OPTN Network Operations Oversight Committee
Meeting Summary
February 16, 2023
Webex

Edward Hollinger, MD, PhD, Chair

Introduction

The Network Operations Oversight Committee (NOOC) met via Webex on 02/16/2023 to discuss the following agenda items:

1. Welcome
2. OPTN Computer System Outage
3. OPTN Member Security Project Updates: Member Training and Exam
4. Public Facing Dashboards

The following is a summary of the committee's discussions.

1. Welcome

Ed Hollinger, Chair of the Network Operations Oversight Committee (NOOC), welcomed the committee and gave an overview of the meeting agenda.

2. OPTN Computer System Outage

Tiwan Nicholson, UNOS Director of IT Operations, briefed the committee on an OPTN Computer System (also known as UNet) outage that occurred the day prior, February 15. He informed the committee that the OPTN Computer System was inaccessible for forty minutes, no transplants workflows were affected during this time, and no patients were adversely impacted as a result. He shared that the OPTN is working to determine the cause of the outage and is providing regular updates to HRSA and USDS. During troubleshooting, the team found that no OPTN data was lost while the database availability cluster of the OPTN Computer System was in an unhealthy state and rendered the OPTN Computer System inaccessible. Mr. Nicholson confirmed that nothing crashed while the system was inaccessible. Upon restoration of services, the Organ Center followed up promptly with OPTN members that had contacted them and confirmed they were able to resume and complete all their workflows successfully.

Mr. Nicholson provided an overview of the OPTN System's backup technology - Veeam. He shared that incremental backups of the file system, not the database, happen every 90 minutes within the system, and during this time, something in the environment presented itself to Veeam as if it was a new system. Veeam acted appropriately and interpreted this as a new system within the network and therefore triggered a full backup of the system.

The SQL always-on cluster has a self-protect mechanism, and if it detects the system is under a high amount of stress, then to protect the data it will shut the cluster down.

Mr. Nicholson explained that engineers took the action to restart always on cluster restore the service and re-enable the OPTN System availability.

The OPTN is actively working with different vendors, Microsoft, Nutanix, Veeam, etc., to perform a root cause analysis of what caused the system to become inaccessible. Mr. Nicholson assured the committee that the results would be presented to them when available.

Summary of discussion:

A representative from HRSA asked for information about the cluster environment. Mr. Nicholson explained that the environments are connected and the cluster acts as the glue that keeps the environments connected, and during this situation it was as if they became separated. The HRSA representative asked if the backup software is configured to back up from the primary database node and if not, was this a misconfiguration in Veeam. Mr. Nicholson explained that the software is configured to back up the file system, not the database, from a read-only node. Veeam will not backup from the active node so it does not impact the performance or availability of the active node. The node is hosted within Nutanix.

A committee advisor asked about the heartbeat and node configuration of the infrastructure. Mr. Nicholson explained that during this particular situation, the node could not detect the heartbeat. Usually, SQL always-on configuration is able to transfer traffic to another healthy node, but in this case, the cluster management plane interpreted what was happening on the node as worse than regular degradation. This led to the cluster taking self-protection measures to prevent data corruption. Veeam and Microsoft were acting as designed, which is to protect the data.

A representative from HRSA asked if the OPTN should bring back the system hot site or whether there was another precaution that could be in place in the event that something like this were to happen again. Mr. Tulchinsky explained that once the OPTN receives more information about what caused the outage, than they will have a better idea of how to prevent it from happening again. A committee advisor agreed that until the OPTN knows what the root cause of the outage was then making changes won't necessarily increase availability because they won't know whether they're addressing the issue.

A representative from HRSA asked about the geographic balance between the two operating environments, to which Mr. Tulchinsky reminded them that the private cloud consists of one environment in Virginia, and the other is located in Texas, noting that environment diversity is required by the OPTN contract. Mr. Nicholson explained that the OPTN also has a geographic load balancer (GSLB) that they utilize to balance availability across sites. The representative from HRSA asked for more clarification on how the two environments work together. Mr. Nicholson explained that the workload can be taking place in either environment. If an incident occurs, the system can transfer traffic over to the alternate site. The two sites work to simultaneously write data in two places while staying in sync with one another.

A representative from HRSA asked for clarification on how the system backs itself up, what system controls the backup, and how often the backup occurs. Mr. Nicholson explained that Veeam is the backup solution from a file system data backup perspective. In this situation, they are not talking about restoring the data from backup but making sure that healthy nodes at the web and the database layer are keeping the system in sync and are able to direct traffic to a number of active nodes. A committee advisor noted that replication of data and data backup are two different things.

A representative from HRSA asked for clarification on how the OPTN made the determination that no adverse events occurred during the outage. Mr. Nicholson explained that the OPTN followed up with each of its members that called during the outage and directly asked whether the outage had adversely affected them. All members responded positively and none of the calls were connected to match runs, reiterating that there was no known impact to patients.

Next Steps:

The OPTN plans to present the findings from the root cause analysis to the committee when they become available.

