AnyConnect

THE *SMARTER* CAMERA PLATFORM

# AnyConnect Smarter Camera Platform

## Frequently Asked Questions

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## VERSION TRACKING

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# OVERVIEW

## A. Introduction

This document is a summary of questions and answers about the features and capabilities of the AnyConnect Smarter Camera Platform.

This document is managed by the AnyConnect engineering change process and is updated periodically.

## B. Frequently Asked Questions

### 1. A Platform for cameras only?

**Q –** Your platform supports cameras. Does it also support other types of devices (e.g., sensors of all types)?

**A –** Yes. The AnyConnect platform supports many types of devices as long as they are connected and meet the minimum requirements. The platform processes data and video and is suitable for other types of sensors, including, for example, connected microphones, sensor hubs, set-top boxes, drones, gyroscopes, accelerometers, telematics control units (TCU), radars, lidars, etc.

### 2. Scalability

**Q -** How many users and devices does AnyConnect Smarter Camera Platform support? How does it scale?

**A -** The AnyConnect platform is comprised of microservices and serverless components running on a leading IaaS platform. Within a serverless architecture, additional resources are automatically provisioned and scaled globally as needed.

### 3. Types of Sensors

**Q -** Does AnyConnect Smarter Camera Platform only support cameras (video sensors)? Our system is comprised of video sensors and other sensors, does the platform support those as well?

**A -** Yes. The AnyConnect Smarter Camera Platform supports video and other types of sensor data. The platform has video-specific (and to a lesser extent audio-specific) functionalities linked to the data weight of audio & video, like Adaptive Bitrate Streaming. Still, it supports almost all kinds of data streams. Those data streams are recorded with selectable data retention, and are protected by access control and encryption, and can be viewed live and played back the same way video is. AnyConnect platform AI at the edge and in the cloud works on non-video data as well.

Data types supported by AnyConnect Smarter Camera Platform Include, but are not limited to: Gyroscope, Magnetometer (Digital Compass), Inertial Sensor, Accelerometer, Laser, Time-of-flight camera, LIDAR, Radar for speed measurement, Radar for object detection, Microwave, Ultrasonic, PIR (Passive Infrared), GNSS (GPS, Galileo, GLONASS). Here are other examples: temperature, humidity, Vehicle parameters (health & telemetry, CAN bus), Microphone(s), Air Pollution Sensors (PM10, PM2.5, NOx, SO2, CO, CO2, O3), airspeed, wind, etc.

### 4. External Wireless Sensors

**Q -** I have 3rd party wireless sensors. Is it possible to integrate them into the Smarter camera platform?

**A -** Yes, in two ways.

1. These sensors can be connected to a camera or another device with AnyConnect libraries through standard wireless mesh networks, such as Bluetooth LE, Z-Wave, ANT+, or other wireless mesh networks working on top of IEEE 802.15.4 such as 6LoWPAN or Zigbee. The system will treat them as its internal sensors as well as providing health information, like battery status, etc. No modification to the sensor's hardware or software is required. AnyConnect smarter camera platform distributes over the air updates to those sensors.

2. For sensors that are not connected to a camera or a device running AnyConnect Smarter Camera Platform, it is still possible to connect them to the AnyConnect Platform, if they are connected and can run libAnyConnect.

### 5. Sensor Fusion?

**Q -** I have multiple types of sensors, is it possible to use them in conjunction (sensor fusion)?

**A -** Yes, AnyConnect Smarter Camera Platform supports many kinds of sensors. Combining those sensors provides better situational awareness, which means that events from those sensors can trigger recording or other processes. Computer Vision algorithms can infer on all the available sensors, audio, and video data.

### 6. End to end support?

**Q -** Does AnyConnect provide end-to-end support?

**A -** Yes, the AnyConnect Smarter Camera Platform is an end-to-end platform. We provide helper libraries that run on edge components, including the camera, other sensors, massively scaled cloud, and user interface. AnyConnect and its platform provides 3rd party integration, AI at the edge and in the cloud, manages access and permissions, provides firmware and inference model updates through AI Containers. AnyConnect provides user interface libraries for the major OS' as well as apps with easy branding.

### 7. Data Collection and Coding

**Q –** I have different kinds of sensors, how should I collect data, and what kind of coding should I use?

**A –** Regarding data collection, it depends on the type of sensor and what it senses. For instance, certain types of sensors provide information at a regular frequency that you can set, like GNSS, for example. Some other sensors have a variable frequency. They provide readings with very long intervals during which the value does not change, and given a new input report data or show volatility. A good example of that is wireless temperature sensors as well as Input/output sensors like door contacts. AnyConnect supports any of these reporting

processes.

