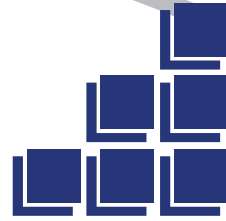


# STEP

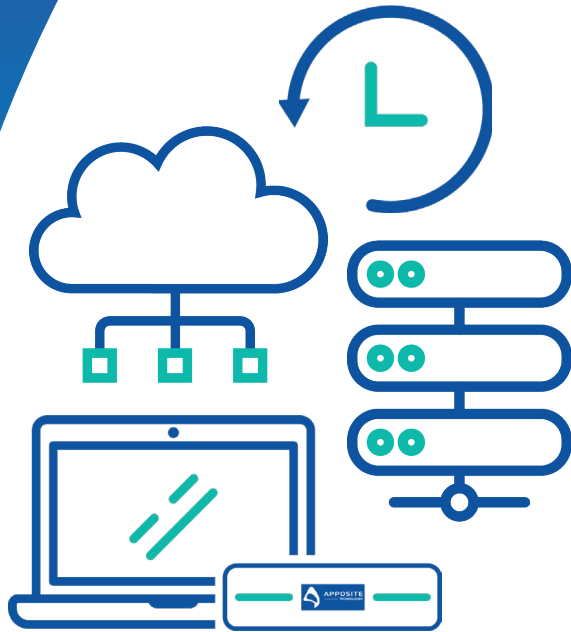
## ELECTRONICS

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APPOSITE  
TECHNOLOGIES

## Netropy® Network Emulators



### WAN Emulation Made Easy

- ✓ Simulate bandwidth, latency & jitter, loss
- ✓ Profile live networks and import into WAN simulation
- ✓ Replay capture files as background traffic
- ✓ Change WAN impairments and view results in real time
- ✓ Configure via browser or automate with API
- ✓ Available in hardware and virtual appliances and in AWS

**Apposite Technologies makes it easy to test the performance of applications over the wide-area network by offering high-precision network emulation appliances with unmatched ease-of-use.**

Apposite's Netropy network emulators offer advanced capabilities to benchmark, troubleshoot, and optimize the performance of critical applications. Netropy's unique, high-performance Emulation Engine enables high-precision emulation of up to 30 separate WAN links to model complex network topologies or run multiple concurrent tests.

Each path is configured with its own bandwidth, latency, loss and other impairments. Endpoints can be assigned to the appropriate path by IP address range, VLAN, or any other packet identifier, and application port number.

Netropy models are available with up to 4 separate Emulation Engines per unit, and capacities up to 100 Gbps. Netropy is also available in a software version, NetropyVE, that runs as a virtual machine in virtual test environments and a cloud version, NetropyCE, that is available in the AWS Marketplace.

Netropy network emulators are configured and managed through an intuitive, browser-based interface for easy operation, or through a fully RESTful API for integration with test automation tools.

## FEATURES

**Easy to Use:** Netropy network emulators are quick to install, intuitive to configure, and easy to operate. The Netropy GUI provides the responsiveness of an application with the convenience of a standard web browser.

**Multiple Links:** Simulate up to 30 separate WAN links through each Emulation Engine.

**Multiple Engines:** Take advantage of multiple Emulation Engines in the N91, 10G2 and 10G4 models for concurrent testing or multi-user environments.

**Packet filtering:** Assign endpoints to different paths by IP address, VLAN, or any other packet identifier.

**Bandwidths up to 100 Gbps:** Accurately simulate links from 100 bits per second up to 100 Gbps.

**Latency up to 20 sec.:** Emulate delay and jitter of 10 seconds or more in each direction, in increments of 0.01 ms.

**Flexible interfaces:** The N61 and N91 are available with copper or SFP ports. The 10G1 and 10G2 offer 1/10 Gbps dual rate SFP+ ports for easy integration into 1 or 10 Gbps networks.

**Loss & Corruption:** Set random, burst, or periodic packet loss. Test the effect of corruption on voice and video applications.

**Capture & Replay:** Record the delay and loss characteristics of the production network as they vary second-by-second and replay them through the Netropy emulator.

**Background Utilization:** Test how applications run over a congested network without costly traffic generators or a rack full of client machines using Netropy's unique background utilization and PCAP replay features.

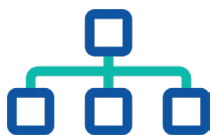
**Traffic Monitor:** View and download up to 24 hours of throughput graphs and link statistics.

**Automated Testing:** Automate testing using the fully RESTful API.

**Unsurpassed Precision:** Test with confidence — the high-precision Netropy Emulation Engine ensures accurate and reproducible results.

**Priced Right:** Get the functionality and performance you need at a price you can afford.

## Application Lifecycle Testing



TERRESTRIAL



WIRELESS



SATELLITE



INTERNET

### Network design:

Build "what-if" scenarios to choose between private lines, internet VPNs, and wireless and satellite networks to connect offices across the globe, then determine how much bandwidth to purchase to ensure critical applications perform as needed.

### Application validation:

See how applications perform prior to roll-out and avoid unpleasant surprises and panic fixes later.

### Vendor selection:

Compare products from different vendors to select the one that works best on your network.

### Tuning:

Adjust application settings to optimize performance and ensure a world-class user experience for every end user.

