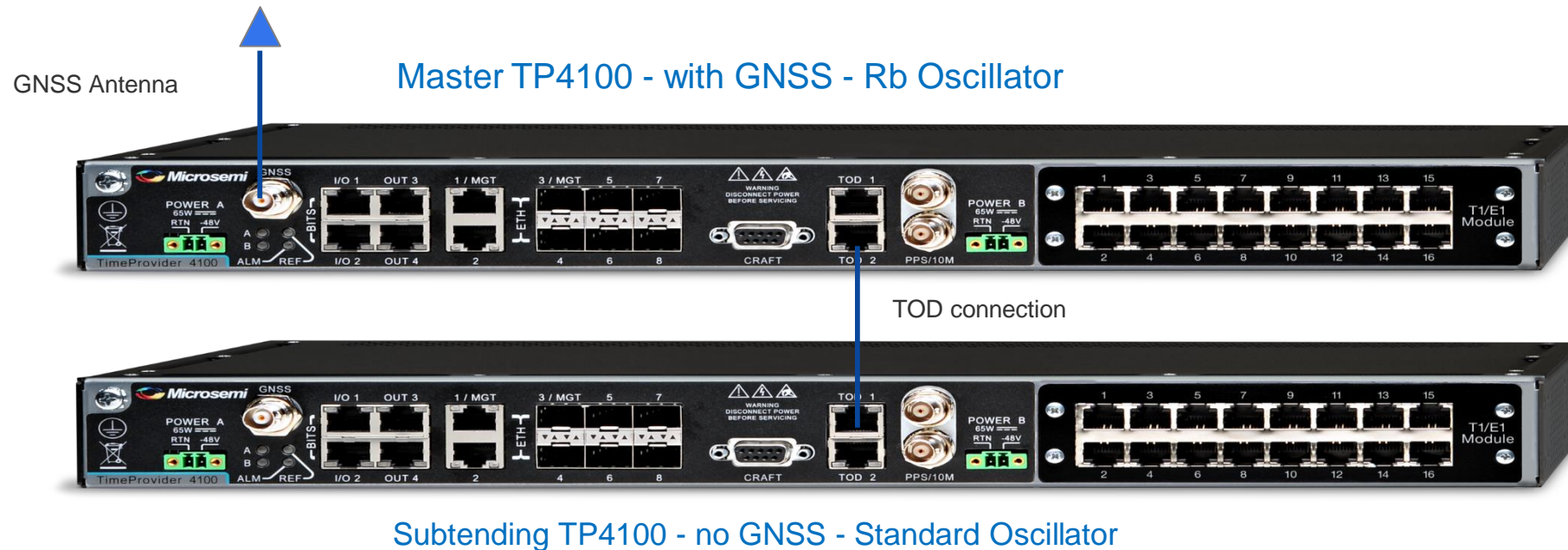1 VLAN per client (2)
1 VLAN for Management

20,000 NTP tps

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Upgrade Options

Hardware Option	Upgrade
Oscillator – base mini OCXO	OCXO or Rubidium
Expansion Module	16 ports – E1/T1

Software Option	Upgrade
NTPr	NTP reflector license
PTP Client Scalability – base 64	128, 256, 512 upgrade licenses
TimePictra Management	Node license

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System Expansion – Subtending

- Slave TP4100 & Master TP4100 : subtend using TOD I/O
- Doubles port count : 12 x Packet Sync, and 40 x E1/T1 Sync

GNSS Antenna

Master TP4100 - with GNSS - Rb Oscillator

TOD connection

Subtending TP4100 - no GNSS - Standard Oscillator

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Reliability, Robustness

Maintain performance levels for a period of time until technicians can re-establish or fix the disruption
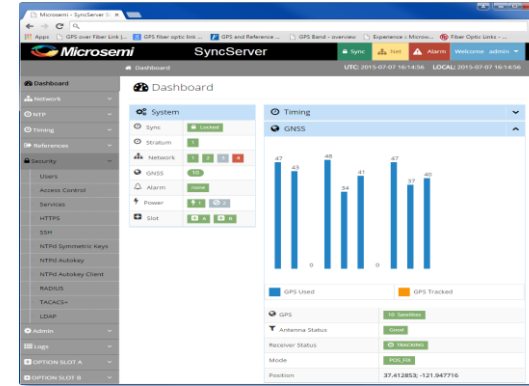

