What to look for in an NVR

Purchasers of security equipment all too often only look at purchase price when acquiring security equipment and not at the maintenance cost and the efforts to keep it operational.

Since CCTV budgets are historically calculated with long life cycles in mind, total cost of ownership is of the utmost importance. If the costs to maintain a system are high, your budget is going to be cash strapped for years to come.

To achieve as low as possible Total Cost of Ownership, look for these 10 qualities in an NVR system:

1. **Is it an Open System or a vendor specific proprietary solution?**
2. **Does it have an Embedded Operating System?**
3. **Is it a truly Networked system?**
4. **Is it Web based or does it have a Thick Client approach?**
5. **Does it deliver the best image quality for my budget?**
6. **Does it support Network cameras from multiple manufacturers?**
7. **Does it record in a Standard Movie format or are the recordings proprietary?**
8. **Do I get the best possible warranty?**
9. **Is it Self Healing and does it do Automated Maintenance?**
10. **Does it come with good Manuals & Training material?**

1. Is it an Open System or a vendor specific proprietary solution?

Open systems are not about Linux. Most Linux based systems run on proprietary hardware platforms. As long as clearly interoperable standards are missing on the DVR /NVR market, purchasers should try to be as vendor independent as possible.

Open systems are about open hardware & software.

Open hardware is a hardware that can be easily replaced in case of a failure, through multiple channels and suppliers. With open hardware you do not depend on a single supplier for spare parts. This will keep the costs down. IT based hardware is largely standardized, more reliable because of the high volume and is readily available. A hard disk purchased through an IT channel is typically one third of the price charged by the security supplier channel.

Systems based on open hardware platforms are more easily upgradeable as the rapidly evolving IT market continuously provides newer and faster components.

Open software is a software which, whenever possible, uses industry standards.

Look for an NVR that supports a **standard file format** (like ASF) for recording. Since the primary function of an NVR is video recording, a recording standard is the first standard you should find in a good NVR.

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The compression codecs used should also be **standard compression codecs** like JPEG, JPEG2000, MPEG, Windows Media codecs. Third party tools are available for these codecs, which is not the case with the proprietary codecs. If you select an NVR with a proprietary codec, expect to become vendor dependant.

Good NVR should send **network problems and service messages in a standard format** like SNMP (Simple Network Management protocol).

Configurations should be saved in such **standard format** as XML. Preferably an **API** should be available for third party integration.

The more standards the NVR of your choice supports the more flexibility you will have in making future adjustments to the unanticipated requirements.

2. Does it have an Embedded Operating System?

An embedded device is a special purpose computer system. It has specific requirements and performs pre-defined tasks. An embedded device is a device, which comes with factory pre-installed software. Compared to software packages only, where software has to be installed after purchase by an occasional user, this approach delivers professionally installed and ready to use devices.

Another advantage of an Embedded Operating System lies in fact that only the necessary software components of the operating system are kept during the installation, resulting in a more secure system.

With the embedded devices, expect the hardware selected by the device supplier to be optimized for the tasks the software performs. This does not mean that this hardware should not be based on standard PC components. Today many embedded devices use standard PC components, combining the best of the two worlds: the affordability of standard PC hardware and an optimal factory software installation.

In general embedded devices have a lower cost of ownership then software packages only, if for no other reason than minimizing installation time.

3. Is it a truly Networked system?

Non-networked devices are much more expensive to own than Networked devices, for one simple reason- they cannot be accessed remotely. Networked devices enable us to perform all the operations remotely without having to physically visit the sites. This saves us time and thus money. (One of the main reasons why PC’s were put on the network in the first place, was to reduce their total cost of ownership).

Network Video Recorders are naturally networked. However there are different degrees to which an NVR can be networked.

A good Networked Video Recorder should be completely accessible, configurable and updateable remotely through its own native interface and not a third party application. Such approach would enable you to visualize incidents or perform system changes or updates instantly without the need of expensive, time-consuming onsite visits.

Good-networked devices are able to use the network in an optimal way and can record locally on disk in a higher quality than the quality that is transmitted over the network. The video transmission should be optimized for the network bandwidth that is available.

4. Is it Web based or does it have a Thick Client approach?

If a Web based system requires you to install an application on the client side, it is done automatically. It's like accessing CNN on the web. As a result Web based clients can be used on different visualization devices without having to worry about any software installations.

Thick clients, on the other hand, require manual installation of an application on every client PC. It means that whenever you upgrade the server you would need to know and update all the clients that have physical access to them. As a result the total cost of ownership of such infrastructure is much higher then it should be. Modern client/server applications are all web based.

5. Does it deliver the best Image quality for my budget?

Why have we settled so long for TV resolutions (or lower) that are not suitable for CCTV purposes? CCTV cameras often cover large areas. Except that unlike in a TV studio, there is no cameraman to continuously follow the action and focus on the important places. The solution to this problem is to increase the resolution of the recorded images.

By comparing the images from a traditional CCTV camera to a one-megapixel camera ones below, you'd be able to see the difference yourself.

In the next few years, we predict a network megapixel camera evolution similar to the one in photo camera industry where every few months a new higher resolution camera appears on the market. Network cameras are no longer more expensive than analog cameras. Often you can get a movable networked camera for the price of a fixed analog one.

