MARTELLO | eBook

Troubleshooting Microsoft Teams

What Native Tools Can (and Can't) Do

by Nick Cavalancia

4-time Microsoft MVP

MARTELLO

Introduction
Understanding the Landscape –
Unraveling Teams Call and Meeting Challenges

Analyzing Teams Calls and Meetings
- Thinking in Terms of Data Streams
- Microsoft Tools Provide Visibility

Identifying Local Issues
- Consider all the Potential Sources of a Teams Issue
- Adding Tennant Data
- Determining That It’s Local

Shifting from Troubleshooting to “Prevention”
- Defining Prevention
- Prevention in Practical Terms
- Prioritizing Prevention
- Achieving Prevention

Conclusion
Troubleshooting Microsoft Teams: Mastering the Art

MARTELLO

Introduction:

Understanding the Landscape – Unraveling Teams Call and Meeting Challenges

MARTELLO

You already know your users are having a ton of issues with Teams – if they didn't, you wouldn't be reading this whitepaper. And it's not just your organization; with 320 million monthly active users[1], an estimated 1 million companies worldwide, and an estimated 91% of the Fortune 100 all heavily relying on Teams, you're in good company. Organizations with thousands of users that are heavily reliant on Microsoft Teams means there will be tens-to-hundreds of thousands of Teams meetings and calls made over the course of a single year, each one possibly experiencing performance and/or quality issues that impact user productivity.

And, in most cases, it's not even Microsoft's fault. An issue experienced within Teams can be the result of non-Microsoft factors that include the user's working environment, the organization and its network, your ISP, Public Switched Telephone Network (PTSN) hardware and services, and more. So, when a user says, "there's a problem with Teams", it may not have anything to do with Teams or any part of the Microsoft cloud.

So, how can you effectively troubleshoot Microsoft Teams call and meeting issues reactively to reduce the impact on users while working towards an ability to potentially prevent issues from impacting users at all by dealing with them proactively?

In this whitepaper, we'll take a look at the work of troubleshooting Microsoft Teams performance issues through three specific lenses:

1. **Analyzing Teams Calls and Meetings** – This will serve as the starting point where organizations qualify and validate user complaints about Teams, looking to understand the scope, requency, and impact of issues.

2. **Identifying Local Issues** – While Microsoft is very specific about how the connectivity between an organization using Microsoft Teams and the Microsoft 365 cloud should be architected, there are plenty of real-world issues that arise that are within the control of an organization to address.

3. **Preventing Teams Issues** – There is a lot that's out of your organization's control when it comes to performance problems within Teams, but if it's possible to identify and work to address those issues before they impact a user, you may find your organization able to actually "prevent" an issue.

We'll provide guidance around how to best troubleshoot and prevent Teams issues, covering what you can and can't accomplish with native tools provided by Microsoft at a high level.

Mastering the Art of Troubleshooting

This paper is based on a 3-part Masterclass Webinar Series entitled *Troubleshooting Microsoft Teams*. Look for links throughout this paper and watch the webinars to get even more insight into how to best take advantage of both Microsoft tools and third party solutions to assist with troubleshooting and preventing Teams issues.

1. Microsoft, Q1 2024 Earnings Call.

MARTELLO

Let's begin by first breaking down Teams calls and meetings, and then establish all the possible sources of problems that simply get blamed on Teams.

Analyzing Teams Calls and Meetings

When a user reports a Teams issue, there is a wide spectrum of possibilities that need to be considered. On the one hand, this could be simply a subjective "problem" that never actually impacted anyone. And on the other hand, this could be an actual issue that impacts two users on a simple call, many users leveraging a Teams Meeting Room, or literally every user in the organization. Because all these possibilities exist, it's necessary to start with an analysis that answers a few questions:

- Was the user reporting the issue actually experiencing bad performance?

And if so...

- How bad was the meeting?
- How many people were impacted?
- If more than one, what are the common factors across all those impacted?
- Are there any network metrics that can support the claim?
- Is this problem one that is recurring?

To answer these questions, you need to first be thinking about your call data in the same way Microsoft does.

