15 Practical Alerts to Track Microsoft Teams Call Quality

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It's official: the quality of calls made within Teams are crucial to keeping organizations operating. With over 300 million monthly active users[1], Teams has solidified its place as a focal part of today's digital workspace. Given that the only true real-time engagement with Teams is found in its' call functionality (as every other interaction with the Teams app includes some degree of acceptable latency), call quality needs to be maintained, or the productivity of an organization reliant on Teams may suffer.

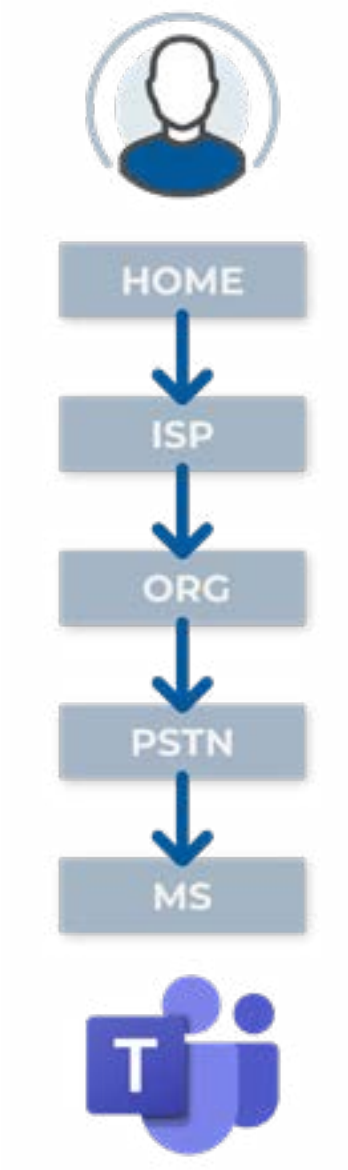
Generally, when a user is having a poor experience within Teams, it's rooted in a call quality issue. Which makes monitoring the quality of calls necessary – the very reason why the Microsoft Call Quality Dashboard (CQD) exists in the first place.

But, as we'll discuss in this paper, there's a need to understand not just when an issue has occurred, but – to the extent that is possible – what is the root cause of the issue, and who is responsible. As you'll see, it's not always Teams or some other facet of the Microsoft 365 cloud that is to blame; in most cases, it's actually some other aspect of the user's connection to Teams – which means you need to be watching more than just Teams if you're serious about tracking Teams call quality.

[1] *Microsoft Fiscal Year 2024 First Quarter Earnings Conference Call,* October 24, 2023

The Five Sources of Teams Call Quality Issues

Let's break down the areas you need to be monitoring and the alerts that may prove valuable by thinking about the connection between the Teams user and Teams itself using the following diagram:



In between the user and calls made with Teams are a large number of potential sources of call quality issues that – at the surface – may simply be deemed "a problem with Teams". The above image groups those call quality issue sources into five groupings:

- **Home** – A majority of workers (78%) prefer either a fully-remote or hybrid working style[2] , making their home network (think WiFi, router, bandwidth capacity, network sharing, etc.), the potential use of a personal device, and any calling hardware (e.g., headset) all part of the Teams call equation.
- **ISP** – The Internet Service Provider used by a home user can have their own issues that impact network connectivity between the user's home network and the organization or (if you are following Microsoft's M365 connectivity recommendations) the Microsoft cloud.
- **Organization** – If you're not following the aforementioned recommendations, you have your user's Microsoft 365 traffic routing through the corporate network, complete with all of its own routing specifics, network scanners, and anything else that can essentially slow down the traffic directed to Teams.

[2] Owl Labs, *State of Remote Work (2022)*

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- **PSTN** – If you are using Operator Connect or Direct Routing, any of the telephony hardware and services being used that connect Teams to your PSTN can play a role in a call quality issue.
- **Microsoft** – And, of course, even Microsoft sometimes has issues with their M365 services that can impact Teams calls.

Having as much visibility into each of these aspects of the user's connection to Teams is what will make the difference in fully understanding when an issue arises, who is impacted, and what is the root cause of the problem. Microsoft has gone to great lengths to provide some degree of visibility through a number of tools that can serve as a foundation for tracking Teams call quality. Let's begin by discussing the capabilities, benefits, and limitations of those tools.

