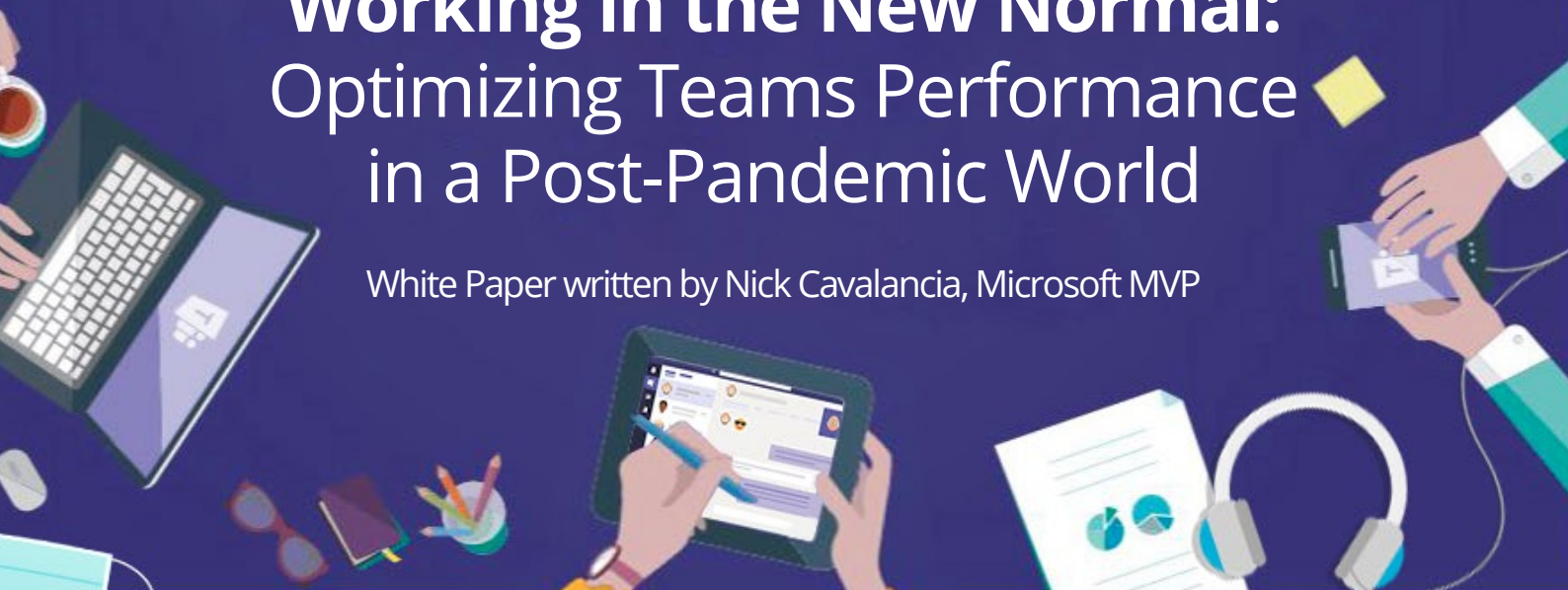


Working in the New Normal: Optimizing Teams Performance in a Post-Pandemic World

White Paper written by Nick Cavalancia, Microsoft MVP



When the world changed in early 2020, many businesses chose the route of shifting their in-house operations to a nearly or completely remote workforce. According to a mid-pandemic Gallup poll, 62% of employees are working remotely as a result of COVID-19¹. This shift has resulted in the massive reliance upon Microsoft Teams as the means by which organizations both communicate and collaborate.

Microsoft has been beefing up Teams, feverishly adding new features and options to meet the demands of their ever-growing set of daily users – plenty of improvements around audio and video experience have been made to increase an organization’s ability to communicate and collaborate effectively online. Additionally, back in March, Microsoft put out a free 6-month trial of Microsoft 365 E1 licenses (which includes the web version of Teams) to help those organizations who suddenly need to work remotely to do so online with a full suite of creation, communication, and collaboration tools. With 75 million daily active users today, Teams has proven itself as an important part of today’s business operations.

But as the world looks to return to “normal” as is possible, organizations need to consider how they will operate moving forward. With 59% of those currently working remotely wanting to remain so post-pandemic¹, it’s evident that some of your workforce will be staying home.