Regarding data coding, AnyConnect Smarter Camera Platform supports any type of text & data stream. For sensors generating a lot of data, e.g., certain lidars, high definition radars, etc., we integrate compression solutions for efficient use of cellular networks.

### 8. Heatmap, density map & data mining

**Q –** I would like to create heatmaps, density maps, and other visualization based on the data gathered by all my field devices. Is it possible? What about further data mining?

**A –** Yes, the AnyConnect Smarter Camera Platform provides APIs to access and further analyze and manipulate generated data. Through those APIs, you can use 3rd party tools & platforms to build heatmaps, density maps, etc.

Regarding Data Mining, the same APIs provide you access to the data. You can either provide this data to your data scientists or use an automated platform like DataRobot.

### 9. Link to 3rd party partners, e.g., insurance companies

**Q –** I would like to have some data sent in a (semi)-automated data transmission to 3rd party partners like insurance companies. Is it possible, and how to do it?

**A –** Yes. An example may be to market a product where you link dashcam data directly to insurance companies. Or, perhaps, the insurance partner would typically provide a discount to users driving safely (within the speed limit, no harsh breaking, strong acceleration, etc.). Your team can program your product to share this data automatically through AnyConnect API. Another use case may be to share data when a configured event occurs, e.g., after an accident. Your team can program this using an AnyConnect API or simply using the AnyConnect video & data export function. The recipient would receive an email with a link to review the event.

### 10. Multi-vehicle support for AnyConnect iOS & Android App

**Q –** Does the AnyConnect user App on Android and iOS support multiple vehicles? Most of my customers do have a fleet of vehicles, and they want to manage all of them in one app with one user account.

**A –** Yes, the AnyConnect App on Android and iOS does support multiple cameras and multiple vehicles. It supports dashcams with multiple imagers as well as GNSS, sensors, and sync playback from up to 4 vehicles at the same time.

## 11. Connecting my devices/cameras to the internet

**Q –** How should I connect my devices to the internet? What are the different options?

**A –** There are multiple options:

1. Cellular only – Only LTE/5G is available. AnyConnect Smarter camera platform will "call home" and provide all of its interactions through this cellular network interface.
2. Cellular & Wi-Fi – Both network interfaces are active at the same time; for instance, the LTE/5G interface provides access to the internet, and the Wi-Fi interface acts as a hotspot to connect other devices to the internet. Both network interfaces could be used at the same time for redundancy purposes (if one interface is down, the other will provide a fallback connection).
   Having a Wi-Fi interface on a camera/device allows end-users to access the camera's settings and local recordings without an internet connection, directly through Wi-Fi.
3. Wi-Fi only – The device will connect to the internet through a Wireless Access point.
4. Ethernet – AnyConnect Smarter Camera Platform supports Ethernet. If the device has an Ethernet interface and a Wi-Fi/LTE/5G interface as well, it can use them for redundancy or hotspot purposes. If Wi-Fi is available as well, a direct connection to the camera is possible.

## 12. Supported areas of operation

**Q –** What are the different areas where the Smarter Camera Platform is available?

**A –** AnyConnect platform runs on a leading IaaS platform. It is currently available in most locations worldwide, such as most of the Americas, Europe, most parts of Asia, Africa & Oceania.

### 13. Limit date usage on metered connections

**Q –** My cameras have different network interfaces, some are metered, like 4G/LTE and 5G cellular connections, and some are not, like Wi-Fi and Ethernet. How can I minimize the data cost over cellular connection and leverage Wi-Fi as much as possible (offload recordings while on Wi-Fi)?

**A –** The AnyConnect Smarter Camera Platform differentiates between network interfaces such as Ethernet, Cellular like LTE/5G as well as Wi-Fi, and, is configurable to minimize data transfer on metered connections and prioritize un-metered connections. It offers additional options to reduce data usage on further:

1. The AnyConnect Smarter Camera Platform streams with a lower bandwidth while on a metered connection (by throttling AnyConnect Adaptive Bitrate Steaming).
2. AnyConnect offers further options to reduce cellular use; for example, your team can program the platform to send less data while on a metered connection.
3. You may choose to send a single, still, native resolution frame, allowing the user to get a high definition view of the scene and recognize faces/read license plates.

