





Intuitive. Insightful. Open.

A camera can
be so much
more than just a
source of video.

New technologies are emerging rapidly. And because of the development of artificial intelligence (AI), video analytics have become a major differentiator in video surveillance, helping to facilitate safety and security, as well as operational efficiency and business intelligence.

Enjoy the easiest access possible to actionable insights. How? By opening the doors to a wide range of flexible, scalable analytics that are easy to set up and use – with a focus on the edge.

Axis analytics solutions are:

Intuitive

**Smooth integration, setup,
and day-to-day use.**

Gain easy access to all the information you need, thanks to analytics on the edge and an open system. We offer an intuitive user experience built on a deep understanding of our customers' needs.

Insightful

**Analytics turn video and
other data into actionable insights.**

Act instantly to protect people and property and make the right decisions about your business or operations. You'll be able to maximize security, performance, and value, while freeing up resources and saving time and money.

Open

**Open standards for adaptable
solutions.**

Take advantage of open standards and a robust, flexible platform to unlock AI-powered, adaptable, and scalable solutions, all set for edge and hybrid deployment.

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What you'll learn

In this eBrochure, we'll look at the benefits of analytics and how Axis can support you by offering open, scalable analytics solutions that help you automate your surveillance and operations.

You will learn:

- What analytics solutions are
- Why you should use it
- How it works, including how to achieve excellent performance
- How we can help you explore the analytics available to you

Click through the navigation bar at the right of the page, or scroll through the pages to learn more or click on a topic below to jump to that section.

Whether you're looking to enhance your ability to protect people and property, or you're trying to make better decisions about your business and operations, our analytics solutions can give you what you need.



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What are analytics?

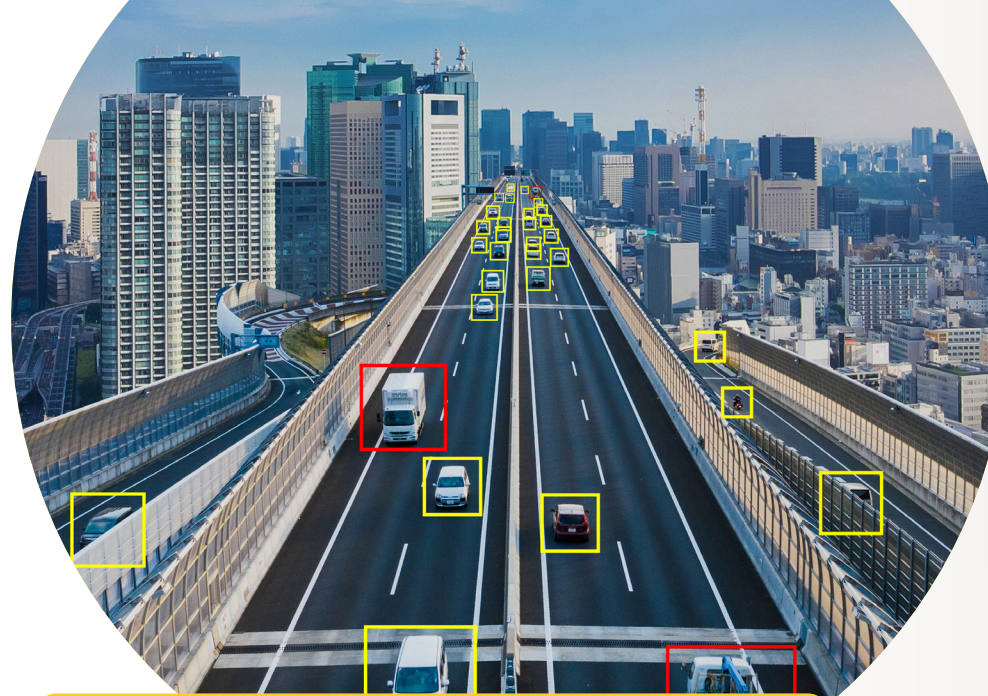
Video surveillance systems produce massive amounts of video. Most of this video never gets watched or reviewed. As a result, security incidents are missed and suspicious behavior isn't caught in time to prevent incidents. Analytics can help address these issues.

Analytics use algorithms to analyze live and recorded video content and generate descriptions (metadata) of what's happening in a scene. Objects such as vehicles and humans can be detected and then monitored to find significant events you want the system to react to automatically. Such an event might be a human detected in a restricted area, a vehicle approaching a gate, an error on a production line (like a partially filled bottle), or something else entirely. This kind of insight allows operators and staff to focus on what truly matters and to act in a timely manner.

**Intuitive.
Insightful.
Open.**

Easy access to
actionable insights.

Watch our analytics video [here](#)



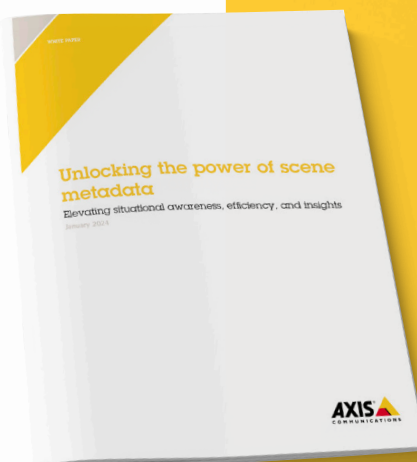
Getting started

Before you dive into the solutions and technologies that power our analytics solutions, make sure you have the high-level insight you need to understand the phrases, terminology, and concepts frequently referred to when discussing analytics.

The importance of metadata

When someone mentions analytics, the first thing that pops into most people's heads is artificial intelligence, and possibly metadata. This white paper takes a closer look at what metadata is and why it's important as well as the basic terms that you should be familiar with when it comes to artificial intelligence in analytics.

Browse the [white paper](#)



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Artificial intelligence

Analytics based on AI and deep learning enable operators to concentrate on what they do best by eliminating the need to continuously monitor video. While deep learning-based analytics can help operators “see” and limit human error and bias, it cannot entirely replace operator experience and decision-making skills.

The strength of deep learning-based analytics is, rather, that they can help make operators more efficient. They typically offer more precise results, particularly under challenging circumstances, such as busier scenes, poor lighting, or when objects are only partially visible. Deep learning-based analytics are also better at classifying objects that don't perfectly match objects that have previously been recognized.

Due to performance requirements, deep learning-based analytics generally require dedicated hardware. And since these analytics rely on large volumes of training data, development can be challenging. It's also important to perform tests in real scenarios, to ensure optimal performance under various conditions.



Watch our AI video [here](#)

Applying AI to surveillance means being able to quickly extract useful information and take appropriate actions.

What is deep learning?

Artificial intelligence (AI) is a broad concept associated with machines that can solve complex tasks while demonstrating seemingly intelligent traits. Deep learning and machine learning are subsets of AI.

Cameras with a deep learning processing unit (DLPU) offer more granular classification of detected objects on the camera itself. This can be very useful for instance when time is critical, as the classification can take place directly on the camera. Deep learning-based analytics are ideal for busier scenes and more demanding surveillance requirements. They also offer better detection and classification capabilities for people in unusual positions (hunched, for example) as well as objects that are only partially visible.

With sufficient training, deep learning algorithms can also detect object attributes such as clothing color, the presence of attributes like hard hats, bags, and so on. Read more [here](#).

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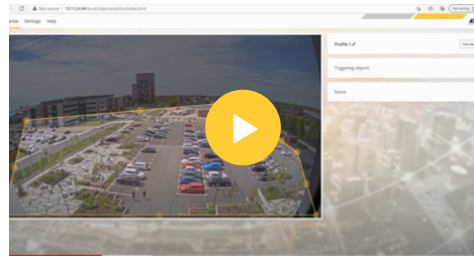
Metadata

Video surveillance is about enabling operators to react to critical events and details in live or in recorded video. When there are huge amounts of data, this can be a difficult task. Automatically generating metadata with information about what's happening in a scene makes it easier to build tools to help operators handle large amounts of video data.

