

Linktropy 4500



The Linktropy™ 4500 from Apposite Technologies is a new generation of link emulator, combining unsurpassed precision with unbeatable prices. The Linktropy 4500 simulates WAN bandwidth, delay, congestion, bit errors, and other important link characteristics independently in both directions at speeds of up to 155 Mbps.

The Linktropy 4500 emulates terrestrial, wireless, internet, satellite or private network links to validate and troubleshoot networks and applications under a spectrum of real-world conditions. The unique Linktropy Scheduler makes emulating even dynamically changing WAN conditions easy. Integrated Ethernet bridging makes it easy to emulate a WAN without routers or other costly equipment. Through an intuitive and easy-to-use graphical interface, you can install the Linktropy 4500 and begin testing within minutes.

Features

Easy to Use: The Linktropy 4500 is 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 Ajax-based GUI combines the responsiveness of an application with the convenience of a standard Web browser interface.

Bandwidths Up to 155 Mbps: The Linktropy 4500 can emulate WAN bandwidths of up to 155 Mbps bi-directionally or 400 Mbps in a single direction. With a packet processing rate of 250,000 packets per second, the Linktropy 4500 can easily handle 45 Mbps of 64-byte packets in each direction.

Delay up to 10 sec: Linktropy can emulate latency from 1 millisecond up to 10 seconds in each direction in a constant, normal, or uniform distribution.

Error Emulation: Loss can be specified as a packet loss rate, bit error rate, or both. Linktropy can emulate bit error rates as low as 1×10^{-14} .

Unique Linktropy Scheduler: Dynamically changing WAN conditions are easy to emulate with the highly-flexible Linktropy Scheduler. Any combination of emulation parameters can vary over time, and the Linktropy 4500 automatically adjusts the link conditions between specified end states. Link outages, variable bandwidth links, route flapping, satellite rain fade, wireless interference, and other dynamic conditions are simple to emulate using the Linktropy Scheduler.

Traffic Monitor: A monitor window provides a visual display of the current traffic conditions, including throughput graphs, and transmission and loss statistics. Up to 24 hours of statistics history can also be downloaded for analysis.

Unsurpassed Precision: The Linktropy 4500 simulates link bandwidth with microsecond resolution and performs bit error rate calculations using 256 bit precision, ensuring accurate and reproducible results.

Bridging/Routing: The Linktropy 4500 can be configured as either a bridge or router, making it easy to install in a wide variety of network configurations.

Automated Testing: A series of tests is easy to run using either the Linktropy Scheduler or the command line interface, making the Linktropy 4500 ideal for automated product testing.

Match Real Link Behavior: Adjustable framing overhead allows accurate emulation of any link layer. Queuing delay can be modeled with queues set in packets, bytes, or milliseconds to match actual WAN hardware.

Advanced Emulation Parameters: Packet reordering and duplication features help verify that applications and networking equipment properly handle anomalous conditions without inducing stability or performance problems.

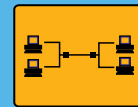
Gigabit Ethernet Interfaces: Gigabit Ethernet interfaces make it easy to simulate a WAN without routers, CSU/DSUs, or other costly equipment.

Everything You Need: Everything you need to emulate a WAN is included in the compact, 1U rack-mountable Linktropy 4500. No additional hardware or software is required.

One Year Maintenance: Purchase includes one full year of support, maintenance, and software upgrades at no additional cost. Extended warranties are also available.

Networks

The Linktropy 4500 can emulate any type of physical network, including:



Terrestrial: The Linktropy 4500 can emulate the bandwidth, delay, and loss characteristics of T1, E1, T3, E3, OC-3, ATM, xDSL, Frame Relay, and dial-up modems. Use Linktropy to find the most cost-efficient WAN technology to meet your performance requirements.



Wireless: Mobile wireless networks offer great convenience for professionals on the road and fixed wireless can be a boon for disperse communities, but performance may not match terrestrial options. Use Linktropy to find out if wireless solutions fit your needs.



Internet: What happens to e-commerce connections when the internet is busy? What happens to the quality of your VoIP calls? Use Linktropy to find out beforehand and plan appropriate countermeasures.



Satellite: With latency in excess of 500 ms and bit error rates as high as 1×10^{-6} , satellite networks can create havoc for protocols and applications. The Linktropy 4500 was especially designed to accommodate the long delays and high error rates of satellite networks, and includes the ability to simulate bit errors in addition to packet loss.

Applications

Network Validation: You have to choose between terrestrial, wireless, satellite, and other WAN technologies to connect between offices across the globe. The cost trade-offs are easy to quantify, but how do differing delay, jitter, and loss affect performance of critical applications? How much bandwidth do you actually need to keep your applications running smoothly? Emulate the links in the lab and demonstrate performance to all decision makers before the choice is made.

Equipment Testing: Will an accelerator, compression device, traffic shaper, cache, or application proxy improve the performance of your network? Use the Linktropy 4500 to find out before you purchase.

Troubleshooting: Your applications aren't performing well and you need to find out why. Use the Linktropy 4500 in the lab to help pinpoint the cause of the problem and validate solutions without disrupting the production network.

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 4500 to ensure your application works well under all conditions before your users complain.

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 link is slow.

VoIP: Voice over IP sounds perfect in demonstrations on the LAN, but quality diminishes with latency, jitter and packet loss. Test VoIP under real-world conditions to verify it meets your quality requirements before you deploy.

Product Demonstrations: You need to demonstrate your products to customers under their network conditions. Bring the Linktropy 4500 to customer sites and trade shows to avoid the hassles of installing equipment on a production network and eliminate surprises with a preconfigured test.

User Interface



Linktropy Configuration Window



Linktropy Monitor/Schedule Window

Specifications

Capacity	Throughput	up to 155 Mbps bi-directionally, 400 Mbps in a single direction
	Packets	up to 250,000 packets per second
Emulation Settings	Bandwidth	300 bps – 400 Mbps 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%
	Bit Error Rate	Rates to 1×10^{-14}
	Additional Emulation Parameters	Packet Reordering, Packet Duplication, Queue Depth, Framing Overhead Linktropy Scheduler for emulation of dynamic WAN conditions
Warranty and Support	Hardware warranty	1 year
	Support and Maintenance	1 year, including all firmware upgrades

About Apposite Technologies

Apposite Technologies makes WAN emulation easy by offering highly precise network emulation tools at reasonable prices. Apposite emphasizes ease-of-use so engineers spend time using the tools, not learning them. Apposite's Linktropy 4500 WAN emulator simulates bandwidth, latency, loss, and other network characteristics to provide accurate simulations of terrestrial, wireless, satellite, internet or any other type of wide-area network. Apposite Technologies – WAN Emulation Made Easy.

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