

OPTIMIZING DATA ACQUISITION A SERIAL MATTER

Extending your reach to high value equipment

A Perle Systems
Discussion Paper
For System Administrators

INTRODUCTION

Many organizations today are facing the dilemma where the need for advanced technology is being compromised by the equally compelling need to cut costs. With IT budgets undergoing more scrutiny than ever, many organizations are trying to find more effective ways to leverage existing technology infrastructures to gain efficiencies and improve profitability.

A key element to maintaining overhead costs is being able to source and extract as much data as possible from multiple sources over a network. This can be telecommunications systems, in-room services, and check-in and point-of-sale (POS) systems. But there are also the not-so-obvious data sources, such as alarm systems, elevators, heating and cooling systems. It stands to reason that the more information you can collect on any device — whether it relates to sales, customer profiles, equipment performance or something as basic as power consumption — the easier it is to make informed business decisions.

The need for pertinent, up-to-date information is imperative. Customers are demanding more for their money. More information on hand means more reliable delivery of services, happier customers and of course, an improved bottom-line.

When managed properly, network connectivity is a very cost-effective way to communicate vital data from disparate systems, as well as providing continuous remote monitoring and control capabilities. However, while most organizations are networked to some extent, they are not always utilizing the infrastructure to its greatest advantage.

General administrative and interdepartmental communications functions may be well integrated with the network, but the same does not necessarily hold true for the more "mundane" devices within the organization. Readings of electro-mechanical equipment for example are often conducted manually on a scheduled basis, even if the devices have built-in intelligence for uninterrupted data acquisition.

CONNECTING SERIAL DEVICES OVER ETHERNET

Some feel that achieving connectivity with these high value devices is an expensive and complex task, however this is no longer the case. Connecting these types of devices is actually a simple matter, since virtually all of them — from elevators and cooling systems to cash registers and printers — have built-in serial ports.

With the strategic use of modern serial terminal server technology, it is easier than ever to get additional valuable data onto the organization's network, without having to incur unnecessary expenditures. Once that information is on the network, management can enjoy considerable benefits, such as reduced maintenance staff requirements, improved system reliability, and central management and control.

The notion of serial connectivity is by no means a new concept to IT managers, but it is rarely utilized to its fullest potential. Today's economic and competitive factors however, are causing managers to revisit this area to better understand how they can leverage their existing resources to improve overall operations. When properly managed, serial connectivity can be an important cost saver, and while the benefits are not immediately apparent, the overall savings can be considerable.

Serial terminal servers (sometimes referred to as device servers, serial hubs or console servers) are rapidly becoming the preferred connectivity option of choice. For one, they allow users to attach one or more devices via the serial ports for delivery of data across a local ethernet or wide area network. Proximity to a local PC is not required, as devices can be managed from the head office.

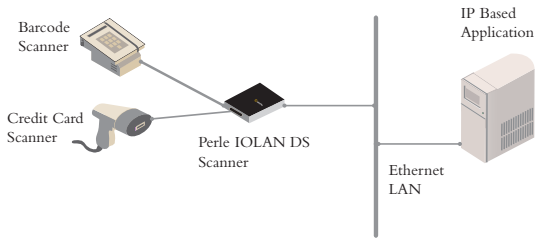
In addition, managers can extract data from devices that were previously "out of reach". Most electromechanical systems for example do not contain the necessary electronics for "direct connect" networking, but virtually every one of them has a built-in serial port that can be easily connected to a network via a serial terminal server. Once connected in this fashion, managers can enjoy the luxury of continuous monitoring, data acquisition and control of any device from a PC or laptop, regardless of their location.

SERIAL TO ETHERNET CONNECTION POSSIBILITIES

There are numerous possibilities for reaching out over an IP network to connect to your high value serial based equipment.

Using Socket Based Applications

Network attached server based applications with the ability to utilize socket services can communicate with remote serial devices attached to terminal servers. Depending on the application, these can be configured as client or servers within the socket service scheme.

