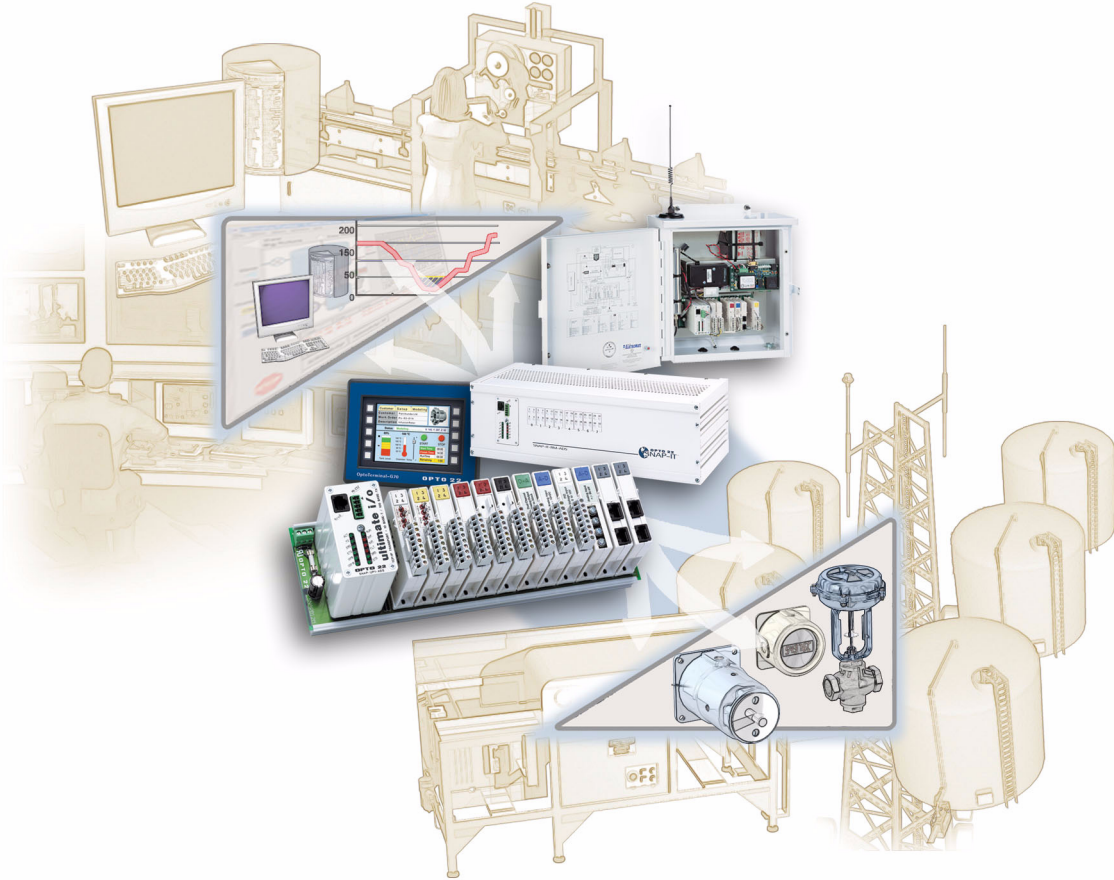


OPTO 22

SNAP Application Guide



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Spanning the Information Gap

The Gap in Your Business

At one end of your organization you have the computer software applications that help you make business decisions, create products, and automate processes every day. Enterprise Resource Planning (ERP), operations, accounting, automation systems on the factory floor, and other software systems manage the data you depend on.

At the other end of your organization you have the line-of-business physical assets—manufacturing equipment, process control systems, remote capital assets, commercial buildings, and other physical assets—that automate production and hold valuable decision-making data.

Between the two is a gap—a gap that previously could not be bridged without complex, costly, proprietary hardware and software. How can you harvest data from your physical assets so it can become useful business information? How can manufacturing processes or physical assets be automatically adjusted based on data from enterprise software applications?

Business Software Applications



Line-of-Business Physical Assets

Bridging the Gap

Opto 22 SNAP systems bridge the gap, exchanging vital data between physical assets and business software, simply and affordably, using open standards.

Whether your application involves industrial automation, remote monitoring, enterprise data acquisition, or a combination of these, SNAP can help your organization be more efficient and responsive to business needs.

SNAP Application Profiles

SNAP systems bridge the gap between assets and information systems using a versatile combination of hardware and software to support a wide variety of applications, from simple monitoring to sophisticated control.

The sample applications in this guide are profiles—cross-sections that highlight hardware, software, and network components used to join assets to automation, monitoring, and data acquisition systems. Each profile focuses on a specific automation, remote monitoring, or data acquisition objective.

Business Software Applications



Line-of-Business Physical Assets

General Profiles

The general profiles on pages 4–6 show systems typical of industrial automation, remote monitoring, and enterprise data acquisition. Refer to these profiles for a broad definition of these applications.

Specific Profiles

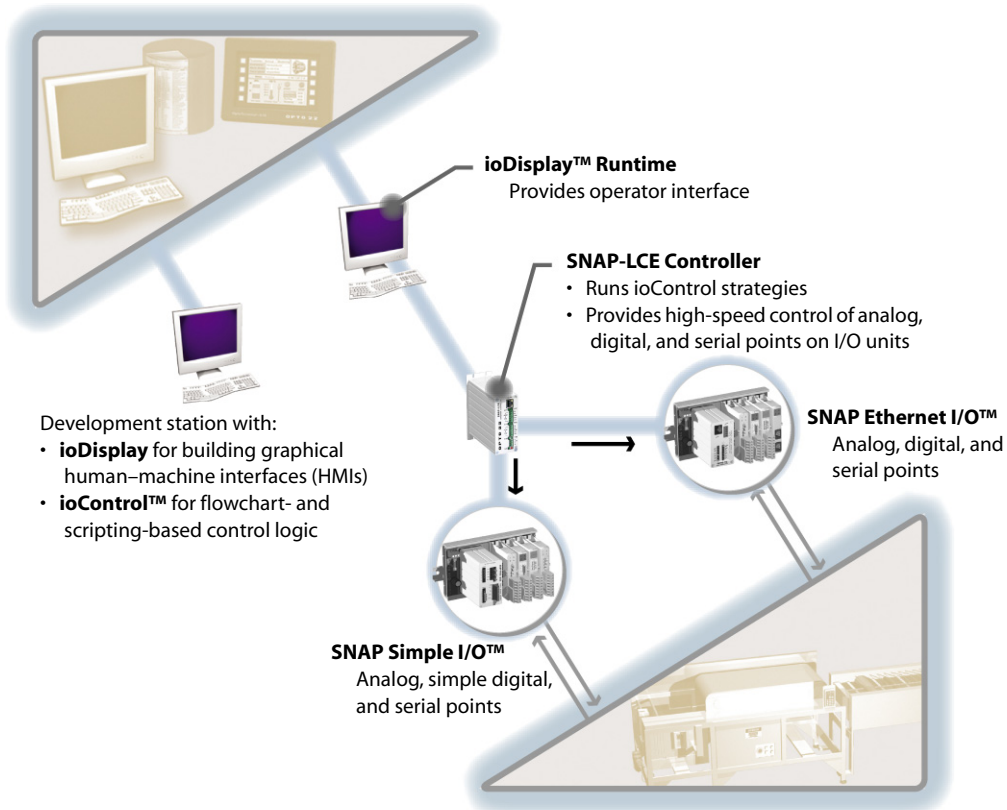
The specific profiles starting on page 7 show part or all of real customer applications employing Opto 22 SNAP products. Use these profiles as ideas for your own application and to see the versatility of SNAP systems.

After you have explored the profiles, check the tips starting on page 20 to choose the SNAP system for your application.

Note: For help in selecting components, see Opto 22 form 1377, the SNAP Selection Guide. For a list of part numbers, see form 788, the SNAP Component List. Both forms are available on our Web site at www.opto22.com.

General Profiles

Industrial Automation Application



SNAP systems were built from the ground up to meet industrial automation needs for:

- Process control
- Discrete manufacturing
- Visibility into manufacturing processes
- Data acquisition

SNAP meets the challenges of industrial automation applications with a modular system architecture consisting of controllers, I/O unit processors, I/O modules, mounting racks, and software that is versatile and simple to use.

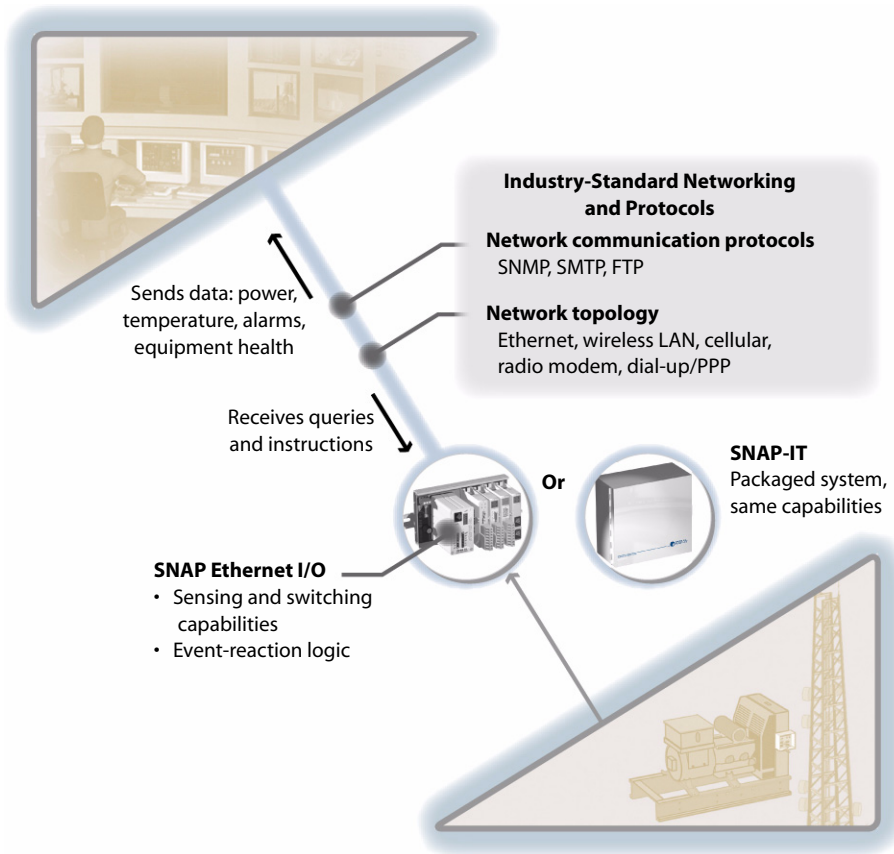
Instead of proprietary networks, SNAP control systems use open Ethernet (an off-the-shelf networking standard

that is increasingly common in industrial settings), serial, or ARCNET networks.

