Digi®

Connectware™

Digi International, the leader in Connectware, makes device networking easy by developing products and technologies that are cost-effective and easy to use.

Fall 2004

Retail/POS
Building Automation/Security
Industrial Automation
Energy Management/Utilities
Traffic Management
Medical Point-of-Care
and many more.....

Making
DEVICE NETWORKING
easy™

Application Guide

Device Server

www.digi.com

2004

Table of Contents

Introduction/Overview

With over 20 million ports connected worldwide, Digi International is the leader in serial connectivity solutions, offering the highest levels of performance, flexibility and quality since 1985. Today, Digi is making device networking easy™ by enabling you to network-enable all your serial devices.

Digi device servers are part of Digi's family of simple, reliable and cost-effective connectivity solutions. With a variety of one-, two- and four-port products to meet your specific needs, Digi device servers combine the inherent benefits of data networking with proven asynchronous connectivity. They quickly and easily turn a previously isolated device with a serial port into a fully collaborative component of your network.

The benefits of networking these devices are clear: immediate access to information, improved flexibility and a significant reduction in operating costs. Customers can now directly access and manage their devices, either through a private intranet or over the public Internet. Wherever you are, you are connected. Anytime. And without the time-consuming problems and additional costs of separate wiring or the setup of campus modems. Instead, you use the existing Ethernet infrastructure to make your business more productive and profitable. Digi makes it easy to connect your industrial devices to the network over industry-standard Ethernet.

As this application guide demonstrates, Digi device servers are ideal for a wide variety of applications. Many of these examples show how Digi products offer complete yet simple solutions to real customer needs and problems.

Retail/POS

Network-enabling peripheral devices for existing POS systems

Problem

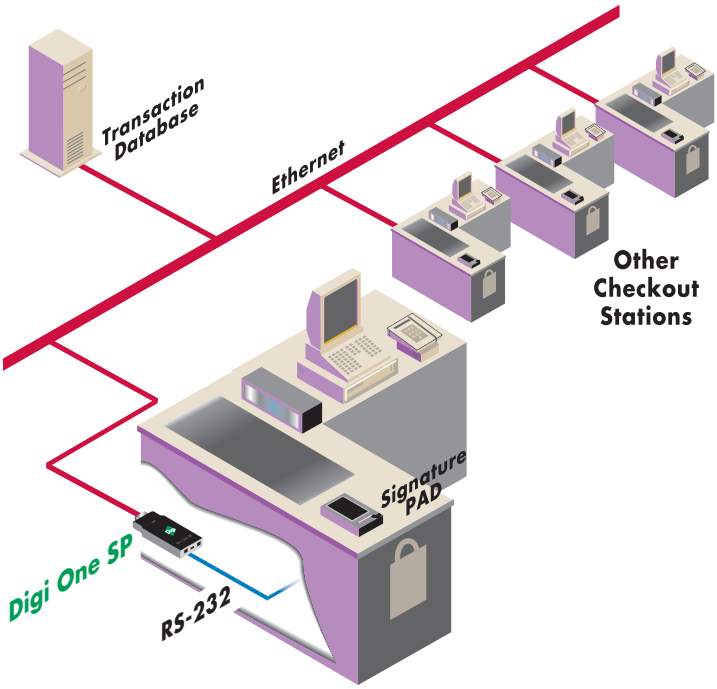
Solution

Digi One SP

Retailers incur significant costs from the handling and retrieval of credit card receipts. Finding a way to reduce these costs, while protecting themselves against credit card fraud, was a key initiative for this consumer electronics and appliances retailer.

This retailer was scheduled to relocate its checkout terminals to improve the in-store shopping experience. This was the perfect time to upgrade the existing checkout systems to include electronic signature capture devices. These devices would allow the retailer to easily retrieve receipts and the corresponding signatures, thus streamlining transaction processing and minimizing the cost of fraudulent charge-backs. The retailer wanted to perform this upgrade without impacting the existing POS software application investment.

The Digi One SP device server connected the signature pads to each store's transaction database simply by utilizing the in-store network. Digi's patented RealPort software allows Ethernet connected serial ports to be used in exactly the same way as locally connected serial ports, without any changes to existing application software. This enabled the electronic signature capture devices to be seamlessly integrated into the POS system. This cost-effective and reliable solution protected the existing POS infrastructure, streamlined credit card transactions and increased customer convenience.



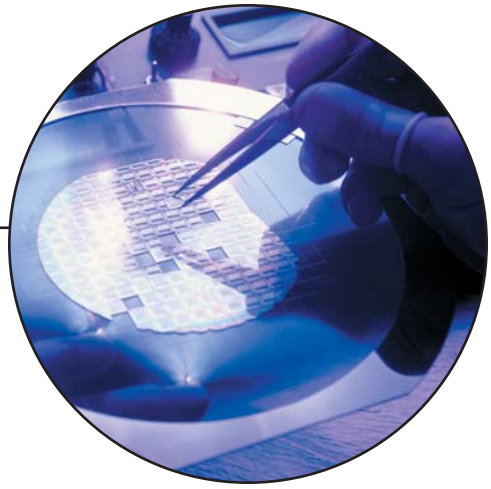
Digi One SP

Now You Can....

Easily network-enable new systems without changing the existing software application by using patented Digi RealPort technology.

