



# Technical Specifications Datasheet



**JAR:emulate**

high precision **network emulators**

# High precision network emulators

	PRODUCT RANGE						
	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
<b>Physical</b>							
<b>Built in Network Interfaces</b>	2	2	2	4	2	4	2
<b>Additional Network Interfaces</b>	n/a	up to 12	up to 12	up to 12	up to 12	up to 12	2
<b>Standard Network Interfaces</b>	GbE Copper	GbE Copper	GbE Copper	GbE Copper	10GE Fiber LC-LC	10GE Fiber LC-LC	40GE Fiber LC-LC
<b>Optional Network Interfaces</b>	n/a	n/a	SFP / SFP+	SFP / SFP+	RJ45 / SFP / SFP+	RJ45 / SFP / SFP+	n/a
<b>Max. aggregate throughput</b>	200 Mbps	200 Mbps	2 Gbps	8 Gbps	20 Gbps	40 Gbps	80 Gbps
<b>Max. packet rate per sec</b>	325k	325k	2.9 million	5.8 million	24 million	24 million	32 million
<b>Storage Capacity (Optional Max)</b>	4GB (8GB)	8GB (16GB)	8GB (64GB)	8GB (64GB)	8GB (1TB)	16GB (1TB)	16GB (1TB)
<b>Redundant Power Supply</b>	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>Dimensions</b>	22x19x6	2u Rack	2u Rack	2u Rack	2u Rack	2u Rack	2u Rack
<b>General</b>							
<b>Timing Precision</b>	1ms	0.01ms	0.01ms	0.01ms	0.01ms	0.01ms	0.01ms
<b>Any Port to Any Port (tm)</b>	✓	✓	✓	✓	✓	✓	✓
<b>Live Changes</b> Real-time modification of any impairment setting or network map	✓	✓	✓	✓	✓	✓	✓
<b>Maximum impairments</b> * Until performance is exhausted	64	128	Unlimited*	Unlimited*	Unlimited*	Unlimited*	Unlimited*
<b>Traffic Capture &amp; Replay with looping option</b>	⊙	✓	✓	✓	✓	✓	✓
<b>Bi-directional, independent emulations</b>	✓	✓	✓	✓	✓	✓	✓
<b>Timeline</b> Schedule changes to emulation settings with no manual intervention required Option: Loop timeline for continuous playback	⊙	⊙	✓	✓	✓	✓	✓
<b>Modes of Operation</b>							
<b>Virtual Routing</b> (Simulate routers / ADSL Gateways) Protocols: DHCP, ARP, ICMP, IGMP, etc DHCP: Enable / Disable Routing Table: Auto generate, manual Multiple WAN Links	⊙	⊙	✓	✓	✓	✓	✓
<b>Bridged Mode</b> Option to impair all traffic sent and received (protocol filtering available)	✓	✓	✓	✓	✓	✓	✓
<b>Delay Emulation (0ms to 30secs, 0.01ms)</b>							
<b>Fixed Latency</b>	✓	✓	✓	✓	✓	✓	✓
<b>Variable Latency</b>	✓	✓	✓	✓	✓	✓	✓
<b>Ramp</b>	✓	✓	✓	✓	✓	✓	✓
<b>Normal / Gaussian</b>	✓	✓	✓	✓	✓	✓	✓
<b>Sinusoidal Wave</b>	✓	✓	✓	✓	✓	✓	✓
<b>Jitter</b> 0.1 ms to 100 ms or 0.1 to 100% of constant delay	✓	✓	✓	✓	✓	✓	✓
<b>Timing Constraints</b> (Specify start and duration of impairments activity) Start / Duration 0.1 ms to 360,000 ms (in 0.1 ms increments)	✓	✓	✓	✓	✓	✓	✓
<b>Bandwidth Emulation</b>							
<b>Constant Throttle</b>	500 Bps to 45 Mbps	500 Bps to 100 Mbps	500 Bps to 1 Gbps	500 Bps to 1 Gbps	500 Bps to 10 Gbps	500 Bps to 10 Gbps	500 Bps to 40 Gbps
<b>Random Range</b> (min to max with time constraints)	501 Bps to 45 Mbps	501 Bps to 100 Mbps	501 Bps to 1 Gbps	501 Bps to 1 Gbps	501 Bps to 10 Gbps	501 Bps to 10 Gbps	501 Bps to 40 Gbps
<b>Random Range Duration</b> 0.1 ms to 10 minutes* (in 0.1ms increments)	✓	✓	✓	✓	✓	✓	✓