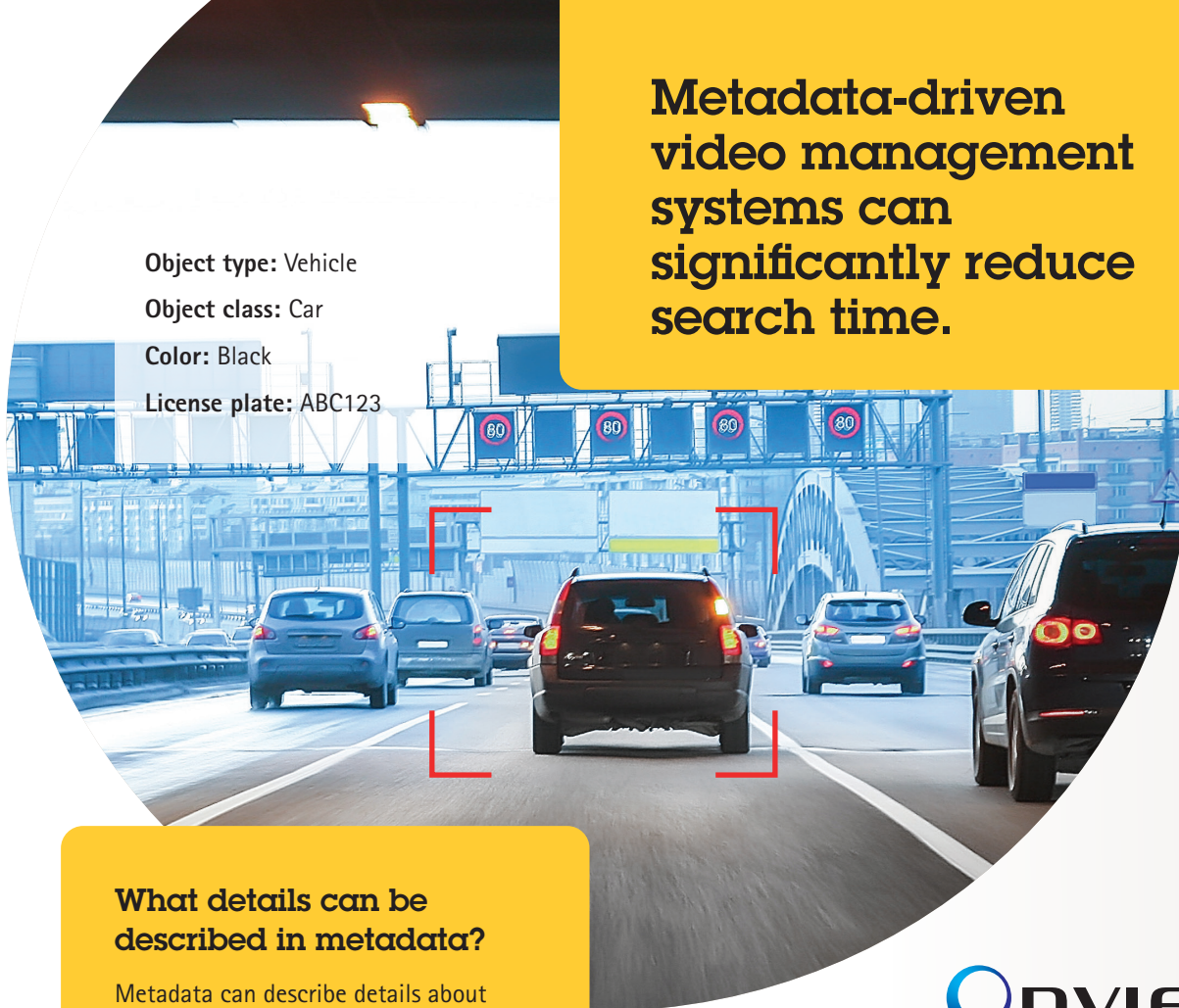
What is metadata?

In simple terms, metadata is data about other data. Metadata describes information about what is in the video. For instance, what objects are visible in a scene – such as vehicles and people – including the attributes associated with them, such as colors of vehicles and clothing or the direction of travel.

The ability for analytics to apply metadata tags to objects and activities in video is incredibly valuable to trigger automated actions or search through vast amounts of video, potentially allowing operators to search using questions such as "find me all video in the business district containing a red car between 18.00 and 22.00 on Wednesday, March 25". Looking forward, metadata can also be central to effectively collecting, organizing, and storing content of interest and spotting patterns and trends to improve operations and optimize your business.



See the Axis metadata video [here](#)



Metadata-driven video management systems can significantly reduce search time.

What details can be described in metadata?

Metadata can describe details about objects of interest in a video, like where those details are located, what they are and how they move in a scene, for example:

- > Location
- > Time
- > Colors
- > Sizes
- > Shapes
- > Coordinates
- > Speed
- > Duration in scene



What is ONVIF Profile M

Most Axis cameras are ONVIF-Profile-M conformant, enabling standardized streaming of metadata and events from edge-based analytics applications. This conformance enables easier integration of metadata and events with ONVIF-Profile-M-conformant like video management software and services. This means these clients will be able to query, filter and receive metadata to trigger automatic responses and effectively store and search for video content of interest.

Read more about Profile M [here](#)

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Analytics for a smarter, safer world

Video analytics add great value by providing actionable insights. They enhance situational awareness, make video and audio searches faster and more efficient, and it can be used to turn complex data into easy-to-understand graphs and charts. This helps users make informed decisions based on comprehensive analysis.


To provide the best analytics solutions, we work hard to understand our customers' requirements. Meeting a variety of needs requires close attention to customer challenges, a strong grasp of technology, and the ability to tie it all together.

Efficient monitoring



Analytics can be used to intelligently monitor a scene and determine if an event should trigger an alarm or not, for instance when selected objects of interest are detected. This helps operators to focus on events that need their attention.

Efficient search



Analytics can accelerate forensic investigations by streamlining search for objects, such as vehicles and people, or incidents. Axis analytics metadata allows you to pinpoint only relevant video clips, reducing analysis time from hours to minutes or even seconds.

Efficient operations




In a retail setting, for instance, analytics can help with efficient management of staff by using automated alerts that enable instant action. For example, a long queue could trigger an announcement of, "More staff to the checkouts, please." Analytics can also be used to monitor processes within manufacturing.

Improved insights



Analytics can provide valuable and actionable insights and statistics to improve operations and help in making more informed decisions to manage, for example, traffic flow or improve visitor journeys.

Privacy

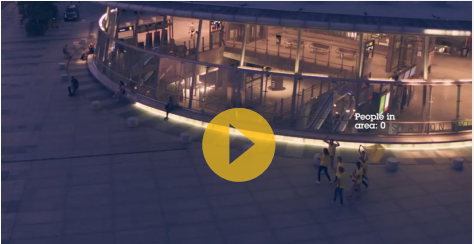


With intelligent masking, license plates, faces and body shapes of people in a scene can be blurred, for increased privacy. If required, the original, unblurred stream can be recorded and viewed when necessary. The analytics can mask the identities of individuals, but allow you to see their movements.

We continue to find different use cases for video surveillance outside of security applications.

Rules, conditions and actions

A rule defines a set of conditions and actions that should take place when specific events occur. The rule can be based on conditions that include how long an object has been in an area (time-based), if an object is moving into a predefined area (object in area), or in which direction it is moving. Examples of actions include starting recording, live streaming, turning on lights, automatically playing a message, and sending notifications.



See examples of analytics in action [here](#)

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What are the benefits of analytics?

Analytics offer many benefits to increase security, safety and operational efficiency, such as helping you:

1



Respond faster to critical incidents

With real-time events and notifications and a clearer picture of the scene, you'll be able to respond faster when time is critical.

2



Make more informed decisions

Beyond security, there are analytics for making data-driven decisions, optimizing operations, eliminating choke-points, and improving profitability by using actionable insights.

3



Make better use of resources

By automating tasks that machines can do just as well as, or even better than humans, operators will be able to focus on more advanced tasks.

4



Proactively prevent unwanted events

Analytics can enable proactive action by providing early warnings about situations that might constitute a risk – such as people loitering or a stolen vehicle in the area.



“ Our analytics make it easier to get the insights you need to better protect people and property and make good decisions about your business and operations”.

Mats Thulin,
Director Core Technologies and Analytics, Axis Communications.

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As a leader in video surveillance, we're committed to delivering cutting-edge solutions that seamlessly integrate the best in camera, server, and cloud technologies. We provide the most flexible, and optimal solutions. And we support you every step of the way, so you're prepared to meet today's – and tomorrow's – challenges.

We know you need to balance internal resources and policies with external factors like local and international regulations. While we don't prescribe specific environments or architectures, we do offer the flexibility and the tools you need to make the best decisions for your own unique situation.

The following pages explore the benefits of different approaches and other considerations that will help you choose the best solution.



Where does the processing take place and how does it impact you?

Analyzing video on the camera (at the edge)



[Learn more](#)

Analyzing video on a server



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Analyzing video in the cloud



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Analyzing video in a hybrid solution



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Analyzing video on the camera

Analytics at the edge make systems with many cameras easier to scale because you don't always have to add more servers when you add cameras. In smaller systems, analyzing video at the edge can eliminate the need for an on-site server.

Benefits

There are several reasons why analyzing video at the edge is so beneficial:

- > **More accurate results:** Analytics at the edge run on uncompressed, video. Because the video is intact and undegraded, the results are more accurate.
- > **Real-time alerts:** Response time is faster in edge-based solutions because the latency of server- or cloud-based systems is avoided.
- > **Easy to scale up:** Processing and analyzing video at the edge reduces system load and means you don't need to add server capacity each time you add new cameras.
- > **Improved privacy:** Analyzing video at the edge supports strict privacy compliance because data can be anonymized before transmission.

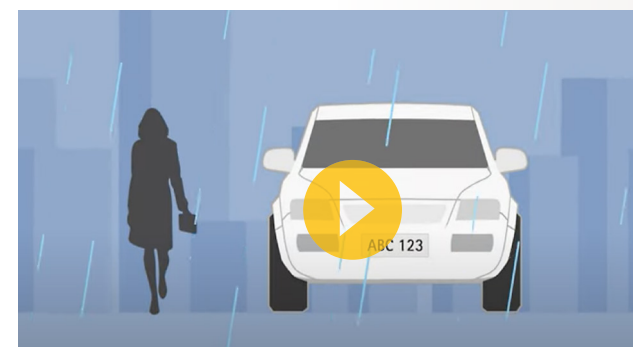
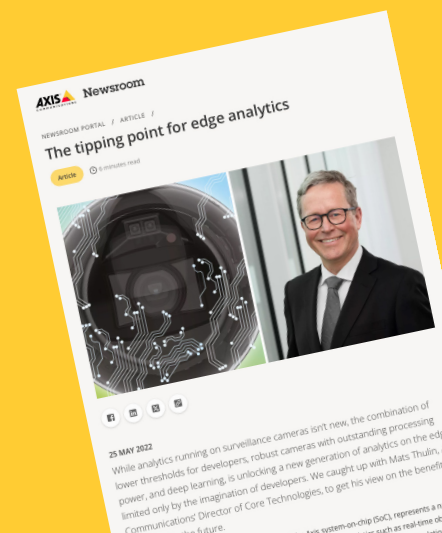
Considerations

- > **Processing power:** Analytics may require more processing power than is available in lower-cost cameras
- > **Hardware compatibility:** Limited support for older, legacy cameras may be an issue.

