

Reliable Services Over L3VPN

NetFlow statistics without netflow capable devices

To achieve higher efficiency and provide better care to their patients, many hospitals and primary healthcare centres have been implementing healthcare software solutions. As this gives rise to a new network-related set of challenges in the operation of medical institutions, software solutions for service monitoring are becoming a must. DZ Palilula, a primary healthcare centre in Serbia, has already overcome some of these network challenges by using NetVizura.

DZ Palilula uses a centralised healthcare solution that renders services crucial for efficient patient care. However, as the number of patients rises and local clinics spring up, some doctors and medical staff have faced new difficulties when accessing and using some of the services in one of the clinics. On the other hand, staff in other clinics faced no problems. As these problems seemed to appear randomly, it became obvious that services had to be monitored to identify and solve the existing problems, and to prevent any potential ones.

Challenges

Given its unique specific internal organisation and the fact that DZ Palilula is a healthcare institution, the network and services monitoring software was faced with some challenges:

• **Centralised system.** Entire software and all of the services used by each of the clinics are located on the central application server in the main clinic.

• **No direct device control.** L3VPN links existed only between the main and local clinics, and as these links were leased from an ISP, network engineers didn't have access to the actual network devices, but rather only to their leased interfaces.

• **Patient medical data must not be compromised.** As patients' medical records must not be compromised during the service monitoring, it was necessary that the protocol for traffic monitoring does not look into the content of the packets sent over the wire.

• **No NetFlow capable devices.** Although NetFlow[®] protocol is ideal for traffic monitoring, available network devices did not support NetFlow[®] export.

Medical staff experienced seemingly random difficulties in accessing the central healthcare application via the web: problems occurred in different clinics at different times – the application operated smoothly at one clinic, while posing problems at another.

Solution

With all of the above in mind, DZ Palilula chose NetVizura as it allows traffic monitoring per clinic, even without NetFlow[®] capable devices. Instead of looking at the traffic based on the interfaces it goes through, NetVizura separates and analyses traffic for each clinic by using information on the traffic source and destination IP address.

Steps taken to implement the solution:

• Netflow probe SoftFlowd® (free netflow generator software) was installed on the central application server on two of its interfaces: link to database and link to local clinics. The probe was set to export net flow statistics to the NetVizura server.

• Traffic pattern for DZ Palilula was created to match the healthcare software and entire traffic.

• All IP Subnets of local clinics and their departments were configured in NetVizura, while clinics with more than one subnet were grouped into Subnet Sets.

• Additional traffic patterns were created in order to monitor specific mission critical services.

• NetFlow[®] protocol monitors only traffic statistics (amount of traffic in bytes, number of packets, IP addresses, services etc.), without looking into the content of the packets sent, so patients' medical records were not compromised.

Results

With NetVizura NetFlow Analyser, traffic of each of the local clinics was separated even though the whole traffic was gathered from the same link. This was possible as the traffic was matched by the source and destination IP addresses of the IP packets. In traffic was matched by interface it went through it would be mixed and shown on the same interface. With NetVizura, each clinic was represented by a separate set of IP subnets and traffic for each of the clinics was shown individually.

Newly available per clinic statistics revealed the root cause of the unpredictable operation of the healthcare software – L3VPN capacity. More precisely, link capacity in respect of the number of patients and department activity in each of the clinics.



Some clinics had much more patients than others, meaning that more medical personnel accessed the healthcare application in the central clinic through their L3VPN link. As the actual number of patients fluctuated depending on the time of the day – healthcare software appeared to be unstable: it would work fine until a clinic with insufficient link capacity faced the rush hour or a busy day, and it would pose no problems at all for the clinics with sufficient link capacity.

Once the connection between the link capacity and application performance was established, it was easy to arrive at the right solution to upgrade the leased L3VPN link capacity for the clinics faced with difficulties.

In addition, "Statistics per clinic indicated the most critical hour of the day in respect of server access and they also showed departments using software the most" said Miloš Marčeta, Network administrator at DZ Palilula. "Also, the monitoring of the link usage per clinic over time made a projection of L3VPN links leasing and related expenses more accurately".

"Monitoring traffic by hosts allows us to identify the most active users and departments in our clinics and pinpoint the periods when the network activity reaches its peak", Marčeta concluded.



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