All this adds up to a scenario where organizations will have this “new next normal” workforce heavily relying on Microsoft Teams and organizational leadership looking for ways to enhance the efficacy this new workforce paradigm.

In this paper, we’ll take a look at how Teams can play a major role in keeping the post-pandemic workforce working, how this impacts your network architecture, and what Microsoft says is best practice. We’ll also look at ways organizations are looking to monitor and determine Teams’ level of performance and service quality, and the resulting level of user productivity.

¹:Gallup, U.S. Workers Discovering Affinity for Remote Work, 2020

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Optimizing Teams Performance Through Synthetic Transactions

There's a lot that makes up a connection to Teams between the home network and the Microsoft service. So, it's often difficult to identify where along this path is the source of a performance issue and remediate the problem. GSX Gizmo uses synthetic transactions to simulate Teams (and other M365) user activity. These transactions continually test Teams workloads to help identify drops in service quality, providing detail on scope, location, service impact, and more.

Look for GSX insights throughout this paper.

The Challenge of "New Normal" Working with Teams

When the pandemic began and organizations first responded, the focus was to get every user functional from home; establishing connectivity, improving security, making new software purchases, and getting users up and running. It was one fire after another. Teams played a large role in allowing users to connect, share, and collaborate – taking away some of the pain felt by both IT and users.

Today, the remote workforce is operational, so the focus now needs to be on optimizing the use of Teams in a way that improves operations, enhances productivity, and results in increased profitability. While Microsoft provides Teams as a robust service with high levels of availability and connectivity, there are a number of challenges that lie outside of Microsoft's control organizations need to focus on in order to get their use of Teams to an optimized state. These include:

- ✓ Improper connectivity between the user and Teams
- ✓ The lack of use of Quality of Service (QoS) when routing internally
- ✓ An inability to properly monitor Teams for service quality issues
- ✓ A need to identify the scope and source of Teams performance problems

The remainder of this paper will focus on each of these challenges, offering guidance on how to overcome each in an effort to optimize your organization's use of Microsoft Teams.

Optimizing Improper Teams Connectivity

When the pandemic hit, your internal IT had no choice but to figure out a way to connect the user at their home to Teams within Microsoft 365 – and do so in a way that ensured corporate security and governance, validated identity, included access to internal corporate resources, and still somehow provided users with a reasonable overall experience. Quite a tall order.

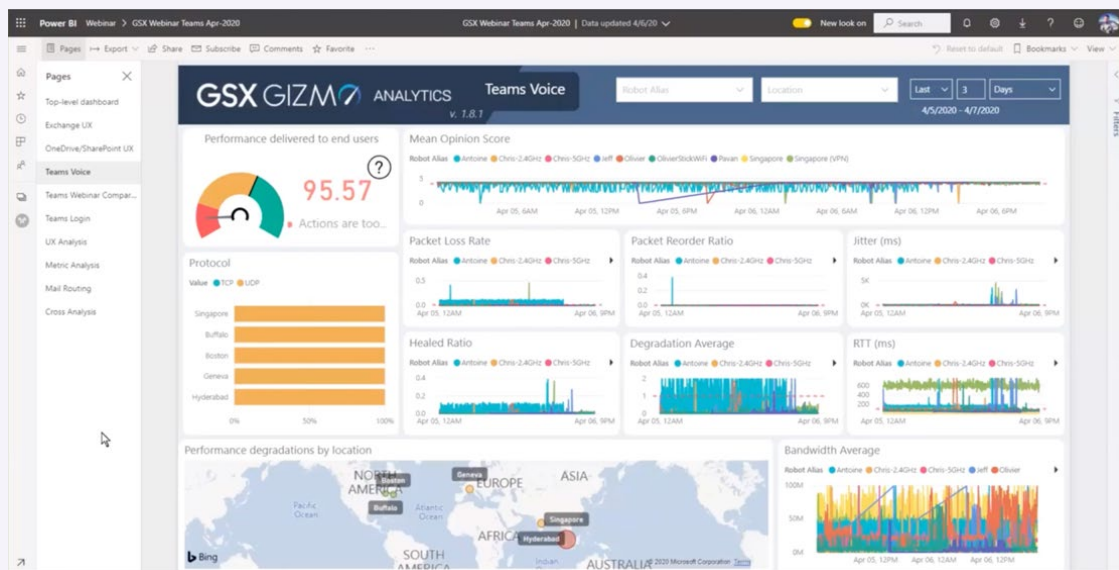
Many organizations simply increased their VPN licenses and had every remote user connect to the corporate network and then routed them, as needed, to Teams. While a viable solution, it's one Microsoft doesn't entirely recommend, for a number of reasons:

- 1. It starts with a less-than optimal home network** – Your corporate network has fast Internet connectivity. But home users have anything and everything under the sun when it comes to wireless connectivity, bandwidth, personal devices, kids playing Xbox and watching Netflix, etc. Consider providing those that will continue to work remotely with some guidance around using (when possible) a wired connection, the right WiFi band (5GHz is faster and best in shorter range scenarios, while 2.4GHz is best for longer distances), a newer (and updated) WiFi router, and high-performing DNS servers (e.g., Google's servers at 8.8.8.8 and 8.8.4.4).
- 2. It doesn't go directly to Microsoft 365** – The use of the VPN forces all traffic to route through the corporate network. Microsoft recommends the shortest path possible, which includes egressing the corporate network as soon as possible. In the case of remote users, this means never entering the corporate network in the first place when it comes to Microsoft 365 traffic.
- 3. It degrades performance** – The forced routing through the corporate network adds latency from both simple internal network routing, as well as the use of internal proxies, security, and network scanning solutions. The latency yields an overall slower connection to Teams, a degraded user experience, and lowered productivity.
- 4. It doesn't identify and differentiate Teams traffic** – Many VPNs have the ability to perform split tunneling where traffic destined for the corporate network is directed through the VPN, while traffic pointing at Teams and other Microsoft 365 services is allowed to pass directly to be routed directly to Microsoft servers. By split tunneling, organizations can continue to protect internal network traffic, uphold security and governance policies, and still allow Teams traffic to flow as needed directly to Microsoft.

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Visibility is Key to Optimization

There are so many factors involved in how your network routes Microsoft Teams traffic from the user's endpoint to the Teams servers. Each part of the network has the ability to impact the performance and service quality of Teams. So, it becomes necessary to gain as much visibility over the entirety of the path users take. GSX Gizmo provides a comprehensive view through its use of bots generating synthetic transactions to provide insight into each step of the way to Microsoft Teams.



Using fully-customizable dashboards, GSX Gizmo provides insightful detail on all the factors that can be objectively measured, allowing organizations to get the full picture of what the current state of Teams performance is, and to identify points that can be optimized.

Optimizing the Use of QoS

There will always be some subset of remote users that will need to connect to Microsoft 365 by first routing through the corporate network – whether it's an inability to split tunnel, a need to inspect all traffic for security and compliance, or some other reason. For these users, optimization can still take place in the form of Quality of Service (QoS).

QoS functionality within your network defines that specific types of traffic have routing priority in real-time. By using QoS with Teams traffic, you can at least ensure Teams voice and video traffic do not result in decreases in quality.

Teams traffic is broken up into three categories listed below in descending order of priority (called DSCP values): audio, video, and application/screensharing. Networking devices supporting QoS and Windows endpoints will need to be configured with the following specific port ranges and priorities:

Media traffic type	Client source port range	Protocol	DSCP value	DSCP class
Audio	50,000–50,019	TCP/UDP	46	Expedited Forwarding (EF)
Video	50,020–50,039	TCP/UDP	34	Assured Forwarding (AF41)
Application/Screen Sharing	50,040–50,059	TCP/UDP	18	Assured Forwarding (AF21)

There are three places between the user and Teams where QoS can be utilized:

- 1. Home Network** – Many WiFi routers support configuring QoS. And with your users sharing bandwidth with other members of the home streaming video, gaming, and home schooling, a less-than-quality connection with Teams is possible, making QoS important.
- 2. VPN** – If users need connect to the corporate network, look for a VPN that supports QoS to ensure any Teams traffic going across the VPN gets priority.
- 3. Corporate Network** – If you aren't able to split tunnel Microsoft 365 traffic and force all Teams traffic to first traverse the corporate network, look for ways to leverage QoS to give this traffic higher priority than other applications.

