University of South Florida

Introduction

University of South Florida (USF), one of the top research universities in the US, is committed to formulating bold ideas and creating innovative solutions for its global community of 45,000 students, staff, and faculty.

To provide its community with reliable, quality network service, USF needed an effective, flexible, and scalable way to prevent aggressive peer-to-peer (P2P) applications from using more than their fair share of bandwidth, to enable sophisticated control of individual abusers, and to support significant growth in traffic volumes.

University of South Florida turned to Ellacoya's IP Service Control System for an effective, flexible and scalable way to control bandwidth congestion in its network.

The Traffic Control Problem

As of late 2002, USF was experiencing significant network congestion due to P2P traffic. Its network was hit particularly hard by KaZaA 2.0, which USF's enterprise-class appliance application could not reliably detect, and by a new P2P application its current firmware failed to detect at all. Network administrators also began to realize the limitations of application-based aggregate traffic management in the face of increasingly evasive emerging applications and the desirability of being able to enforce policies on specific individuals. Additionally, USF was in the process of upgrading its Internet connection to Gigabit speeds and needed a platform with the capacity for Gigabit throughput and the flexibility to scale with the university's growing needs.

Early Attempts To Address The Problem

Like many universities, USF had initially used an enterprise-class appliance to control P2P traffic, but the device was unable to consistently classify KaZaA traffic. At times, apparently after being up for an extended period of time, the device would classify KaZaA traffic as HTTP traffic, making rate-limiting very difficult. It was also limited in ability to pinpoint individual users using large amounts of bandwidth and had very limited throughput capabilities

Soft Signatures

Ellacoya's IP Service Control system impressed the university with its high-throughput capabilities and the ease with which port-hopping traffic could be identified and individual users could be controlled.

The Ellacoya system includes a set of predefined application signatures for the most common P2P applications, including KaZaA 2.0, iMesh, Grokster, WinMX, Blubster, Filetopia, BitTorrent, and the dozens of clients that use the Gnutella protocol. But unlike most signature-based classification products, which detect hard-coded signatures, Ellacoya detects "soft" signatures at Gigabit speeds, which network administrators can add to the system at any time through the system's Service Creation Manager.

"The Ellacoya platform lets me classify and control new peer-to-peer applications within hours of discovering them, instead of waiting months for a new version of code," said Joe Rogers, USF's Senior Network Administrator. "It's easy to identify the application signature and to add it to the existing signature definitions. When BitTorrent showed up, I took a quick packet trace, found the signature, and entered it in to the Ellacoya software within minutes of noticing it. Then I shared the signature with the Ellacoya team, who distributes new signatures to all customers whether discovered by the internal team or in the field."

The Ellacoya system uses hardware inspection to look for signatures in every packet that crosses its switch fabric at wire speed. When the system detects a packet containing one of the defined signatures, it reclassifies the corresponding flow using the policies associated with the signature. For example, if a user starts a KaZaA download on port 80, the system will see the KaZaA signature, classify the flow as KaZaA rather than HTTP, and apply the policies the network administrator has defined for KaZaA.

This combination of performance and extensibility assures USF of an effective means to detect and control port-hopping applications even as total traffic approaches one Gigabit in throughput.

Controlling Individual Users

Ellacoya's individual enforcement capabilities enable sophisticated control of abusive users where application-based aggregate control approaches fail. The Ellacoya system allows an individual IP address to be treated differently than the rest of the subnet to which it belongs. In this way, individual heavy users can be controlled based on total usage or other behavior.

Initially, USF has leveraged this control feature to pull individual users by IP address out of the standard set of policies and place them into a "penalty box" policy set.

Configuration

USF deployed Ellacoya's 16000 Series Switch, the network component of the IP Service Control system, with two Gigabit Ethernet ports and 12 Fast Ethernet ports. This configuration fit both the university's current environment and its planned Gigabit Internet connection.

The initial deployment of the 16000 Series Switch used all Fast Ethernet ports and easily handled peaks of almost 100 Mbps outbound (leaving USF) and about 50Mbps inbound produced by approximately 18,000 active machines. When the upgrade of its Internet connection to a Gigabit Ethernet link is complete, USF will use one of the switch's Gigabit ports for the uplink, which will provide headroom to accommodate future traffic growth.

USF's network administrators found the Ellacoya system easy to install and configure. It was up and running in just a few hours without the need for Ellacoya's technical support. Network administrators accustomed to setting up switches and routers find a familiar interface in the Ellacoya switch's CLI, and the Service Creation Manager GUI makes it easy to define policies, enter new signatures, and selectively control individual users.

Future Plans

USF plans to further leverage Ellacoya's DHCP Passive Authentication capabilities for more robust individual abuser management in their dynamic IP address environment, which is powered by redundant ISC DHCP servers. Development is under way for integration with the DHCP servers to enable an even more secure "penalty box" enforcement solution that measures and controls by MAC address, rather than IP address. The university is also interested in Ellacoya's ongoing work with content owners to improve and streamline the process, whereby network administrators are alerted to copyright infringement by users and take action to modify behavior without drastic or invasive tactics.

Conclusions

With Ellacoya's IP Service Control system deployed at the edge of the network, USF has unparalleled visibility into and control over its network traffic. Because of the Ellacoya system's flexibility, scalability, and individual control capability, USF can rest assured that its investment will provide lasting value for years to come.

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ABOUT ELLACOYA

Ellacoya Networks is an innovative technology company building breakthrough IP service control platforms for broadband operators. Ellacoya's IP Service Control System brings visibility, control, and new services to broadband networks. With the Ellacoya system, operators can immediately increase customer satisfaction and reduce costs, while collecting data and preparing their infrastructure for new sources of revenue.

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