Benefits of edge analytics

Read more in an interview with Mats Thulin, our Director of Core Technologies, as he explains the present and future of analytics at the edge:

Read the article [here](#)



Watch our edge analytics video [here](#)

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Analyzing video on a server

When you need a lot of processing power, analyzing video on dedicated servers is often the best solution. Servers can also analyze multiple video streams simultaneously from many different sources and perform database searches in huge amounts of data.

Benefits

- > **Data integration:** Data from multiple cameras can be analyzed at one time for more comprehensive insights and correlations.
- > **Enhanced analytics:** Servers tend to have more processing power, so more complex analytics can be used.
- > **Support for video streams from multiple sources:** Dedicated servers can manage analytics for multiple cameras simultaneously.

Considerations

- > **Video quality:** Video to be processed on servers has been compressed for sending, so it may be of lower quality.
- > **Processing power:** Substantial processing power is needed to decompress video before processing.
- > **Maintenance:** Servers usually require more maintenance than individual cameras
- > **Security:** Servers must be installed in a secure environment to protect them from physical and cyber threats.

A server has the advantage of being able to analyze multiple video streams simultaneously.

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Analyzing video in the cloud

Sending video directly from cameras to the cloud enables simultaneous processing of multiple camera streams, providing flexibility and scalability. However, this approach requires a strong and stable internet connection to ensure seamless performance.

Organizations that manage sensitive data – such as banks, power plants, hospitals, and government agencies – often prefer on-premise solutions for greater control and security. In these cases, a private cloud can be a good alternative, offering the flexibility of cloud computing while keeping data securely within the organization's environment.

Benefits

- > **Easier data sharing:** Facilitates smoother integration and sharing across services and systems.
- > **Seamless upgrades:** Provides immediate access to service upgrades and improvements.
- > **Increased processing power:** Supports more complex analytics, including occasional in-depth analyses.
- > **Instant scalability:** Allows for rapid scaling as needs grow.
- > **Efficient processing of multiple video streams:** Simplifies the handling of video streams from various sources and sensors.

Considerations

- > **Internet dependency:** Requires a robust and reliable internet connection.
- > **Recurring costs:** Analyzing multiple camera streams can be excessively expensive.
- > **Complex cybersecurity:** Transmitting video securely to the cloud adds complexity.
- > **Latency:** Sending data back and forth during live on-site monitoring can introduce latency, unlike edge-based processing, where everything happens in-camera for minimal delay.

Secure, flexible and easy to deploy.

The impact of cloud technology

Learn more about cloud technology in end-to-end surveillance solutions [here](#)

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Analyzing video in a hybrid solution

Hybrid systems share the processing load between edge devices, on-premises servers, and the cloud, or any combination of these. They are highly scalable because you can often add cameras with edge analytics without adding servers.

Hybrid solutions that combine edge, server, and cloud analysis are gaining popularity for their many benefits. These setups utilize the unique capabilities of each layer, with cameras handling basic object detection and classification, while more complex, resource-intensive analysis is performed on servers or in the cloud.

Benefits

- > **Hybrid advantages:** You get all the benefits of edge, server, and cloud, including the ability to process video streams from many sources and share information efficiently.
- > **Cost efficiency:** Performing initial analysis at the edge reduces data transmission by sending only relevant information from the cameras. This approach lowers bandwidth usage and lightens the load on other system components, resulting in reduced server and cloud costs.
- > **Integration possibilities:** Combining edge and cloud processing opens new opportunities to integrate and unify data from diverse sensors, dashboards, and other sources.
- > **Enhanced security:** Processing some data on the edge means less data is transmitted, lowering cybersecurity risks and enhancing data security.

Considerations

- > **Complexity in integration and management:** Combining edge, server, and cloud processing can complicate management and troubleshooting. Ensure your solution uses proven standards and supports open interfaces for third-party integration.
- > **Cybersecurity risks:** Data transmission between edge devices and the cloud introduces vulnerabilities, requiring robust security measures. Find resources to safeguard your system [here](#).
- > **Cost implications:** Cloud processing can be expensive, but performing some analysis on powerful edge devices can help reduce costs.

We believe that most surveillance solutions will ultimately be hybrid.



What's right for you?

Contact your local Axis office or one of our partners to discuss what system architecture best suits you.

Find a contact [here](#)

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The foundation for great analytics performance

We are committed to developing top-quality surveillance cameras and advanced analytics that help our customers get the most out of their hardware investment.

Obtaining top performance and valuable insights from analytics involves many factors. We integrate robust hardware, exceptional processing power, AI, and advanced imaging technologies to provide a strong foundation for success. And we always prioritize ease of use.

There are many criteria to consider to obtain the best results:

- ✓ Robustness and reliable performance
- ✓ Ease of use
- ✓ Versatility
- ✓ Open platform
- ✓ Integration capability
- ✓ Technical support

Robust hardware



[Learn more](#)

Outstanding processing power



[Learn more](#)

Intuitive user experience



[Learn more](#)

Sophisticated image technologies



[Learn more](#)

A robust solution means less time and resources spent on false alarms ensuring the most effective solution in the long term.

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Choosing the right camera

Great analytics performance always starts with the right camera. Axis offers industry-leading quality with the world's broadest and most complete product portfolio for network video resulting in outstanding performance even in challenging conditions.

Axis cameras deliver video optimized for analytics, using advanced chipsets to capture key scene details and enhance scene understanding. To guide you in finding the right camera for your need, please visit [Axis product selector](#).

The bigger picture

Image quality is about usability – meaning, images that live up to your specific requirements. You may need an overview of a large area, for example. Or enough detail to identify objects such as people. Axis has a deep understanding of image processing and image usability. This allows you to get the best possible performance in challenging conditions like low light and back light.

Built on years of experience

We've designed our cameras with a host of different needs in mind. Some are vandal-proof, some are built for deterrence, and others are more discreet, meant to blend into their surroundings.



Watch our quality control video [here](#)

Quality you can rely on

Quality has always been a key part of the Axis success story – from the initial design phase throughout the product journey – from design to component sourcing, to manufacturing, delivery and beyond. Making sure we deliver on our promises is our focus every step of the way.

Benefit from AI

We're committed to integrating AI into all new Axis cameras for enhanced analytics performance. Fundamental to our AI-based analytics is the deep learning acceleration provided by our award-winning ARTPEC-8 system-on-chip (SoC). ARTPEC-9, our latest SoC, builds on this foundation to further enhance performance.

Meticulous testing for exceptional results

We set high standards for reliability and performance. Our cameras are always tested rigorously for durability and accuracy under various conditions.

Read the white paper [here](#)

Our cameras for advanced analytics feature:

- > Powerful deep learning
- > Granular object classification
- > Support for third-party AI-based analytics
- > Edge-based processing for scalability
- > Advanced image technologies:
Axis Scene Intelligence, Axis Lightfinder, Axis OptimizedIR and more.



Maintaining a clear view

Timely firmware and software updates – or "digital maintenance" – are crucial to effective analytics, but physical upkeep is equally important.

A clear view is essential to accuracy. Whether caused by poor lighting or a dirty lens, poor image quality can affect performance. To get the most from your investment, Axis recommends proactive digital and physical maintenance.

Read more [here](#)



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Cutting-edge processors for AI on the edge

At the heart of every Axis product is our advanced ARTPEC system-on-chip (SoC), which significantly boosts video analytics performance through enhanced processing power and deep learning capabilities at the edge. The integration of AI in our ARTPEC SoCs improves camera performance across various aspects, including configuration, image quality, and video analytics.

For edge processing in IP cameras, a dedicated system-on-chip (SoC) is preferred due to its power efficiency and integrated analytics capabilities. For enhanced analytics performance, it is beneficial if it includes a deep learning processing unit (DLPU). DLPUs use advanced neural networks to analyze complex patterns in data. This makes them ideal for tasks like object recognition and classification. AI-powered video analytics can recognize complex activities, detect anomalies, and make intelligent predictions about the future. All new Axis cameras come equipped with a DLPU.

The heart and the brain of every Axis product is its system-on-chip (SoC)

Most of our products feature our own ARTPEC SoC, developed in-house to perfectly match the requirements of professional video surveillance.

Axis Communications won The Security Industry Association's (SIA) award 2022 for Advanced Imaging Technologies for the latest SoC, ARTPEC-8.

