



# Axis analytics

Easy access to actionable insights

Enter >

**AXIS**<sup>®</sup>  
COMMUNICATIONS



# Intuitive. Insightful. Open.

In the world of security, new technologies are emerging. And because of the development of artificial intelligence (AI), analytics have become a major differentiator in video surveillance, which helps facilitate security, safety and operational efficiency.

Enjoy the easiest access possible to actionable insights based on video, audio, and other data. How? By opening the doors to a wide range of flexible, scalable analytics solutions – 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 excellent support, and an intuitive user experience built on our 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

**A wide portfolio. An extensive partner network.**

Open standards and a flexible, robust development platform. Support for artificial intelligence (AI) on the edge, and a library of tailored applications. It all adds up to a wide range of adaptable, scalable analytics solutions.

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

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# What you will 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 is
- 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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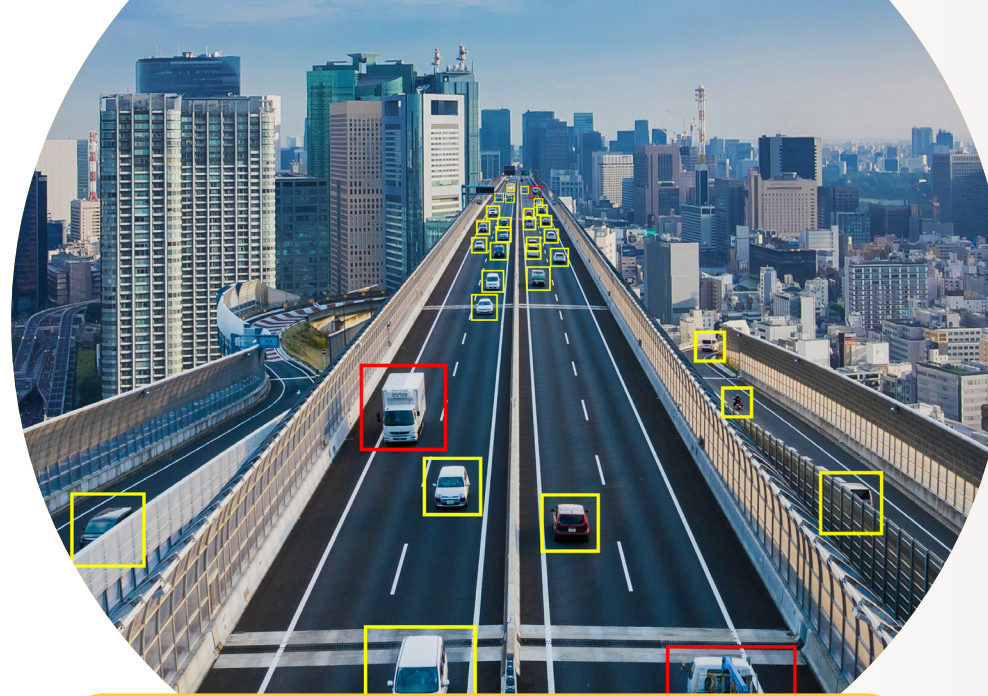
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# What are analytics?

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 go through 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 events can be anything from a human detected in a restricted area to a vehicle approaching a gate. This can help operators and staff more efficiently answer the relevant questions who, what, where, and when, and focus their attention on what really matters.



## 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.

### AI in analytics

When someone mentions analytics, the first phrase that pops into most people's heads is artificial intelligence. This white paper takes a closer look at how artificial intelligence can take analytics to new levels, 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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Watch our analytics video [here](#)

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# Analytics for a smarter, safer world

## 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 camera [metadata](#) allows you to pinpoint only relevant video clips, reducing analysis time from hours to minutes.

## 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 visitor journeys.

## Privacy



With intelligent masking, 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 mask the identities of individuals, but allows you to see their movements.

Analytics are used to increase security and safety and optimize business operations and management. There are also analytics designed to actively protect people's privacy in surveillance. Ultimately, it will help you use your resources more efficiently.

To be able to offer the best analytics solutions – together with our partners – we have developed a deep understanding of our customers' needs. This is crucial when it comes to developing analytics to meet a wide variety of requirements. It requires close attention to the challenges our customers face every day, a strong understanding of technology, and the ability to tie it all together.

## 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 (line crossing). Examples of actions include starting recording, live streaming, turning on lights, automatically playing a message, and sending notifications.

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

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



## Find what you're looking for

Accelerate investigations by enabling efficient search in multiple video streams to find objects, their attributes or incidents of interest in a scene.

Read more [here](#)

5



## 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, Axis Communications.

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# System architecture

At Axis, we use the best of each instance – camera, server and cloud – to provide the most optimal and flexible solutions for you. The choices you make today will define your ability to face tomorrow's challenges. We are here to guide you every step of the way.

Your unique architecture needs should take into account both internal resources and policies, and external factors such as local and international regulations. As a security solution vendor, it's not up to us to define what environments and architecture you should use, but rather equip you with the tools and flexibility to decide on the best solution for your unique situation.

The following pages will introduce you to the pros and cons of each architecture, to help you choose which will best fit your needs.



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## 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



[Learn more](#)

### Analyzing video in the cloud



[Learn more](#)

### Analyzing video in a hybrid solution



[Learn more](#)

# Analyzing video on the camera

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

## Benefits

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

- > **Using uncompressed data:** Running analytics on uncompressed video results in higher accuracy because video quality is not degraded
- > **Real-time alerts:** In scenarios where a real-time alert is critical, an edge-based solution avoids the latency in a server- or cloud-based solution
- > **Easy to scale up:** Doing some of the heavy processing directly on the edge device enables scalability by reducing the processing load on other parts of the system
- > **Improved privacy:** Running analytics on the edge gives the option to only send anonymized data and/or alerts over the network, which could enable compliance with strict privacy requirements

## Possible drawbacks

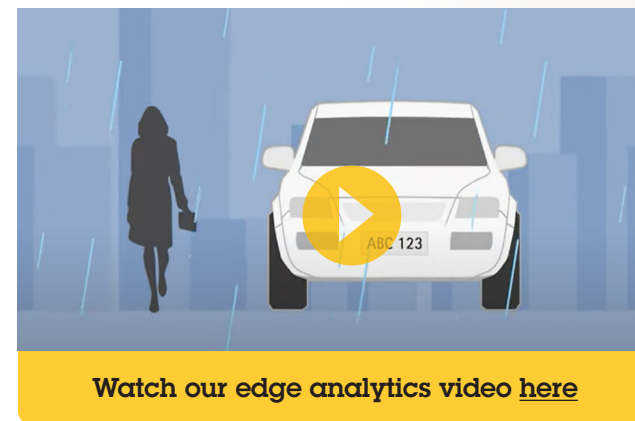
- > **Processing power:** Analytics may require more processing power than is available in lower-cost cameras
- > **Hardware compatibility:** Limited support for legacy cameras



## 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 from multiple cameras can be analyzed
- > Analytics that require more power can be used
- > A dedicated server can support many cameras, depending on the complexity of the analytics

## Possible drawbacks

- > The quality of the compressed video processed on servers may be degraded
- > Higher hardware cost
- > It takes substantial processing power to decompress video prior to running analytics
- > Typically requires more maintenance than a camera
- > Need for a secure physical location for the server installation

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 for processing is another solution. But a solution based purely on the cloud won't always be optimal – or even possible from a cost perspective. Cloud computing often requires a robust and reliable internet connection that isn't always available in every situation.