Semiconductor Manufacturing

Problem — **Cost-efficient network integration of asynchronous devices**



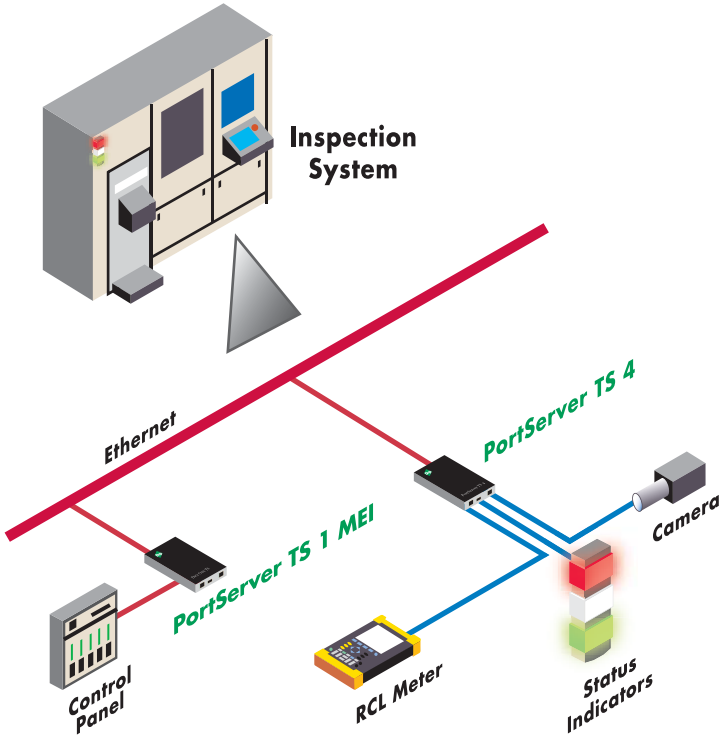
Solution — **PortServer TS MEI**

In the semiconductor industry, accuracy is defined in microns. With such a microscopic margin for error, the automated production inspection of silicon wafers is one of the most demanding machine vision applications.

Semiconductor process control systems combine highly accurate optics, precision mechanics, sophisticated image/data analysis software and an array of other measurement controls to automatically identify, measure and classify defects on processed wafers. The results are used to resolve underlying process or equipment issues, and to increase production output and quality.

A leading manufacturer of semiconductor process control systems was designing a next-generation product based entirely on network communication. All vital measurement and control components inside the complex system needed to be tied to the central processor through an internal Ethernet network. The challenge was the cost-efficient and reliable network integration of components that utilize asynchronous interfaces.

The Digi PortServer TS 4 and the PortServer TS 1 MEI device servers were quickly and seamlessly integrated into the process control system. Advanced serial-to-Ethernet features like RealPort COM/TTY port redirector software allow applications to communicate transparently with serial devices over an IP network. The device servers allowed the manufacturer to deliver the next generation of reliable, network-enabled products, without impacting production time and cost.



PortServer TS MEI

Now You Can....

Ethernet-enable asynchronous serial devices, without impacting production time and cost.

Convenience Store/Gas Station

Reducing costs associated with credit card transactions and monitoring fuel levels

Problem

PortServer TS 1 MEI

Solution

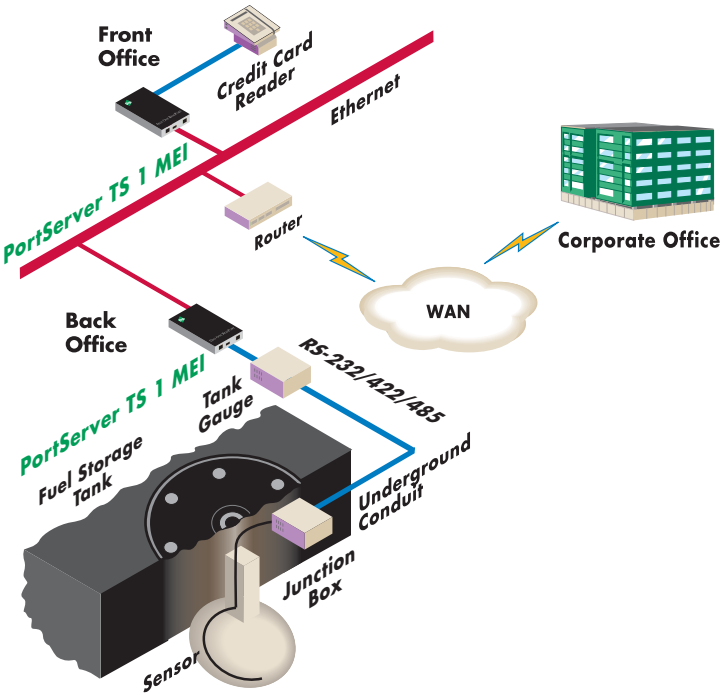
Time is money. And with more than 300 outlets nationwide, savings add up quickly for customers like this leading convenience store chain.

Facing the need to reduce operating costs and deliver a higher level of customer service, this convenience store needed to reduce both the cost and transaction time associated with credit card purchases. The existing payment solution lacked efficiency and speed. It took up to 25 seconds and three cents per credit card transaction to authorize a purchase using an analog modem.

As an additional measure to reduce operating costs, the monitoring of each station's underground gasoline tanks needed to be automated. In the past, store employees manually checked and reported fuel levels to manage the corresponding refill orders. This was a manual process that was error-prone and time-consuming.

The PortServer TS 1 MEI device server network-enabled the credit card reader in each store by connecting it directly to the corporate network, dramatically reducing the average transaction authorization time and associated costs. Applied over thousands of daily calls per store, the payback on this upgrade was virtually immediate.

Another device server also automated and optimized the fuel management by monitoring fuel in the underground storage tanks. By utilizing Digi device server technology, tank gauges were easily set up for central monitoring over the Ethernet.



PortServer TS 1 MEI

Now You Can....

Reduce operating costs and streamline transactions by eliminating analog modems using Digi device servers.