SNAP I/O modules handle the wide range of digital, analog, and serial signal types required by industrial equipment. All SNAP hardware is built to last in harsh environments, through extremes of temperature, vibration, noise, and electromagnetic interference.

Powerful controllers run flowchart-based control logic for complex control requirements. Operator interfaces include trending and alarming. In addition, third-party controllers, control applications, or human-machine interfaces (HMIs) can connect with reliable SNAP I/O units using Opto 22 driver toolkits and OPC support.

Remote Monitoring Application



SNAP systems provide visibility into the far reaches of your enterprise, without communication or integration hassles. SNAP systems can monitor almost any electrical, electronic, or mechanical sensor or device, and deliver realtime data on remote conditions so you know exactly what's going on.

- Did a light go out atop a remote communication tower?
- What are the current temperatures in convenience store refrigeration units located across the country?
- Who unlocked which gates at citywide storage locations?

With SNAP, remote asset monitoring that once required a private communications infrastructure is now possible through commercial networks, phone systems, mobile networks, and even the Internet. With these new options you can cost-effectively monitor assets even when

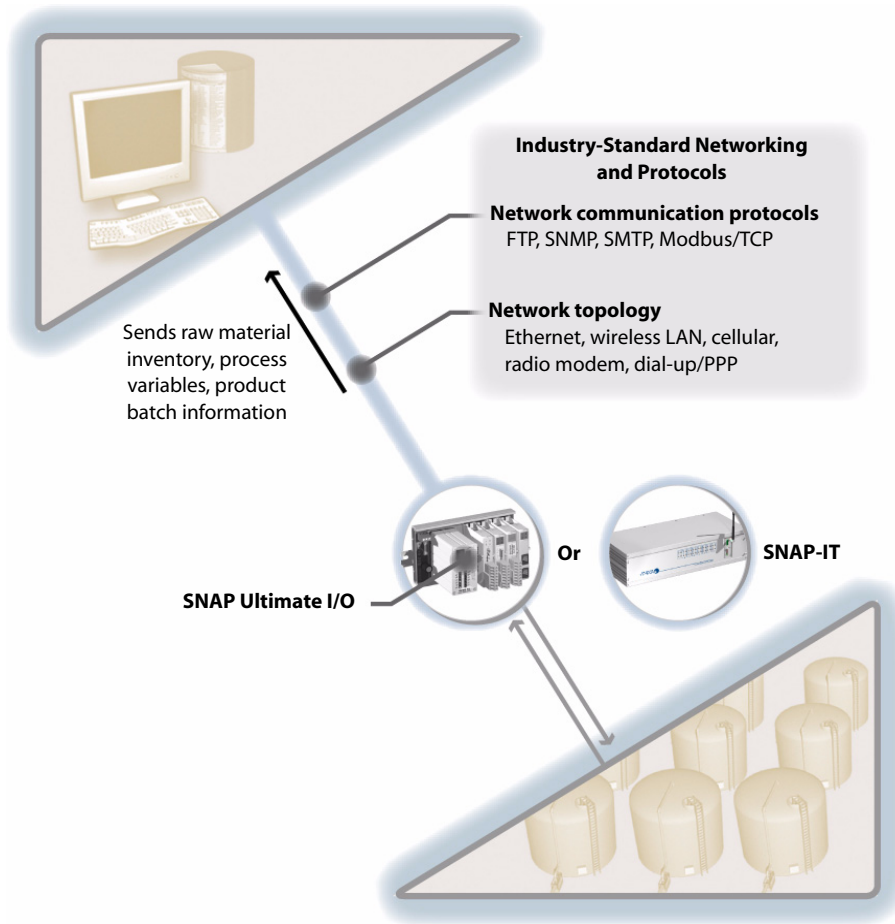
topology or distance requires wireless and satellite-based communications.

Packaged Opto 22 SNAP-IT™ units are ready for use indoors or outdoors, while component-based SNAP Ethernet I/O™ or SNAP Ultimate I/O™ can provide the connection for remote monitoring at any location.

A remotely deployed SNAP system brings a rich set of features that need only configuration. The alarms you define can notify monitoring systems and execute simple commands at the monitored location. The variety of communication protocols supported by SNAP systems gives you great flexibility in implementing primary and backup networks.

Remote monitoring often leads to data acquisition and to control. With SNAP systems, once assets are monitored, data collection is free—and much of the hardware required for control is already in place.

Enterprise Data Acquisition Application



SNAP systems offer an inexpensive way to connect remote data sources directly to information destinations. Because SNAP data acquisition systems use standard networks and protocols, such as Ethernet and TCP/IP, data that was previously uneconomical to collect can now be profitably used.

- Data you need from storage tanks, machines, and processes is no longer locked in proprietary systems, but readily available.
- Data that used to come from inherently unreliable manual systems can now be tapped directly and in real time.
- Data from all your real-world assets can go directly into your business software—turning it into business information you can use to make better decisions.

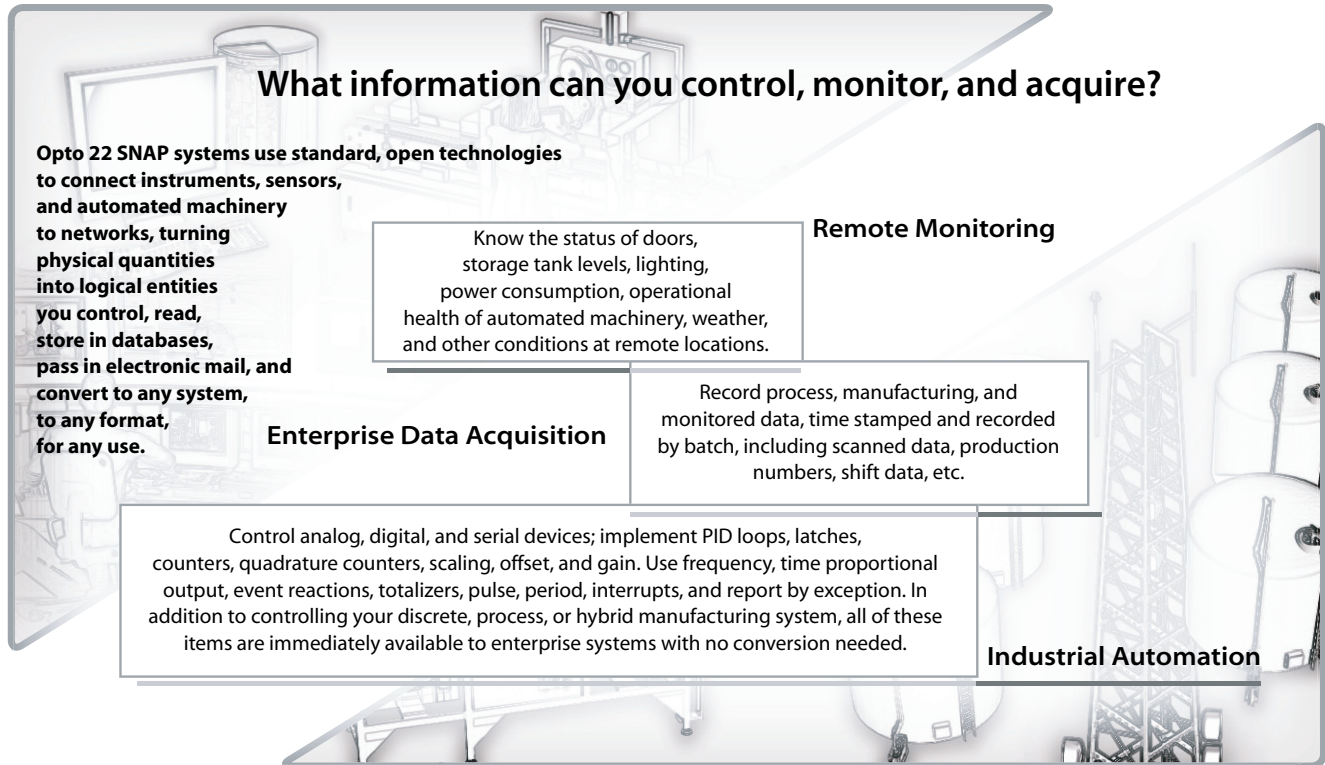
As supply-chain management, customer relations management, and vendor-managed inventory systems grow, SNAP can provide the reliable, time-critical data required to make these systems work.

Automation and data acquisition can be combined, with the industrial SNAP system controlling a process while the I/O unit sends key performance indicators and time-sensitive data from the process to enterprise data applications.

If a proprietary control system already exists, however, SNAP systems can collect and send data independently and non-intrusively, without interfering with existing control.

Specific SNAP Application Profiles

This section offers ideas for how you might deploy SNAP systems to collect data, automate a process, or monitor assets in specific applications.



Applications

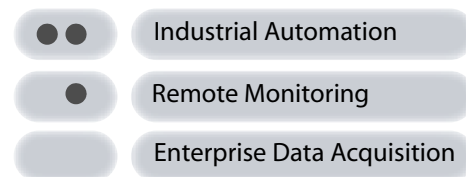
SNAP products are deployed for industrial automation, remote monitoring, and enterprise data acquisition, but it is rare that a single solution applies to only one of these. In fact, many of the applications in this document were selected for their general applicability.

Key: Highly relevant: ● ●
 Applicable: ●
 Not applicable: (No marker)

Application Developers

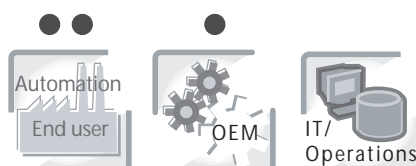
We find that most customers of SNAP products have one or more of the following backgrounds: automation end-user, Original Equipment Manufacturer (OEM), or IT/operations personnel.

Example: Applications



To show where a profile is from and who might find it useful, each profile contains a legend indicating the application(s) and developer(s). These indications are a guide and are not absolute.

