Healthcare Discovers Source of Slow Image Retrieval Using nGeniusONE

Healthcare imaging, typically for the purposes of diagnosis and treatment evaluation, is one of the most critical and frequently used services in the healthcare environment, with X-rays, ultrasounds, and magnetic resonance imaging (MRI) being some of the most common. Cardiology-specific imaging provides targeted patient analysis with echocardiograms, cardiac computed tomography (CTs), and angiography. Storing and sharing these images require strategy, planning, and budget on the part of hospitals and healthcare organizations.

Failure

One healthcare's help desk saw an increase in service tickets relating to their cardiology staff experiencing lengthy delays in pulling images for tests performed on their patients. These test images were critical for understanding patients' conditions, establishing and administering treatment plans, and evaluating patients' progress with existing therapeutics. The delays were expanding from hundreds of milliseconds, to seconds, to, in some instances, the application timing out and the users having to repeat the process. At times, when the staff needed to view two files to compare recent images to those taken prior to treatment being administered, the problem became even more frustrating. In a short time, this became a very significant challenge for the IT staff.

Impact

It seemed some image retrieval requests could be completed, while others were being significantly delayed. Furthermore, given these tests were for cardiac patients, the issue was critical to investigate, pinpoint, and resolve. The delay in getting the images for both diagnosis of acute cardiac threats was having impact at multiple levels:

- Threat to swift patient care, which was particularly concerning for those with life-threatening conditions
- Reduction in productivity for essential workers, like cardiac surgeons
- Risk of reputational damage, compliance violations, as well as potential lawsuits for delay of treatment

This had to be address and rectified immediately!

Troubleshooting

To begin the investigation into the image slowdown, the IT team turned to their nGeniusONE® Service Assurance solution with strategically deployed InfiniStreamNG® appliances to provide much-needed visibility into the situation. The triage and troubleshooting started with the dashboard view for their cardiac image application. Their NETSCOUT® Premium Services Engineer (PSE) quickly discovered that the file-sharing protocol in use, Common Internet File System (CIFS), showed high failure rates.

From the CIFS service tile in the dashboard, the PSE drilled down into the service monitor view for details regarding the CIFS servers, which confirmed the extent of the problem. The service monitor view (Figure 1) showed that over the course of an hour, there were several CIFS servers experiencing failure rates of between 92 and 98%, affecting thousands of image lookups, and that the server load showed many transactions had even "aged out." The analysis of failed transactions in the application error code distribution view revealed increases in "status not found" and an even higher rate of "access denied" errors, affecting the thousands of image lookups.

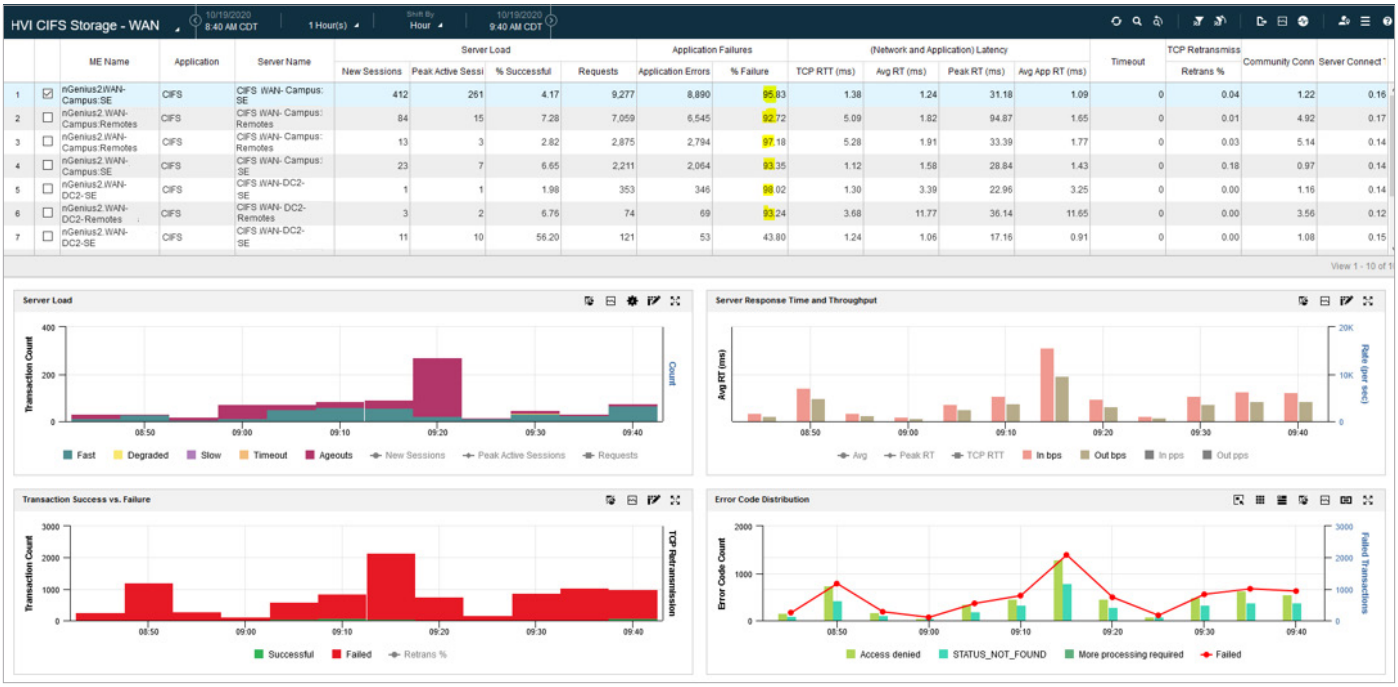

Figure 1: The Universal Service Monitor view in nGeniusONE was able to reveal details related to the delays in image retrieval, with failure rates for the CIFS file-sharing protocol ranging between 92% and 98% over the course of the hour for thousands of attempts.

The PSE was able to pull packet decodes for the servers with high failure rates that clearly showed the instances of "access denied" and "status not found" errors. These details were shared with the application development team in IT, as well as with the application vendor for the cardiac images. Ultimately, the signature information in the decode led the application team and vendor to identify a previously unknown defect in the imaging software code where some client sessions were unexpectedly attempting to access portions of the file system that they shouldn't have.

Remediation

The visibility provided by the InfiniStreamNG appliances and analysis by nGeniusONE were essential in triaging and diagnosing the root cause of the problem. Armed with this information, the imaging application vendor was able to rewrite the code and patch the application, rectifying the access denied and image retrieval problem.

Summary

By viewing the session analysis details offered by nGeniusONE, this healthcare was able to find an error in the application code to share with their application vendor, which, when corrected, improved performance for their cardiac staff, and likely many other cardiac units using the same software. For this healthcare's cardiac staff, they were soon able to pull up patient images quickly, efficiently allowing them to return to the high-level patient care for which they are known.

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