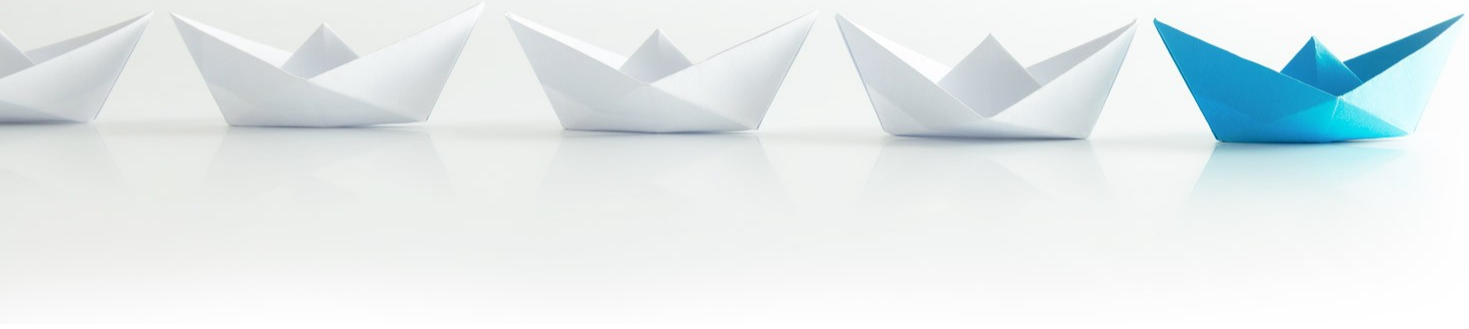
Teams Call Records

Eine Schatztruhe oder die Büchse der Pandora?

March 11th, 2025



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Before We Start

All attendee lines are muted

This is to prevent interruptions during the presentation.

Please submit questions via the Chat or Q&A panel

Your questions will be addressed directly during the webinar or in the Q&A section after the presentation.

The webinar is being recorded

After the webinar, we will send you a mail to give access to the recording and presentation slides.

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Use the link provided at the end to let us know what we can do better.


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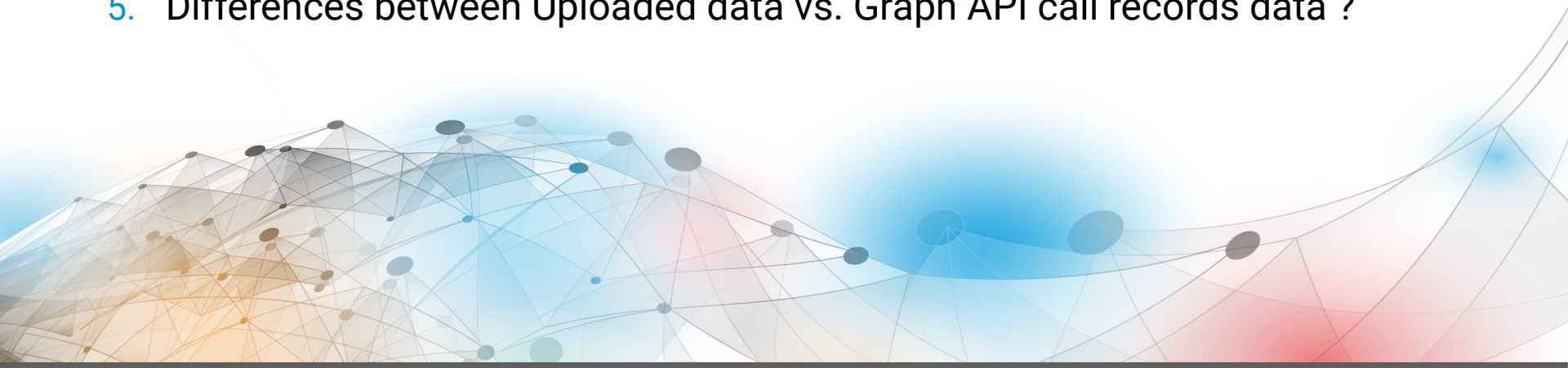
Agenda

1. What Are Teams Call Records and Why Are They Important?
2. Call Telemetry Data flow *(creation – upload –processing – retrieval)*
3. Structure of a Teams Call Record
4. Limitations of the available data ?
5. Differences between Uploaded data vs. Graph API call records data ?



What Are Teams Call Records and Why Are They Important ?

What are Teams Call Records?

- **What ?**
  - They give detailed information of usage and telemetry data on calls and meetings in Microsoft Teams
  - Provided by Microsoft via Microsoft Graph API
  - No additional Costs (part of M365 Subscriptions)