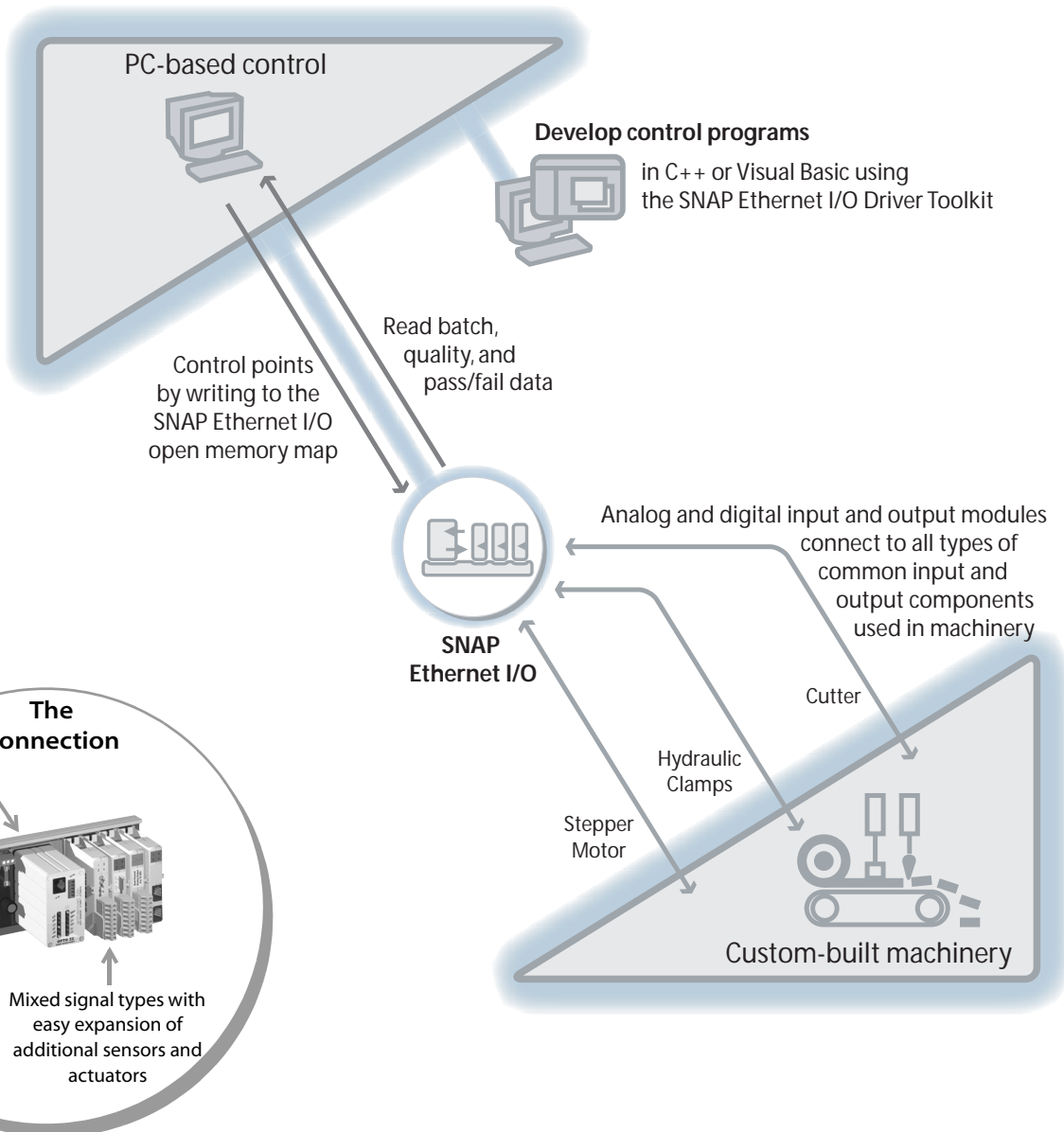
Example: Application developers






SNAP Application Profile 1: Custom Control Program

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● ● Industrial Automation Remote Monitoring Enterprise Data Acquisition 	Ethernet IEEE 1394-based protocol TCP	<ul style="list-style-type: none"> ● ● Automation End user ● ● OEM IT/Operations

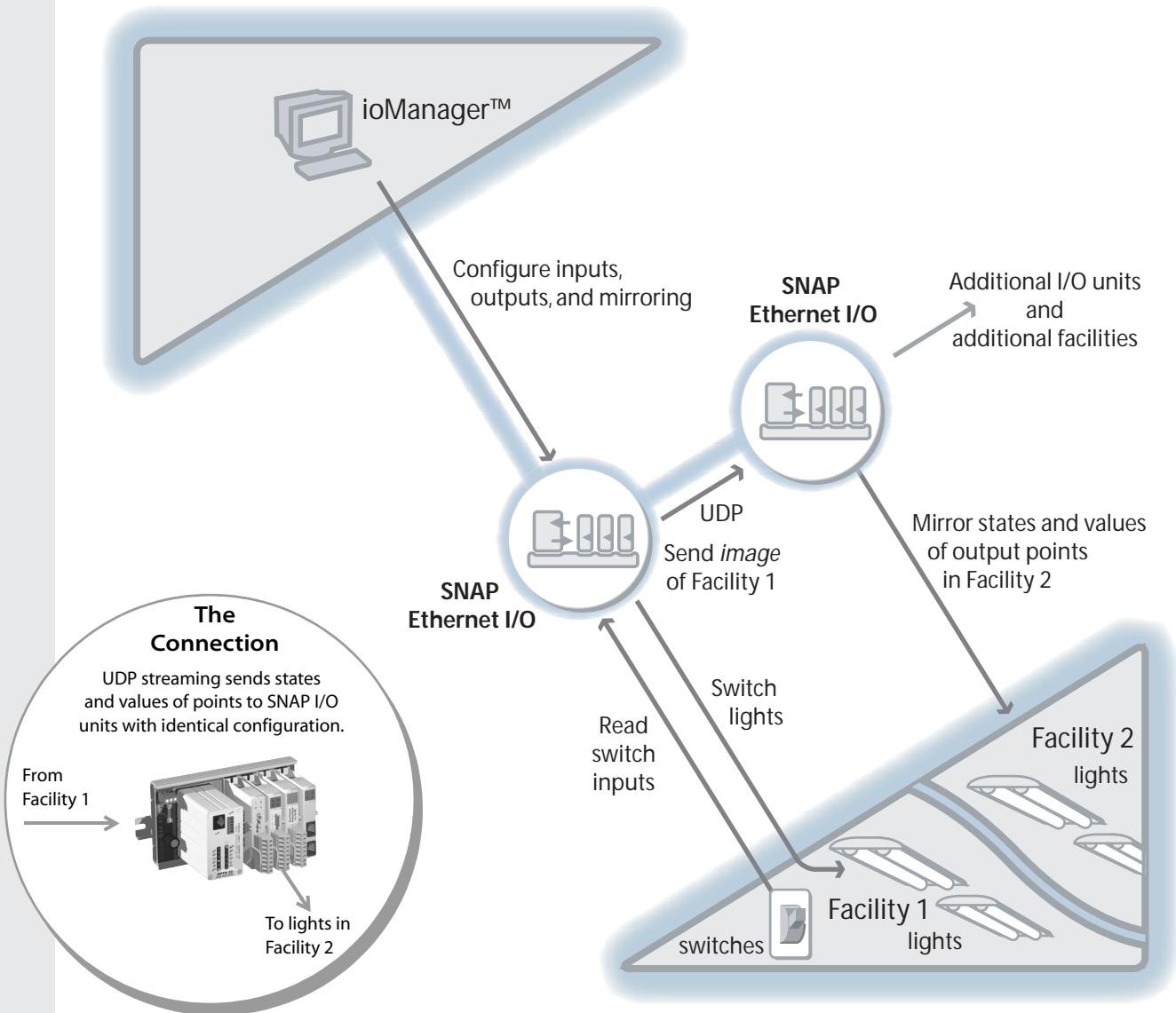
Industrial automation often requires developing or utilizing machinery for unique applications. This machinery uses standard and custom hardware (bolts, brackets, rollers, belts, motors) with numerous sensors, actuators, and transmitters from different vendors, producing the inputs and outputs that make the machine work. In this profile, a SNAP system unifies these inputs and outputs and offers low-cost and versatile PC-based control by opening programming functions to C++™, Visual Basic™, and other high-level



SNAP Application Profile 2: Multiple Facility Lighting Control

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● Industrial Automation ● ● Remote Monitoring Enterprise Data Acquisition 	Ethernet UDP/IP (streaming)	<ul style="list-style-type: none"> ●  ●  ● 