Oscillator Choice

Geographical Redundancy

APTS

Bridging Time

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Management & Security
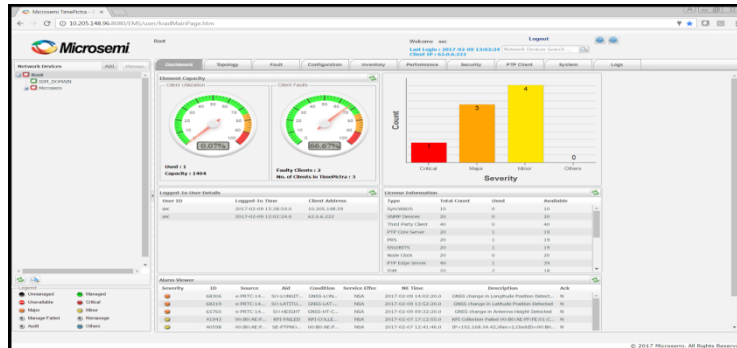
TP10 - Full FCAPS

webGUI
Monitoring
Status Dashboard

Internal Log

SNMP

SSH

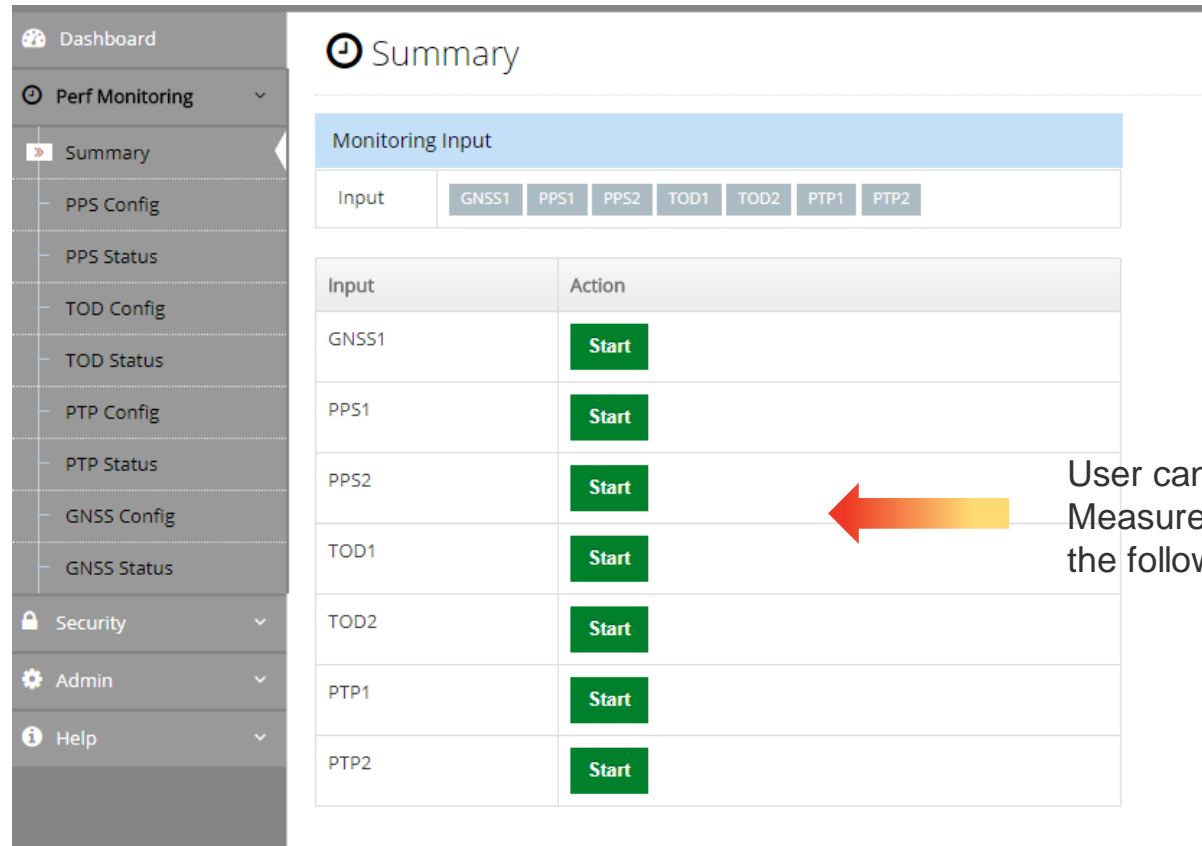Separate Management Port

Firewall

In band Management

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Monitoring Overview

PTP Calculated in TP4100
Time Error - TE
Daily path offset average value
cTE
Max|TE|
TE threshold alarm

1pps
1PPS Input to 4100 Monitoring - TE
Daily path offset average value
cTE
Max|TE|
TE threshold alarm

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Performance Monitoring Summary page