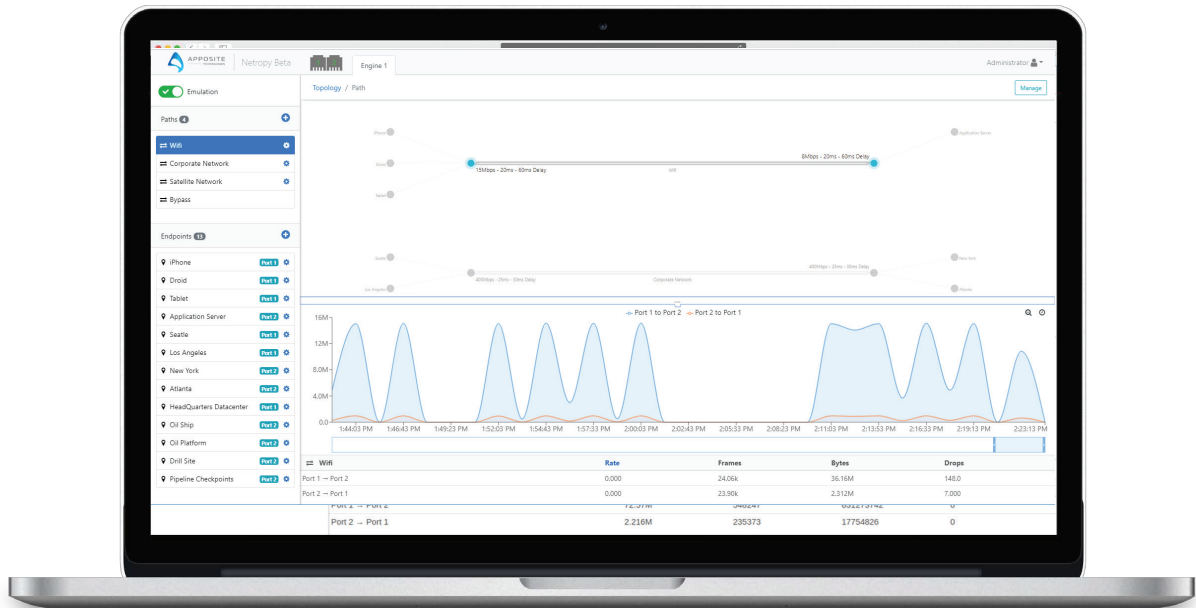
### Optimization:

Analyze the benefits of WAN acceleration and SD-WAN products to optimize the existing infrastructure.

### Troubleshooting:

Pinpoint the cause of reported problems and complaints, then validate potential solutions without disrupting the production network.

## USER INTERFACE



## PRODUCTS

### Netropy N61

Emulate complex networks up to 1 Gbps



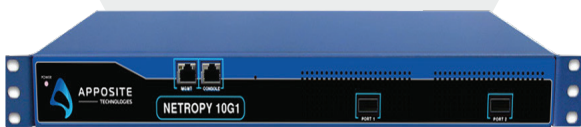
### Netropy N91

Four separate 1 Gbps emulation engines



### Netropy 10G1

Emulate links up to 10 Gbps



### Netropy 10G2

Two separate 10 Gbps emulation engines



### Netropy 10G4

Four separate 10 Gbps emulation engines



### Netropy 100G

100 Gbps Emulator, supports 25 & 40 Gbps



### NetropyCE

Cloud edition of 1 Gbps WAN emulator for cloud environments.

### NetropyVE

Virtual edition of 1 Gbps WAN emulator for virtual environments

## MULTI-LINK EMULATIONS

Each Emulation Engine can simulate up to 30 separate WAN links. Each Netropy unit contains up to 4 independent Emulation Engines, depending on the model.

### Emulate multi-site networks:

Model a full enterprise network of regional, branch, and local offices, telecommuters, and partners, all connected to headquarters or a centralized datacenter.

- View applications as they will be seen by different end users
- Verify the operation of application servers with concurrent users

### Side-by-side benchmarking:

Run separate tests side-by-side.

- View the effects of different conditions on application responsiveness
- Compare products from different vendors
- Tune application settings
- Analyze the benefits of acceleration and optimization products

### High scalability:

Simulate thousands of separate clients for testing cloud-based applications, mobile apps and gaming.

### Isolate individual applications:

Segregate traffic from different devices and apply impairments to specific applications.

### Concurrent testing:

Test a matrix of conditions by running multiple emulations in parallel.

## VIEW IMPACT OF NETWORK CONDITIONS



### Throughput

Test bulk data applications: File transfer, network storage, remote back-up / disaster recovery



### Responsiveness

Test interactive applications: File sharing (CIFS), virtual desktop (VDI), database applications, CRM, ERP, remote access, web, cloud computing, SAAS



### Quality

Test real-time applications: VoIP, video, IPTV

## About Apposite Technologies

Apposite Technologies makes WAN emulation easy by offering professional-quality network emulation tools at affordable prices. Apposite's award-winning Netropy and Linktropy WAN emulation appliances simulate bandwidth, latency, loss, congestion, and other network impairments with fine-grained precision to provide accurate simulations of any type of wide-area network. Netropy and Linktropy WAN emulators are widely deployed by leading enterprises, application and equipment developers, telecoms carriers, and government and military organizations around the world. Apposite Technologies – WAN Emulation Made Easy

Specifications	N61	N91	10G1	10G2	10G4	100G
Capacity						
Ethernet Ports	2 x SFP+ 1 Gbps or 2 x RJ45 1 Gbps	8 x SFP+ 1 Gbps or 8 x RJ45 1 Gbps or 4 x SFP+ & 4 x RJ45 1 Gbps	2 x SFP+ 1 Gbps/10 Gbps or 2 x RJ45 1 Gbps/10 Gbps	4 x SFP+ 1 Gbps/10 Gbps	8 x SFP+ 1 Gbps/10 Gbps	2 x QSFP28+ 100 Gbps
Max. Agg. Throughput	2 Gbps	8 Gbps	20 Gbps	40 Gbps	80 Gbps	150 Gbps
Emulation Engines	1 @ 1 Gbps	4 @ 1 Gbps	1 @ 10 Gbps	2 @ 10 Gbps	4 @ 10 Gbps	1 @ 100 Gbps
Maximum Packet Rate	3 million pps	12 million pps	29 million pps	59.5 million pps	119 million pps	32 million pps
Maximum Frame Size	9 KB	9 KB	9 KB	9 KB	9 KB	9 KB
Emulation Capabilities						
Packet Classification	IP source & destination address range (IPv4 or IPv6), VLAN, TCP or UDP port number, IP ToS, MAC address, MPLS label, or any other packet contents					
Bandwidth	100 bps – 100 Gbps in 1 bps increments (depending on model)					
Delay	0 ms – 10, 000 ms or greater in each direction in 0.01 ms increments; constant, uniform, normal distributions; replay recorded loss, accumulate & burst					
Loss & Corruption	random, burst, periodic, BER, Gilbert-Elliott, or recorded loss; data corruption; network outage					
Background Utilization	0 – 100% in increments of 0.1%; PCAP replay					
Queuing & Prioritization	RED or tail drop queue management; priority or round robin queuing					
Additional Parameters	Packet Reordering, Packet Duplication, MTU and Fragmentation, Queue Depth, Framing Overhead					
Interfaces						
Management	1 x Gigabit Ethernet, 1 x RS-232 serial console					
Power Supply	Single	Single	Single	Redundant	Redundant	Redundant
Security	SSL and SSH for secure management; per-user locking of engine configuration					
Warranty & Support						
Hardware Warranty	Hardware warranty is included with product license					
Support & Maintenance	Support is included with product license and software maintenance					
Ordering Information						
Part Number	N61-1G	N91-1G	N10G1-10G	N10G2-10G	N10G4-10G	N100G-100G
Product License 1-Yr	N61-R1YR	N91-R1YR	N10G1-R1YR	N10G2-R1YR	N10G4-R1YR	N100G-R1YR
Product License 3-Yr	N61-R3YR	N91-R3YR	N10G1-R3YR	N10G2-R3YR	N10G4-R3YR	N100G-R3YR
Port Options	N61-SFP	N91-SFP N91-C4S4	N10G1-SFP	N/A	N/A	N/A



