# PacketShaper® Features     <small>(for PacketWise 5.2)</small>

Packeteer's PacketShaper product line enables organizations to control application performance and WAN costs. The PacketShaper/ISP product line enables providers of managed bandwidth services to provision and manage customized IP services. Brief, technical feature descriptions follow, divided into categories. If you'd like more complete introductions, consult PacketShaper's technical product overviews, "Four Steps to Application Performance" or "Innovative Bandwidth Farming."

## Classification Features

| Feature | Description | Examples |
|---|---|---|
| **Traffic Categorization** | Classify traffic by application, protocol, port number, URL or wildcard, host name, LDAP host lists, Diffserv setting, MPLS labels, IP precedence bits, IP or MAC address, subnet, travel direction (inbound/outbound), source, destination, host speed range, Mime type, web browser, Oracle database, Citrix published application, Citrix ICA priority tagging, VLAN varieties, and more. | • SAP traffic to/from a specific server<br>• Oracle traffic referencing the *Sales* database<br>• Web traffic to your e-commerce website from those using a Netscape Navigator browser<br>• WindowsMedia<br>• Traffic with an MPLS label of 9<br>• Print traffic from MS Word running over Citrix with an MPLS label of 5. |
| **Layer-Seven Classification** | Detect dynamic port assignments, track transactions with migrating port assignments, and even differentiate among different applications using the same port | Traffic requiring layer-seven classification technology:<br>• MP3 music downloads<br>• Passive FTP<br>• PeopleSoft running on Citrix |

## Application Discovery Chart, Partial List

**Applications and protocols PacketShaper automatically detects, identifies, and classifies include:**

| Client/Server | Database | File Server | Legacy LAN and Non-IP | Music P2P | Routing | Thin Client or Server Based |
|---|---|---|---|---|---|---|
| CORBA | FileMaker Pro | AFS | AFP | Aimster | AURP | Citrix |
| Folding@Home | MS SQL | CVSup | AppleTalk | AudioGalaxy | BGP |   Published Apps |
| FIX (Finance) | Oracle 7/8i | Lockd | DECnet | DirectConntect | CBT |   and VideoFrame |
| Java Rmt Mthd | Progress | NetBIOS-IP | IPX | eDonkey2000 | DRP | RDP/Terminal |
| MATIP (Airline) | | NFS | FNA | Gnutella | EGP |   Server |
| MeetingMaker | **Directory** | Novell | LAT | Groove | EIGRP | |
| NetIQ AppMngr | **Services** |   NetWare5 | NetBEUI | Hotline | IGMP | **Voice over IP** |
| OpenConnect JCP | CRS | | MOP-DL/RC | Imesh | IGP | Clarent |
| SunRPC (dyn port) | DHCP | **Games** | PPPoE | KaZaA | MPLS (+tag, +app) | CUSeeMe |
| | DNS | Asheron's Call | SNA | Napster | OSPF | Dialpad |
| **ERP** | DPA | Battle.net | | Scour | PIM | H.323 |
| Baan | Finger | Diablo II | **Messaging** | Tripnosis | RARP | I-Phone |
| JavaClient | Ident | Doom | AOL Instant Msging | | RIP | MCK Commun. |
| JD Edwards | Kerberos | EverQuest | ICQ Chat | **Network** | Spanning Tree | Micom VIP |
| Oracle (7,8,9i) | LDAP | Kali | MSN Messenger | **Management** | VLAN (802.1q/p) | RTP |
| SAP | RADIUS | Half-Life | Yahoo! Messenger | Cisco Discovery | | RTCP |
| | TACACS | MSN Zone | Internet Relay Chat | ICMP by | **Security** | T.120 |
| **Internet** | WINS | Quake I, II, & III | |   packet type | **Protocol** | VDOPhone |
| ActiveX | whois | Tribes I,II | **Misc** | Microsoft SMS | DLS | |
| FTP, Passive FTP | | Unreal | Time Server | NTP | DPA | |
| Gopher | **E-mail,** | Yahoo! Games | Date-Time | RSVP | GRE | |
| IP, IPIP, UDP, TCP | **Collaboration** | | | SNMP | IPSEC | |
| IPv6 | Biff | **Host Access** | **Multi-Media** | SYSLOG | ISAKMP/IKE | |
| IRC | cc:MAIL | ATSTCP | Multi-cast | |   key exchange | |
| Mime type | IMAP | Attachmate |   NetShow | **Print** | L2TP | |
| NNTP | LotusNotes MSSQ |   SHARESUDP | NetMeeting | LPR | PPTP | |
| SSHTCP | Microsoft DCOM | Persoft Persona | QuickTime | IPP | SOCKS Proxy | |
| SSL |   (MS Exchange) | SMTBF | RTP | TN5250p | | |
| TFTP | Novell | TN3270 | Real Audio | TN3287 | **Session** | |
| UUCP |   GroupWise | TN5250 | Streamworks | | REXEC | |
| URL | POP3 | | RTSP | **Push** | rlogin | |
| Web browser | Kerberos | | MPEG | Backweb | rsh | |
| | SMTP | | ST2 | EntryPoint | Telnet | |
| | | | SHOUTcast | Marimba | Timbuktu | |
| | | | WebEx | PointCast | VNC | |
| | | | WindowsMedia | | Xwindows | |