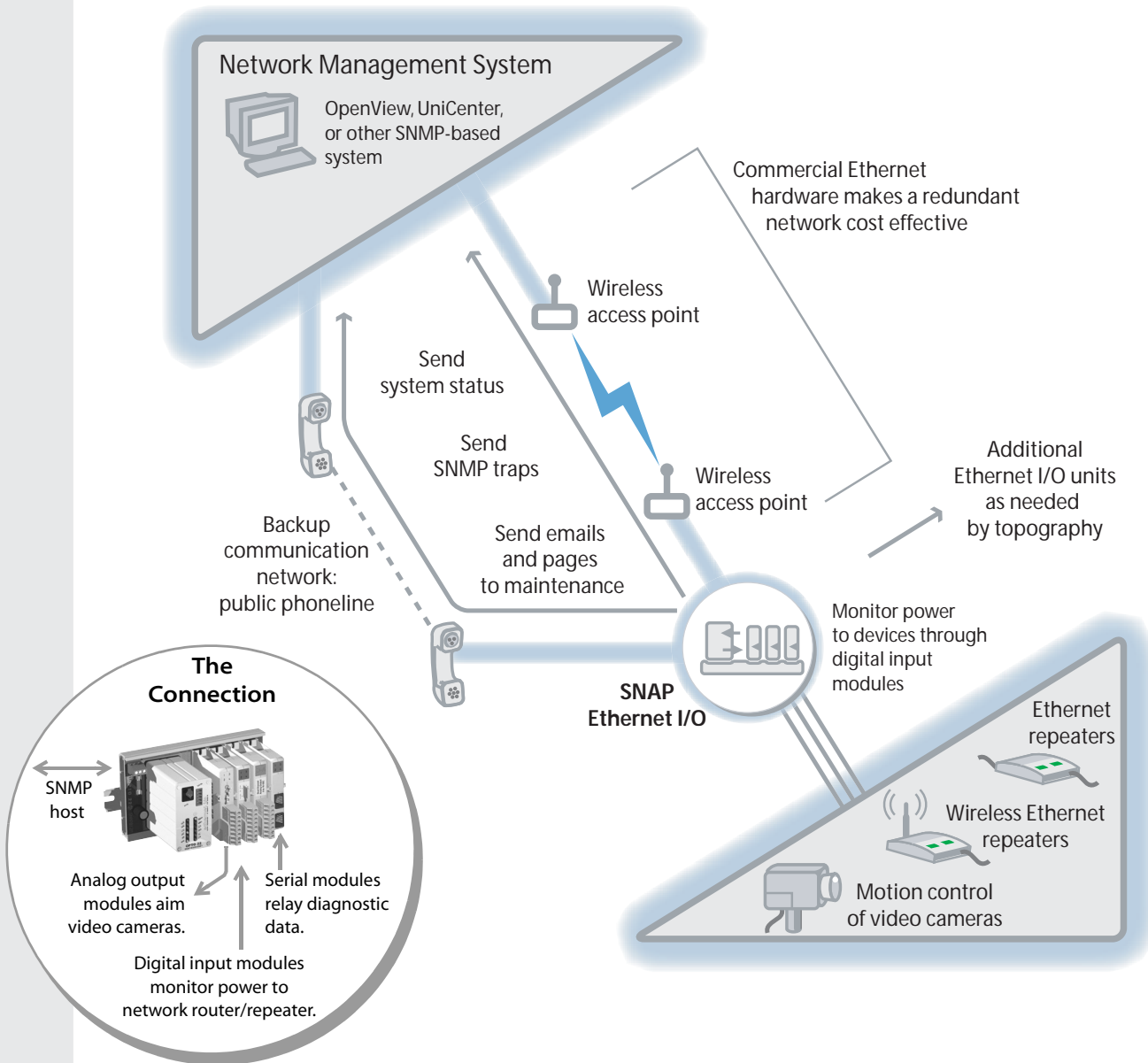
In this profile, the building controls in one facility act as a master switch for other facilities requiring identical lighting. Lights in each building are switched on and off with a SNAP Ethernet I/O unit (a SNAP Ultimate I/O unit could also be used). The on/off states of the master building are controlled through switches attached to the I/O unit. The current lighting status of the master building (on/off states) is mirrored on up to eight other Ethernet I/O units in other buildings. Each SNAP Ethernet I/O unit can stream data via UDP to eight IP addresses. In this case it is more cost effective to use existing Ethernet connections between facilities than to wire building lights to a central switch.



SNAP Application Profile 3: Network Infrastructure Monitoring

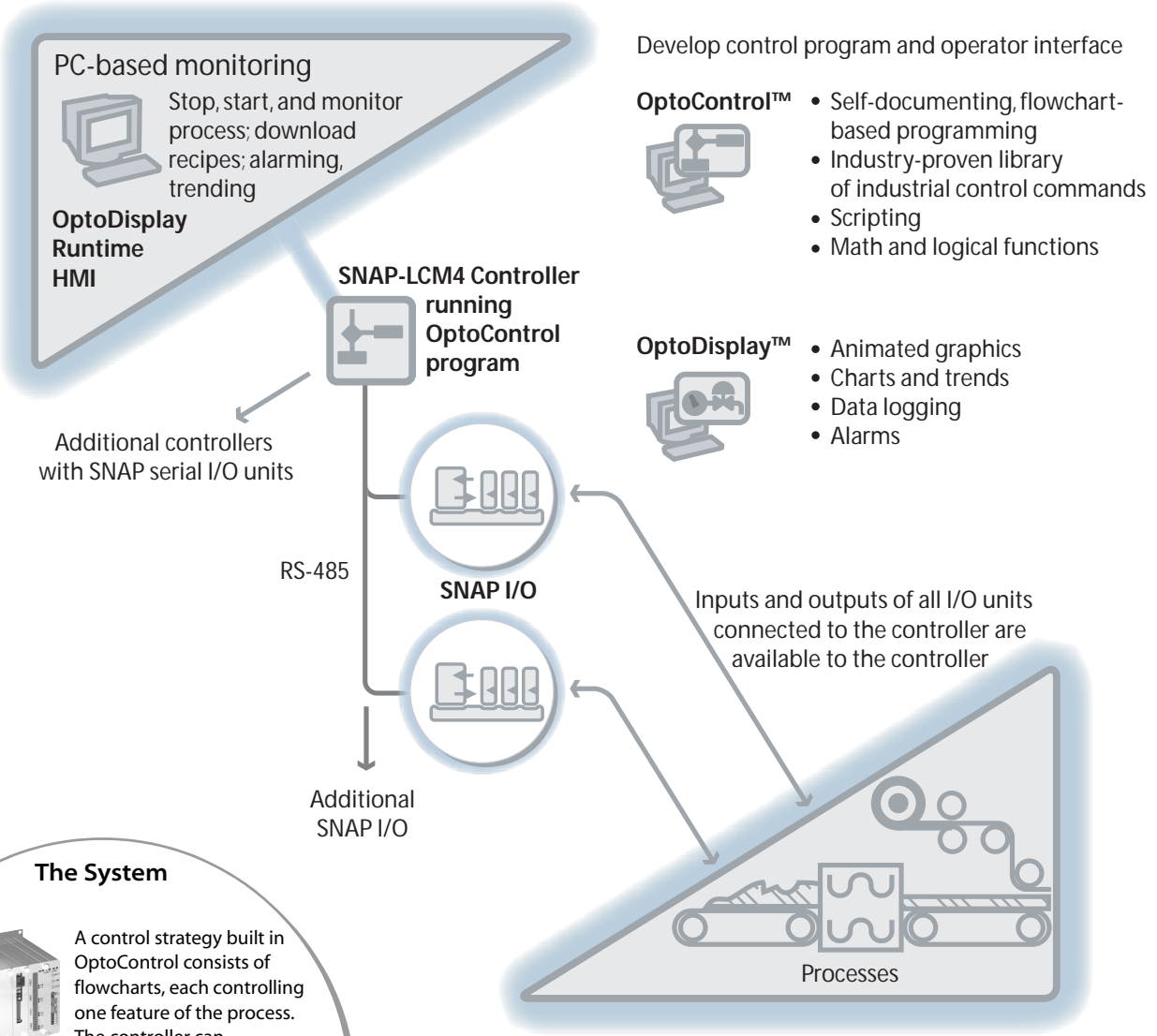
Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● Industrial Automation ●● Remote Monitoring Enterprise Data Acquisition 	Ethernet UDP/IP, SNMP TCP/IP, SMTP SNAP Software Family: ioProject	<ul style="list-style-type: none"> ● Automation End user ●● OEM ●● IT/Operations

This profile shows digital modules monitoring the power signals to wired and wireless repeaters and video cameras. System configuration detects any power loss and sends an SNMP trap to the network management system. Since monitoring features of the I/O unit are exposed to the SNMP host, SNAP Ethernet I/O becomes an SNMP agent. For example, I/O modules connected to warning devices or redundant hardware can be remotely engaged by the network management system.



SNAP Application Profile 4: Scalable Serial Network

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● ● Industrial Automation Remote Monitoring Enterprise Data Acquisition 	RS-485 (Serial) Mystic® SNAP Software Family: FactoryFloor™	<ul style="list-style-type: none"> ● ● Automation End user OEM IT/Operations



The System

Control

A control strategy built in OptoControl consists of flowcharts, each controlling one feature of the process. The controller can simultaneously run 32 charts.

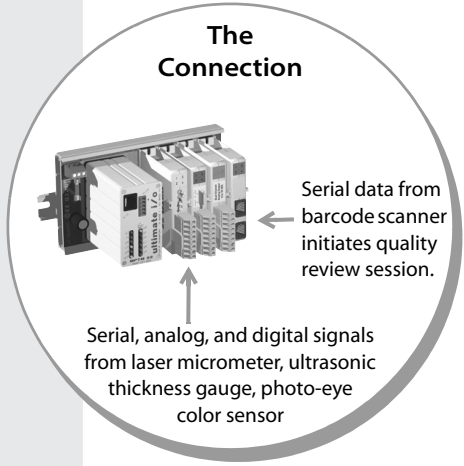
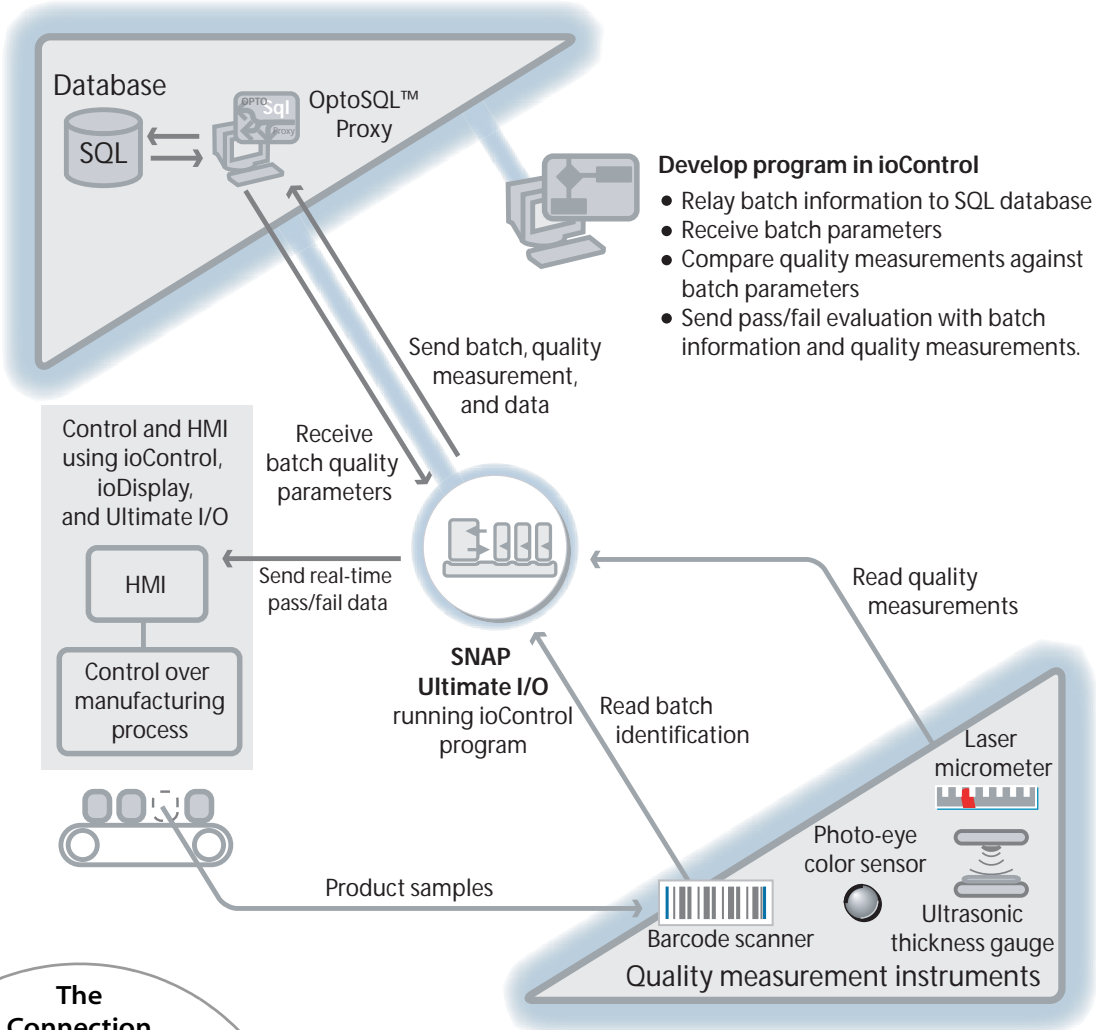
All points on all I/O units are available to the controller's flowcharts.