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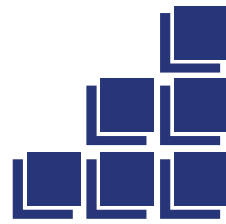
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# **STEP**

## **ELECTRONICS**

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## **Linktropy® WAN Emulators**



**APPOSITE**  
TECHNOLOGIES



### **WAN Emulation Made Easy™**

**Apposite® Technologies makes it easy to test the performance of applications over the wide-area network by offering high-precision network emulation appliances that combine unmatched ease-of-use with unbeatable prices.**

Apposite's Linktropy® WAN emulators simulate bandwidth, latency, jitter, loss, congestion, and other important link impairments to test the performance of applications in the lab under a spectrum of real-world conditions.

Through an intuitive, browser-based user interface, you can install the Linktropy WAN emulator and begin testing within minutes.

### **About Apposite Technologies**

Apposite Technologies makes WAN emulation easy by offering professional-quality network emulation tools at affordable prices. Apposite's Netropy and Linktropy WAN emulation appliances simulate bandwidth, latency, loss, congestion, and other network impairments with fine-grained precision to provide accurate simulations of any type of wide-area network. Netropy and Linktropy WAN emulators are widely deployed by leading enterprises, application and equipment developers, telecoms carriers, and government and military organizations around the world. Apposite Technologies – WAN Emulation Made Easy.



## FEATURES

**Easy to Use:** Linktropy WAN emulators are a snap to install and configure. Just plug in the Ethernet cables, specify your link conditions, and begin the emulation. No software to install, no training needed. The Linktropy GUI combines the responsiveness of an application with the convenience of a standard web browser.

**Bandwidths up to 1 Gbps:** Emulate links of any speed from 300 bits per second up to 1 Gbps.

**Delay up to 10 seconds:** Emulate latency from 0.1 ms up to 10 seconds in each direction in a constant, normal, or uniform distribution.

**Error Emulation:** Specify loss as a packet loss rate, bit error rate, or both.

**Congestion:** Determine the effects of congestion on bandwidth and jitter-sensitive applications by utilizing Linktropy's background traffic emulation.

**Multiple Links:** Emulate multiple links with the 8510 model. Four separate pairs of Ethernet interfaces make simulation of multiple links as easy as a single link.

**Bridging/Routing:** Install the Linktropy WAN emulator as either a bridge or router for easy integration with any test network.

**Copper or Fiber Interfaces:** Available with either copper or SFP ports for easy integration into any network.

**Flexible Capacity:** Pay only for the bandwidth that you need to emulate now, and upgrade later if you ever need to emulate higher speed links.

**Capture and Replay Live Network Conditions:**

Capture live network conditions with the Linktropy Recorder and replay them through the Linktropy WAN emulator to reproduce the varying characteristics of the actual network in a repeatable test environment.

**Advanced Emulation Parameters:** Verify that applications properly handle anomalous packet reordering and duplication conditions without inducing stability or performance problems.

**Traffic Monitor:** See a visual display of the current traffic, including throughput graphs and link statistics. Download up to 24 hours of statistics for analysis.

**Automated Testing:** Take advantage of the Linktropy Scheduler or the command line interface to automate a series of tests.

**Unsurpassed Precision:** Test with confidence — Linktropy WAN emulators offer unsurpassed precision to ensure accurate and reproducible results.

**Everything You Need:** Everything you need is included in the compact, rack-mountable Linktropy WAN emulator. No additional hardware, software, or training required.

## USE CASES

**Application Testing:** You've developed your client/server application and it works great on your local network. But how well will it run when users are located across town from the server, or on the other side of the world? Use the Linktropy WAN emulator to ensure your application works well under all conditions before deployment.

**Network Validation:** You have to choose between terrestrial, wireless, satellite, and other WAN technologies to connect offices across the globe. The cost tradeoffs are easy to quantify, but how do differing delay, jitter, and loss affect performance of critical applications?

**Website Performance:** See your website as your users experience it and make sure it's responsive. Verify that your e-commerce system doesn't leave purchasers hanging when their links are slow.