✓ Provided as Standard ⊙ Optional

\*Depending on Storage Capacity

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	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
<b>Background Traffic Generation</b>							
<b>Fixed Data rate:</b> 500 bps to 40Gbps Percentage of available link: 1 to 99% Generate broadcast packets Range (min to max with time constraints)	⊙	✓	✓	✓	✓	✓	✓
<b>Range Duration</b> 0.1 ms to 360,000 ms (in 0.1ms increments)	⊙	✓	✓	✓	✓	✓	✓
<b>Reordering</b>							
<b>Time Based Re-order</b> Displace packet from 0.1 to 500 ms	⊙	⊙	✓	✓	✓	✓	✓
<b>Position Base Re-order</b> Displace packet up to 1,000,000 places	⊙	⊙	✓	✓	✓	✓	✓
<b>Corruption</b>							
<b>Bitflips</b> Start and end position (first byte to last byte), 1 to 100%	⊙	✓	✓	✓	✓	✓	✓
<b>Byte overwrites</b> Start and end position (first byte to last byte) 1 to 100%	⊙	✓	✓	✓	✓	✓	✓
<b>Ethernet fragmentation</b> MTU: 128 to 9,000	⊙	✓	✓	✓	✓	✓	✓
<b>Bit Error Rate (Per) Simulation</b> x bits in y received (1 bit to IE-14)	⊙	✓	✓	✓	✓	✓	✓
<b>Duplication</b>							
<b>Simple</b> (single duplication) Packets received on link will be duplicated once immediately	⊙	✓	✓	✓	✓	✓	✓
<b>Timed</b> (duplicated every x seconds) Single duplication after specified delay (1 to 1,000 ms)	⊙	✓	✓	✓	✓	✓	✓
<b>Complex</b> (multiple, timed duplication) Specified multiple duplications after specified time delay (1 to 1,000 ms)	⊙	✓	✓	✓	✓	✓	✓
<b>Loss</b>							
<b>Standard</b> Drop x packets in Y recieved (1x to 99,999,999y)	✓	✓	✓	✓	✓	✓	✓
<b>Percentage</b> Drop 0.1% to 100% (in increments of 0.1%)	✓	✓	✓	✓	✓	✓	✓
<b>Outage</b> Drop all packets recieved on specified link	✓	✓	✓	✓	✓	✓	✓
<b>Drop evenly</b> Packets will be dropped regularly throughout emulation	✓	✓	✓	✓	✓	✓	✓
<b>Drops in bursts</b> Packets will be dropped in continuous groups	✓	✓	✓	✓	✓	✓	✓
<b>Timing Constraints</b> Start / Duration 0.1 ms to 360,000 ms (in 0.1ms increments)	✓	✓	✓	✓	✓	✓	✓
<b>Modification</b>							
<b>Generic Packet Modifier</b> Modify up to 6 bit / byte sections per packet	⊙	⊙	✓	✓	✓	✓	✓
<b>Frame Check Sequence modification</b> Transport, corrupt and modify the FCS	⊙	⊙	⊙	⊙	⊙	⊙	⊙

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	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
<b>Filtering (UDP, TCP, Packet count)</b>							
<b>Maximum filter</b> Connect multiple filters in any way to create complex filter rules	32	32	Unlimited*	Unlimited*	Unlimited*	Unlimited*	Unlimited*
<b>IP Source / destination address</b> filtering (impair specific traffic flows)	✓	✓	✓	✓	✓	✓	✓
<b>TCP</b> Advanced: Source and destination port filtering ( including range) TCP Packet length filtering	✓	✓	✓	✓	✓	✓	✓
<b>UDP</b> Advanced: Source and destination port filtering (including range) TCP Packet length filtering	✓	✓	✓	✓	✓	✓	✓
<b>MAC Address</b> Src/Dst single or range	✓	✓	✓	✓	✓	✓	✓
<b>Ethernet Payload</b>	✓	✓	✓	✓	✓	✓	✓
<b>Packet Counting</b> Fail or Pass filters based on packet count or percentage	✓	✓	✓	✓	✓	✓	✓
<b>Advanced Filtering</b>							
<b>Generic Filter</b> Filter on multiple bit / byte values with logic operations	⊙	⊙	✓	✓	✓	✓	✓
<b>IP Protocol: payload type and value</b>	⊙	⊙	✓	✓	✓	✓	✓
<b>MPLS: MPLS Label, QoS Value, TTL value</b>	⊙	⊙	✓	✓	✓	✓	✓
<b>VLAN: VLAN ID, user priority</b>	⊙	⊙	✓	✓	✓	✓	✓
<b>MPEG Video</b>	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>RTP A/V</b>	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Flow Control (simulation link switching)</b>							
<b>Output Switcher: up to 4 available outputs</b>	⊙	⊙	✓	✓	✓	✓	✓
<b>Input Switcher: Up to 4 available inputs</b>	⊙	⊙	✓	✓	✓	✓	✓
<b>Merge Tool</b>	⊙	⊙	✓	✓	✓	✓	✓
<b>Network Analysis</b>							
<b>Latency Measurement</b> Measure live hardware and network latency to microsecond levels	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Network Conditions Monitor</b> Extract network parameters from any live or WireShark file	⊙	⊙	✓	✓	✓	✓	✓
<b>Instancers (create unique impairments for hundreds of streams)</b>							
<b>VLAN Instancer</b>	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>MPLS Instancer</b>	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Reporting</b>							
<b>Live monitoring</b> Bandwidth monitoring, packets per second, export to CSV max / average values,- etc	✓	✓	✓	✓	✓	✓	✓
<b>Wireshark Integration</b> (on up to 200 protocols) Allows for live traffic capture and root cause analysis; replay 3rd party traffic streams under impairments, record traffic and replay at a later date	⊙	✓	✓	✓	✓	✓	✓
<b>Customisable end-of emulation-reports</b> Reports detailing results of emulation run, such as impairment settings, dropped packets, bandwidth, corruption, jitter etc	⊙	⊙	⊙	⊙	⊙	⊙	⊙

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	Lite 100	100/2	1,000/2	1,000/4	10,000/2	10,000/4	40,000/2
<b>TAP (Test Access Point) devices -</b>							
Extract analysis information from any part of the emulation							
<b>Bandwidth Graph</b>							
Show bandwidth utilisation - Export, clipboard, peak and averaging, etc.	✓	✓	✓	✓	✓	✓	✓
<b>Packet rates</b>							
Show packet utilisation	✓	✓	✓	✓	✓	✓	✓
<b>RTP Analyser</b>							
Output detailed information on RTP streams	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>RTCP Analyser</b>							
Output detailed information on RTCP streams	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Reports</b>							
Create customisable reports from various metrics	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Stateless load generation with multiple load distribution models</b>							
<b>Generic/RAW Load Generator</b>							
Generic any type of load with extensive stream options	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>TCP Client</b>							
Simulate clients with data streams	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>TCP Server</b>							
Simulate servers with data streams	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>RTP / VOIP</b>							
Simulate audio/video equipment	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>UDP</b>							
Raw UDP traffic with payloads	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>DDOS Simulation</b>							
Simulate extremely stressful DDOS environments	n/a	n/a	⊙	⊙	⊙	⊙	⊙
<b>Audio Visual (AV) Pack</b>							
<b>RTP Filter</b>							
	⊙	⊙	⊙	⊙	✓	✓	✓
<b>MPEG H.264 Filter</b>							
	⊙	⊙	⊙	⊙	✓	✓	✓
<b>MPEG H.264 Corruptor</b>							
	⊙	⊙	⊙	⊙	✓	✓	✓
<b>G.1050 Wizard</b>							
	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>TIA-921 Wizard</b>							
	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Management</b>							
<b>Drag and Drop User Interface</b>							
Simple user Interface, allowing user to draw out their target network on screen, drop impairments as required and visualise the network under test	✓	✓	✓	✓	✓	✓	✓
<b>Open XML for test automation</b>							
Easy Integration with test environments to schedule, run and report on emulations without recourse to user interface	⊙	✓	✓	✓	✓	✓	✓
<b>Hardware capacity monitoring</b>							
Device load, memory usage, hardware status, load history	✓	✓	✓	✓	✓	✓	✓
<b>Command Line Interface</b>							
Powerful CLI (with source code) for Windows, Linux and Mac	⊙	⊙	✓	✓	✓	✓	✓
<b>SNMP</b>							
Operational based SNMP traps and alerts	⊙	⊙	⊙	⊙	⊙	⊙	⊙
<b>Smart start-up</b>							
Automatically launch previous map on boot	✓	✓	✓	✓	✓	✓	✓
<b>Multi-User support</b>							
Unlimited GUI instances, share maps etc	⊙	⊙	⊙	⊙	✓	✓	✓
<b>Hardware NTP / PTPv2 Timestamping</b>							
Lock hardware and packet timings to accurate clocks	⊙	⊙	⊙	⊙	⊙	⊙	⊙

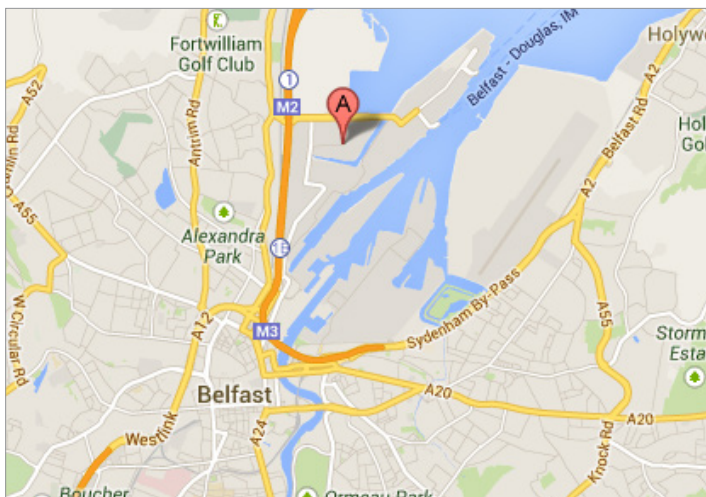
## About JAR Technologies

JAR is a leading provider of Web and Application Testing Tools for the Application Performance and Quality Assurance market.

With a wide spectrum of experience and expertise from developing the **'World's first hybrid WAN Emulator'** to offering cloud based web load testing tools, JAR are committed to providing revolutionary and flexible bespoke solutions for our partners and their customers.

For more information on JAR:emulate, including more detailed information on the product range and feature set please visit [www.jartechnologies.com](http://www.jartechnologies.com)

If you would like to discuss how JAR:emulate can benefit your company or are simply interested in finding out more please use the contact details below to get in touch.



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