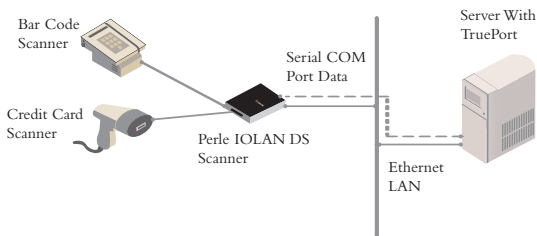


Using Serial Based Applications

Many software applications have been written to communicate with external devices that are directly connected to a server's serial COM ports. These devices are sometimes moved to remote locations where, due to distance limitations, can no longer be directly connected to their servers.

In order to enable these applications to communicate with serial devices across an IP network infrastructure, a seamless solution to both the application and device is required.

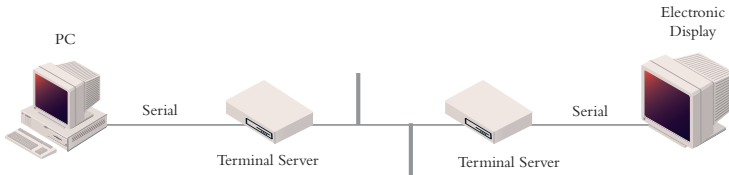
A COM port re-director driver utility installed on the application server in conjunction with a serial terminal server can be used. All COM port directed data sent by the application is re-directed by the COM port re-director across the IP / ethernet network to remote terminal servers which have the target serial devices connected to them. Data and serial port signaling is transparently communicated between the application and serial device. Host server software changes are not required.



Serial Device to Serial Device Connections (Serial Tunneling)

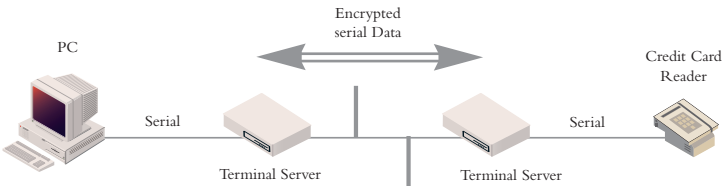
There may be a requirement to simply extend the communications between serial devices across an IP network enabling them to be physically separated over large distances.

By using serial terminal servers, these devices can be interconnected over an IP network.



Secure Serial Device to Device Connections (Encrypted Serial Tunneling)

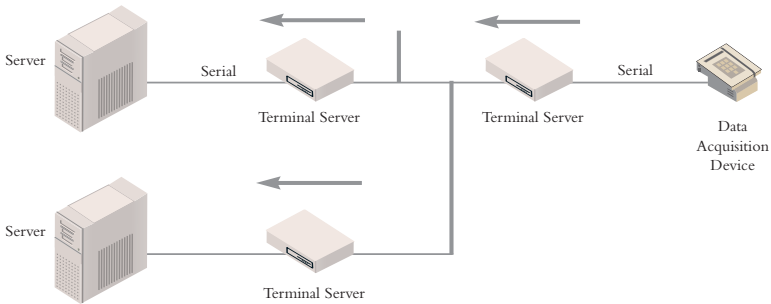
If sensitive information such as customer credit card data needs to be passed between the serial devices across the network, then data encryption is required. Protocols such as SSH (Secure Shell or Secure Socket Shell) using encryption techniques such as AES, 3DES, Blowfish, ARCFOUR and CAST prevent this data from being captured, viewed or “sniffed” during transit across the network. Modern terminal servers now have the capability to encrypt the data from the serial device before sending across the network. The information is then decrypted at the destination terminal server before being passed to the target serial device.



SERIAL MULTICAST APPLICATION

Sometimes there is a requirement to have one serial device send the same information to multiple serial devices at the same time. An example of this is where information from a data acquisition device is sent to two servers at once for backup purposes. If one should become disabled or become disconnected from the network, then the information transmitted would not be lost.

When using an advanced terminal server with this multicast capability, a table of IP/port addresses is created identifying the multitude of serial devices that will receive communications from the single source. Information can then be sent from the single source to all of the devices specified in the multicast table.