Learn more [here](#)

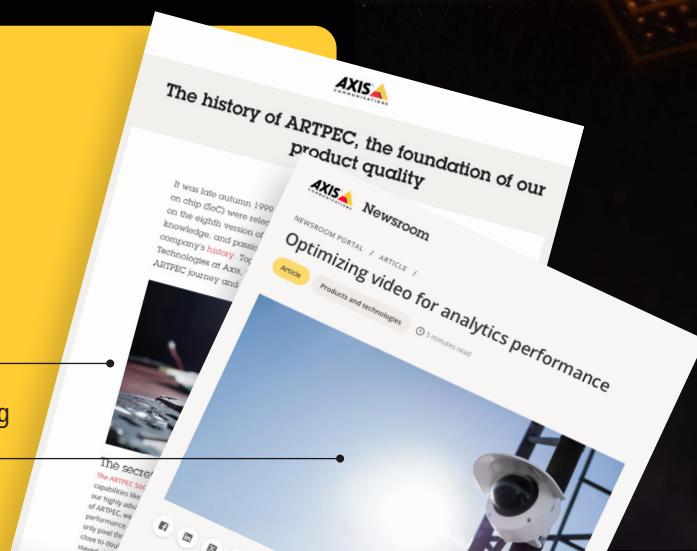


Learn more

Axis is one of the few companies developing proprietary SoCs in-house. Read more about:

The history of ARTPEC [here](#)

Read more about optimizing analytics using AI [here](#)



Axis ARTPEC-9 system-on-chip introduces next-generation analytics with superior image processing. Read more [here](#)

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Video Management Software that makes the most of your analytics

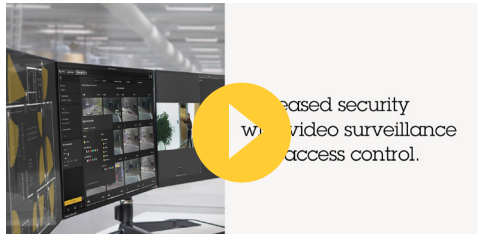
Video Management Software (VMS) is the core of any surveillance system. Your VMS integrates with cameras, encoders, recorders, underlying storage infrastructure, client workstations, gateway systems, and – not least – video analytics.

The heart of every solution

A VMS is central to your surveillance workflow, providing a unified interface for managing your video infrastructure. It should empower you to fully leverage video analytics with ease. AXIS Camera Station, our robust VMS, does just that, ensuring a seamless experience for all your surveillance needs.

A powerful rules engine

Equipped with a flexible rule engine and intuitive user interface, AXIS Camera Station lets you easily set up rules to trigger actions based on specific events such as when a person or vehicle is detected in a scene. For example, this enables automated actions like starting a recording, turning on lights, playing a message, or notifying a guard whenever your predefined events occur.



Learn more about **AXIS Camera Station Pro** [here](#)

Smart search functionality

AXIS Camera Station features an advanced timeline with video scrubbing and event display, making it easy to find exactly what you're looking for. With smart and intuitive search functionality, you can quickly locate important scene details in your video. For instance, you can search for objects based on specific characteristics or attributes.

Built for the future

Our next generation of AXIS Camera Station is a well-packaged, single-vendor, end-to-end offering, providing great flexibility. Whether you need simple video management software or something more powerful and feature-rich, there's a solution that suits your needs.

Find out more about [AXIS Camera Station solutions](#) on [axis.com](#)

Partner VMS solutions

In addition to AXIS Camera Station, we offer a variety of applications to support customers using partner VMS software. For example, AXIS Optimizer for Milestone XProtect® is a free suite of integrations that enhances Axis device performance within the Milestone VMS. This one-time installer streamlines daily workflows, saving users valuable time and effort.



Video management software enables you to fully leverage your analytics.

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Image processing

Analytics, no matter how powerful, rely on the technologies that support them. Without quality image processing, you won't get acceptable results. The data you get can only be as good as the image it comes from.

The effectiveness of analytics relies heavily on the image technologies supporting them.

It's often said that bad data in, equals bad data out. Since images are the raw data source for analytics, high-quality image processing is crucial.

Things like noise filtering, contrast enhancement, and motion blur affect the precision of analytics. Good performance in low light can be a challenge. And in installations where vibration is an issue, image stabilization is vital to high-performance of analytics.



Explore our image technologies [here](#)

To find out what technology is available in a specific camera please visit our product comparison table [here](#)

Or go to our product selector [here](#)



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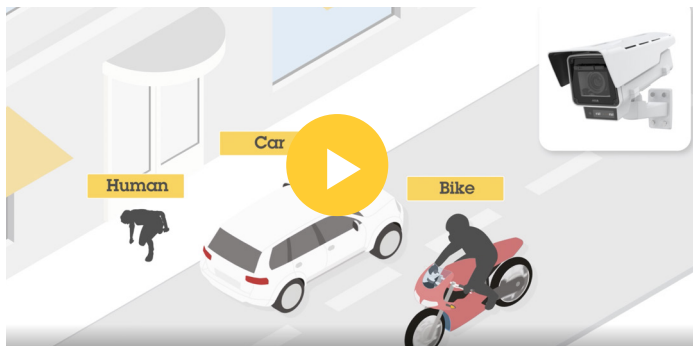
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Axis Scene Intelligence

Axis Scene Intelligence creates a superior foundation for analytics performance. It includes our latest technology based on a deep understanding of image processing, image usability, and expertise in edge analytics and deep learning.

The foundation for high-quality analytics

Axis Scene Intelligence technology puts market-leading expertise from decades of experience with image processing and deep learning to work. The result is a foundation for consistent performance with fewer false alarms. Axis Scene Intelligence uses algorithms trained to deliver detailed metadata under challenging surveillance conditions – like low light and wide dynamic range. Plus, automatic adaption eliminates the need for fine-tuning during installation and adjusting when circumstances change. That adds up to cost savings on installation and support.



See the [Axis Scene Intelligence video here](#)

Axis Scene Intelligence builds on decades of expertise in image processing and deep learning.

Learn more [here](#)

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Axis Lightfinder

Axis Lightfinder technology delivers high-resolution, full-color video with minimal motion blur, even in near darkness. It reduces noise and reveals details in low light, ensuring excellent image quality even when external light sources are not an option.

See colors in low light.

Illumination impacts analytics performance by affecting contrast. Axis cameras with Lightfinder technology use sensitive sensors and advanced image processing to capture full-color images in low light, often discerning between colors better than the human eye. Accurate colors improve object identification and detail and are vital to forensic purposes.



See Axis Lightfinder in action [here](#)

Did you know?

For cameras, light is essential. However, there are other detection technologies available. Our thermal cameras can detect possible intruders when the distance to cover is long and at times when no light is available.

Read more [here](#)



Detecting moving objects on a rainy day, or in the middle of the night, can also be very challenging for a visual camera, while a radar, on the other hand, has hardly any problems.

Read more [here](#)

Axis Lightfinder delivers high resolution, full color video with a minimum of motion blur even in near darkness.

Some light reading – Find out more about the evolution of Lightfinder technology [here](#)

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Axis OptimizedIR

Low light can impact video quality and analytics. When adding extra lighting isn't possible, Axis OptimizedIR is the solution. It combines advanced camera technology with powerful LED lighting to provide effective IR performance in complete darkness.

Dealing with darkness

OptimizedIR is tailored for specific cameras and situations. For example, in PTZ cameras, the IR beam adjusts automatically as the camera zooms to ensure even illumination. Discreetly placed IR LEDs with individually adjustable intensity help prevent reflections, while some fixed dome cameras feature an IR-shielded dome that prevents reflections from rain and snow.

Find out more about Axis OptimizedIR [here](#).

**Boost image quality
with advanced camera
intelligence and cutting-edge
LED technology.**



No light?



See the Axis OptimizedIR video [here](#)

Read more

Learn more in our white paper
"IR in surveillance,
Day-and-night cameras
and OptimizedIR"

Download the
white paper [here](#)

IR in surveillance
Day-and-night cameras and OptimizedIR
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Electronic image stabilization

Electronic image stabilization (EIS) counteracts vibrations to provide clear, precise images even in high-motion, dynamic scenes.

Minimizing motion blur for clearer footage

Cameras on high poles or near busy roads can suffer from motion blur due to wind or traffic. EIS minimizes these effects, making images more usable for analytics and operators. Built-in gyroscopic sensors in Axis network cameras automatically adjust the images to maintain clarity. EIS also reduces bitrate, saving bandwidth and storage space.



Smooth video despite vibrations

Watch our image stabilization video [here](#)

Ensure clear images even when the camera is subject to motion or vibration.



Find out more about electronic image stabilization [here](#)

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The importance of live testing

Because every video surveillance installation is unique, carrying out live on-site testing to evaluate the performance of video analytics is important. When you take all the many factors in play into consideration, you can often optimize performance.

Factors such as camera selection, scene dynamics, illumination, and camera placement are all important with regard to performance. Camera placement and configuration, for example, significantly impact image usability because of their effect on contrast, dynamic range, angle of view, and so on. Adjusting such factors may increase performance.

For tasks such as license plate recognition or people counting, cameras must be installed according to specific requirements. Ensure the camera meets exact standards for pixel density, mounting location, and field of view. Adhering to these guidelines and testing the setup in your environment are crucial for achieving optimal performance.

Every surveillance installation is unique.