On the other hand, cloud computing lets you process multiple video streams at once. It's also easy to scale. Some companies handle sensitive information and need to keep all data on their premises – and are therefore unlikely to consider a cloud solution. Some examples are banks, power plants, hospitals, critical governmental operations, etc. In some cases, a private cloud might be the solution.

## Benefits

- > Sharing data across services and systems becomes easier
- > Seamless and immediate availability of service upgrades
- > More processing power allows for more complex analytics, e.g. if a complex analysis only is run occasionally
- > Immediately scalable
- > Processing multiple video streams from many sources becomes easier

## Possible drawbacks

- > Requires a robust and reliable internet connection
- > Expensive recurring cost – cloud processing can be prohibitively expensive when analyzing multiple camera streams
- > Cybersecurity becomes more complex, because the video has to securely stream to the cloud
- > Local live monitoring of incidents requires the event or metadata to be sent back to the site

**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

Sharing the processing load between the edge and server will make systems much more scalable, because adding a new camera with edge analytics capabilities means you wouldn't need to increase server processing power.

Hybrid solutions with cloud, on-premise, server, and edge technologies that take advantage of the strengths of each technology are becoming more common. In hybrid solutions, object classification can take place in the cameras, while algorithms that require more power are performed on servers or in the cloud.

## Benefits

- > You get all the benefits of edge, server, and cloud, including the ability to process video streams from many sources

## Possible drawbacks

- > Cloud processing can be very expensive
- > More complex integration
- > Cybersecurity concerns
- > Requires more hardware than a purely edge-based solution – servers can be expensive

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 focus on developing the best quality surveillance cameras. And on creating analytics – together with our partners – that let our customers get the most out of their hardware investment.

There are many factors that go into obtaining top performance and relevant insights from analytics. We combine robust hardware, outstanding processing power, AI, intuitive experiences, and sophisticated image technologies to deliver the best possible foundation for success. And ease of use is always a priority.

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

- ✓ Robustness and reliable performance
- ✓ Ease of use
- ✓ Versatility
- ✓ Open platform
- ✓ Integration
- ✓ 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 and the most effective choice for the long term.**

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# Choosing the right camera

Great analytics performance always starts with the right camera. Axis has the world's broadest and most complete product portfolio for network video, offering great performance even in challenging conditions.

With Axis cameras, you'll get video that serves your purpose. Our cameras provide the perfect platform for analytics based on artificial intelligence with deep learning. And they feature innovative chipsets that are the basis for nuanced object classification. To guide you in finding your camera, the Axis product selector is available [here](#).

## 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

Axis has made a commitment to include AI broadly in our portfolio in order to boost analytics performance. Fundamental to our AI-based analytics is the deep learning acceleration in our award-winning system-on-chip (SoC) ARTPEC-8.

## Tested without compromise

You can always rely on our cameras because at Axis, we're meticulous about every aspect of quality.

Read the white paper [here](#)

## Our cameras for advanced analytics feature:

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

## Maintaining a clear view

It almost goes without saying that timely firmware and software upgrades – or "digital maintenance" – are important to well-functioning analytics. But something that often gets less attention is physical maintenance.

A principal requirement for analytics is a clear view of the scene. And poor image quality is poor image quality whether it's caused by poor light conditions or a dirty window or dome. So, to get the most out of your investment in analytics, Axis recommends a proactive approach to camera maintenance, both digital and physical.

Read more [here](#)



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# Processing power dedicated to AI

Processing power is an important enabler for video analytics performance. Better integration of AI into the processor also enhances many aspects of video surveillance performance, from camera configuration to image quality to video analytics.

## Kinds of processing units

- > A CPU (Central Processing Unit) is rarely used alone in servers or recorders for analytics because of processing limitations. Instead, a CPU is used with a GPU (Graphics Processing Unit) for analytics.
- > Processing on the edge calls for a power-efficient solution. Therefore, a dedicated SoC (System on Chip) is the most common choice for processing video analytics in IP cameras.

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](#)



## Hardware acceleration

While you can run analytics on a CPU, if you have limited power, performance will be better if you use a platform with dedicated hardware acceleration.

### GPU (Graphics Processing Unit)

GPUs are mainly developed for graphics processing applications, but they are also used for accelerating AI on server and cloud platforms. While sometimes also used in edge systems. GPUs are not optimal for machine learning in terms of power efficiency.

### MLPU (Machine Learning Processing Unit)

For very specific tasks and kinds of data input, an MLPU can be a good choice for accelerating machine learning algorithms – particularly when power efficiency is important. However, MLPUs are not the most robust solution when tasks and data input vary.

### DLPU (Deep Learning Processing Unit)

A DLPU is a powerful solution for accelerating the much more flexible and robust deep learning algorithms, which allow for more granular object classification, for example.

## Learn more

Axis is one of just a few device manufacturers developing proprietary SoCs in-house.

Read more about:

The history of Artpec [here](#)

The launch of our latest SoC [here](#)



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# Deep learning

Analytics based on 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 also often offer significantly more accurate results. This is particularly true under more 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 deep learning-based analytics call for a great deal of training data, development is demanding (read more about training data in our white paper below). It's also important to perform tests in real scenarios, to ensure optimal performance under various conditions.



Watch our [AI video here](#)

## AI in analytics

This white paper provides a technological background on deep learning algorithms and how they can be developed and applied for analytics.

Read more [here](#)



Applying AI to security means automating the process of watching hours and hours of surveillance videos, 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 hard hats, and so on.

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 VMS controls the surveillance workflow and provides a single interface for managing your video surveillance infrastructure. And it should let you take full advantage of video analytics as easily as possible. Axis analytics are compatible with all major video management systems.

## Easy to find and install

Sometimes Axis devices are delivered with powerful Axis analytics pre-installed. But when Axis analytics solutions are not pre-installed, it's easy to find, install, and configure them using Axis video management software (VMS). It's a matter of just three steps: 1. Find the software you need on Axis.com. 2. Download it. 3. Install and configure it with your Axis VMS. It's that simple. You can also browse for analytics solutions from our many partners in the Application Gallery on Axis.com.

**Video management software should let you take full advantage of your analytics.**

## A powerful action engine

Equipped with a powerful and flexible action engine, AXIS Camera Station VMS is ideal for setting up the rules that govern which events trigger which actions. For example, if you set up the presence of a person in the analytics software as the trigger, you can set up actions that range from starting recording to turning on lights to sending a notification to a guard. All via an intuitive user interface.

## A smart search function

AXIS Camera Station also has a smart search function that helps you use data generated by object classification, for example to distinguish between different classes of objects such as people, cars, trucks, and bicycles. The search function's intuitive interface makes it possible for any user to quickly search through video material to find objects of interest.

## VMS from our partners

We can provide our partners with tools and documentation to facilitate smooth integration between their VMS and analytics from Axis and our partners.



See our end-to-end solutions [video here](#)

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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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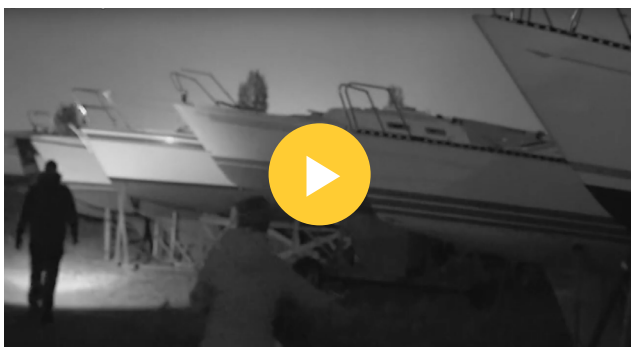
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# Axis Lightfinder

Axis Lightfinder technology delivers high-resolution, full color video with a minimum of motion blur, even in near darkness. Because it strips away noise, Lightfinder makes dark areas in a scene visible and captures great detail in very low light. The result is excellent image quality when external light sources are not an option.

