

# Application Note

## Monitor a Hybrid Exchange Environment

### Overview

While many organizations are moving key business applications to the cloud, some organizations need to maintain a hybrid environment, with a mix of on-premises applications and cloud applications. One common scenario is to have Exchange servers installed on-premises and have other business applications, such as Microsoft 365 applications, deployed in the cloud.

Deploying Exchange servers on-premises requires a high level of support from your IT team. With on-premises servers, the IT team needs to apply updates and ensure the databases continue to function, maintain the hardware and security certificates, and manage capacity limits. To have a complete understanding of this complex environment, you need to be able to access data from your monitoring tools quickly and easily.

This application note describes how you can use the modules in the Vantage DX solution to gain an end-to-end view of your environment.

- Vantage DX Monitoring provides data about the performance of Microsoft applications and resources, as well as network conditions that impact the performance of those applications and resources.
- Vantage DX Diagnostics tests the network path between your business site and the Microsoft Outlook web service. It measures round-trip time (RTT), jitter, or packet loss for each hop in the path, and identifies the segments of the network where errors occur.
- VDX Analytics displays data from Vantage DX Monitoring and Vantage DX Diagnostics. It also integrates with a wide range of monitoring tools, and consolidates all your data in one interface. In addition, you can integrate your ITSM system with VDX Analytics to streamline the process of creating and resolving incidents.

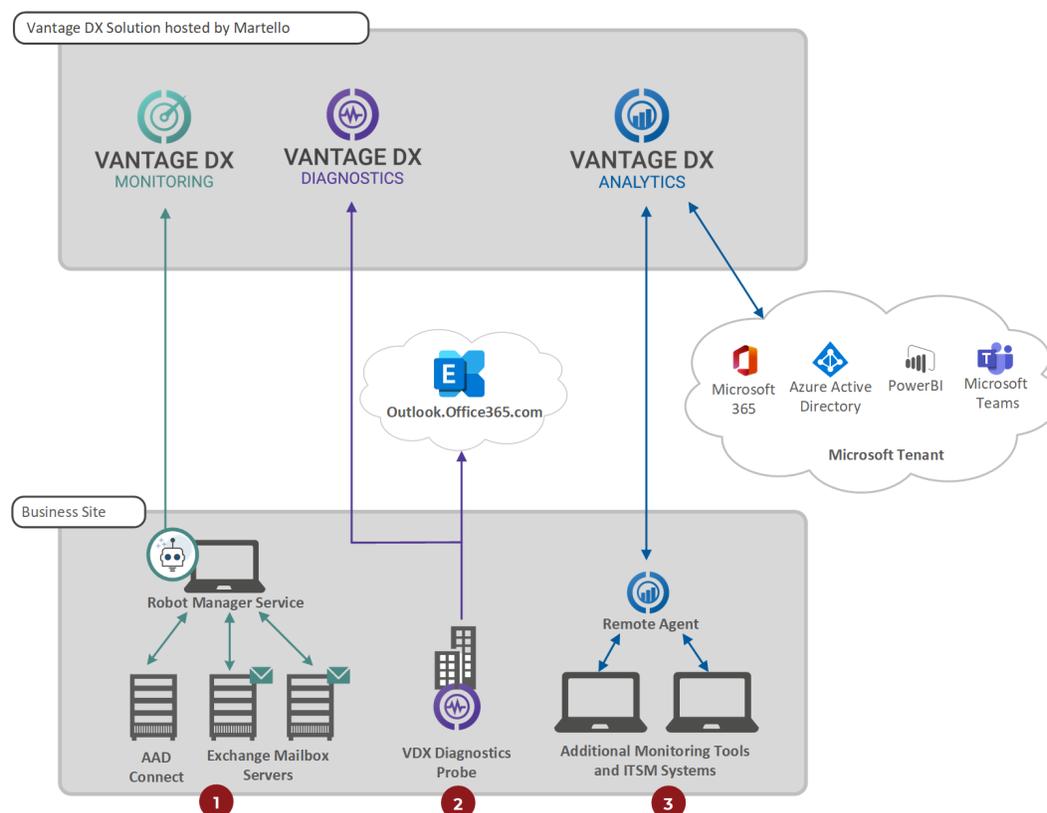
Together, these modules provide a consolidated view that allows you to quickly understand the health of your network and the conditions that your end users are experiencing, and to troubleshoot potential problems proactively.

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 the Solution

The following diagram provides an overview of how the Vantage DX modules work together to monitor your hybrid Exchange environment.

