

White paper: Why choose NVR over DVR? – Weighing up cost and performance

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1. Introduction

When it comes to recording footage from a CCTV system there are currently two main options available, Digital Video Recorder (DVR) and Network Video Recorder (NVR), but which is most appropriate for your organisation?

This can usually be determined by the purpose and size of the CCTV network it will be serving. The following paper explains the benefits of using one over the other, plus where and why it is important to get the choice right. The key driver to using a single box DVR is cost. It is cheaper than an NVR solution, however, there are trade-offs in terms of flexibility, performance and system resilience.

2. Flexibility – Separate Storage and Encoding Locations

Using an NVR system, the storage and encoding are separate and linked by an IP network. This allows the two elements to be located in separate parts of a site – ideal if space is at a premium or if:

- the existing termination point for CCTV cabling is not secure enough for image storage – the NVR can be located elsewhere
- CCTV cabling terminates in a number of different locations
- installing cabling is difficult (for example between station platforms or across roads)
- the site is large and an existing IT network can be used to reduce the cost of transmission/image distribution.

A DVR storage solution combines both the encoding and storage into a single unit, but the above flexibility is lost.

3. Performance – Guaranteed No Dropped Frames

Quality NVR systems have a separate IP transmitter for each video channel, which guarantees no dropped frames no matter how much motion is experienced overall. DVRs typically process a number of camera video channels through a single processing board, so if high motion is experienced on all cameras simultaneously, this can lead to dropped frames or an unacceptable degree of compression artefacts (seen as fuzzy or blocky elements within the picture) or increased latency (transmission delays).

4. Reliability – Reduced Impact of Component Failure

If we take Indigo Vision's NVR architecture for example, it has a dedicated transmitter card for each channel. In a typical ATEC solution, these cards slot into a four-channel rack unit which has few components, providing only power and network connection to the four encoder cards.

The benefit of this architecture is that the failure of any encoding hardware only affects a single channel of video, whereas a similar failure on a DVR board will likely affect, four, eight or 16 channels. Repairing such a failure on a DVR system will involve the recording on all channels being stopped whilst the component is replaced whereas individual channels can be hot-swapped in our NVR solution.

5. Reliability – Resilience and Redundancy

NVR solutions normally have redundancy and resilience features that aren't often found in DVR units. These include:

- Redundant Ethernet ports providing connectivity failover
- Redundant Power Supply Units (PSUs) providing failover in the event of power shortages / failure

Because the encoding and storage is separate, NVR systems can more readily incorporate standby or fail-over NVRs which can take up the recording task should the original NVR fail. This makes NVR solutions more suitable for mission-critical applications where security is important.

6. Integrity – No Removal of Evidence from Site

Although a DVR with on-board storage is a cost effective solution, when the unit experiences failure, the diagnosis and repair is typically carried out by the manufacturer. This can lengthen response times and, if the storage is on-board, means precious evidence is returned to the manufacturer's factory. This creates concerns of having no access to footage, security threats as it leaves the premises (tampering etc) and the possibility of footage being lost or deleted.

As storage and encoding are separate in an NVR solution, an encoding failure has no effect on the recording function for other cameras. The system's continuity is ensured as the encoder can be removed from the four-channel rack and replaced whilst recording on other channels proceeds uninterrupted, resulting in no loss of footage. It is important to ensure that all video storage in the NVR is removable, and that the NVR is serviceable on site.

7. Extended System Life – Enhancements and Upgrades

A good quality NVR system is easily upgradeable. Both the firmware for the recorder and the software used for evidence location, review and production will benefit from continued development by the manufacturer, made available to the user in a technology refresh. Up to four releases per annum is not uncommon and ATEC manages this with our users through a technology refresh programme, normally with an annual update.

This enables the user to take advantage of the latest video encoding platforms and maintain the best possible video quality. DVR units are not typically upgradeable so systems can quickly become dated.

- Example: Indigo Vision's IP encoding hardware is fully firmware upgradeable to take advantage of new developments. The H.264 9000 encoding platform proposed is taking over from the 8000 series as Indigo Vision's main product line and will typically benefit from three upgrades per annum. ATEC passes on these new features to clients using the technology refresh mechanism. The review software typically benefits from three software updates per annum.

8. Extended System Life - Backwards Compatibility

It is inevitable that, at some point, recording hardware will be superseded and next-generation hardware will need to be added to the network.

Manufacturers often require the latest monitoring software to be installed to support the latest hardware and do not continue to support the older product. This is a particular risk in the case of DVR products that are not designed to be firmware upgradeable and therefore lack the backwards compatibility of NVR solutions.

Because of this limitation, DVR-based solutions are typically replaced every five to seven years, whereas NVR-based solutions can continue to grow and expand for over ten years, still incorporating the original base hardware.

Simon Adcock, Managing Director of ATEC Security concludes, "With camera technology accelerating at such a rapid pace, it's only natural that transmission and recording technology changes with it. If a CCTV network exists over a large area, has a large number of cameras, or if the CCTV function is mission-critical, then NVR is the most effective and flexible solution. Some organisations may be attracted by the reduced cost of a DVR, however they fail to consider the whole life cost/benefit. In reality, an NVR solution is likely to cost less in the long term. These days, DVRs should only be the default choice on relatively small sites where CCTV is non-critical."

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