SNAP I/O and SNAP family industrial controllers were developed specifically for industrial automation, using the communication standards and offering the rich set of features required by industrial processes.

As shown in this profile, Opto 22 FactoryFloor improved on earlier control systems by providing easy-to-use flowchart-based control programs and highly scalable hardware platforms that can expand as demand on a successful application grows.

SNAP Application Profile 5: SQL Database-Driven Quality Control

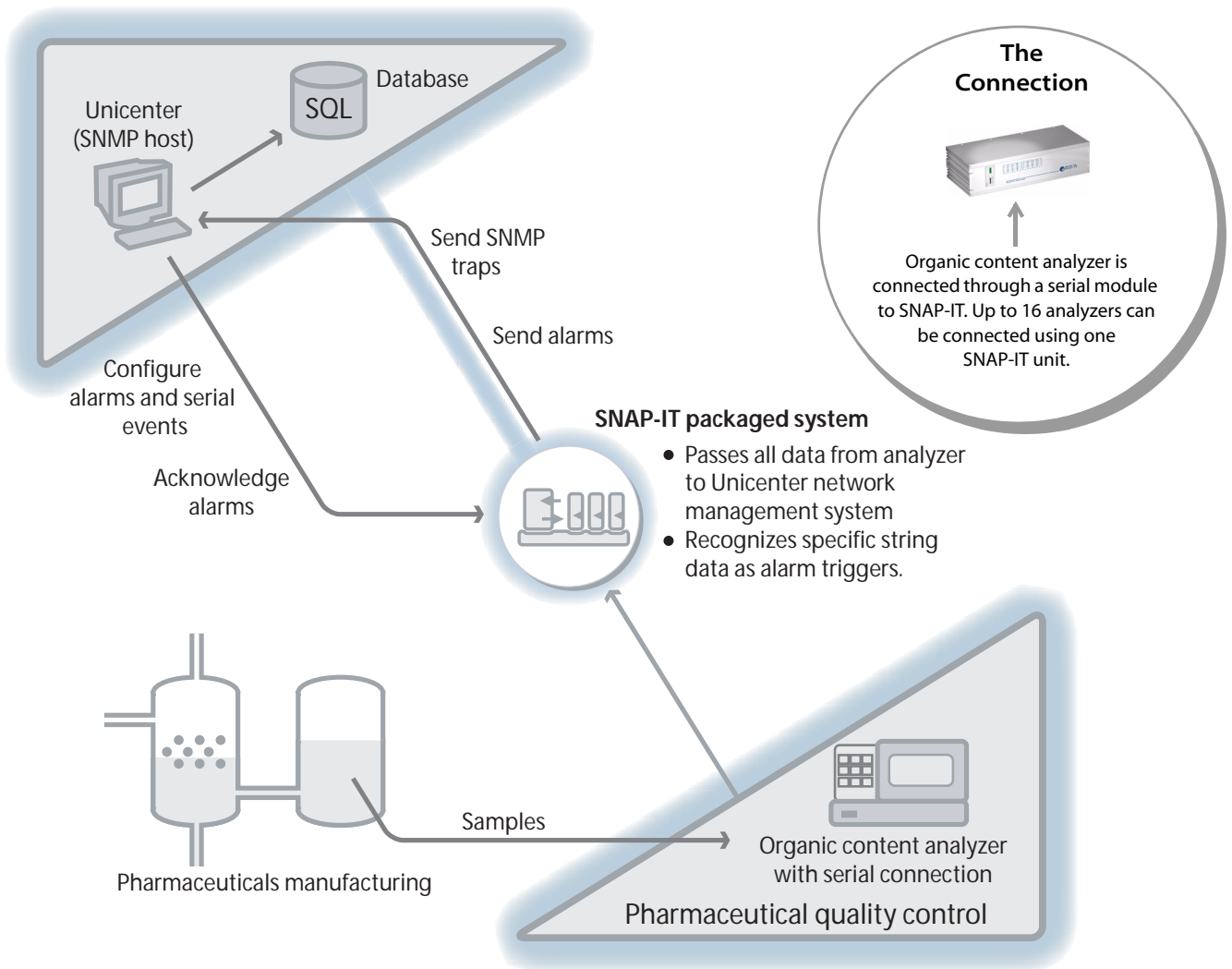
Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● ● Industrial Automation Remote Monitoring ● ● Enterprise Data Acquisition 	Ethernet TCP/IP SNAP Software Family: ioProject	<ul style="list-style-type: none"> ● ● Automation End user ● OEM ● IT/Operations



In this profile, connecting quality control instruments to SNAP Ultimate I/O uses the power of a database to ensure quality with minimal human error. At the same time, the system collects valuable data for both immediate use by the production process and for later analysis.

SNAP Application Profile 6: IT Systems Data Collection

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● Industrial Automation ● Remote Monitoring ● Enterprise Data Acquisition 	Ethernet UDP/IP, SNMP	<ul style="list-style-type: none"> ● Automation End user ● OEM ● IT/Operations

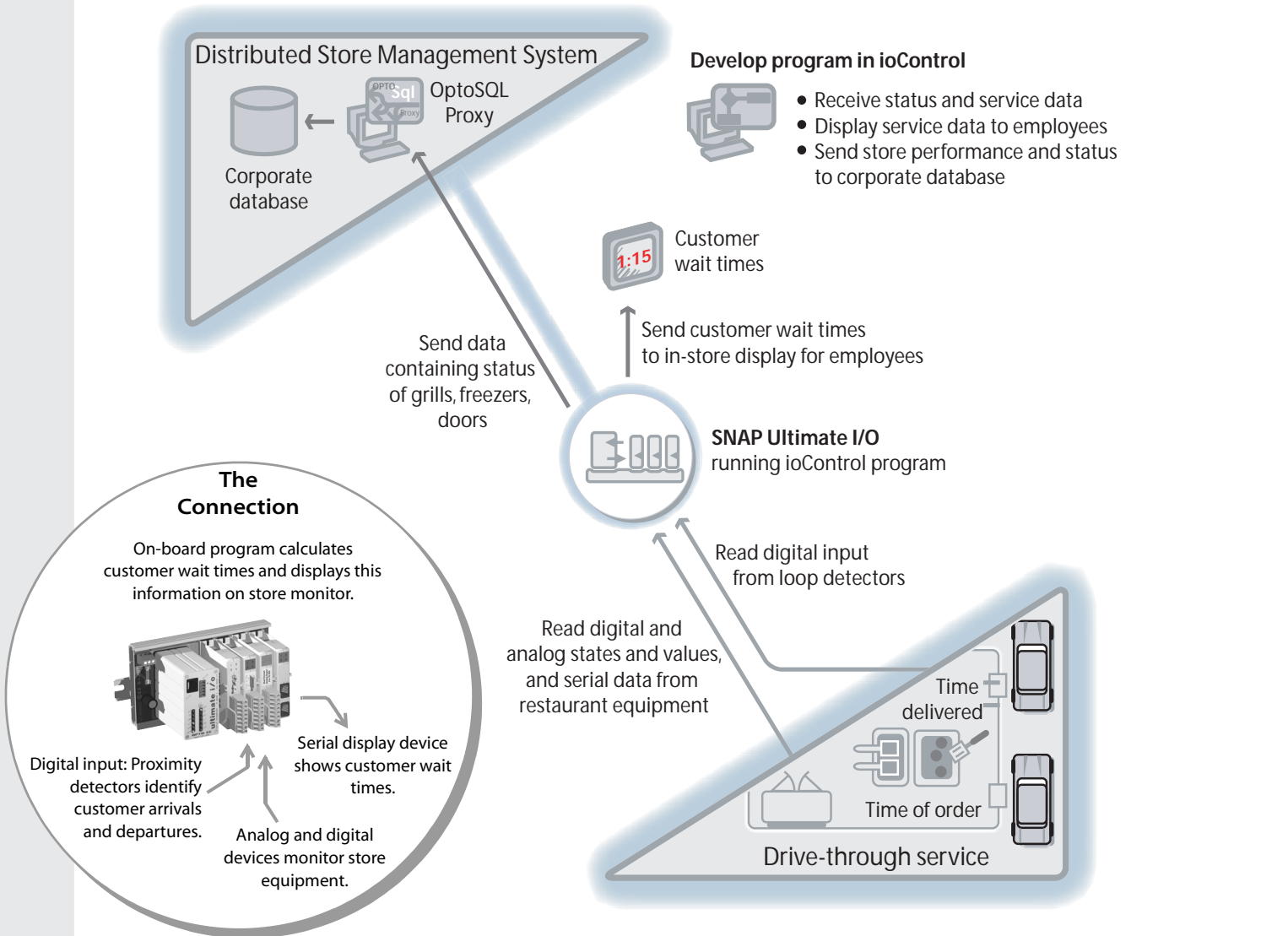


SNAP Ethernet and SNAP Ultimate I/O provide an SNMP MIB file that defines data types for analog, digital, and serial points on an I/O unit. The MIB file has already been integrated into Computer Associates® Unicenter®, the network management system shown in this profile. All SNAP Ultimate I/O and SNAP Ethernet I/O units on the network are automatically discovered by the central monitoring system, as with any other monitored piece of equipment. I/O points and the devices connected to them are exposed to the network system with no additional programming.

