

# Spirent Attero-100G

## High Speed Ethernet Impairment Testing

### Key highlights

- Prove 100GbE and 40GbE device performance with full line-rate network emulation
- Full line-rate delay of up to 80 ms at 100G and 200 ms at 40G.
- Boost full line-rate delay to 256 ms at 100 G and 640 ms at 40G (optional)
- Introduce lost, mis-ordered, errored and repeated packets
- Latency and jitter to nanosecond accuracy means repeatable testing
- Flexible profile options to test multi-flow CoS impairments
- Extensive and powerful set of filters to configure and inject impairments
- Web-based GUI with built-in controller
- FPGA architecture protects your investment
- Integrated Tshark support

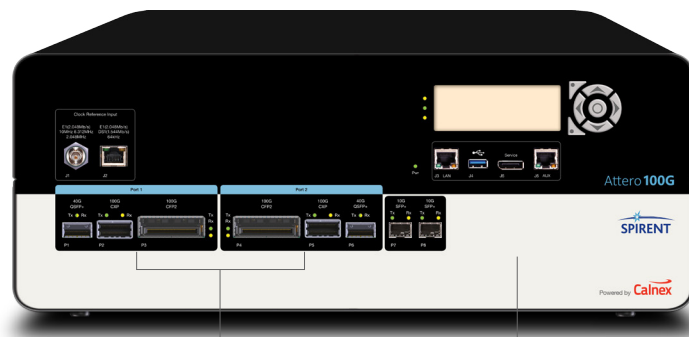
### Test with real-world network conditions in your lab

Latency in networks really is a big deal. It dramatically reduces throughput and when it affects high speed links carrying applications such as real-time gaming and streaming video, consumers can get pretty disgruntled. Even the financial industry now demands ultra-low latency as algorithmic trading becomes more widespread. So when you are developing high-precision network products, it is critical that you validate their performance with real-world network conditions. And that means latency.

It is impractical and almost impossible to use large, unwieldy and expensive drums of fiber to test your design margins and tolerance to the effects of latency—a 200 km drum of fiber only provides 1 ms of delay, is not controllable and needs amplification due to signal loss. Not much help when you need to emulate a long-haul network. Alternatively, you could use the Spirent Attero-100G. This high speed Ethernet impairment tester can be used to emulate propagation, routing, switching and buffering delays by up to 256 ms at 100 Gb/s and 640 ms at 40 Gb/s. That's the equivalent of over 50,000 km of fiber at 100 Gb/s. Plus, the Attero-100G offers precise adjustment of the network delay so that you can easily and conveniently model different fiber lengths to emulate:

- Global, continental and transoceanic networks
- Delay sensitive video traffic
- Delay critical data transmission for financial services applications

What's more, you can assess the impact of network congestion, queuing issues or multi-path fading on your device's performance. Attero-100G lets you introduce lost, mis-ordered, errored and repeated packets with nanosecond accuracy to help you define the performance limits of your device, tune performance, or to detect and eliminate problems before deployment. In other words, you don't need to build inflexible, unrealistic and costly networks to validate your device's performance. Simply use the Attero-100G to simulate real-world network conditions for maximum stress-testing.



High speed interface ports for both 100GbE and 40GbE are supported:

- Two CFP2 ports for 100GbE LR4/SR4\*
- Two CXP ports for 100GbE SR10
- Two QSFP+ ports for 40GbE

\*SR4 is a future release

The Attero-100G offers extensive traffic filtering capabilities allowing you to create simultaneous multi-profile impairments. Plus, you can add delay and packet corruptions to each independent profile.