Arterial Traffic Management

Problem — **Remote monitoring of networked serial devices**

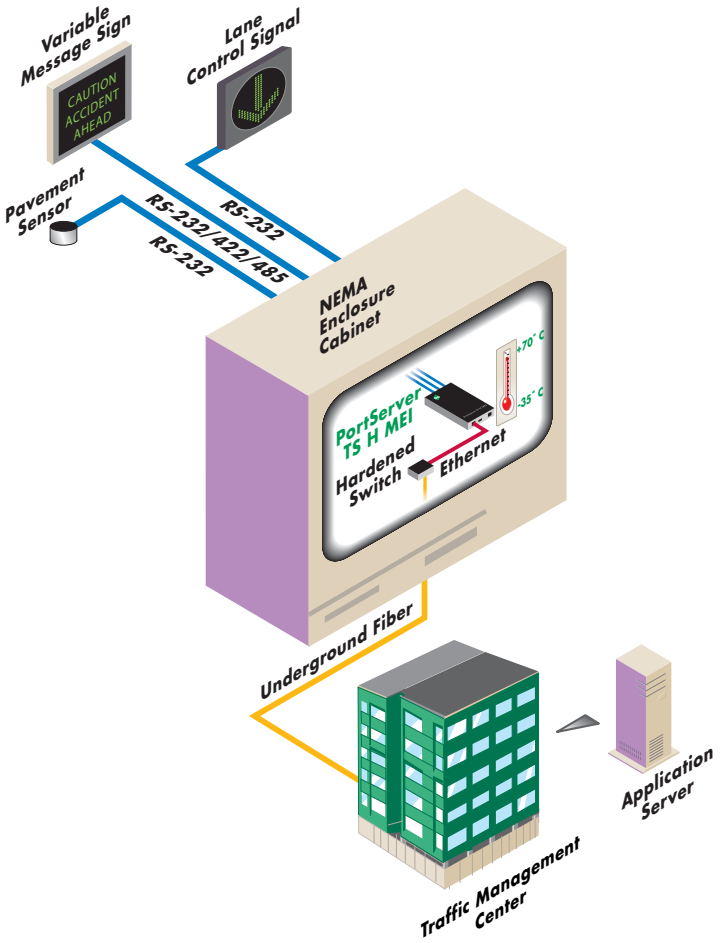
Solution — **PortServer TS H MEI**

Intelligent Transportation Systems (ITS) play a significant role in advancing public safety through monitoring traffic flow, reducing congestion, and enhancing productivity of traffic management systems. In addition to signal controllers, other devices such as variable message signs, video cameras, side-scan radars, vehicle detectors, and lane control signals are essential in managing traffic on arterial streets and major roadways.

As outlined by the National Transportation Communications for Intelligent Transportation Systems Protocol (NTCIP), authorized jurisdictions must have the ability to gain access to traffic systems of other Traffic Management Centers (TMC). TMCs are often faced with the challenge of adhering to strict NTCIP guidelines while leveraging existing network infrastructure.

Digi makes it easy for transportation departments to network-enable any serial device already on the roadways, promoting the interoperability and interchangeability of transportation systems. The PortServer TS H MEI family of device servers delivers cost-effective serial-to-Ethernet connectivity in a hardened chassis designed specifically for traffic management applications. Available in one-, two-, and four-port versions, PortServer TS H MEI can withstand temperatures of -35° C to +70° C (-31° F to +158° F), making it ideal for use inside traffic enclosures or other harsh environments.

Portserver TS H MEI enabled remote monitoring of devices through a TCP/IP connection, providing an IP gateway from the TMCs to the satellites and field devices along arterial roadways. This means that authorized jurisdictions have the ability to easily gain access to remote systems, as outlined by the NTCIP.



PortServer TS H MEI

Now You Can....

Easily integrate and publish relevant customer transaction data on the Internet using Digi device servers.

Retail Distribution Center

Network-connecting printers and scanners that are scattered throughout the warehouse

Problem

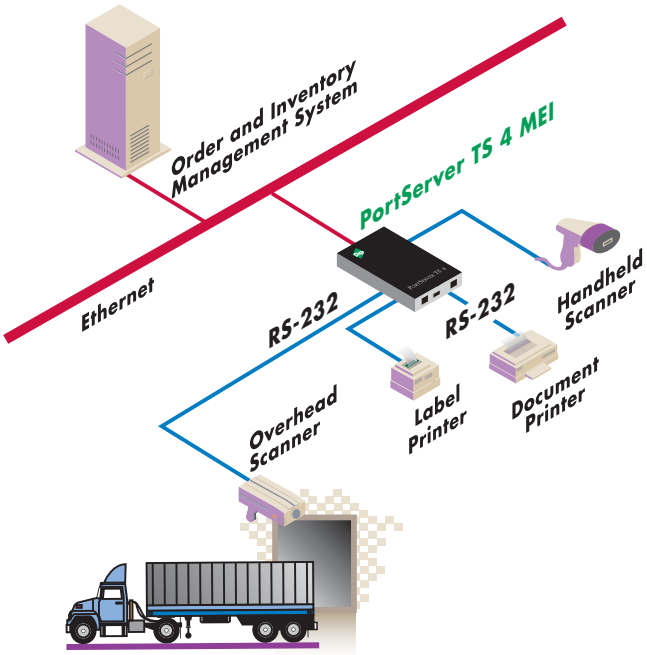
PortServer TS 4 MEI

Solution

A warehouse is the heart of any merchandise distribution. The fast and accurate tracking of incoming and outgoing shipments is essential to successfully manage orders and inventory.

In order to streamline the logistics associated with running its merchandise warehouses, this company decided to upgrade the warehouse system. Several overhead scanners were installed at each warehouse location to allow faster and more efficient unloading of delivery trucks using conveyors, virtually eliminating the slow and resource-intensive manual scanning process. The scanned information is then used to automatically print labels, route packages on the conveyors and immediately validate purchase and shipping orders. A key requirement of the project was the easy and seamless network integration of scanners and printers, which were often scattered throughout the large facilities.

PortServer TS 4 with Digi's patented RealPort technology was deployed in each warehouse, connecting up to four different serial devices to the existing order and inventory management system. Scanners and printers were made available on the network, without any changes to existing application software and hardware. The flexibility of Digi device servers proved to be invaluable, allowing the customer to significantly reduce operating costs and function more efficiently.



Shipping/Receiving Dock

PortServer TS 4 MEI

Now You Can....

Optimize supply chain efficiency by automating delivery and pick-up of warehouse merchandise using Digi multiport device servers.

