

# Monitoring tools for VoIP and Microsoft Teams

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**Abstract-** the monitoring tools used for VOIP and Microsoft teams are used to determine the experience and reliability usage patterns along with user feedback. These insights usually help us to determine the training and the communication efforts required to help user's adaptability to a product like Microsoft teams, skype or any other VOIP video and audio-conferencing application. these reports can be used to understand the trends with user effectiveness and usage to a particular application such reports can be obtained either from call quality dashboard available in skype for business or teams admin center or from power bi reports for in-depth analysis and step by step analytics reports for product analysis.

**Keywords-**teams, power bi, usage analytics, monitoring tools, call quality dashboard (CQD)

## I. INTRODUCTION

The usage report is one of the main tools to analyze the emerging trends to any application. The usage reports also indicate user experience to review different scenarios for application adaptability. Users are sensitive about the quality of service they receive from any application depending on the performance of the application for sending or receiving messages for upload and download of document for a message, internal and external performance for meetings and calls. This is termed as normal and most of the usage of teams is synchronous and depends upon sustaining the optimal user performance satisfaction and popularity for wider adaptability (1).

## II. TEAM ANALYTIC AND REPORTS (ADMIN CENTRE)

The teams analytic reports in Microsoft admin center gives you an insight to any tenant's information or organizational usage information. The reports to these usages can be categorized as user activity report, usage reports, and device usage reports. These reports have a day today analysis based on the everyday analytics run through different power shell scripts to create these reports (2).

### 2. 1.Teams usage reports-

This report gives an overview of total active users and channels, guests and number of teams created between the active users. This report also helps in graphical analysis depending on the number of active users, location, usage summary which helps in building of this report (1).

### 2.2. Teams user activity report-

The type of report gives us insights into activities perform by users to communicate in one to one discussions, calls, channels and messages. This type of report also helps in peer to peer call analysis between users communicating across an organization or in a federated setup across multiple organizations (2).

### 2.3. Teams device usage report-

Teams device usage report shows how users are connected to teams this includes how the number of mobile devices, iPad, tablets are connected to teams or other applications. The device usage report can also be obtained with the help of power bi analyses. It depends what type of report is required the same can be obtained from the report section of the admin center for teams. These reports can be selected, and a new report can be built with the help of dimension, measurements, and filters from CQD (call quality dashboard) analyses (2).

### III. CALL FLOW IN TEAMS ANALYSIS USING MONITORING TOOLS

The call flow in teams is represented by following flow descriptions

**Flow 1** – represents a flow initiated by a user from client to client internal within organization. (Client to client call flow) this is known as p2p calls which are within one to another user in an organization which includes the call analysis on day to day calls (6).

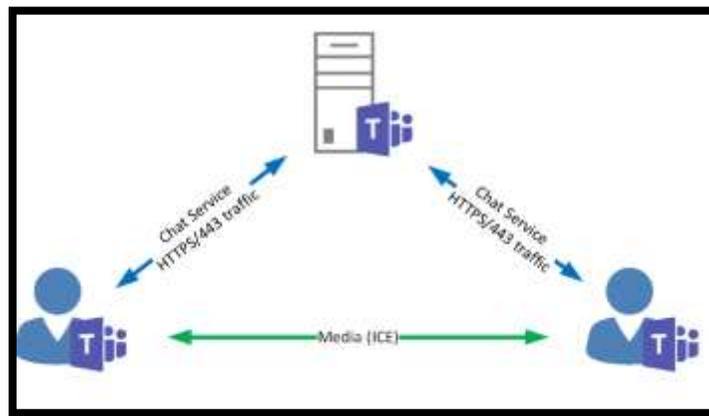


Figure 1. P2P calls (6)

**Flow 2** – represents a flow initiated by a user from client to server external outside organization. (Client to server call flow) this is known as conference calls which are within one to another user or one to many users outside the organization which includes the call analysis on day to day calls.

These flow depend on the type of call if the call and also the participants in the call to provide a in depth analysis for the calls to make a result oriented report for analysis in order to identify the factors which cause poor audio experience include packet loss , jitter , latency, round trip delay and concealed round trip ratio(6).