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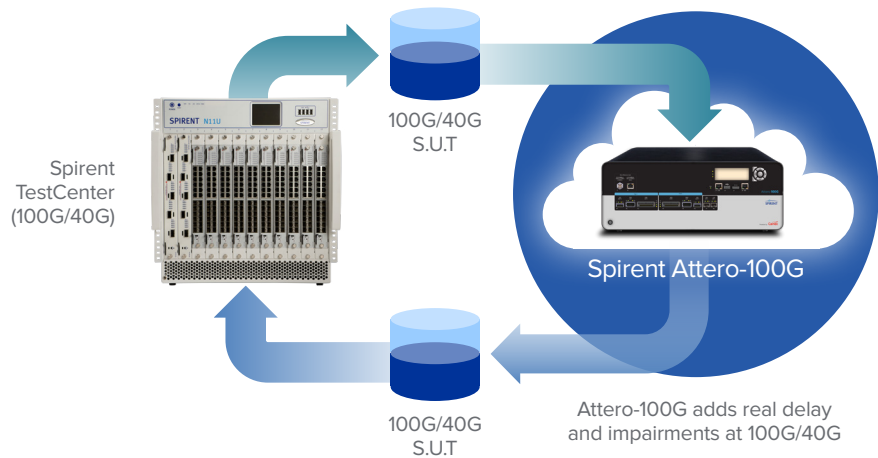
Use the Spirent Attero-100G for testing:

- IPTV, VoIP
- Cloud Computing
- CoS/QoS Levels
- Server Actualization/Consolidation
- WAN Acceleration
- Telecom/Federal Applications
- ADSL, FTTH
- LAN/WAN Emulation
- Customer Proof of Concept
- SLA Verification
- ITU-T Y.1731
- IEEE 802.1 ag
- Storage Networks
- Mobile Subscriber Networks
- Content Delivery
- Cable/Broadband
- Carrier Wi-Fi

## Applications

Use Spirent TestCenter to emulate user and network traffic and test switches, routers, applications, even new routing protocols under realistic network conditions:

- Introduce different impairments for different CoS levels
- Add delays that are accurate to nanoseconds
- Optimize network throughput performance



## Combine with Spirent TestCenter for E2E protocol and scale testing



## Use stand-alone for inline 100G/40G emulation



## Web-based User Interface

Control the Attero-100G from any web-enabled device, including your tablet.

The top screenshot displays the 'Data Path' configuration page. It features two modes: 'Tx + Rx Mode' and 'Thru Mode'. The 'Thru Mode' is selected, showing a diagram where data on port 1 is routed through the instrument to port 2 and vice-versa. Below this is the 'Port Selection' section, which shows a physical device with two ports, Port 1 and Port 2, each with a green indicator light.

The bottom screenshot shows the 'Packet Corruptions' configuration page. It includes a 'Profile Statistics' section with 'Lost Packets: 48284' and 'Total Packets: 2444000'. The 'Packet Corruptions' section is set to 'Enabled: ON' with a 'Rate %' of 1.05 and a 'Periodicity' of 'Packet Count' at 3200000999. Below this is a table of profiles for Port 1 and Port 2.

| Port            | Profile | Filter       | Delay/Jitter | Corruption   | Bandwidth  |
|-----------------|---------|--------------|--------------|--------------|------------|
| Port 1 Profiles | 7       | West Video   | Delay/Jitter | Corruption   | Bandwidth  |
|                 | 6       | West Voice   | Delay/Jitter | Corruption   | Bandwidth  |
|                 | 5       | West Control | Delay/Jitter | Corruption   | Bandwidth  |
|                 | 4       | West IPv4    | Delay/Jitter | Corruption   | Bandwidth  |
| Port 2 Profiles | 3       | East Voice   | Delay/Jitter | Corruption   | Bandwidth  |
|                 | 2       | East Control | Delay/Jitter | Corruption   | Bandwidth  |
|                 | 1       | Default      | No Filter    | Delay/Jitter | Corruption |

## Avoid the 'wait-and-see' approach

### Powered by Calnex

The Attero-100G is powered by technology from Calnex Solutions, proven leaders in precision test equipment with best-in-class accuracy and performance.

Validate the performance of your applications, services, protocols or devices against a wide range of delay, bandwidth and impairment conditions found in real-world networks. The Attero-100G lets you prove 100GbE and 40GbE network and device performance with full line rate network simulation, allowing you to:

- Evaluate performance and characterize end user experience
- Perform negative or conformance type testing (corruption, modification, etc.)
- Discover and fix network related issues early

For more information on the Spirent Attero-100G, call your Spirent sales representative or visit us at [www.spirent.com](http://www.spirent.com).



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## Spirent services

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at [www.spirent.com](http://www.spirent.com) or contact your Spirent sales representative.