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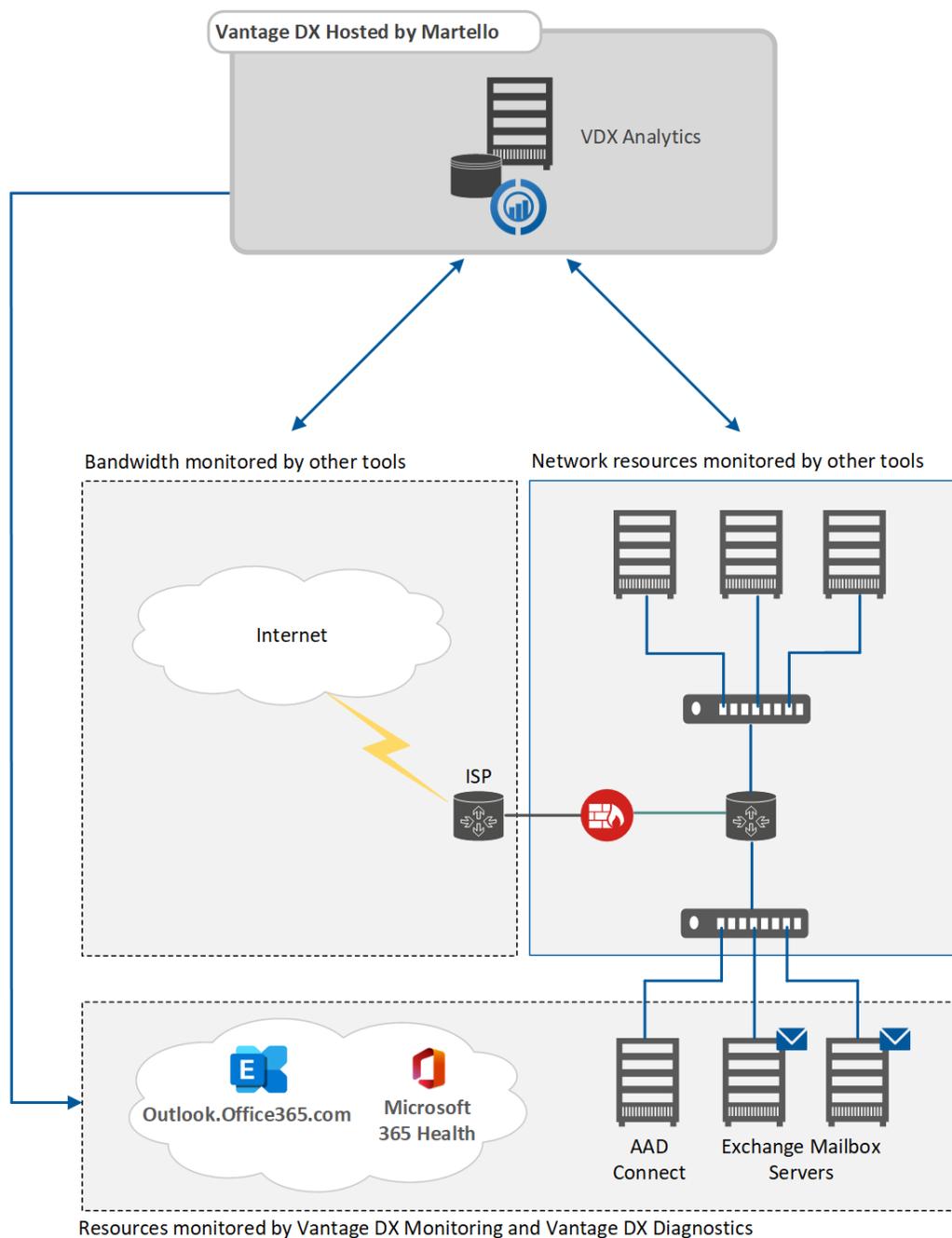
**1.** Robots installed at your business site perform synthetic transactions, which are tests that simulate the activities that your users typically do. The robots also test network conditions. Because the tests are performed at the sites where your users are located, you have insight into the user experience at each site. Vantage DX Monitoring calculates the health status of each workload based on test results. This health status information is available in VDX Analytics, but if you wish, you can also view the data in the Vantage DX Monitoring interface.

**2.** A Vantage DX Diagnostics probe tests the network path between your business site and the Exchange web service. The health of the network path is reported in VDX Analytics, and you can view a visualization of the path—as well as information about each segment of the path—in the Vantage DX Diagnostics interface.

**3.** VDX Analytics integrates with your tenant and provides health status information about Microsoft services. In this example, VDX Analytics retrieves the health status of the Exchange Online service. If you use additional monitoring tools to understand events that are happening in the infrastructure of your network—tools such as PRTG, SCOM, vCenter, SolarWinds, or Cisco Prime—you can use VDX Analytics to consolidate all of your monitoring data in one place.

The following diagram provides an example of how you can use VDX Analytics to obtain an end-to-end view of your network and resources.

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For example, if monitoring data from Vantage DX Monitoring indicates that your end users are experiencing a problem, the problem may be caused by a network switch or router, or it may be caused by an issue with the machine that hosts the VM or server where your Exchange Mailbox is installed. The issue could also be caused by bandwidth consumption.

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If your organization is using one tool to monitor bandwidth, and others to monitor switches, routers, or VMs, you can visualize the data from all of these tools in VDX Analytics. The ability to see and compare data from multiple monitoring tools helps you troubleshoot issues quickly. For a complete list of the integrations that VDX Analytics supports, see the *VDX Analytics Integrations Guide*. A link is provided in the **Resources** section at the end of this document.

## Key Resources to Monitor

### Monitor Workloads with Vantage DX Monitoring

While Vantage DX Monitoring can monitor many different workloads, this application note will focus on a few selected workloads that are particularly important in a hybrid environment:

- Exchange Mailbox Server
- Exchange Edge Server
- Exchange Database Availability Group (DAG)
- Azure AD (AAD) Connect
- Active Directory Federation Services (ADFS)
- Hybrid Mail Routing
- If your environment includes users with Exchange Online accounts as well as users with on-premises mailboxes, you can also monitor the Exchange Online and Exchange Online Network workloads.

#### Exchange Mailbox Server

For on-premises Exchange Mailbox servers, the robots perform tests that simulate the activities of your end users. Vantage DX Monitoring also tests the connectivity between the Exchange server and Outlook, checks the status of Windows services, and checks the status of queues. While Vantage DX Monitoring collects many metrics, some key ones are:

- **Mailbox database status**—Health status information about mailbox database copies.
- **Copy queue length**—The copy queue length indicates the number of logs waiting to be copied.
- **Replay queue length**—The number of log files waiting to be replayed into the copy of the database.
- **RPC user count**—The number of users connected to an Exchange server.

#### Exchange Edge Server

The Exchange Edge Server is mainly responsible for sending and receiving external email. Vantage DX Monitoring monitors the status of queues and server resources. While Vantage DX Monitoring collects many metrics, some key ones are:

- **Submission queue**—The submission queue indicates the number of messages that are either waiting to be processed, or are actively being processed.

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- **Unreachable queue**—The unreachable queue indicates the number of messages that cannot be routed to their destinations.
- **Poison queue**—The poison queue indicates the number of messages that are isolated in the poison queue. The poison queue isolates messages that contain errors and are determined to be harmful to Exchange after a server or service failure.
- **Server performance**—The server performance metrics show you Exchange Edge servers that have low disk space, as well as CPU usage and RAM usage statistics.

Vantage DX Monitoring is also able to monitor the health of the Exchange Edge Server, the availability of the Exchange services and protocol, and its connectivity to the Exchange Online environment.

### Exchange DAG

In Exchange, the mailbox databases are duplicated through the DAG. Vantage DX Monitoring robots perform replication health checks for the databases.

### ADFS and AAD Connect

Vantage DX Monitoring checks hybrid identities that are key in Microsoft 365 monitoring. Issues with Azure AD Connect or Active Directory Federation Services (ADFS) can significantly impact the end-user experience.

For Azure AD Connect, Vantage DX Monitoring continuously checks the synchronization of the identities to make sure your users can authenticate successfully. When synchronization is working correctly, your users can log into your on-premises Exchange server and into Microsoft 365 using the same credentials.

If you use ADFS, Vantage DX Monitoring robots measure the amount of time that it takes a user to authenticate against the ADFS. The robots perform real token exchange in order to make sure the entire process is healthy. The robots also verify the expiration date of the token-signing certificate and check for certificate-related errors.

### Mail Routing Hybrid

Vantage DX Monitoring robots test the routing time of an email by connecting to a user's mailbox to send an email, and then connecting to the recipient's mailbox to check the receipt of the email. The recipient sends an auto response. When the response is received, the mail flow is successful and the robots delete the test messages. The email can be sent by either EWS or SMTP.

### Exchange Online and Exchange Online Network

For Exchange Online deployments, Vantage DX Monitoring robots perform the same actions that your users typically do, such as creating messages, tasks, and meetings, and uploading and downloading attachments. Vantage DX Monitoring measures the time that it takes to complete these tasks, and provides performance metrics. Although Vantage DX Monitoring collects many metrics, a key indicator for Exchange Online is the AutoDiscover Execution Time. This metric reflects the amount of time it takes to find the Exchange Web Service

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endpoint URL. If auto-discover takes a long time, initial connections to Exchange user mailboxes are also impacted.

When you use Vantage DX Monitoring to monitor the Exchange Online Network workload, it provides network performance information, such as TCP ping times, DNS resolution time, and the percentage of packet loss.

### Monitor Service Health in Vantage DX Analytics

When you configure an integration between Vantage DX Analytics and Microsoft 365, Vantage DX Analytics retrieves health information for the Microsoft 365 services that are configured for your tenant. For hybrid Exchange environments, you can use this integration to monitor the status of the Exchange Online service.

### Monitor the Network Path to Outlook

You can install Vantage DX Diagnostics probes at your business sites and configure them to monitor the paths between those sites and Outlook.Office365.com.

## Example

The following example provides a high-level overview of how to build a business service in VDX Analytics that monitors the health and availability of your hybrid Exchange deployment. Links to the technical manuals that contain detailed instructions are provided in the **Resources** section at the end of this document.

Business services provide a way of mapping the devices and applications that work together to meet specific business needs. When you map devices and applications to a business service, you can monitor your organization's IT resources in the context of the business workflow where those resources are used.

Begin by creating a business service in VDX Analytics and selecting one or more perspectives for the health roll-up.

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Create A Business Service
✕

Business Services allow you to categorize components to make it easier to visualize and locate issues in your network.
ℹ

**Choose a name for your service\***

Name

---

**Add a description to your service**

Description

---

**Choose a service health rollup**

End User
  Application
  Infrastructure

CREATE

When you select a perspective, VDX Analytics bases the overall health status of the service on that perspective. VDX Analytics also bases SLA calculations on the perspective that you select. In this example, we recommend that you select the end-user perspective because the goal is to monitor the availability of your email service to your end users. VDX Analytics will report the health status of your email service based on your end-user perspective, and your SLA data will show the percentage of time that the email service was available to your end users.

After you create the business service, search for the components of your Exchange service and pin them to the appropriate perspective, as shown in the following examples.

## End User

In the End User perspective, pin the Vantage DX Monitoring robots that are monitoring Exchange workloads at each of your business sites.

1. To find all robots that are monitoring Exchange workloads, enter the following search string on the **Home** page and then press **Enter**:  
`source.Gizmo.appAlias:Exchange`
2. Click the **Components** tab to view all the search results:

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The screenshot shows the Vantage DX Analytics interface. The top navigation bar includes a menu icon, the title 'Vantage DX Analytics', and a user profile icon. Below the navigation bar, the breadcrumb 'source.Gizmo.appAlias:Exchange' is visible, along with 'SAVE' and 'LOAD' buttons. The main content area features a tabbed interface with 'COMPUTERS (0)', 'ALERTS (0)', 'INCIDENTS (0)', 'GROUPS & SERVICES (0)', and 'COMPONENTS (32)'. The 'COMPONENTS' tab is active, displaying a table with columns for 'State', 'Name', 'Type', and 'Integration Type'. The table lists 11 components, each with a colored state indicator (red, yellow, or green) and an integration type of 'Vantage DX Monitoring'.

State	Name	Type	Integration Type
●	Ottawa VIP (FR): Exchange DAG	Object	Vantage DX Monitoring
●	Azure: Exchange Online - Copy	Object	Vantage DX Monitoring
●	Bangalore (BW-FR) : Exchange Online	Object	Vantage DX Monitoring
●	Singapore (L-FR): Exchange Online	Object	Vantage DX Monitoring
●	Ottawa VIP (FR): Exchange Online	Object	Vantage DX Monitoring
●	Paris (PL-FR): Exchange Online	Object	Vantage DX Monitoring
●	Singapore (L-FR): Exchange MAPI	Object	Vantage DX Monitoring
●	Bangalore (BW-FR) : Exchange MAPI	Object	Vantage DX Monitoring
●	Sydney (DNS-FR): Exchange Online	Object	Vantage DX Monitoring
●	Singapore (L-FR): Exchange Free/Busy	Object	Vantage DX Monitoring
●	Paris (PL-FR): Exchange MAPI	Object	Vantage DX Monitoring

3. Select the robots that are monitoring Exchange workloads at the business sites you want to monitor. You can use the **Shift** key to select multiple robots.

4. Click the **Action** button and click **Pin to Service**.

The following image shows that robots deployed at the Paris site are monitoring several workloads related to Exchange:

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The screenshot shows the Vantage DX Analytics interface for an 'End User' in the 'Exchange hybrid EMEA' environment. The top navigation bar includes a menu icon, the user profile 'Vantage DX Analytics', and a notification bell. Below the navigation bar, the user is identified as 'End User' and the environment as 'Exchange hybrid EMEA'. The main content area is divided into five tabs: MEMBERS (5), ALERTS (0), INCIDENTS (16), RULES (0), and EXCLUSIONS (0). The MEMBERS tab is active, displaying five application cards, each with a green header and a cube icon. The cards are: Paris (PL): Exchange MAPI, Paris (PL): SMTP Gateway Con..., Paris (PL-FR): Exchange Free/..., Paris (PL-FR): Exchange Online, and Paris (PL-FR): Hybrid Mail Rou...

## Application

In this example, the following items are pinned to the Application perspective:

- Exchange Online service health, which is being monitored through the Microsoft 365 integration.
- The SMTP service that is monitored by Nagios.

The screenshot shows the Vantage DX Analytics interface for an 'Application' in the 'Exchange hybrid EMEA' environment. The top navigation bar includes a menu icon, the user profile 'Vantage DX Analytics', and a notification bell. Below the navigation bar, the user is identified as 'Application' and the environment as 'Exchange hybrid EMEA'. The main content area is divided into five tabs: MEMBERS (2), ALERTS (1), INCIDENTS (6), RULES (0), and EXCLUSIONS (0). The MEMBERS tab is active, displaying two application cards. The first card has an orange header and a gear icon, labeled 'Exchange Online'. The second card has a green header and a cube icon, labeled 'SMTP 10.20.34.154\SMTP'.

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1. To find the Exchange Online services, enter the following search string on the **Home** page and then press **Enter**:  
`source.Office365.Id:Exchange`
2. Click the **Components** tab and select the service; pin it to the business service.
3. To find the SMTP service that is monitored by Nagios, enter the following search string on the **Home** page and then press **Enter**:  
`source.nagios.display_name:SMTP`
4. Click the **Components** tab and select the service; pin it to the business service.

When you view objects in Vantage DX Analytics, you can open them to see detailed information, and you can also navigate directly to the source system from the object. The image below shows an example of the SMTP service that is monitored by Nagios and displayed as an object in Vantage DX Analytics:

The screenshot displays the Vantage DX Analytics interface for the 'SMTP - Object'. The interface includes a navigation bar with tabs for PROPERTIES, EXPLORER, ALERTS (0), INCIDENTS (0), BOARDS (0), and SERVICES (1). The main content area shows several key metrics:

- OPEN INCIDENTS:** 0, with an MTTR of 0h.
- UPTIME LAST 7 DAYS:** 100.00%, with a note 'Last Week 100.00%'.
- COMPONENT TYPE:** Object.
- OPEN ALERTS:** 0, with an MTTR of 0h.
- LAST STATE CHANGED:** a day ago.
- RETRIEVED FROM INTEGRATION:** Nagios, Nagios Ottawa.

Below these metrics is a section titled 'Raw Properties' with the following data:

Host Name	10.20.34.154
Display Name	SMTP
Check Command	check_xi_service_smtp
Initial State	0
Check Interval	5
Retry Interval	1
Max Attempts	5
Parallelize	true

## Infrastructure

Use this perspective for any network resources that are part of your on-premises Exchange environment. For example, if your Exchange mailbox servers are installed on a VM that is monitored by vCenter, pin that VM here. You could also pin routers or switches that are monitored by tools such as Cisco Prime, SolarWinds, or PRTG. If you use Zabbix to monitor your bandwidth usage, you could pin that to the infrastructure perspective as well.