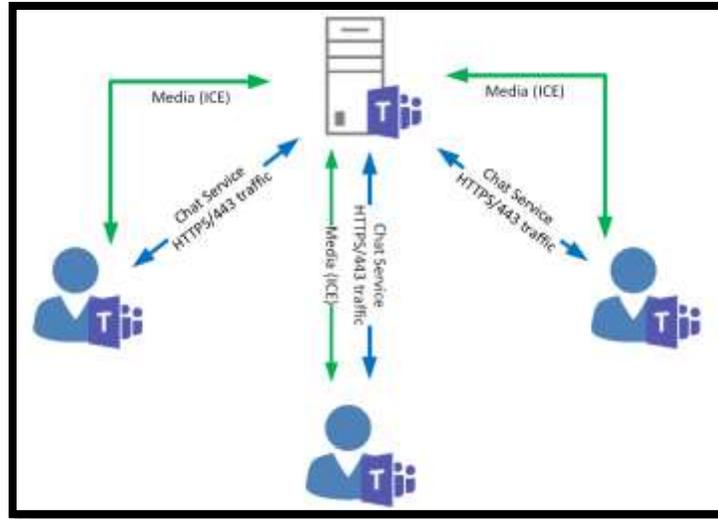


Figure 2. Conference calls (6)

#### IV. MICROSOFT 365 USAGE ANALYTICS

The analytics can be viewed in power bi for teams and another Microsoft 365 applications. The analytics can be the number of prebuild reports, each report gives you the content and the specific data insides based on the various categories which include the dimension, filters and measurements (2). These reports also help together feedback regarding the adoption of new collaboration experience of users enabling different users for training so to transition from old technology to Microsoft teams.ms teams consumes a lot of network band width capability is required to make sure that it can handle the load before and after the adoption phase. The MS teams quality of service is dependent on various distributed factors like location, network, or bandwidth or Wi-Fi security. To help improve the quality of experience from users it is very necessary that different monitoring should always be enabled to help attain proper quality of reports (3).

#### V. MEASURING THE NETWORK IMPROVEMENT PLAN FOR MICROSOFT TEAMS

There are a lot of users on which we can decide whether our network is prepared to experience the best of Microsoft teams environment for users with Microsoft teams monitoring tools you can make accurate measurements to provide facts and define different action items. The quality of service (QOS) is also one of the main factors for performance improvement if properly implemented for a tenant. Deploying various technologies for network like SD-wan helps increasing the local band width and QOS upgrade from rest of the services (3).

#### VI. DIFFERENT TOOLS FOR HEALTHY TEAMS ENVIRONMENT

The network assessment tools for teams can be applied depending on what and where a tool is to be in place for quality assessment which involves segmentation for voice and video and screen sharing options (4).

There are various key features which helps in end to end visibility across multi-vendor network echo systems which involve the following:

- Generate synthetic transactions to match expected VoIP traffic parameters
- Identify issues that can affect the overall VoIP quality
- Perform load-based testing on real time traffic
- Monitor QOS enforcement on managed and unmanaged networks using MS teams.

##### 6.1. Generate synthetic transactions to match expected VoIP traffic parameter

The synthetic transactions involve building scripts or tools that stimulate activity that normally performed for application which involved typical testing for user activities like calls, meetings, and day today chat history. The synthetic traffic represents various communication patterns that facilitate the evolution of experimental results for aspects of bandwidth, traffic and dealing (4).

### 6.2. Identify issues that can affect the overall VoIP quality-

The teams admin center is one of the main sections where you can check the audio quality analysis. The meetings and peer to peer calls can be affected due to poor Wi-Fi coverage, incomplete proxy or firewall configuration, insufficient bandwidth (4).

### 6.3. Perform load-based testing on real time traffic-

Through proper planning and design for deploying teams or skype for business online the overall testing for real time load helps us to understand whether RA high quality and the amount of effort required to maintain such quality requires any improvement made to improve the audio experience will directly translate to improve network adoption using high deployment for various amount of devices and drivers so that the adoption can be maximized to help improve overall performance (5).

### 6.4. Monitor QOS enforcement on managed and unmanaged networks using MS teams-

QOS (quality of service) enforcement is required for all subnets to be reinforced across all the subnets wherein involving a high number of audio and video improvements to accelerate proper classification of packets with the help of implementation of QOS involving audio, video & VBSS.