Building Automation/Security

Problem

Ethernet-enabling legacy access control panels

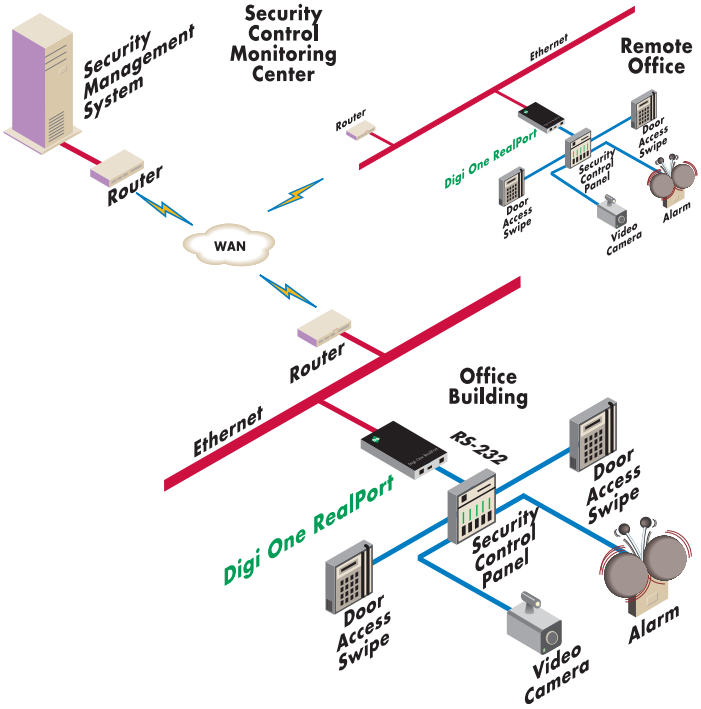
Solution

Digi One RealPort

Manufacturers of electronic security systems face the increasing demand for scalable and integrated building security solutions that enable customers to centrally manage and monitor sensitive areas in multiple locations.

This leading manufacturer of access control system products wanted to network-enable its line of security control panels in order to provide fully centralized and near real-time monitoring and management of security systems. The existing solution required a dedicated PC workstation to manage the systems in each facility, and slow on-demand dial-up modem links were used to connect multiple locations to a customer's central management system.

Digi One RealPort added seamless network connectivity to the control panels of the security systems. Each security control panel was connected to a Digi One RealPort, which utilized the customer's network infrastructure to share information and make it accessible remotely. A central monitoring and management station was now able to collect and consolidate information over the network in near real-time. This integrated solution eliminated the need for the local PC management workstations at each location, and directly translated into reduced operating and deployment costs. Digi One RealPort offers existing security applications an easy and quick migration path to a fully networked system.



Digi One RealPort

Now You Can....

Cost-effectively centralize building monitoring and control by eliminating dedicated on-site equipment.

Medical Point-of-Care

Ethernet-enabling medical equipment for more efficient and reliable data collection

Problem

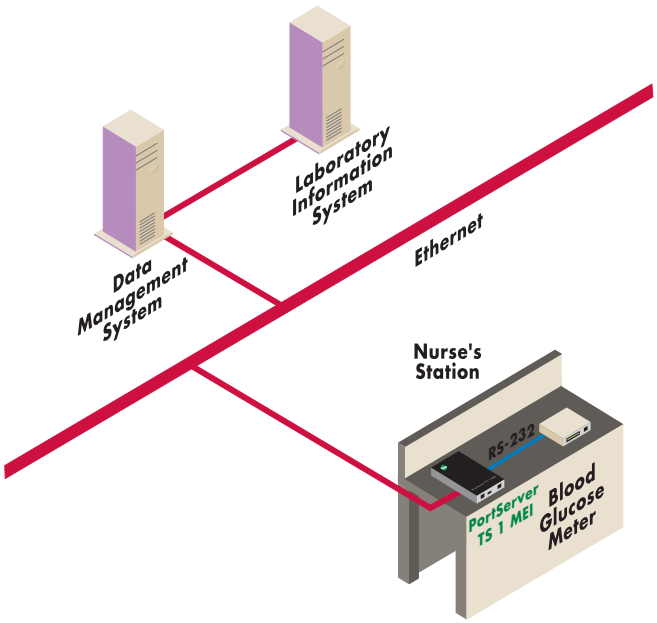
PortServer TS 1 MEI

Solution

Hospitals, clinics and laboratories constantly look for solutions to streamline the patient care process with the goal to increase productivity, reduce billing cycles and improve the quality of care.

This leading provider of Point-Of-Care (POC) information management systems wanted to optimize the POC testing process. In the past, test data from instruments like blood glucose meters, pulse oximeters or blood gas meters was recorded manually on patient charts. This manual process was highly inefficient and required nurse's time – time that could be better spent on greater patient care and monitoring. In addition, sometimes this information didn't make its way fully into the record systems that drove billing, resulting in a loss of revenue for the hospital.

The PortServer TS 1 MEI device server network-enabled a variety of medical instruments in order to electronically submit test data to the clinical information system immediately after testing. This automated solution increased the total number of captured charges and improved the coding compliance of patient records. The immediate distribution of the information also led to shorter billing cycles. The integration of Digi device server technology enabled this company to offer a solution that significantly increased productivity and improved quality of patient care.



PortServer TS 1 MEI

Now You Can....

Ensure accurate billing by integrating point-of-care devices with hospital information systems.

Process Control/Industrial Automation

Problem

Networking industrial devices and electronic displays on the factory floor

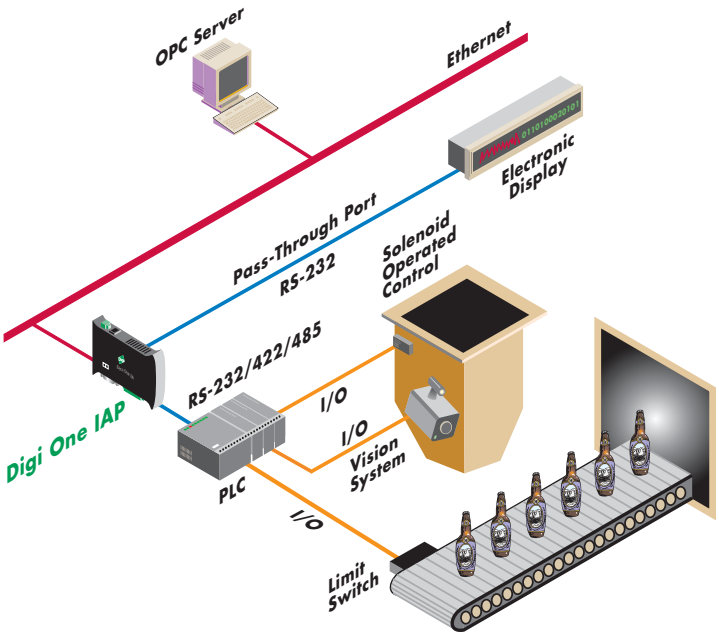
Solution

Digi One IAP

Every factory needs to manage production goals as well as identify and address potential capacity issues as early in the process as possible.