## See colors in low light.

Illumination obviously has a big impact on the performance of analytics, since this can affect the contrast. Thanks to a combination of extremely sensitive sensors and carefully tuned image processing, cameras with Lightfinder capture full-color images in low light. In fact, cameras with Lightfinder discern color in low light better than the human eye. This is particularly important when images are used for forensic purposes. Because the truer the colors, the better your chances of identifying an object. Truer color also has a positive impact on analytics performance.



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 impacts video quality and how well analytics perform. The best solution is always to add more light. But because that's not always possible, we developed Axis OptimizedIR for very dark scenes. Axis OptimizedIR provides a unique and powerful combination of camera intelligence and sophisticated LED technology, resulting in our most advanced camera-integrated IR solutions for complete darkness.

## Dealing with darkness

Just as the name implies, OptimizedIR is "optimized" for specific cameras and situations. For example, in our pan-tilt-zoom (PTZ) camera with OptimizedIR, the IR beam automatically adapts by becoming narrower and wider as the camera zooms in and out, so the entire field of view is always evenly illuminated. And the IR LEDs are placed exceptionally discreetly. Another example is that, in some cameras, the intensity of the integrated LEDs can be adjusted individually. This is useful for avoiding reflections when a camera is installed in a corner or close to a wall. In addition, some Axis fixed dome cameras feature an innovative IR-shielded dome that prevents IR reflections from rain and snow.

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

Optimize image processing with a combination of camera intelligence and sophisticated LED technology.



## Read more

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

Download the white paper [here](#)



No light?

See the [Axis OptimizedIR video here](#)

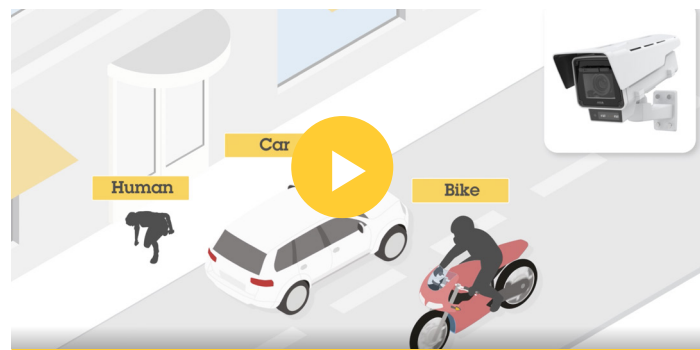
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# Axis Scene Intelligence

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 to work. The result is a foundation for consistent performance with fewer false alarms. Axis Scene Intelligence uses algorithms trained in real-life environments to deliver valuable 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 puts market-leading expertise from decades of experience with image processing to work.**

Learn more [here](#)



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# Electronic image stabilization

Electronic image stabilization counteracts the effects of vibrations. The result? Clear and precise images – even in scenes with lots of motion.

## Dealing with vibration

Cameras mounted on high poles or near busy roads can be shaken by wind or passing traffic, which often results in motion blur. Motion blur makes images difficult for analytics, and operators, to use. Electronic image stabilization minimizes the effect of vibration and shaking to give you usable images.

## The solution

Thanks to electronic image stabilization technology, there's no need for costly stabilization mounts – you can install your Axis network camera anywhere and be confident of capturing clear, steady images. Built-in gyroscopic sensors continuously detect the camera's movements and vibrations, and automatically adjust the image to ensure you always capture the details you need. Electronic image stabilization reduces bitrate, so you save on bandwidth and storage space.



Watch our image stabilization video [here](#)

Install your Axis network camera anywhere and be confident of capturing clear, steady images.



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 often can 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 impacts image usability because of its effect on contrast, dynamic range, angle of view, and so on. Adjusting such factors may increase performance.

**Every surveillance installation is unique.**

## What to watch out for:

- > Difficult lighting conditions that create shaded areas or whiteout effects
- > Compression settings that cause image blur or pixelation
- > Motion blur caused by slow shutter speeds
- > Excessive noise in low-light situations
- > Overlay text appearing in a critical part of the scene
- > Vegetation or other obstacles that occlude objects you want to see

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# The open ecosystem

With Axis, you get the freedom to find a solution that fits your purpose best. Choose from a wide range of analytics from us or our partners all over the globe. We're invested in bringing value back to developers and communities, inviting them to work with us to create endless possibilities.

Axis analytics solutions are compatible with all major video management systems. Analytics from our partners are built on our flexible AXIS Camera Application Platform. The platform contains tools that make it easy for our many partners to deliver applications tailored to you.

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

## Benefits of an open ecosystem

- > **More choices and variety:** An open ecosystem allows you to find the solution that fits your unique needs; you're free to choose which systems work best for you.
- > **Interoperable and flexible:** Open standards and programming interfaces also establish protocols and building blocks that can help make our applications more functional and easier to integrate.
- > **Adaptable between platforms:** Because the implementation follows standardized rules, and the application programming interface (API) is known, it's easier to port an application from one platform to another.

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

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## Interested in becoming an Axis partner?

Partnership is at our core. Through collaboration, we define and shape new opportunities on the market.

Find out more [here](#)

# 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 for a wide range of Axis products.

## Serve your customer needs

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:

- > Support for running container-based applications on the device
- > Adoption of known open software frameworks and industry-standard APIs
- > Support for high-level programming languages
- > Deep learning toolchain and APIs



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

**Empowering developers**

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



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



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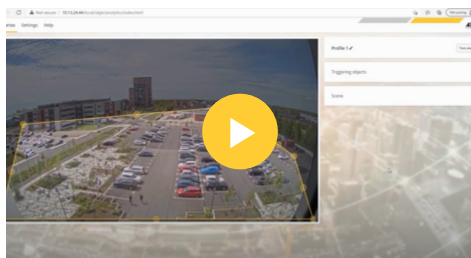
# Metadata

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](#)

Object type: Vehicle  
Object class: Car  
Color: Black  
License plate: ABC123

## 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

Video management systems that make use of metadata can dramatically improve the time needed for searching.



## What is ONVIF Profile M

Most Axis cameras are now ONVIF Profile M conformant, enabling standardized streaming of metadata and events from edge-based analytics applications. Conformance to Profile M enables easier integration of metadata and events with ONVIF Profile M conformant clients like video management software and services. Profile M conformant 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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# Axis analytics solutions

Axis analytics solutions help cities, businesses and organizations gain the insights they need to improve efficiency, make faster and smarter business decisions, and improve public safety and security. And many of Axis analytics come preinstalled, free of charge.

Using Axis hardware together with dedicated software will make your installation as straightforward as possible: One solution from one vendor, with one user interface, one point of contact for support, and one design tool. This means full system compatibility and a far simpler arrangement that removes unnecessary frustration and delivers peace of mind.

From the point of view of the end user, one of the strengths of Axis equipment is that “It just works.”

Intuitive.  
Insightful.  
Open.

Easy access to actionable insights.

