

## Intelligent Infrastructure Management

### 1. Overview

An Intelligent Infrastructure Management (IIM) solution can enhance your business by helping you to establish a fully traceable cabling infrastructure. Early IIM systems supported the tracking of moves, adds and changes (MACs) and kept accurate records of the patching and the physical cabling, but today a lot more is expected. Companies need to see real-time connectivity, to the point of what is connected to the network and where it is connected.

Networks are becoming more mission-critical than ever before and you cannot allow connectivity issues to cause potentially damaging down-time. From a physical point of view MACs have historically been a manual task, with paper work orders being issued to individuals. But this can lead to work being carried out incorrectly due to operator error, which in turn results in costly and time-consuming tracing of problems. To overcome this long-standing issue, companies are looking at alternatives to paper-based tracking, and so Intelligent Infrastructure Management (IIM) has moved from being a 'nice to have' to becoming a 'must have'.

With the kind of advanced software solutions which are now available, it is possible to create an authentication database which ensures that only approved users and equipment can connect to your Local Area Network. Within many sectors of the market, there is a move to implement 'intelligent management' of the physical infrastructure and in fact there are even some regulations which insist upon the use of some form of electronic database to maintain this correctly.

In addition, many IIM solutions can be linked into your physical security system and even into building management systems. This enables a full and active 'secure system' which can be relied on to be accurate at all times. And if there is an unplanned change, or if unexpected equipment is added, then automatic warnings are generated, which can minimise the potential risks to your business.

As data rates continue to increase, from 10Mbps to 10Gbps, there is an even greater challenge to ensure that your cabling infrastructure can cope. And as the speed of the network increases, so does the requirement for more data points to support it, which in turn leads on to the support functions which are then required. How do we manage these ports? Where do they go? What are they connected to? And are they all being used? An Intelligent Infrastructure Management solution can answer all of these questions, and many more besides.

Typical benefits of an IIM solution for individual industry sectors include:

Comply with audit trail regulations

- Finance
- Retail
- Pharmaceuticals
- Healthcare

Expedite fault finding

- Mission critical businesses (data centers)
- Healthcare
- Aviation

Improve resilience

- Defense
- Data centers
- Corporate
- Government
- Multi-site organizations
- Retail stores
- Companies with limited IT resources

## 2. Regulatory compliance

The 'best practices for IT service management' covered by ISO 20000 recommends the deployment of automated tools, because any system with a human element cannot be classed as a trusted source. It states that 'an appropriate level of automation should be implemented to ensure that processes do not become either inefficient, error prone or may not be followed at all'.

The Sarbanes Oxley Act Section 404 also requires control of the IT processes within a business. As the physical infrastructure of any company is of prime importance, it is a requirement to ensure that all systems are correctly documented and are secure from unauthorized internal and external access. For example, an extract from the Sarbanes Oxley Act Section 404 '10 Threats to Compliance' states that the following question should be asked:

*"Does the supporting technology adequately collect, track, and maintain risk-related information?"*

As with any larger internal control programme, an organization's risk management programme must be supported by an adequate IT infrastructure. It is therefore imperative that all infrastructure MACs are logged and kept up to date, and this is where IIM becomes a requirement.

Another consideration is compliance with the growing requirement for Enhanced 911 (E911) systems. This is a North American telephone network feature which automatically associates a physical address with the calling party's telephone number, and which is increasingly required for emergency calling capability. An IIM system enables calls which are made via the managed system to be easily tracked back to the location of origin, meaning that companies can easily become E911 compliant.

IIM solutions enable you to address key issues which affect companies worldwide, including meeting the requirement for a fully compliant audit trail, and automating your infrastructure management to fully comply with regulatory requirements.

## 3. Business continuity

Another key benefit of an IIM solution is the ability to implement an effective business continuity strategy. If the worst happens, the ability to access an up-to-date plan of your network environment will enable the IT infrastructure of your most important departments to be recreated quickly and efficiently, thus minimizing down-time.

The business continuity capabilities of an IIM solution will enable you to back up your IT infrastructure as efficiently as you back up your data, which means that you will be able to identify business-critical services and prioritize their re-connection. This in turn will save your IT budget, by avoiding emergency replication of unnecessary functions. With a list of all your assets and a full plan of your connectivity in one database, the important areas of your business can be functioning again in the minimum possible time.

## 4. Standards compliance

It is important to stress that an IIM solution does not manage the functionality of your network or test its integrity. This solution sits outside of the transmission path and has no effect on the quality or the resilience of your infrastructure. It is non-intrusive and simply monitors your network and associated connectivity intelligently, using port-sensing or circuit-sensing technology for the patched connections, and IP-level detection for the attached network devices.

To meet the latest standards, your copper cabling infrastructure needs to be a minimum of Class E or Category 6 with a usable bandwidth of 250MHz. In fact, the latest developments in structured cabling actually give a usable bandwidth of at least 500MHz, which in turn gives support for 10 Gigabit Ethernet.

## 5. Process automation and control

When changes are required, to provision a service for a user, the network manager first needs to understand the situation exactly as it currently is. An IIM solution enables you to save time, as there is no need to establish what services are currently in use and what is available for deployment. You can simply choose the desired service from a list which you have defined, and then select the outlet where that service is required. The software will then automatically construct an appropriate work order to facilitate the circuit, including all points of connection in between.