**Optimization:** Can tweaks to application settings improve performance? How much benefit will an

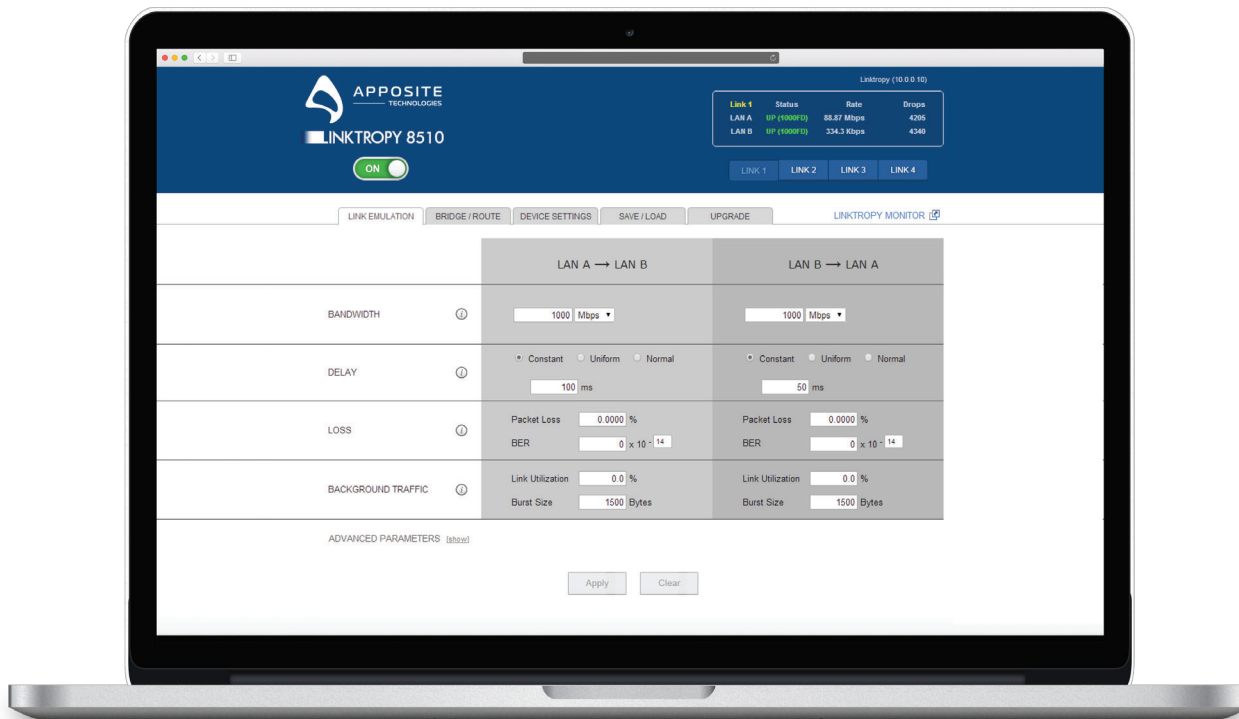
accelerator, traffic shaper, or application proxy provide? Use the Linktropy WAN emulator to find out.

**Troubleshooting:** Our applications aren't performing well and you need to find out why. Use the Linktropy WAN emulator in the lab to help pinpoint the cause of the problem and validate solutions without disrupting the production network.

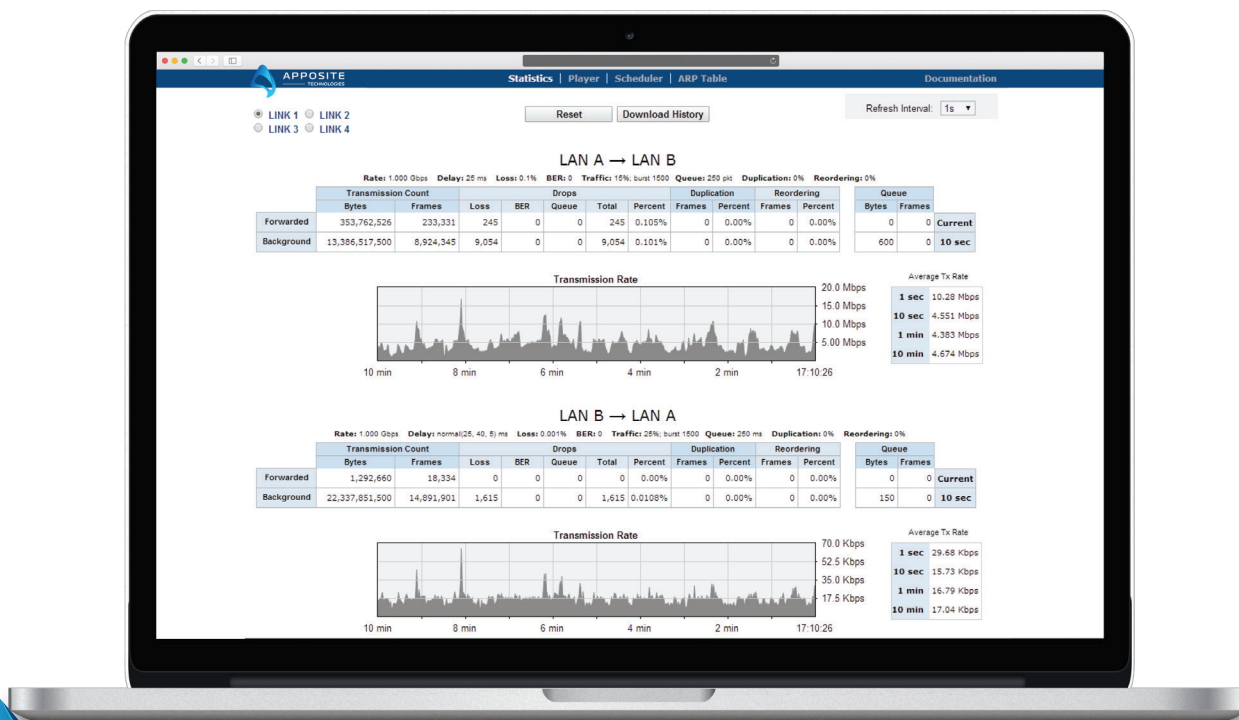
**VoIP and Video:** P voice and video work perfectly in demonstrations on the LAN, but quality degrades with latency, jitter, and packet loss. Evaluate quality under real-world conditions to verify that they meet your requirements before making a commitment.

**Disaster Recovery and Remote Backup:** Data at remote offices needs to be backed up to a central facility, while centralized records have to be moved off-site for disaster recovery. Use the Linktropy WAN emulator to ensure that bandwidth limitations and link latency do not prevent the process from completing in the available time.





LINKTROPY CONFIGURATION WINDOW



LINKTROPY MONITOR WINDOW

## PRODUCTS

### Linktropy 5510

Emulate wan links up to 1 gbps in a compact, cost-effective appliance.



### Linktropy 8510

High-precision, gigabit-speed wan emulation of up to four separate links.

