HoloWAN®

HoloWAN Ultimate

WAN Emulator

Product Data Sheets

Jiangmen Yunzheng Technology Co., Ltd
http://msytest.com

HoloWAN Ultimate Features :

- **Easy to use :** Plug and play, no need to install any applications, quickly issue damage configurations through a simple and easy-to-use Web GUI.
- **Multiple links :** A single simulation engine can simulate up to 15 independent virtual links, meeting the needs for multitasking parallel testing.
- **High-performance link :** Supports the simulation of virtual links from 1bps-25Gbps, with bandwidth limitation control granularity accurate to 1bps.
- **More comprehensive delay and jitter :** One-way delay and delay jitter of up to 10 seconds can be constructed, with delay control granularity accurate to 0.01ms. It also supports uniform distribution, normal distribution, custom normal distribution and other delay jitter modes.
- **More comprehensive packet loss :** Construct 0-100% random packet loss, provide 0.0001% packet loss control accuracy, and also support complex packet loss modes such as burst , period , Gilbert-Elliott packet loss.
- **More comprehensive bit error :** Construct random bit errors in the content of the packet .Also supports multi-range error coding and packet error damage modes.
- **More comprehensive comprehensive impairment functionality :** HoloWAN Ultimate also support modify, recordering, duplication, queue depth, frame overhead, background traffic, and MTU damage.
- **Packet capture and analysis capability :** During the test process, it captures packets and displays the delay, packet loss, and error coding that each packet has suffered in real-time in the

form of a Gantt chart. It can compare packets before and after damage online, or export packets before and after damage as pcap files.

- **Network recording and playback :** Use the network recording tool provided by HoloWAN to record the changes in network delay and packet loss rate over a period of time. Import the recorded data into HoloWAN for playback, and accurately reproduce the delay and packet loss rate of the real network in HoloWAN.
- **Open API :** Every atomic function can be controlled through the Python API or Restful API, integrated with various test automation tools, to improve test efficiency and liberate productivity.
- **Statistics list and charts :** The statistical list provides real-time tallies of damaged packets and supports the saving and downloading of all damage statistics data since the device was powered on. Furthermore, statistical charts present the real-time fluctuations of the packet rate in the form of a line graph, helping users to more intuitively understand the changes in packet rate before and after damage occurs.

HoloWAN Ultimate can be used in :

- **simulate wireless networks,such as 2G、3G、4G、5G**

Wireless network technologies, such as 2G, 3G, 4G, 5G, WiFi, are often plagued by network issues like latency and jitter, packet loss and network congestion. HoloWAN can simulate these network impairments to construct complex network environments, allowing for the testing of wireless applications' adaptability and stability in real-world network conditions.

- **Simulating satellite networks**

Satellite networks typically have limited bandwidth, latency exceeding 500 milliseconds, and a bit error rate as high as 1x10^-6, posing significant challenges to the protocols and programs operating within them. In response, HoloWAN has been specially designed to better simulate the high latency and high bit error rate of satellite networks. HoloWAN is used to test satellite network protocols and programs with the aim of optimizing them.

- **Evaluating the required network bandwidth**

Using HoloWAN, one can simulate various degrees of network impairments such as bandwidth limitations, latency and jitter even in a network with good conditions. This helps you to more accurately assess the performance and stability of applications under a variety of network conditions and to determine the minimum bandwidth required to maintain stable operation of the applications.

- **Network Authentication**

Using HoloWAN to simulate bandwidth constraints, latency, jitter, packet loss and other conditions allows for comprehensive and in-depth testing of various network devices and deployment strategies. Helps to assess the performance of different network devices and solutions in various network environments, thereby enabling informed decisions on the optimal selection and deployment of network equipment.

- **Product testing**

Using HoloWAN to simulate real-world Wide Area Network conditions allows for the testing of network accelerators, application delivery devices, compression devices, WAN optimization appliances, flow control equipment, network behavior monitoring devices, and network security equipment. This ensures that these devices can operate stably and efficiently in actual WAN environments.

- **Application testing**

During the development of C/S or B/S systems, such as financial systems, stock trading platforms, online banking, and medical management systems, HoloWAN is used to simulate a real-world Wide Area Network environment to test the systems. This allows for the evaluation of system performance in the face of latency, packet loss, and network congestion, and facilitates the adjustment of algorithms and strategies in both server and client-side systems.

- **Website Testing**

Before launching a website platform, use HoloWAN to construct impairments such as latency, jitter and packet loss to conduct in-depth testing of the website platform. Simulate various network conditions such as slow network connection speeds to assess the stability of the website, so that prevent potential network issues that may arise when the website is deployed in a real-world wide area network.