By using the IIM software, work orders for moves, adds and changes can be created in advance and then delivered to the area which requires them, so that technicians can be deployed logically. This means that errors can be reported instantly in real-time, or avoided altogether, reducing the risk of any down-time. By automating the process of work order construction, the potential for human error can be minimised. This in turn enables accelerated deployment of new hardware; faster moves and changes through better configuration management; automated allocation of required connectivity and services, and automated alarms in the case of equipment conflict, via email or SMS to your mobile device. All of this together ultimately gives clear end-to-end visibility of assigned services.

An IIM solution also enables you to deliver better process control, by applying discipline to the change control process and so improving efficiency. A full audit trail of historical changes to the network can be established, allowing you to ensure that requested work actually takes place. The IIM system also provides one central source of up-to-date information which can be accessed by authorized personnel, and also streamlines your network set-up to maximize efficiency and availability. In addition, you can also plan ongoing developments, including creating work orders for future requirements well in advance of the actual implementation date

## 6. Security

All IT infrastructures need to be physically secure, whether this is through advanced access control technology, or simply by locking the room and the cabinets. IIM solutions offer an enhancement to these approaches, as the combination of software and hardware ensures that any illegal changes to your network infrastructure can be instantly identified and reported upon. IIM systems have the ability to send automated emails, or text messages to mobile devices, so that you are always aware of any unauthorized changes and can rectify these as soon as possible. In addition, the use of electronic work orders also ensures that any planned changes are only carried out on the correct day and at the correct time, as scheduled.

An IIM solution can also assist with fault-finding, by detecting unauthorized connections or disconnections and by identifying the cause of reported faults instantly. IT staff can receive proactive alerts when errors occur, often before users are even aware of a problem, and can then also view historical data to understand original configurations.

## 7. Hardware

IIM hardware is very similar to the other standard networking products which are installed, meaning that the physical infrastructure does not really alter. The work area doesn't change and the physical connectivity to the patch panels also doesn't change. Patching to the front of the panel is carried out in exactly the same way as with standard products, using a patch cord to connect the horizontal to the switch.

The 'intelligence' of the system really sits within the rack. The panels are all connected back to local or central controllers and these in turn are connected over the network to a main software-based database. There are various systems available and all have slightly different features, such as micro switches or ninth wire connections to confirm physical connectivity.

There are a variety of different active hardware options, which include:

**a. Rack manager**

Each rack has a 'rack manager' with a visual display which acts as a management point, indicating any planned work orders for each one and also giving details of any errors which have been detected. This connects to every panel within the rack via a fixed backbone at the rear, and then multiple rack managers are connected together to simplify the overall management of the system. In addition, each port on each patch panel has an LED light, which helps to identify which ports require changing. Standard patch cords are used with this system utilising a micro switch for each port.

**b. Ninth wire**

This solution requires special patch cords which create connectivity between the ports. The rack also has a built in analyser which detects the connectivity to each of the ports on the patch panels. The analyser then supports connections to a PDA or electronic tablet, so that work orders can be issued and errors can be displayed.

**c. RJ45**

This third solution is of a similar design to the other two, but the main difference is to the patch cord connectivity. The cord uses a 10-position RJ45 style connector and then the integral ninth wire provides the connectivity path confirmation.

In general, all of these systems provide a software database application that detects the physical patching, with various levels of intelligence built into the software to detect the end equipment. The connectivity is available for both copper and optical fibre, and the same technology which is used for the copper is also employed for the fibre solution. Using a standard patch cord without copper, a micro switch for each connector can show that both fibres for 'transmit' and 'receive' are connected. Alternatively, to provide continuity a copper wire can be included in a special patch cord within the jacket.

An IIM solution can also assist with asset management, working with your existing asset management software to track your IT hardware assets. This includes identifying unused equipment, so that it can be redeployed efficiently to maximize your IT budget, and also assists with ongoing strategic growth planning and long-term capacity management.

**8. Software**

IIM software, in association with the relevant hardware, gives you the ability to manage your cabling infrastructure more effectively and also to track all hardware assets which are attached to it. The software also allows you to create an audit trail of your equipment, and enables you to closely monitor moves, adds and changes. Based on the information gathered, it is also capable of building a database which can track and maintain your physical infrastructure, to support your current and future requirements.

The IIM software allows you to schedule network audits which will identify inactive ports and determine when they were last used. With this information to hand you can then make the necessary adjustments, to free up additional capacity without the need for additional investment. Any IP-based equipment that is connected to the network can be tracked and logged. This covers anything from a simple printer, right through to a mobile user who is accessing the network remotely to view output from a security camera.

The software element of an IIM solution can be fully integrated into standard network management systems such as HP Openview or Remedy. This ensures that all the information you need is still accessible via the one user interface, with no requirement to view multiple systems to gather necessary data.

As an extension to the core system, it is also preferable to include a mechanism which allows drawings of the building or floor to be imported into the system. This will enable you to create a graphical representation of your infrastructure, which shows all connections from switch to end equipment. This provides full visual traceability, allowing assets to be positioned more effectively around your premises. The graphical representation can include not only your main office site but also remote locations as well, giving fully centralised visibility and management of your network, even if this is spread over many locations.

## **9. Summary**

It is clear that an Intelligent Infrastructure Management solution is vital for all organisations who wish to manage and maintain their IT network in a structured and professional manner. By understanding every aspect of your infrastructure at all times, you will be able to:

- keep a full database of historical information
- identify errors before users are even aware they exist
- deal with unexpected changes effectively
- carry out scheduled work in a controlled manner
- maintain a secure environment at all times
- keep up to date with regulatory compliance

And ultimately be prepared for any situation which may otherwise have negatively affected your business.