Summary

Monitoring Input

Input	GNSS1	PPS1	PPS2	TOD1	TOD2	PTP1	PTP2
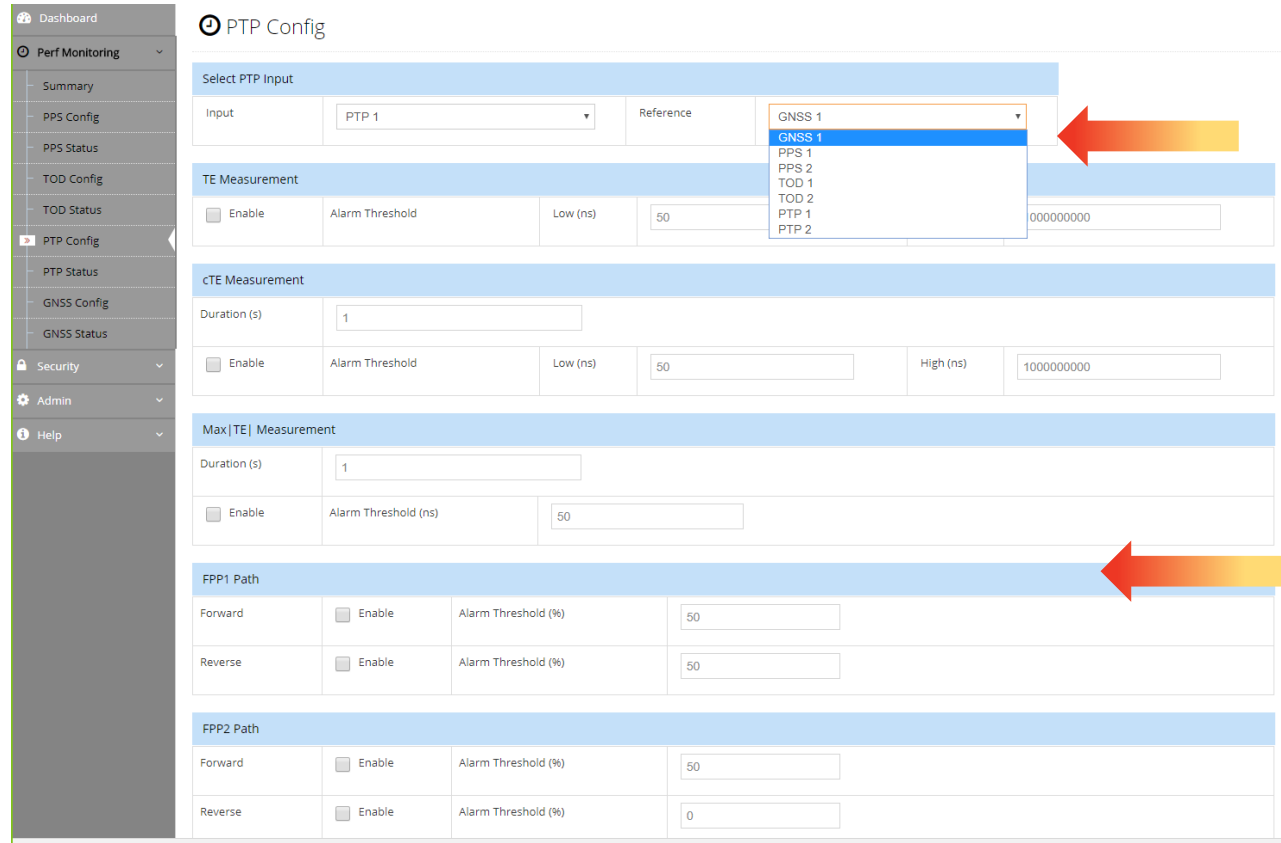
Input	Action
GNSS1	Start
PPS1	Start
PPS2	Start
TOD1	Start
TOD2	Start
PTP1	Start
PTP2	Start

Dashboard
Perf Monitoring
  Summary
  PPS Config
  PPS Status
  TOD Config
  TOD Status
  PTP Config
  PTP Status
  GNSS Config
  GNSS Status
Security
Admin
Help

User can start up to 4 parallel Measurements in parallel from the following phase channels

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Monitoring Web-Pages : PTP1/PTP2 Configuration page

Any Single Reference from 7 possible inputs

Measured Parameters: TE, cTE with User Threshold, Max |TE|, FPP1/FPP2 Forward and Reverse Threshold

Real Time Graphing of PTP channels

On time results will be saved including floor measurements

Results trending on Graph

Results in 1 sec resolution can be exported to TimeMonitor or 3rd party tools

TP4100 Strengths Summary

Flexibility	• Legacy & New – Frequency, Phase, E1/T1, 1588 • Numerous Ports - 4+16 E1/T1 ports and 8 Ethernet ports • Expansion – internal module 16xE1/T1
Scalability	• 512 1588 PTP Clients at 128 pps, NTP 20,000 tps
Resiliency	• Back Up to GNSS – PTP Input, APTS • Oscillator Options – Mini OCXO, OCXO, Rubidium • Dual Power
Evolutive	• Modern Platform – latest electronics, FPGA, Galileo • Existing & Future Standards, Trends – 1588 Phase profiles, PRTC compliant
Feature Rich Base Unit	• Hardware & Software rich feature set
Management	• Sync Portfolio – full FCAPS • Monitoring – PTP, 1pps, presentation GUI • SDN model evolution – TimePictra platform

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TP4100 v2 – Summary of main features

Capabilities	
10G ports	4 x SFP+ and additional 4 x SFP
Redundancy	1:1 software based
Higher capacity	1,000 or greater
PRTC-B Demo	PoC of L1/L2 receiver with < 40ns performance
Dual Active-Active PTP client	Hitless switching for East-West architecture
Enhanced monitoring	MTIE/TDEV for SyncE and E1/T1

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