A leading beverage producer wanted to track and improve its production output by displaying up-to-the-minute production information on the factory floor. This capability was required in order to make the information accessible to production managers and workers, and to track actual performance against goals. The data from all stages of production needed to be collected and displayed on electronic displays throughout the factory.

The Digi One IAP device server connected the Programmable Logic Controllers (PLCs) in the production cells and the electronic displays to the factory's local network. An OPC server system processed the relevant production data from the PLCs and sent it to the individual signs on the factory floor. With a switch-selectable RS-232/422/485 interface and support for DIN rail mounting, the Digi device server provided reliable and seamless network connectivity for the various displays and PLC equipment. It also supports multi-master/multi-protocol, which adds flexibility by allowing serial devices to be managed from more than one host machine, regardless of the serial protocol native to the device. Digi One IAP allowed the beverage producer to standardize on one device server product and actively manage production performance and goals.



Digi One IAP

Now You Can....

Identify capacity issues and manage production efficiently by connecting all serial interface control equipment using Digi device servers.

Telecom PBX Console Management

Replacing analog modems with Ethernet for remote management of phone systems

Problem

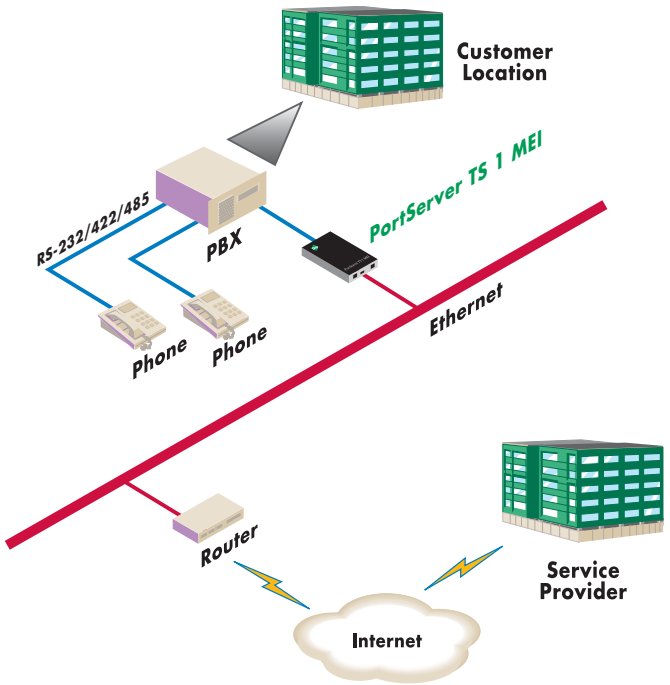
PortServer TS 1 MEI

Solution

Managing a company's phone system can be a challenge and usually requires highly trained and dedicated personnel to reconfigure or upgrade the system. This is a problem for companies with limited resources.

To offer a remote maintenance service for its base of enterprise customers, this leading telecommunications equipment manufacturer and service company was looking for a flexible and cost-efficient way to network-enable phone systems. In the past, on-site assistance was required for troubleshooting, configuration changes or upgrades to the system software. This approach was time-consuming and costly for both the manufacturer and the customer. The only alternative was remote management using analog modems, however this required an additional phone line and was also cumbersome, inflexible and slow.

The PortServer TS 1 MEI device server allows a Private Branch eXchange (PBX) to be connected to an IP network, making it easier to access over the corporate LAN/WAN. This solution greatly simplified the remote management of phone systems and eliminated the use of analog modems. In addition to being the new service business for the manufacturer, it also directly translated into productivity improvements and significant cost-savings for both the customer and the manufacturer.



PortServer TS 1 MEI

Now You Can....

Improve productivity and reduce costs by simplifying the management of previously isolated devices.

Energy Management/Utilities

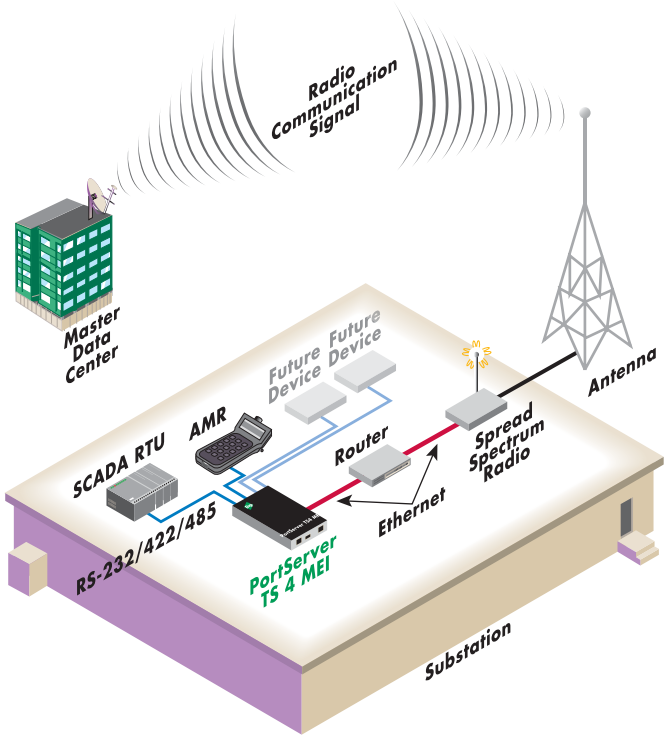
Problem — **Connecting electrical meters to a network router for faster data polling**

Solution — **PortServer TS 4 MEI**

One of the largest member-owned power companies in the northeastern United States recently established an Ethernet network that extended to the substation level. The network was put into place with the goal of gathering real-time power metering data from its group of substations. The company needed to Ethernet-enable an installed base of Automatic Meter Reading (AMR) equipment and digital meters at eight existing sites and 70 additional sites after the initial trial.

The PortServer TS 4 MEI, which provides four network-enabled RS-232/422/485 (Multi-Electrical Interface) serial ports, was an ideal solution for this power company. Each solution connects to a router at the substation. In turn, the AMR receivers and digital meters are connected to PortServer TS 4 MEI, instantly making them available for readings over the Ethernet.