Watch our analytics video [here](#)

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# Axis analytics portfolio

Axis analytics deliver actionable insights and results.

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



[Learn more](#)

## AXIS Perimeter Defender



[Learn more](#)

## AXIS Live Privacy Shield



[Learn more](#)

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[Learn more](#)

## AXIS Fence Guard

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## AXIS Motion Guard

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## AXIS Loitering Guard

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## AXIS Video Motion Detection

[Learn more](#)

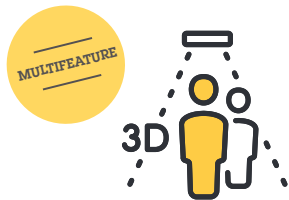
## AXIS Barcode Reader

[Learn more](#)

## AXIS Speed Monitor

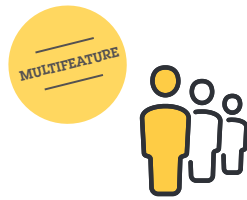
[Learn more](#)

## AXIS P8815-2 3D People Counter



[Learn more](#)

## AXIS People Counter



[Learn more](#)

## AXIS Queue Monitor



[Learn more](#)

## AXIS Face Detector



[Learn more](#)

## Axis Application gallery

In Axis Application gallery, you'll find an extensive selection of analytics developed by Axis partners ready to be embedded in Axis products.

Find analytics that meet your needs [here](#)

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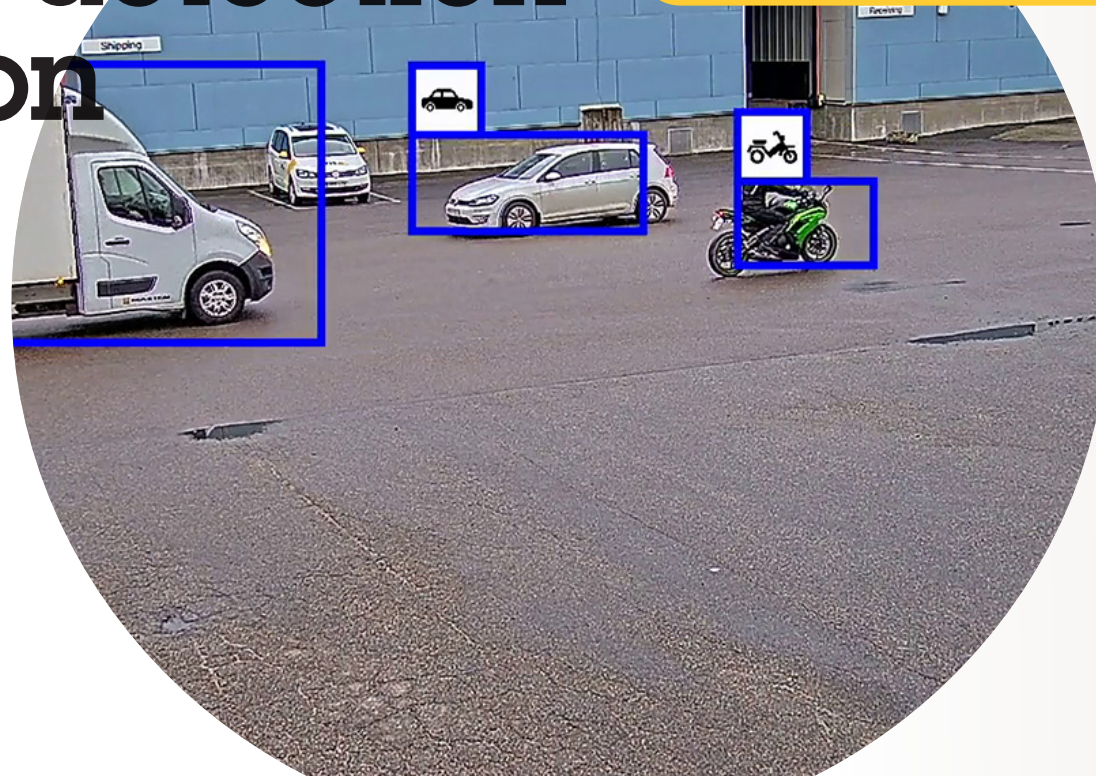
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# AI-based object detection and classification

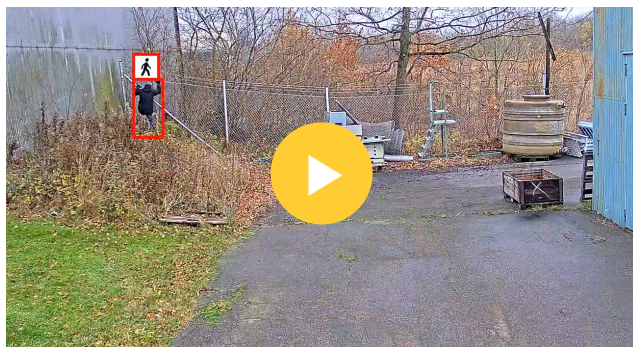
AXIS Object Analytics is a multifeature analytics solution that gives you actionable insights in both indoor and outdoor use cases. It delivers real-time intelligence you can act on, so you can focus your attention on what happens, when it happens.

### 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 algorithms and behavioral conditions, it analyzes the scene and spatial behavior of the objects within, ignoring common irrelevant sources of unwanted events. And, because it knows what to detect, you can focus only on objects of interest and events that need attention, making your monitoring more effective. Like all Axis analytics, this edge-based analytics processes and analyzes live video directly on the camera, eliminating the need for costly servers. You also benefit from more efficient data processing, minimized storage and bandwidth requirements, and improved scalability.



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

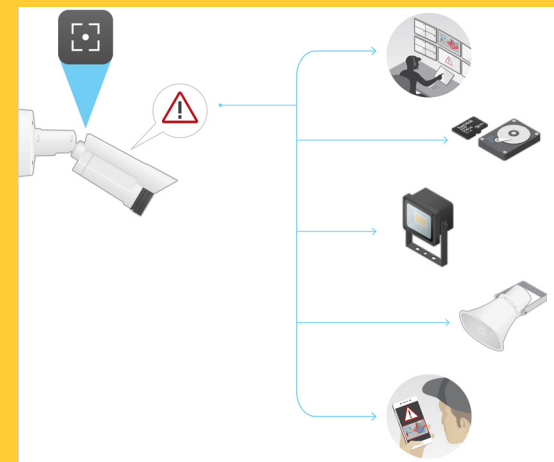


See the [AXIS Object Analytics video here](#)

### Cost-efficient operations

AXIS Object Analytics integrates with AXIS Camera Station and other major video management systems. Designed to enable proactive monitoring and access to actionable insights, you can quickly verify detected events or set up automatic responses. AXIS Object Analytics also supports bounding box overlays and trajectories in live and recorded video to help you determine what triggered an event and where the object originated.

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



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# High-security, scalable 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.

