VMware Edge Intelligence

Introduction

VMware Edge Intelligence™ is a vendor-agnostic artificial intelligence for IT operations (AIOps) solution focused on the enterprise edge that ensures end user and internet of things (IoT) client performance, security, and self-healing through wireless and wired LAN, SD-WAN and secure access service edge (SASE).

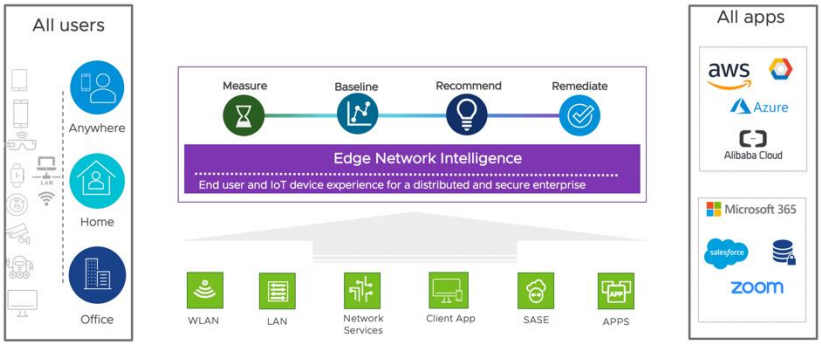

Figure 1: VMware Edge Intelligence overview

The solution employs machine learning (ML) algorithms and modern big data analytics to process high volumes of data from a wide range of network, device and application sources. In doing so, VMware Edge Intelligence auto-discovers end user and IoT devices, automatically establishes baselines, understands every single client interaction and monitors for deviations to provide actionable insights that operations teams can proactively remediate.

Benefits

Rich client experience

Manage a distributed and secure enterprise deployment with a client experience that eliminates IT visits. Get deep visibility into client's wireless or wired state and proactively manage end user and IoT device issues across the entire network stack.

Self-healing

Employ fault detection, isolation and remediation using ML algorithms to tackle application problems caused by wireless and wired LAN, WAN, network services, security services and application. Remediate faults isolated with each

application performance measured at vantage points between distributed workforce and distributed cloud applications. Provide global self-healing with assisted remediation by communicating policy changes to the VMware Edge Cloud Orchestrator™, to assure performance for private cloud business applications.

Application assurance

Assure performance of thousands of applications with objective actionable data isolating faults. Identify the worst-performing clients, the number of clients affected and detect systemic issues, such as the number of sites impacted.

Operational simplicity

Remove the time spent in root cause analysis and focus on proactive remediation. Address exponential growth in end-user and IoT devices with auto-discovery, baselining, monitoring and self-healing. Assure IoT device operations by monitoring critical devices for performance and behavior deviation.

Rich API support

Utilize API for seamless integration with enterprise tools and workflows, increasing agility for IT Ops and helping drive enterprise automation.

VMware Edge Intelligence Components

VMware Edge Intelligence has three components:

Cloud Analytics Engine/Private Cloud Appliance

This component can be hosted in the cloud and is referenced here as Cloud Analytics Engine or deployed on-premises as Private Cloud Appliance. It runs machine learning algorithms to perform auto-discovery, automatically establishing a baseline, monitoring for deviations, and analyzing historical trends with the output shared through the UI or integration through the platform API. Historical trends and baseline data from aggregated analysis is held for two years.

Crawler/Analytics Edge

This component collects data from different sources and is deployed on-premises in the branch, campus, or data center. When VMware Edge Intelligence is deployed with VMware SD-WAN™, the collection is done inline by the VMware SD-WAN Edge and is referenced here as Analytics Edge function. When VMware Edge Intelligence is deployed in a standalone mode, the component doing the collection is called the Crawler. The Crawler or the Analytics Edge function within VMware SD-WAN Edge performs deep packet inspection on all traffic, network application identification, and correlation of traffic with user information. This information is analyzed and correlated locally. Only metadata trends and analytics are sent to the Cloud Analytics Engine for use by all levels of IT staff, from the help desk to the CIO. No packet data is stored by the Crawler or the Analytics Edge function within the VMware SD-WAN Edge.

