OPTN

Mini-Brief

Clinically Acceptable Availability of the OPTN Matching Function

OPTN Network Operations Oversight Committee

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Affected Policies: None
Sponsoring Committee: *Network Operations Oversight Committee*
Board of Directors Meeting: *June 26-27, 2022*

Executive Summary

As a part of the committee's on-going oversight and metrics review, the Network Operations Oversight Committee (NOOC) conducted a detailed review of the clinically acceptable availability of the OPTN Matching Function delivered by the UNet[SM] system availability (uptime).

Based upon this review the NOOC recommends that the OPTN maintain the 99.9% OPTN Matching Function uptime excluding planned maintenance. Where practical, planned maintenance periods should not exceed 30 minutes.

Background

The Network Operations Oversight Committee (NOOC) is an operating committee of the OPTN. It assists the Board of Directors in its oversight of the OPTN operations, including the OPTN matching function, the process of official OPTN data collection, including data from potential donors, deceased donors, living donors, transplant candidates, and transplant recipients required for the OPTN matching function and other OPTN activities. To fulfill their charge, the NOOC reviews quarterly metrics associated with the OPTN match function. The NOOC also develops an annual review of network operations and metrics which is submitted to the Contracting Officer Representative (COR).

The percentage of matching function (system) availability by month is one of the metrics that the NOOC regularly reviews. System availability is typically expressed as a Service Level Agreement (SLA), which translates into an amount of allowable downtime per month. The following table shows some typical system availability SLAs:

Availability % (SLA)	Downtime per month
99%	7.31 hours
99.5%	3.65 hours
99.9%	43.83 minutes
99.99%	4.38 minutes
99.999%	26.30 seconds

The 2019 OPTN contact required 99.5% availability for the matching function. Matching function availability is measured as the overall UNet[SM] system availability, and included both planned and unplanned downtime. Planned downtime is time when UNet purposefully taken off-line in order to perform system maintenance or to deploy organ allocation policy changes. The OPTN posts system notices to inform UNet users of the planned maintenance. UNet has met or exceeded 99.5% availability throughout the contract period.

In January of 2022, a modification to the OPTN contract was proposed to require 99.9% availability not including planned maintenance. Since the contract modification, UNet continued to meet or exceed 99.9% availability.

An illustration below shows UNet availability since October 2020.

Month	UNet Availability With Maintenance	Scheduled UNet Maintenance Impact	UNet Availability Without Maintenance
Aug-20	99.95%	0.05%	100.00%
Sep-20	100.00%	0.00%	100.00%
Oct-20	100.00%	0.00%	100.00%
Nov-20	100.00%	0.00%	100.00%
Dec-20	99.83%	0.17%	100.00%
Jan-21	100.00%	0.00%	100.00%
Feb-21	99.72%	0.07%	99.79%
Mar-21	99.77%	0.22%	99.99%
Apr-21	99.89%	0.11%	100.00%
May-21	100.00%	0.00%	100.00%
Jun-21	99.72%	0.28%	100.00%
Jul-21	100.00%	0.00%	100.00%
Aug-21	100.00%	0.00%	100.00%
Sep-21	99.91%	0.09%	100.00%
Oct-21	100.00%	0.00%	100.00%
Nov-21	100.00%	0.00%	100.00%
Dec-21	99.94%	0.06%	100.00%
Jan-22	99.91%	0.09%	100.00%
Feb-22	99.87%	0.05%	99.92%
Mar-22	100.00%	0.00%	100.00%
Rolling Avg 12 Months	**99.94%**	**0.06%**	**99.99%**
Rolling Avg Since Aug 2020	**99.93%**	**0.06%**	**99.99%**

Purpose

At the NOOC's December 2, 2021 meeting, HRSA requested a clear statement/recommendation from the NOOC on a clinically acceptable availability for the OPTN Matching Function.

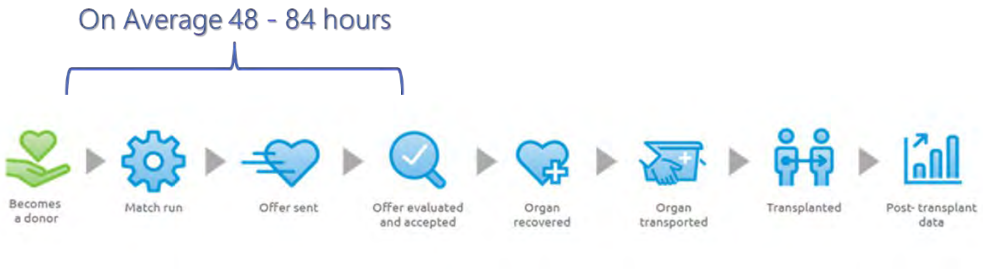
In response to this request, the NOOC Chair (assisted by UNOS staff) conducted individual interviews with each of the NOOC members and advisors.

