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WHITEPAPER

Educational organizations face pressing network management challenges:

- Mobile, cloud and video applications are driving bandwidth use to unprecedented levels.
- Network congestion can degrade the performance of key educational applications and cause poor user experience.
- Unregulated peer-to-peer (P2P) traffic can increase congestion and create legal issues.

To effectively address these challenges, educational networks need traffic management that supports efficient e-learning, such as prioritization of learning applications to insure fast response time and bandwidth guarantees for classroom video.

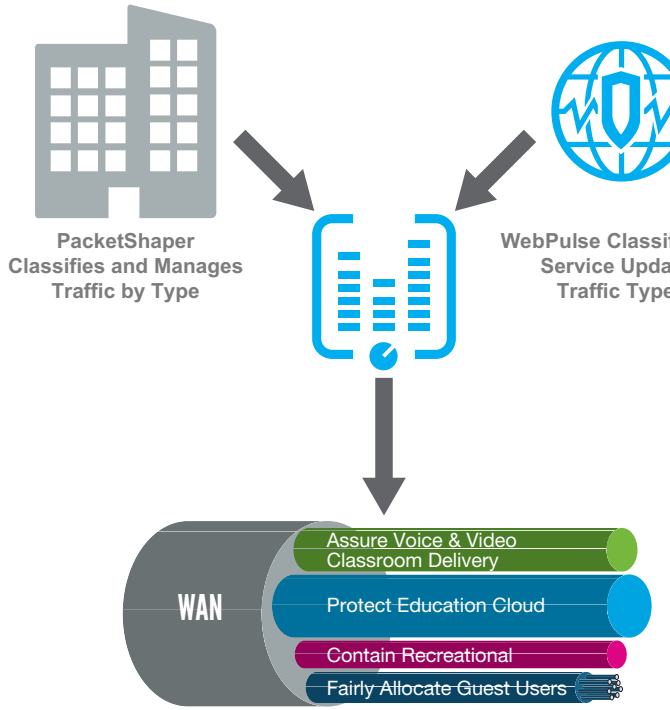
Blue Coat offers a full set of solutions that effectively addresses these needs. This paper shows how they solve problems specific to education.

Proven Technology that Improves Application Performance and Reduces Bandwidth Cost

Blue Coat PacketShaper, ProxySG MACH5 and CacheFlow help control bandwidth costs and deliver an enhanced user experience for students and educators alike. PacketShaper does this through bandwidth reservations for critical applications, containment of disruptive traffic, and minimization of bandwidth increases. Simple application-level bandwidth policies using asymmetric shaping and dynamic partitions allow the network to respond to educational needs in an adaptive way without reconfiguration as network usage patterns change during the day, week, and year. The new PacketShaper S500 is key to implementing these benefits by combining 10GB throughput with lightning-fast administration.

PacketShaper: Insight and Control through Visibility

To manage an educational network, you need an accurate picture of network traffic. PacketShaper automatically classifies and measures network traffic by application and – in the case of web traffic – by content category. Integration with Microsoft Active Directory can provide a user-based view of traffic to help administrators understand who is driving traffic on their networks. This unmatched visibility gives you the insight of a probe with far more sophistication.



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PacketShaper offers application-intelligent Layer 7+ visibility that integrates with Blue Coat WebPulse (Blue Coat Global Intelligence Network) for real-time content categorization. In addition to reporting on network and application utilization and performance, visualization validates common protocols and tracks what happens to each connection established by any application.

As the proportion of web-based traffic continues to increase, PacketShaper provides invaluable insight into how web-connected applications such as SaaS, social media, recreational video and audio/video communications are used on the network. The online learning communications critical to education today can be identified by both their source and type of traffic through custom configuration within the PacketShaper.

Containing Bandwidth Cost by Managing Network Usage

The Blue Coat offering can manage bandwidth for thousands of users individually as they log on or off the network. Special network usage limits can be placed on subnets with special purposes. For example, guest network traffic can be limited both by amount and type of traffic.

Per-user or application bandwidth is not reserved until needed. The traffic is managed through TCP controls rather than dropped packets. Flows are managed individually rather than in aggregate so that only some flows are affected by controls. Dropped packets can cause many applications, especially the on-demand video loved by students, to retry and produce un-wanted congestion.

Reducing YouTube Bandwidth Usage to Improve e-Learning Performance

Blue Coat MACH5 and CacheFlow can offload the media server by caching content locally and providing instant access on-demand. This approach greatly improves the speed and quality of video delivered – creating a superior user experience. Customers can typically experience a bandwidth savings of 40 to 50 percent and avoid having to purchase expensive bandwidth.

YouTube traffic can produce two kinds of problems:

1. On the LAN, YouTube video downloads eat up bandwidth needed for important applications. PacketShaper can limit this consumption.
2. On the WAN, multiple students requesting the same video can quickly overload the organization's connection to the Internet.

Caching and restricting YouTube is not a common capability for network products because YouTube often changes its format. Only caching that is constantly updated by a service like Blue Coat CachePulse can keep up with these changes and maintain bandwidth savings. CachePulse tracks the ever-changing web, so as new sites emerge or popular sites change the way they deliver content, new caching rules and instruction updates are automatically delivered from the CachePulse cloud to the CacheFlow appliance.