### 14. Type of video recording & retention time

**Q –** What are the different recording schemes available to record video, audio, and data?

**A –** There are four different recording schemes available:

1. Event – Event recording means that video, audio, and data are recorded when an event is triggered. This event could come from a sensor crossing a certain threshold or from video analytics. Usually, video is sent prior to and for a period after the event. The retention time is programmable as well as FPS & resolution.
2. Continuous – The system records video continuously. The retention time is programmable as well.
3. Event + Continuous – In this configuration, the system records video continuously at a specific resolution/FPS/bandwidth, usually something like mid-resolution but low FPS and low bandwidth. In case of an event, the recording resolution will change, usually to higher resolution, FPS & bandwidth for the event duration, as well as pre and post-recording. The event video is tagged as well.

4. Time-lapse – In this configuration, the system records snapshots only (no video) at specific times every day.
5. Snapshot – This is the event-driven version of Time-lapse. When an event arises, the system records a snapshot. Retention time is programmable.

### 15. Video Playback options

**Q –** What are the different ways of playing back videos from AnyConnect Platform or from the camera directly?

**A –** Replaying video from the cloud or from a camera is transparent to the users. Different interfaces enable users to playback video, audio, and data with different functionalities and benefits:

1. Application – libAnyConnect provides full-featured playback, provides access to all related sensor data, and native definition still image playback. Playback is served automatically from a local source or a cloud source. libAnyConnect is provided for iOS & Android, as well as Linux, macOS, Web Browsers, & Windows upon request.
2. Clientless – AnyConnect enables the clientless playback of video using HTML5. In this case, playback is served from the cloud. It works for audio and video only and not for metadata.

### 16. Post recording video analytics

**Q –** Is it possible to run video analytics on recorded videos?

**A –** Yes, our cloud video analytics can run on live and recorded video.

### 17. How to work with AnyConnect and time to market

**Q –** How do I get the AnyConnect Smarter Camera Platform? What do I need, and what is the time to market?

**A –** Have you sourced a camera/device and other sensors?

1. Yes, I have a target device/camera already – It has to meet the minimum technical requirements. If it does, you will need the toolchain and the support of the manufacturer of this device/camera.
2. No, I need help to find a device/camera – AnyConnect can help you to find a suitable device/camera within its network of partners.

Once the right camera/device has been identified, and when all pieces of software have been provided, the integration usually takes between 2 to 4 weeks.

### 18. Encoding and compression standards for sensor data

**Q –** What are the different encoding standards and compression algorithms supported by the AnyConnect smarter camera platform?

**A –** AnyConnect doesn't mandate a specific encoding or compression algorithm. You can use your preferred system, whether it's using a standard SensorML or an in house delta based encoding. Please note that AnyConnect's Adaptive Bitrate technology can be applied to your encoding implementation to throttle its output. Your encoder has to support this, of course.

### 19. Device & storage health monitoring

**Q –** Does AnyConnect Smarter camera platform provide monitoring of my device health parameters? SD cards have a limited lifespan, does the platform monitor it as well?

**A –** AnyConnect smarter camera platform does monitor the device's health parameters. Select the device's subcomponents to monitor (e.g., CPU temperature, RAM usage, input voltage, etc.) during the device's integration through AnyConnect Plugin Libraries. You can set thresholds to generate health monitoring notifications. You can monitor SD cards' and other storage systems like SSDs or HDDs, health as well as wear and tear through the same mechanism.

### 20. Challenges of edge-to-edge communication

**Q –** What are the challenges with edge-to-edge communication?

**A –** The internet is not an environment built to easily facilitate edge to edge communication. It is littered with NATs, Firewalls, and other challenges like intermittent and unreliable cellular and wireless networks.

The anticipation of 5G and its promise to wirelessly offer broadband speeds presents a great opportunity for the industry to provide solutions for difficult network solutions, which is expected to drive a surge in demand in edge-to-edge communications.

### 21. Easiness of AI at the edge

**Q –** How easy is it to engineer AI capabilities at the edge?

**A –** Enabling AI at the edge usually requires a complex project led by "la crème de la crème "of software developers and engineers. Deploying edge AI, securely, at scale, over-the-air, on different types of products, using different chips and different AI accelerators is extremely difficult, complex, and has a high chance of failing.

AnyConnect's platform enables the deployment of cloud and edge inference models at scale in smart camera networks through AI Containers. Those deployments happen over-the-air, securely, on different types of products and AI accelerators at the same time.