UNOS staff also contacted Gartner (a leading technology research and consulting firm) to obtain general information about system availability in the healthcare sphere.

The findings from the interviews conducted by the NOOC Chair were presented and reviewed by the committee at the February 2022 NOOC meeting. A summary of the review and input from the committee members and advisors is as follows:

Organ allocation is a critical and multi-faceted workflow

Organ allocation is a critical process and there are many factors and redundancies built into this process. Organ allocation is a planned process as evidenced by the fact that organ offers occur hours or days before the set operating room (OR) time for the transplant and that most organ recoveries occur at night when operating rooms are available for organ recovery. To illustrate the process, UNOS staff looked at the time duration between a donor being added to UNet and organ acceptance. In calendar year 2021, this timeframe averaged between 48 and 84 hours depending on the organ as shown in illustration below.



The table below depicts aforementioned timeframes by organ.

Organ	Average time (in hours) between donor being added to organ acceptance in calendar year 2021
Heart	48
Heart/Lung	49
Lung	51
Liver	52
Intestine	66
Kidney	79
Kidney/Pancreas	84

Committee members noted that there are process dependencies that exist outside of UNet such as organ transportation. The committee chair commented that, "the technology component while a very close partner in marriage to the actual workflows of donor identification all the way through to match

run and then the actual organ allocation process. The technology is not the actual primary driver in this process".

Planned vs. Unplanned downtime

Committee members and advisors often commented that there is a big distinction between planned and unplanned downtime. Members and advisors recognized the need for planned downtime in order to improve and maintain the system. Due to the nature of organ allocation as described above, planned downtime of 30 minutes or less is not clinically impactful.

Members and advisors often stated that unplanned downtime can be more impactful, but an occurrence of 30 minutes or less is clinically tolerable. Committee members and advisors suggested rather than increasing the overall availability it would be best to maintain focus on limiting episodes of unplanned downtime. There could be few episodes of unplanned downtime and any episode of unplanned downtime should be limited to about 30 minutes. OPTN Members should also be periodically reminded of the published best practices and OPTN procedures for situations when technology is delayed or temporarily unavailable.

Value of increasing availability

Committee members and advisors stated that the value of raising system availability to 99.999% (with downtime measured in seconds per month) is unclear. One advisor commented that "Every time you add a 9 the cost increases exponentially".

The committee members and advisors discussed appropriate baseline and benchmarks for the matching function and concluded that a service level of 99.999% is not appropriate because UNet is "not landing airplanes, not a nuclear power plant, or an emergency management system".

Appropriate availability baseline/benchmarks

Although UNet is not an electronic health record (EHR), committee members and advisors agreed that UNet was comparable to an EHR for system availability purposes. It was noted that Epic has not historically, provided a system availability SLA and that Cerner will not provide a standard SLA, but will guarantee 99.96% SLA for a premium. Members and advisors also commented that EHRs have regular planned downtime and that hospitals have procedures for continuing operations during these downtimes.

One NOOC advisor investigated the SLAs for a cloud based computing services. "I investigated what Amazon Web Services and Azure post as availability, which is 99.9%. I looked at the multi-redundancy options and the best guarantee that you can get from Azure is 99.99%. They have consistently paid out some kind of small fee on a regular basis because having 99.99% is really hard. If you look at December alone, Amazon had four outages in that set of services." This advisor also noted that Azure and AWS offer infrastructure availability times. "That is not application availability time. Application availability is far harder to do than [keeping] services and redundant locations up and running at 99.9% or 99.99%." The OPTN matching function availability is an application availability metric.

Another NOOC advisor commented, "As long as the right business continuity and disaster recovery protocols are in place to try to keep as much uptime as possible I think that 99.9% or 99.99% is all that you can ask."

As a part of this assessment of appropriate availability baselines and benchmarks, UNOS staff gathered feedback from Gartner, a leading technology research and consulting firm.

The information provided by Gartner confirmed much of the information from the NOOC interviews. The Gartner consultant stated that when you are trying to support a healthcare supporting system on a nationwide scale like UNet it is virtually impossible to achieve 99.999% availability. Barriers to 99.999% availability are mainly due to the number and variety of endpoints in such systems and national network grid dependencies. These types of systems may be able to provide 99.999% availability in the location where it is hosted but it is virtually impossible to guarantee 99.999% availability across the nation.

Gartner also confirmed that major EHRs resist giving an availability SLA guarantee. EHRs often refer to the SLA of the hosting environment instead of the EHR application availability. Cerner (one of the major EHR vendors) will not guarantee an availability SLA, but will monetize a 99.96% SLA for a premium.

Gartner also commented that planned maintenance is not normally included in the availability metrics, but they also noted that systems need to ensure adequate operational contingencies, early communication of planned downtime, and infrastructure redundancies, in order to protect against any unintended downtime during planned maintenance. Gartner also advised a focus on defining acceptable service levels based clinical risk and impact.