SNAP Application Profile 7: Customer Service Monitoring

Application	Network/Protocols Used	Application Developer
Industrial Automation	Ethernet TCP/IP	Automation End user
Remote Monitoring	SNAP Software Family: ioProject	OEM
Enterprise Data Acquisition		IT/Operations

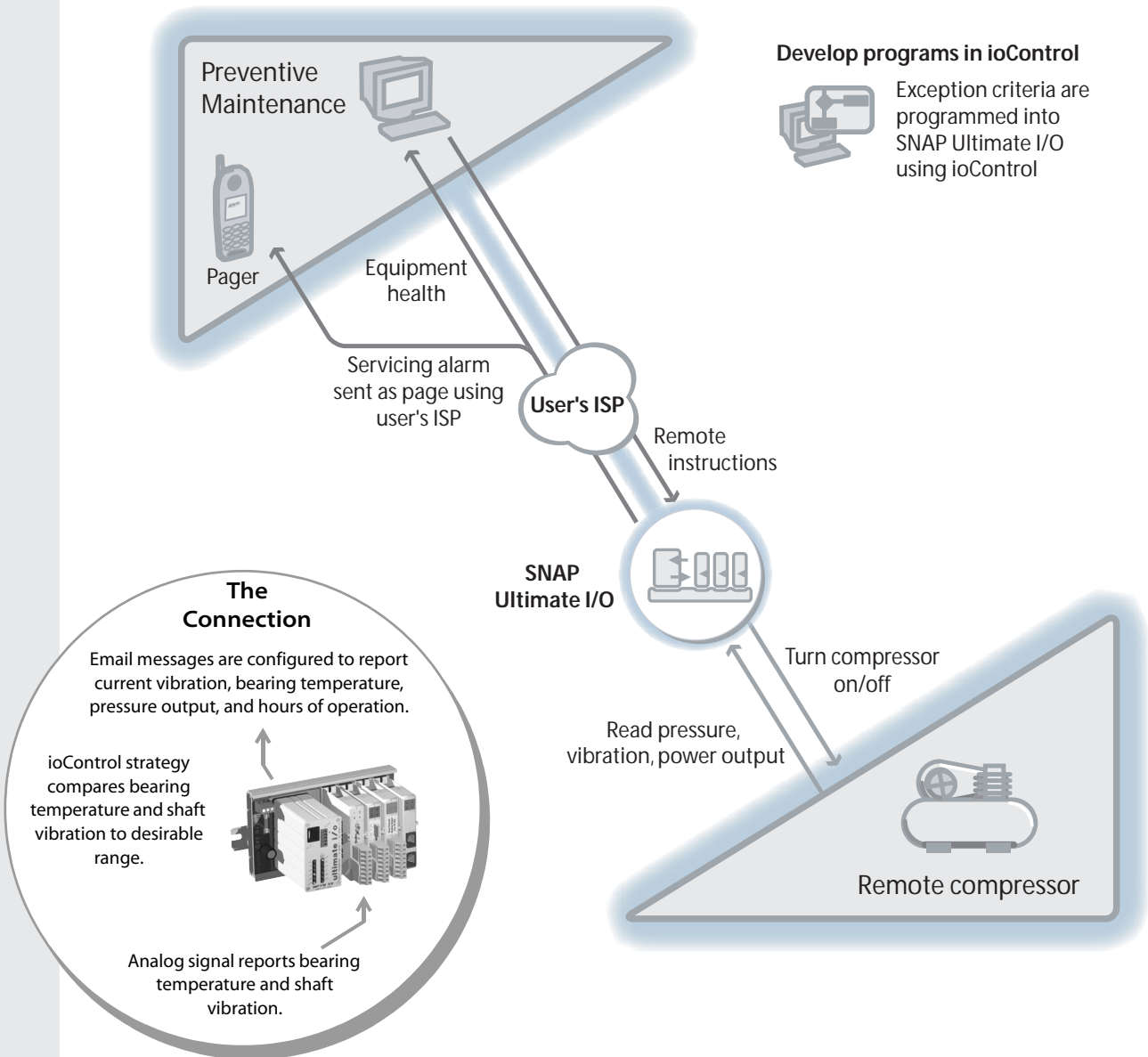
In this profile, SNAP Ultimate I/O improves customer service in a drive-through, fast-food restaurant by measuring and reporting customer wait times. The SNAP system offers major advantages over traditional systems of this type because it can package any data available to the brain in a SQL command or Stored Procedure Call for direct transfer to corporate databases. Once the timing system is in place, additional data is virtually free for the taking. While the I/O unit connects to the sensors and display device, extra I/O module slots allow other types of equipment or sensors to be monitored and controlled: temperature sensors for refrigeration equipment, door sensors for security, lighting switches and state sensors, and so on.



SNAP Application Profile 8: Compressor Monitoring with Email Notification

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● Industrial Automation ● ● Remote Monitoring Enterprise Data Acquisition 	Ethernet SMTP SNAP Software Family: ioProject	

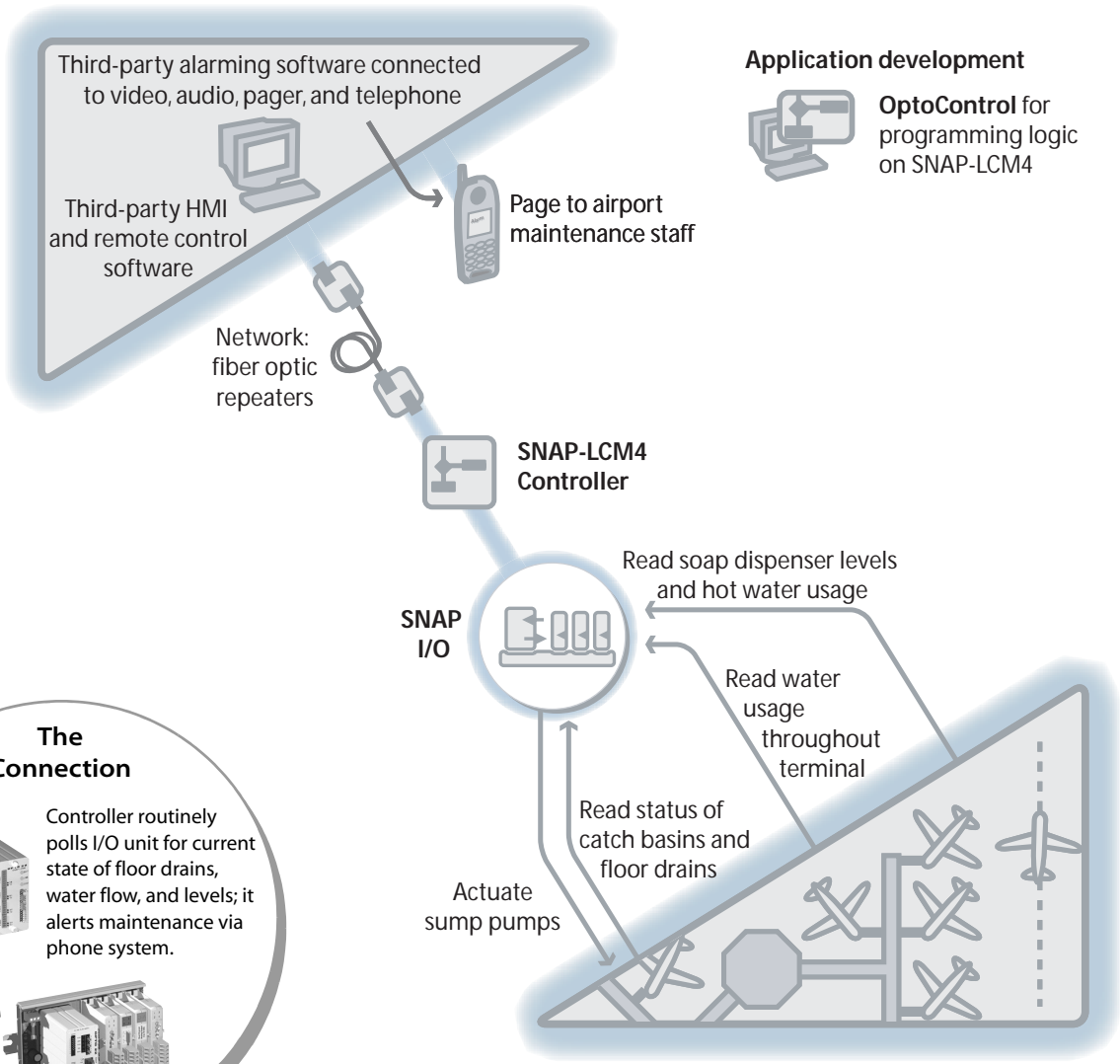
This profile illustrates the monitoring of industrial equipment in remote locations. A remote compressor attached to a SNAP I/O unit is monitored for pressure, vibration, power output, and other conditions. Customers often deploy SNAP Ethernet I/O and SNAP Ultimate I/O in this type of application, as both are independent and compatible with any commercial network. In this case, SNAP Ultimate I/O was used to provide programmability: inputs are compared to set points, and notification is sent to the maintenance team when warning signs and critical states occur.