Watch out for:

- > Shaded areas or whiteout effects from poor lighting
- > Image blur or pixelation from compression settings
- > Motion blur from slow shutter speeds
- > Excessive noise in low light
- > Overlay text blocking critical parts of the scene
- > Vegetation or obstacles blocking key objects

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The open ecosystem

Open systems from Axis offer the flexibility to find the ideal solution for your needs. Choose from a wide range of analytics from Axis and our global partners. We're committed to creating value for customers, developers, and communities, and we invite them to collaborate with us to explore limitless possibilities.

Open standards let you address evolving threats and improve business performance. AXIS Camera Application Platform (ACAP) lets developers integrate advanced technologies and boost functionality with a wide range of tailored applications.

Find compatible analytics designed by Axis and our Application Development Partners [here](#).

Benefits of an open ecosystem

- > **More choices:** Choose solutions that fit your needs with the flexibility of an open ecosystem.
- > **Interoperability:** Open standards and APIs ensure easy integration and improved functionality.
- > **Cross-platform adaptability:** Standardized rules and known APIs make it simple to move applications between platforms.

Axis analytics solutions are easy to use and compatible with all major video management systems.



Interested in becoming an Axis partner?

Collaboration is at the heart of what we do. Together, we shape new opportunities and drive market innovation. Find out more [here](#)

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AXIS Camera Application Platform

AXIS Camera Application Platform (ACAP) is our well-established open platform that enables great opportunities for developers to develop applications and analytics on the edge for a wide range of Axis products.

Tailored solutions for every need

ACAP extends the functionality of the camera (or devices) to include custom-made analytics to address specific use cases. Our customers and partners use ACAP to build tailor-made solutions that run on the edge and integrate with your management systems.

Key features include:

- > Open software frameworks and industry standard APIs
- > Support for high-level programming languages
- > Deep learning toolchain and APIs



See the **Axis ACAP video** [here](#)

Empowering developers

Read more about how ACAP empowers developers making the move to edge computing [here](#)



ACAP allows partners and developers to develop analytics for a wide range of industries and use cases.



Are you a developer?
Collaborate with us on GitHub [here](#)

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Axis analytics solutions

Axis analytics solutions provide cities, businesses, and organizations with crucial insights to help them improve safety and security, make faster and more informed decisions, and boost overall efficiency. Many Axis analytics also come preinstalled at no additional cost.

Combining Axis hardware with dedicated software simplifies installation. You benefit from seamless, single-vendor solution with a unified interface, one contact for support, and a single design tool. This ensures full system compatibility, eliminates unnecessary complexity, and provides peace of mind throughout the process.

From the user's perspective, one of the greatest strengths of Axis equipment is its reliability: "It just works."

**Intuitive.
Insightful.
Open.**

Easy access to actionable insights.

Watch our analytics video [here](#)

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Axis analytics deliver actionable insights and results.

Axis analytics portfolio

We provide innovative, easy-to-use analytics solutions that you can trust. Some are preinstalled in selected cameras for your convenience and most of them are free of charge.



AXIS OBJECT ANALYTICS

Supported scenarios:

- > Object in area
- > Line crossing
- > Time in area
- > Crossline counting
- > Occupancy in area



AXIS PERIMETER DEFENDER



AXIS SCENE METADATA



AXIS AUDIO ANALYTICS



AXIS LICENSE PLATE VERIFIER



AXIS IMAGE HEALTH ANALYTICS



AXIS LIVE PRIVACY SHIELD

AXIS FACE DETECTOR
[LEARN MORE](#)

AXIS FENCE GUARD
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AXIS LOITERING GUARD
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AXIS MOTION GUARD
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AXIS VIDEO MOTION DETECTION
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AXIS BARCODE READER
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AXIS RADAR DATA VISUALIZER
[LEARN MORE](#)

AXIS SPEED MONITOR
[LEARN MORE](#)

Intuitive.
Insightful.
Open.

Find the right fit:

Explore a wide range of additional analytics developed by Axis partners in the [Axis Application Gallery](#), ready to be embedded in Axis products.

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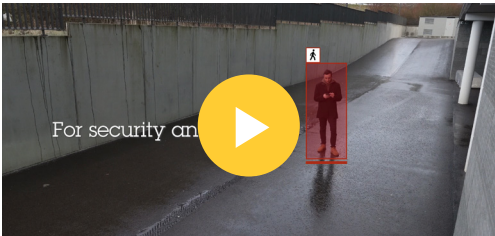
A suite of AI-based analytics for actionable insights

AXIS Object Analytics is a suite of AI-based analytics that lets you detect, classify, track, and count humans and various types of vehicles to make informed decisions. It delivers real-time intelligence for immediate action.

Added value at no extra cost

AXIS Object Analytics comes preinstalled on compatible Axis network cameras, adding value at no extra cost. Thanks to AI-based classification, you can focus only on objects of interest and events that need attention, for effective monitoring. You can run multiple use cases simultaneously and set up triggers for various events based on your needs. So you can respond appropriately to events in real-time, and use automated processes and valuable insight into trends to optimize your business.

Like all Axis analytics, this edge-based analytics processes and analyzes live video directly on the camera, decreasing the need for costly servers. You also benefit from more efficient data processing, minimized storage and bandwidth requirements, and improved scalability.

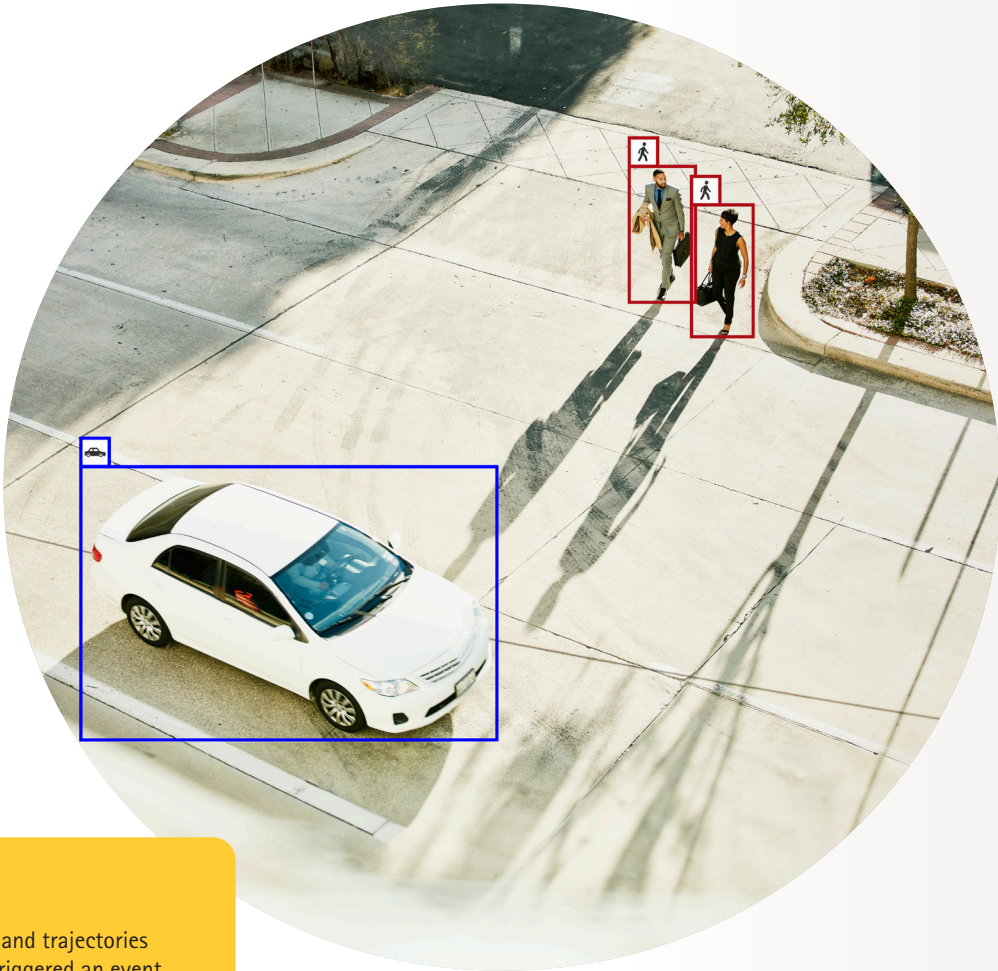


See the **AXIS Object Analytics** video [here](#)

Cost-efficient operations

AXIS Object Analytics supports bounding box overlays and trajectories in live and recorded video, helping you identify what triggered an event. You can quickly verify events and automate responses. AXIS Object Analytics integrates with AXIS Camera Station and other major video management systems.

AXIS Object Analytics transforms video into valuable insights you can act on instantly.



Learn more about **AXIS Object Analytics** [here](#)

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High-security, long-range perimeter protection

AXIS Perimeter Defender reinforces physical access control to give you an edge where security starts – at the perimeter of your site. Together with Axis cameras, it provides an effective edge-based system that automatically detects and responds to people and vehicles intruding on your property.

AXIS Perimeter Defender uses motion- and AI-based detection to detect and classify humans and vehicles in restricted areas over long distances. Optimized for Axis thermal cameras, it's suitable for high-security perimeter protection under challenging light- and weather conditions.

Efficient analysis and event handling

AXIS Perimeter Defender is compatible with many video management software systems, allowing you to program automatic responses to trigger alarms. For example, it's possible to automatically play a message from loudspeakers, turn on lights to scare off intruders, or trigger real-time alerts to inform staff that immediate action is needed. When using the optional AXIS Perimeter Defender PTZ Autotracking, you can automatically zoom in and track intruders with a PTZ camera to capture greater details.