# Analysis and Reporting Features

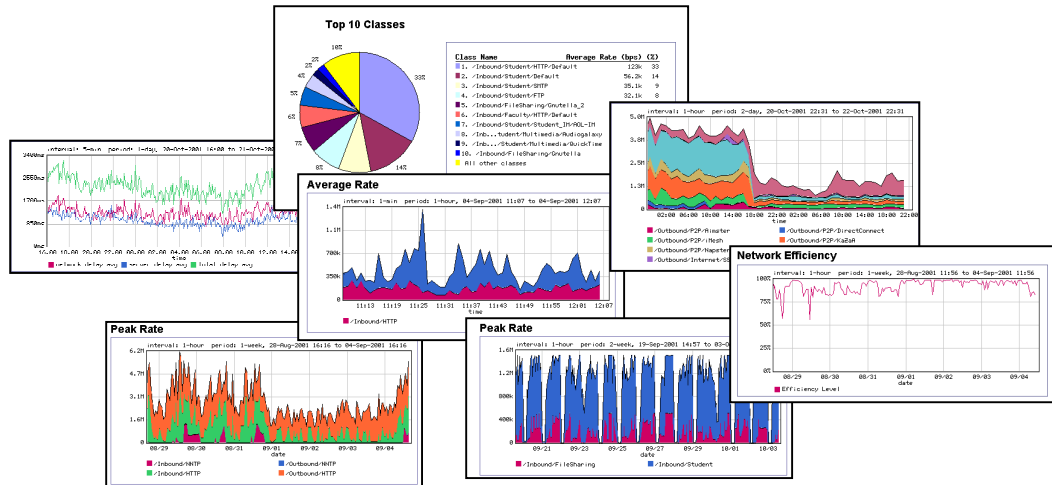| Feature | Description | Examples |
|---------|-------------|----------|
| **Response-Time Management** *(not available in PS/ISP)* | Gain access to performance statistics, threshold monitoring, high-level problem indicators, and performance graphs. Divide response times into components for time spent on the server, on the network, or on a portion of the network. Identify the clients and servers with the slowest performance. | • Microsoft Exchange response times:<br>Total Delay: 630 ms<br>Server Delay: 210 ms<br>Network Delay: 420 ms<br>• MS Exchange, *later*:<br>Total Delay: 2230 ms<br>Server Delay: 190 ms<br>Network Delay: 2040 ms<br>• Other features help isolate the cause of the jump in network delay and prevent future occurrences. |
| **Top Talkers and Top Listeners** | Answer your questions about who generates the most traffic or who receives the most traffic of a certain type. | • Top Talkers for http: yahoo.com, nasdaq.com, cnn.com, and espn.com<br>• Top Listeners for http:<br>CfoPC, VpMarketingPC, DirEngineeringPC |
| **Service-Level Agreements** *(not available in PS/ISP)* | Set response-time commitments in milliseconds. Measure and track service-level compliance. | • 99 percent of JD Edwards transactions should have end-to-end response times of less than 1100 milliseconds.<br>• Actual average response time is 867 milliseconds.<br>• But only 97 percent of transactions complete within limits, so SLA is in violation. |
| **Network Efficiency and TCP Health** | Expose hidden network inefficiencies:<br><br>Calculate the percentage of bandwidth wasted by retransmissions. Correlate dropped packets with their corresponding applications, servers, or URLs. Compare the number of TCP connections that were started, aborted, and ignored or refused by the server. Group connection or retransmission statistics for a link, partition, or traffic class. | • 12 percent of bandwidth goes to retransmissions<br>• The rate jumps to 37 percent for Oracle 8i traffic.<br>• The rate jumps to 78 percent for the Oracle traffic to a specific (and overburdened) server. |
| **Top Ten** | Zero in on the traffic types that are generating the most traffic. Top Ten is part of PacketShaper's easy-access features that help new users spot trouble and fix it -- quickly and without a big learning curve. | 46 percent of bandwidth goes to web browsing<br>22 percent of bandwidth goes to music downloads<br>12 percent goes to MS Exchange<br>07 percent goes to SAP<br>… and so on. |
| **Host Accounting** | Track historical usage levels for each IP address and retrieve statistics summed for each user, host list, or subnet. If you import this data into a tool such as MS Excel, you can sort the results, yielding top users, or even a fully ranked list of users from top to bottom. | • Departmental usage figures (Human Resources uses this much and Marketing uses that much)<br>• Per-user usage figures.<br>• Per-group usage (roll-ups of individual usage figures into grouped totals) |