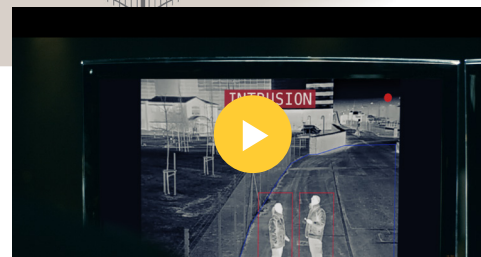
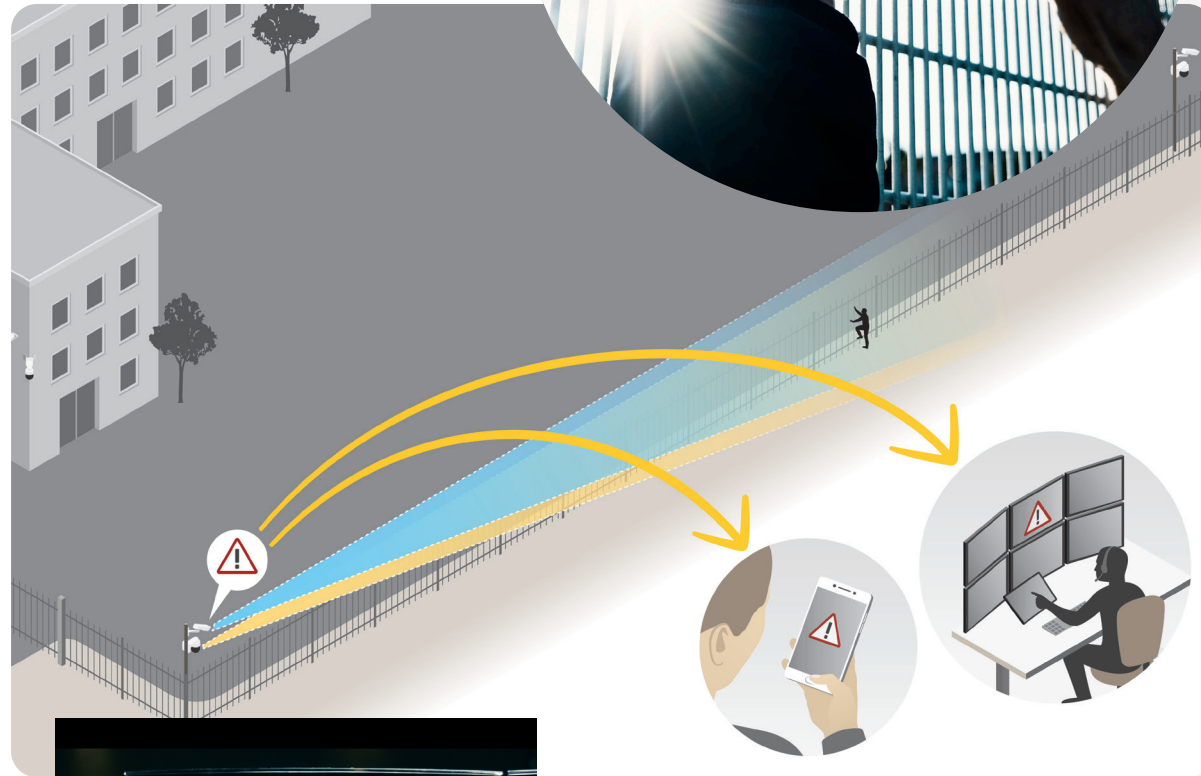
AXIS Perimeter Defender enables a fixed camera to detect and classify moving people and vehicles. For selected cameras, the analytics also support human and vehicle classifications based on AI.

### Efficient analysis and event handling

AXIS Perimeter Defender analyzes video directly on the camera. It integrates with the camera's event management functions and is compatible with many video management software applications – so you can program automatic responses to alarm triggers. Automatically playing a message from loudspeakers or turning on lights helps scare off intruders, for instance. Or generating a notification when a loiterer is detected (for example) notifies guards to take action.

**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](#)



See the **AXIS Perimeter Defender** video [here](#)

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

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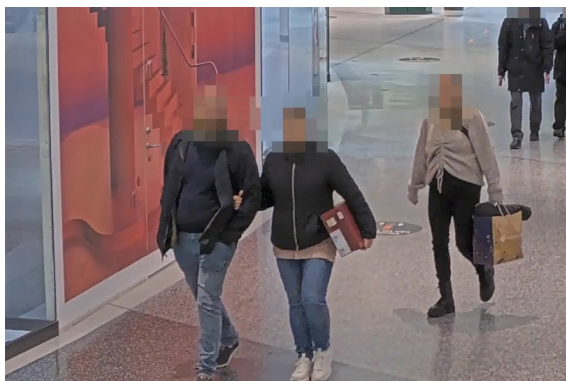
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# Versatile dynamic privacy masking

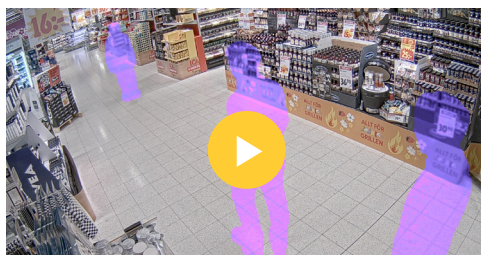
AXIS Live Privacy Shield makes it easy to remotely monitor activities while safeguarding privacy. This versatile, edge-based application enables compatible cameras to dynamically mask moving objects, humans, faces, or the background in live and recorded video. AXIS Live Privacy Shield supports both motion-based and AI-based privacy masking.

### Two methods of dynamic masking

Motion-based masking supports live, full frame rate motion-based masking and is designed for indoor scenes with good, stable lighting. AI-based masking enables dynamic masking at 10 frames per second and is applicable for near-range indoor and outdoor scenes. Both kinds of masking let you set the level of masking that fits your needs, and you can also exclude areas you prefer not to mask.



AI-based masking is supported in selected cameras with a deep-learning processing unit (DLPU). With AI-based masking, you can analyze live video for human forms, and mask either humans, or the background. This functionality is applicable to near-range indoor and outdoor scenes.



See the [AXIS Live Privacy Shield video here](#)

Explore [AXIS Live Privacy Shield here](#)

Monitor activities remotely while safeguarding privacy.



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

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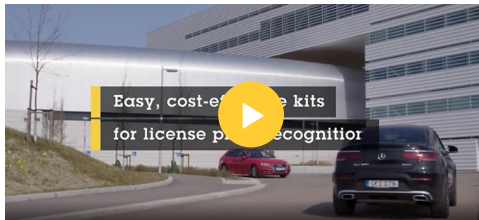
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# Hassle-free license plate recognition

Ideal for freeflow, slow-speed traffic, and vehicle access control scenarios, AXIS License Plate Verifier makes it easy to detect and read license plates, monitor vehicles, create a vehicle access solution, identify stolen vehicles, and more. It lets you easily tailor a solution that fits your exact needs – today and tomorrow.

Featuring an intuitive user interface, AXIS License Plate Verifier offers efficient search capabilities and supports event log entries that include thumbnail images of license plates for easy administration and follow-up. Plus, because the processing is done at the edge, the analyzed metadata only requires a small fraction of the bandwidth, saving valuable storage.