Optimizing Teams Service Quality

Every part of the business can have Teams play a roll including internal collaboration, company meetings, automated workflows, planning, interaction with social media, and more. Because Teams has become the lifeblood of some organizations, any degradation in service can have an impact on the organization's ability to operate. So, it become important for organizations to have a handle on exactly how well each user's experience is with Teams to identify when service quality isn't up to par and is having a negative

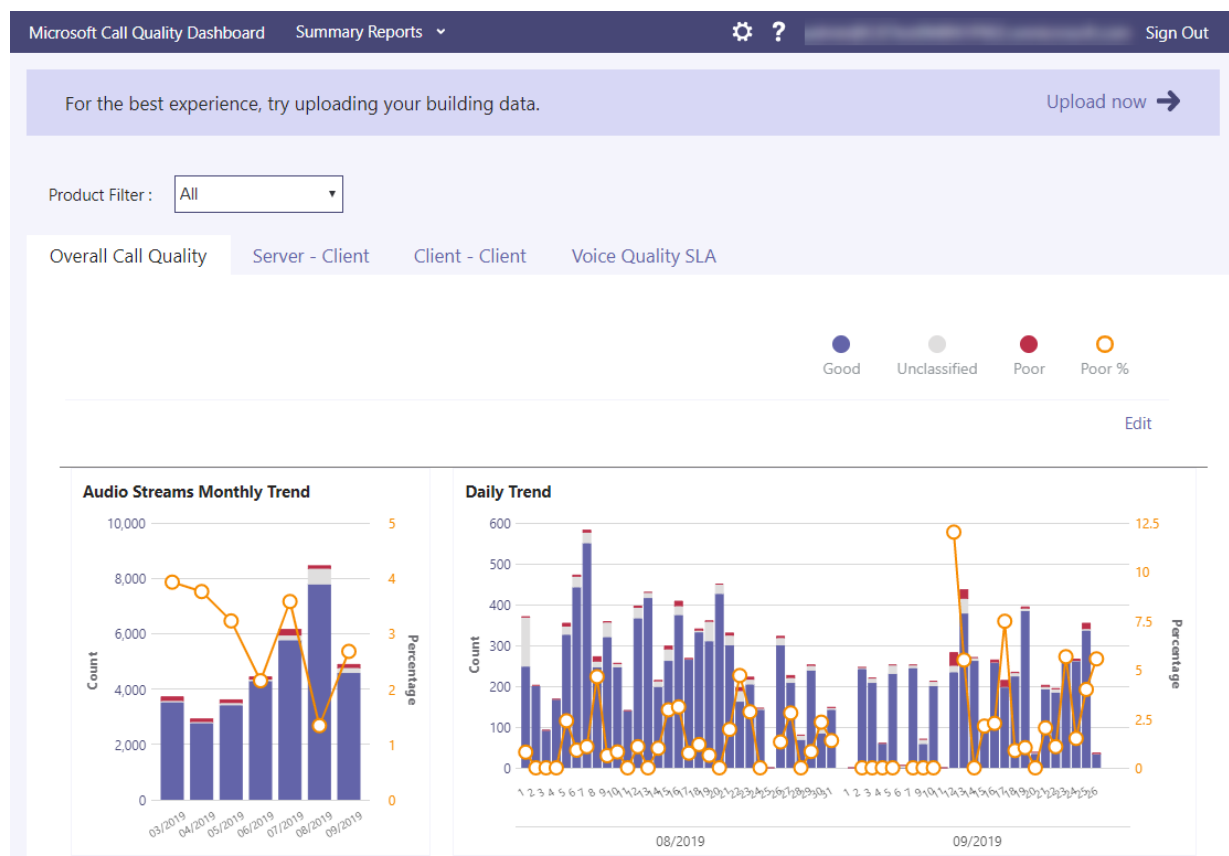
impact. To highlight different ways of monitoring and analyzing Teams service quality, we'll break up the conversation into two parts:

1. Call quality
2. Overall Teams performance

Optimizing Call Quality

For many organizations, Teams becomes the central means by which all meetings and calls occur. These two specific uses of Teams depend on a quality connection far more than, say, updating a chat or uploading a file. And when calls or meetings have issues, it can bring either to an unexpected end, impacting the user experience and organizational productivity.