Thermal cameras can see far along fence lines by detecting the heat of intruders at great distances.

Read more about how our thermal cameras make use of powerful analytics [here](#)



Learn more about
 AXIS Perimeter Defender [here](#)

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Get instant access to key scene details

AXIS Scene Metadata boosts insights by pinpointing crucial scene details, supporting efficient analysis of past and current events. This facilitates rapid decision-making, automation, and efficient video search.

A camera stream focused on key details

AXIS Scene Metadata is a separate camera stream, that provides a detailed description of what occurs in a scene – when, where, how, and in some cases why. These details include object classifications (such as humans or vehicles), clothing and vehicle colors, license plate information, as well as location, time and speed data.

Powered by Axis Scene Intelligence

The precision of the metadata relies on **Axis Scene Intelligence**, ensuring high-quality images and refined object classification through algorithms trained on relevant data. When integrated with various platforms, including event-based analytics, AXIS Scene Metadata improves situational awareness and insights.

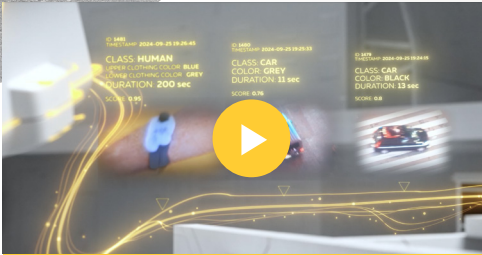


What details can be described?

AXIS Scene Metadata describes moving objects in the scene, including their location, class, appearance, and movement. Examples include:

- > **Humans** (including faces and upper and lower clothing color)
- > **Vehicles** (including type of vehicle, license plate, vehicle color)
- > **Best snapshot**
- > **Trajectory**
- > **Speed** (requires radar)
- > **Geolocation** (requires radar)

Explore the metadata stream produced by an Axis device in [AXIS METADATA MONITOR](#)



See the **AXIS Scene Metadata** video [here](#)

AXIS Scene Metadata enhances scene understanding for multiple users

Edge applications

Cameras with edge analytics trigger events by filtering scene metadata according to pre-configured sets of rules (scenarios).

Multi-layer analytics

To provide more detailed information about objects and activities of interest, some advanced analytics analyze scene metadata multiple times. First on the edge, and then again on a server or an IoT platform.

Video Management Systems (VMS)

Video Managements Systems use the metadata stream to find objects and activities of interest in the quickest, most efficient way possible.

IoT platforms

IoT platforms analyze aggregated scene metadata to provide actionable insights by visualizing trends and patterns in dashboards.

Improve awareness by analyzing sound alongside vision

AXIS Audio Analytics uses AI-powered technology to deliver audio-based insights alongside visual information from cameras. This combination can help staff respond faster.

Audio analytics analyze and classify sound patterns to enable early detection and prompt intervention, which can help prevent escalation. Audio analytics can significantly improve response time and operational efficiency across a wide range of industries.

[WATCH VIDEO](#) to find out more.



How does audio classification work?

- 1 Sound detection:** AXIS Audio Analytics continuously monitors audio levels, identifying sudden increases in volume
- 2 Alert generation:** The system triggers notifications for significant audio events, such as loud noises and disturbances.
- 3 Event classification:** AI-classifiers identify specific sound patterns of interest, such as screaming or shouting.
- 4 Integration option:** For better scene understanding, audio notification can be combined with verification via visual information from cameras.



Learn more about
AXIS Audio Analytics [here](#)

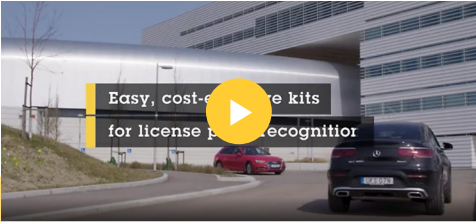


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Hassle-free license plate recognition

AXIS License Plate Verifier swiftly reads license plates to improve traffic management, access control, and parking solutions. Its range of other potential applications, include aiding in monitoring vehicle movements and identifying stolen or missing vehicles.

AXIS License Plate Verifier offers real-time, AI-powered license plate recognition with accurate readings at speeds up to 105 km/h (65 mph). It features an intuitive interface with event logs and license-plate thumbnails for easy management. Plus, because processing takes place at the edge, only a fraction of the bandwidth and storage is needed because only relevant data is transmitted.

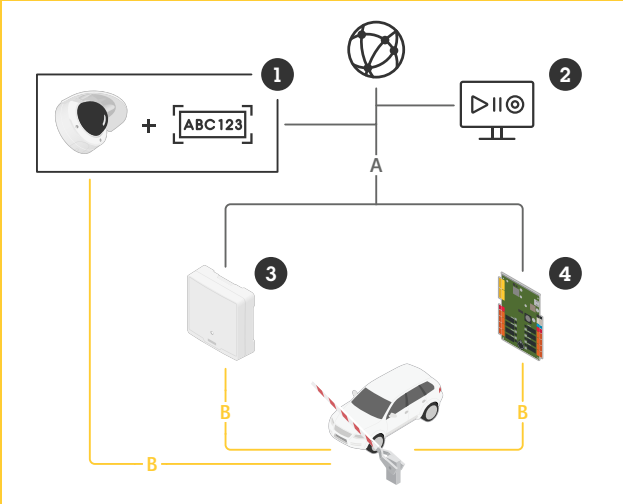


See the **AXIS License Plate Verifier** video [here](#)

Learn more about **AXIS License Plate Verifier** [here](#)



- Example of a basic vehicle access procedure:
- 1 Detection and reading of the license plate.
 - 2 Verification that the license plate is on the allow list.
 - 3 Confirmation that the license plate is permitted to access the West parking lot between 8:00 AM and 6:00 PM.
 - 4 Opening of the barrier to grant access.



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AI-powered image health monitoring

AXIS Image Health Analytics alerts you if the image from a camera declines in quality or otherwise changes. So, you can address issues quickly – and rely on the accuracy of your video.

Know your system is operating reliably

This smart application alerts you if a camera image is not as it should be. You can decide how you want to receive the information – for instance as real-time notifications or in a daily report. AXIS Image Health Analytics also works smoothly with most video management software, and it can be seamlessly integrated with other analytics.

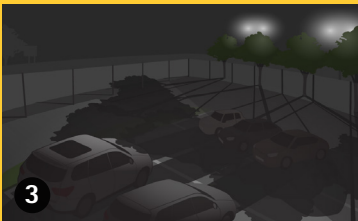
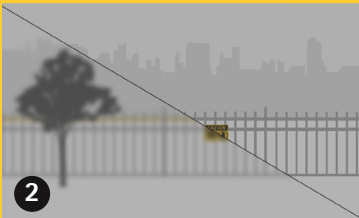


Get notified if the image of a scene changes:

This AI-powered application notifies you when the camera image has been:

- 1 Blocked
- 2 Blurred
- 3 Underexposed
- 4 Tampered with

Monitor image quality across multiple sites directly from your VMS without having to check video streams manually.



Learn more about AXIS Image Health Analytics [here](#)

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Versatile dynamic privacy masking

Remotely monitor activities in real-time, indoors and outdoors, while safeguarding privacy. This versatile, edge-based application enables AI-based dynamic masking of moving and still objects such as humans, license plates, and backgrounds.