Tracking Teams Call Quality with Native Tools

Microsoft realizes the importance of call quality within Teams and has provided organizations with two tools that can provide some visibility into calls.

The **Call Quality Dashboard** (CQD) provides visibility across the organization, showing historical trends that can be used to identify larger problems. The biggest challenge with the CQD is that it may be a bit too big picture on its own to be of real value in determining where a problem exists, its scope, etc. Microsoft have provided a set of customizable Power BI-based reports that pull from the CQD, which can be used as the basis for building your own custom visibility into specific parts of all your Teams calls.

Call Analytics provides detailed visibility into the devices, networks, and other related information for specific calls and meetings for each user within Teams. The detailed views help to facilitate troubleshooting of a single call; any diagnosing of an issue that impacted an entire location, for example, would require investigating multiple calls and determining any details that occur across all impacted calls.

In short, CQD (and even the PowerBI reports) provide a high-level look at Teams calls, with Call Analytics providing per-call details. They are point-in time reporting tools that don't offer any ability to track and alert on Teams call quality issues – let alone provide insight into root cause, and who's responsible.

Applied to the five sources of call quality issues previously mentioned, the CQD (including the Power BI reports) and Call Analytics only provide visibility into two of the five sources of call quality issues: Microsoft, and Home. And, even then, home is limited to user- and computer-specific details related to Teams; there is no real visibility into the user's endpoint, network, WiFi, etc.

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The reality is that, while Microsoft does provide much-needed visibility into Teams calls, what's needed is to leverage Microsoft partners that have created solutions that augment the visibility into Teams, enabling organizations to effectively monitor, track, investigate, and response to call quality issues.

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The remainder of this paper is focused on tracking and alerting on Microsoft Teams calls in 15 specific ways using a third-party solution, such as Martello's Vantage DX, to track and alert on Teams call quality. These 15 alerts are the most common and impactful alerts determined from Martello's own vast customer-base that heavily rely on Teams calls. Regardless of the solution your organization uses, these practical alerts will help to establish when there are Teams call issues, along with helping to determine the scope, source, and responsible party.

We'll cover the 15 alerts using the five sources of call quality issues as a framework so you can see how the alerts help to identify the responsible party.

Home Network / User

There are a number of sources of call quality issues just within the user's home environment. Take the example of an old computer whose CPU is running at peak utilization – while not a common occurrence, it makes the point that a lot about the user's network can influence call quality. Two of the most common sources of call quality issues are as follows:

Not Enough Bandwidth

Despite Teams being able to deliver HD video quality with less than 1.5Mbps of bandwidth, it's still possible that the user's home WiFi isn't centrally located, or their computer is not optimally placed to receive the best signal.

Vantage DX Alert: Connection type is WiFi and Signal Strength is low

Vantage DX Alert: Bandwidth is low

Teams Non-Certified Audio Devices

Microsoft maintains a list of "Microsoft Teams enabled devices" that includes headsets, speakerphones, cameras, Teams Rooms devices, and more. Even the use of a non-certified headset can have quality ramifications.

Vantage DX Alert: Devices listed in Inbound/Outbound Audio/Video Stream Details are not part of the "certified" list of audio devices.

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ISP

Every ISP involved in connecting a user to the Microsoft Cloud falls subject to the alerts in this section, regardless of whether they are the ISP for the user's home network, or one of the many used by the organization to connect to the Internet. In general, the focus here is to set up alerting based on the overall health of the call from a networking perspective.

Networking Health

The table below shows both the Vantage DX Alerts that should be set up, along with (if applicable) Microsoft's expected value to be seen in the Call Health view within Teams:

VANTAGE DX ALERT	CALL HEALTH EXPECTED VALUE
Latency is > 100ms	
Jitter is > 30ms	< 30ms
Packet Loss is > 10%	< 2%
Round Trip Time > 500ms	< 200ms

Organization

Pre-pandemic, the organization's network was architected for internal users to access internal resources with an ability to reach cloud-based services, apps, and data as well. But post-pandemic, you have a massive influx of users back into the office on a network that isn't necessarily designed to handle real-time video at scale. So, there are a few alerts that are needed to determine if the issue is in fact that you're back in the office.

