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nGeniusONE Service Assurance Solution Identifies QoS Mis-Matches

Voice services today are delivered digitally using Voice over Internet Protocol (VoIP). However, the high- quality call standard people expect was set with analog voice, and that must be met with IP Telephony. VoIP is a latency-intolerant networked service. Should voice packets be dropped or delayed across the network (i.e., jitter), then the call will suffer degradation, sometimes to the point of making the communications unintelligible. Because VoIP is delivered converged with other business data services, issues like traffic bursts, network errors, and high traffic volumes caused by other applications might impact the performance and quality of the VoIP calls.

VoIP services are comprised of two different protocol types – signaling protocols for call set up and management – such as SIP (Session Initiation Protocol) and audio protocols for the actual media, specifically RTP (Real-time Protocol). The packets carrying these protocols need to receive priority delivery across the network in order to achieve high-quality voice transmission, which Quality of Service (QoS) class assignments ensure as packets are delivered across a data center, a campus, an MPLS network, and through the cloud. QoS is implemented with a ToS (Type of Service) byte in the IP header that defines the differentiated services class - DSCP (Differentiated Services Code Point) tag, which universally carries a priority level. That tag should be carried in each packet header throughout the full path of communications – across every hop to routers, switches, gateways, etc., in the originator's network, across any third-party network, and to the destination router. Should that tag be incorrectly assigned, changed or dropped anywhere in that path, the default typically becomes a best- effort delivery of the voice packet. It is regularly the cause of degraded and poor-quality call or video experiences as reported by affected end-users.

Performance Issue

The IT department of one public judicial system started to experience an increase in tickets for poor- quality phone calls, many from the judges themselves, and they were not shy about expressing their frustrations with the phone system. IT knows first-hand that in the judicial system, Judges talk! And not just in the court room, but also over the phone – judges to attorneys, sheriffs and police to bailiffs, clerks to paralegals, citizens to the courts regarding jury duty.

While people will often endure a little slowdown in their data applications, they typically have little or no patience with poor quality calls – frankly anything short of a flawless experience will result in immediate, negative reactions. People expect IP Telephony to be the same high quality of analog.

Impact

The impact to the court system and, really, any business with multiple locations that depend heavily on voice communications, is obvious and immediate. Packet loss, packet delay, and jitter all impact the quality of a call – it may be choppy, the connection may be lost, or the conversation may become virtually illegible. This will necessitate hang-ups and callbacks that are time-consuming, especially when the call goes through several individuals before being connected to a judge, for instance. When members of the court have short recesses from official proceedings, every minute counts. Poor call quality was creating a productivity issue for the staff, requiring callbacks and delaying critical conversations. The situation was quickly becoming intolerable.

Troubleshooting

For the IT team researching the issue, it can be complicated – they need visibility into the entire communications path of the call, including both the signaling protocols and the voice media. They need to be able to evaluate the underlying network, as well as business data applications in converged environments. And complexity increases with multiple vendors involved in delivering IP Telephony – from the phone, gateway, and SIP Trunk equipment vendors at the courts, to third-party WAN or MPLS vendors, to equipment vendors on the other end of the calls. Depending on the court itself – a county, provincial, or country system, there could be hundreds to thousands of phones across dozens to hundreds of locations. Pinpointing the source of the degradation in such cases requires sophisticated, scalable, comprehensive visibility.

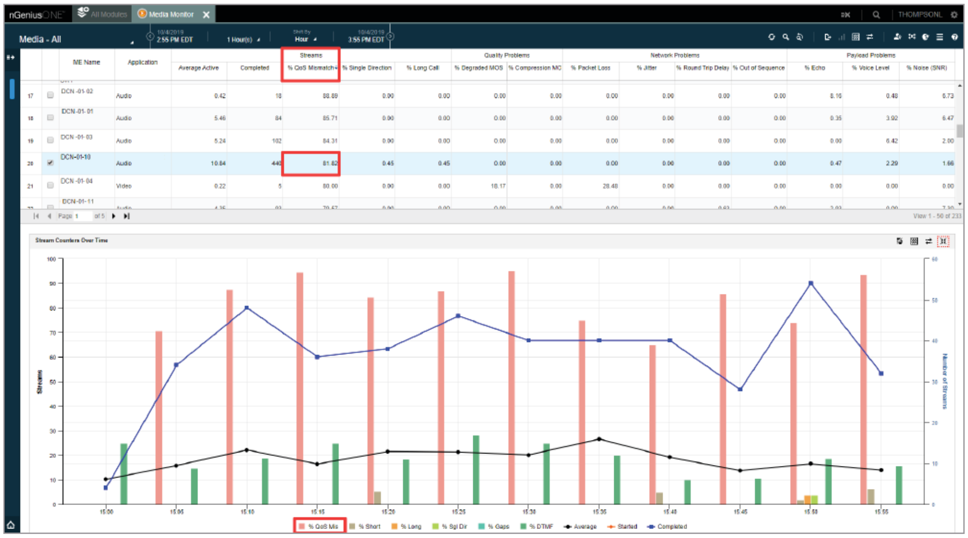

Figure 1: Media Monitor in nGeniusONE Service Assurance platform monitors traffic streams carrying VoIP traffic and identifies QoS Mismatches typically caused by equipment misconfigurations.

Fortunately, the IT team had the advantage of NETSCOUT® service assurance solutions deployed throughout their distributed environment, along with a NETSCOUT MasterCare Onsite Engineer (OSE) who helped them to gain expertise pinpointing the source of the VoIP degradations. The IT team and OSE leveraged the nGeniusONE® Service Assurance solution with a UC server and multiple InfiniStreamNG™ appliances in their data center and at most major locations for packet-based, end-to-end visibility of the VoIP calls and traffic. Following a well-defined workflow, the team began investigations using a dashboard view that included VoIP traffic performance, drilling down to a specialized Media Monitor with key metrics on voice calls and information, to session details for particular calls, to a network view identifying QoS Mismatches.

nGeniusONE classifies a stream as QoS Mismatch if the QoS value for that stream differs from the value used in the opposite direction (when the nGeniusONE solution is monitoring traffic in both directions.) The DSCP value taken from the IP header is used to detect QoS mismatches. This is a frequent problem and the most common causes of a QoS mismatch is either the original QoS assignment was incorrect or a mis-configuration of network equipment that sets precedence or priority is changed and becomes incorrect for one direction.

Remediation

With NETSCOUT, the IT team worked with the OSE to identify the information necessary to find the route and resolve a major issue with one of their voice gateways in short order. With the configuration corrected, the issue impacting more than 100 users at that point was cleared, and they were able to successfully make and receive calls and engage in high-quality conversations. The team is using nGeniusONE in a proactive manner now, leveraging ongoing trended information in reports that detect and report on QoS mis-matches.

Going forward, the IT staff has the choice of establishing Alerts on QoS mismatches in nGeniusONE that can be forwarded to ServiceNow using restful API to generate tickets. Once they had cleaned up their QoS mismatches, this will alert the IT staff should a change occur.

Summary

Two things seem clear when evaluating efficient operation of court systems – strong time management and quality communications. Both of these have been improved with the use of nGeniusONE to pinpoint and address QoS mis-matches. The IT team has reduced the mean time to pinpoint and resolve voice quality issues using nGeniusONE, often times enabling correction of the problem prior to them impacting the judges, clerks, and staff. The effect outside the IT organization has been positive as well. Productivity of the court staff and citizens that work with the courts has improved and their quality of user experience is meeting expected levels for all.

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