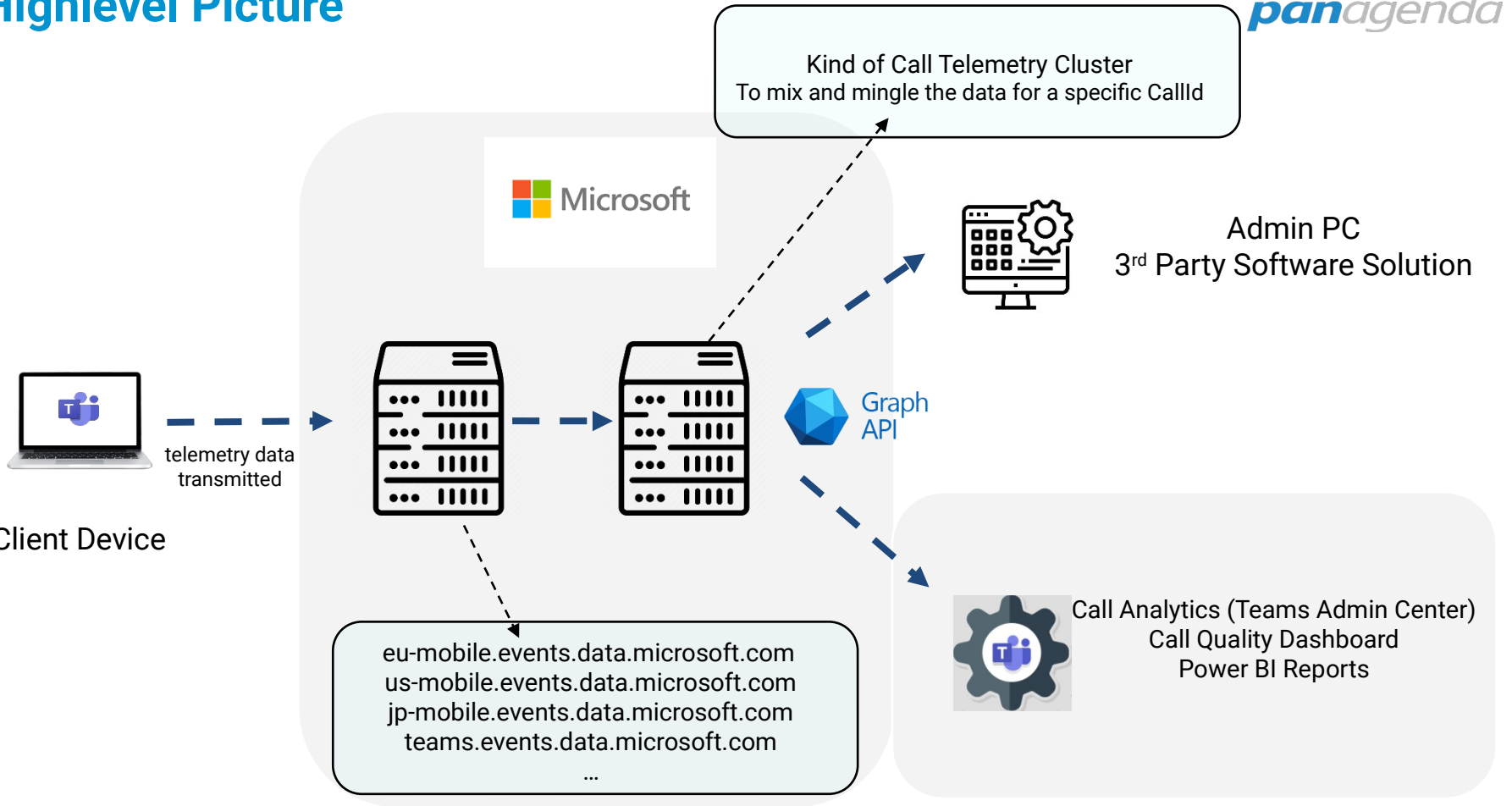
Importance and Relevance

- **Importance and Relevance ?**
  - Monitoring and Troubleshooting Call Quality
  - Powering native Microsoft Tools (e.g Teams Admin Portal)
  - Analyzing Usage Patterns
  - Creating Custom Reports
  - Improve Product Performance (for Microsoft)

Call Telemetry Data Flow

How does data from a PC get uploaded to the cloud to become accessible as a call record?

Highlevel Picture

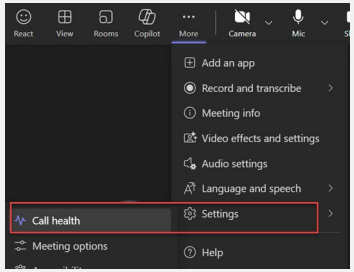


Let’s begin with the Client Device

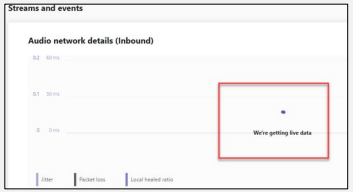
…the Source of the Telemetry Data

Client

During a Call (EndUser)



During a Call (Admin)



Teams Real-time data
*.streaming.rtt.teams.microsoft.com

After a Call

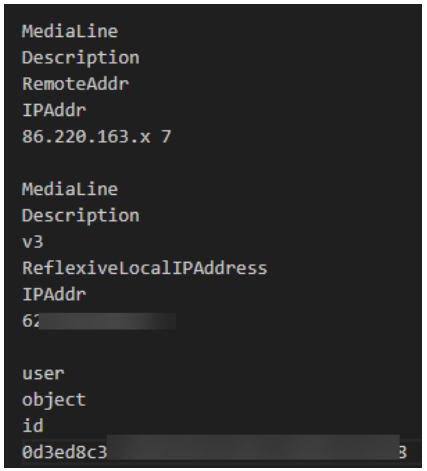
200	HTTPS	teams.events.data.microsoft.com	/Collector/3.0/
200	HTTPS	teams.events.data.microsoft.com	/Collector/3.0/
200	HTTPS	teams.events.data.microsoft.com	/Collector/3.0/
200	HTTPS	teams.events.data.microsoft.com	/Collector/3.0/