3. OPTN Member Security Project Updates: Member Training and Exam

Terri Helfrich, UNOS Director of Information Security, provided an update on the committee's proposal to Establish Member System Access, Security Framework, and Incident Management and Reporting Requirements. She provided an update on the themes from public comment and regional meetings. She briefed the committee on a proposed self-assessment and suggested the creation of a focus group so the committee could obtain a baseline measurement of security frameworks. Ms. Helfrich presented a proposed scoring method for members to use when determining compliance.

Summary of discussion:

A committee member commented that until members have an initial readiness assessment there is not an accurate baseline measurement for members to compare themselves to. The committee won't have a clear idea of what member's IT security may look like without this baseline. They noted there are concerns about the six-month timeframe to implement these changes and members are worried that they could receive a failing grade. An advisor has also heard these concerns and has already seen some members analyzing their security framework to ensure it adheres to the requirements of the policy. A committee member suggested that there should be no pass or fail grade after only six-months; this time should be an opportunity to collaborate with members and not penalize them.

The committee took a deeper look into the proposed scoring and thought it was important to consider how they introduce the scoring. A committee member suggested the NOOC wait to release the proposed scoring or to wait to score members before they determined what an organization's baseline may be. The committee agreed that there is not enough data to determine what the scoring should look like at this time. A committee member suggested reviewing member readiness assessment results before the committee considers scoring. A representative from HRSA suggested the committee consider an internal review process to measure the progress of a member over time and establish parameters on expectations of growth over time.

A committee advisor thought that members may struggle to understand the scoring scale. They noted that although it is an industry standard, they suggested there be a measure of what members should work towards in the future. They suggested setting clear expectations of where members should be and what the indicator of success would be. Another committee member suggested measuring member's growth based on their initial assessment score, every year for three years. They thought it was important to consider members who may have shown substantial improvement in their system but may still be below the standard. They noted that these member's efforts and growth should not go unnoticed. They also thought the inverse was important to consider, that although a member may have a great score, if they haven't shown any effort to better their system, then this is also something the committee should consider. Another committee member suggested that the group could establish a minimum acceptance level for members.

4. Public Facing Dashboards

Tiwan Nicholson, Director of IT Operations, presented on public facing dashboards and asked the committee what public dashboards they thought were important to provide to the public in order to increase transparency and trust in the system across the community. The creation of some public facing dashboards have been mandated within the OPTN Contract modification received late last calendar

year. The committee discussed what is suggested by “public facing” and also explored what metrics they would like to see displayed on these dashboards.

Summary of Discussion:

A committee member suggested the OPTN analyze their system and see what vulnerabilities may lie within the system. They then suggested that the OPTN administer this information to exclusive but appropriate parties to ensure that high risk stakeholders are in the know. A committee member asked if there were any industries or companies comparable to the OPTN that provide these metrics and dashboards so the OPTN can refer to them as guidance. Mr. Nicholson agreed that this could be an interesting starting point and that status dashboards are always a useful place to start if the committee would like to utilize those resources. The information that the OPTN provides to members, to the general public, and to the government adds a unique layer to the capabilities of the OPTN Computer System and the dashboards that can be produced. A representative from HRSA suggested that the OPTN provide information about the status of the OPTN Computer System and not delve in to potential vulnerabilities or otherwise confidential information.

A committee member suggested the team consult the OPTN Patient Affairs Committee (PAC) to receive their perspective on what dashboards and information patients may find most useful. A committee member cautioned the rest of the group to carefully consider the information they want to show on these dashboards as they don’t want members to be overwhelmed by the amount of information, nor do they want information to be lost in the copious amount provided.

A committee advisor suggested the dashboards include uptime of infrastructure to enhance visibility to key applications. This could be important information to exemplify visibility of the system and show that they are running.

A committee member stressed the importance of providing information to the patient community and how these dashboards could be useful to patients and their families. They discussed a tiered approach to have the dashboards display simple patient information and to build out from there so that patients are able to explore the dashboards in more depth if they wish. The OPTN must consider their multiple audiences and provide adequate information to each of these respective groups to maintain trust and visibility of the system. The committee will continue this conversation during a future meeting.

Attendance

- **Committee Members and Advisors**
  - Adam Frank
  - Bruno Mastroianni
  - Clifford Miles
  - Daniel Yip
  - Edward Hollinger
  - Kelley Hitchman
  - Kimberly Rallis
  - Maryjane Farr
  - Melissa McQueen
- **HRSA Representatives**
  - Adriana Martinez
  - Christopher McLaughlin
  - Cliff Myers
  - Manjot Singh
  - Nick Lewis
  - Vinay Vuyyuru
- **UNOS Staff**
  - Alex Tulchinsky
  - Amy Putnam
  - Anna Messmer
  - Bonnie Felice
  - Bridgette Huff
  - Courtney Jett
  - David Klassen
  - Jason Livingston
  - Kristine Althaus
  - Liz Robbins Callahan
  - Marty Crenlon
  - Maureen McBride
  - Michael Ferguson
  - Morgan Jupe
  - Ralph Medina
  - Roger Vacovsky
  - Susie Sprinson
  - Terri Helfrich
  - Tiwan Nicholson
  - Tynisha Smith