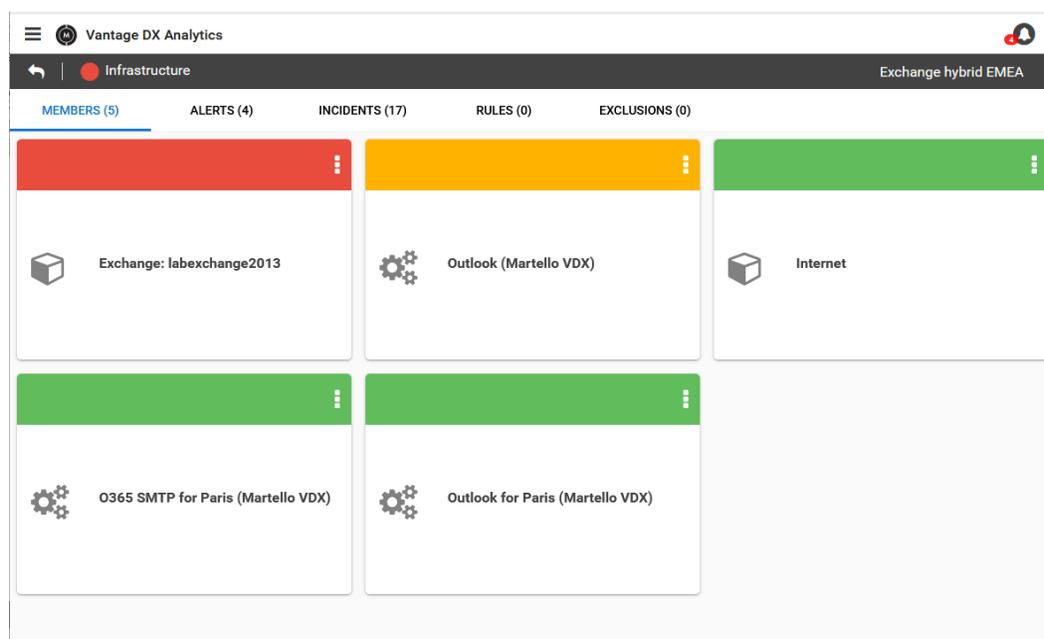
In this example, the following items are pinned to the Infrastructure perspective:

- Vantage DX Diagnostics probes that are monitoring the paths between your business sites and Outlook.Office365.com

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- PRTG sensors that are monitoring the SSL certificate of the on-premises Exchange server.
1. To find the Vantage DX Diagnostics probes, navigate to the **Home** page and use the **Integrations** filter to display objects from Vantage DX Diagnostics.
  2. Select the probes that are monitoring the path to Outlook.Office365.com from each of your business sites.
  3. To find the PRTG sensor, enter the following search string on the **Home** page and then press **Enter**:  
`source.prtg.Host:*.savision.int`  
 This search uses an asterisk (\*) as a wildcard to find all servers in a specified domain.
  4. Click the **Components** tab and select the relevant server, then pin it to the business service.

In this example, Vantage DX Analytics has retrieved a critical status from PRTG, related to the Exchange server named "labexchange2013." It has also retrieved a warning status from Vantage DX Diagnostics, related to the network path to the Outlook service:



The following image shows how you can open the Exchange server object retrieved from PRTG to view the properties of the object. You can use the tabs to view the Properties of the monitored item, as well as the Alerts and Incidents related to it.

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Vantage DX Analytics

Exchange: labexchange2013 - Object

PROPERTIES | EXPLORER | ALERTS (1) | INCIDENTS (11) | BOARDS (0) | SERVICES (2)

OPEN INCIDENTS: 11 (MTRR 0h)

UPTIME LAST 7 DAYS: 0.00%

COMPONENT TYPE: Object

OPEN ALERTS: 1 (MTRR 0h)

LAST STATE CHANGED: 16 minutes ago

RETRIEVED FROM INTEGRATION: PRTG NETWORK MONITOR (PRTG Ottawa)

Raw Properties

Host	labexchange2013.savisionlab.savision.int
Group	Network Infrastructure
Nr Of Ack Down Sensors	1
Nr Of Paused Sensors	5
Id	2034
Parent Id	53
Probe	Local Probe
Type	Device
Active	true
Status	8

The information on the Alerts tab indicates that there is a problem with the SSL certificate sensor:

Vantage DX Analytics

Exchange: labexchange2013 - Object

PROPERTIES | EXPLORER | ALERTS (1) | INCIDENTS (11) | BOARDS (0) | SERVICES (2)

Severity	Target/Message	State	Created On	Last Updated	Integration Type
●	Exchange: labexchange2013 Alarm for sensor SSL Certificate...	Acknowledged	Mar 10, 2022 2:33 PM	Mar 10, 2022 2:33 PM	PRTG Network Monitor

You can click the Incidents tab to view incidents related to the Alert. In this example, the incidents are created in ServiceNow, which is integrated with Vantage DX Analytics:

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**Vantage DX Analytics**  
Exchange: labexchange2013 - Object

PROPERTIES | EXPLORER | ALERTS (1) | **INCIDENTS (11)** | BOARDS (0) | SERVICES (2)

Name	State	Integration Type	Created On	Last Updated	Assigned To
INC0010218	New	ServiceNow	Mar 18, 2022 6:40 PM	Mar 28, 2022 10:41 A	
INC0010212	New	ServiceNow	Mar 17, 2022 3:55 AM	Mar 17, 2022 9:02 AM	
INC0010210	New	ServiceNow	Mar 14, 2022 8:33 PM	Mar 17, 2022 3:42 AM	
INC0010200	New	ServiceNow	Feb 24, 2022 1:47 PM	Mar 8, 2022 6:18 PM	
INC0010196	New	ServiceNow	Feb 15, 2022 4:55 AM	Feb 23, 2022 4:02 PM	
INC0010191	New	ServiceNow	Dec 20, 2021 12:35 PM	Dec 23, 2021 3:06 PM	
INC0010179	New	ServiceNow	Dec 6, 2021 5:59 AM	Dec 13, 2021 5:30 PM	

Vantage DX Analytics has also retrieved a warning status from Vantage DX Diagnostics, indicating an issue with the network path to the Outlook service:

**Vantage DX Analytics**  
Outlook (Martello VDX) - Service

PROPERTIES | MEMBERS (13) | EXPLORER | ALERTS (3) | **INCIDENTS (6)** | BOARDS (0) | SERVICES (2)

OPEN INCIDENTS

**6**

MTTR 0h

UPTIME LAST 7 DAYS

**99.62%**

Last Week 99.62%

COMPONENT TYPE

Service

OPEN ALERTS

**3**

MTTR 1h

LAST STATE CHANGED

**15 hours ago**

RETRIEVED FROM INTEGRATION

**VANTAGE DX DIAGNOSTICS**

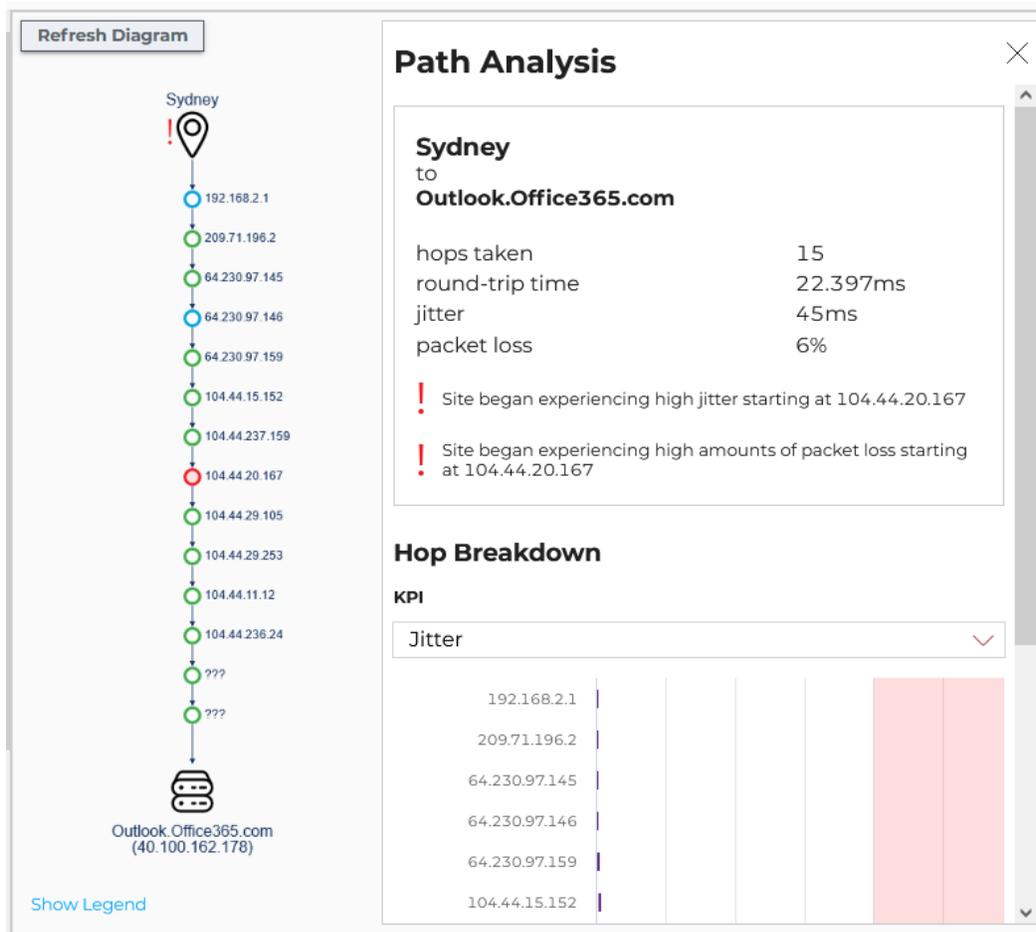
Vantage DX Diagnostics

### Raw Properties

Service	081840ab-cf99-4515-93a1-1ed94c8f7387	
Type	GenericTestEndpointServiceInstance	
Components	Type	GenericTestEndpoint
	Probe	18c485a8-8d63-4287-88f5-465f5c5f0913
	Node Type	Site Service Monitor
	Guid	57afa47a-d6aa-4097-b3f1-ab94ba55da8f
	Type	GenericTestEndpoint
	Probe	7aae7590-3f24-4bcd-8a57-8a34d65f5bed
	Node Type	Site Service Monitor