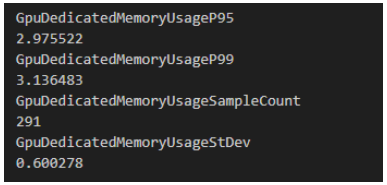
```
POST https://teams.events.data.microsoft.com/Collector/3.0/ HTTP/1.1
Host: teams.events.data.microsoft.com
Accept-Encoding: gzip, deflate
Client-Id: NO_AUTH
Content-Length: 40633
Content-Type: application/bond-compact-binary
Expect: 100-continue
SDK-Version: SCT2-Windows-C++-No-5.0.381.118
User-Agent: RT HttpStack
X-APIKey:                                                    a7753fb9887-7371

AppInfo.ExperimentIds
P-R-1257081-1-11,P-R-1229055-1-16,P-R-1149640-1-11,P-E-1534264-C1-8,P-E-1525757-2-7,P-E-1461093-C1-11,P-R-1533806-1-5,P-R-1292117-1-18,P-R-1524761-1
CallNumber0CallRoleCallerCallType
ConferenceCall_DtlsAcceptedInAnswerfalseConferenceE2EEApiEnabledfalseConferenceE2EERekeyCount0
DeviceInfo.Id3327529359813334910DeviceInfo.ModelPrecision 3591DeviceInfo.NetworkTypeWifiDeviceInfo.OsName WindowsDeviceInfo.OsVersion10.0%
DtlsCertReadytrueDtlsCertTypeDtlsHandshakeCompletedfalse)DtlsHandshakeCompletedOnAtLeastOneChannelfalseDtlsHandshakeFailedfalseDtlsEg
ENTERPRISEEndpoint_v2_VirtualizationFlags1Endpoint_v7_CPUBuildArchNamex64Endpoint_v7_CPUMarketingName
meteorlakeEndpoint_v7_CPUSupportsAVX2trueEndpoint_v7_CPUSupportsFMA3trueEndpoint_v7_DeviceFormFactorLAPTOPEndpoint_v7_MachineInfoDell
26100.31947Endpoint_v8_VideoPlatformEnd_ApiEnumerationRequestCount11Endpoint_v8_VideoPlatformEnd_EnumDeviceCountFirst10Endpoint_v8_VideoPlatformE
0:1.000000FMediaLine_Description_CaptureDev_v8_AudioCaptureDeviceErrorFlagsReopen08MediaLine_Description_CaptureDev_v8_AudioCaptureDeviceIdvid:11
-76.500000(MediaLine_Description_CaptureDev_v8_NamePoly Sync 20-M7MediaLine_Description_CaptureDev_v8_SpeechFragmentCount347@MediaLine_Descriptio
255.255.255.07MediaLine_Description_NetworkConnectivityInfo_LinkSpeed    520000000?MediaLine_Description_NetworkConnectivityInfo_NetworkConnection
0:1.000000DMediaLine_Description_RenderDev_v8_AudioRenderDeviceErrorFlagsReopen06MediaLine_Description_RenderDev_v8_AudioRenderDeviceIdvid:1151|
3950172054265 2MediaLine_Description_v8_ConfStartedSystemTimeInMs
1741183254267#MediaLine_Description_v8_DeviceHash949230722133462MediaLine_Description_v8_IsMultistreamVideoChannelfalse(MediaLine_Description_v8_
3950172055155 9
MediaLine_InboundStream_Network_v8_FirstRtpPacketRecvSSRC221018
MediaLine_InboundStream_Network_v8_FirstRtpPacketRecvSeq240517129
MediaLine_InboundStream_Network_v8_FirstRtpPacketRecvTime3950172087063 2MediaLine_InboundStream_Network_v8_HealedDataRatio0.0057185MediaLine_Inbound
3950174583372:MediaLine_InboundStream_Network_v8_LatestRtpPacketRecvSSRC221019MediaLine_InboundStream_Network_v8_LatestRtpPacketRecvSeq
1497300992:MediaLine_InboundStream_Network_v8_LatestRtpPacketRecvTime
```

What kind of Data ?

- Device Information
- Network Information
- Audio/Video/VBSS metrics
- Only for this user!





Any PII ?

- User Id; Device Name; IP Addresses

Microsoft ensures that EUII(PII) is handled with strict privacy controls and is typically anonymized or pseudonymized to protect user privacy.

Some are already pseudonymized during upload (e.g. Public IP)

…and they also train AI models

https://aiinfrastructure.static.microsoft/public/aiinfrastructure/Machine_capability_minor_version/*/model.gz
https://aiinfrastructure.static.microsoft/public/aiinfrastructure/great_rose_q_kind_heart_md_q_combined.fpie/*/model.gz

>> Pointing to an AnyCast address


```
"hash": "1",
"model_name": "model-dec2_1698682613_00d3cddb-avg_kind_heart_combined.fpie",
"encryption_type": "v2_aes256cbc",
"metadata": {
    "source_uri": "azure feed",
    "model_name": "model-dec2_1698682613_00d3cddb-avg_kind_heart_combined.fpie",
    "id": "great_rose_q_kind_heart_md_q_combined.fpie",
    "hash": "13",
    "attestation": "https://o365trustcompliance.visualstudio.com/Trust/_compliance/product/fcaf70d3-d3c2-9c7c-11ac-1388b42bbc99/assessments/2c738e72-dccf-051a-5126-cc0b6561a5de",
    "cyber_eo_assessment": "https://o365trustcompliance.visualstudio.com/DefaultCollection/Trust/_workitems/edit/517000",
    "commitid": "VSO2254905",
    "blob_location": "great_rose_q_kind_heart_md_q_combined.fpie/3/model.dat",
    "issued_sas": [],
    "status": [],
    "signing_release_id": "",
    "processing_error": "",
    "author": "34d87c0e-ca8c-4a74-8e06-bc35feaca275",
    "tags": "dec md combined, dvqe music",
    "cdn_uri": "",
    "gallatin_cdn_uri": "",
    "model_uri": "",
    "azure_feed_uri": "https://skype.visualstudio.com/scc/_artifacts/feed/csc/UPack/microsoft.skype.ic3ai.deepaudio.model.deepvqe-md/overview/2.0.0",
    "model_source": 0,
    "url_hash": "",
    "retried_signing": false,
```

Controlling the Data ?

