# Industrial Network Management: Finding the Perfect Solution

## Introduction

If you manage or operate an industrial automation network you will already be familiar with network management. All of the activities that are involved in configuring, maintaining, monitoring and troubleshooting your network are network management tasks, for example, it is important to know which parts of your network are dependent on each other, how heavily each section of the network is being used, whether some devices are more prone to failure than others and when devices should be replaced to prevent failure while in use. In industrial networks, it is likely that most of these complicated tasks are done manually. Wouldn't it be ideal to automate these management tasks with software, in order to improve the efficiency of the process? That's exactly what network management software (NMS) does.

# What is Network Management Software (NMS)?

With network management software, it is possible to quickly assess the health of your network. Many networks today are complex and if something goes wrong it can take a long time to locate the problem. In this situation, attempting to fix the problem without an accurate diagnosis of what is wrong is like troubleshooting in the dark! With proactive network monitoring, it is possible to locate problems before they become emergencies, and locate emergencies before they become catastrophes.

Enterprise-based information technology administrators have long enjoyed the benefits of NMS on enterprise networks. With NMS, IT administrators can identify which services are most heavily used, when or where to add more resources to maximise network uptime. Industrial Automation (IA) engineers, envying the efficiency and reliability that NMS provides to IT networks, have long wished that a similar solution existed for their own networks. Some have even gone so far as to attempt to use existing enterprise NMS (eNMS) software for their industrial networks; the results have been less than ideal.

# Round Pegs, Square Holes: Shortcomings of eNMS in Industrial Networks

The problem is that most NMS software packages available today are not actually network management software in the broad sense of the term: they are actually enterprise network management software (eNMS). eNMS is an excellent solution when used in the scenarios for which it is designed: IP-based office networks, commonly arranged in a dual tree or star topology. But when eNMS attempts to manage industrial networks, it's like asking a F1 race car to run an off-road rally course: eNMS simply isn't designed for the rigors of this kind of challenge. A number of key obstacles prevent eNMS software from fulfilling the requirements of IA engineers.

## eNMS is designed for enterprise networks:

The internet protocol is widely adopted for use in enterprise IT networks, eNMS software targets IT networks by operating at the logical IP layer. This approach is perfect for IT networks, but industrial networks are often concerned with activity at the physical layer, which the logical IP layer will obscure. For example, in some networks a single device may have multiple IP addresses. An eNMS solution would interpret this device as multiple different objects, which is not an accurate representation of the physical network. Other important physical features of a network, such as double links between devices and port trunks, are likewise transparent to the logical IP layer. These physical objects and structures, such as cabling and redundant topologies, are of interest to automation engineers, but are poorly represented on the logical IP layer.

Modern industrial networks are based on Ethernet technologiesand take advantage of many recent IT developments. However, this does not mean the two are the same: IA networks use specialised Ethernet technologies such as real-time Ethernet in order to meet the

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demands of industrial applications. As industrial network technology advances, this divergence will only grow. There will be more and more differences in how Ethernet technology is used in enterprise and industrial networks, and eNMS will become even less capable of in industrial Ethernet applications.



ProfiNet is an example of a technology that is exclusive to industrial networks.

# eNMS is concerned with the big picture:

eNMS software must monitor the full scope of the network, including services, servers, and routers. This includes high-level information such as whether or not the web server is up, or if the office has a connection to the outside world. Industrial automation networks are on a different level, "closer to the ground" of operations, with many switches and edge devices. Industrial engineers need accurate and prompt low-level information; eNMS provides extraneous information about higher-level objects that simply confuses the picture.



IT and IA networks operate on different levels

## eNMS requires a different field of expertise:

As software originally created for a completely different field, eNMS software demands a skill set that will be unfamiliar to automation engineers. An eNMS software solution presents a

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text-heavy screen full of tables that list service status. These tables of text may be clear to an IT professional, but are not very helpful for an automation engineer who is interested in a network overview. Deployment and installation of an eNMS solution is even more complicated, and often requires the services of outside consultants. eNMS administrators are typically IT professionals with specialised certifications and qualifications such as Cisco Career Certifications. It is unreasonable to expect automation engineers to possess this level of expertise in a wholly unrelated field, but it is equally infeasible to hire expensive IT professionals simply to manage the NMS.