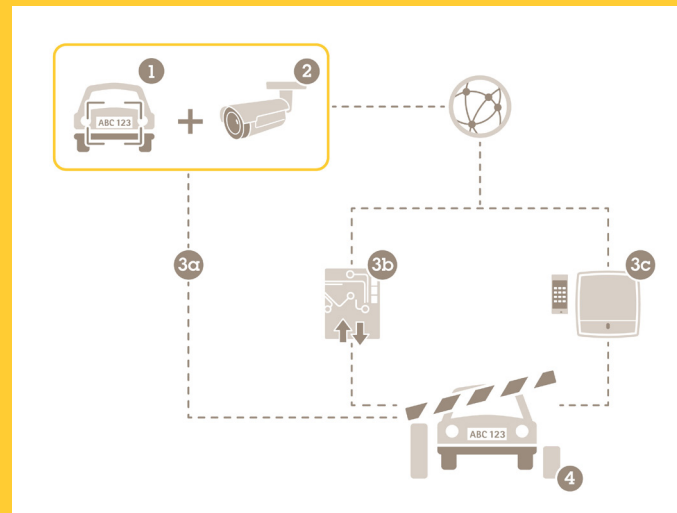
See the [AXIS License Plate Verifier video here](#)

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

You can also learn more about [licence plate recognition here](#)

### A typical setup for vehicle access

- 1 The analytics reads the vehicle license plate captured by the camera
- 2 License plate is on allow list
- 3
  - a. The camera's I/O port connects to the barrier's relay
  - b. AXIS A91 Network I/O Relay Module connects to the barrier's relay
  - c. Axis network door controller connects to the barrier's relay for extended functionality
- 4 Barrier opens



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# Complete, sophisticated 3D people counting

AXIS P8815-2 3D People Counter combines stereoscopic imaging with 3D analytics for reliable people counting even in challenging conditions. It provides valuable information that can help you gain insights into visitor trends, evaluate site performance, and enable you to optimize your business operations.

The counter can also estimate real-time occupancy levels. This insight can help you improve how a space is used, get an indication of the revenue opportunity, and help you take measures if occupancy exceeds your set threshold. You can also inform potential visitors about peak visitor times or when your premises are at full capacity. Additionally, it can detect tailgating and direction and notify you if more than one person enters within a set time interval or if people move in the wrong direction. Plus, you can configure it to automatically respond to these events. For instance, by playing an audio message or closing an entrance door.



Visit [here](#)  
to find out more about  
AXIS P8815-2 3D People Counter



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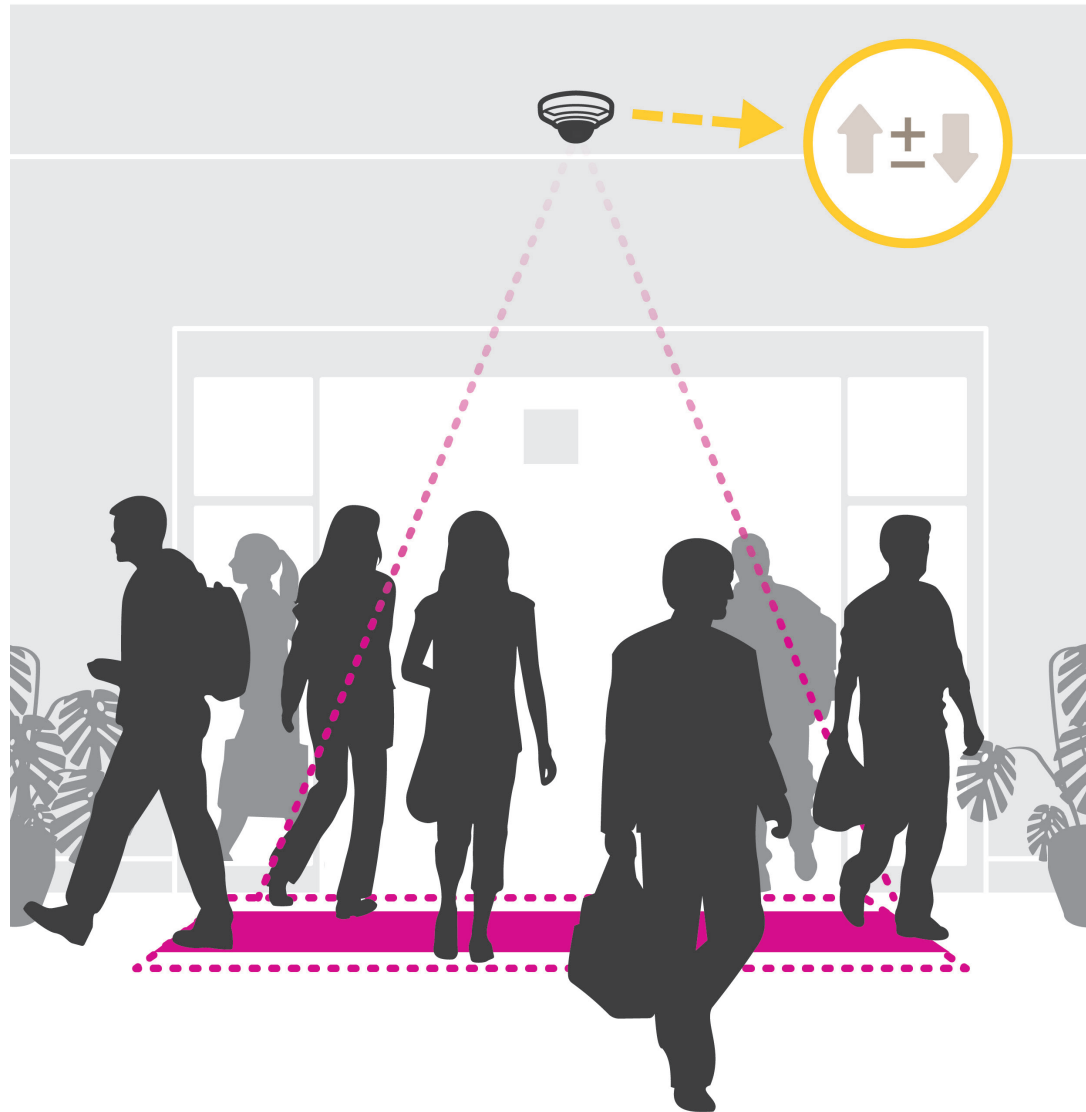
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# Insight beyond people counting

Whether you want to evaluate site performance, enhance visitor experience, or reduce costs, AXIS People Counter delivers useful – actionable – insights.

With reliable people counting simultaneously in both directions, it tracks when people enter and exit your premises, so you can analyze trends and identify peak visitor times. Occupancy estimation, tailgating, and direction detection deliver additional insights beyond people counting. Use them to adjust staff levels and maintenance planning, meet actual demand, and take immediate action when needed.



See the [AXIS People Counter video here](#)

Learn more about [AXIS People Counter here](#)

Learn more about [counting people here](#)

