



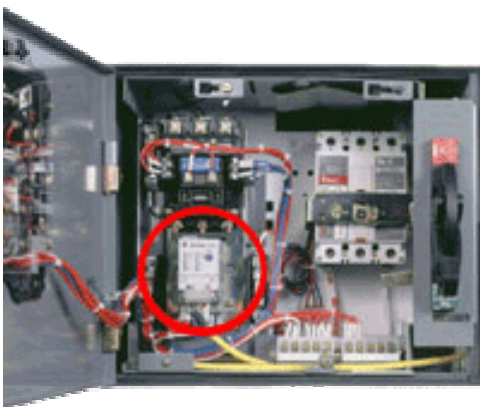
IntraValue

The *Financial* benefit of IntraVUE

In today's economic environment it is important to ensure that any purchase provides a financial return, no matter how technically attractive it may seem. Gone are the days of acquiring the latest and greatest only to discover that the costs cannot produce a justified return on investment. This can be especially true regarding software where, not only the initial purchase price, but also the added resource-cost to deploy, can be much higher than the achieved financial savings.

As Ethernet networks bridge the front office with the factory floor, it promises to reduce the complexities and improve responsiveness by interfacing directly to production equipment, creating a common network infrastructure that transcends the office onto the plant floor. Adapting Commercial and Enterprise software systems to the factory floor has been one of the most difficult areas. Trying to leverage and/or utilize the current network support software developed for enterprise computing and server applications may not however be the answer, as these packages may cost more in deployment than targeted software geared toward plant technicians. The following highlights the cost savings of IntraVUE, a package specifically targeted at supporting plant floor Ethernet TCP/IP devices.

The plant floor is a much different environment with a great deal of focus on the end devices (PLCs, robots, power management, and drives). As Ethernet TCP/IP moves to replace proprietary communications on the plant floor, it is a costly mistake to assume that network support software used in the enterprise computing area can be used as a cost effective solution for the plant floor devices. There are several reasons for this, such as:



A majority of problems on the plant floor will be associated with connection or device failures. Some studies indicate that close to 80% of plant floor problems are device or connection related. The harsh environment with vibration, heat, humidity, dirt and electrical noise degrading the life of components is a major cause of these early failures. The industrial equipment with an Ethernet connection is a device, which are unfamiliar to IT and network specialist. Some of this equipment is connected to high voltage and may be running production equipment.

Motor Control center with an Ethernet connection



The time to respond to a problem if the individual is not resident on the plant floor will mean additional down time. Response time even for simple problems may result in an additional delay of one or two hours. This is caused due to the fact that the Ethernet devices are not located on a desk or IT closet, but rather distributed in electrical enclosures on the plant floor. During this time the process or machinery may also be down awaiting resolution or replacement.

It will also be important to use the appropriate resource to address basic networking or device connection problems. This will reduce the need to tie up valuable IT / Networking specialists on these local device or connection problems. The plant floor personnel, if given the proper tools can be an extremely cost effective resource.

IntraVUE automatically discovers, displays and documents the TCP/IP devices of the network. The key emphasis off IntraVUE is support of IP addressable devices with a very easy to use tool. A tool that can be configured to not only easily highlight the device, provide all the necessary information to support or replace the device, but actually automate a secure system for the actual device replacement.

Analyses of costs shows that there are three basic stages in the deployment of a network solution.

Initial design and installation

Routine maintenance and documentation

Additions and changes to the system

The following areas will be covered and details of the savings of each are outlined in the material below. The figures are developed from information retrieved from several active applications. It is used to provide a baseline for cost savings pointing out the intended "Value Proposition" of IntraVUE.



Design and Installation Savings

The average percentage of wiring errors or connection problems encountered when installing an automation system is 10%, each of which require identification and re-work. In a recent project at a manufacture, IntraVUE had uncovered many grounding and connectors problems that were causing devices to have intermittent failures in a matter of minutes. Before IntraVUE was installed they had spent weeks with network sniffers without much success.