SNAP Application Profile 9: Airport Automation

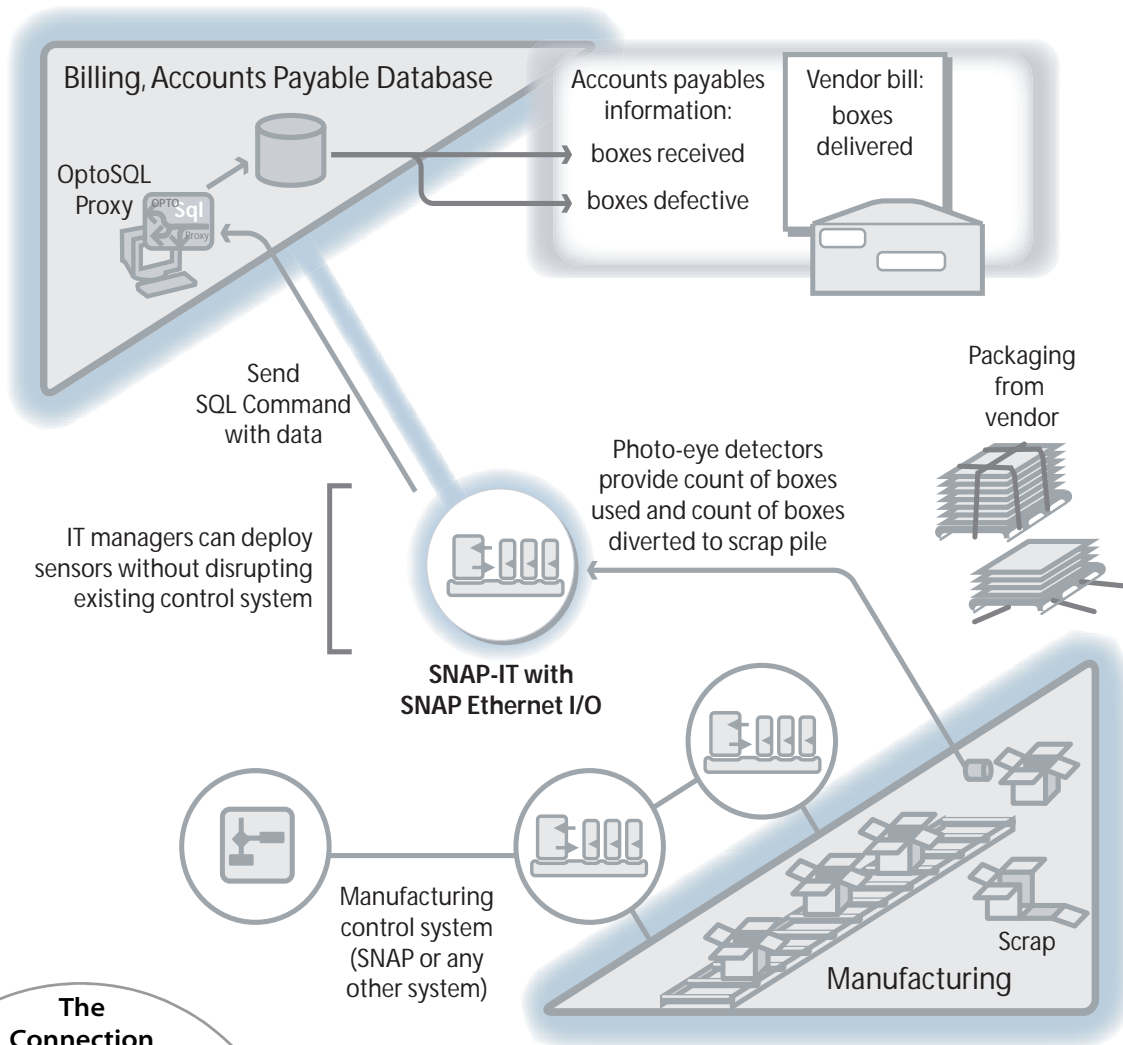
Application	Network/Protocols Used	Application Developer
Industrial Automation	Ethernet TCP/IP, SMTP	Automation End user
Remote Monitoring	RS-485 (Serial) UDP/IP, SNMP	OEM
Enterprise Data Acquisition	SNAP Software Family: FactoryFloor	IT/Operations

In this profile, a SNAP system is used to monitor and control water systems at a major airport. SNAP offers ease of programming, the ability to handle diverse signal types, and compatibility with existing third-party software and networks. Once the water monitoring sensors were in place, it was easy to expand the system to monitor service areas such as soap dispenser levels and hot water usage in the valet car wash and to monitor building drains and notify maintenance personnel of blockages.



SNAP Application Profile 10: Billing Verification

Application	Network/Protocols Used	Application Developer
Industrial Automation	Ethernet TCP/IP	Automation End user, OEM, IT/Operations
Remote Monitoring		
Enterprise Data Acquisition		



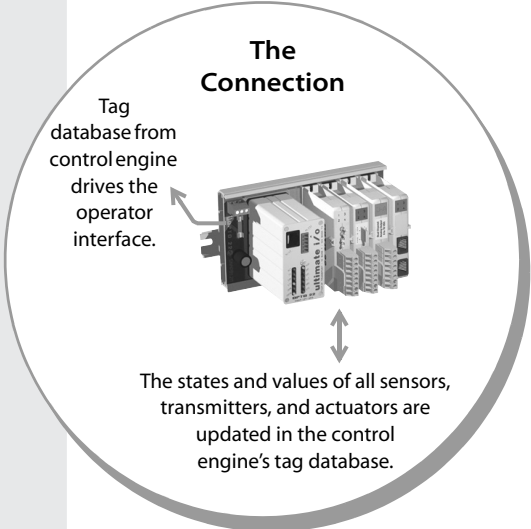
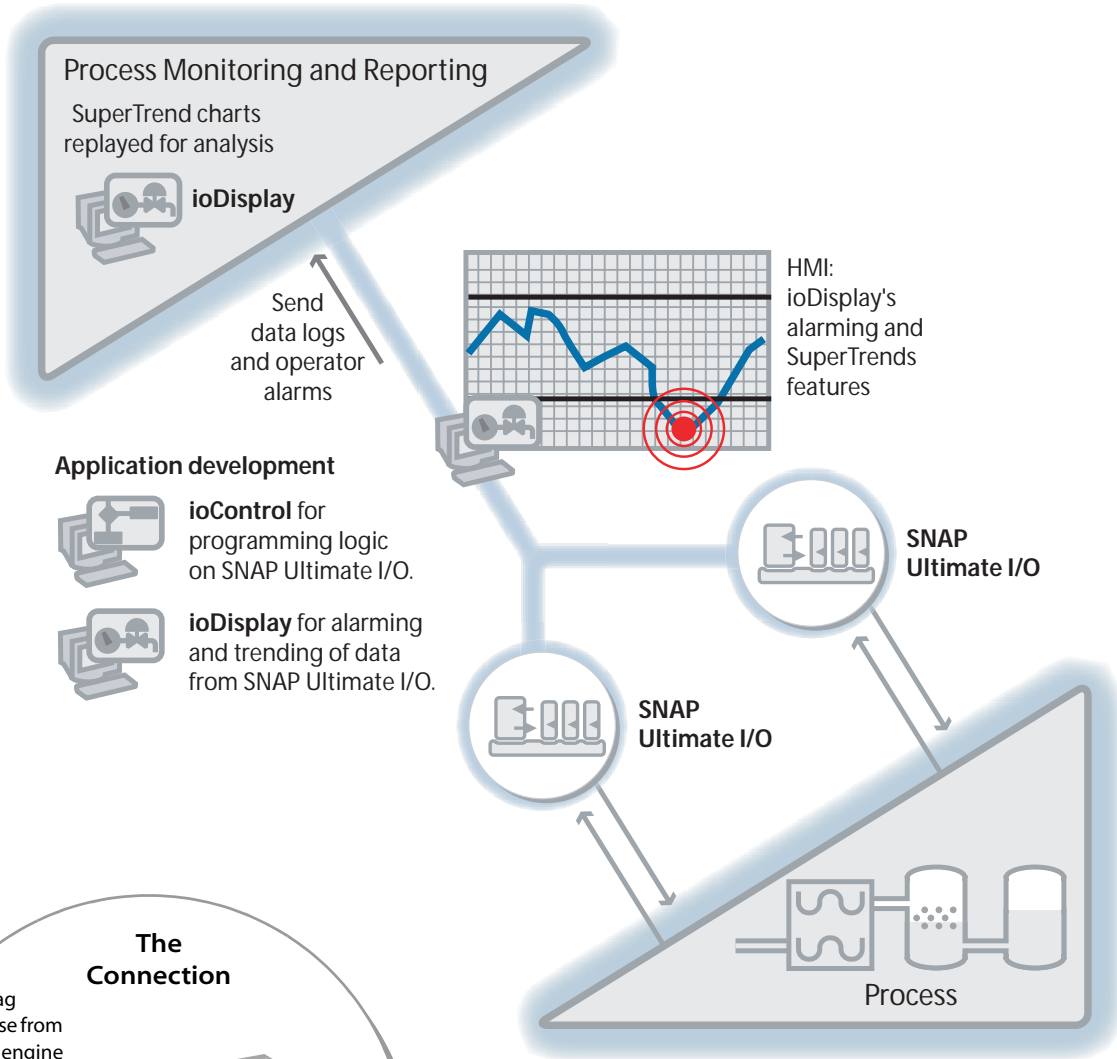
The Connection

SNAP-IT packaged system contains a power supply and I/O unit within an industrial enclosure. The sensor is wired to a module within the I/O unit.

When a change to the business system requires data that is not currently collected by the manufacturing system, the Information Technology (IT) network can be extended to collect the data without disrupting the automation and control system. In this profile, a SNAP-IT unit is used to easily connect a new sensor to the business network. The SNAP-IT unit contains all the intelligence necessary to read the sensor and transfer its data directly to enterprise applications, with no interference to the control system.