Customers can be confident that the patent-pending MACH5 and CacheFlow solutions will sustain high bandwidth savings and user experience gains over the long haul.

Managing User Classes with Network Segmentation

PacketShaper can identify special user classes that are using the network through logins on the Authentications server. This enables institutions to manage this usage by:

- Limiting traffic by application
- Identifying special users through a Microsoft AD interface and giving them extra bandwidth partitions across applications
- Monitoring traffic usage by application and URL

What this means: selected faculty members and students can be given additional rights on networks – but they'll be identified if they attempt to escalate their privileges.

Managing Student Network Traffic with Time-of-Day Policies

Students have interests and schedules that differ from those of workers and staff members. At most colleges, students are present all the time, and often use more network bandwidth in non-working hours. To accommodate this, Blue Coat products allow policies to be set based on time of day. During the day, bandwidth for non-educational sites and applications can be minimized, then opened up again during non-classroom hours.

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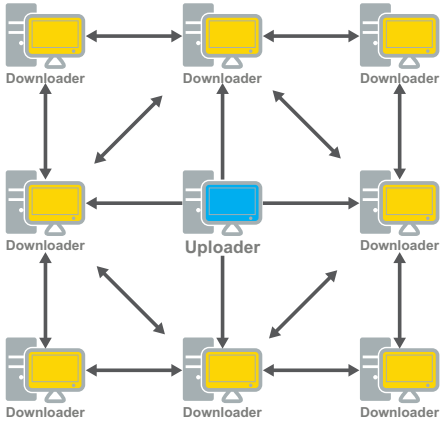
Detecting and Controlling P2P Applications

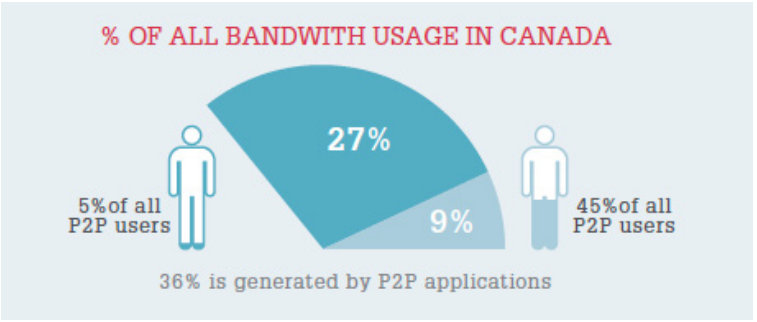
Entertainment traffic is far more popular among students than staff. Students are masters at sharing videos, music and applications across campus networks using P2P applications, as we diagram here:



Student P2P users can act as content servers (the Uploader), generating large amounts of outbound traffic. At the same time, they can continue to search and download files from other peers in the network. This can lead to a huge amount of inbound (search) traffic, as well as heavy, bandwidth-intensive outbound (file transfer) traffic that competes for bandwidth with other applications.

If the Uploader/server in the diagram is able to connect to the Internet, outside P2P search engines will find it and use it as a "source". As a result, outside users will start using bandwidth that the school has to pay for, even though it isn't being used by its students.

P2P applications hop ports and masquerade as FTP, HTTP and other traffic types. This inherent defense mechanism usually enables the applications to avoid detection by firewalls, routers and filters. On the other hand, their usage is often concentrated; just a few machines generate almost all the P2P traffic – as shown by the chart below.



PacketShaper can detect and rate-limit not only P2P traffic; it can also manage users so that no single user is able to exceed preset limits for bandwidth usage for specified subnets.

PacketShaper's network optimization solution and associated best practices help organizations gain visibility into, and control over, their network links. Its Layer 7 classification and analysis capabilities provide the application-level intelligence necessary to identify and track P2P on your network. PacketShaper measures bandwidth utilization and its impact on business-critical applications. This enables network managers to implement policy controls to contain unsanctioned traffic, protect mission-critical traffic, and smooth out traffic spikes. Through simple policy-setting and patented technology, PacketShaper provides visibility and control over traffic on an application, user, or session basis.

Managing Mobile Device Traffic

Students like to use mobile devices on campus networks and this can eat up bandwidth. As shown above, PacketShaper limits traffic on guest wireless networks. This is particularly important for organizations that supply their students with mobile devices or provide them with special guest wireless networks. If a student is loading unwanted content to a device, it will show up on the Suspect and Bad Traffic classes on PacketShaper and the appropriate shaping policy will be enforced.

Blue Coat's Partnership with Education

Networks have a history of presenting operational challenges to educational organizations. Many educational institutions have found that Blue Coat delivers a powerful solution that meets their needs for bandwidth and application management. This has resulted in a trusting partnership between Blue Coat and educational customers, many of whom have provided important feedback on product design and usage. Blue Coat has developed a loyal following and deployed many of its popular products at educational facilities.

If you're an existing Blue Coat educational customer, be sure to look at the new PacketShaper S500 with 10Gb performance. If you're a prospective customer, Blue Coat partners can provide you with a network visibility assessment in the form of BC360 service. This analysis not only shows the types of traffic running on your network, but also provides insight on how Blue Coat's Performance products can provide a better experience for students and administrators.

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