No	IP Address	Date	Description	Type
1979	10.1.1.101	01/19/2004 13:54:26	Device 10.1.1.101 reconnected with new mac addr 00 00 54 10 35 05 (no name)	Conn
1976	10.1.1.101	01/19/2004 13:44:47	Device 10.1.1.101 disconnected (00 30 DE 00 15 1A, no name)	Conn
1974	10.1.1.101	01/19/2004 13:44:19	Device 10.1.1.101 reconnected (00 30 DE 00 15 1A, no name)	Conn
1972	10.1.1.101	01/19/2004 13:44:04	Device 10.1.1.101 disconnected (00 30 DE 00 15 1A, no name)	Conn
1968	10.1.1.101	01/19/2004 13:42:55	Device 10.1.1.101 reconnected (00 30 DE 00 15 1A, no name)	Conn
1967	10.1.1.101	01/19/2004 13:42:51	Device 10.1.1.101 disconnected (00 30 DE 00 15 1A, no name)	Conn
1964	10.1.1.101	01/19/2004 13:42:03	Device 10.1.1.101 reconnected (00 30 DE 00 15 1A, no name)	Conn
1961	10.1.1.101	01/19/2004 13:41:58	Device 10.1.1.101 disconnected (00 30 DE 00 15 1A, no name)	Conn
1959	10.1.1.101	01/19/2004 13:40:42	Device 10.1.1.101 reconnected (00 30 DE 00 15 1A, no name)	Conn

Event logs clearly identify devices that are having problems

A time per connection that covers the identification of the appropriate connection and confirmation that communication is active after changes are made is about 2 hours based on the distribution of devices. For a 128-node network this can mean about 26 hours of effort. IntraVUE's visualization will reduce this searching to 30 minutes per connection, cutting 75% of this activity. The dynamic real-time display will keep everyone updated to the actual changes taking place and indicate immediately that communication is occurring. IntraVUE is found to be optimal for a distributed network topology with an emphasis on both switches and edge IP addressable devices.

Savings 19.5hrs x \$150/hr* start up costs = \$2925 per 128 node system

Complete ROI as an IntraVUE 128 node package = \$2950

*Typical installations require two individuals for troubleshooting wiring.

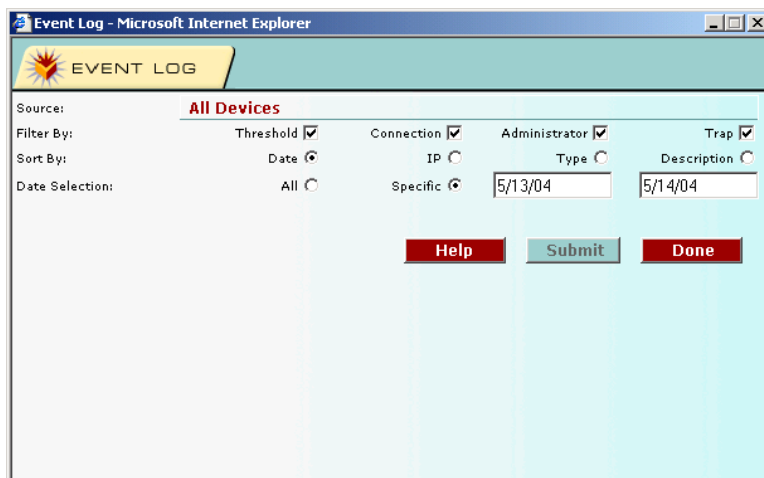


Documentation of the as-is network to compare to the design drawings is a mandatory requirement in some industries and good practice in general. The ability to provide an accurate inventory of the devices connected with their unique MAC address will simplify future support. Manually documenting the IP devices and their connection information can take days for a large system. The use of the documentation feature ivLINK of IntraVUE can provide an export of the automatically discovered devices with their connection information to standard packages such as Excel and Access. Start-up engineers can monitor progress and provide reports daily with a simple push of a button. Integrating OEM equipment that may exist on the same network will also be documented. These automatic scanning features and documentation can reduce duplicate IP addresses that plague many new installations.