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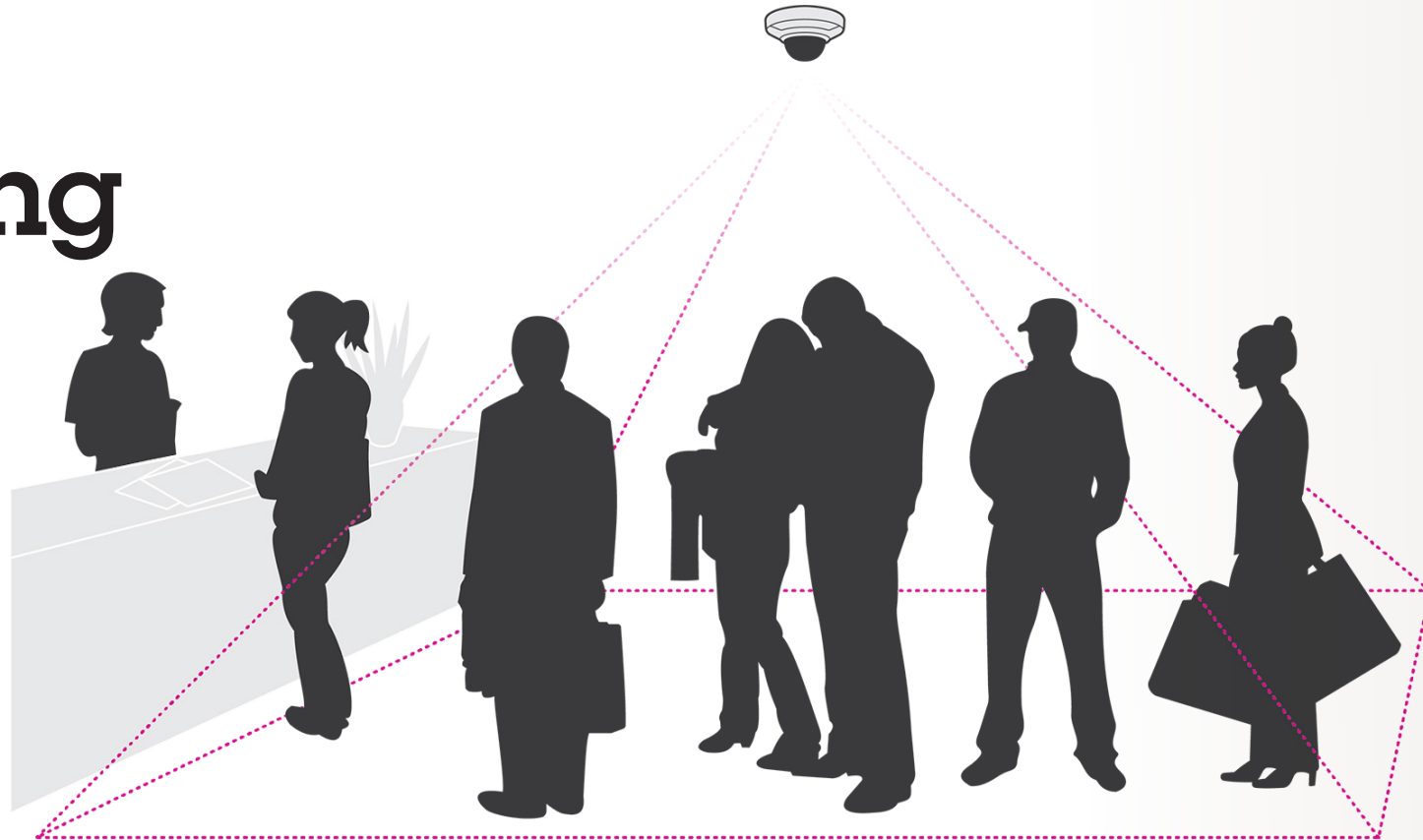
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# Don't keep them waiting

AXIS Queue Monitor is a cost-efficient application for queue measurement and analysis. This smart application provides real-time data that can help identify where bottlenecks are occurring, enhance service planning, and improve your visitors' overall experience.

## You can count on it

Long queues can result in dissatisfied visitors, inefficient resource allocation and potentially lost revenue. By managing queues more effectively and decreasing waiting times you can reduce visitor walkaways and enhance the overall visitor experience. AXIS Queue Monitor provides real-time data on the approximate number of people queuing and statistics about queue fluctuations over the course of the day. Analyzing this valuable information can help you improve resource allocation and ensure your resources match visitor traffic and needs. This can help increase visitor loyalty while reducing overall costs.



Analyzing statistics from **AXIS Queue Monitor** lets you review your service-cycle time and identify required resource improvements.



See the **AXIS Queue Monitor** video [here](#)

Learn more about **AXIS Queue Monitor** [here](#)

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# Face detection for loss prevention

AXIS Face Detector is an easy-to-use solution that detects faces in live video and applies bounding boxes on top of them. This can help deter would-be thieves by giving the illusion that visitors are being closely monitored.

Alerting potential shoplifters that they are being monitored helps you to proactively reduce shoplifting and other unwanted behavior in your stores. The solution not only shows passers-by that they are being watched, it also helps create a sense of security for both customers and employees. And there's no need to maintain and manage watchlists.



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 type of metadata overlay. It's used in recorded and live video to draw an operator's attention to what is happening in a scene. It typically includes a rectangular box that appears around an object or attribute of interest.

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# Legal and ethical considerations

In surveillance, it's always crucial to have a responsible mindset, to be aware of privacy considerations and changing legislation, and to balance the right of individuals to privacy with the ambition to increase security, safety, and operational efficiency. Developing and using analytics based on AI also requires additional considerations.

Specific installations and use cases demand careful ethical considerations as well as understanding and adhering to local legislation. They also create requirements for ensuring cybersecurity and preventing unintentional access to video material. On the other hand, edge-based analytics can help improve privacy because they provide the option of transmitting only anonymized metadata.

The increase in analytics in surveillance systems brings with it new considerations. Although deep-learning-based analytics are particularly accurate, errors are not unheard of. So decision processes should include experienced operators and users. This is often referred to as keeping a "human in the loop." Moreover, it's important to recognize that human decisions can be influenced by how events are generated and presented. Without proper training and awareness of analytics functionality, wrong conclusions can be drawn.

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 data is not carefully selected, some AI-based solutions may exhibit both ethnic and gender bias. This has prompted an open discussion and given rise to legislative restrictions and activities to ensure that such aspects are addressed 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 [here](#)

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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.

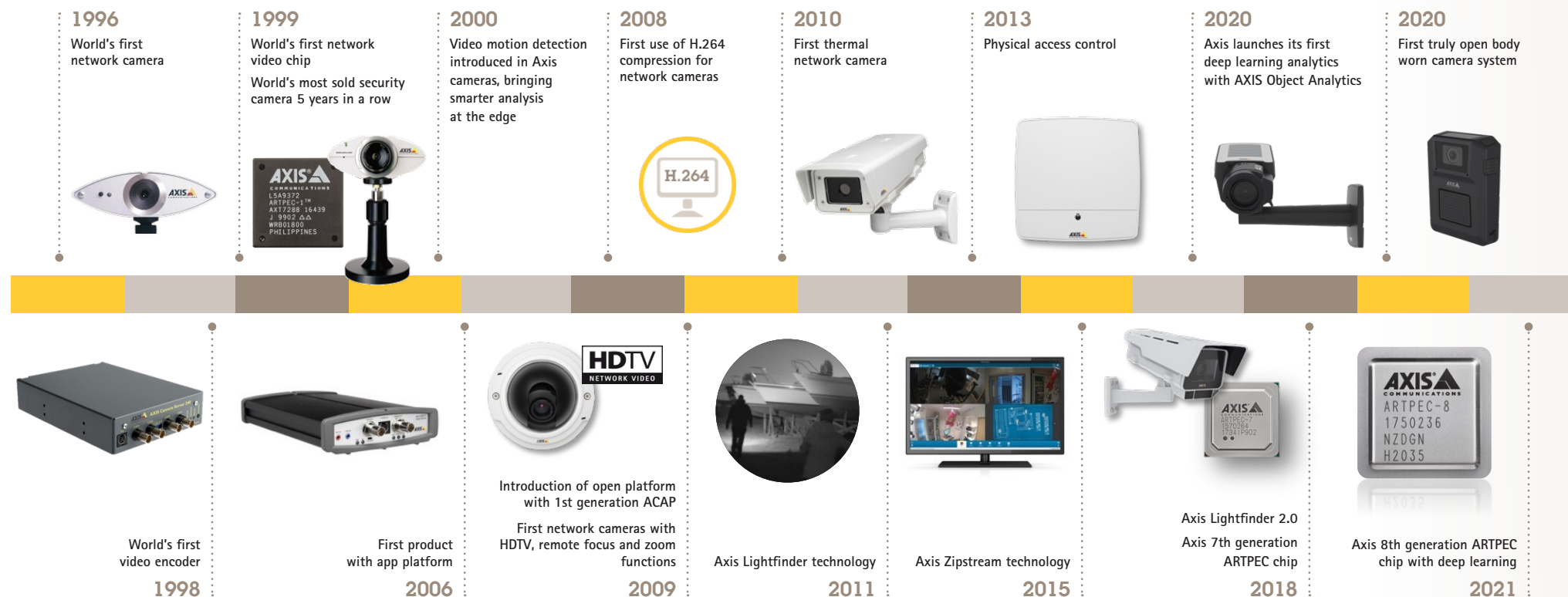
We delivered the first analytics for surveillance more than 20 years ago. Since then, analytics technology has made giant leaps forward. And things will just keep getting better with future innovation in hardware, software, and platforms.