Why buy a horse and chariot when a car is available? Why buy an NTSC/PAL camera when you can have a Mega pixel resolution?

Analogue Security Camera (CIF)

The image allows to see a person

Megapixel Network Camera (800x600)

The image allows to identify the person

Analogue Security Camera (CIF)	Megapixel Network Camera (800x600)
	
The image allows to see a person	*The image allows to identify the person*
	
A person or not?	*The image allows to see a person*

Why buy an NVR that does not support Mega pixel Resolution cameras? A recorded mega pixel camera image contains more image information than a recorded VHS image. When you have an incident you will need all the image information you can get.

6. Does it support Network cameras from multiple manufacturers?

Don't let yourself be locked into a single camera supplier. NVRs supplied by Network Camera suppliers tend to limit the supported cameras to their own camera brand. It means that when you want to add a camera later you will be limited to a single camera supplier. Such dependency will limit your choice of suitable cameras in the future.

On the other hand it's not advisable to select an NVR supplier that supports every network camera available on the market. Beware that in such cases a long list of supported cameras might mean that not all the cameras are thoroughly tested together with the NVR by the NVR manufacturer. In most cases it's a question of quantity and quality. A long list of supported cameras is usually a sign of limited camera function support in the NVR application. In such cases, a camera might have a lot of different functions but not necessarily all the functions would be available once the camera is connected to the NVR.

7. Does it record in a Standard Movie format or are the recordings proprietary?

One of the basic functions of an NVR or a DVR is to record images. Most manufacturers claim that their software is open and standard based. Yet many DVRs and NVRs record in proprietary file formats. The usual explanation is that it is safer. Is it safer for the manufacturer or safer for the customer?

There is no need to record in a proprietary file format anymore. 90% of the recordings available on the web are Windows Media recordings. The latest version is called ASF (Advanced System Format). ASF is codec independent. ASF can store images compressed in JPEG, JPEG2000, MPEG-4, WM9 etc.

It is an open file format. Not only did Microsoft publish an SDK to work with it, but also the specifications of the format are freely available on the Microsoft website[1]. Any software developer can use the SDK to make an application that uses this format on any platform or operating system. As a result, most popular video players on the market today support ASF files.

The importance of recording in a standard file format cannot be underestimated. Recording standards are as important to the security industry as VHS or DVD standards are to the consumer electronics industry.

To understand the importance of the recording standards, let's compare a software media player to a TV set. Today we can watch live or recorded programs supplied by any channel on our TV. That's the beauty of TV standards. What would happen if you had to buy a new separate TV every time you wanted to watch a new channel or a movie? That is exactly what is happening in the security recording industry today. Many DVR manufacturers still produce their own 'TVs'. So if you want to view life and recorded images from different DVR manufactures you'd have to have a few 'TVs'.

Even though the proprietary 'TV's'/software media players are sometime given away for free, it does not make it easier for a policeman who has to review CCTV footage from multiple sources. In fact absence of recording standards in the security industry makes it quite complex and time consuming to both share CCTV footage with the local police and for the local police to view it.

What if the recorded CCTV footage could be shared with police in minutes? And not just police but anyone else regardless of where they are? Would it not help us improve crime prevention rate and create a much safer environment? Why not use standard media players that are already available on every PC? The conclusion is simple, if a recording is done in a standard file format it can then be viewed in a standard player.

Now you can see why support of popular Internet broadcast standards like Real player or Windows Media technology is crucial for video message distribution.

What we can see today however is that some manufactures with proprietary codecs manage to support standard media players without having to give up their non-standard codecs. It's achieved by converting a proprietary codec to the standard format. One thing should be said here however. If a recording is not done natively in a standard file format any recompression to fit the standard would result in the loss of time and image quality.

Standard file formats also make it easy to enhance the NVR system with extra third party tools after purchase. If such tools as License Plate Recognition or Face Recognition support standard file format, these functionalities can be added to the system without the involvement of an NVR manufacturer

1. http://www.microsoft.com/windows/windowsmedia/format/asfspec.aspx

8. Do I get the best possible warranty?

Here are some simple rules:
Two-year warranty is better than one year.
Three year is better than two.

Five year is even better than three.
Onsite warranty is better than offsite. On-site warranty is critical to avoid your security device being unavailable due to shipment or in-shop repair delays. Compared to the warranties from little known companies, a warranty from a big worldwide supplier is more likely to be respected.

9. Is it Self Healing and does it do Automated Maintenance?

A good system should be self-healing. A service should be available to detect abnormalities in the system. For optimal functioning, it should have predefined scenarios to restore the system. If the system is unable to restore itself and requires outside help it should report this situation preferably through standardized messages like SNMP (Simple Network Management Protocol) messages.

Even more important in today's security world, are Operating System software updates. An NVR should contain an updating mechanism to secure the system with security patches when needed. All networked devices have network vulnerabilities but good devices come with an updating infrastructure with update warnings and easy to install security patches. Only the very best come with an automatic updating mechanism.

10. Does it come with good Manuals & Training material?

Good solutions come with good manuals. Checking the manuals before purchase can save you a lot of time and trouble in the future. You can reduce training costs for your security staff by selecting a product that is user friendly. A user-friendly application is an application, which offers intuitive user interface which would install itself automatically when accessed remotely.

And remember you can always judge about the user friendliness of the product by the user manual, which you should be able to obtain without having to buy the system.