Cost savings for automatic report generation can also pay for the cost of an IntraVUE package.

Routine maintenance and documentation

The majority of problems experienced on a running network are caused by simple connection problems created by vibration or individuals working on other equipment near the Ethernet device. Another common problem is the intermittent communication failures caused by degrading devices. Such problems appear as a slowdown of the network only to ultimately fail completely, typically at the worst possible time. IntraVUE runs continuously 24 x 7 and identifies immediately when a device fails to communicate or starts to randomly fail. These failures may start out infrequently only to accelerate with age and quality of equipment. We frequently hear my network is fine only to have IntraVUE



Event Log can be sorted or filtered to find specific problems

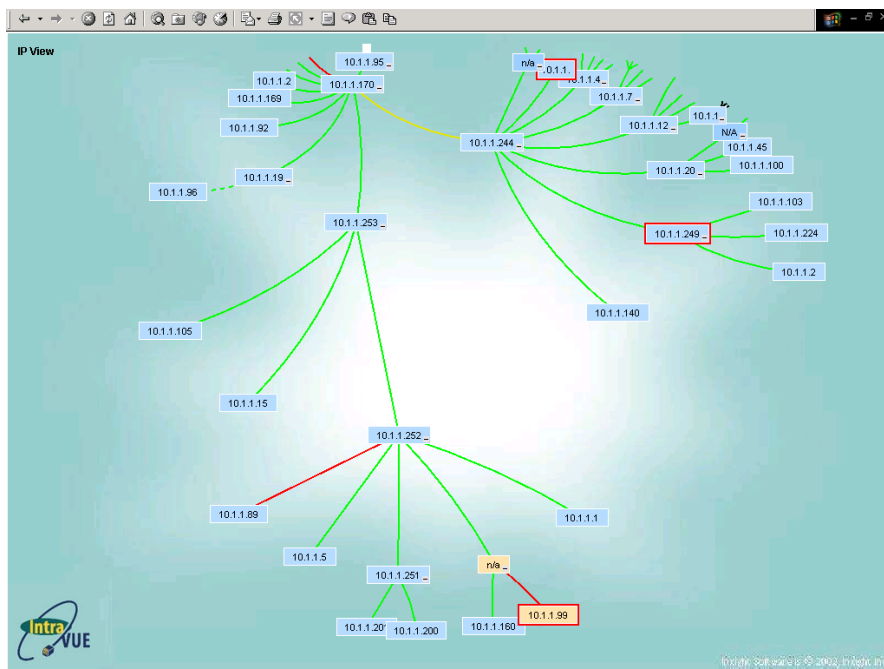
scan the network and uncover several devices having intermittent communication problems. These will lead into larger problems as more devices are added and communication increases. The ease of use of IntraVUE with access from any computer with a browser will provide easy color coded troubleshooting overview that can pinpoint problems.



A typical 100+ node system may experience a problem or two a week especially if additions/connections are frequent or as the network ages. The use of lower cost switches has also created unpredictable performance problems on factory floor networks that become heavily used. As network loads are increased (due to automation vendors are using multicast traffic in their applications) some switches cannot support the loads or bottlenecks will cause unwanted collisions on the uplink ports.

Having a real time interconnection display will provide a valuable view as to where devices should be connected for optimal performance and elimination of bottlenecks. Viewing the actual connection rather than connecting to the nearest available port will provide a better-constructed network architecture. IntraVUE will be a place that most will view to decide the best location to add a device. It will also provide an overview to determine if additional switches are required

The average time to bring in a network specialist and run the necessary test, if there is a problem can be up to three hours. If the system is experiencing an intermittent problem then this resolution may be significantly longer as it may not be exhibiting the symptoms at the time the specialist arrives, perhaps 6 hours to several days. A wire swapped to another port on the switch that is not configured in the same manner may also take 3 hours after a



problem is identified. Newly added devices are depicted as Tan boxes identifying the time and location they were placed on the network.

IntraVUE overview colors indicating Bandwidth problem, lost communication & SNMP support to several devices, and new devices added to the network



These basic problems are identified immediately and opening an IntraVUE screen will highlight the problem in minutes. The event log, which is continually running, will pick up intermittent communication failures. This provides the plant floor personnel with the information to quickly solve these simple, but common problems. New devices added to the network are easily identified.

Savings 6 incidents per month @ 3hrs per incident = 18 hrs per month

18 hrs per month x \$60 per hr = \$1080 per month

Three month ROI on the \$2950 (128 node IntraVUE package)

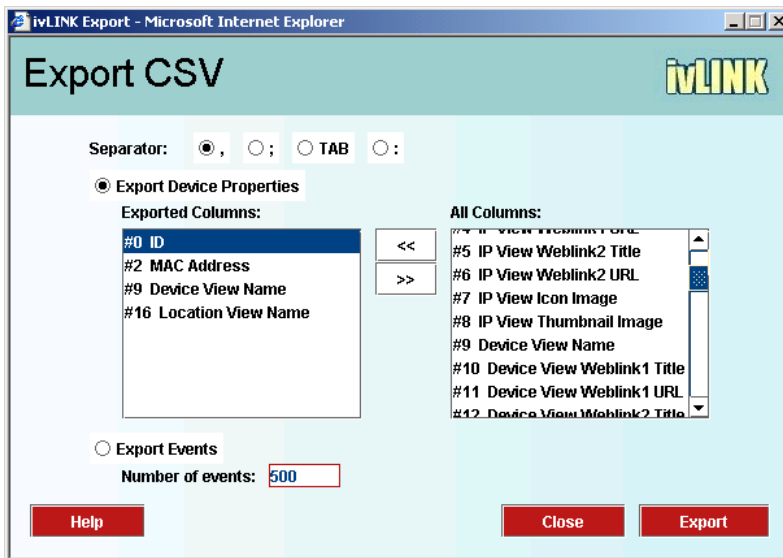
Searching for multiple IP addresses or a specific vendors product are also very time consuming activities. Since devices can be hard coded with an IP address it is not uncommon for duplicate addresses to be on the same network. Quickly identifying devices with the same IP address on a large network can be challenging the source for many plant floor problems. Finding Vendors equipment that may be embedded in the equipment is another feature that IntraVUE can perform to save hours of tedious work.

Additions and changes to the system

The addition of devices to the factory will continue as equipment is introduced or older equipment is replaced with newer versions that communicate over Ethernet. The ability to view the actual network, as a connection diagram will provide the proper information required to properly placing new equipment. In addition to viewing it will be important to inventory all equipment periodically.

Documenting an inventory of all the IP addressable devices and their interconnections can take days. One account spent a full week to fully document all the IP devices and connections details in their facility. IntraVUE with the export feature (ivLINK) can provide all the details in a matter of minutes. The manual process of checking and documenting is time consuming and may open up the opportunity for errors. Lack of current documentation may mean hours of downtime and the potential for larger issues created by devices given the wrong address.

IntraVUE graphic representation of the actual network saves 8 to 16 hours in maintaining an up-to-date drawing through connection verification and documentation for a typical 128-node network.



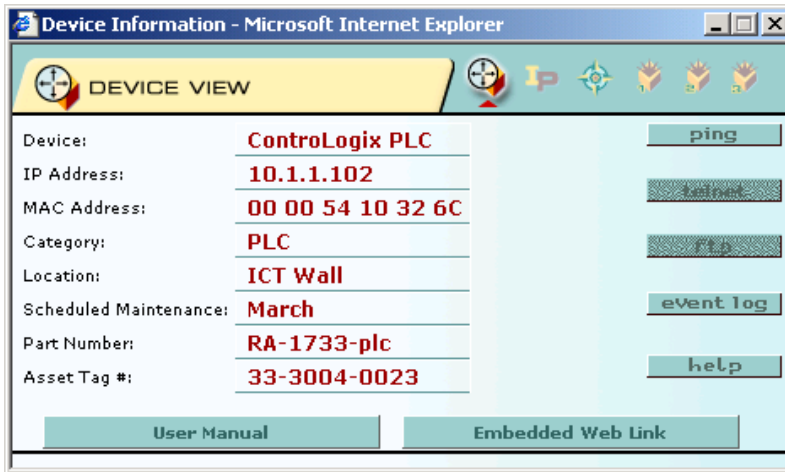
Exporting data from the device or events is as easy as select and click

12 Hours average x \$50 per hour = \$600 per system update.

Searching for problems of duplicate IP addressing and location of devices are standard features of IntraVUE, a problem that is common when fixed IP addresses are used.

Failed device recovery is a requirement addressed uniquely by the Auto-IP feature of IntraVUE. IntraVUE will highlight the failed unit and can even send an email upon failure. The responsible person can just click on the properties of the highlighted device to get all the necessary details including part number and asset tag for verification. The ability of IntraVUE to have up to 12 web Links associated to every device provides the ability to have at a click away all the necessary documentation required to service or replace the device. This key maintenance feature can point to asset management packages available from the Automation supplier, OEM, or Corporate system.

The structuring of information to bring in other packages that may be already in use will also simply the learning process and reduce cost. Rather than having someone remember what IP to address a webserver in a PLC or Switch one merely pushes the button marked Web Link.



IntraVUE can store device specific information and links to user manuals for easy servicing and or device replacement.

Once the replacement unit is retrieved the technician replaces the unit by first connecting the communication cable and then powering the unit up. Auto-IP will sense a request from the device on startup looking for an address (BootP). Auto-IP will identify the location of where the request is coming from and search its database for the appropriate fixed IP address. This simplifies the replacement and provides additional security with respect to wrong addresses being added to the network.

IntraVUE also frees up the IT staff to remain focused on higher-level problems, which require their skill and advanced software tools. Allowing the plant floor to address the common issues provides several benefits such as:

- Quicker response time and reduced equipment downtime. We have not added the cost of lost production in this calculation.
- Better working relationship between your Controls and IT departments, a sore spot for many companies.
- A balanced and appropriate use of your employees



Ethernet is rapidly expanding on the plant floor however:

- You may think that you do not have enough devices to justify the purchase of IntraVUE. IntraVUE is scalable and can start with a package of 16 nodes for less than \$1000. As you grow the package can be easily upgraded.
- You may feel that the IT group will be responsible for the network, however who is responsible for the control equipment connected to the network? IntraVUE has been designed for support of the devices with the ability to picture the activities of the network. It is a great common tool that both departments can use providing value for a number of activities.
- You may feel that there is nothing wrong with the network it is running with no problems. The question is, can you be sure that systems are not having intermittent problems and you just do not know it? Have you ever felt that the network slowed down for a while or a device was having problems getting the data? Like a spark plug that starts to misfire the vehicle still runs but gas mileage starts to decrease. The check engine light similar to IntraVUE can keep your performance optimal and save you money in the long run.
- You may feel that network software is just too complex for me, or my people. IntraVUE is the most intuitive and easy to use package on the market. We provide a money back policy that after 30 days you do not feel the package can be used by your operators, technicians, or maintenance personnel you can return it for a full refund.

Network Vision has developed this package to address a growing need for anyone that will be responsible for supporting IP addressable devices on an Ethernet network. The Auto-discovery and display technologies are state of the art. We have strategically priced the package to provide a return on investment in less than 6 months. Many have had IntraVUE pay for itself in the first month. It is fully complementary to all IP devices and is even being used in applications outside of the plant floor. It is better to have it running before a communication problem causes your company to experience downtime or apply significant amounts of resources searching for problems easily identified by IntraVUE.