| Metrics | Track over 50 metrics. Most can apply to all traffic or to just a portion, such as one application or a particular group of users. Metrics can reflect a flexible time interval. |
|---|---|

- Throughput in units of bytes, packets, transactions, connections
- Byte throughput for any traffic class: counts, averages, and peaks
- Throughput counts for any IP address, host list, subnet
- Counts and percentages of TCP connections that were denied by a policy, denied because of resource contention, ignored by servers, aborted by users, refused by servers
- Counts and percentages of retransmitted, received, tossed, dropped, and good TCP packets
- Number of HTTP response messages with 2xx success codes, 3xx redirection codes, 4xx client error codes, and 5xx server error codes.
- Largest number of simultaneous TCP connections
- Connection-speed and packet-size histogram data for profiling users
- Histograms, medians, and averages for components of transaction response time: network delay, server delay, total delay, round-trip time, and normalized network delay
- Counts and percentages of transactions that satisfied (or did not satisfy) performance requirements
- Time intervals within service-level compliance
- Time intervals that a service was unavailable
- Top applications, URLs, users; worst performing clients and servers
- Number of users per dynamic partition, using dynamic partitions, and denied access to dynamic partitions
- Counts of traffic flows that were blocked after exceeding a configurable flow limit (suspected DoS attack involvement)
- Numbers of software licenses allowed and in use

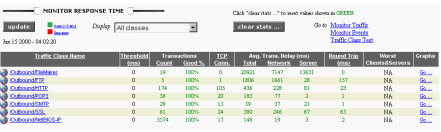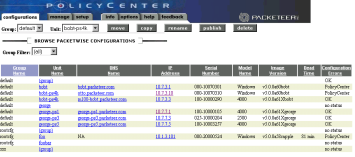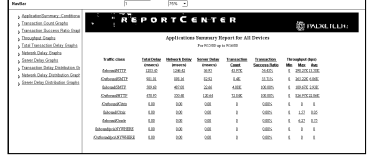| Graphs | Examine graphs describing current or historical network and application behavior. Apply graphs to the whole link or to just one portion such as one application or URL. |
|---|---|