Is it possible to control what is being uploaded?
Can specific components be reduced, or can the entire data upload be disabled?

Controlling the Data?

*Teams v2 follows **Office Cloud Policy** tenant settings*

- Policy (config.office.com): *Configure the level of client software diagnostic data sent by Office to Microsoft*

Note: This does not stop the upload of events but reduces the dataset

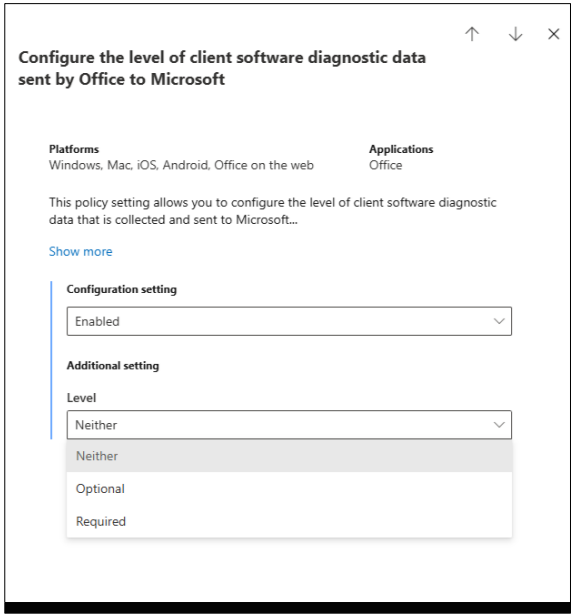
Policy setting for diagnostic data

Diagnostic data is used to keep Office secure and up-to-date, detect, diagnose and remediate problems, and also make product improvements.

You can use the *Configure the level of client software diagnostic data sent by Office to Microsoft* policy setting to choose what level of diagnostic data is sent to Microsoft.

If you enable this policy setting, you must choose which level of diagnostic data is sent to Microsoft. Your choices are Required, Optional, or Neither.

- If you choose ***Required***, the minimum data necessary to help keep Office secure, up-to-date, and performing as expected on the device it's installed on is sent to Microsoft.
- If you choose ***Optional***, additional data that helps make product improvements and provides enhanced information to help detect, diagnose, and remediate issues is sent to Microsoft. This data may also be used in aggregate to train and improve experiences powered by machine learning, such as recommended actions, text predictions, and contextual help. If you choose to send optional diagnostic data, required diagnostic data is also included.
- If you choose ***Neither***, no diagnostic data about Office client software running on the user's device is sent to Microsoft. This option, however, significantly limits Microsoft's ability to detect, diagnose, and remediate problems that your users may encounter when using Office.



https://learn.microsoft.com/en-us/microsoft-365-apps/privacy/manage-privacy-controls#policy-setting-for-diagnostic-data

Controlling the Data?

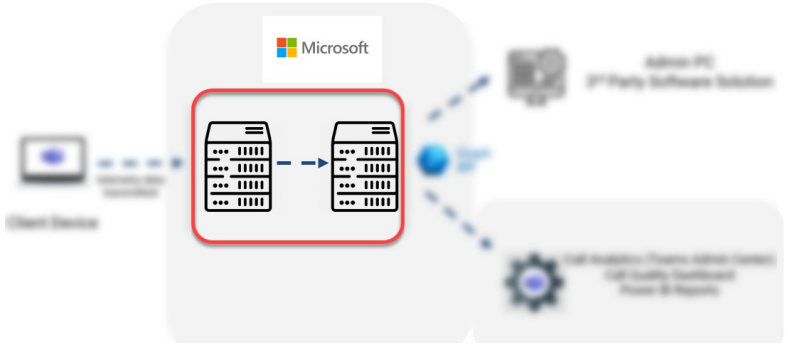
- Diagnostics Data produced by “Office”
  - *Network Settings*
  - *Group Policy*
  - *Registry*

- Complexity of technical feasibility to control it
- Impact on Operation and Featured Connected Experience

https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Publikationen/Studien/Office_Telemetrie/Office_Telemetrie.pdf?__blob=publicationFile&v=1

Where is the data uploaded(stored) ?

Is telemetry data from European clients always uploaded in Europe ?

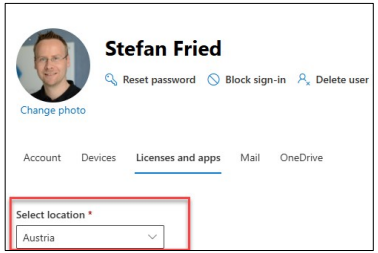


Uploaded / Stored – There are several factors

- **Uploading Location != Storing Location**
- **Data Residency**

  Microsoft ensures that call quality data is stored in data centers within the same geographic region as the tenant → adhering to local data residency and compliance requirements

- **Regional Privacy Regulations (e.g Microsoft EU Data Boundary)**
- **Service Specific Configuration**
  - **User Usage Location - Entra**
  - **Multi-Geo**
  - **...**



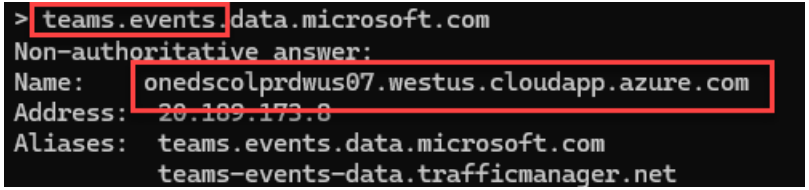
BUT there is one scenario where this can be influenced by the End-User!

https://learn.microsoft.com/en-us/privacy/eudb/eu-data-boundary-learn

Be aware of this Scenario!

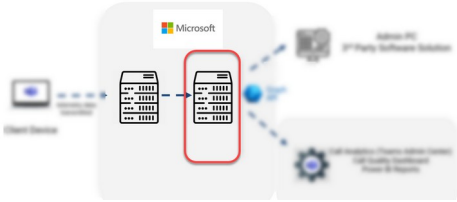
A European user switches to a non-EU tenant because he is listed as a guest there and joins a Call.

- Call telemetry data is only available in the other tenant
- Call telemetry data is uploaded outside of e.g EU



This can occur when your End Users can switch to other M365 tenants.

Merging all collected data for a Call



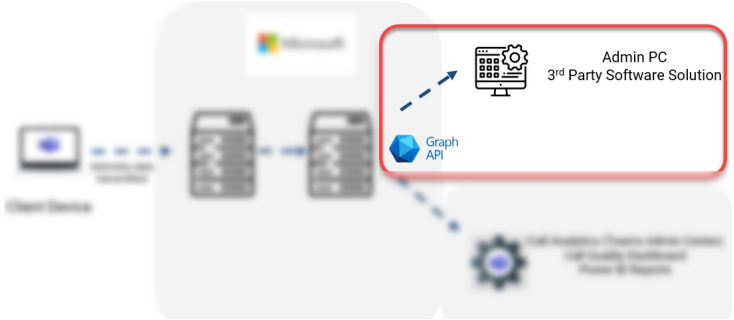
- **CallId –** Unique Identifier of tracking a Call

- **Call Telemetry Clustering / Data Aggregation**
  The collected telemetry data is associated with a unique call ID to cluster all data points related to the same call, ensuring that metrics from all participants are aggregated into a single call record.

  Telemetry data is aggregated/processed to create a view of the call's performance (e.g. including analyzing metrics such as RTT, packet loss, …)

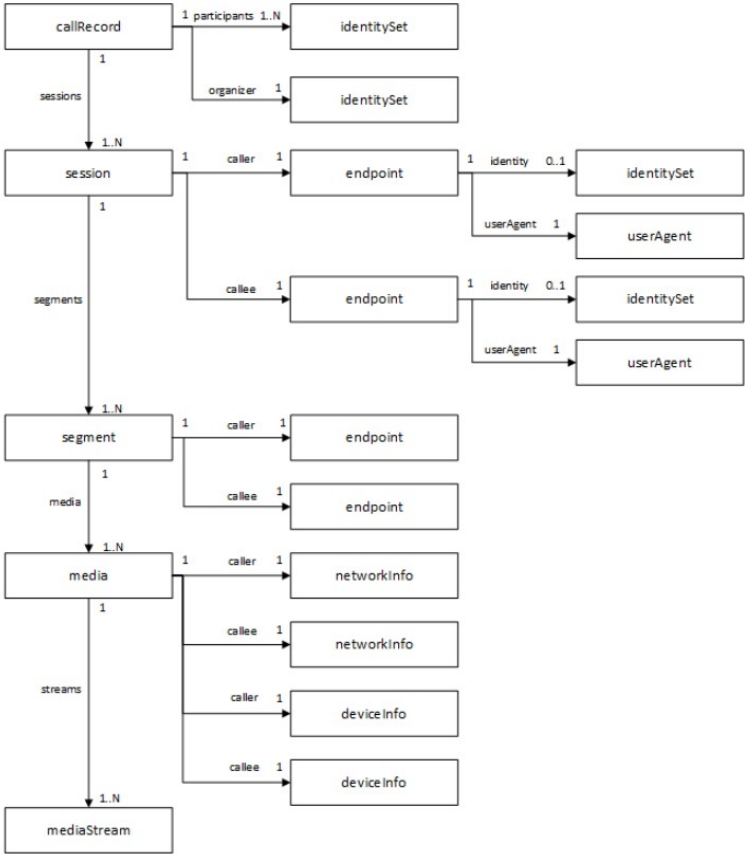
Microsoft Graph API – Call Records

Structure ?
How can I pull / access the Call Record?
Are there any restrictions in terms of Content?



Structure of a Call Record

- Organizer
- Session
- Segment
- Media
- MediaStream
  - Audio
  - Video
  - VBSS



https://learn.microsoft.com/en-us/graph/api/resources/callrecords-api-overview?view=graph-rest-1.0

Structure of a Call Record - Examples

- Meeting between two Tenants
  - Organizing tenant's call record
  - Participating tenant's call record
- P2P call between two Tenants
  - Initiator tenant's call records
  - Participating tenant's call records

Let’s have a look

Content Limitations?

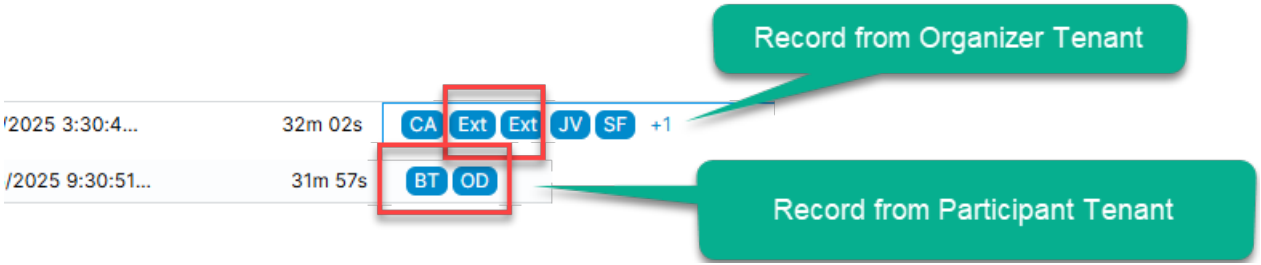
- Almost zero Documentation exists on this topic
- Tenant organizing the call has most information
  - Minimal data from external callers
- Other (Participant) tenant has limited data
- In-tenant information may vary due to local regulations (across End-Users)

Important: By design, Graph API call gives the display name of the organizer even when queried from a different tenant. Organizer display name is never obfuscated – This is the expected behavior.

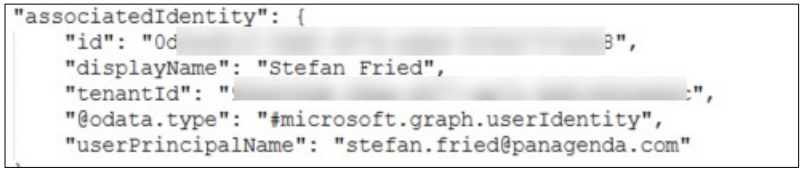
Let's talk about Content Limitations

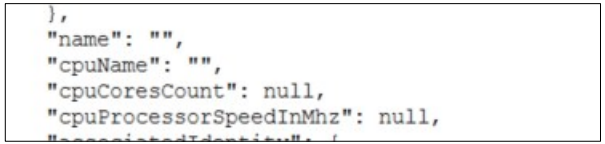
Example Participant visibility – Meeting (more than 2)

If an organization's users join a meeting but did not organize the meeting, that organization will only see details for their own users .The organization that organized a federated meeting will see all participants.



What does the organizing tenant knows from the user from the other tenant ?



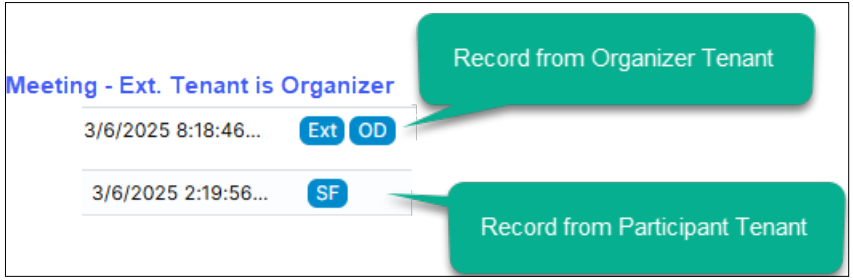


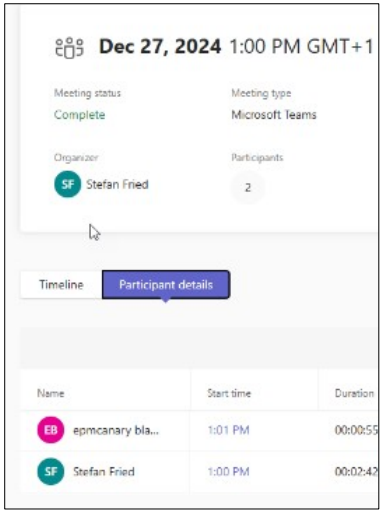
https://learn.microsoft.com/en-us/microsoftteams/monitor-call-quality-qos#participant-visibility-in-call-quality-tools

Let's talk about Content Limitations

Example Participant visibility – Meeting (only two)

If an organization's users join a meeting but did not organize the meeting, that organization will only see details for their own users .The organization that organized a federated meeting will see all participants.



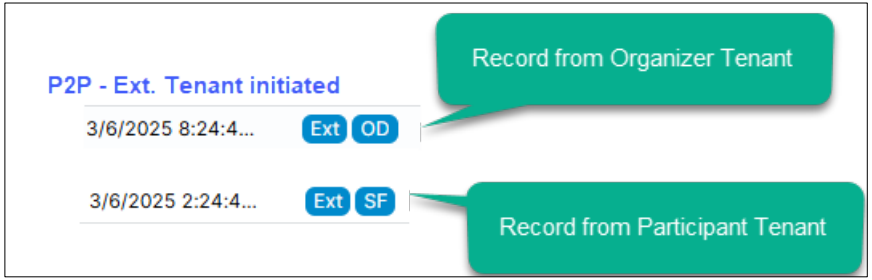


https://learn.microsoft.com/en-us/microsoftteams/monitor-call-quality-qos#participant-visibility-in-call-quality-tools

Let's talk about Content Limitations

Example Participant visibility – P2P

You will see all (both) Users



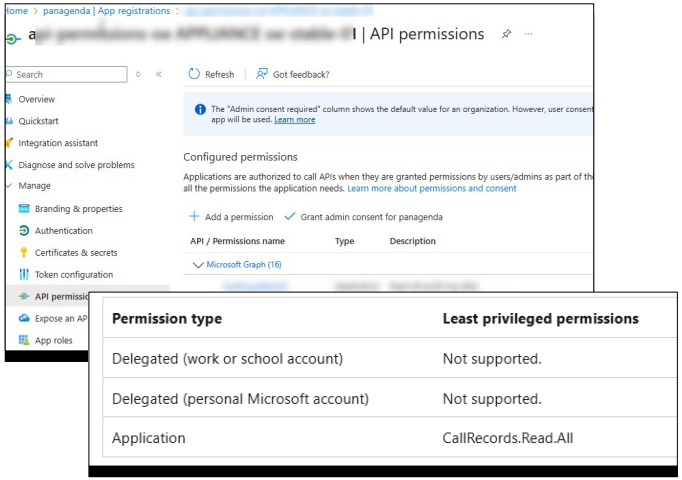
What does the organizing tenant knows from the user from the other tenant ?


```
"associatedIdentity": {
    "id": "0d                                    8",
    "displayName": "Stefan Fried",
    "tenantId": "                                    :",
    "@odata.type": "#microsoft.graph.userIdentity",
    "userPrincipalName": "stefan.fried@panagenda.com"
```

```
},
"name": "",
"cpuName": "",
"cpuCoresCount": null,
"cpuProcessorSpeedInMhz": null,
```


https://learn.microsoft.com/en-us/microsoftteams/monitor-call-quality-qos#participant-visibility-in-call-quality-tools

How can you retrieve a record ?



Permission type	Least privileged permissions
Delegated (work or school account)	Not supported.
Delegated (personal Microsoft account)	Not supported.
Application	CallRecords.Read.All

- Build App

```
const config = {
  auth: {
    clientId: 'YOUR_CLIENT_ID',
    authority: 'https://login.microsoftonline.com/YOUR_TENANT_ID',
    clientSecret: 'YOUR_CLIENT_SECRET',
  },
```

```
async function getAccessToken() {
  const authResponse = await cca.acquireTokenByClientCredential({
    scopes: ['https://graph.microsoft.com/.default'],
  });
  return authResponse.accessToken;
```

```
onst callRecord = await client
.api(`/communications/callRecords/${callRecordId}?$expand=sessions($expand=segments)`)
.get();
```

Important

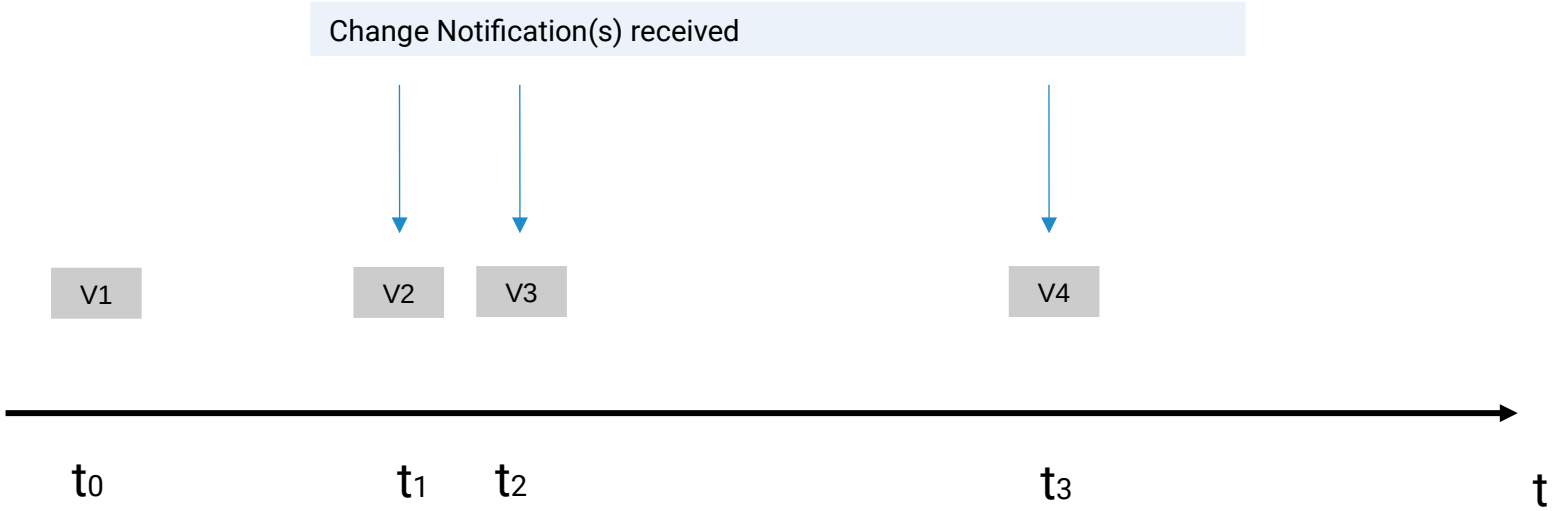
- Version Updates (use Change notification)
- Throttling

Type	Version	Modalities	LastModifiedDateTime
groupCall	2	["audio","video"]	2025-03-06 13:45:15.2100
groupCall	3	["audio","video"]	2025-03-06 13:49:51.1410

https://learn.microsoft.com/en-us/graph/api/resources/callrecords-api-overview?view=graph-rest-1.0
https://learn.microsoft.com/en-us/graph/api/resources/change-notifications-api-overview?view=graph-rest-1.0

Version Updates for a Call Record

When new Call Telemetry Data is aggregated, the system will provide a new Version of the Call telemetry content



t0: v1 - you want to retrieve this immediately when it becomes available

t1,t2: You may want to skip v2 and v3 to limit the number of graph calls (throttling?)

t3: v4 – your app retrieves after x hours the latest available version → less graph calls!

traceRouteHops

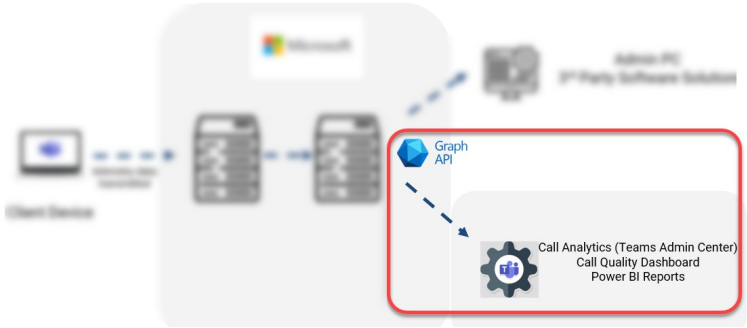
> **Note**
>
> *By default, **traceRouteHops** will always return an empty arra orting of trace route data for your organization.

```
"traceRouteHops": [
    {
        "ipAddress": "192.168.1.1",
        "hopCount": 0,
        "roundTripTime": "PT0.006S"
    },
    {
        "ipAddress": "5",
        "hopCount": 1,
        "roundTripTime": "PT0.015S"
    },
    {
        "ipAddress": "7",
        "hopCount": 2,
        "roundTripTime": "PT0.009S"
    },
    {
        "ipAddress": "7",
        "hopCount": 3,
        "roundTripTime": "PT0.01S"
    },
    {
        "ipAddress": "7",
        "hopCount": 4,
        "roundTripTime": "PT0.02S"
    },
    {
        "ipAddress": "104.44.230.176",
        "hopCount": 5,
        "roundTripTime": "PT0.019S"
    },
    {
        "ipAddress": "104.44.30.118",
        "hopCount": 7,
        "roundTripTime": "PT0.081S"
```

https://learn.microsoft.com/en-us/graph/api/resources/callrecords-networkinfo?view=graph-rest-1.0#properties

Microsoft Graph API – Call Records

In which native Microsoft tools Call Records are used?



Several Area's

Call analytics show detailed information about the devices, networks, and connectivity related to ***specific calls and meetings*** for each user in Teams.

Real-time analytics show detailed information about the devices, networks, and connectivity related to ***scheduled in-progress meetings*** for each user in Teams.

Call Quality Dashboard (CQD) gives you a ***view*** of call quality across your organization.

Power BI Report– Quality of Experience(QER)

EUII data

For compliance reasons, EUII data is only kept for 28 days. As CQD's data crosses the 28-day mark, fields that contain EUII are cleared, resulting in EUII-free data. Fields that contain EUII data are:

- IP Address
- User ObjectId
- MAC Address
- Phone Number
- UPN
- Feedback Text
- Client Endpoint Name
- Local Address
- Remote Address
- Base Address
- BSSID
- Local Site
- Remote Site
- Auto Attendant Identity
- Call Queue Identity
- Transferred from Call Queue Identity
- Organizer ObjectId
- Organizer UPN
- Organizer Sip Uri (Skype for Business only)
- VTC Device Name
- VTC Device Detail

https://learn.microsoft.com/en-us/microsoftteams/cqd-data-and-reports#euii-data

Any Differences?

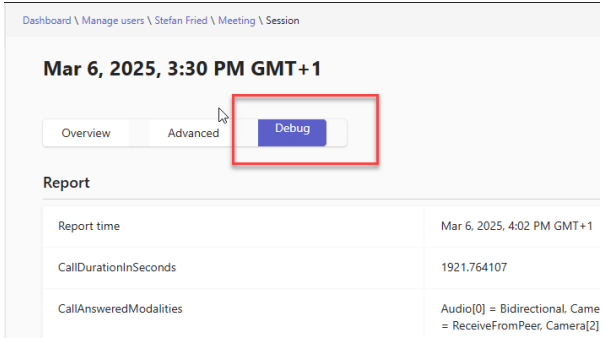
Are there any differences between the data uploaded and what can be retrieved via the API

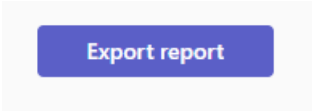
Differences ?

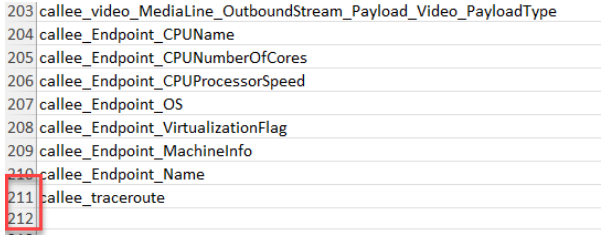
Data not exposed via Graph API

- WebRTC Statistics
- ICE (Interactive Connectivity Establishment)

Exporting debug info from the Admin Portal gives you just a subset of the previous uploaded client data



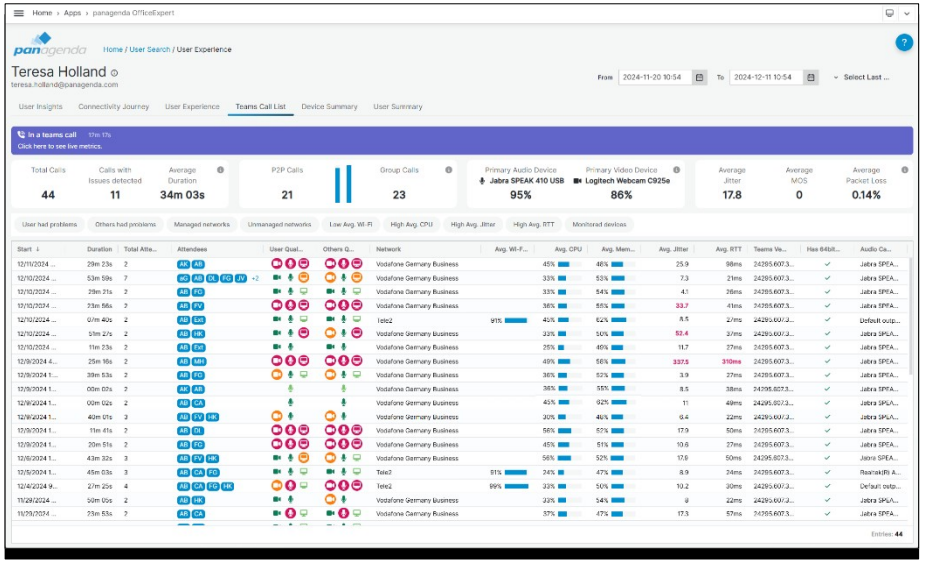




Summary

- A lot of Information
- Metrics are aggregated
- Easy retrieval
- Be aware of limitations

Want more ?
Check out
panagenda OfficeExpert TrueDEM



Q & A

panagenda

THANK YOU!