Thinking in Terms of Data Streams

As shown below, for any scheduled Teams call or meeting that isn't peer-to-peer, there are at least two users involved with Teams facilitating communication between them.

Within each call, Microsoft break a call down into three data streams:

Audio – At its core, a Microsoft Teams call generally must allow participants to hear each other. The quality of the audio data will dictate whether someone sounds great or like some kind of garbled digital noise.

Video – Calls utilizing individual cameras or those used as part of a Teams Meeting Room expect to see clear and continual video in sync with audio.

Screen Sharing – Should someone share their desktop or an application, the screen shared must be visible to call participants with little-to-no degradation of video quality.

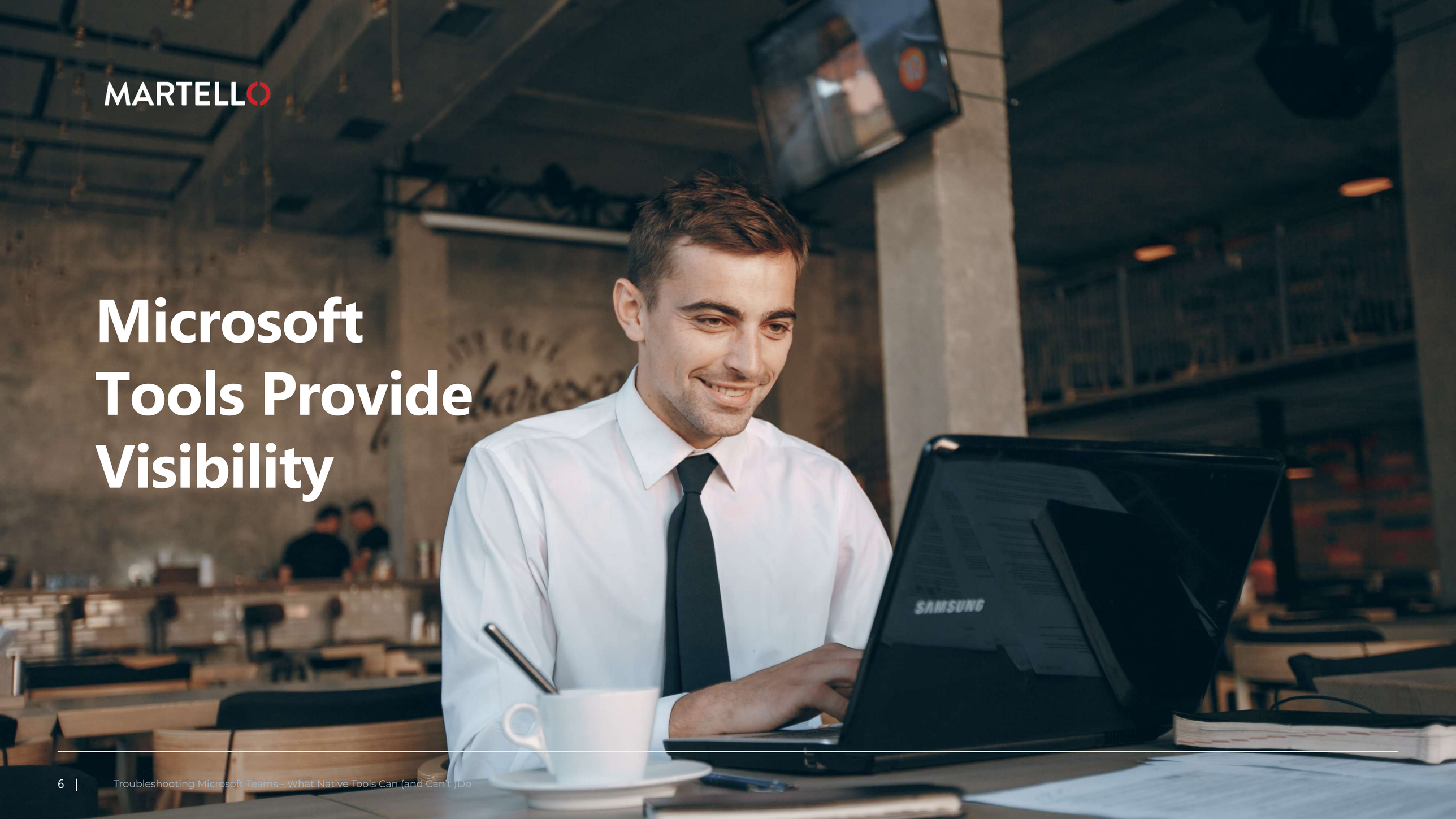
And for each data stream, there is an inbound and an outbound stream. Microsoft uses these stream classifications to determine whether the status of a call is good or poor. Additionally, Microsoft looks at calls as either a peer-to-peer or a conference call.