To accelerate the assessment for managing all the networks this can be possible with the help of collection of network information that can be used for creation of reports across buildings, location and from internal to outside communication fields. The quality in context to telemetry for a call depends on the CQD parameters used for accessing per user call analytics involving poor stream, setup failure rate, and drop failure rate. (5)

#### 6.4.1. Poor stream rate-

The poor stream rate (psr) represents the overall percentage of streams that have poor quality. There are certain areas which could have highest impact reducing the value and improving user experience through manage networks. Considering the best practices for external user and call audio poor percentage measurement the network matrix averages helps in identification of call quality assessment for a stream.

Building mapping file is one of the main information holders which helps in collection of information related to internal and external subnets. These internal and external subnets have a combination of information basis on the overall to and fro call details recording information of any building location experiencing network issues (5).

#### 6.4.2. Setup failure rate-

Setup failure rate also known as total call setup failure percentage is a measurement in CQD where the number of streams in a media path couldn't be established between the end points at the start of the call the severity of a problem can only be understood with the help of overall deployments and firewall rules to help us calculate the number of streams which have failed. Setup failure rate is calculated as

Setup failure rate = total call setup failed stream count /total CDR available stream count (4)

#### 6.4.3. Drop failure rate-

The drop failure rate is the total number of quality calls made and out of which the calls in which you get dropped off. Drop failure rate is published under the quality of review reports for providing a comprehensive guide to maintain high quality of experience for end users. Looking at the several customer data from past many months you would get a trend of increase audio drop failure rate for good magnitude and unclassified audio stream counts affecting several end numbers of users (4).

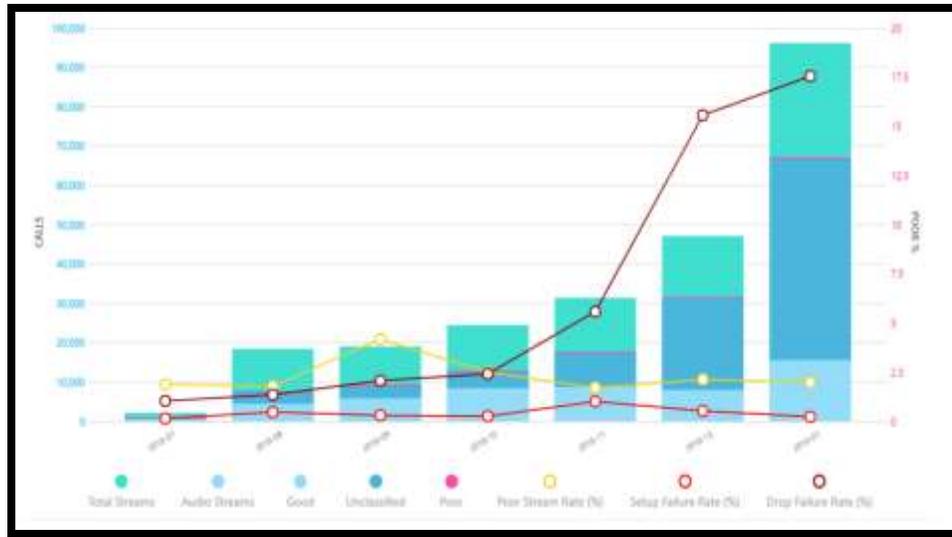


Figure 3. Example of summary reports (3)

The summary graph is a very important parameter for the analysis of call quality dashboard. The various characteristics of summary graph are total streams, audio streams, good, unclassified, poor stream rate, setup failure rate and drop failure rate.

These all parameters help in setting up of a report for CQD analysis for all calls including audio calls, video calls and screen sharing data analysis. The call quality dashboard also helps in building of power bi analysis for telemetry calls and day to day operations including call analytics, call drop rates and unclassified calls (4).

Microsoft teams monitoring tools are designed in such a way that the overall collaborative platform provides all round availability of monitoring tools like CQD, power bi analysis in a collaborative environment (5).

#### VII. POWER BI ANALYSIS OF CALL QUALITY DASHBOARD

Power BI is one of the most important tools for it administrative to enable them to build their quality and reliability reports these quality and reliability reports help in formation of advance call quality dashboard data which actually involves in depth analysis of audio calls, video calls, video based screen sharing (vbss) for day today analysis. The power bi reports also help in underlying the subnets which report poor call quality from different locations irrespective of connection type either Wi-Fi or wired or mobile BB. The following diagram provides a view of power BI CQD report within depth data analysis (6).