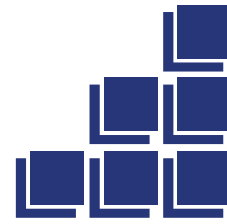


Specifications	Linktropy 5510	Linktropy 8510
Capacity		
Max. Emulation Speed	10 Mbps, 45 Mbps, 100 Mbps or 1 Gbps	10 Mbps, 45 Mbps, 100 Mbps or 1 Gbps
Max. Aggregate Throughput	2 Gbps	8 Gbps
Emulated Links	1 link	4 links
Maximum Packet Rate	3 million pps	12 million pps
Emulation Settings		
Bandwidth	300 bps – maximum rate in 1 bps increments	
Delay	0 ms – 10 sec. in 0.1 ms increments; constant, uniform, normal distributions	
Packet Loss Rate	0 – 100% in increments of 0.0001%	
Background Traffic	0 – 100% in increments of 0.1%	
Additional Parameters	Bit Error Rate, Packet Reordering, Packet Duplication, Queue Depth, Framing Overhead	
Interfaces		
Emulation	2 Gigabit Ethernet (copper or SFP)	8 Gigabit Ethernet(8 copper, 8 SFP, or 4 of each)
Management	1 x Gigabit Ethernet, 1 x RS-232 serial console	1 x Gigabit Ethernet, 1 x RS-232 serial console
Warranty & Support		
Hardware Warranty	1 year included	1 year included
Support & Maintenance	1 year included	1 year included

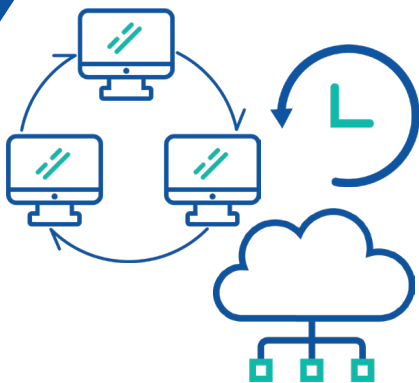
# STEP

## ELECTRONICS

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## Linktropy® Mini Series WAN Emulators

### Linktropy Mini-G™ / Linktropy Mini-G100

Basic WAN emulation capabilities at unbeatable prices.

## SIMULATE

**Bandwidth** | **Latency & Jitter** | **Packet Loss**

The Linktropy Mini-G and Mini-G100 are portable, low cost, easy-to-use WAN emulators, designed to emulate basic network conditions for application development and customer demonstrations of networking products.

The Linktropy Mini Series WAN emulators simulate bandwidth, latency, and loss separately in each direction. Their small size and light weight make them easy to carry, while their fanless design and solid-state storage offers silent operation with high reliability. The Mini-G100 simulates links up to 100 Mbps while the Mini-G handles links up to 1 Gbps.

An intuitive, browser-based interface makes installation and configuration quick and easy. A real-time traffic monitor displays throughput graphs and statistics, revealing the effects of WAN conditions on application performance. Together, the GUI allows users to grasp the test conditions at a glance and quickly view the results.

## FEATURES

**Easy to Use:** The Linktropy Mini Series emulators are a snap to install and configure. Just plug in the Ethernet cables, specify the link conditions, and begin testing. No software to install, no training needed.

**Bandwidth up to 1 Gbps:** Emulate links up to 1 Gbps in each direction with the Mini-G and 100 Mbps with the Mini-G100.

**Delay up to 10 seconds:** Emulate latency from 0.1 ms. up to 10 sec. in each direction in a constant, normal, or uniform distribution.

**Error Emulation:** Specify loss as a packet loss rate, bit error rate, or both.

**Emulate any WAN:** Emulate terrestrial, wireless,

internet, satellite or any other type of wide area network.