Teams Audio Issues at an Office Location

There are two parts to this alert. First, what constitutes "an office" from Teams' perspective and, second, what is considered poor Teams audio quality? The office can be defined based on user IP addresses and subnets used for a given location. Within Teams, this can be accomplished by uploading tenant data to define buildings and endpoints and third-party solutions usually have the additional ability to dynamically group devices to establish locations.

When it comes to poor call quality, Microsoft is pretty clear on what is considered "poor." As a general rule, Microsoft marks an audio stream (read: an individual Teams call) as poor based on a calculation using several factors including Round Trip Time, Packet Loss Rate, Jitter, and Packet Utilization. Using their definition, it's possible to establish alerts based on the number of calls marked poor from a given location compared with the total number of calls at that same location (called the Audio Poor Stream Rate).

Vantage DX Alert: Audio Poor Stream Rate is ≥ 2.0% for internal calls

Vantage DX Alert: Audio Poor Stream Rate is ≥ 3.0% for external calls

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Too Many Users with Poor Call Quality (per Location)

In addition to the overall call quality being poor, what about a threshold of users having an issue? For example, an office with 100 people all making calls may have an overall Audio Poor Stream Rate of, say, 1%, but there are 25 people having issues. Despite the larger group of users having no issues, there may be something about those 25 (such as when are all using the same WiFi access point) that could be having an issue. The Martello recommendation is as follows.

Vantage DX Alert: ≥10% of users within a location with ≥20% of poor-quality calls

Too Many Users with Poor Call Quality (per Country)

If your organization spans multiple countries – with the assumption that you are using different ISPs to connect users to Teams – it additionally makes sense to be alerted should a material percentage of users appear to be having call issues.

Vantage DX Alert: ≥20% of users within a country with ≥20% of poor-quality calls

Direct Routing or Operator Connect

With either of these two services added onto Teams, the addition of telephony hardware and services enters into the mix, further complicating the identifying of call issues. Because of this, it becomes necessary to include the monitoring of and alerting on any issues related to the telephony used to facilitate Direct Routing or Operator Connect.

PSTN Users (10% Poor)

The same capabilities that are described above for non-PSTN calls can also be defined for PSTN calls. There is a field that we can use to filter out PSTN calls which can be combined with the filters mentioned above (country, location, etc.).

Session Border Controller Issues detected

Session Border Controllers (SBCs) control the flow of Voice over IP (VoIP) traffic between Teams and telephony hardware. These hardware or software devices manage connectivity, quality of service (QoS), and the security of voice traffic. Making certain these devices are operational is critical to the performance of Direct Routing or Operator Connect. There are a number of aspects of SBCs that could indicate either an existing or forthcoming call issue that include the following:

- Chassis (fan, power, hardware)
- Trunk (loss of signal, trunk stopped, line issue, channel issue)
- High availability alarm (system failure, configuration issue, network issue)
- Device (failure, configuration, temperature, reset, upgrade, proxy connection, DNS unavailability, overload, node, lost connection with remote monitoring)
- TLS certificate (expire, mismatch)
- Network (ethernet, LDAP, IPv6, HTTP, connection & configuration)
- Media (overload, bandwidth, IP route issue, cluster usage)
- SNMP Trap (issues, performance threshold)

Vantage DX Alert: This one is not so easily defined; the most important would be to ensure the SBC is online and responding obviously. But because there are a wide range of SBC devices (both physical and virtual) and because any of the aspects mentioned above can have an impact on the performance and availability of the SBCs, alerts for the issues listed above should be set for each device, with alerting set both per device as well as for a group of SBC devices. Any condition impacting a configured group of SBCs should trigger an individual alert, unless they received within the same 5 minutes span (in which case, only 1 notification should be sent).

Microsoft / Teams-Specific

There are, of course, times when Microsoft is the source of a Teams issue; like any other platform vendor, they, too, are susceptible to service issues. The alerts in this section span a few aspects of Teams, providing you with an ability to not only know when there's a problem, but that it's likely somewhere within the Microsoft Cloud that is the root cause.

Microsoft 365 License Capacity Issue

This is an issue you need to be alerted about well before you actually need to assign licenses to an employee. Any employees waiting for a license pool to be expanded is likely to have a negative impact on their productivity.