“Our engineers are constantly looking to expand our analytics capabilities. This relates to both enhancing and expanding our analytics at the edge, and to the greatly improved ability to search and analyze video after it has been captured.”

Petra Bennermark  
Manager, Analytics Solutions at Axis



Read more about our vision for the future of analytics [here](#)



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
- ✓ Advanced edge processing
- ✓ 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.

## > Deep learning capabilities for enhanced performance

With advanced analytics that use deep learning, it's possible to automatically detect objects and distinguish between different kinds of objects, such as humans and types of vehicles. This makes it easier and more efficient for operators to find what they need, faster.

## > Open platform equals many options and flexible integration

Open standards, industry leading analytics, and our powerful ACAP platform allow for flexible integration. This helps you create a solution that fits your unique needs, without overcomplicating the installation process.

## > Skilled channel partners creating tailored systems

We wouldn't be able to deliver the highest value without close collaboration with the partners in our ecosystem: system integrators, technology integration partners, and more. Each plays an important role in meeting the diverse needs in the market. Through collaboration with our skilled partners, we constantly improve and adapt to new demands from our customers.

### 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 pride ourselves on the quality of our products and we're here to support you in making the best possible use of them. We also put a lot of energy into being a good partner to our customers and business partners alike.

We focus on training our many skilled partners to design installations and configure Axis products to maximize the benefits for the end user.

We do this, for example, by creating and sharing training and educational resources on products and technologies. For instance, we have multiple instructor-led and online courses focused specifically on analytics. Whether it's basic training or application-specific training, everyone's welcome to join in and learn more.

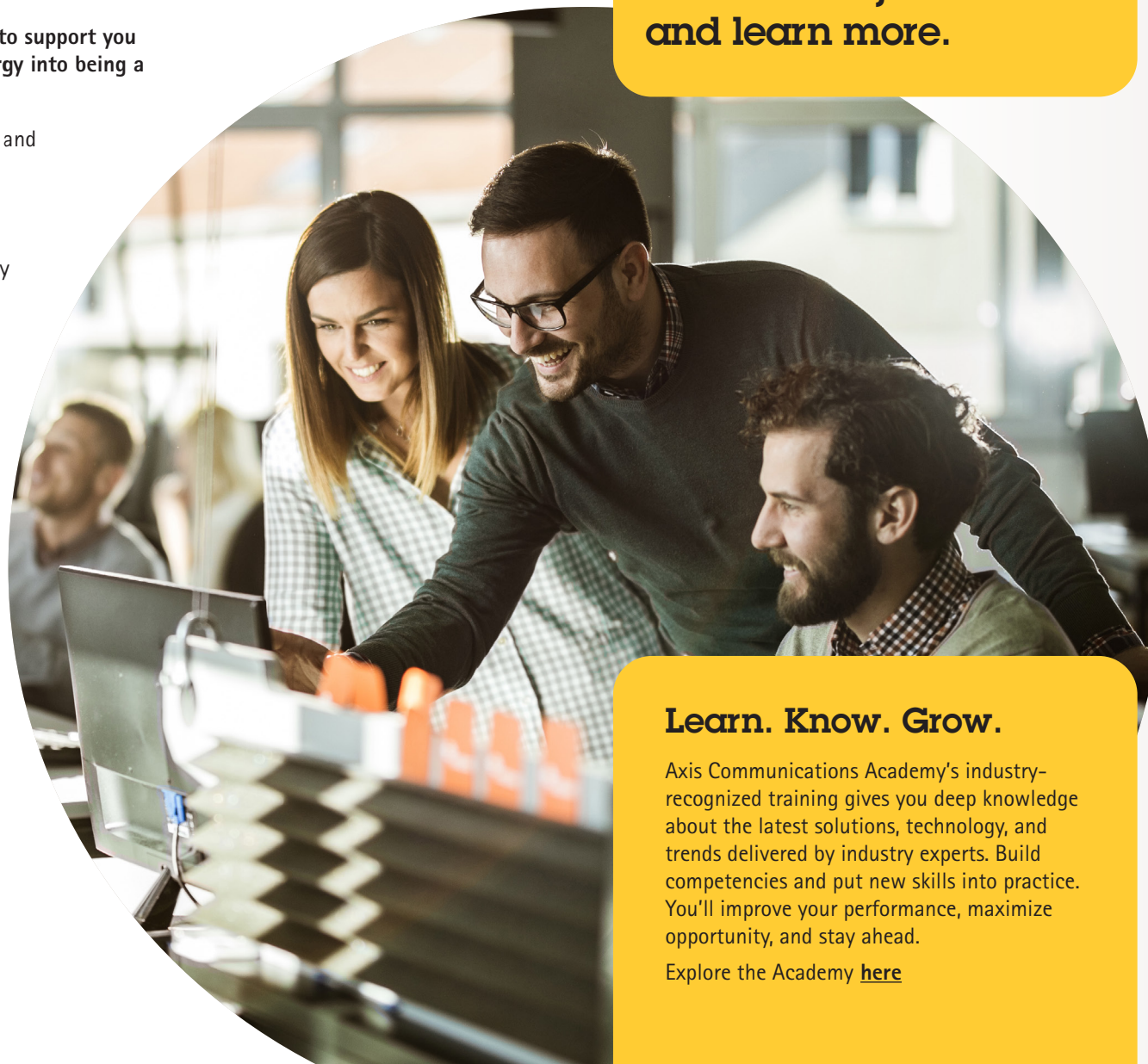
## Newsroom

Find the latest news and stories from Axis. [Click here](#)

## Secure Insights

Learn more about surveillance and gain insight on how Axis analytics deliver business intelligence. [Click here](#)

From the basics of analytics technology to application-specific training, everyone is welcome to join in and learn more.



## Learn. Know. Grow.

Axis Communications Academy's industry-recognized training gives you deep knowledge about the latest solutions, technology, and trends delivered by industry experts. Build competencies and put new skills into practice. You'll improve your performance, maximize opportunity, and stay ahead.

Explore the Academy [here](#)

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# About Axis Communications

Axis enables a smarter and safer world by creating solutions for improving security and business performance. As a network technology company and industry leader, Axis offers solutions in video surveillance, access control, intercom, and audio systems. They are enhanced by intelligent analytics applications and supported by high-quality training. Axis has around 4,000 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.