October 6, 2022

Application Note

Identify Call Quality Trends with Dynamic Offices

Overview

Typical modern workplaces include a mix of on-site and remote users. This hybrid approach presents a challenge for IT organizations. If participants in a Microsoft Teams meeting experience poor call quality, you need to distinguish whether the poor quality is caused by issues within your network, or by issues outside of your network. The Vantage DX solution provides many features to help you monitor and troubleshoot Teams call quality. One feature—dynamic offices—is particularly helpful in identifying call quality trends that occur at your business sites.

This application note describes how you can use the dynamic office feature of Vantage DX to understand and manage the conditions that impact call quality—and therefore productivity—at your business sites.

If you are new to Vantage DX, you may find it helpful to read *Understanding Vantage DX* for an overview of the solution and its modules. See the **Resources** section at the end of this document for more information.

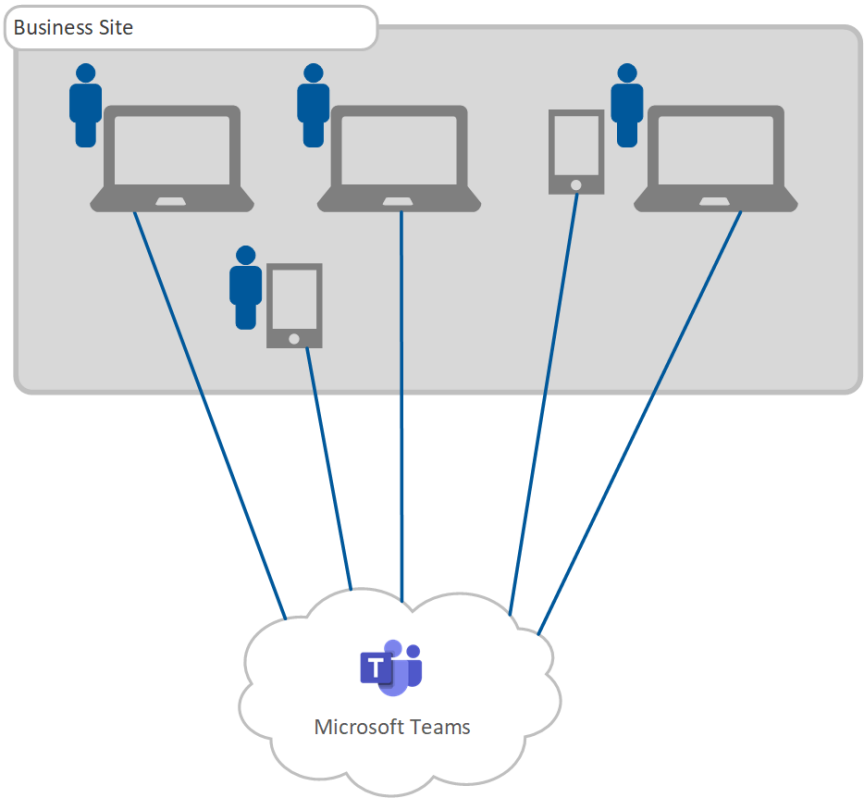
Understanding Dynamic Offices

The dynamic offices feature in Vantage DX Analytics allows you to monitor the call quality of Microsoft Teams meetings that include three or more devices with the same IP address. When three or more devices with the same IP address participate in a Teams call, VDX Analytics automatically creates a group for that IP address and provides call quality metrics for the call.

Dynamic offices are helpful because user devices that connect to a call from the same IP address are typically located in the same office. Call quality issues that occur at the business site may be caused by company-owned equipment, or by services provided by the company. When you monitor dynamic offices, you can identify trends, such as whether the same users, equipment, or services are consistently correlated with poor call quality. When you can understand the call quality trends at your business site, you can understand how your IT environment is impacting productivity and make adjustments based on that data.

It is important to understand that dynamic offices and their performance metrics are based on the number of devices with the same IP address, not the number of users with the same IP address. For example, if four users connected to a Teams call, but one user connected to the call from both a laptop and a mobile device, the dynamic office and its performance information would be based on five devices, as shown in the image below:

Identify Call Quality Trends with Dynamic Offices



For each dynamic office, VDX Analytics retrieves device-level metrics from the Microsoft CQD integration. The metrics are averaged over all the call streams for the device during the data collection window. Video frame rates are averaged separately for video sessions and for screen sharing sessions, and the highest average frame rate is displayed.

The following table lists the metrics that VDX Analytics displays for each device.

Table 1: Call Quality Metrics

Metric	Description
Last call time	The time of the last call on this device.
Client forward jitter	The jitter from the client to the destination.
Client forward RTT	The round-trip time from the client to the destination.
Client forward video frame rate	The video frame rate from the client to the destination.
Client reverse jitter	The jitter from the destination to the client.
Client reverse RTT	The round-trip time from the destination to the client

Identify Call Quality Trends with Dynamic Offices

Metric	Description
Client reverse video frame rate	The video frame rate from the destination to the client.
Average MOS	A prediction of end-user audio quality experience. It is based on latency, the packet loss, jitter, and the codec used.
Call times	A list of calls, with their start and end times.
Number of poor calls	The number of calls with poor voice quality that occurred during the data collection period.
Poor call times	The start and end times of calls with poor voice quality.
Dropped streams call times	The start and end times when call streams were dropped. Calls do not necessarily fail when call streams are dropped. For example, the video stream may drop but the audio stream may continue.
Failed calls times	The start and end times when calls failed.

VDX Analytics uses a color-coded system to indicate the health state of the dynamic office. The health state is based on the percentage of bad calls that occurred during the data collection window. The percentage of poor calls, and the duration of the data collection window, are configurable. By default, the health status is warning (yellow) when 20% of the calls in the dynamic office are experiencing poor call quality. The health status is critical (red) when 30% of the calls in the dynamic office are experiencing poor call quality.

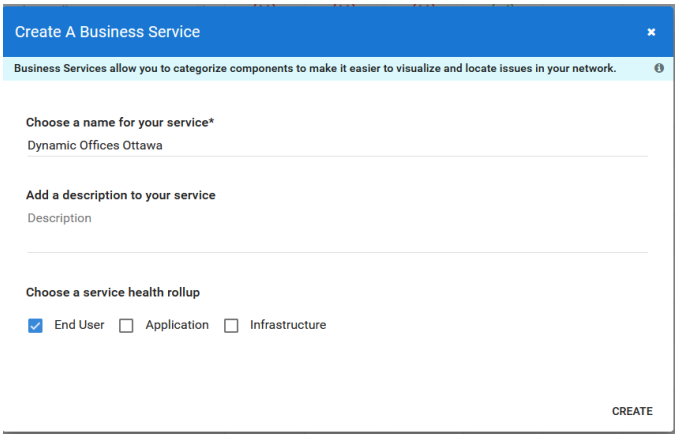
Implementation

This section provides an overview of how you can configure a business service in VDX Analytics to monitor dynamic offices. Detailed procedures are available in the technical documentation; see the **Resources** section for information.

Dynamic offices are available when you configure an integration between Vantage DX Analytics and the Microsoft Call Quality Dashboard (CQD). The Microsoft CQD is a tool that is available in the Teams Admin Center. It monitors all voice and video calls made in Teams and provides call quality metrics within 30 minutes of the end of a call. This example assumes that the integration is configured with default settings.

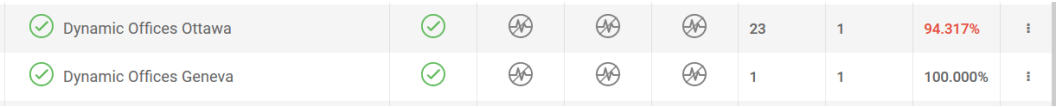
The first step is to create a business service for each office location:

Identify Call Quality Trends with Dynamic Offices



When you select the perspective for the health rollup, VDX Analytics reports the health status of the business service based on the objects in this perspective. The SLA data is also based on the health of the objects in this perspective. You have the option to select multiple perspectives for the health rollup. If you choose multiple perspectives for the health rollup, the overall health state is based on the worst-case of any of the selected perspectives, and the SLA calculations will also include data from those perspectives.

In this example, we have created two business services: one for dynamic offices in Ottawa and one for dynamic offices in Geneva, as shown in the following image:



The next step is to pin the dynamic office groups to the End-User perspective in each business service. VDX Analytics has powerful search capabilities that allow you to refine the type of data that you pin to the business service. For example, you can search for all dynamic offices at a specific location, or you can search based on the number of meeting participants at a specific location. By default, a dynamic office is created based on three or more devices, but depending on the size of your organization, you may want to create a business service that focuses on calls that involve a larger number of people. Below are examples of searches you can use to refine the type of data that you want to include:

To find all dynamic offices by a specified location:

- `source.Office365CQD.groupType:OfficeGroup AND source.Office365CQD.Name:Ottawa`
- `source.Office365CQD.groupType:OfficeGroup AND source.Office365CQD.Name:Geneva`

To find all dynamic offices that include a specified minimum number of devices:

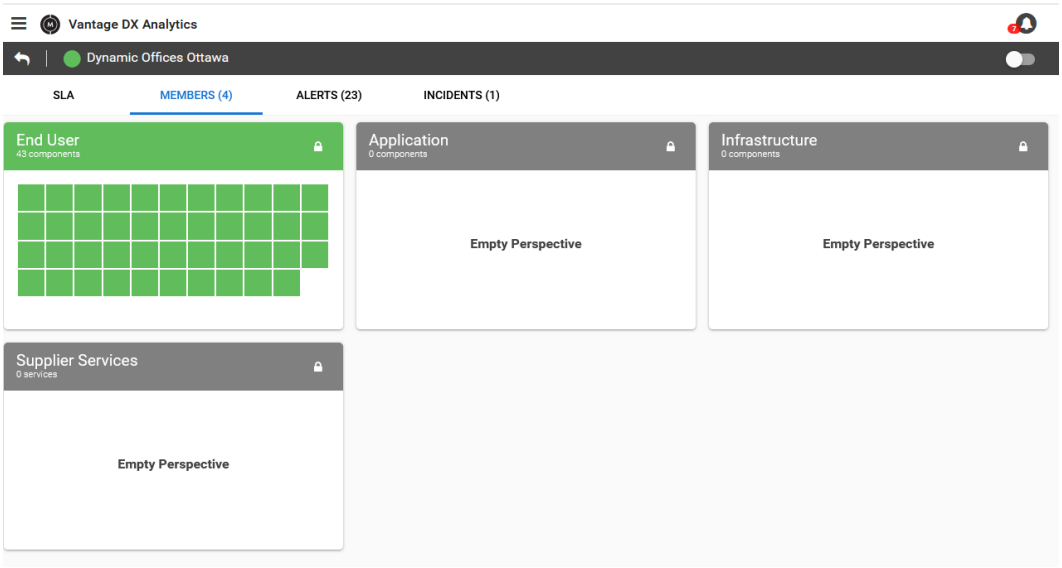
- `source.Office365CQD.groupType:OfficeGroup AND source.Office365CQD.NumberOfDevices:>=10`

To find dynamic offices with a minimum number of devices at a specific location:

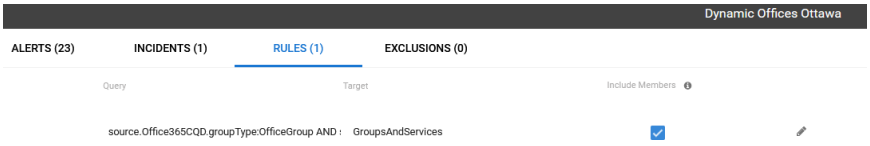
Identify Call Quality Trends with Dynamic Offices

- `source.Office365CQD.groupType:OfficeGroup AND source.Office365CQD.Name:Geneva AND source.Office365CQD.NumberOfDevices:>=10`

Enter the search string on the **Home** page and click the **Groups and Services** tab to view the search results. Select the dynamic office group and pin it to the business service. In the following image, the dynamic office group for Ottawa has been pinned to the End User perspective of the business service.

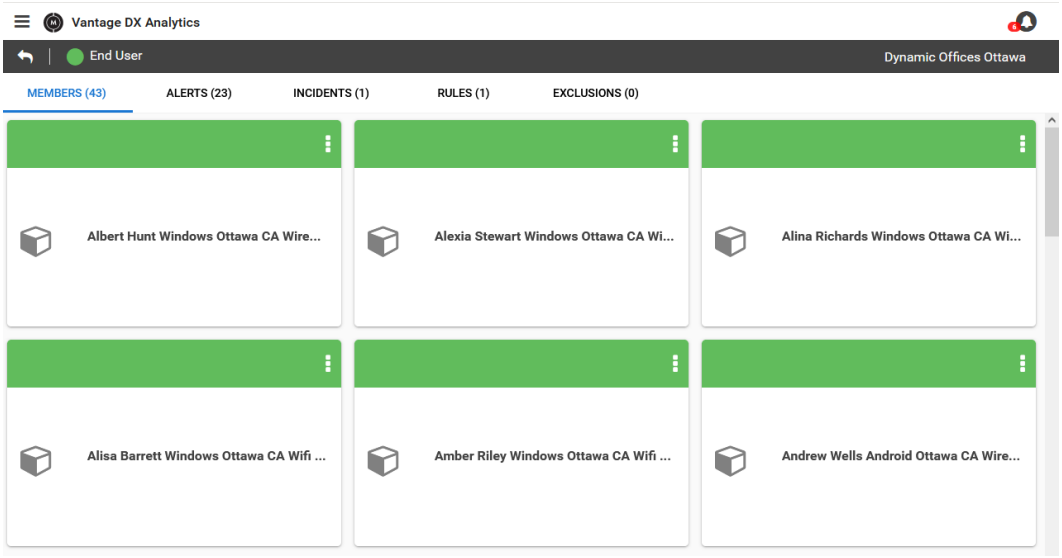


Open the End User perspective and click the **Rules** tab and select the **Include Members** option, as shown in the image below. When you select this option, VDX Analytics includes the members of the dynamic office group in the SLA data. In this case, the members of the dynamic office group are the devices and the users associated with them. It is helpful to include this information in the SLA data because it allows you to see which devices and users were impacted by critical call quality over the course of a month.



Now that the business service is set up, you can see the status of all users:

Identify Call Quality Trends with Dynamic Offices



You can open a user to view detailed properties. The following images show the properties that are available for each user:

PROPERTIES | EXPLORER | ALERTS (1) | INCIDENTS (1) | BOARDS (10) | SERVICES (3)

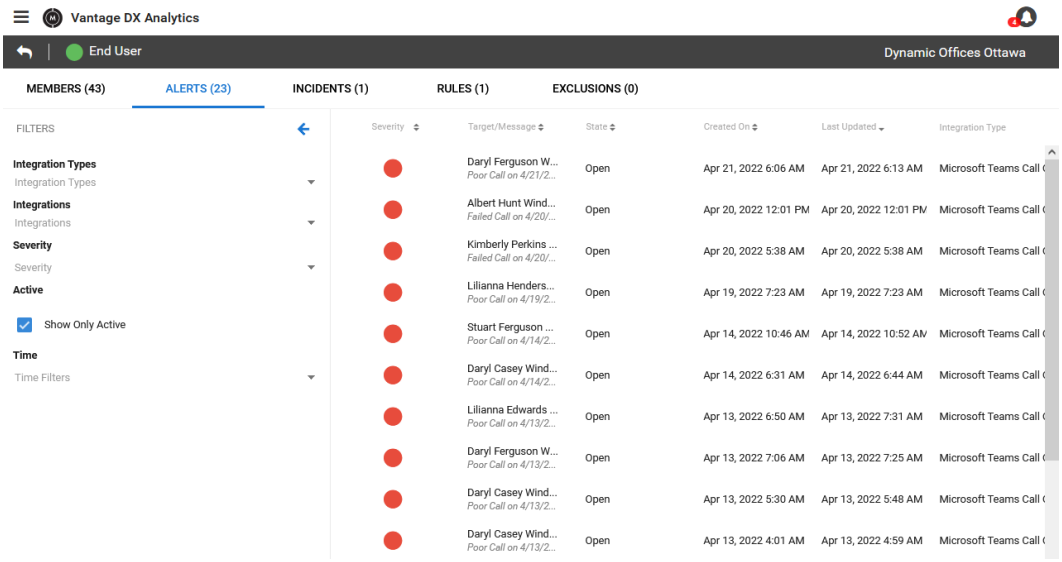
Raw Properties

Name	Albert Hunt Windows Ottawa CA Wired Bell Canada
Id	Albert.Hunt@martellotech.com-Windows-204-BellCanada-Ottawa-Canada
Client OS	Windows 10.0.19043.1586 Arch: x86
Client CP U	Intel(R) Core(TM) i7-8650U CPU @ 1.90GHz Number of Cores 4
User Agent	CallSignalingAgent (27/1.5.00.8070//;release_releases/CL2022.R09.2022.09.01.1;releases/CL2022.R09)
Email	Albert.Hunt@martellotech.com
User Display Name	Albert Hunt
Ip Address List	• 204.101.47.119
Connection Type	Wired
City	Ottawa
Country	Canada
IS P	Bell Canada
Time Zone	Eastern Standard Time
Audio Devices	• Conexant ISST Audio • Sennheiser SC260 Control
Audio Codecs	• SATIN
Video Devices	• HP Full-HD Camera
Video Codecs	• H264
PSTN Carriers	
Last Call Time	2022-04-20T16:03:29

Identify Call Quality Trends with Dynamic Offices

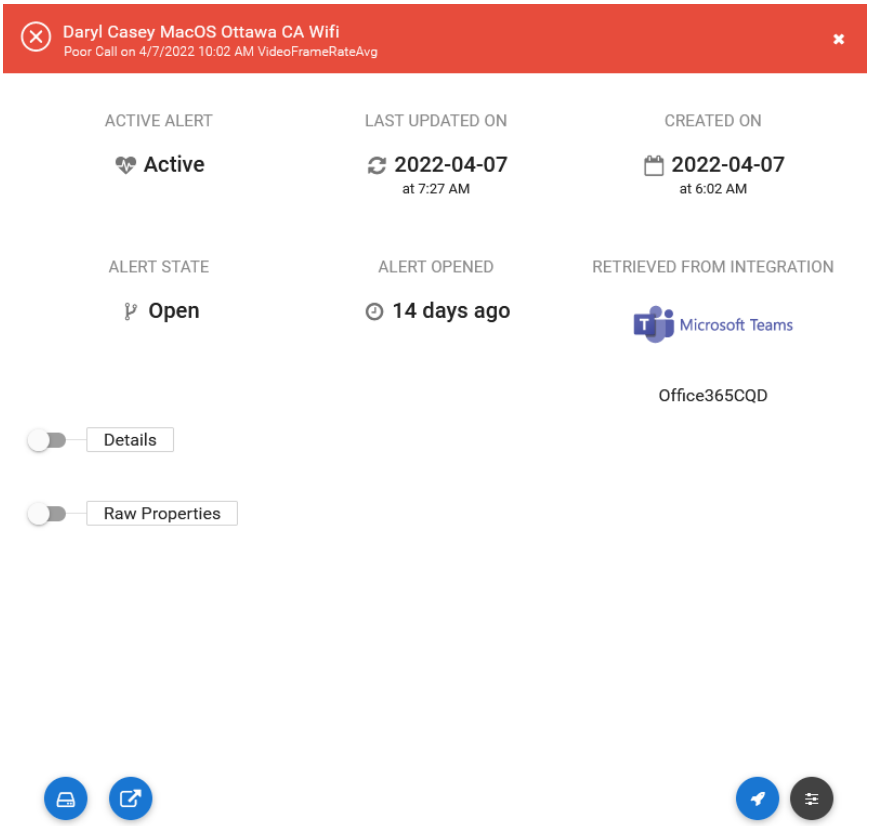
Active Use	• Call Date	20220420
	Number Of Calls	4
	Number Of Failed Calls	1
	• Call Date	20220330
	Number Of Calls	3
Number Of Calls	7	
Number OfP 2 P Calls	5	
Number Of Conference Calls	2	
Number Of Video Calls	6	
Number Of Cloud Calls	7	
Number OfUD P Calls	7	
Number Of Failed Cloud Calls	1	
Number Of FailedP 2 P Calls	1	
Number Of FailedUD P Calls	1	
Forward Jitter	2.14	
Forward RT T	60.14	
Forward Video Frame Rate	21.45	
Reverse Jitter	4.86	
Reverse RT T	60.57	
Reverse Video Frame Rate	23.84	
Call Times	• Start Time	2022-04-20T16:03:29
	End Time	2022-04-20T16:27:19