You can navigate to Vantage DX Diagnostics to view more detailed information if you wish:

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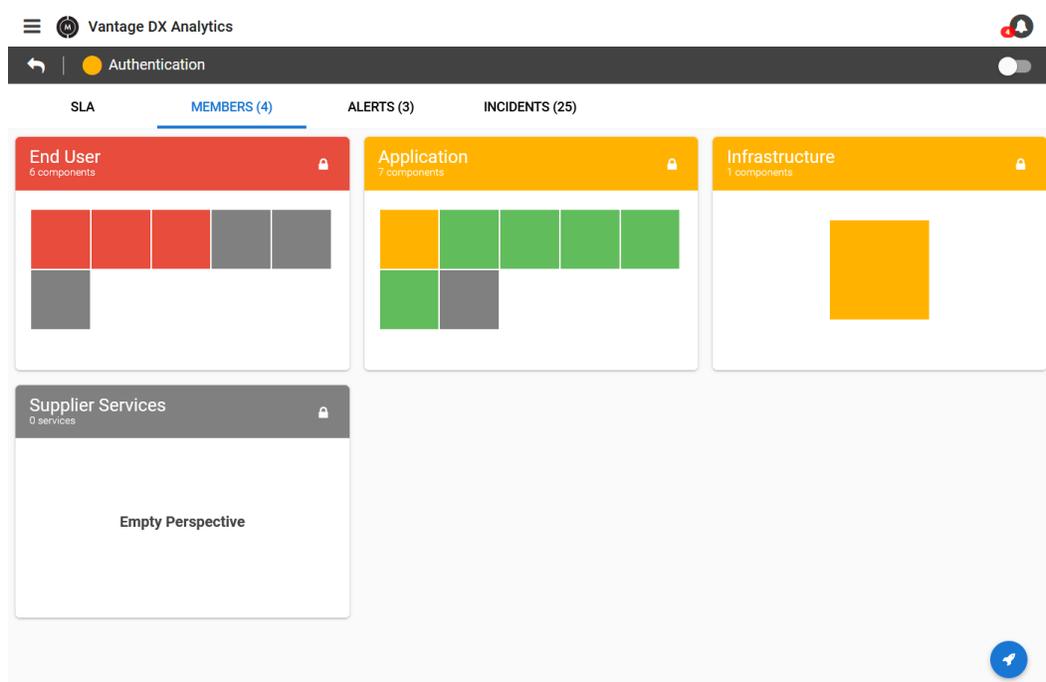
## Supplier Services

In the supplier services perspective, you can add other business services that support the Exchange service, such as DNS or any other services that affect your ability to route mail. The supplier services perspective is helpful because it allows you to model dependencies in your IT environment. For the purposes of this example, we will assume that there is an existing a business service that monitors authentication resources, which we will add as a supplier service.

The business service called Authentication, shown in the image below, monitors the health state of resources such as:

- ADFS, which is tested by Vantage DX Monitoring robots
- DNS/DHCP sensors, which are monitored by PRTG
- Identity Services, which are monitored through an integration with Microsoft 365

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1. To add a supplier service, open the business service that you want to add.
2. Click the **Action** button and click **Pin to Service**.

## SLO and SLA

After you create the Hybrid Exchange business service, you can set service level objectives (SLO) and then use the SLA tab in VDX Analytics to monitor the availability of the service.

For more information about the SLA management features in VDX Analytics, see the **Resources** section at the end of this document.

## Resources

For an overview of Vantage DX and its capabilities, see *Understanding Vantage DX*.

For information about configuring workloads in Vantage DX Monitoring, see the *Vantage DX Monitoring User Guide*.

For a full list of supported integrations, see the *Vantage DX Analytics Integration Guide*.

The following Application Notes provide information and examples about key features in VDX Analytics:

- *Monitor and Troubleshoot Teams Call Quality*
- *Monitor Co-Authoring Platforms*
- *Manage Complex Data in Vantage DX Analytics*
- *Business Services and SLA Performance Data in Vantage DX Analytics*

## Monitor a Hybrid Exchange Environment

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.

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