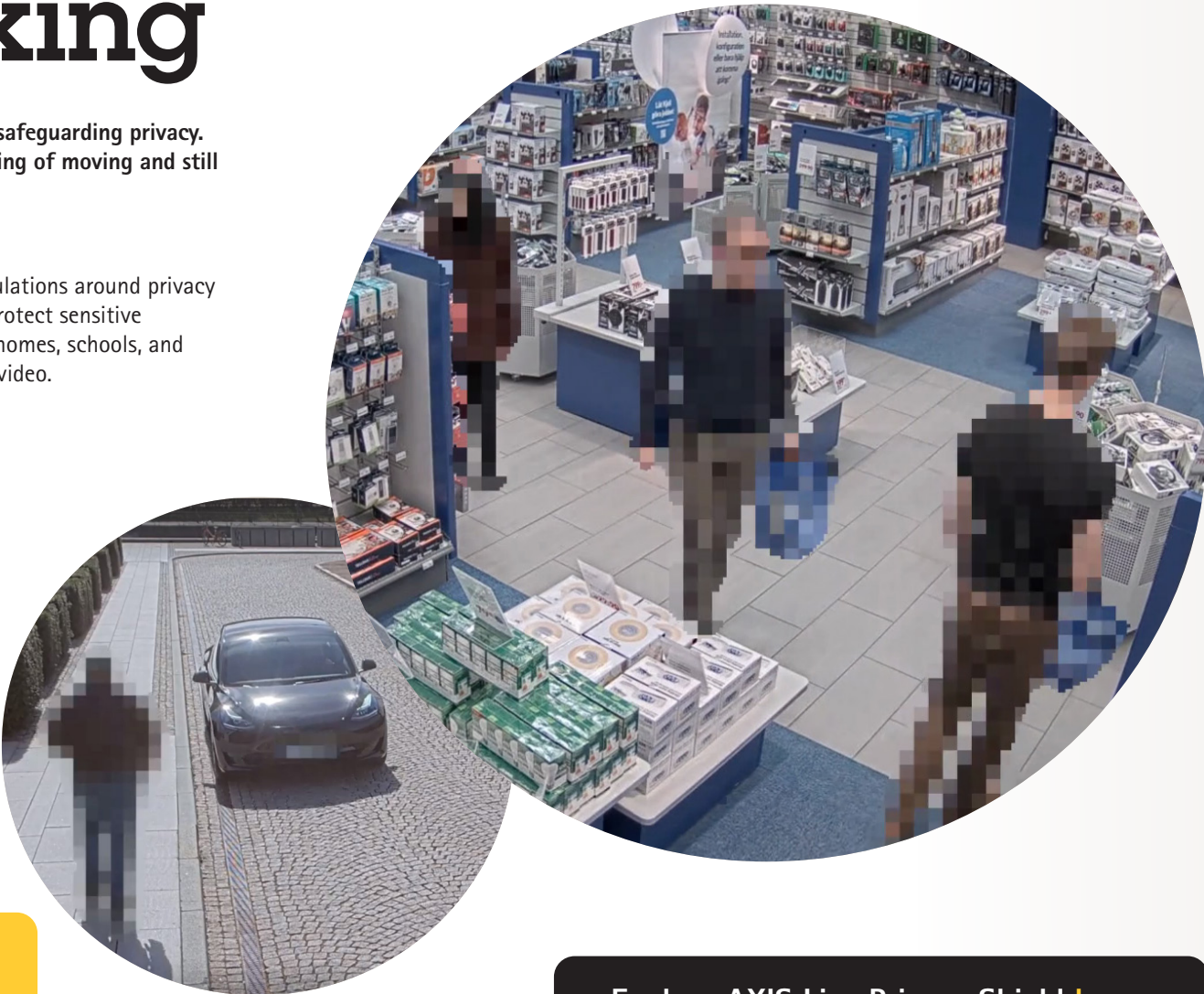
Two methods of dynamic masking

AXIS Live Privacy Shield lets you monitor activities while addressing regulations around privacy and personal data. It blurs humans, license plates, and backgrounds to protect sensitive information in sensitive areas. Suitable for locations like hospitals, care homes, schools, and offices, it masks personal data in real-time in live video and in recorded video.



Learn more about how to benefit from remote monitoring while safeguarding privacy [here](#)

Monitor activities remotely while safeguarding privacy.



Explore AXIS Live Privacy Shield [here](#)

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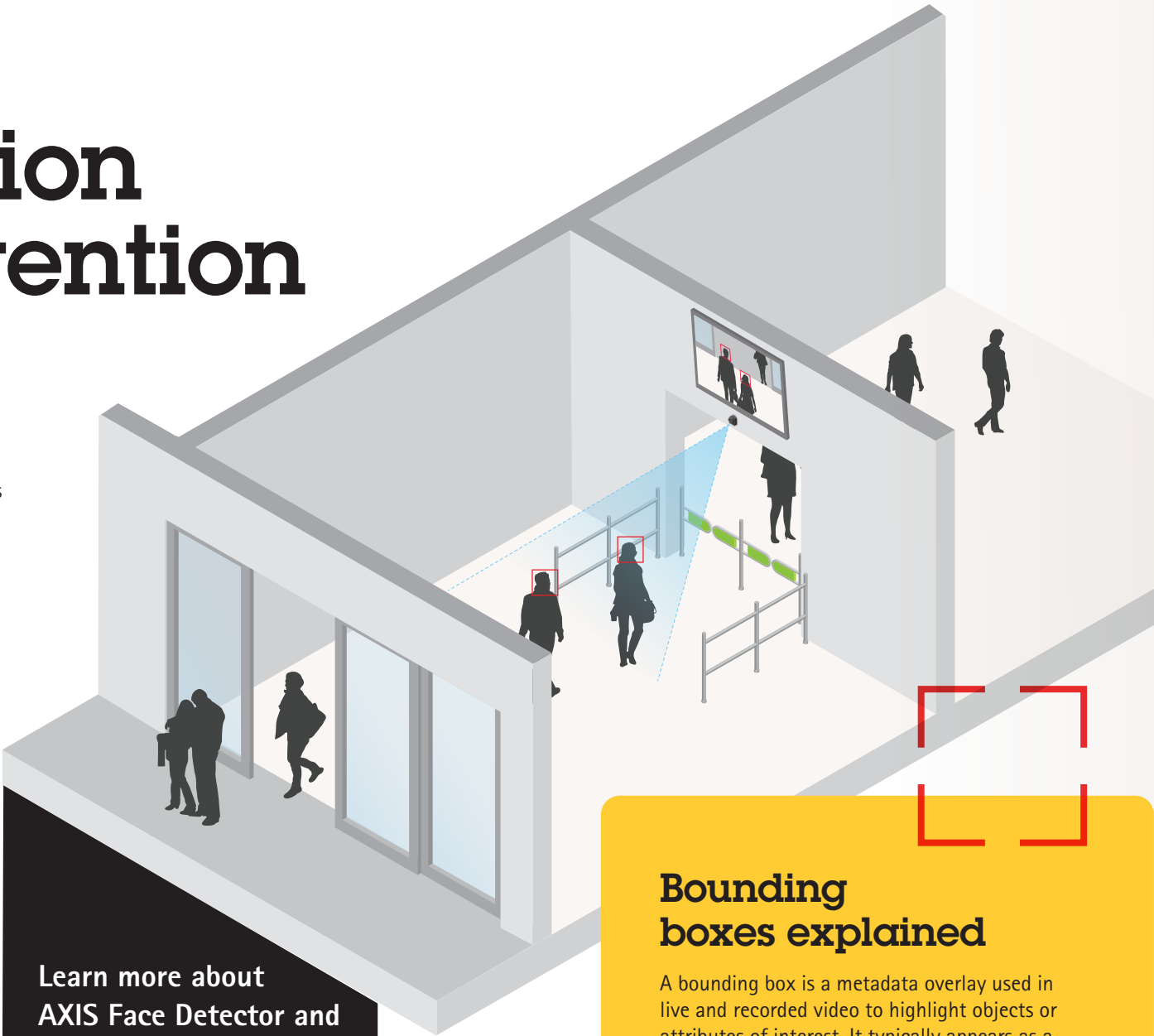
Face detection for loss prevention

AXIS Face Detector detects faces in live video, applies bounding box overlays, and displays the video stream on public view monitors, such as at store entrances. This helps deter thieves by creating an impression of active monitoring.

Showing potential shoplifters that they are being monitored helps proactively reduce theft and other undesirable behavior in your stores. This solution signals that people are under surveillance, enhancing security and providing peace of mind for both customers and employees – with no need for watch lists or the collection of personal data.



See AXIS Face Detector in action [here](#)



Learn more about
AXIS Face Detector and
how it can benefit your
organization [here](#)

Bounding boxes explained

A bounding box is a metadata overlay used in live and recorded video to highlight objects or attributes of interest. It typically appears as a rectangular box around relevant items that draws the operator's attention to important elements in a scene.

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Legal and ethical considerations

In surveillance, it's important to balance privacy with improving security, safety, and efficiency. This means staying updated on privacy laws and using AI responsibly with ethical and legal considerations in mind.

Every installation and use case requires careful ethical consideration and adherence to local laws. It's also crucial to focus on cybersecurity and prevent unauthorized access to video. However, edge-based analytics can support privacy by allowing only anonymized metadata to be transmitted.

The rise of analytics in surveillance systems introduces new considerations. While AI-based analytics are highly accurate, errors can still be made, so decision-making should involve experienced operators – a practice known as keeping a "human in the loop." It's also crucial to understand that human judgment can be influenced by how data is presented. Proper training and awareness of analytics are essential to avoid incorrect conclusions.

The way deep learning algorithms are developed can also be cause for concern. A cautious approach to applying the technology is required for certain use cases. The quality of the algorithms is fundamentally linked to the datasets used for training the algorithm – that is, the videos and images.

Tests have shown that if the training data is not carefully selected, some AI-based solutions may exhibit both ethnic and gender bias. This has sparked discussions and led to legislative measures aimed at addressing such issues during development. Furthermore, it's always important to balance the advantages of operational efficiency and new potential use cases with a mindful discussion of where and when to use the technology.

Working in the surveillance space over many years has helped Axis develop the strong ethical code of conduct that continues to guide us through new technologies and shifts in the market. Together with our partners, we strive to always take advantage of new opportunities responsibly.

We care about privacy

Learn more about privacy and ethics in surveillance

[here](#)



Read more

Read more about our solutions and how they support privacy

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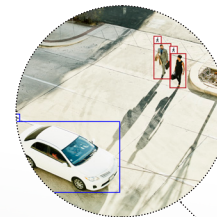
A history of innovation

Axis was founded in 1984, and we've been developing technology designed to make the world a safer and smarter place ever since.