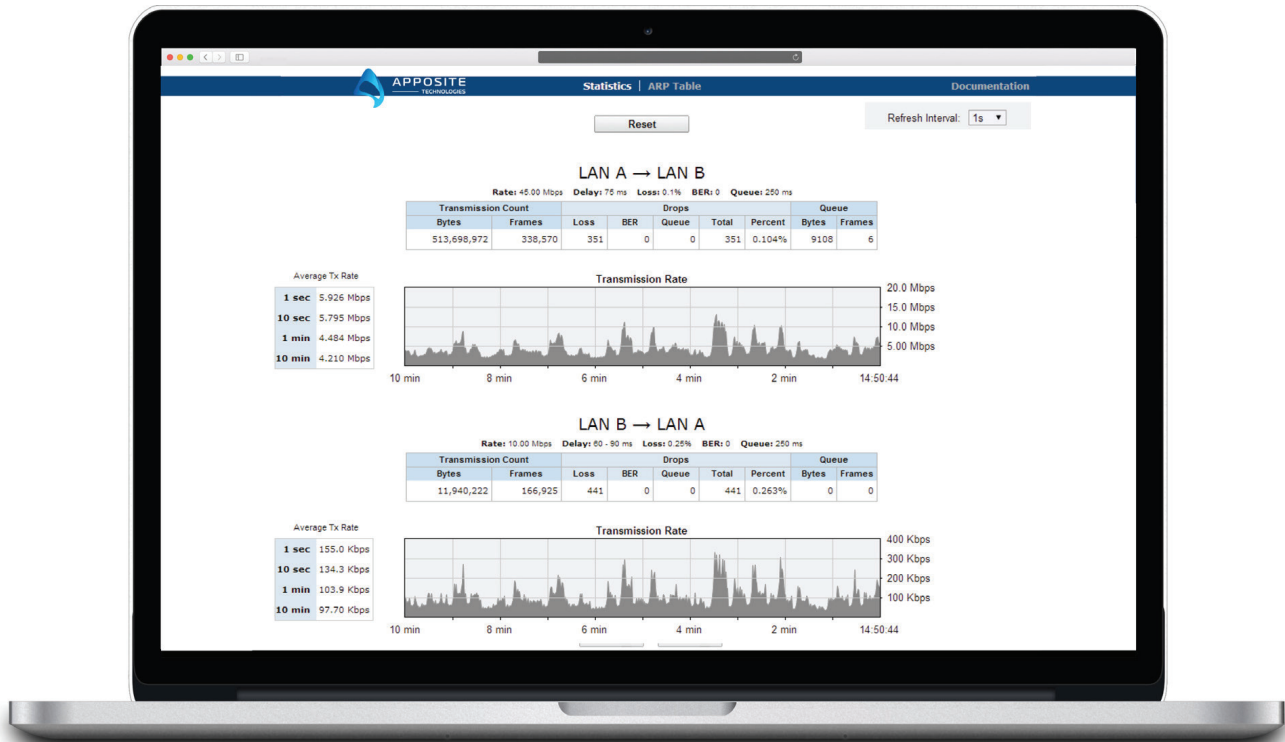
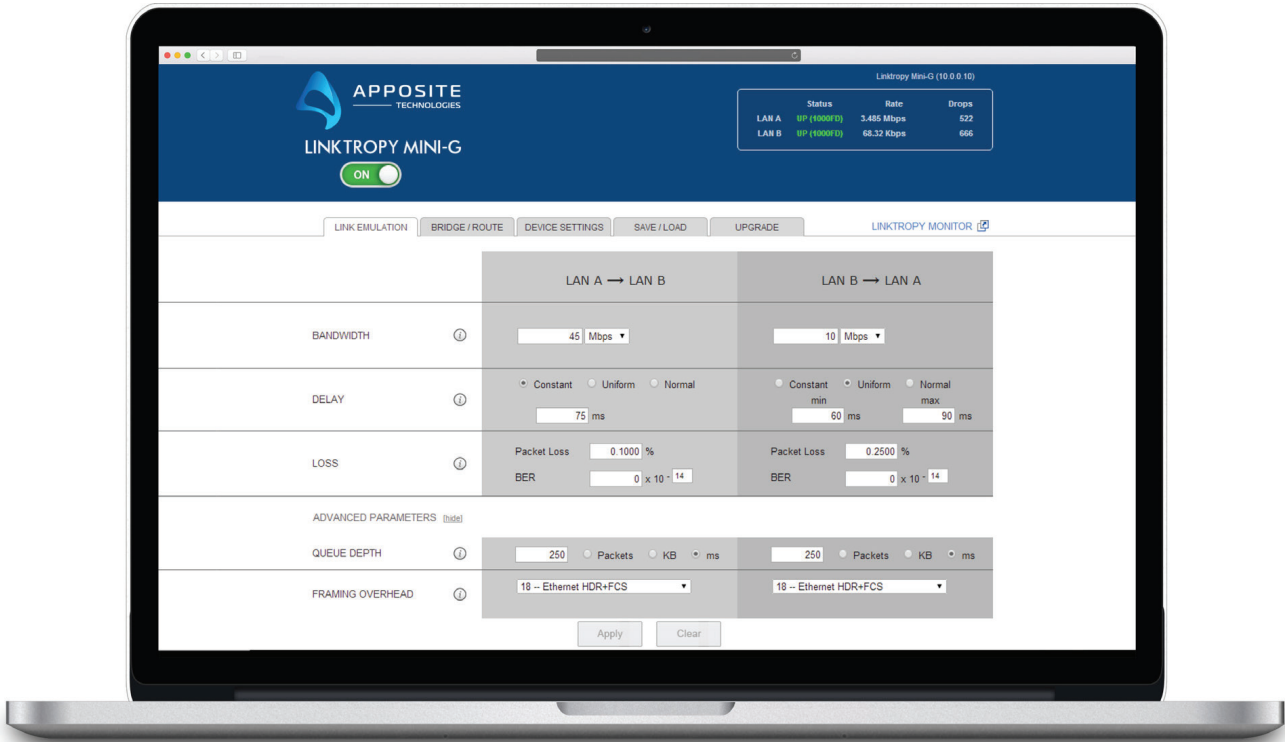
**Traffic Monitor:** See a visual display of the current traffic, including throughput graphs and link statistics.

**Bridging/Routing:** Install the device as either a bridge or router.

**Portable:** Carry the Linktropy Mini series emulator with you. Their small size and light weight make them easy to take wherever you travel.

**Everything You Need:** Everything you need to emulate a WAN is included in these compact devices. No additional hardware or software required.

# USER INTERFACE



## PRODUCTS

### Linktropy Mini-G™ / Linktropy Mini-G100

Basic WAN emulation capabilities at unbeatable prices.



Specifications	Mini-G100	Mini-G
Performance		
Emulation Rate	100 Mbps full duplex, 350,000 packets per second	1 Gbps, 350,000 packets per second
Emulation Settings		
Bandwidth	300 bps – 100 Mbps in 1 bps increments	300 bps – 1 Gbps in 1 bps increments
Delay	0 ms. – 10 sec. in 0.1 ms. increments; constant, uniform, normal distributions	
Packet Loss Rate	0 – 100% in increments of 0.0001%	
Additional Parameters	Bit Error Rate, Queue Depth, Framing Overhead	
Interfaces		
Emulation	2 x Gigabit Ethernet	
Management	1 x Gigabit Ethernet, 1 x RS-232 serial console	
Physical		
Weight	1.1 lbs (0.5 kg)	
Dimensions	6.6" W x 6.2" D x 1.2" H (168 mm x 157 mm x 30 mm)	
Power Input	12V DC power, 11 Watts	

### Linktropy Family

For more comprehensive product testing and high-precision benchmarking, Apposite offers the Linktropy 5510 and 8510 models built with the high level of precision, performance, and functionality required by network managers, IT staff, product developers, customer support, and QA teams.



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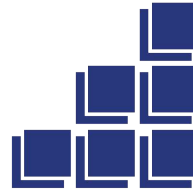


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## Netropy® Cloud Edition



### WAN Emulation Built for the Cloud

**Emulate Real-world Networks in the Cloud for Accurate, Affordable Performance Testing of Distributed Applications.**

Netropy Cloud Edition, NetropyCE, runs as an Amazon Machine Image (AMI) on AWS to performance test any application in the cloud. Easily replicate global networks in a single AWS region and introduce real-world network conditions like bandwidth limitations, latency, and packet loss using NetropyCE's intuitive GUI or restful API. Measure the impact these network characteristics have on performance to benchmark and optimize mission-critical applications.

