NETEQUALIZER

Case Study

Background

Lutheran Health Network (LHN) is a regional healthcare provider network that consists of multiple hospital campuses and dozens of urgent care and physician practice locations, serving 23 counties in northeastern Indiana and northwestern Ohio. Every year, LHN cares for more than 50,000 inpatients, treat hundreds of thousands of outpatients, and touches the lives of their families and friends. To learn more about Lutheran Health Network, go to http://www.lutheranhealth.net/.

Jason Whiteaker is a Senior Network Engineer at LHN. He is part of a network engineering team that supports a diverse mix of traffic, including: traditional Email, Internet SaaS/ASP, patient EMR, VoIP (unicast and multicast), medical imaging, teleworker, and telemedicine (unicast, multicast, and video) applications.

LHN utilizes a mix of enterprise (wired and 802.11 wireless) and carrier (TDM and Metro Ethernet) transport services to provide these application services to their clients.

The Challenge

LHN had to find a mix of traffic limiting solutions that would balance a diverse set of applications across a wide range of bandwidth levels offered at their various sites. Like other healthcare providers, they were also looking to offer a better user experience by reducing network congestion, while balance competing needs on their network.

Because LHN's network heavily relies on Metro Ethernet services between the large campuses and small urgent care facilities, their options in terms of fancy queuing tools offered by traditional WAN or provider edge routers were limited.

Further complicating traffic management, they had to consider government mandates for Electronic Health Records (EHR) and compliance (HIPPA, PCI, etc.). Sometimes these service mandates can even be in "conflict" with each other, for example, when providing secure wireless access to meet Meaningful Use objectives along with supporting medical imaging study transfers over bandwidth-constrained resources, which can be as low as a single T1 facility (1.544 Mbps).

A typical usage scenario at a remote clinic might include patients standing in line to check in or out, an MRI or portable X-Ray image waiting to be sent to the PACS system in their data center, and multiple patients in the waiting area utilizing free Internet Wi-Fi services on their mobile devices. All of the users in this scenario might be contending for less than 5 Mbps of bandwidth. From a traffic engineering perspective, each of these applications places unique demands on the network.

A key goal was to support this use case by balancing applications' competing needs while keeping the network flowing smoothly.

Solutions Considered

LHN felt that there was no single approach or tool that could manage such a diverse mix of requirements, and so looked for a solution set to meet their needs. As part of their solutions set, they considered tools such as traffic policing to help them limit traffic. According to Jason, policing is appropriate for services like virtual application and software "pushes", but there is no fine control or consideration for high and low bandwidth sites. In addition, policing can be too harsh of an approach, as traffic is indiscriminately dropped once certain thresholds are exceeded.

Executive Summary

Customer: Lutheran Health Network (lutheranhealth.net)

Industry: Healthcare

Location: northeastern Indiana northwestern Ohio

 # Inpatients: >50,000 per year
 # Outpatients: hundreds of thousands per year

Challenge: Diverse mix of traffic. Balance competing needs. Optimize bandwidth usage.

Solution: NetEqualizer 4000 series. Primary NE4000 with redundant NE4000.

Results:
- User experience is smoother.
- Bandwidth optimized.
- Network engineers time freed up.

Benefits:
- Optimizes network infrastructure
- Reports on real-time network performance for troubleshooting
- Technical and political "win-win" for the network team

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The network team ran the risk of causing severe secondary side effects from policing that is too aggressive or too coarse. Issues like tail drop that can morph into full-blown TCP global synchronization across key aggregation points in the network could become a serious problem.

The Solution

LHN purchased two NE4000 1Gpbs units in May 2014, and then installed them as an active/passive pair to ensure traffic limiting full redundancy in case of an outage.

LHN looks to the NetEqualizer approach of traffic management as a way to augment their traffic processing needs. Because the NetEqualizer actively manages TCP connections and UDP flow states, they can apply a coarse interface traffic policy on the metro ring, yet fine tune and manage the mobile phone user checking their medical record portal or watching a YouTube video.

Jason has coined a term, "connection context", to describe a key NetEqualizer feature that is critical to LHN, namely NetEqualizer's active connection management method. *Due to connection context, a network engineer is able to manage the connection flow, end-to-end, in relation to all other traffic. Connection context is a tremendous capability* that appeals to anyone who has needed to create classification policies for hundreds of devices! From LHN's perspective, it is superior to setting up static classification policies, as even if you automate policy creation, the policy may not dynamically adapt to changing traffic mixes and flow counts.

They have also found that the enhanced reporting capabilities of the NetEqualizer 8.1 release provides them an improved picture of what their NetEqualizer appliances are doing in real time. They use the NetEqualizer reports to go back in time and answer questions such as, "Was there a network problem at 2:00 AM last night?". When the reporting capability of the NetEqualizer appliance is combined with other tools such as Cisco's Netflow, they gain a more complete picture of network performance.

The Results - How NetEqualizer Met the Challenge

LHN loves the user-friendliness of the NetEqualizer appliance. Their environment is large enough that they can dig as deep as they care to into the esoteric QoS/traffic management tools of the infrastructure. *However, being able to perform an initial configuration and let the appliance do its thing without a huge amount of babysitting is a big time saver*. Still, there are "nerd knobs" available that one can turn in order to really customize the appliance's function. In environments that have frequent service moves, adds, and changes, not having to go back and constantly tweak traffic management policies really frees up their network engineer's time.

It's understood that sometimes throwing bandwidth at a problem is appropriate. However, most environments don't have the ability to quickly purchase expensive transport for remote locations. *The NetEqualizer appliances allow Lutheran Health Network to optimize the network infrastructure in which they have already invested*. Management can feel more confident that when the time comes for bandwidth upgrades, those purchases will be effective and beneficial. As a bonus, applications that aren't bandwidth constrained enjoy better "goodput" and the overall user experience is smoother - a technical and political win-win for the network engineering team.