Since their Supervisory Control and Data Acquisition (SCADA) system would eventually be moved to the Ethernet as well, the customer requested a solution that would also support relays, power quality devices, circuit breakers, transformers and other intelligent electronic devices. The two extra serial ports on PortServer TS 4 MEI future-proofed the application design to ensure easy system updates.



PortServer TS 4 MEI

Now You Can....

Network-enable existing serial devices and provide for system updates with a future-proof design.

Traffic Management

Gathering real-time traffic information for efficient traffic management

Problem

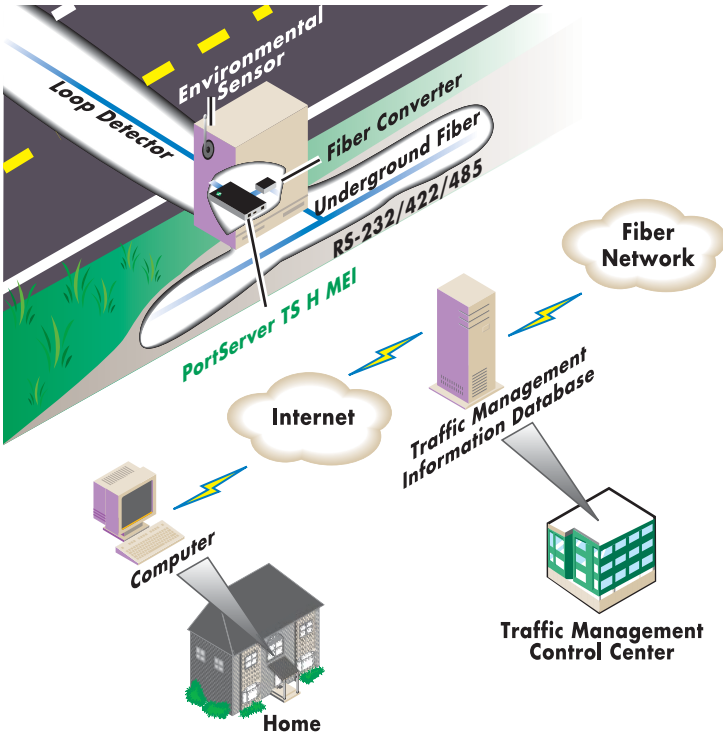
PortServer TS H MEI

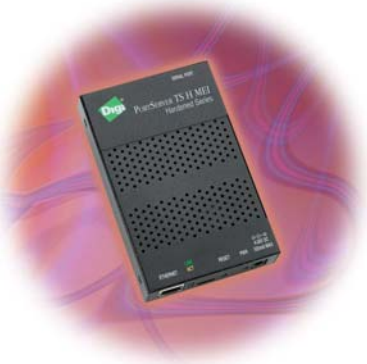
Solution

Getting from point A to point B is not always as easy as planned. In a world of ever-increasing traffic, information is key. Both commuters and transportation agencies can take advantage of the benefits provided by traffic information systems.

The national transportation agency of a Central European country wanted to provide real-time traffic information on the most important inter-urban arterial routes throughout the country. In the past, information about traffic conditions on these routes was primarily relayed by local authorities or obtained through video surveillance of vital intersections and passages. By the time the information was centrally consolidated and distributed, it often turned out to be incomplete or outdated. In other words, the established process was too time-consuming, slow and inefficient for a real-time traffic information and management system.

The PortServer TS H MEI device server network-enabled loop detectors and environmental sensors by connecting them to the existing underground fiber network along the roads. This significantly improved the accuracy of traffic status and environmental data and allowed better management of local and national traffic flow. It also enabled the transportation agency to provide access to the traffic information on its website. This allows the public to look at traffic volumes, estimated travel times, and traffic volume forecasts, in order to plan trips and avoid traffic hot spots – 24 hours a day, seven days a week.





PortServer TS H MEI

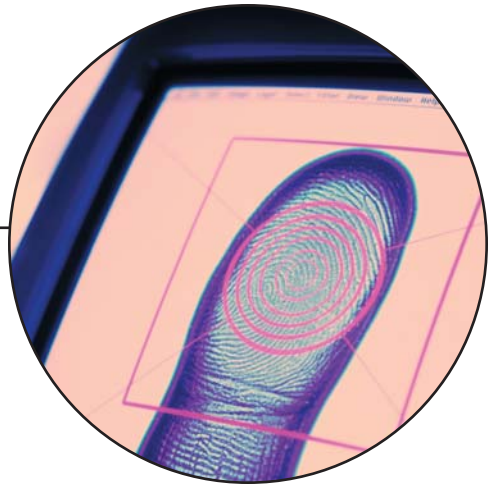
Now You Can....

Distribute traffic and road condition data to optimize travel and improve traffic flow management.

Access Control/Security

Problem

Adding embedded network connectivity to existing biometric devices, without a product redesign



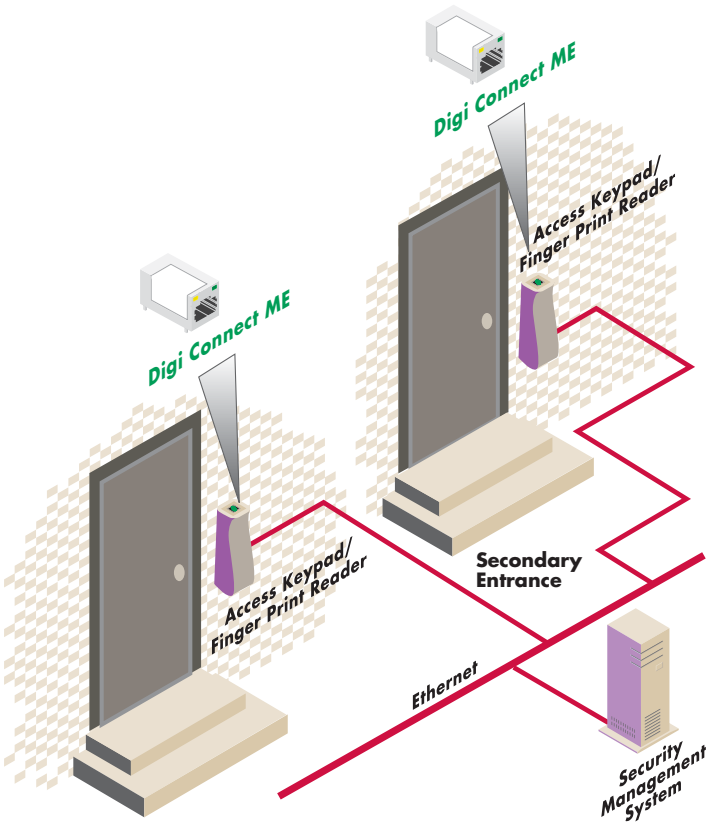
Solution

Digi Connect ME

In a world that is facing new security threats every day, manufacturers of access control products need to design reliable solutions to effectively address security issues.