Client App

The VMware Edge Intelligence Client App is designed as a self-help tool for end-users to determine what's causing application slowdown issues, and as a remote diagnostic tool for enterprise administrators to baseline and diagnose remote issues. The Client App is an optional component of VMware Edge Intelligence that can be installed in end-user devices. The app has a simple user interface to determine if a remote users' problem in accessing applications is due to local Wi-Fi, broadband service, VPN connectivity or the application provider. The app performs a series of low-impact tests and reports results to the user. Additional tests can be configured in VMware Edge Intelligence, including tests for VPN-reachable sites.

Cloud Analytics Engine/Private Cloud Appliance deployment options

The Cloud Analytics Engine is hosted in the cloud by VMware, taking away the responsibility of managing the lifecycle for this component of the solution. The Cloud Analytics Engine can also be deployed on-premises as Private Cloud Appliance. VMware provides the software for on-premises deployment and customers can deploy it on the hardware specified in this data sheet. Both deployment options have feature parity except that the on-premises version can be deployed as a single tenant only.

Crawler/Analytics Edge deployment options

The functionality delivered by the Crawler is being integrated into all models of VMware SD-WAN Edge devices. Two options are available for data collection:

- Legacy approach with Crawler for standalone deployment
- Crawler functionality integrated into the VMware SD-WAN Edge when deployed with VMware SD-WAN (Analytics Edge).

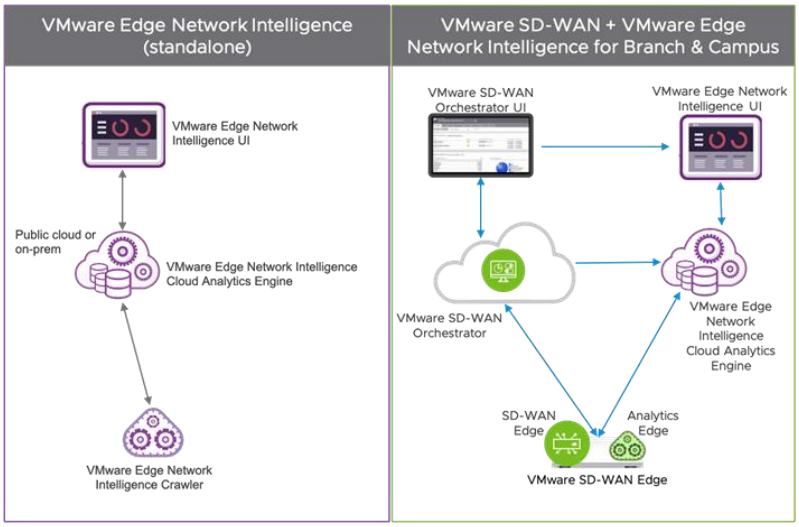

Figure 2: VMware Edge Intelligence Crawler/Analytics Edge deployment options

Data sources

VMware Edge Intelligence collects data from a variety of sources. They include:

- Network packet information from switch port organizer (SPAN), Dynamic Host Configuration Protocol (DHCP), domain name system (DNS) and Remote Authentication Dial-In User Service (RADIUS)
- Wi-Fi and wired access network metrics
- Client app installed on end user devices
- Unified communication and other critical applications
- IoT device transactions

Pipelines and machine learning algorithms

VMware Edge Intelligence runs many different pipelines and uses the general framework of unsupervised machine learning (ML) algorithms. ML algorithms help the product automatically learn baseline performance and deliver features like automatic incident detection and generation, automated remediation, Health and Remediation, IOT device discovery and behavioral analysis, and more. Throughout the product we leverage a number of machine learning algorithms including the following:

- Clustering
- Gaussian outlier detection
- Exp-weighted distance matching
- K-Nearest Neighbor distance matching
- Attribute-based data aggregation

Crawler specification

The Crawler VM software requires:

- VMware ESXI v.5.5 or higher
- Xeon quad core processor with 20GB of storage
- 4 virtual processor cores, and 4GM of virtual RAM
- Single 10 Gbps copper or fiber NIC and a single 1 Gbps copper or fiber NIC for high-speed connectivity to enterprise access network

Crawler/span speed			
	1G	10G	40G
Edge Intelligence 2X1G	x		
Edge Intelligence 4X1G	x		
Edge Intelligence 4X10G *	x	x	
Edge Intelligence 8X10G *	x	x	
Edge Intelligence 4X10GRW *	x	x	
Edge Intelligence 2X40G **			x

* 1G copper, 10G copper, 10G SR/LR SFPs supported
** 40G SR/LR QSFP optics supported

Analytics Edge specification

Analytics Edge functionality is supported on these VMware SD-WAN Edge models:

EDGE/BW	10M	30M	50M	100M	200M	350M	500M	750M	1G	2G	5G	10G
Edge 510	•	•	•	•	•							
Edge 510-LTE	•	•	•	•	•							
Edge 520	•	•	•	•	•							
Edge 520v	•	•	•	•								
Edge 540				•	•	•						
Edge 610	•	•	•	•	•	•	•	•	•			
Edge 620				•	•	•						
Edge 640				•	•	•	•	•	•	•		
Edge 680				•	•	•	•	•	•	•	•	
Edge 840*				•	•	•	•	•	•	•[1]		
Edge 2000*							•	•	•	•	•	•
Edge 3400					•	•	•	•	•	•	•	
Edge 3800							•	•	•	•	•	•

* Maximum SD-WAN performance without VNF on Edge 840 is 4 Gbps; however, the maximum allowed bandwidth license is 2 Gbps.

For hardware and VMware SD-WAN specific details, refer to the *VMware SD-WAN datasheet*.

Hardware specification for On-Premises (to run Analytics Engine on premises)

The Analytics Engine software can be deployed in an on-premises environment if the cloud-hosted model is not suitable. This is available as a single-tenant or multi-tenant deployment. VMware provides the software that can installed by customers on their hardware with the specification as described in the following table:

Deployment	PoC	Small	Medium	Large	Xlarge	XXLarge
Nodes[1]	Up to 100	Up to 2.5k	Up to 5k	Up to 10k	Up to 15k	Up to 20k
Clients[2]	Up to 1k	Up to 25k	Up to 50k	Up to 100k	Up to 200k	Up to 300k
Controller Nodes[3]	1	1	1	1	1	1
Worker Nodes[3]	1	2	3	4	5	6
Total Cores	52	68	100	132	164	196
Total Memory	272 GB	272 GB	400GB	528GB	656GB	784GB
10G NICs	1	2	3	4	5	6
Total Storage	500 GB	2 TB	4.5 TB	6 TB	10 TB	12 TB
Storage type	SSD	SSD	SSD	SSD	SSD	SSD

1 Node is an Access Point, Access Switch, or SD-WAN Edge that VMware Edge Intelligence is ingesting data for

2 Clients are either end user and/or IOT devices

3 Controller and Worker Nodes are a group of resources for hosting your application containers. Controller nodes require 4 cores and 16 GB of memory this is included in the table above.

Note: Edge Intelligence can scale beyond what the table listed above states for larger-scale deployments.

Client App specifications

The Client App can be installed using a device management platform such as VMware Workspace ONE. Supported platforms are Windows 10 and macOS X.

Learn more

- VMware SD-WAN, *sase.vmware.com/sd-wan*
- VMware SASE, *sase.vmware.com*

Software subscription and hardware purchase details

VMware Edge Intelligence has the following license components.

- A software subscription license is sold per-node for a 1-year, 3-year or 5-year term. A node here refers to switch, SD-WAN Edge or access points. The software node license can also be purchased as a license to install the Client App on end-user devices.
- If the Cloud Analytics Engine is deployed on-premises, then the hardware component for purchase also requires a private cloud appliance.

VMware Edge Intelligence purchase is easier with VMware SD-WAN deployment. VMware SD-WAN Enterprise, VMware SD-WAN Premium, VMware SD-WAN WFH, and VMware SD-WAN WFH Pro licenses entitle users to VMware Edge Intelligence software node license and Client App installation on end-user devices.

Third-party/technology integrations

- **Applications**: Zoom, Microsoft Teams, Cisco UCM, Skype for Business, Citrix, ASCOM, GE Patient Monitoring
- **Network Access Control (NAC) and identity systems**: Cisco ISE, Aruba/HPE ClearPass, FreeRADIUS, Microsoft RADIUS
- **Security threat control platforms**: Cisco's Platform Exchange Grid (pxGrid). VMware Edge Intelligence is a certified solution on the Cisco pxGrid ecosystem
- **Wireless LAN**: Cisco, Aruba/HPE, Juniper MiST, Extreme Networks, Meraki, VMware SD-WAN Edge Wi-Fi
- **Wired LAN**: Cisco, Juniper, HPE, Alcatel-Lucent
- **ITSM/CMDBs**: ServiceNow native integration, Slack
- **SIEM**: Splunk and others via extensible VMware Edge Intelligence platform APIs