Reduce costs by building your test environment in the cloud. Intelligently mimic realistic network conditions so you can be confident the solutions you are designing and deploying work as expected when rolled out to your users.



#### SCALABLE

NetropyCE can emulate a global network in a single virtual private cloud (VPC). Save money by running tests contained in one VPC instead of paying to send traffic between geographically dispersed AWS regions.



#### FLEXIBLE

Change impairments and view results in real time. Configure settings using a browser or automate with RESTful API. Profile live networks and import those conditions into the cloud network.



#### POWERFUL

Simulate complex network topologies to get the most realistic understanding of your app's performance. Quickly benchmark, troubleshoot, and optimize your mission-critical applications under the most challenging conditions.



## FEATURES

**Scalability:** Deploy a global test network with multiple instances in a single virtual private cloud (VPC).

**Multiple Links:** Simulate up to 20 separate WAN links in each instance.

**Bandwidth:** Precisely emulate links up to 1 Gbps and 20 Gbps in the future.

**Latency:** Emulate delay and jitter of 10 seconds or more in each direction, in increments of 0.01 ms.

**Automation:** Automate testing with comprehensive, RESTful API.

**Packet filtering:** Assign packets to different links by IP address, VLAN, or any other packet identifier.

**Loss and corruption:** Set random, burst, or periodic packet loss to test the effects of corruption on voice and video applications.

**Capture and replay:** Record the delay and loss characteristics of a production network as they vary second-by-second and replay them through the Netropy emulator.

**Background noise:** Test how applications perform over a congested network with the background utilization and PCAP replay features.

**Traffic monitoring:** View and download up to 24 hours of throughput graphs and link statistics.

**Cost-effective:** Only pay when you are using it. AWS and Apposite charge hourly rates to use NetropyCE.

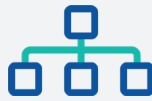
## USE CASES



**5G  
Cellular**



**Storage  
Networks**



**Network  
Design**



**Application  
Performance**



**Cloud  
Migrations**

### Network design

Replicate an entire global network in a single AWS region, or virtual private cloud (VPC). Then, easily simulate real-world network conditions like bandwidth constraints, latency, and packet loss all in the cloud.

### Application Performance

See how applications perform under a variety of network conditions prior to roll-out and avoid unpleasant surprises and panic fixes later.

### Storage

Validate storage to multiple locations in a single VPC instead of paying to send traffic between geographically dispersed AWS regions.

### 5G Testing

Replay network conditions experienced in new 5G networks to benchmark the performance of mobile applications or to evaluate the scalability of new 5G networking devices.

### Cloud Migration

Prepare for cloud migration projects by building and testing your network architecture inside the cloud. Anticipate how network constraints such as bandwidth limitations and latency will impact a large data transfer without the risk of losing data.

### Troubleshooting

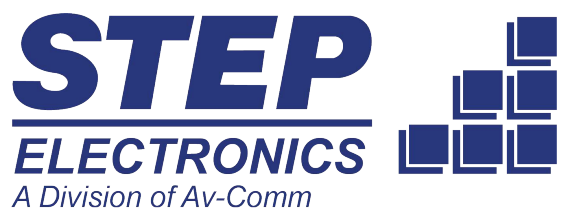
Pinpoint the cause of reported problems and complaints, then validate potential solutions without disrupting the production network.

## SPECIFICATIONS

Specifications	NetropyCE 1G	NetropyCE 20G (Coming Soon)
Capacity		
Test Ports	2 1-Gig Ethernet	2 20-Gig Ethernet
Max. Agg. Throughput	2 Gbps	40 Gbps
Emulation engines	1 @ 1 Gigabit	1 @ 20 Gigabit
Maximum Packet Rate	Processor Dependent	
Maximum Frame Size	9KB	
Emulation Capabilities		
Packet Classification	IP source & destination address range (IPv4 or IPv6), VLAN, TCP or UDP port number, & IP ToS	
Bandwidth	1 Gbps in 1 bps increments	20 Gbps in 1 bps increments
Delay	0 ms – 10,000 ms or greater in each direction in 0.01 ms increments; constant, uniform, normal distributions; replay recorded loss, accumulate & burst	
Loss & Corruption	Random, burst, periodic, BER, Gilbert-Elliott, or recorded loss; data corruption; network outage	
Background Utilization	0 – 100% in increments of 0.1%; PCAP replay	
Queueing & Prioritization	RED or tail drop queue management; priority or round robin queuing	
Additional Parameters	Packet Reordering, Packet Duplication, MTU and Fragmentation, Queue Depth, Framing Overhead	
Additional Details		
Requirements	C5.XLarge Instance	Any instance that has 20Gbps, 2 CPUs & 8 GB RAM or more
Security	SSL and SSH for secure management; per-user locking of engine configuration	
Support and maintenance	Support is included with product license and software maintenance	
Ordering Information		
Purchasing	NetropyCE is available for purchase on our AWS marketplace profile at an hourly usage rate.	

### About Apposite Technologies

Apposite Technologies makes WAN emulation easy by offering professional-quality network emulation tools at affordable prices. Apposite's award-winning Netropy and Linktropy WAN emulation appliances simulate bandwidth, latency, loss, congestion, and other network impairments with fine-grained precision to provide accurate simulations of any type of wide-area network. Netropy and Linktropy WAN emulators are widely deployed by leading enterprises, application and equipment developers, telecoms carriers, and government and military organizations around the world. Apposite Technologies – WAN Emulation Made Easy

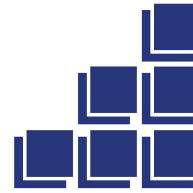


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# STEP ELECTRONICS

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## Netropy® Virtual Edition

**Emulate Realistic  
Network Conditions  
in Virtual  
Environments  
to Guarantee  
Application Quality**

NetropyVE lets you test any virtual application as if it's running over a wide area network. Recreate real-world network conditions, such as bandwidth limits, excessive latency/jitter, loss, and other impairments, to optimize the performance of applications and virtualized network functions (VNF).

NetropyVE runs as a Virtual Machine (VM) and can be used to impair specific traffic flows—all within the virtual environment.

By intelligently mimicking network conditions you can ensure the solutions you are designing and deploying work as expected when rolled out to your users.