This manufacturer of intelligent biometric access control devices wanted to add Ethernet connectivity to its existing product line of fingerprint readers. Traditionally, these devices either operate as stand-alone units or use asynchronous RS-232/485 communication for management and control purposes. A stand-alone unit is fairly easy to install, but its regular maintenance activity, such as the updating of access control information due to personnel changes, always requires intervention at the point-of-use. Asynchronous communication solves this problem, but not without the trouble and additional cost of running dedicated wires to the individual units. Using the existing network infrastructure would combine easy and cost-efficient integration with central management and control.

The Digi Connect ME embedded device server enabled the manufacturer to add network connectivity to the fingerprint readers at a fraction of the cost and time required to design a custom solution, all without the need for software development or significant product redesign. The manufacturer can continue to focus on its core product competency and benefit from a significantly reduced time to market. The network-enabled biometric devices seamlessly integrate into existing network environments, providing a flexible and reliable access control solution.



Building Entrance

Digi Connect ME

Now You Can....

Quickly design network-based products utilizing proven embedded Digi device server technology.

Agriculture

Combining Ethernet networking and satellite-based communication to monitor storage conditions

Problem

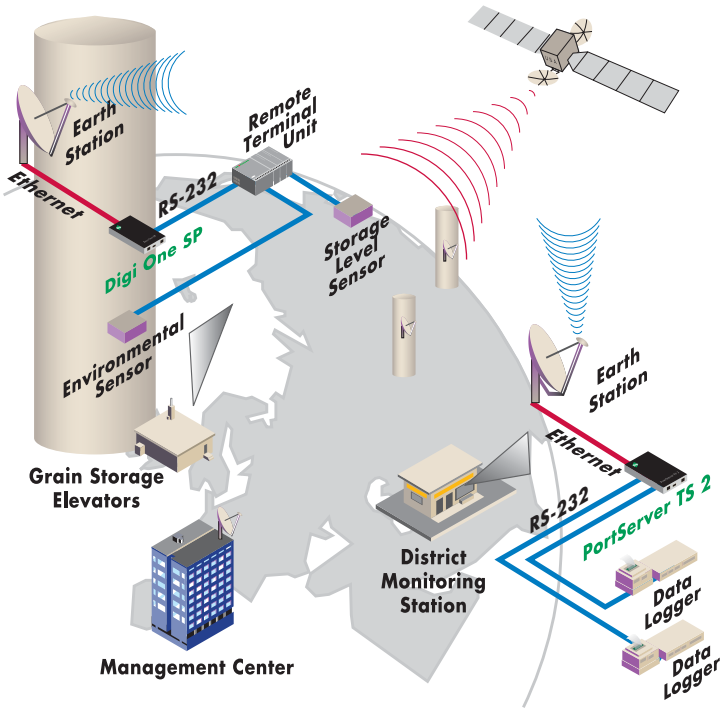
Solution

Digi One SP

Managing the grain reserve of an entire country is a crucial and complex task. The individual storage areas are spread all over the country, and a sophisticated management infrastructure is required to ensure that both volume and quality are always at the optimum level.

A national agency was looking for a cost-efficient and reliable way to optimize the management of the national grain reserve. It needed to enable the central management center to monitor and control the stockpile as well as storage conditions, such as temperature and humidity, at the individual storage locations. This task was made even more difficult by the vast geographical dimensions of the country, which ruled out the use of traditional landline networks. Instead, the design of the solution demanded satellite-based communication.

Digi One SP provided cost-effective network connectivity for the remote terminal unit at the storage locations using TCP socket services, allowing them to be connected to the local earth station network equipment. Each remote terminal unit has a variety of environmental sensors and control devices attached to it. Through the satellite network link, sensors and control devices at the individual storage locations are now available to the district monitoring stations and the national management center. This flexible and efficient solution provides accurate and up-to-date information about the status of the reserve, including centralized and fully automated control of the storage locations throughout the country.



Digi One SP

Now You Can....

Consolidate and remotely manage storage conditions and inventory levels of perishable goods for many locations.

Entertainment

Problem

Creating wire-free intelligent, flexible ticketing solutions with back-end system processing

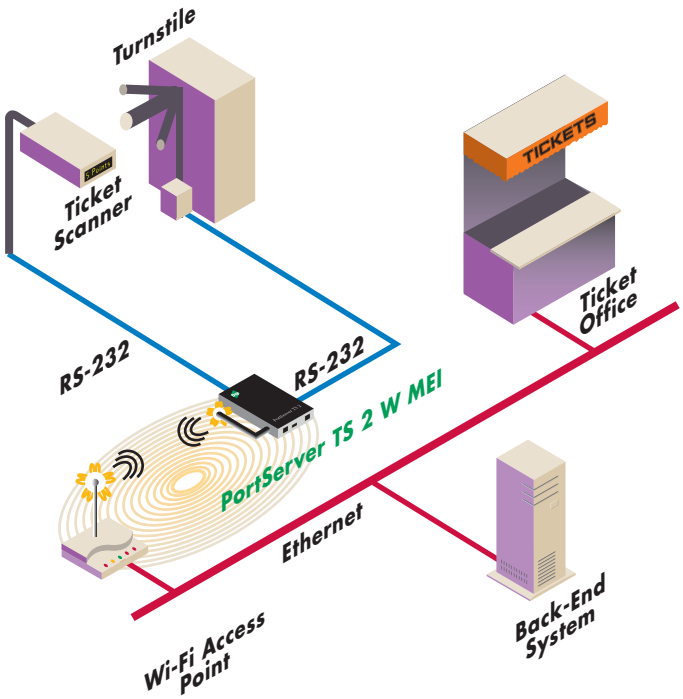
Solution

PortServer TS 2 W MEI

In order to fill a day at the park with fun and excitement, amusement parks need an efficient and customer-friendly admission and ticketing system.