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urveillance View: default		
iow all nodes	PROD	TEST
Routers	0 of 0	0 of 0
Switches	0 of 0	0 of 0
Servers	1 of 3	0 of 0
larms	<<	1 to 1 of 1
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www.ebay.com Node www.ebay.com is down.	. 1 Wed Jun 20 2007 19	57:51 GMT-0400 (EDT) We
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A typical table-based eNMS interface

## Finally, an NMS Solution for Industry: Industrial NMS (iNMS)

Some eNMS providers have attempted to increase the appeal of their product for industrial users by adding "industrial-purpose" modules to their software. These additional components may address some of eNMS' shortcomings when it comes to industrial applications, but the effect is like painting racing stripes on a minivan. Fundamentally, eNMS is designed for management of service-level objects and no amount of cosmetic changes can make the underlying operational logic more suitable for industrial users.

Fortunately, industrial network operators torn between the value of NMS software and the shortcomings of eNMS for their applications can now turn to a new solution that is tailored for industrial users: iNMS. To be considered "industrial" network management software, an NMS solution must offer certain advantages to industrial network operators:

	Industrial NMS (iNMS)	Enterprise NMS (eNMS)	
Display Logic	Physical Wiring	Logical, IP Based	
Target user	Automation Engineer	IT Professionals	
Interface	Graphs and Visualization	Text Tables	
Response Time	Under 1 second	10's of seconds	
Ring Topology Support	Yes	No	
SCADA Integration	Yes	No	

Industrial NMS (iNMS) and Enterprise NMS (eNMS) Head-to-head:

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#### Displays the Low Level Switches, Edge Devices, and Cables:

On the plant floor, engineers aren't worried about IP addresses or web servers. Instead, they need to monitor the status of actual switches, cables, and ports. An iNMS solution should display the actual physical architecture of the industrial network, down to the port level, edge devices and cable type. Put simply, what you install should be what you see on the computer screen.



What You Install is What You See in iNMS

# **Targets Automation Engineers:**

iNMS software should have a user interface that is easy for automation engineers to understand, its configuration should also be as simple as possible. Since iNMS should monitor an actual physical architecture, a straightforward graphical display of the network architecture has to convey all the relevant information and be easy to understand. This software should be designed specifically for the expertise of automation engineers and have a shorter learning curve to master.

## Faster Response Time:

Industrial networks are used in critical applications such as traffic signal systems, assembly line management and power distribution. In an office network, if the local network goes down temporarily, there might be some inconvenience to the users, but work can continue. In an industrial network the consequences are far greater when the network falls down on the job: the assembly line jams, traffic comes to a halt as signals malfunction, or power outages occur because of a surge. The stakes are higher for industrial networks and iNMS software needs to have a faster response time to identify and prevent problems more quickly.

It is important to remember that response time goes beyond simple network latency. A welldesigned automation system must take into account the human factor; the fastest network in the world won't do any good if it fails to notify users when events occur. In order to improve the response time of the complete system, including its human component, the iNMS software should have versatile notification and alarm strategies to draw operator attention to important events.

#### Compatible with Ring Topology:

Industrial automation networks often use redundant ring network topologies in order to create redundant networks with fast recovery times. This kind of architecture is rarely seen in enterprise networks, which rely on bus or star topologies, so eNMS software can rarely

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detect or display it properly. In order to provide operators an accurate picture of their network health, an iNMS product should be capable of monitoring ring topologies, including deactivated backup links.

#### Integrates with Existing SCADA Control System:

Automation engineers have existing Supervisory Control and Data Acquisition (SCADA) control systems for their industrial processes. Adding new components to an existing SCADA system is never easy, especially if the new components are not designed to be interoperable. In order to minimise deployment costs and ensure smooth operations, iNMS solutions must be easy to integrate with SCADA software.

#### MXview is the New Solution for Industrial Networks

MXview is a new, powerful, and easy-to-use industrial network management software package.

- Simple, hassle-free setup with a 4-step installation wizard that automatically discovers SNMP/ICMP switches, wireless access points, and other network nodes.
- Intuitive and easy-to-learn graphical interface delivered through a familiar web browser.



MXView features an easy-to-learn graphical interface

- Versatile event notification with email, SMS, and alarm alerts, as well as custom triggered programs.
- Comprehensive monitoring with active and passive event detection which can be sorted, filtered and exported.
- A versatile portfolio of cost-effective solutions starting at a budget 50-node license and ranging up to 1000 nodes. Purchase the version that fits your current network, and expand with license upgrades if the number of nodes increases.

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#### **Choose a Solution Designed for Industrial Challenges**

In the past, industrial automation engineers and operators needed to compromise on their network management tools with a category of software originally designed for a completely different purpose. This is no longer the case: today it is possible to choose iNMS solutions with features designed for industry, such as physical network visualisation, fast response time, redundant ring topology support and SCADA integration.

For more information and download, please visit the <u>Amplicon website</u> or call our networking specialists on 01273 570 200.

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