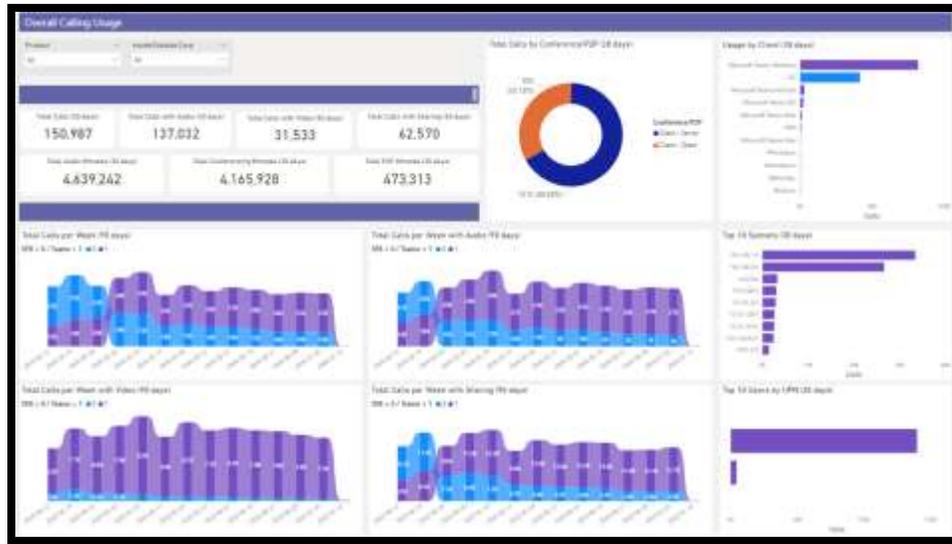


Figure 4. Power BI CQD report overview (4)

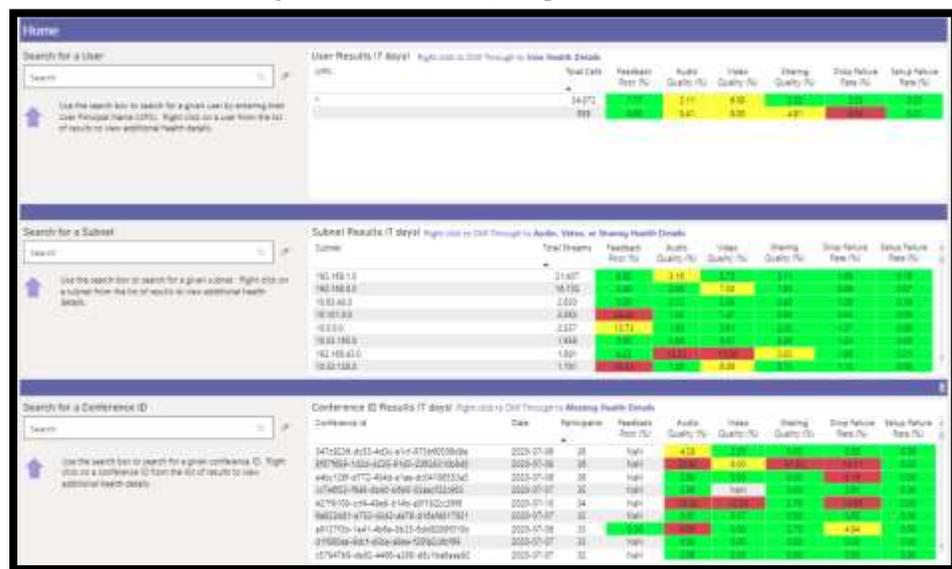


Figure 5. Subnet report (4)

The power BI CQD data has a power bi connector which fetches CQD data either from a direct query or from an indirect query. The command get- data provides an interlinking connection to the direct query to help us fetch call quality analysis data with various remediation models involving the steps to help us build a report which include visualizations involving measurements, dimensions, filters. These three parameters setup a building block for power bi report analysis. There are also various filtering types available in power bi analysis which involve basic filtering, relative filtering, and advanced filtering. These all help us drill down to create a report in context of focused analysis selecting the appropriate dimension, measurement, filtering. There are certain limitations to power bi functionality for call quality analysis with the help of calculated columns, aggregations, custom visuals, cached data and relative data filtering (7)(5).

### VIII. RESULT

The monitoring tools of power bi provide a powerful analysis of various data analytics the below diagram provides a complete set of analysis of an organization where by the report has been prepared to give the complete audio analysis with the help of the three measurements which include dimensions, measurements, filters. In the diagram below we have prepared report with the following parameters (9).

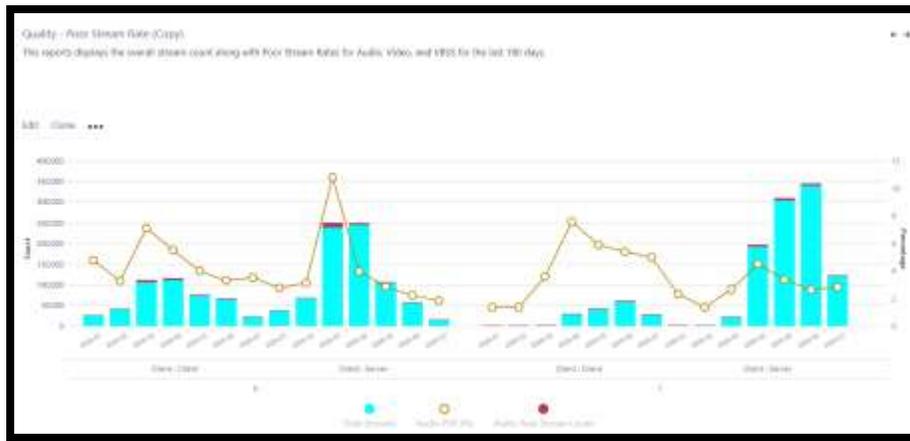


Figure 5. Call quality analysis of audio poor stream calls (4)

Quality - Poor Stream Rate (Copy) (Copy)  
 This reports displays the overall stream count along with Poor Stream Rates for Audio, Video, and VBSS for the last 180 days.

Edit Clone Add Sub-Report ...

Show 10 entries

Is Teams	Is Server Pair	Month	Total Streams	Audio PSR (%)	Audio Poor Stream Count
Filter: Is Teams	Filter: Is Server Pair	Filter: Month	Filter: Tc	Filter: Av	Filter: Ac
0	Client : Client	2020-01	22854	4.71	647
0	Client : Client	2020-02	40004	3.27	769
0	Client : Client	2020-03	105578	7.1	4953
0	Client : Client	2020-04	111066	5.51	4075

Figure 6. Call quality analysis client to client & client to server (6)

## IX. CONCLUSION

the monitoring tools for VoIP and Microsoft teams is one of the most power tools with visualizations which help in remediation of best quality of customer data analysis to identify the factors causing poor audio quality, video quality and poor screen sharing experience. The drill through report in power bi helps us on a focused approach to evaluate all data reports fetched in context to several parameters which allow day today and monthly analysis of relative data obtained from various custom filters of user data available under tenant information of team's admin center. These reports help us provide a notable view to create much more powerful tools which provide deep insides even on data related to users from multiple platforms.

## REFERENCES

- [1] <https://docs.microsoft.com/en-us/microsoftteams/get-started-with-teams-monitor-usage-and-feedback>.
- [2] <https://www.gsx.com/solutions/microsoft-teams-monitoring-tool/>
- [3] <https://techcommunity.microsoft.com/t5/microsoft-teams-blog/the-rise-of-drop-failure-rate-and-unclassified-streams-explained/ba-p/327015>
- [4] <https://tomtalks.blog/2020/02/6-power-bi-reports-for-microsoft-teams-call-quality-dashboard-cqd/>
- [5] <http://www.babylon365.net/introducing-microsoft-call-quality-power-bi-connector-aka-cqd-power-bi-connector/>
- [6] <https://stefanoceruti.wordpress.com/2017/08/23/media-flow-in-microsoft-teams/>
- [7] <https://docs.microsoft.com/en-us/microsoftteams/teams-architecture-solutions-posters>
- [8] <https://docs.microsoft.com/en-us/microsoftteams/teams-architecture-solutions-posters>
- [9] <https://www.audiocodes.com/media/14560/mediant-sbc-for-voipms-sip-trunk-with-microsoft-teams-enterprise-model-configuration-note.pdf>



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