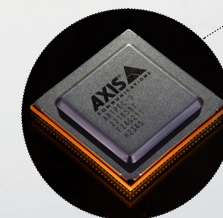
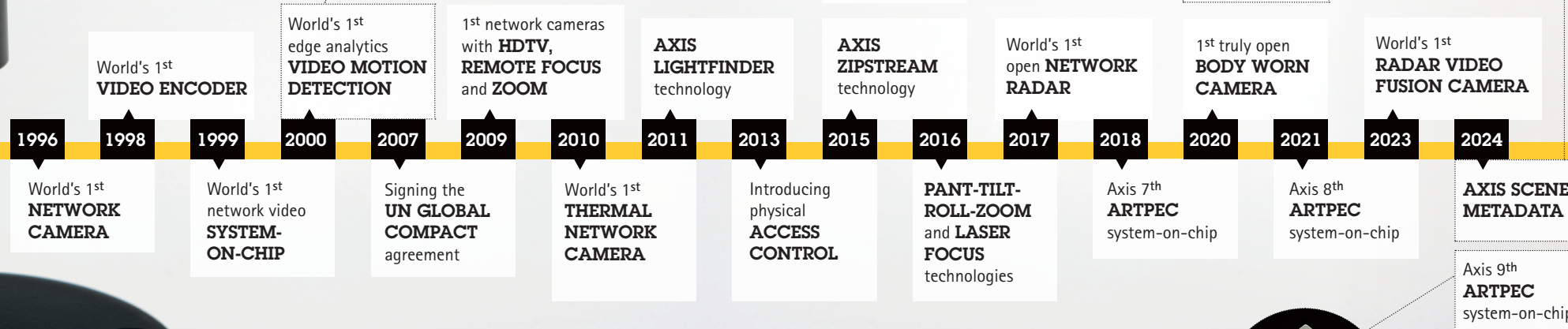
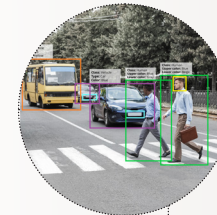
We delivered the first analytics for surveillance more than 20 years ago. Since then, analytics technology has made giant leaps forward. And things will just keep getting better with future innovation in hardware, software, and platforms.



1st generation
**AXIS CAMERA
APPLICATION
PLATFORM (ACAP)**

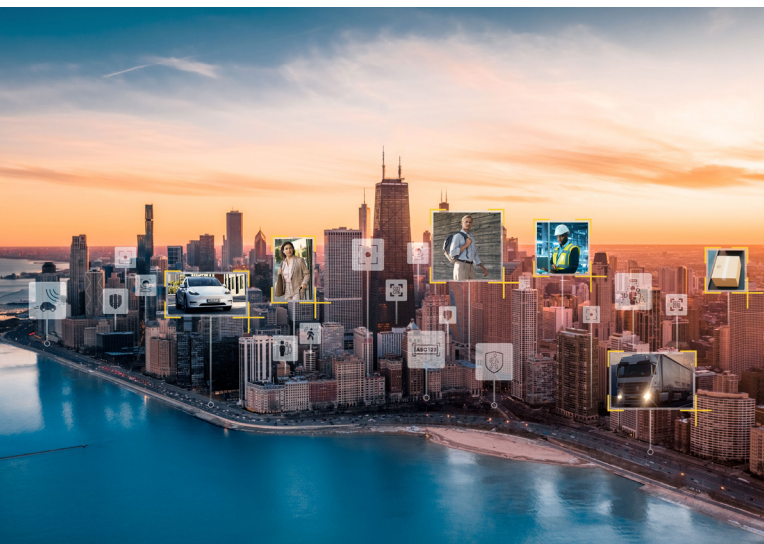


Axis 1st
deep learning
camera with
**AXIS OBJECT
ANALYTICS**



Read more about the Axis legacy [here](#)

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Axis delivers the foundation for great analytics performance

- ✓ Advanced image processing
- ✓ High-quality hardware
- ✓ AI-powered edge analytics
- ✓ Relevant training data
- ✓ Modern development tools
- ✓ Open integration

Why choose analytics solutions from Axis?

Enjoy the easiest access possible to valuable – actionable – insights through a wide range of flexible and scalable analytics solutions.

> Widest range of smart edge devices and technologies

The development of our analytics solutions is driven by our vision of a smarter and safer world. We see analytics, combined with our wide portfolio of smart edge devices, as a way to move toward this vision.

> Excellent scene understanding with AI

Axis AI-powered analytics and detailed scene metadata greatly improve scene understanding. Our solutions enable you to respond swiftly to protect people and property or make informed decisions about your operations.

> Open platform equals many options and seamless integration

Open standards, industry leading analytics, and our powerful ACAP platform allow for flexible integration. This lets you tailor solutions to your needs without complicating the installation process.

> Higher value through close partner collaboration

Close collaboration with system integrators, technology partners, and others is essential to delivering high value. Working with skilled partners helps us continuously adapt to meet evolving customer needs.

Want to know more?

Find your local sales office [here](#) or fill out this [form](#) and we will contact you regarding your specific needs.

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Resources for success

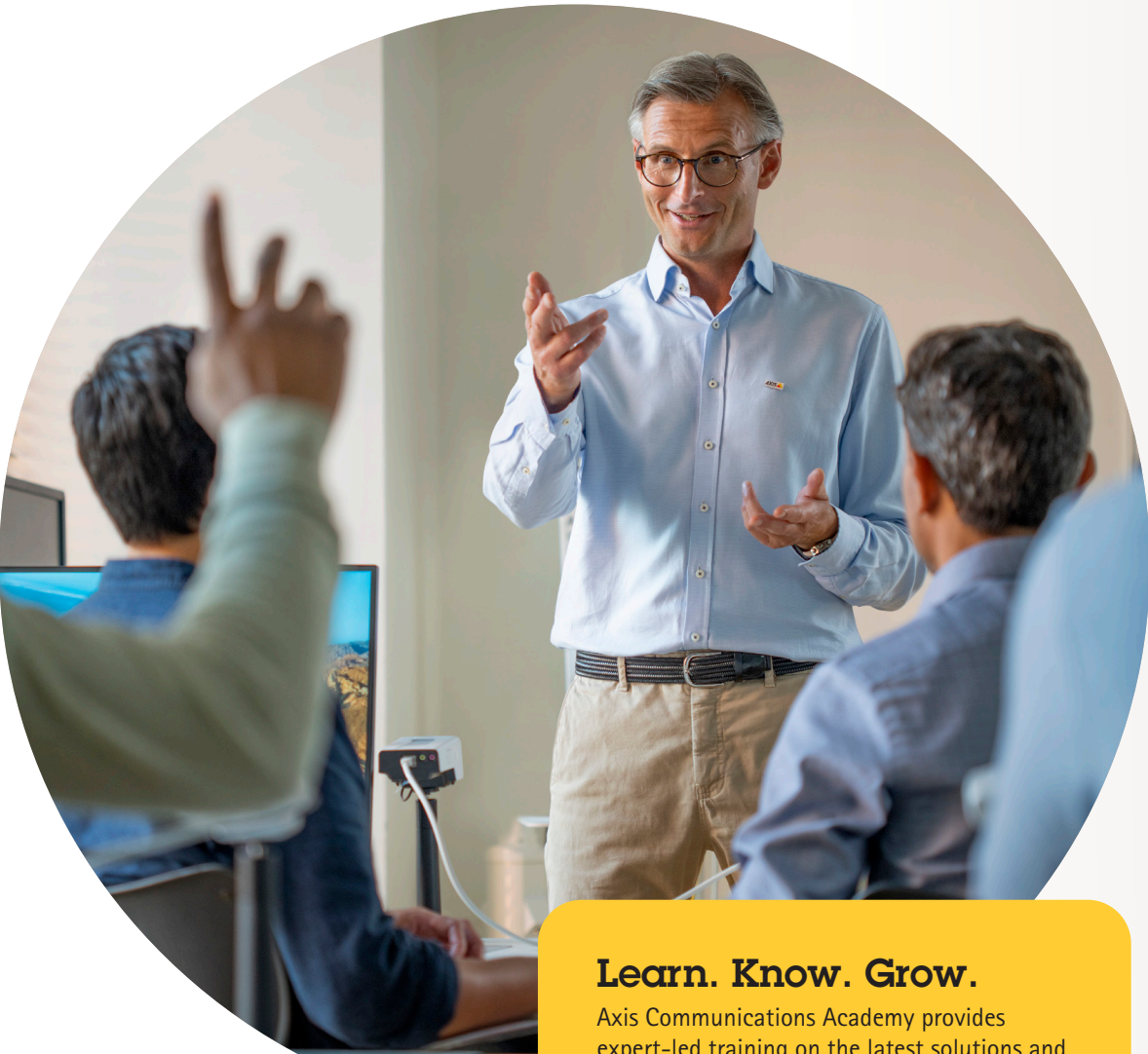
We are committed to delivering high-quality products and supporting you in making the most of them.

We focus on training our skilled partners to design installations and configure Axis products for maximum benefit. We provide extensive educational resources and training, including instructor-led and online courses on analytics. From basic training to application-specific training, we offer opportunities for everyone to deepen their knowledge and expertise.

Newsroom

Find the latest news and stories from Axis and learn more about video analytics. [Click here](#)

From basic to advanced courses, everyone is welcome to join and learn.



Learn. Know. Grow.

Axis Communications Academy provides expert-led training on the latest solutions and technologies. Gain valuable skills, boost your performance, and stay ahead with our hands-on courses.

Explore the Academy [here](#)

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About Axis Communications

Axis enables a smarter and safer world by improving security, safety, operational efficiency, and business intelligence. As a network technology company and industry leader, Axis offers solutions in video surveillance, access control, intercom, and audio systems. These are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 5,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden.