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Edge Cloud

Cloud Video Surveillance for Distributed Low-bandwidth Environments

White paper

WHAT'S INSIDE

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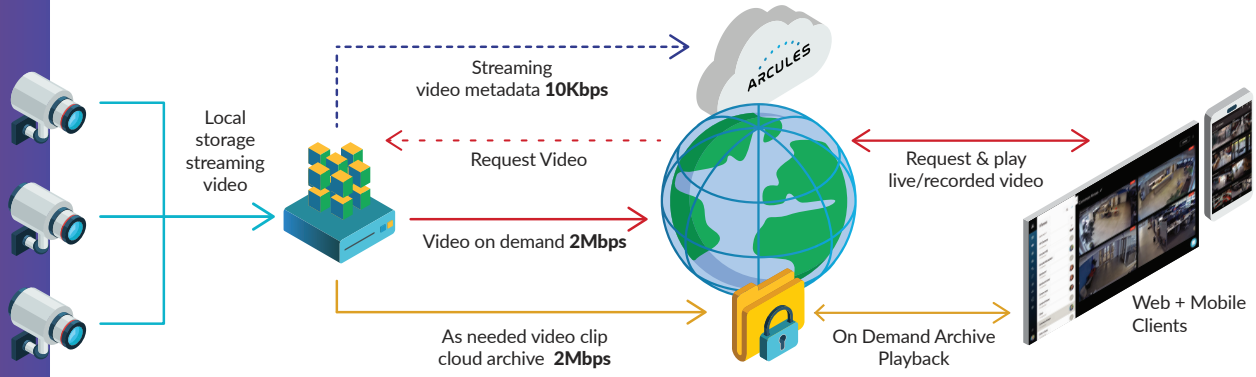
Cloud video surveillance for distributed low-bandwidth environments

By 2025, there will be 41.6 billion connected Internet of Things (IoT) devices, generating 79 zettabytes of data, according to research firm IDC. All of this data needs somewhere to go, pushing IT and business leaders to determine how this data is managed and stored. Whether an organization uses an on-premise option, sends their data to the cloud, or combines the two in a hybrid infrastructure, a common goal remains: being able to easily access that data as the need arises.



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Defining storage

As camera technology generates video data for use in investigations, analyzing patterns for streamlined operations, or is saved to adhere to regulatory compliance mandates, storage becomes a crucial piece of the puzzle. Where to store the video due to bandwidth limitation or regulatory concerns, however, remains a core focus of business and IT leaders tasked with ensuring that video is accessible. There are a number of options available that leverage cloud-based infrastructure, including:

Pure Cloud. Video that is recorded and stored via a pure cloud solution records footage and stores directly to the cloud instead of storing the data on-site. This makes it easy to access, view and manage incoming video data from anywhere on any type of device. For sites that do not have bandwidth challenges, the pure cloud option provide constant streaming video to the cloud with low-latency live viewing, lighting fast remote playback, secure and redundant storage with a large choice of 3rd party integrations.

On-premise. Fully on-premise video management system (VMS) options consist of local hardware, such as a computer, server or other device, where data is stored and the application is run, rather than at a remote facility such as a server farm or cloud. These devices are often expensive, require a significant amount of resources and maintenance, and have to be manually updated regularly.

Hybrid Cloud. Hybrid cloud serves as a bridge between solely leveraging on-premise solutions and a fully cloud-based structure, acting as a stepping stone before advancement to the highest level of cloud adoption (pure cloud). Users can leverage a hybrid approach when it comes to security, including uniform access to live video, recordings and alarms across cameras connected physically on-premise and virtually via the cloud. The combination of powerful functionality and feature-rich video surveillance enables modern enterprises to streamline communication and information sharing.

Edge Cloud. Storage on the "edge," or Edge Cloud, stores data on a local device, such as a gateway, close to the source of that data. On the edge, the data can be pushed "to the cloud" when needed, but can remain on-site within the gateway device or camera (Camera-to-Cloud) to save ongoing bandwidth and network latency needs.

Storage challenges continue to hinder many of today's modern organizations, as more and more move toward leveraging the power of cloud computing, and as increasing amounts of data are collected and required to be saved. Typically, large-scale, enterprise organizations combine two or more of these storage options to better address the optimization needs of their incoming and outgoing data, depending on overall goals.