Click the **Alerts** tab to see any alerts related to the business service:

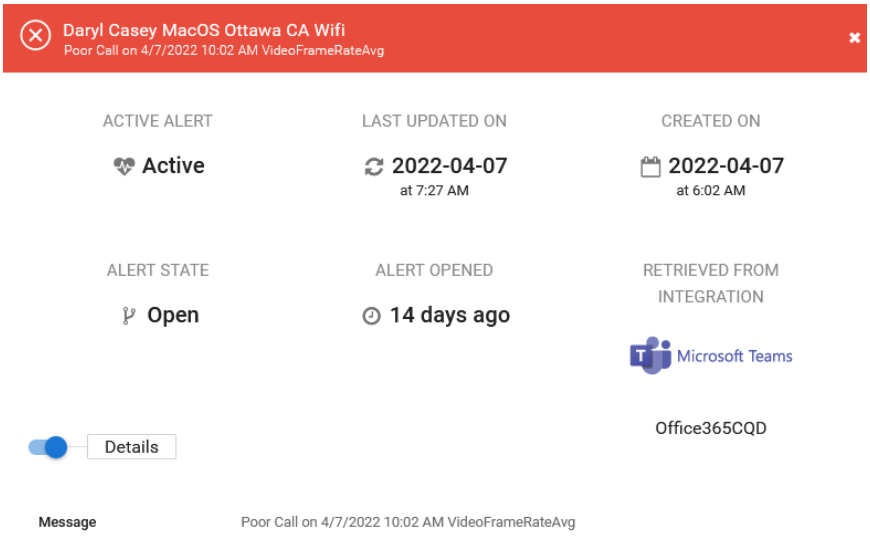


You can open the alert for an affected user:

Identify Call Quality Trends with Dynamic Offices



You can use the **Details** toggle to view a message that describes the reason for the health status:

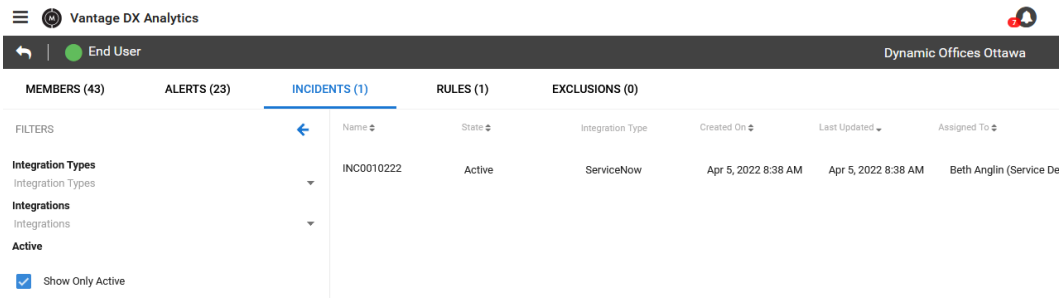


You can also use the **Raw Properties** toggle to display more properties of the alert:

Identify Call Quality Trends with Dynamic Offices

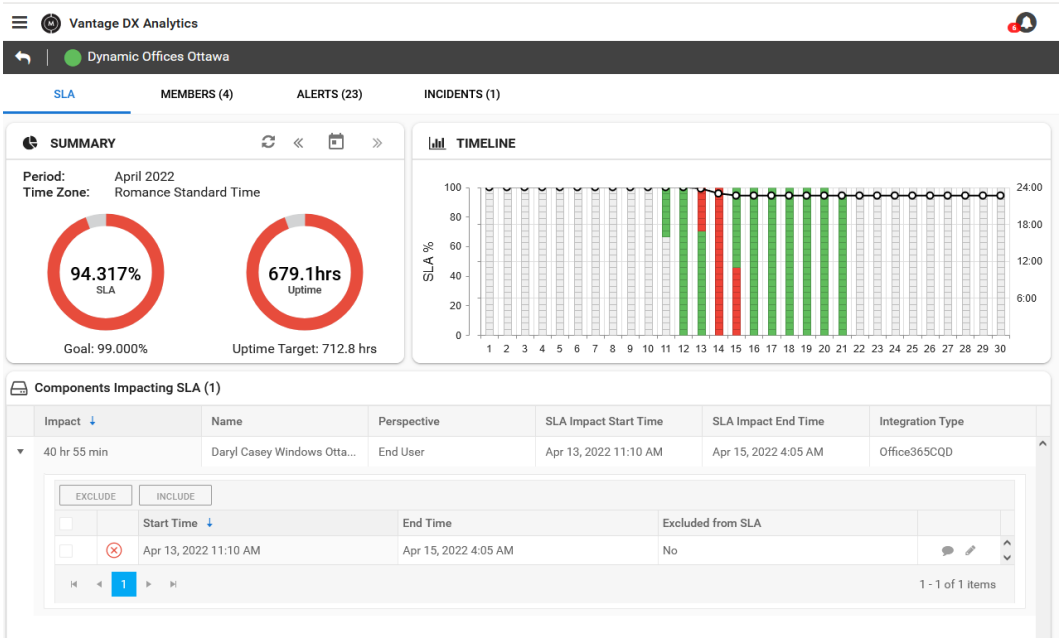
Poor Reason	VideoFrameRateAvg
Forward Jitter	2
Forward RT T	83
Forward Video Frame Rate	1.02
Reverse Jitter	3
Reverse RT T	31
Reverse Video Frame Rate	28.62
Reverse Video Local Frame Los	0.8
ForwardP 50 Latency	26
ReverseP 50 Latency	30
Call Setup Failure Reason	NotMediaFailure
Media Failure Type	NotMediaFailure
Poor Call Explanation	• Average frames per second received for a video stream, computed over the duration of the se
CQD Component Type	Call Alert

If you have integrated an ITSM system with VDX Analytics, you can click the **Incidents** tab to see incidents related to the business service:



You can use the SLA tab to view performance information. In the case of dynamic offices, SLA data does not report outages; instead, it helps you understand the voice quality that your users experience over time. The performance information reported on this tab shows the call quality that the dynamic offices experienced over the duration of the data collection window, which you specify in the integration settings. This information is helpful for identifying trends. For example, you can use the **Components Impacting SLA** section to identify users who were associated with meetings where the call quality was poor. If a specific user is consistently associated with poor quality calls, your IT department can focus troubleshooting efforts on the factors that are specific to that user, such as equipment or connection type.

Identify Call Quality Trends with Dynamic Offices



The SLA data is calculated based on Service Level Objectives (SLO) that you can configure. For the purposes of this example, we have used the default SLO settings, which sets a goal of 99% availability, calculated monthly, for 24 hours a day, 7 days a week.

Extend the capabilities

Dynamic offices provide valuable information with minimal configuration. If the dynamic offices indicate a trend, such as recurring problems at a particular business site, you have the option to extend the scope of your monitoring by installing the following Vantage DX components at the problem sites:

- A Vantage DX Diagnostics probe to perform network path monitoring.
- A Vantage DX Monitoring robot to perform proactive testing.

