

## Video Surveillance



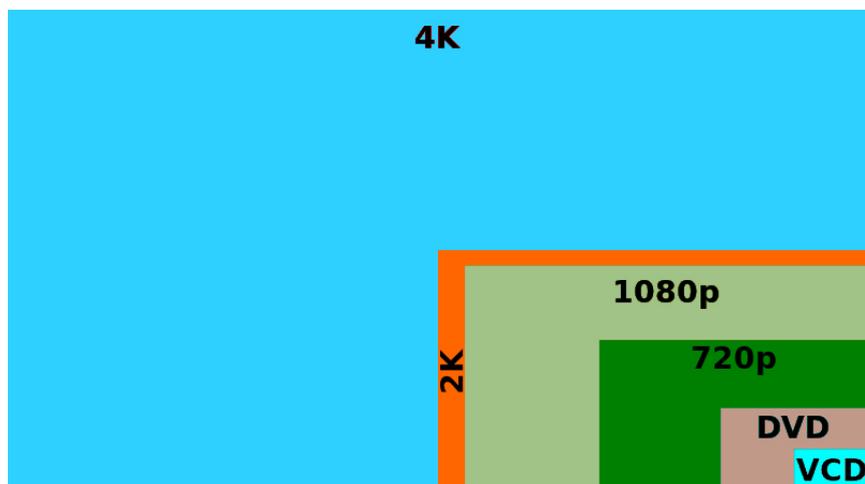
# 4K Resolution

Ultra high-definition technology

### 4K resolution

**4K ultra high-definition technology is poised to revolutionize video surveillance.**

4K resolution is defined as 4096 x 2160 pixels with an approximate aspect ratio of 1.9:1. On the other hand, Ultra-high-definition television (UHDTV) has a resolution of 3840 x 2160 with an approximate aspect ratio of 1.78:1 aspect. The use of width to characterize the overall resolution marks a switch from the previous generation, which categorized media according to the vertical dimension such as 720p or 1080p.



**4K cameras provide end users with a higher level of detail than ever before possible.** 4K resolution provides four times the detail of 1080p observational-class cameras, resulting in the clearest picture possible on the market today.

**4K technology has incredible potential for the entire video surveillance industry.**

**4K technology combines new sensors and digital signal processors (DSPs) to achieve next-generation image detail.** The innovative sensors enable the cameras to operate at up to 30 frames per second (fps), which significantly improves the quality of the image coming into the camera. With improved DSPs, the camera is able to handle larger image formats than previously possible.

The resolution provided by the prevailing range of 10-megapixel cameras is almost the same as that of 4K cameras. However, **10 MP cameras provide low frame rates and light sensitivity, while requiring expensive storage capabilities to handle the resulting high-resolution video. On the other hand, 4K provides higher frame rates and greater light sensitivity** without the need for cost-prohibitive storage arrays.

## Benefits of 4K

**4K technology offers four times the amount of evidentiary detail** with minimal impact to storage cost. The technologically innovative sensors and DSPs make it possible for end users, who may have previously only been able to afford cameras in the 720p to 1080p range, to now benefit from the superior image quality of 4K without going over budget.

In addition, **4K gives end users better forensic zoom capabilities and greater image detail** than 10 MP cameras. 4K avoids the problem of many HD and megapixel cameras that display “choppy” or “blocky” video when using the digital zoom feature. With 4K, users can zoom in further on an image before it degrades. **The finer pixel geometry of 4K resolution also provides improved video analytic capabilities** as a result of higher image quality and could, in some cases, even double detection ranges.

**4K technology increases situational awareness** and offers considerable value in control room environments. Delivering approximately 8.3 million pixels, 4K displays significantly enhance the ability of operators to monitor finely detailed imagery in a range of applications.



Higher screen size

**4K security systems are perfect for high-traffic areas where you need to be able to zoom in to see whether someone is dancing or fighting.** Hotels, tourist areas, Athletic fields, Schools, universities, big box retail, train/bus stations and government facilities are just a few of the industries that could benefit from these 4K systems.

**4K has the ability to support high quality live view**, even if users choose not to store images at full frame rate.

A 4K image is crisp and the higher frame rate would make it easier for police to get a clear image of a criminal even if they were moving. Besides, the high resolution doesn't sacrifice quality even when they have to deal with large crowds.

The widespread deployment of 4K HDTV video surveillance cameras for a large user not only provides increased opportunities for improved investigations, but also business intelligence.

Covering a large warehouse or busy hallways would be easier with 4K resolution. More pixels added into the image allows for the user to zoom into the picture without sacrificing image quality which makes this technology optimal for security.

## Challenges

**As with any new technology, the eco-system has to be in place for 4K video to be successfully deployed for security applications.**

- The security camera has to support 4K video.
- The network-attached storage appliance must provide storage for nearby cameras and redundancy of storage.
- The server must be capable for applications that help to decode and analyse the video footage.
- A 4K monitor is required in order to view the stored footage.

For most Organizations, putting this eco-system in place could prove challenging. The servers and network infrastructure may be in place, but many desktop monitors do not support full 4K video. This is further compounded by the fact that a premise might deploy multiple 4K security cameras for monitoring, which increases the demand on both storage and network.

An Organization switching to 4K, needs to invest in at least four times more capacity in their network while maintaining data integrity, flexibility and performance. IT management must determine if their network is capable to take on this new influx of data. If the current system has already begun to experience degradation in performance or there are new challenges such as reliability limitations, the system may not be equipped to take on increased amounts of complex storage and an IT manager should explore increased network capacity, such as adding additional 10 Gigabytes (Gbps) network connections or adding higher performance connections, such as 40 Gbps Ethernet. It must be noted that with 4K cameras, the increase in resolution will push up bandwidth and storage requirements.

## Conclusion

- The penetration of 4K video surveillance will depend on the eco-system. The cost of the cameras, suitable optics, encoders, transmission, recorders and faster computers and most importantly, 4K displays. In brief, other aspects of the IP surveillance ecosystem will need to evolve. Perhaps H.265 will become the next component in this ever progressing evolution.
- A video source capable of supporting the identification of a person or vehicle of interest depends not only on resolution, but imager, image processing, lens, illumination and compression efficiency. With all parameters being equal, 4K provides four times the resolution of 1080p HDTV video sources.
- A major advantage of 4K is the extended picture resolution and ability to reduce the number of cameras normally used in open spaces.
- The major disadvantage is the bandwidth required for high resolution, although H.265 is expected to partly address this issue. Low light capabilities are also restricted by pixel sizes and the amount of light that falls onto an 'imager'. Wide Dynamic range is also an issue.
- 4K has a big future but Organizations will have to weigh the pros and cons as the technology is relatively new.
- **It is just a matter of time before 4K becomes a business standard.**

-----

