Packetstorm Network Emulator - complete network simulation

The Packetstorm Network Emulator system provides a complete packet-based "network in a box" which can be used stand-alone or in-circuit with a real network to allow consistent and worst-case testing of networked applications.



Main Features

The PacketStorm 1800E/2600E IP Network Emulators reproduce the unfavorable conditions of IP Networks and WANs in a controllable and repeatable lab setting. The emulator recreates the dynamic behaviour of the Internet such that any network model can be reproduced including those models that change with traffic, time, or the behaviour of another traffic flow.

Packetstorm gives the user complete control over packet impairments, modifiers and filtering within a multi-link simulation and can have multiple LAN, WAN and ATM interface cards.

Advanced features include: Routing & Bridging, Diff Serv with traffic conditioning, ToS emulation, IP monitoring, packet counters and timers, Tcl scripting language, network capture & replay, packet modifiers, multiple network interfaces, network queues, and remote control.

The available parameters are set out in the table below. Click on a column heading for a definition of the corresponding Packetstorm functions.

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Sink	All packets are discarded. Emulates an unreachable destination.	
Accumulate and Burst	Holds packets until queue is filled and timer expires. Creates bursty traffic that is typical in the Internet	
Bit Error	Inserts random or periodic errors in either the payload only or the complete packet	
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Packet Modifiers	Description	
Source Address	Inserts a user specified value into the source address.	
Destination Address	Inserts a user specified value into the destination address.	
ToS	Inserts a user specified value into the Type of Service field.	
DSCP	Inserts a user specified value into the Diff Serv field	
TTL (Set)	Inserts a user specified value into the TTL field.	
TTL (Decrement)	Subtracts n from the current Time To Live value similar to what occurs when a packet makes n router hops	
TTL (Check)	Looks at the value of the Time To Live field. If the value is equal to 0, the packet is discarded	
Protocol	Inserts a user specified value into the protocol field	
Transport Checksum	Allows the user to corrupt the Transport Checksum by inserting any legal value.	
Network Checksum	Allows the user to corrupt the Network Checksum by inserting any legal value.	
Source Port	Inserts a user specified value into the source port field.	
Destination Port	Inserts a user specified value into the destination port field	
Fragment (Yes)	Sets the "Don't Fragment Flag" to "0".	
Fragment (No)	Sets the "Don't Fragment Flag" to "1"	
MPLS	Inserts user specified values into one or two MPLS labels	
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Network Interfaces	Description	
Ethernet	10 or 100 Mbps, 10 Base-T, 100 Base-T Interface, Half or Full Duplex	
Gigabit Ethernet	1000Mbps, Multimode and Single-mode, 62.5µ / 125µ, SC	

T1/E1	Fractional, 1.544Mbps, 2.048Mbps, PPP, Cisco HDLC	
DS3	Fractional, 44.736Mbps, Frame Relay, Cisco HDLC, PPP, Raw HDLC	
E3	Fractional, 52Mbps, Frame Relay, Raw HDLC, Cisco HDLC, PPP	
OC-3	155Mbps, ATM (AAL5, Classical IP in ATM Encapsulation)	
OC-12	622 Mbps, ATM (AAL5, Classical IP in ATM Encapsulation)	
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Network Queues	Description	
Weighted Fair Queuing (WFQ)	A queuing algorithm in which each traffic flow is given a specific proportion of the network capacity	
Stochastic Fair Queuing (SFQ)	A queuing algorithm in which packets are randomly assigned multiple queues and then the queues are processed on a round robin basis. SFQ is an approximation to WFQ requiring lower overhead	
Weighted Round Robin	A queuing algorithm in which queues are given priority (weight) and packets are released on a round robin basis according to their weight	
Random Early Detection (RED)	A queuing algorithm in which packets are dropped randomly as a routers queue exceeds a preset threshold. The RED algorithm is designed to interact with the Transmission Control Protocol (TCP) to cause TCP to reduce how fast packets are launched in flows that are experiencing congestion	
Balance RED	A queuing algorithm in which packets are dropped based on the buffer occupancy of the packets flow. If a flow exceeds a preset threshold, the router drops the flows incoming packets. Balanced RED ensures non-adaptive flows are penalized to prevent them from stealing bandwidth from adaptive flows.	
First In, First Out (FIFO)	A queuing algorithm in which packets are processed in the order in which they are received	
Prioritized FIFO	A queuing algorithm in which packets are prioritized and processed according to their priority and order in which they were received. Higher priority packets are released before any lower priority packets	
Leaky Bucket	A queuing algorithm that restricts the queues output to a maximum rate	
Token Bucket	A queuing algorithm in which a queue accumulates credit during idle times which can be used to allow packet burst rates that are higher than the average rate	
	Return to Features	

Packet Filters	Description	
Source Address	Packets are routed through specific impairments, modifiers and network queues based on its source address.	
Destination Address	Packets are routed through specific impairments, modifiers and network queues based on its destination address	
Source Port	Packets are routed through specific impairments, modifiers and network queues based on its source port.	
Destination Port	Packets are routed through specific impairments, modifiers and network queues based on its destination port	
Protocol	Packets are routed through specific impairments, modifiers and network queues based on its protocol label	
ToS	Packets are impaired and modified based on its Type Of Service (ToS) field value	
Diff Serv	Packets are impaired and modified based on its Diff Serv (DSCP) field value	
MPLS	Packets are impaired and modified based on its MPLS Shim value.	
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Traffic Conditioning Emulation

To emulate emerging IP networks utilizing Differentiated Services (DiffServ), Service Level Agreements (SLA), and Quality of Service (Qos) in IP networks, the ability to condition and police IP network traffic is essential.

The PacketStorm Traffic Conditioning emulates Queuing methods used to condition IP network traffic (i.e., Edge routers that condition traffic based upon a SLA). A description of each emulated queuing method is given below.

Network Queues	Description
Weighted Fair Queuing (WFQ)	A queuing algorithm in which each traffic flow is given a specific proportion of the network capacity
Stochastic Fair Queuing (SFQ)	A queuing algorithm in which packets are randomly assigned multiple queues and then the queues are processed on a round robin basis. SFQ is an approximation to WFQ requiring lower overhead
Weighted Round Robin	A queuing algorithm in which queues are given priority (weight) and packets are released on a round robin basis according to their weight
	A queuing algorithm in which nackets are dropped randomly as a

Detection (RED)	routers queue exceeds a preset threshold. The RED algorithm is designed to interact with the Transmission Control Protocol (TCP) to cause TCP to reduce how fast packets are launched in flows that are experiencing congestion
Balance RED	A queuing algorithm in which packets are dropped based on the buffer occupancy of the packets flow. If a flow exceeds a preset threshold, the router drops the flows incoming packets. Balanced RED ensures non-adaptive flows are penalized to prevent them from stealing bandwidth from adaptive flows.
First In, First Out (FIFO)	A queuing algorithm in which packets are processed in the order in which they are received
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Differential Service Emulation

The PacketStorm1800E/2600E provides the emulation of any IP network with up to sixty four levels of service. Each level has independent impairment and modifier profiles. In addition, a traffic conditioner performs marking, policing, and shaping operations on all incoming packets. Thus out-of-profile packets can be re-marked for another level, policed (dropped), or shaped (queued until they are in profile). The queuing methods include: Random Early Detection, Balanced RED, Leaky Bucket, WFQ, Weighted Round Robin, FIFO, Token Bucket, Priority FIFO, and SFQ.