Audio • Video • Screen Sharing

Thinking in terms of these data streams is important, as analysis may determine, say, that it's only video that is having a performance problem and the root cause ends up being a Quality of Service (QoS) misconfiguration on the organization's internal routers. To help determine what kind of issue a user is experiencing, who is impacted, and get some initial indicators as to the root cause, you can start with the built-in Microsoft tools.

MARTELLO

Microsoft Tools Provide Visibility



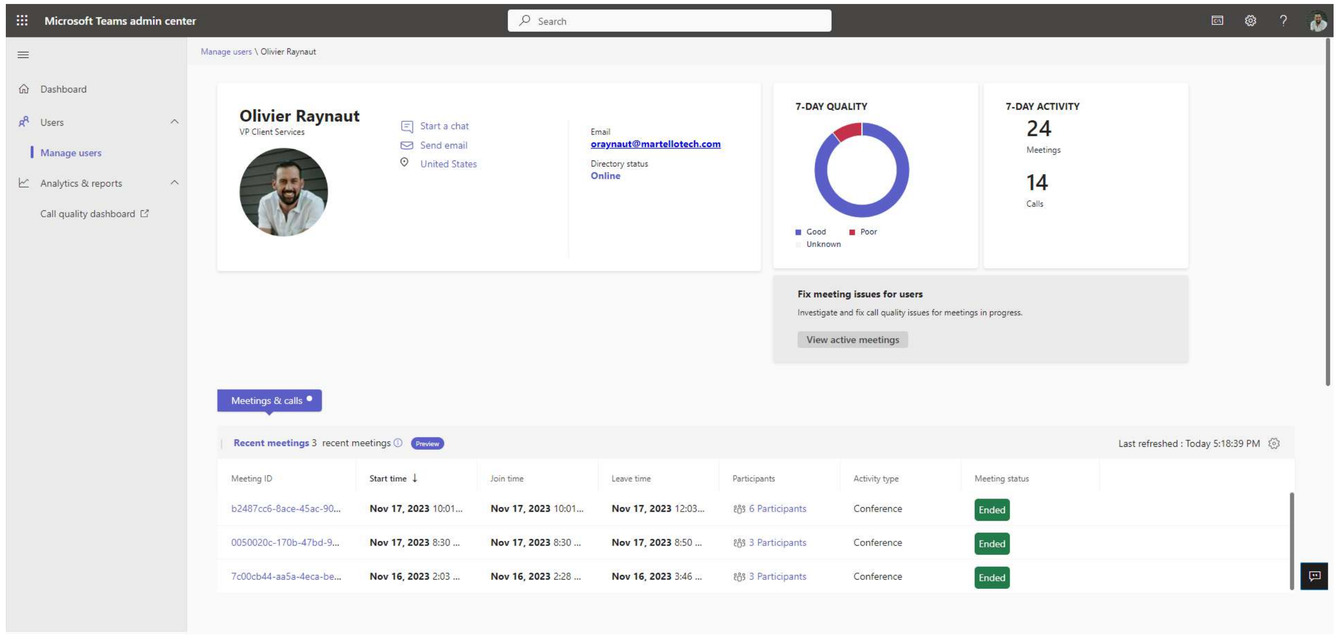
MARTELLO

With every new platform or enterprise application Microsoft creates, they understand the need for tools that provide IT teams with the necessary administrative tools to both manage and maintain. But in the case of Teams, there's a distinct real-time experiential factor that comes into play that isn't seen with most Microsoft applications. And so, Microsoft had to create a number of tools that provide visibility into how Teams is performing because so much of the user experience is subjective.

There are three primary tools to consider:

Teams Admin Center

While this tool has a number of administrative functions, with regard to analyzing Teams calls, the Teams Admin Center provides detail on a per-user basis including call history, call analytics, real-time telemetry, as well as user and connectivity information. It's a great place to start because it's easy to find a specific meeting or call based on the user(s) involved and view details about the individual data streams and performance metrics that may help identify the source of the problem.



Teams Admin Center

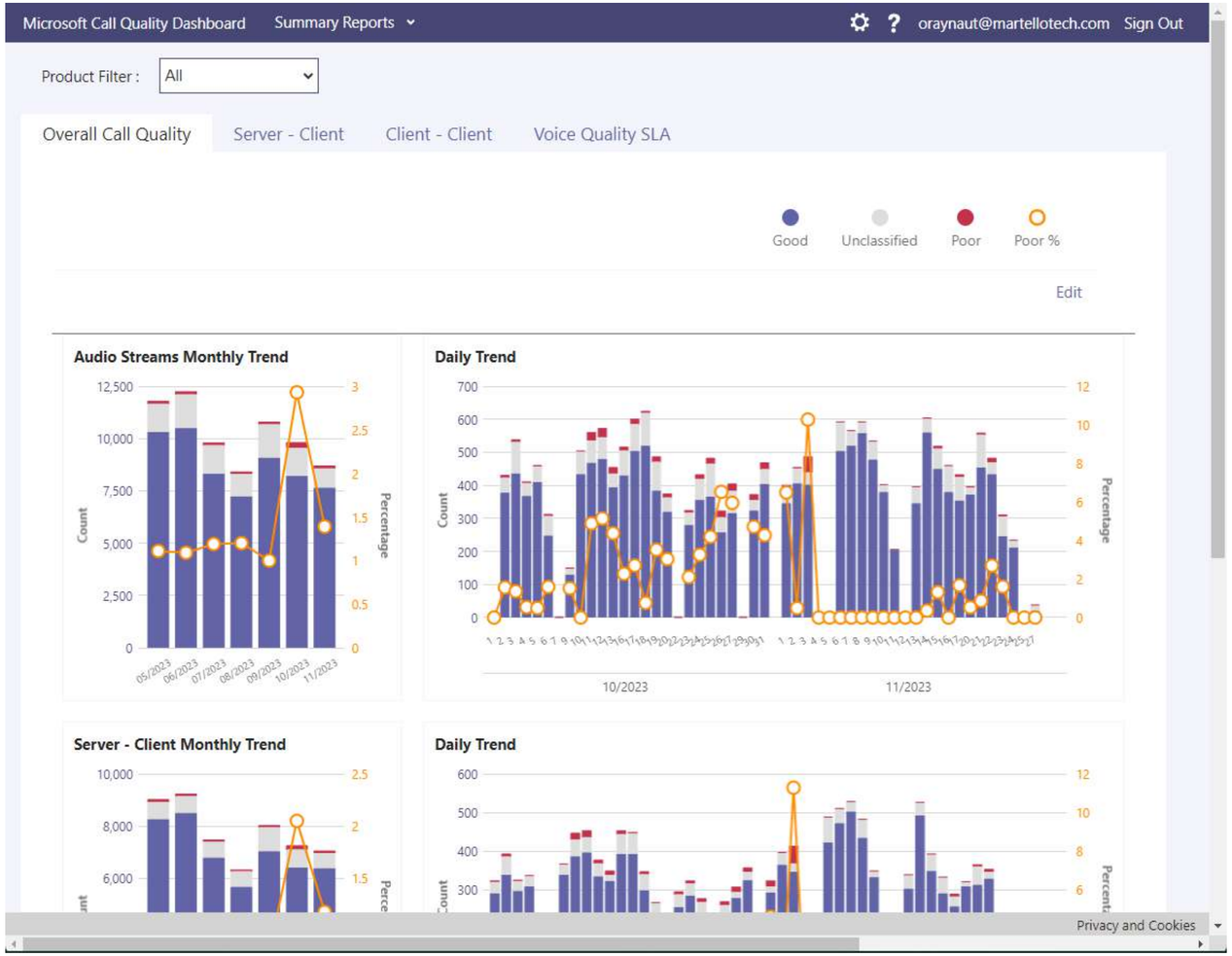
MARTELLO

Call Quality Dashboard (CQD)

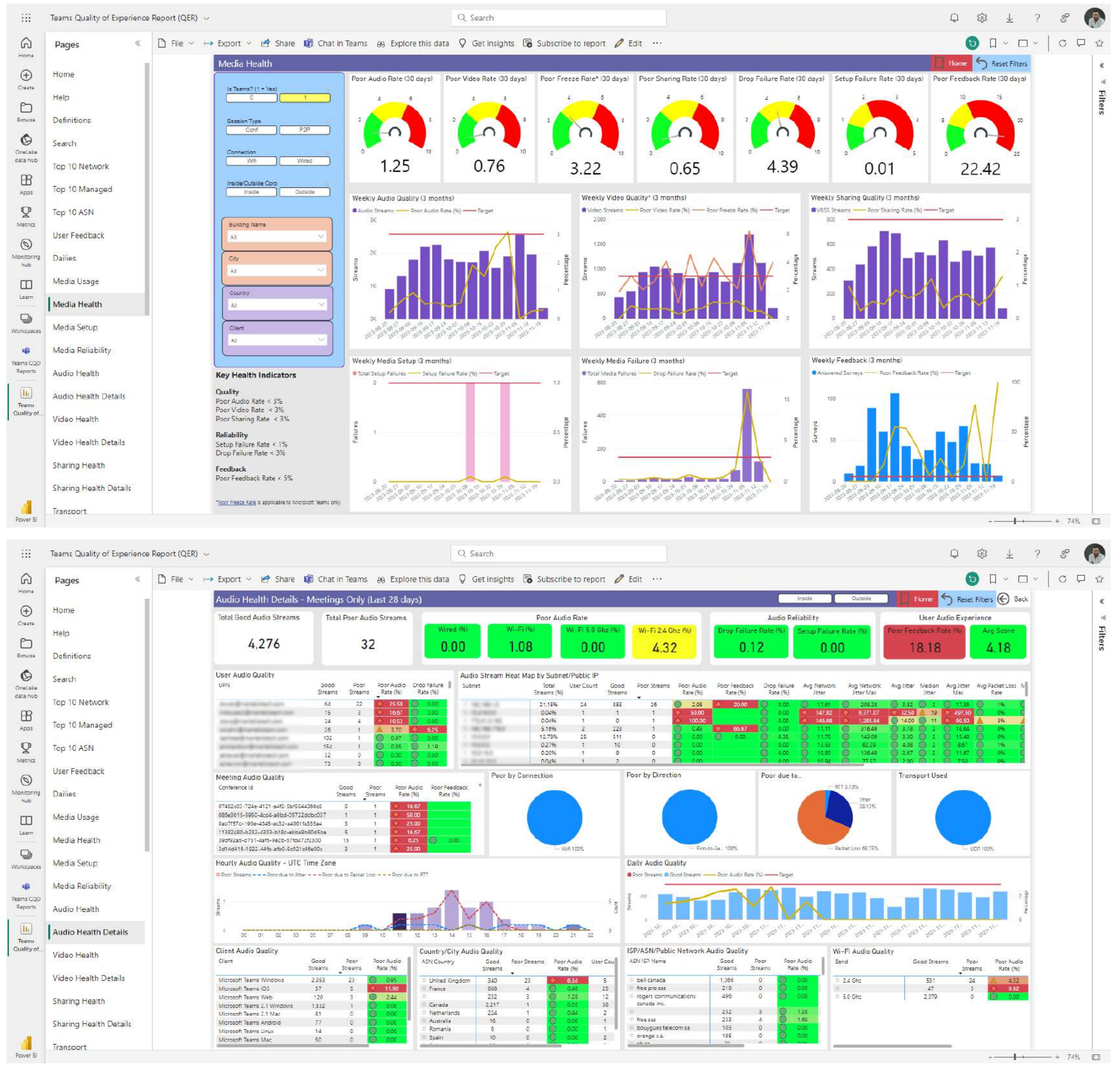
The primary focus of the CQD is to provide visibility into the overall experience for an organization or Microsoft 365 tenant. There is also some ability to navigate down into Teams Meeting Rooms. This tool is useful for providing an understanding of whether the reported problem is being experienced at a much greater scope than just a single user.

Power BI Reports

Microsoft has created some built-in reports on the Power BI platform around Teams quality of experience, with a number of sub-reports that can be used as templates to build out your own reports and dashboards based on the specific aspects of Teams that are important to your organization. With access to just about any piece of call and user data related to Teams, you can think of the Teams reports in Power BI as a customizable way of presenting both Teams Admin Center and CQD data in one place. The only downside is that it does take some time to refresh the data viewed within Power BI, so you'll need some patience when using this tool. Since the data only refreshes at set intervals (usually 24 hours), it is far from real-time.



Call Quality Dashboard (CQD)



Teams Reporting in Power BI (Image is Teams Power Bi QoE 1)

Mastering the Art Insights

You can see practical examples of these tools in action in the first webinar in the Masterclass webinar series entitled Troubleshooting Microsoft Teams: Calls & Meetings.

By using these tools, you should expect that you are able to – at a minimum – establish that a problem does indeed exist and who is impacted. There's also enough visibility here to know whether the Wi-Fi signal strength is too low, but there is relatively minimal insight offered into the root cause.

More on that in the next section.

MARTELLO

Identifying Local Issues

MARTELLO

Identifying Local Issues

Anytime we hear there's a performance issue with Teams, thoughts jump immediately to it being a problem with something within the Microsoft cloud. But in most cases (in Martello's vast experience of monitoring Microsoft Teams), the problem causing a performance issue usually has nothing to do with Microsoft. To make this clearer, let's start by looking at the various aspects of what makes up a Teams call to see how the problem can be a local issue.

The easiest way to wrap your head around all the possible places a Teams call performance issue can exist, let's consider a single user's connection to Teams .

Five Sources of Microsoft Teams Issues

USER	ORGANIZATION	ISP	PSTN	MICROSOFT
• Endpoint • WiFi • Internet Connection • Headset	• Corp. Connectivity • Internal Services • Internal Routing • Traffic Prioritization • Network Infrastructure	• Routing • Latency	• Direct Routing • Operator Connect • Telephony • SBC/SIP	• Authentication • Routing • Infrastructure • Teams services • Functionality

You'll note that there are five distinct source areas – two of which should be considered local in that they are within the control of the organization and its IT staff:

1. The User – Anything from the Operating System being used, the version of the Teams client, their wireless connectivity (or lack thereof), their Internet connectivity (or, again, lack thereof), and their headset can all be the source of a Teams call problem.

2. The Organization – Microsoft has some very specific networking architecture recommendations (or requirements, if you want to maximize your Teams user experience) that can be found here; In short, they want the user connecting to the Microsoft cloud as directly as possible; so, no VPN, no routing through the corporate network infrastructure, no being scanned by internal security solutions, etc. – basically avoiding anything that would slow down the traffic and, therefore, impede the user experience.

MARTELLO

And then there's three other source areas that internal IT have less control over:

3. The Org's ISP – Your ISP could have DNS issues, problems with IP routing, added latency, etc. all creating a negative experience for Teams.

4. PTSN Services and Hardware – Should you be using any of Team's calling services, any integration with the PTSN creates the potential for those services and hardware to be the source of a Teams issue.

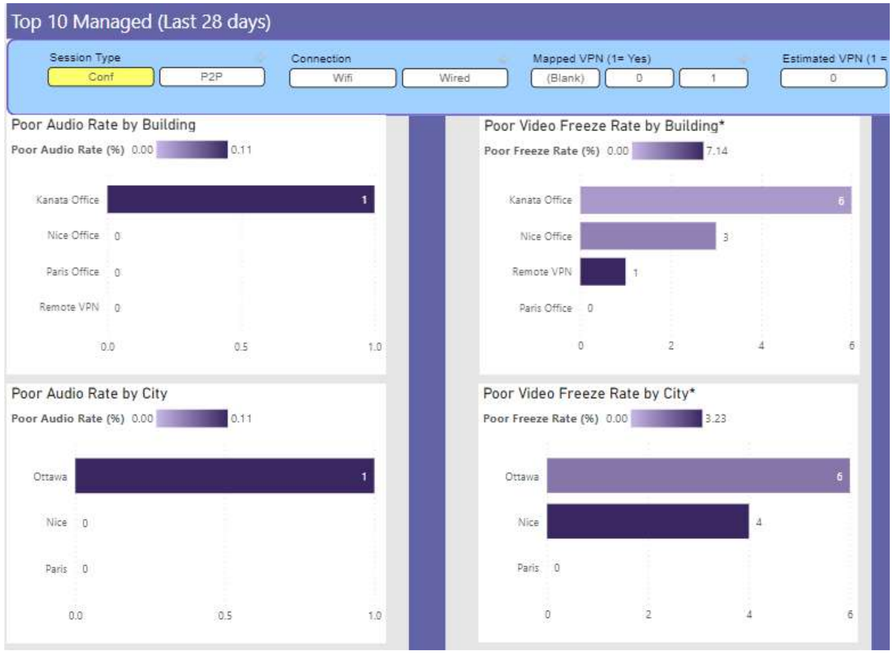
5. Microsoft – Yes, it is possible that Microsoft themselves can be the cause of a problem.

According to our ***analysis*** of our customer's Teams issues, at least 62% of problems were caused by local issues. For example, in 28% of failed calls, poor Wi-Fi was responsible, and in 58% of poor calls, local bandwidth constraint was involved.

So, how do you identify that the problem is a local issue? To start, you need to better define what "local" looks like.

Adding in Tenant Data

Microsoft supports the uploading of information about your networks, associating building names, location details, and whether VPNs or Azure ExpressRoute are in use. By doing so, you augment your analysis beyond just users to include specific locations. With this in place, you have the ability to differentiate locations, wired and wireless networks, regions of the world, etc. to better isolate who is impacted and, potentially, why.



Analyzing Teams Calls Using Tenant Data

Mastering the Art Insights

You can see practical examples of how tenant data can be used to aid in troubleshooting, as well as identifying scope and root cause in the second webinar in the Masterclass webinar series entitled Troubleshooting Microsoft Teams: Identifying Local Network Problems.

MARTELLO

Determining That It's Local

In the previous section, we covered the basic value of the three built-in Microsoft tools to drill down into user specifics (one of the two local source areas). The tenant data is what empowers your troubleshooting to determine if a problem is local or not; by cross-checking all impacted users to see what is common among them you may find, for example, they are all in one location, on a specific Wi-Fi network within the office, etc., helping to identify scope and aid in identifying a root cause.

As you add in tenant data and build out custom Power BI reports, you will eventually have a solid grasp on the local areas you can control – and even be able to identify that the root cause lies somewhere in the vicinity of the three areas out of your control.

But as your organization and its VIPs become increasingly reliant on Teams, there is often an expectation is that it must be reliably working and performing – which means you need to change tactics from reactive troubleshooting to proactive prevention. This shift can help IT teams elevate their strategic value to the organization.

MARTELLO

Shifting from Troubleshooting to “Prevention”

MARTELLO

In many cases, you can't truly prevent a Teams issue; if Microsoft's cloud goes completely sideways and stops working, there's nothing you can do about it. So, prevention needs to be defined a bit so we can discuss how to attain it with regard to addressing Teams call issues.

Defining Prevention

The goal of prevention is always to stop an issue BEFORE it can impact a user. Sometimes that involves IT finding the source of the problem and fixing it, and (in the case of Teams, given the three source areas of Teams issues) sometimes it involves IT being aware of the issue and simply communicating to affected users that "Microsoft" or "our ISP" is "having an issue making Teams unavailable. We will send out an email communication when Teams services are restored."

Prevention in Practical Terms

Prevention is first found in shifting from reactive troubleshooting post-issue to monitoring Teams for potential issues and proactively remediating those issues, to the extent possible. With native tools, this means you're going to need to rely on trending data over time, looking for anomalous behavior or user experiences, and likely adding in some form of proactive alerting not currently found with the Microsoft Toolset.

If you go back and look at the five source areas of potential Teams issues, consider that you effectively need to have end-to-end visibility (that is, from the user all the way to Teams) across all of those areas.

MARTELLO

Prioritizing Prevention

You also cannot monitor and alert and LOOK at every single call, every single user and every single location, etc. There must be some priority established for specific parts of your organizations use of Teams and various segments that have the biggest impact on your overall user population. These should include:

Users – This will most likely revolve around the organization's VIPs in the C-suite, etc.

Locations – Specific offices and floors may also more generally represent VIPs.

Rooms – Conference rooms including those set up as Teams Meeting Rooms.

Networks – Specific wireless or wired networks, or IP Ranges.

Service Providers – Monitoring the network response of your ISP, the availability of telephony services and the PTSN, and even the Microsoft cloud and its services.

MARTELLO

Prevention Requires End-to-End Data Sources

It is possible to attain some level of prevention using Power BI dashboards and Rate My Call data, but the reality is (given the lack of instantaneous refreshing of data within Power BI), built-in tools are not a viable solution for proactive monitoring.

What's needed to provide end-to-end visibility is a combination of a few types of data and technologies:

1) Microsoft Call Quality Data – This is the same data source used in the CQD and in Power BI and provides a ton of user-specific metadata that can be used to identify and isolate issues and their root causes.

2) Microsoft Service Health – This data provides context as to whether Microsoft knows there's an existing problem.

3) Network Path Performance – Having an understanding of how well the network is performing as data is sent from the user all the way to Microsoft, including the paths taken, helps to identify which provider(s) is/are having issues.

4) Session Border Controllers – If you're using Microsoft Teams call functionality, these are the interface between software and hardware, providing visibility into whether the PTSN side of your Teams-based telephony is working.

5) Service Management Providers – Visibility into Teams-related helpdesk calls also provides value as an identifying source of problems.

6) Microsoft 365 24/7 Synthetic Transactions – This technology continually interacts with the Microsoft cloud, performing every type of action an actual user would, providing proactive insight into performance and service issues before any real users experience the problem.

The reality is it's only through combining the data sources and technologies above into a single solution designed to provide intelligent data analysis and actionable insight that you will truly be able to shift from troubleshooting reactively to preventing proactively. Third party solutions – including Vantage DX – are the only real way to prevent Teams call issues BEFORE they impact users.

Mastering the Art Insights

To see practical use of Power BI and Rate My Call functionality to monitor Teams call data for proactive "prevention" purposes, watch the third webinar in the Masterclass webinar series entitled Troubleshooting Troubleshooting Microsoft Teams: Calls & Meetings.

MARTELLO

Get Proactive

Microsoft has gone to great lengths to provide IT teams with meaningful and insightful tools to provided needed visibility into Teams call performance. By leveraging the native tools covered in this paper (and demonstrated in the aforementioned webinar recordings), you will find your organization in a much better position where reports of Teams call quality issues can be investigated and, in some cases, addressed.

But should prevention be the goal, it's going to require the use of tools outside of Microsoft to accomplish, bridging the gaps that exist between needed data sources that, when correlated, provide the actionable insight needed to turn troubleshooting into prevention and move the remediation timeframe from after the fact to before a single user is impacted.

MARTELLO

About Martello

Martello (TSXV: MTLO) provides monitoring solutions to optimize the modern workplace. Our products provide actionable insight on the performance and user experience of communication and collaboration services, while giving IT teams and service providers control and visibility of their entire IT infrastructure. Martello's software products include Vantage DX, which provides Microsoft 365 and Microsoft Teams end user experience monitoring and optimization.

Learn more at ***www.martellotech.com***

About Author

Nick Cavalancia is a 4-time Microsoft MVP and has over 25 years of IT experience dealing with the architecture, implementation, and training of Microsoft technologies for 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.

Book a call with our experts to bridge the gap between Microsoft Native Tools and proactive monitoring

CONTACT US