This customer wanted the flexibility of integrating a credit point value system for each ride in the park; however, running Ethernet cable was a problem. In order to ride an attraction, visitors purchase credit point passes at a ticket booth or an automated ticket-selling machine. At the actual rides, the operator then swipes the guest's pass and the appropriate number of credit points is deducted. The ticketing system is completely tamper-proof, because the bar-coded passes do not store active information. A back-end system manages the validity and credit point status of each pass based on the unique and static bar-code information. In addition, the turnstile gates are used to collect data about the number of riders on each of the attractions.

The PortServer TS 2 W MEI device server utilized 802.11b wireless technology to connect the laser scanners and turnstile units of the individual rides to the Ethernet network. This allowed the park to design and implement an intelligent and flexible solution, without the trouble and cost of wiring each individual unit. This wireless solution enables the park's back-end system to centrally manage and control the whole ticketing process, from pricing to validation, and provides accurate information about visitor flow and ride utilization at any given time.



PortServer TS 2 W MEI

Now You Can....

Provide streamlined and secure customer transaction processing.

Building Automation/Security

Providing a serial-to-Ethernet migration path for deployed elevator control systems

Problem

PortServer TS 1 MEI

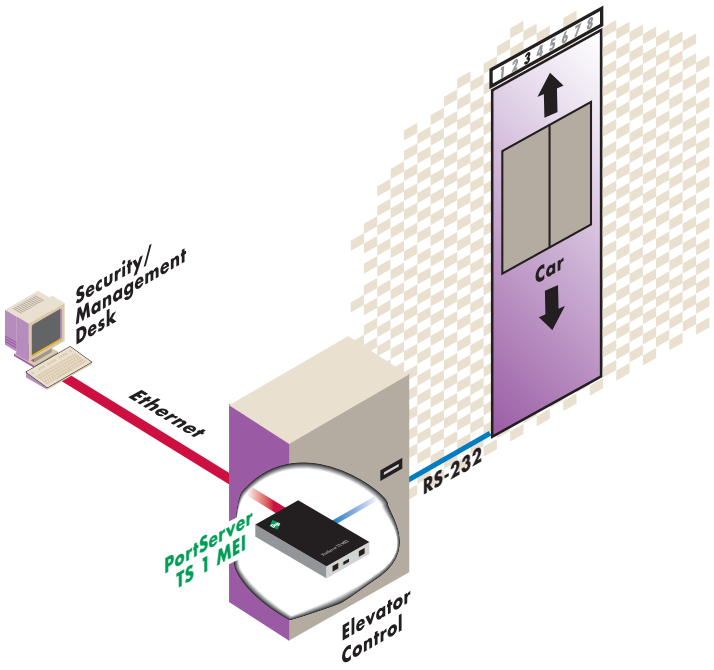
Solution

Need a lift? The control unit is the brain of every elevator, governing the secure operation of the car. Manufacturers of elevator control systems need to provide products that allow customers to take advantage of the inherent benefits offered by smart building control solutions.

This leading manufacturer of open elevator control systems wanted to add Ethernet support to their line of products. Typically, the control components of elevator systems provide an asynchronous interface to connect dedicated management and control equipment. While this is a proven and simple way of communication, it also is a rather inflexible and isolated approach. Network connectivity offers the same level of reliability and provides universal access to the units through the local network or the Internet.

Using the PortServer TS 1 MEI device server, the manufacturer added proven and dependable network connectivity to the elevator control products. The unique and innovative mounting system of the PortServer TS 1 MEI enabled the company to integrate the device server in compliance with strict safety regulations. Network access to the individual control units in a building simplifies management and control of the elevator systems, and instantly turns them into an integral part of a smart building control solution. Now the control units of the elevator system are available on the local network, or even the Internet.

This quick and cost-efficient solution also offers existing customers an easy migration path by simply upgrading the systems that are already in place.



PortServer TS 1 MEI

Now You Can....

Easily and cost-effectively integrate previously independent control systems, transforming them into a part of a smart building control solution.

Digi International Inc. Sales

11001 Bren Road East
Minnetonka, MN 55343
PH: 1-877-912-3444
1-952-912-3444
OEM PH: 1-877-OEM-3444
FX: 1-952-912-4952
Email: info@digi.com
www.digi.com

Digi International GmbH

Joseph-von-Fraunhofer Str. 23
D-44227 Dortmund
Germany
PH: +49-231-9747-0
FX: +49-231-9747-111
www.digi.de

Digi International (HK) Limited

Suite 1703-05, 17/F
K Wah Centre
191 Java Road
North Point
Hong Kong
PH: +852-2833-1008
FX: +852-2572-9989

Digi International

Room 705-6
Ruoychai International
Building, No. 8
Yong An Dong Li, Jian Guo
Men Wai
Chao Yang District, Beijing
PH: +86-10-8528-8130/31/32
FX: +86-10-8528-8152
www.digi.net.cn

Digi International Denmark

Naverland 2
2600 Glostrup
Denmark
PH: +45-49-17-70-90
FX: +45-49-17-70-91

Digi International N.V.

Keizersgracht 62-64
1015 CS Amsterdam
Netherlands
PH: +31-20-5207-566
FX: +31-20-5207-972

Digi International (UK) Ltd

Ashwood House, Almondsbury
Business Center Woodlands
Bradley Stoke, Bristol
BS32 4QH
PH: +44(0)1454-643444
FX: +44(0)1454-619048

Digi International

2 Rue de L'Eglise
92200 Neuilly sur Seine, France
PH: +33-1-55-61-98-98
FX: +33-1-55-61-98-99

NetSilicon

411 Waverley Oaks Road #304
Waltham, MA 02452
PH: 1-800-243-2333
1-781-647-1234
FX: 1-781-893-1338
Email: info@netsilicon.com
www.netsilicon.com

Digi®

Connectware™

Making DEVICE NETWORKING *easy*™

Connectware™

91001148
C2/1104