If you have additional monitoring tools that monitor your network switches and firewalls, you can integrate those tools with VDX Analytics to have a consolidated view of the data.

Network path monitoring

The Vantage DX Diagnostics probe tests the network paths between your physical office sites and the endpoints that you want to monitor. If the dynamic office data indicates recurring problems at a specific office location, you can install a probe at that location to test the path to the Microsoft Teams endpoint. After you have deployed the probe, Vantage DX Diagnostics provides a visual representation of the quality of the connection at each hop in a network path.

Identify Call Quality Trends with Dynamic Offices

Proactive testing

After you have used the real-user data and the network path data to identify and troubleshoot problems, you can use Vantage DX Monitoring robots to proactively monitor the network conditions that affect call quality.

Vantage DX Monitoring collects a range of metrics for the Teams workload, but the following metrics are key predictors of call quality:

- **Jitter**—The recommended average is < 30 ms during any 15-second interval.
- **Packet loss**—Microsoft recommends a packet loss rate of 1% during a 15-second interval. A packet loss rate between 3% and 7% causes a noticeable impact to call quality. A rate of more than 7% severely impacts the call quality.
- **Round Trip Latency**—The recommended target is < 100 ms.
- **Average bandwidth**—The recommended targets are:
  - Voice calls: > 100 KBPS
  - Video calls: > 300 KBPS
- **Packet reorder ratio**—The recommended target is < 0.05%.
- **Network MOS**—The recommended target is > 4.

Vantage DX Monitoring robots continually test these metrics from your business sites. When test results indicate that a performance threshold has been breached, the health status of the workload changes to either Warning or Critical, depending on the test. This continual monitoring means that you can be notified of performance degradation immediately, and address it before it impacts your end users. You can also use this information to proactively notify your users about known issues.

Additional monitoring tools

Vantage DX Analytics integrates with a wide range of monitoring tools, and consolidates all your data in one interface. For example, if you use other tools to monitor switches, routers, firewalls, or bandwidth availability, Vantage DX Analytics can retrieve data from those tools and you can add it the business service. This comprehensive view allows you to quickly understand how your own infrastructure is affecting Teams meetings and prioritize changes.

In addition, you can integrate your ITSM system with VDX Analytics to streamline the process of creating and resolving incidents.

For information about the integrations that Vantage DX Analytics supports, see the **Resources** section at the end of this guide.

Resources

For more information, see the following documents:

- For an overview of the Vantage DX solution and its capabilities, see the *Understanding Vantage DX* Application Note.

Identify Call Quality Trends with Dynamic Offices

- For information about how to configure business services, see the *Vantage DX Analytics User Guide*.
- For detailed information about using the Microsoft Teams Call Quality Dashboard with Vantage DX, see *Real User Monitoring with Vantage DX Analytics*.
- For information about the monitoring tools and ITSM systems that you can integrate, see the *Vantage DX Analytics Integration Guide*.
- See the following Application Notes for information and examples about key features in Vantage DX:
  - *Manage Complex Data in VDX Analytics*
  - *Monitor and Troubleshoot Teams Call Quality*
  - *Monitor Co-Authoring Platforms*
  - *Customize Monitored Sites in Vantage DX Monitoring*

All documentation is available on the Martello website at:

https://martellotech.com/documentation/vantage-dx/

About Martello Technologies

Martello Technologies Group Inc. (TSXV: MTLO) is a technology company that provides digital experience monitoring (DEM) solutions. The company develops products and solutions that provide monitoring and analytics on the performance of real-time applications on networks, while giving IT teams and service providers control and visibility of their entire IT infrastructure. Martello's products include unified communications performance analytics software and IT analytics software.

Martello Technologies Group is a public company headquartered in Ottawa, Canada with offices in Nice, Amsterdam, Paris, Dallas and New York. For more information, please contact us:

North America: +1-613-271-5989

Europe: +31-20-2170-790

Internet: www.martellotech.com

Email: info@martellotech.com

MARTELLO