FACTORS TO CONSIDER WHEN CHOOSING A SERIAL TERMINAL SERVER SOLUTION

When choosing for the best terminal server for your serial connectivity project, it is important to consider the following;

- 1) Do all the serial devices use an EIA-232 serial interface or is there a mix of EIA-232, 422 or 485 ? Many multi-port serial terminal server manufacturers have units that are all EIA-232 or all EIA-422. The more modern terminal servers come with a software selectable EIA-232/422/485 (multi-interface) capability which enables you to choose which interface is needed on a port by port basis.
- 2) Is your environment prone to electrostatic discharges or surges. If so, you will need to ensure that the serial ports are surge-protected. This protection is normally provided for surges up to 15kV.

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- 3) Your network will evolve over time. It is important to ensure that the equipment you buy is ready to meet future needs. Does the terminal server support Next Generation IPV6 or is it limited only to the 32 bit IPV4 IP addressing scheme?
 - 4) Do you need to encrypt the data being passed across the network? If so, consider a terminal server with SSH capabilities. This would also apply to the management of the server itself. If you need the administration of the server to be done across a secure link then ask for terminal servers with SSL/https capability when using browser management.
 - 5) Monitoring and event notification. Does the terminal server provide the capability to monitor port signaling status and report these either as an SNMP alert or even sending an email to a predefined address ?
 - 6) Warranty and support. What type of warranty is being offered? Are maintenance packages such as overnight express replacement or on-site service available?

PERLE IOLAN SOLUTIONS

Perle's new IOLAN DS line follows the success of the IOLAN+ Terminal Server family, delivering exceptional performance and expanded features into a cost-effective serial to ethernet solution.

Perle IOLAN DS products are the most advanced device servers on the market for secure serial to ethernet connectivity applications. Delivering high performance in a compact desktop or rack mount form factor, the IOLAN DS offers robust security, flexibility and next generation IP technology making it ideal for applications that require remote device/console management, data capture or monitoring.

Features and Benefits

- Next Generation IP support (IPV6) for investment protection and network compatibility
 - This new standard is now being rolled out across the IT industry in order to prepare for the rollout of 3G cellular services which will significantly deplete the available IP addresses. This will force enterprises to accommodate this new IP addressing scheme. It is important to choose equipment today with this built in capability

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- Universal, software selectable EIA-232/422/485 interface – prevents mechanical tampering in the field
 - It is important to not rely on external physical DIP switches on terminal servers to select the interface type. These switches are prone to accidental or malicious tampering which may result in unplanned downtime. A software selectable interface completely eliminates this possibility
 - 15 kV ESD protection for continuous and reliable operation
 - Secure browser management with HTTPS/SSL support
 - Powerful authentication schemes prevent unauthorized access
 - All of the major authentication schemes are supported by the IOLAN DS
This means that access is assured for only those individuals that are authorized. Schemes such as RADIUS, TACACS+, LDAP, kerberos and NIS are supported
 - The IOLAN DS is officially certified by RSA Security for customer use of their two factor token card SecurID technology
 - Secure data transfer and management via SSH
 - Various encryption methods are supported such as AES, 3DES, Blowfish, ARCFOUR and CAST
 - COM or TTY port control and management for serial based server applications
 - TruePort, a COM-port redirector utility, is provided with an unlimited license for use with Perle servers. This enables serial based applications to directly communicate over an IP network to a remote serial device connected to a Perle IOLAN DS unit. A broad range of operating systems are supported
 - Windows
 - Linux
 - AIX
 - Solaris
 - SCO Openserver
 - SCO Unix
 - NCR Unix
 - HPUX

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- Serial tunneling is supported either as clear text over TCP, UDP packets or encrypted over SSH protocol
 - The IOLAN DS can support the multicast of information from a single device up to 64 serial devices on the network.
 - Power over serial capability can eliminate the cost of a separate power installation
 - Power can be provided to the IOLAN DS over the serial connection. The IOLAN DS can also supply power to a low power parasitic device like POS devices over serial
 - Port Buffering for data capture and analysis
 - Data transmitted or collected by the IOLAN DS can be stored either locally on the unit or transmitted over a 3DES secure link to a remote NFS server
 - DIN Rail mounting option for Industrial Automation applications
 - Industrial automation environments sometime require that the equipment be DIN Rail mounted. A optional DIN Rail bracket is available from Perle.

For more information on Perle's Device Management Solutions visit Perle at www.perle.com



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