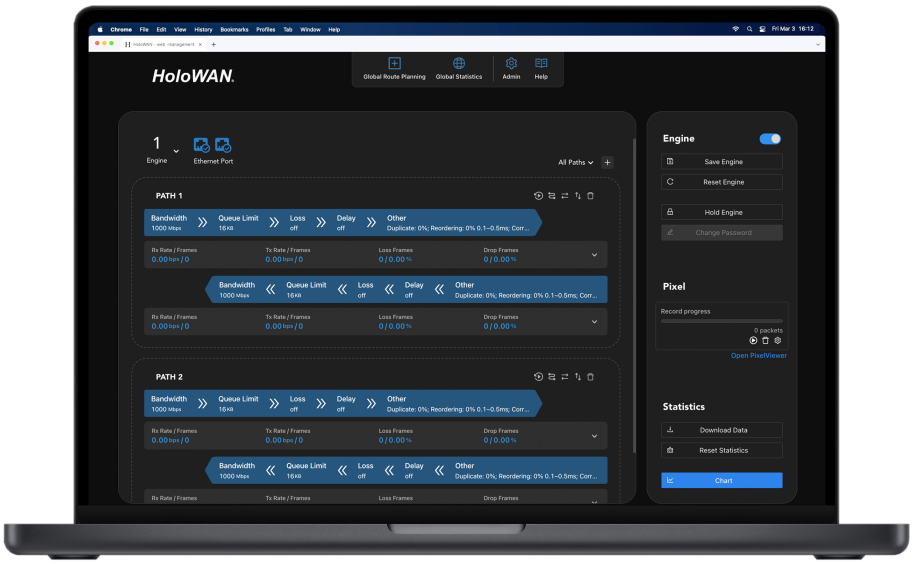
- **Real-time audio and video applications**

HoloWAN is utilized to emulate authentic network conditions for testing real-time audio and video network applications, such as video conferencing, live streaming, online gaming, Voice over IP (VoIP), Video over IP, and video surveillance. The testing assesses the resilience of these audio and video applications to packet loss and disorder, as well as their ability to automatically modify sending strategies when confronted with suboptimal network conditions.

- **Product demonstration**

When you need to demonstrate to your customers how your product operates in actual network conditions, bring along HoloWAN. It will showcase your device' s stable operation and efficient processing capabilities across a variety of complex network environments. This will assist you in presenting your product' s powerful features and exceptional performance in the most direct and intuitive manner.

Web GUI :



Products :

HoloWAN 1200U

one 1 Gbps emulation engines

HoloWAN 2600U

three 1 Gbps emulation engines

HoloWAN 10GEU

one 10 Gbps emulation engines

HoloWAN 24GEU

twelve 1 Gbps emulation engines

HoloWAN 25GEU

two 25 Gbps emulation engines

Comparison of HoloWAN Ultimate models :

Models	1200U	2600U	10GEU	24GEU	25GEU
Capacity					
Engine Number	1	3	1	12	2
Maximum Bandwidth	1,000Mbps	1,000Mbps	10Gbps	1,000Mbps	25Gbps
Path Number Of Per Engine	15	15	15	15	15
Maximum Packet Rate	0.3Mpps	3Mpps	3Mpps	3Mpps	3Mpps
Emulation Capabilities					
Bandwidth	Fixed , Jitter , Token Bucket				
Queue Limit	Simple , Drop Tail , RED				
Corruption	Bit Error , Bit Range Error , Packet Error				
Delay	Constant , Uniform , Normal , Custom , Jitter , Gamma , Accumulate&Burst				
Loss	Random , Cycle , Burst , Gilbert-Elliott , Jitter , 4-State-Markov				
Modify	Normal , Cycle , Random				
Recordering	Normal , Jitter , Cycle				
Duplication	Normal , Jitter				
Other Damage	Frame Overhead , Background Utilization , MTU Limit				
Packet Classification	IPv4 address , IPv6 address , MAC address , VLAN , TCP/UDP/SCTP port number , MPLS Label , PPPoE , RAW 1-Byte offsets , RAW 4-Byte offsets , Tunnel(GRE) , Combination				
dditional Parameters	• Packet capture and analysis, comparing the message before and after the damage, Gantt chart display of the damage process ; • Recording and playback of network bandwidth, latency, and packet loss, with a playback parameter change frequency of 0.1s, visualization of the network scenario playback process, and updates to the network scenario database ; • Basic Network Data Template ; • GRE Tunnel .				
Other Key Information					
Size	1U	2U	2U	2U	2U
Management	1 * Gigabit Ethernet	1 * Gigabit Ethernet	1 * Gigabit Ethernet	1 * Gigabit Ethernet	1 * Gigabit Ethernet
Ethernet Ports	2 * RJ45 1Gbps	6 * RJ45 1Gbps	2 * SFP+ 10Gbps	24 * RJ45 1Gbps	4 * SFP28 25Gbps
GUI	web				
Support & Warranty					
Hardware Warranty	3 year				
API	restful API , python API				
Technical Support	API technical support , Remote technical support				

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