Vantage DX Alert: Chosen Microsoft SKU has a status of Warning

% of Previous Calls with Impacted Quality

This alert provides a high-level view of the health of Teams calls across your tenant. By defining percentages of calls within a given duration of elapsed time that can serve as Warning and Critical levels, these alerts can serve as a leading indicator that something is wrong with Teams, requiring drilling down into who is having issues, and ultimately determining why.

Vantage DX Alert: (Configurable) % of poor-quality calls with X days – one established for Warning and one for Critical levels.

Teams VIP Users Experiencing Poor Call Quality

Every organization has a subset of executives and line of business leaders that are considered to be "VIP Users". Monitoring the call quality of these users is a no-brainer to minimize poor quality calls.

Vantage DX Alert: A VIP User has experienced 20% poor calls on at least 3 calls with at least one of their devices is considered a warning, 30% poor calls is considered critical.

Microsoft 365 Service Health Incident

Assuming you're centralizing all of these alerts into a third-party solution, it only makes sense to also leverage the information communicated by Microsoft in the Service Health Dashboard around service incidents. Your environment may not be currently utilizing the impacted services, so knowing about them – in this case – proactively is helpful to notify users and set service availability expectations. You should consider raising alerts specifically for any Microsoft Teams workloads your business deems important and establish appropriate notifications within the organization based on the workload impacted.

Vantage DX Alert: Corresponding alert for any new incident raise by Microsoft.

Teams Conference Calls with Poor Call Quality

Different from the previous alerts focused on specific users or percentages of users in a given location having poor call quality (in which case the issue may very well be the user, the organization, or the ISP), this alert revolves around a portion of users within a conference call having poor call quality. Because of the likely disparity in location, ISP used, etc., this alert assumes (at least by default) that the problem is Teams itself.

Vantage DX Alert: >10% of conference calls within 4 days have been in a warning (where one attendee experiences a poor or dropped call) or critical (where more than 2 attendees have experienced a poor or dropped call) state.

Teams Large Meeting Audio Quality Issue

Teams supports meetings with up to 1,000 participants, with an additional 10,000 view-only invitees. For many organizations, though, a meeting with more than 10 participants is considered a (relatively) large meeting. In either case, calls like this rely on good audio quality as the key to all attending understanding the messages being conveyed. So, it's valuable to be watchful if a material portion of attendees are experiencing bad audio quality.

Vantage DX Alert: Using the same warning and critical states from the previous alert, >10% of large meeting calls in either state.

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Tenant-Wide Issue

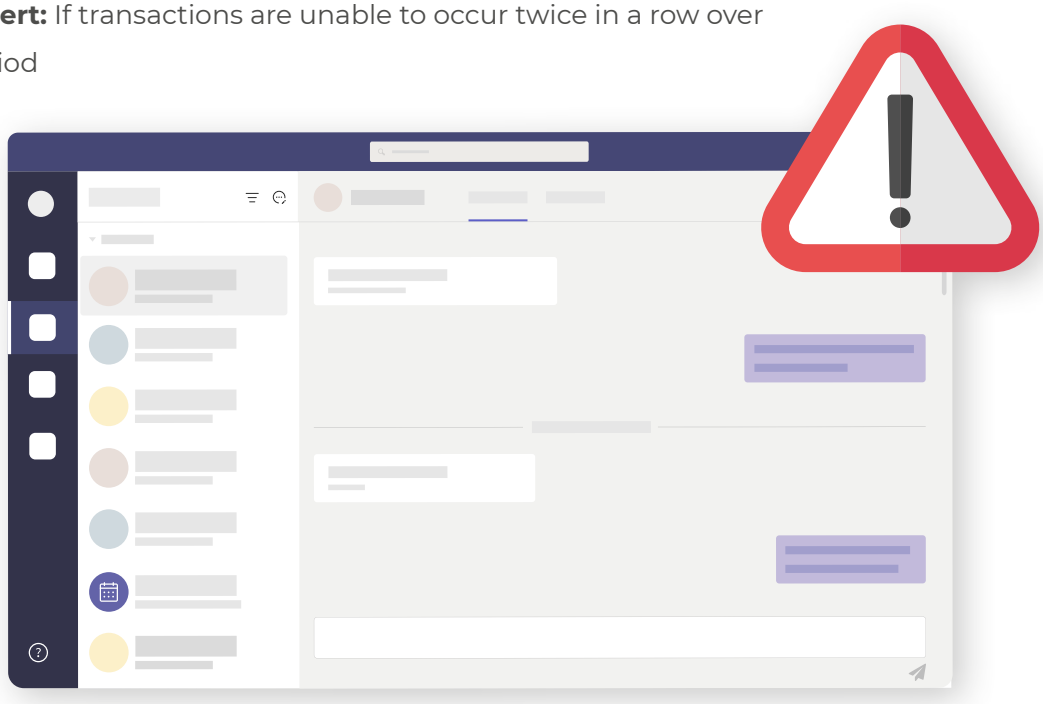
Part of responding to any Teams alert is understanding the scope of the issue or outage, which can sometimes encompass your entire Microsoft 365 tenant. Because the outage may have little to do with Teams calls, this particular alerting requires more than just monitoring the data found in the Call Quality Dashboard; instead, it requires synthetic monitoring that simulates a wide range of user interactions with Teams and the rest of Microsoft 365 (think authentication, file uploads, chat, calls, scheduling calendar invites, etc.). By placing synthetic monitoring agents (which Martello calls Robots) at each of the organization's locations, you can proactively represent what a corresponding user's experience is with Teams. For this issue, there are a few alert possibilities. Also, note that these Teams alerts can be applied to other Microsoft 365 workloads including Exchange, OneDrive, and SharePoint.