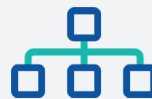
### Rigorously Evaluate Applications in Different Stages and Environments



Application  
Design



DevOps



Network  
Design



Application  
Performance



Cellular  
Networks



SD-WAN



Storage  
Networks



Satellite  
Communications

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## FEATURES

**Scalability:** Route multiple VMs through a single NetropyVE instance

**Packet filtering:** Assign packets to different links by IP address, VLAN, or any other packet identifier.

**Bandwidth:** Precisely emulate links up to 1 Gbps.

**Latency:** Emulate delay and jitter of 10 seconds or more in each direction, in increments of 0.01 ms.

**Loss and corruption:** Set random, burst, or periodic packet loss to test the effects of corruption on voice and video applications.

**Capture and replay:** Record the delay and loss

characteristics of a production network as they vary second-by-second and replay them through the Netropy emulator.

**Background noise:** Test how applications perform over a congested network with the background utilization and PCAP replay features.

**Traffic monitoring:** View and download up to 24 hours of throughput graphs and link statistics.

**Automation:** Automate testing with comprehensive API.

**Cost-effective:** Get the functionality and performance you need at a price you can afford.

Capacity	
Test Ports	2 1-Gig ethernet (virtual network adapters)
Max. Agg. Throughput	2 Gbps
Emulation engines	1 @ 1 Gigabit
Maximum Packet Rate	Processor Dependent
Maximum Frame Size	9KB
Emulation Capabilities	
Packet Classification	IP source & destination address range (IPv4 or IPv6), VLAN, TCP or UDP port number, IP ToS, MAC address, MPLS label, or any other packet contents
Bandwidth	100 bps – 100 Gbps in 1 bps increments (depending on model)
Delay	0 ms – 10,000 ms or greater in each direction in 0.01 ms increments; constant, uniform, normal distributions; replay recorded loss, accumulate & burst
Loss & Corruption	random, burst, periodic, BER, Gilbert-Elliott, or recorded loss; data corruption; network outage
Background Utilization	0 – 100% in increments of 0.1%; PCAP replay
Queueing & Prioritization	RED or tail drop queue management; priority or round robin queueing
Additional Parameters	Packet Reordering, Packet Duplication, MTU and Fragmentation, Queue Depth, Framing Overhead
Additional Details	
Requirements	EXSI 5.5 and above, 2 VCPUs, and 8 Gigabytes of ram and 1G of hard drive space.
Security	SSL and SSH for secure management; per-user locking of engine configuration
Support and maintenance	Support is included with product license and software maintenance
Ordering Information	
Part Number	NVE
Product license - 1 year	NVE-1YR
Product license - 3 years	NVE-3YR

## THE CHALLENGES

Networks are imperfect—how will your application perform in the real world? Get the most realistic, geographically distributed understanding of your app's quality.

Customers access applications over many different network types, each with different performance characteristics. Safeguard application performance on any network.

Optimize network designs for improved ROI by finding out how work-loads will behave at different locations. Which applications or storage systems need to be deployed at the network edge?

## Virtualized Network Emulation



### POWERFUL

Each virtual machine can be assigned a unique WAN access profile, and then controlled to insert latency, jitter, packet loss, and congestion to assess application performance under changing



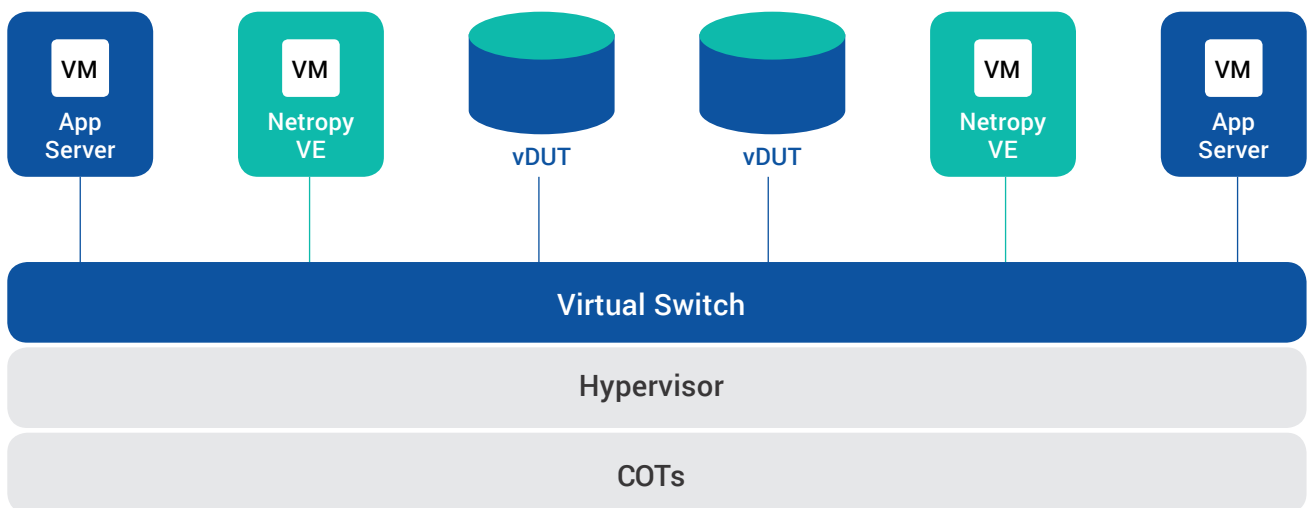
### FLEXIBLE

Change impairments and view results in real time. Configure settings using a browser or automate with CLI. Even profile live networks and import those conditions into network emulation.



### SCALABLE

Supported on VMware ESXi and KVM platforms. A floating license system allows NetropyVE to be easily moved to different hosts. Scale up by routing multiple Virtual Machines through a single instance of NetropyVE.



## Network Emulation Made Easy

Many software development teams run their tests in a cloud or private datacenter where they do not have the ability to install an appliance. With NetropyVE, it is now possible to install WAN emulation between virtual resources. For high bandwidth applications, Netropy appliances are available supporting all speeds up to 100 Gbps.

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**STEP**

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