### Technical specifications

|                           |  |
|---------------------------|--|
| <b>Optical Interfaces</b> | Ethernet (optical CXP, CFP2 and QSFP+ modules not supplied). <ul style="list-style-type: none"><li>100GbE: CXP (SR10) – 2 slots (optional)</li><li>100GbE: CFP2 (LR4/SR4) – 2 slots (optional); Note: 100GbE SR4 is a future release</li><li>40GbE: QSFP+ (LR4/SR4) – 2 slots (optional)</li></ul> Order the 100GbE option and/or the 40GbE option. At least one must be ordered |
|---------------------------|--|

|                                 |   |
|---------------------------------|---|
| <b>Internal reference clock</b> | Frequency Stability over Temp: $\pm 1.5 \times 10^{-7}$ |
|---------------------------------|---|

### Network Emulation

|   |  |
|---|--|
| <b>Line rate delay</b>  | Full line-rate delay of 80 ms at 100 Gb/s and 200 ms at 40 Gb/s  |
| <b>Delay boost</b>  | Full line-rate delay of 256 ms at 100 Gb/s and 640 ms at 40 Gb/s   |
| <b>Selection of flow from multi-flow environment</b><br>(Free update*/future release) | <ul style="list-style-type: none"><li>Powerful user-configurable filters including ranges and wildcards (e.g. VLAN ID, IP/MAC addresses, MPLS labels, TCP/UDP port, etc.)</li><li>Targeted GTPv2 control message impairments (e.g. create session request, modify bearer request etc.)</li></ul> |

|                            |   |
|----------------------------|---|
| <b>Impairment Profiles</b> | Standard product includes 2 profiles allowing 1 flow of impaired packets in each direction. Future release provides choice of 2, 4, 8 or 16 profiles. Each profile can be configured individually: <ul style="list-style-type: none"><li>4 profiles allows 2 flows of impaired packets in each direction</li><li>8 profiles allows 4 flows of impaired packets in each direction</li><li>16 profiles allows 8 flows of impaired packets in each direction</li></ul> |
|----------------------------|---|

|   |  |
|---|--|
| <b>Packet Corruption</b><br>(Free update*/future release) | <ul style="list-style-type: none"><li>Errored packets, lost packets, repeated packets, mis-ordered packets</li><li>Corruption modes: burst (1-10,000), rate (0.00001 to 100%)</li><li>Continuous or On/Off/Repeat based on time or number of packets</li></ul> |
|---|--|

|               |   |
|---------------|---|
| <b>Jitter</b> | Add independent delay/jitter distribution to each profile simultaneously <ul style="list-style-type: none"><li>Jitter range from 100 ms to 400 ms</li><li>Gaussian, Gamma (Internet), Step or Uniform distribution of delay</li><li>Readout of Max, Min Jitter and Max Delay for the applied distribution</li></ul> |
|---------------|---|

|                        |      |
|------------------------|------|
| <b>Timing accuracy</b> | 5 ns |
|------------------------|------|

### General

|                        |   |
|------------------------|---|
| <b>Web browser UI</b>  | Integrated Web-based user interface (supports Chrome, IE and Firefox)   |
| <b>Management port</b> | RJ45 LAN with Static or DHCP settable IP address  |
| <b>Remote control</b>  | <ul style="list-style-type: none"><li>Scripting via TCL, Perl and Python</li><li>Automatic Script Recorder for TCL, Perl and Python</li></ul> |
| <b>Rackmount</b>       | Rackmount kit included  |
| <b>Power Input</b>     | 100 -240 Vac  |
| <b>Maintenance</b>     | First Year SW and HW Maintenance included (extensions available)  |

### Related products

**Spirent TestCenter™** is an end-to-end testing solution for next generation networks—providing traditional performance testing to the rigorous analysis of Virtualization, Cloud Computing, Mobile Backhaul, and High Speed Ethernet.

**Spirent TestCenter™ Virtual** is the industry-leading solution that optimizes the performance of new cloud-enabled network services and innovations like SDN and NFV. TestCenter Virtual creates testing topologies to run on both control plane and data plane to stress simulated, virtualized network functions.

The **Attero-X**, **Attero-Lite** and **Attero-Virtual** family of Ethernet Network Emulators use dedicated impairment engines to provide nanosecond accuracy and full line rate traffic throughput from 100 Mb/s to 10 Gb/s. Apply delay, jitter and packet corruptions to selected traffic or capture 'real network' jitter profiles and replay these in the test lab.

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