Microsoft does provide the Call Quality Dashboard (CQD) found in the Microsoft Teams admin center, shown below, as a means to provide organizations with visibility into the current and historical state of call quality to help identify when and to whom issues occur.



Source: Microsoft

Microsoft does also support uploading building and endpoint information to establish further granularity when attempting to identify service quality issues.

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What's Causing the Drop in Call Quality?

Call quality isn't just a function of Microsoft's services; it depends on every facet of the user's connectivity to Teams. So, while Microsoft provides some foundational levels of granularity and functionality, once the admin checks the CQD, more insight into every part of the environment that may impact call quality is needed.

GSX Gizmo provides organizations with more context around call quality and insight into call quality patterns.



By using synthetic transactions to simulate real user activity from different types of networks, routing paths, times of day, and locations, GSX Gizmo can:

- ✓ Better hone in on where the bottleneck is within your organization causing call quality issues;
- ✓ Prevent future service quality problem.

Optimizing Teams Performance and User Experience

Because Teams is a cloud-based service, identifying the source of any issue experienced by a user is difficult. Remember, the problem can literally exist anywhere in between the user and the service – this includes the endpoint, initial network connectivity (WiFi, wired), network routing, latency introduced by network hairpin turns to internal services, Internet latency, and even Microsoft servers. So, it's important to find insightful data sources that can help with analysis and identification of the source of performance problems.

Microsoft does offer three sets of logs to provide detail and visibility into what's going on – at least at a high level – between the user and Teams:

- **Debug logs** – these logs provide detailed data around logins, connection requests to middle tier services, and call/conversation information.
- **Media logs** – these logs provide diagnostic data about audio, video and screen sharing.
- **Desktop logs** – these logs provide detail around communication that occurs between the desktop client and the browser

These logs are used by Microsoft support to troubleshoot issues and can be used by internal IT as well to look into user issues. More detail on these logs can be found at bit.ly/2A5v4KS.

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Optimizing Every Remote Worker

One of the challenges in supporting any Office 365 service is a lack of understanding where the problem lies. The following process will help you both identify when performance issues arise, as well as where the problem root cause lies. It should be noted that this process still can be used whether you have synthetic transactions in place or are using other methods.

1. **Establish a Performance Baseline.** You can look at metrics like bandwidth available, packet loss, jitter, and any other data available.
2. **Compare what normal service to when issues occur.** Look for patterns in service degradation across different remote workers having the issue.

3. Compare network options between those remote users that are and are not having issues. This can be which Teams client is being used, use of a wired connection, WiFi band, and VPN, etc.

4. Make needed changes and measure service improvement.

Having visibility into the user experience for some or all of your remote workers can be impactful in order to better understand whether one or all users are experiencing issues, as well as whether the issue is something many remote users have in common or an issue unique to just one. GSX Gizmo can provide the needed visibility down to the individual remote worker.



By maintaining visibility, it's possible to see optimization of your remote workforce as an on-going effort, rather than a one-time attempt in improving Teams service quality.

Preparing for a Post-Pandemic Teams

As you begin to make plans for your employees to come back to the office, the challenge of getting every user – regardless of where they're working – to have a consistent Teams experience. But with a material percentage of your workforce remaining remote, the methods used to get them operational within Teams may not meet the organization's ongoing needs. This may make achieving the goal of a great user experience within Teams difficult. By addressing the four challenges around your users' connectivity to Microsoft Teams – and by optimizing each appropriately – you can improve service quality levels, user performance, and user experience for remote and in-office workers alike.

About the author

Nick Cavdancia is a Microsoft Cloud and Datacenter MVP and has over 25 years of IT experience dealing with the architecture, implementation and training of Microsoft technologies to enterprise customers.



Nick has attained industry certifications including MCSE, MCT, MCNE, and MCNI. He has authored, co-authored and contributed to over a dozen books on Windows, Active Directory, Exchange and other Microsoft technologies and has spoken at many technical conferences on a wide variety of topics.

About GSX Solutions

GSX Solutions provides the only Office 365 end-user experience monitoring solution that truly measures the quality of the service delivered to all enterprises' sites.

Working hand-in-hand with Microsoft for more than 400 large companies in the world, we focus on constantly reducing their operational and financial risk while keeping their employees on the path of optimal productivity.

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