Vantage DX Alert: > 50% of the synthetic users at monitored locations are experiencing issues with Microsoft Teams

Vantage DX Alert: If a predetermined % of monitored locations are experiencing issues

Vantage DX Alert: If 70% of monitored datapoints in the past 19 minutes are above configured thresholds

Vantage DX Alert: If transactions are unable to occur twice in a row over a 5-minute period



Microsoft Teams Rooms

Teams Rooms transform simple meeting spaces into collaborative Teams' experiences for a hybrid workforce. As organizations continue to determine the balance between in-office, fully remote, and hybrid work, Teams Rooms is expected to grow in adoption. Because Teams Rooms is a mixture of collaborative hardware and software that larger numbers of employees will be relying on at one time, it becomes important to alert as proactively as possible to ensure, come meeting time, those participating are productive. There are a number of alerts that can be applied to monitoring Teams Rooms.

Vantage DX Alert: Teams sign-in failure

Vantage DX Alert: Peripherals (e.g., camera, speaker, display, microphone) with a Connection Status of Unknown or Disconnected

Vantage DX Alert: Health Status within Teams for the peripherals is Critical (as defined by their Health Impact setting)

The user can provide two thresholds - one to create an alert with a severity of 'warning', and one to create an alert with a severity of 'critical'. Both of these thresholds are defined as percentages. For all users, Vantage DX will look back at historical data and if the % of poor calls for any user exceeds the defined thresholds, then an alert will get generated.

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Using Practical Alerting to Stay on Top of Teams Call Quality

If you can't tell already just from this paper alone, there are a lot of ways your user's interaction with Teams calls can go awry. And, assuming (especially because you've read all the way to the end of this paper) Teams calls are an imperative in your organization, it's hoped that the guidance provided in this paper – whether used within Martello's Vantage DX or another Teams performance monitoring solution – is put into practice to ensure the availability and quality of Teams calls.

By leveraging the alert guidance in this paper, you should be far down the path to having a better understanding of how to keep a watchful eye on Teams calls, as well as an improved sense of the continual state of your Teams environment and the experience of its' users.

About the Author

Nick Cavalancia 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 Martello

Martello Technologies Group Inc. (TSXV: MTLO) provides Microsoft 365 and Teams monitoring solutions including the Vantage DX SaaS platform, which optimize the modern workplace. The company's products deliver end-to-end visibility of the entire IT infrastructure supporting Microsoft 365 and Teams, empowering IT teams and service providers to deliver stellar user experiences. Martello Technologies Group is a public company headquartered in Ottawa, Canada with employees in Europe, North America and the Asia Pacific region.

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