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Video data storage **challenges**

IP-enabled camera technology has shifted the modern enterprise toward more networked infrastructure, necessitating additional connectivity functionality to meet the needs of the organization. Cloud-based infrastructure has been widely adopted across a number of markets as cloud storage scales and remains flexible enough to address the changing nature of business. But transitioning to a fully cloud-based platform for incoming video surveillance data can run into several challenges for these companies, including:

- Low-bandwidth and connectivity issues
- High camera counts
- Lack of network optimization

The barriers to adopting a full cloud-based infrastructure can be addressed by thinking about edge-based infrastructure as a migration path toward full cloud functionality. And adopting storage at the edge is one way to get there

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Storage on the edge: **Where it works**

The introduction of storage on the edge helps organizations address common challenges that many enterprises face when incorporating remote or disparate locations into the overall security landscape using cloud-based functionality. For many of these companies, cloud-based applications are already in use, including office management software, banking and accounting, data management, and much more. IT departments have widely adopted cloud-based solutions to aid in business optimization goals; but physical security has traditionally been looked at as an on-premise necessity.

However, the limitations of on-premise security, including the need for ongoing maintenance and large up-front hardware investments, help propel modern organizations to look for other ways of collecting, storing, and analyzing incoming video and IoT data. As many turn to a pure cloud option that offers full redundancy, there are some organizations that realize there are limitations to their ability to harness the power of the cloud, which means storage at the edge becomes a viable and preferable option as a logical next step toward achieving full cloud functionality.

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So when does storage on the edge make sense?

Regulatory compliance

There are a number of industries that are required to keep video footage for a set amount of time, such as high-risk businesses like cannabis, casinos/gaming, critical infrastructure or financial institutions. Oftentimes, this footage needs to be easy to access and the amount of time the video data should be saved varies based on federal, state and regulatory rules. Edge Cloud storage allows users in these vertical markets to identify and customize their retention times either across the facility or on each specific camera, as well as where the video footage is stored. The centralized nature of the dashboard that manages multiple sites in a single view makes the identification of locations and footage easy and streamlined.

High camera count location

It's simple: the more cameras at a location, the more video data is being collected, which means the need for more bandwidth in a full cloud storage environment. Storing this video on the edge frees up bandwidth and offers customers the flexibility to harness the power of the cloud without sacrificing network bandwidth that is needed to meet the needs of the organization beyond security and video surveillance.

Network optimization

The demands of a global organization running multiple cloud-based management programs and applications can be a challenge for IT leaders looking to ensure the network is safe, secure and accessible at all times. But sometimes the demand creates a need for IT leaders to optimize the network and maximize its performance for outbound operations. Video data being uploaded directly to the cloud can slow down the network for other functions, so storing that video on the edge becomes a necessary next step in helping IT departments with this goal of ensuring the highest levels of service for WAN activity.

Dispersed, remote sites

With large-scale enterprises, there tends to be a central location that serves as a headquarters that leverages on-premise storage solutions. As these businesses grow and add multiple satellite locations across the country or even around the globe, the set-up and maintenance of multiple, on-premise storage devices can become costly and hinder the ability of centralized security teams to effectively monitor or address incoming alerts. Hybrid video management systems (VMS) can help address some of these issues, but Edge Cloud storage can create a way to better manage dispersed, remote sites without the additional need for extensive bandwidth. Using Edge Cloud also allows all of these dispersed sites to be viewed and managed through a single platform, from anywhere.

Bandwidth challenges

At the core of any of these challenges is the limitations that organizations may have with bandwidth, which dictates the rate of data transfer across the network. Challenges can exist in the capacity of the connection to handle large amounts of data; and this can become more of an issue when using a full cloud solution that continuously sends video to the cloud for storage and analysis.

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Benefits of **Edge Cloud**

Customers leveraging Arcules' Unified Cloud Security Platform found challenges when scaling to remote and disparate locations without access to faster internet speeds, often hindering their ability to broadly adopt the platform. They needed the ability to be able to manage and access video in these locations through the centralized Arcules dashboard, while limiting bandwidth use, which meant they needed to store video and other data at the edge in an effort to meet these needs.

The edge cloud solution helped achieve this, and also included a number of aditional benefits, including:

Cloud archival for case management

The ability to centrally manage alerts and set rules for individual cameras gives customers the power to identify incidents, create a case, and quickly archive footage for streamlined management. Customers can export up to 60 minutes of video evidence to a case and can only be deleted by the user through the dashboard. This information is automatically archived to the cloud to ensure it's available on-demand when needed.