# QoS and Performance-Control Features

| Feature | Description | Examples |
|---|---|---|
| **Partitions** | Protect or cap all the traffic in one class with a partition. You specify the size of the reserved virtual link, choose if it can exceed that size (called bursting), and optionally cap its growth. Partitions function like frame relay PVCs, but with the added important benefits that they cost less and they share unused bandwidth with other traffic. | • Limit Music downloads to 128 Kbps of a T1 WAN link.<br>• Reserve a minimum of 20 percent of the WAN link for Microsoft Exchange. Allow Exchange to exceed the minimum, but cap it at 60 percent of the link. |
| **Dynamic Per-User Partitions** | Create per-user subpartitions dynamically, as needed, when users initiate traffic of a given class. When the maximum number of subpartitions is reached, an inactive slot is released for each new active user. As always, unused bandwidth is available to others. | • Each dormitory student gets a minimum of 20 Kbps and a maximum of 60 Kbps to use in any way they wish. No tedious per-user configuration required. |
| **Rate Policies** | Keep greedy traffic sessions in line or protect latency-sensitive sessions with a *rate* policy. Deliver a minimum rate (perhaps zero) for each individual session of traffic, allow that session prioritized access to excess bandwidth, and set a limit on the total bandwidth it can use. | • Reserve precisely 21 Kbps for each VoIP session to avoid jitter and static.<br>• Cap each FTP download at 28 Kbps. |
| **Priority Policies** | *Priority* policies allocate bandwidth based on a priority, 0 to 7. The priorities determine how pro-rated bandwidth allocation is scaled. | • Protect Telnet, which has small but latency-sensitive flows, with a priority of 6.<br>• Give games such as Doom and Quake a priority of 0 on a business network. People can play if the network is not otherwise busy. |
| **Discard Policies** | *Discard* policies intentionally block traffic. The packets are simply tossed and no feedback is sent back to the sender. | • Discard traffic from websites with questionable content.<br>• Block attempts to Telnet *into* your site.<br>• Block external FTP requests to your internal FTP server. |
| **Never-Admit Policies** | *Never-Admit* policies are similar to discard policies except that the policy informs the sender of the block. | Redirect music enthusiasts to a webpage explaining that streaming audio is allowed only between 10:00 p.m. and 6:00 a.m. |
| **Ignore Policies** | *Ignore* policies simply pass traffic on, not applying any bandwidth management at all. | Let any traffic pass unmanaged that is going to a destination that is not on the other side of the managed WAN access link. |
| **Easy Config** | Instead of creating policies and partitions yourself, let PacketShaper do it for you. Assign your applications to categories, such as MissionCritical. PacketShaper automatically creates appropriate partitions and policies. This is an optional feature. | (see table below) |

| Applications | Assignment |
|---|---|
| SAP | MissionCritical |
| Oracle | MissionCritical |
| Customers' web | MissionCritical |
| Internal web | Average |
| MS Exchange | Average |
| Email, FTP | LowPriority |
| Gnutella, Imesh | Prohibited |
| Internet Radio | Prohibited |

| | | |
|---|---|---|
| **TCP Rate Control** | Overcome TCP's shortcomings with Packeteer's TCP rate control. It proactively prevents congestion on both inbound and outbound flows. It tells the end stations to slow down—it's no use sending packets any faster because they will be accepted only at a particular rate once they arrive. Rather than discarding packets from a congested queue, TCP rate control paces packets to prevent congestion. It forces a smooth, even flow rate that maximizes throughput. | Packeteer's TCP rate control has four key steps:<br><br>1. Measure network latency<br><br>2. Forecast packet inter-arrival times<br><br>3. Adjust window size according to latency and forecast<br><br>4. Meter the acknowledgement stream to ensure just-in-time delivery of the transmissions |
| **TCP Autobaud** | Detect the connection speed of the client or server at the other end of the connection or on the other side of the Internet. This automatic speed-detection mechanism can adjust bandwidth management even as bandwidth conditions vary. | • Substitute a text-only web page for a highly graphical web page if the user has a very slow dial-in connection.<br>• Use different minimum and maximum bandwidth rates for an application according to connection speed. |
| **Admission Control** | Decide how to handle additional sessions during bandwidth shortages: deny access, squeeze in another user, or, for web requests, redirect the request. | Accommodate new patrons of a streaming-media website until additional visitors would downgrade the quality of service to all. Then redirect latecomers to a page describing the temporary over-popularity problem. |
| **Denial-of-Service Attack Avoidance** | Don't be an assailant: Avoid being an unwilling participant (so-called *launch pad*) in a DoS attack.<br><br>Don't be a target: Detect and stop SYN floods or similar DoS attacks. | Detect and block ICMP variants that can plant malicious instructions.<br><br>Block flows to the KeySales web server after 15,000 flows-per-minute exceeded |
| **MPLS Support** | Add to the performance gains possible with MPLS alone. Attend to some of MPLS' administrative overhead. Add layer-7 application awareness to MPLS installations.<br><br>Classify traffic based on MPLS labels, tag an application's unlabelled traffic, swap or remove labels. | Tag SAP traffic with an MPLS label of 12 to preserve QoS through the MPLS core.<br><br>Tag traffic from one subscriber with a given MPLS label to route subscriber's traffic appropriately through their VPN. |

# Ease-of-Use, Interface, and Integration Features

| Feature | Description | Examples |
|---|---|---|
| **Installation** | Install PacketShaper products by plugging in two cables and filling out a convenient, web-based form. No need to change router configurations, topology, desktops, or servers. |  |
| **Browser-Based Interface** | Manage PacketShaper with an easy, graphical user interface from any desktop with a web browser. |  |
| **Command-Line Interface** | Use a command-line interface over Telnet as an efficient alternative to a GUI for streamlined, advanced operations. | telnet command line>> class show |
| **Passive Connector** | Remain connected — even if PacketShaper goes down or is turned off, traffic passes right on through. | |
| **Hot Standby** | Add redundancy to PacketShaper. Deploy two PacketShapers together, one passive and one active. | |
| **Failover Support** | Supply alternate policy values for use with a slower backup link, and PacketShaper automatically switches when it detects a failure of the primary link. | |
| **SNMP Support** | Use SNMP to access PacketShaper data. Packeteer provides MIB II and two proprietary MIBs with the | HP OpenView Network Node Manager can solicit information from PacketShaper using its |

| | | |
|---|---|---|
| | PacketShaper metrics listed above. | standard SNMP management tools. |
| **Integration** | Integrate with third-party tools via HTML, XML and CGI APIs, SNMP traps, POP3 email traps, the PacketShaper user interface, or customized integration features with select Packeteer partners. Extracted data can be saved in a variety of formats including SML, CSV, TSV, and ASCII. | • Export usage data into an Excel spreadsheet.<br><br>• Use a favorite reporting tool with PacketShaper metrics. |
| **Centralized Control** | **Centralized access:** Access all your PacketShaper units individually from a single desktop with the browser-based user interface.<br><br>**Centralized configuration:** Multiple PacketShapers can share configuration and policy definitions with Packeteer's PolicyCenter.<br><br>Through partnerships with leading vendors of network-management platforms, PacketShaper offers centralized access and control with HP's OpenView Network Node Manager and PolicyXpert and Micromuse's NetCool. Platform functions such as topology mapping, data collection, user-interface access, and event reporting all integrate smoothly with PacketShaper.<br><br>**Centralized Policy Management:** PacketShaper integrates with HP PolicyXpert and serves as a policy-enforcement point.<br><br>**Centralized Reporting:** While each PacketShaper tells its own story, Packeteer ReportCenter gives the big picture. It aggregates metrics from large deployments and creates organization-wide reports to manage trends or problems before they adversely affect applications. | <br><br>Define a QoS strategy with HP PolicyXpert and PacketShaper enforces performance policies.<br><br>Access PacketShaper configuration by clicking on the Packeteer icon in HP OpenView's topology map.<br><br> |
| **Customer Portal**<br>*(only available in PS/ISP)* | Offer subscribers customized, branded network and application status web pages. Enable subscribers to check their own status and reduce the volume of helpdesk calls.<br><br>PacketShaper/ISP maintains your portal's HTML pages and automatically customizes them for each subscriber. It serves HTML pages to subscribers when requested and insulates subscribers from each other's data. | Portion of a Sample Customer Portal Page in HTML with 60-Minute Graphs<br>…(deleted)…\<head><br>\<title> Graph sample \</title><br>\</head><br>\<body><br>\<h1> Network performance overall, last 60 minutes \</h1><br>\<h2> Inbound throughput \</h2><br>\<IMG SRC=/customer/Cgi1?OP.MEAS.GETGRAPH= &MEAS.NAME=/Inbound&MEAS.TYPE=link &MEAS.PERIOD=3600&MEAS.VARLIST= avgbps%%20peakbps&MEAS.VARLISTLABE L=AverageRate%%2CPeakRate&MEAS.GRAP HTYPE=line><br>\<h2> Outbound throughput \</h2><br>\<IMG SRC=/customer/Cgi2?OP.MEAS.GETGRAPH= &MEAS.NAME=/Outbound&MEAS.TYPE= link&MEAS.PERIOD=3600&MEAS.VARLIST<br>… (Deleted)…\</body><br>\</html> |