Xcompass S10 Network Emulator

With rapid development of network technology, various applications based on new technologies are also changing our lives. However, the real network is not perfect. During the end-to-end transmission process, business traffic has to pass through different physical environments and network equipment. Accidents will always occur, resulting in impact to network quality. How to simulate the real network environment in lab to verify the operation of network equipment and applications is a key challenge currently.

The Xcompass-S network emulator launched by Xinertel is a solution for network impairments, which based on FPGA architecture to achieve 100% line-speed performance. Xcompass-S supports network impairments like delay, jitter, packet loss, out-of-order, duplicate packets and error packets with nanosecond-level accuracy, which help to verify the performance of network equipment and applications and provide basis for optimizing performance. It can effectively reduce the costs and ensure the network quality for customer.

XCompass S10 supports native 10G/1G interfaces.

▌ Key Features

- Support 10/100/1000M RJ45/100M/1000M SFP and 10G SFP+interfaces
- Based on FPGA architecture, achieve 100% line speed performance
- Port-based optical fiber flashing and optical link control impairments
- Support the network impairments with nanosecond level accuracy
- Support network impairments like delay, jitter, packet loss, out-of-order, duplicate packets and error packets etc
- High-precision network impairment ensures test repeatability
- Comprehensive and detailed statistics
- Web based GUI without additional client installation
- Support Python API

▌ Specifications

Hardware and electrical characteristics	
Port speed	Fiber:1G/10G; Copper:1G
Port density	1G Copper: 2; 1G fiber: 2; 10G Fiber: 2
Interface	10M/100M/1000M(RJ45); 100M/1000M(SFP); 10G (SFP+)

User reservation	By port type, occupied by port group
Weight(kg)	4.6
Dimensions(W x H x D)	438mm x 54mm x 400mm
Temperature	Working: 0 ° C to 35 ° C; Storage: -40 ° C to 70 ° C
Humidity	Working: 20% to 85%; Storage: 20% to 85%
I/O	1 RJ45 10/100/1000M Base-T management interface; 1 micro HDMI interface;2* Type-A USB 2.0 interfaces; 1 LCD screen; 2 QSFP28 interface
Switch/Display	Power On/Off Key on front panel
Chassis power supply	1*220(1 ± 10%) v; 50(1 ± 5%) Hz
Max power consumption(W)	100W
Time accuracy	5ns
Internal clock source	Stratum-3, +4.6ppm

Network impairment

Flow filter	Filtering mode: Basic, Advanced(supports 8*6-byte filtering fields) Filtering rules: Filter by Byte, MAC address, IP address, protocol type, port number Operation rules: AND, OR, NOT
Delay	Maximum delay at full line speed: 800ms(10G), 320ms(25G), 200ms(40G), 80ms(100G)
Jitter	Jitter model: fixed, Gaussian, Gamma, Step Jitter mode: single, repeated Time mode: single frame, time window(r100ns~1638300.0ns, accuracy: 0.1us)
Out of order	Out of order mode: single, periodic Out of order depth range: 1-32 frames
Bandwidth limit	0-100Gbps
Packet loss	Packet loss modes: single, burst, proportional, continuous, Poisson, Bernoulli loss. Burst packet loss range: 0-10000 frames Ratio: 0.00001%~99.9999% Packet loss period: 0~10.000s, repetition period 0~600.000s, with a step of 0.001s User defined packet loss: 32~320000bytes, with 32 as the basic unit Proportional burst packet loss: 1-99%, number of bursts: 1-320, optional repetition Proportional burst loss enhancement mode: 1-99%, number of bursts: 1-250, optional repetition
Duplicate	Repetition mode: single, burst, proportion, continuous burst Repetition range: 0~10000% Ratio: 0.00001%~99.9999% Repetition period: 0-10.0s, repetition period 0-600.0s, with step of 0.1s
Modification	Tampering or replacing fields: any byte in the first 256 bytes of the frame
Corrupt	Corrupt type: CRC error, IPv4 checksum error Corrupt mode: single, burst, proportional, continuous burst Corrupt range: 0-10000 frames Ratio: 0.00001%~99.9999% Repetition period: 0-10.0s, repetition period:period 0-600.0s, with step of 0.1s
Physical Link Impairment	Error Type: Preamble Error Impairment Patterns: Single, Burst, Continuous, Proportional(Range: 0.00001% to 99.99999%) Burst Impairment Count Range: 0 to 10, 000 frames Repetition Period: Impairment Interval 0 to 10.0 seconds, Repetition Period 0 to 600.0 seconds, Step Size 0.1s
Impairment profile	8 impairment profiles 8 impairment profiles allow 16 impairment profiles(8 bidirectional) to be independently configured

Traffic Generator

Maximum frames per port	64
Frame length	64 -1518 Byte(excluding CRC)
Transmit mode	Sequential, Random, Reverse
Number of transmission	0~232, 0 represents cyclic transmission
IPG settings	Minimum 8 Bytes

Statistics

Port Statistics	Total frames, total bytes, byte rate, frame rate, Pause frames, broadcast packets, VLAN packets, QinQ packets, ARP packets, MPLS packets, CRC error packets, Undersize packets, Oversize packets, Jumbo packets, Fragment packets, Jabber packets, IPv4 packets, IP length error packets, IPv4 header verification error packets, IPv6 packets, TCP packets, UDP packets, ICMP packets, Merge packet loss, UDP checksum, TCP checksum.

Capture

Capture mode	Support capture by filtering template Supports 64-16383 byte capture with CRC