Ability to view video via the cloud

One of the main challenges of storing data on-premise is being unable to access the data unless you are physically able to be on site. But edge-based storage changes the game. Video data is stored on-premise with the ability to play live and locally stored recorded video from the gateway through the cloud.

Centralized management and configuration

The Edge Cloud solution gives organizations the ability to store video locally on the gateway to reduce bandwidth usage for their video management and still benefit from the value of the Arcules platform by offering administration and configuration from anywhere through the dashboard. IT managers or installers are able to turn on local storage for each gateway connected to the cloud. This gives flexibility based on the location to enable cloud or local storage.

Edge-based video motion detection/ camera-based analytics

The Edge Cloud solution allows for motion detection and camera status events to be recognized at the edge, then forwarded as alert notifications to the cloud in real time. Once at the cloud, notifications are distributed to the security operation team without delay. Edge-detected triggers could be a video motion detection event, a camera side analytic event or a device health event.

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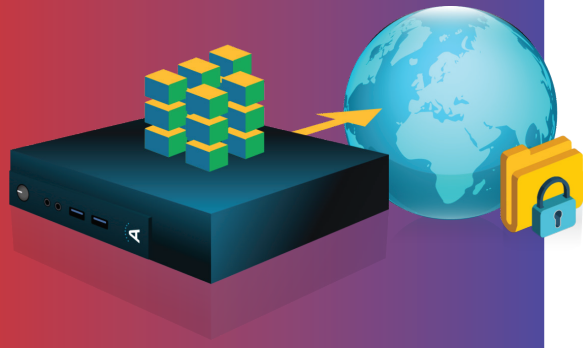
Benefits of **Edge Cloud**



Customizable retention

Since video is stored on the gateway, a local retention time can be set for each gateway to age out video. Default retention is 7 days, but can be adjusted based on the number of cameras and available storage of the gateway. Video is stored on the gateway with an estimated maximum retention time or until the disk is full. Retention times are fully customizable based on each camera. For example, if a camera in a lobby requires additional retention time beyond the standards 7 days for regulatory compliance, that setting can be adjusted through the Arcules dashboard.

Added storage options

An organization can now store data in two ways as part of the Arcules Unified Cloud Security Platform: via the Edge Cloud solution and through the full cloud option.

Bandwidth reduction

Using the Edge Cloud solution, customers can reduce a site's video bandwidth consumption by more than 90%, significantly reducing the amount of bandwidth required to continuously save data directly in the cloud. Sequence metadata is sent to the cloud when video is recording, 10 Kbps (upto 50 Kbps) per channel.

Bandwidth considerations

One of the biggest ways that the Edge Cloud solution reduces bandwidth is by consuming bandwidth only while on-demand viewing video or archiving data to the cloud. For more specific guidelines:

1 Mbps per second upload speed
Recommended for 720p @10 FPS*

2.2 Mbps per second upload speed
Recommended for 1080p @ 10 FPS*

1 Mbps per second download speed
Recommended for 720p @10 FPS*

2.2 Mbps per second download speed
Recommended for 1080p @ 10 FPS*

*Note: These recommendations are per channel. Multiply these numbers by the number of cameras that will be recording or you will be viewing at once to determine upload/download bandwidth requirements.

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About arcules

Arcules, a Canon Group company, addresses the unmet need of modern enterprises for integrated cloud-based video surveillance, access control and IoT with its Unified Cloud Security Platform. Arcules combines previously untapped video monitoring data with sensor data and analytics to deliver actionable insights that ultimately drive better business decisions, optimize operations and improve safety. Arcules is headquartered in Irvine, Calif.

Learn more at **arcules.com.**

Harnessing the Power of **the Edge**

The new Arcules Edge Cloud solution is designed to deliver customized cloud functionality based on specific security priorities, risk environment and operational priorities. It also addresses some of the main challenges that customers face when considering cloud-based options: internet issues, high camera counts and the need for network traffic optimization. With the introduction of the Arcules Edge Cloud solution, businesses now have the ability to store video locally to address low-bandwidth challenges and usage for their video management while still benefiting from the value of the Arcules cloud approach to security services.

Want to learn more about Edge Cloud for your business? **Click here.**

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