SNAP Application Profile 11: Process Key Performance Indicators

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● ● Industrial Automation ● Remote Monitoring ● ● Enterprise Data Acquisition 	Ethernet TCP/IP, UDP/IP SNAP Software Family: ioProject	<ul style="list-style-type: none"> ● ● Automation End user ● OEM ● IT/Operations

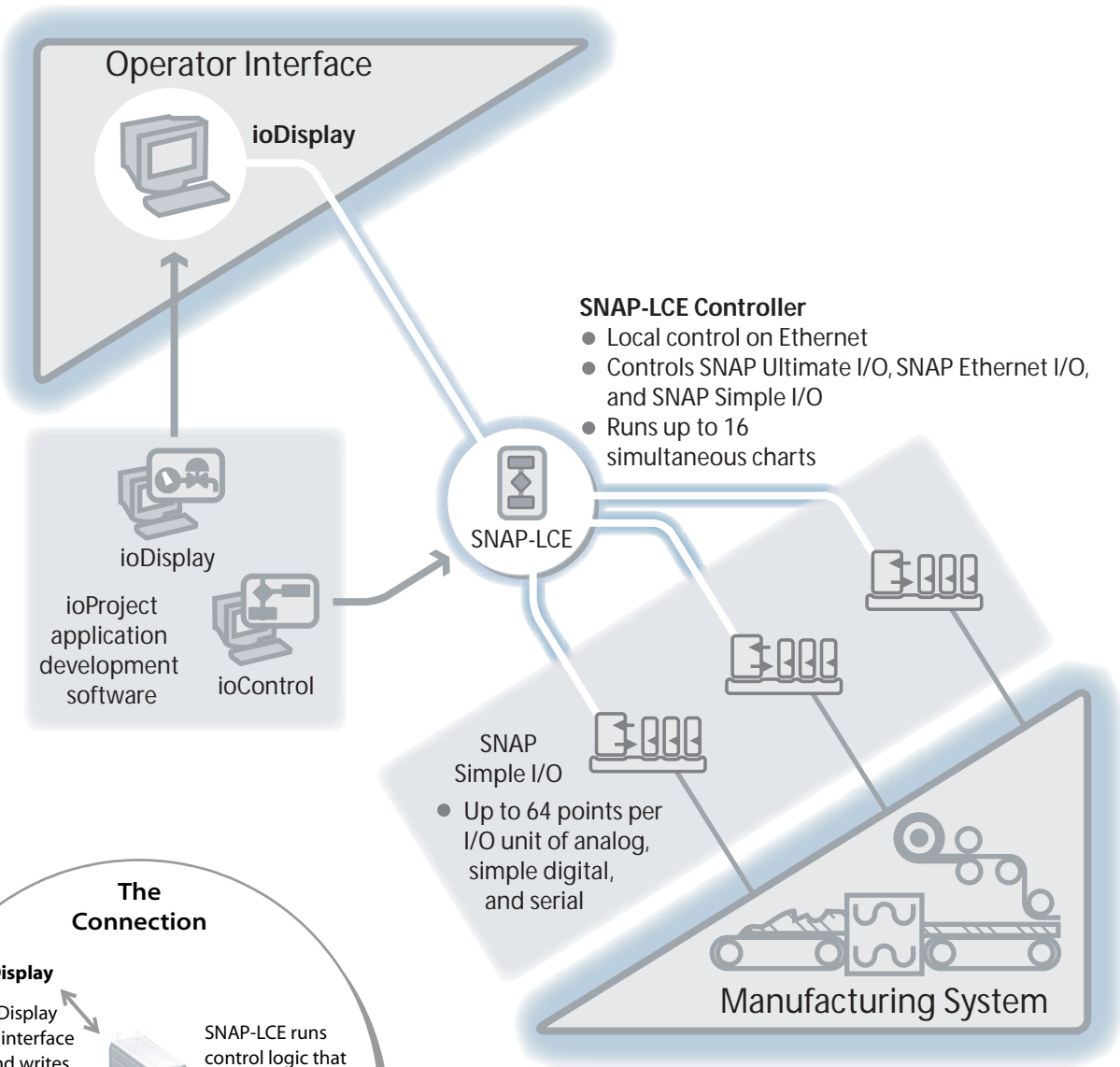


A SNAP control system delivers an easy-to-use, feature-rich human machine interface that gives technicians and operators a window to the control process, data collection, and data analysis.

The creation of an ioControl program automatically produces a tag database that ioDisplay uses to animate graphics and text, plot trends, and store data logs.

SNAP Application Profile 12: Ethernet Control System

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> Industrial Automation Remote Monitoring Enterprise Data Acquisition 	Ethernet TCP/IP SNAP Software Family: ioProject	<ul style="list-style-type: none"> Automation End user OEM IT/Operations



SNAP-LCE Controller

- Local control on Ethernet
- Controls SNAP Ultimate I/O, SNAP Ethernet I/O, and SNAP Simple I/O
- Runs up to 16 simultaneous charts

SNAP-LCE

SNAP Simple I/O

- Up to 64 points per I/O unit of analog, simple digital, and serial

Manufacturing System

The Connection

ioDisplay

The ioDisplay operator interface reads and writes to data in the control system (variables and I/O points) through the controller.



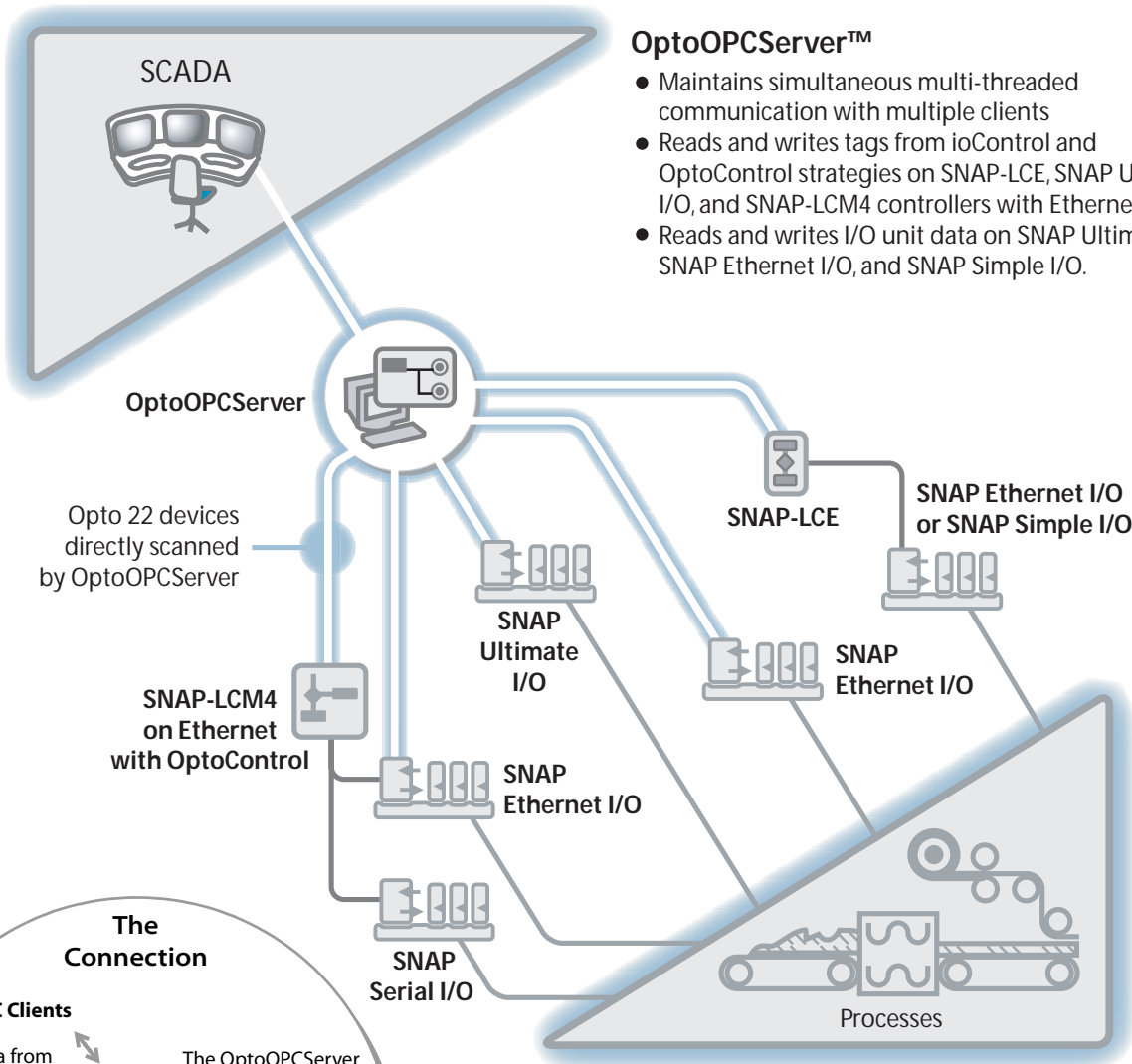
SNAP Simple I/O

SNAP-LCE runs control logic that represents I/O values and states as tags.

Providing local control on Ethernet systems, the SNAP-LCE is a small footprint, inexpensive controller that runs programs developed with ioControl programming software. The I/O uses SNAP Simple I/O, a high quality I/O unit with a simpler feature set designed for the lowest cost per point. Such systems are easily expanded with additional SNAP-LCE controllers and SNAP Simple I/O units. The SNAP-LCE controller also provides the critical link to ioDisplay, the operator interface.

SNAP Application Profile 13: OPC-Compliant SCADA System

Application	Network/Protocols Used	Application Developer
<ul style="list-style-type: none"> ● ● Industrial Automation ● ● Remote Monitoring ● Enterprise Data Acquisition 	Ethernet TCP/IP, OPC SNAP Software Family: ioProject	<ul style="list-style-type: none"> ● ● Automation End user ● OEM ● IT/Operations



OptoOPCServer™

- Maintains simultaneous multi-threaded communication with multiple clients
- Reads and writes tags from ioControl and OptoControl strategies on SNAP-LCE, SNAP Ultimate I/O, and SNAP-LCM4 controllers with Ethernet cards.
- Reads and writes I/O unit data on SNAP Ultimate I/O, SNAP Ethernet I/O, and SNAP Simple I/O.

The Connection

OPC Clients

Read data from control system, write to controller variables and I/O points



The OptoOPCServer runs on a workstation or server and manages information exchange between OPC clients and SNAP hardware

SNAP controllers and I/O

Strategy variables on Ethernet-based controllers and I/O points on Ethernet-based I/O units.

Many systems, especially larger ones, grow piece by piece. OptoOPCServer is well suited for such systems because it scans all Opto 22 Ethernet-based controllers and I/O units, regardless of the software they are running. This OPC 2.0-compliant server helps provide a smooth migration path for changing systems that include both serial and Ethernet Opto 22 hardware.

Under any suitable OPC-compliant application, such as a SCADA system, OptoOPCServer unifies SNAP-LCE controllers and SNAP Ultimate I/O units running ioControl strategies, SNAP Ethernet-based I/O units, and the widely deployed SNAP-LCM4 controllers running OptoControl strategies.

Choosing SNAP Systems

SNAP systems are the critical connections between assets and software systems in diverse industrial automation, remote monitoring, and enterprise data acquisition systems. Choosing a SNAP system for your application depends on four requirements:

- Level of intelligence your application needs
- Networks and protocols you must or wish to use
- Signal types used to sense assets and actuate machinery
- Packaging appropriate to the environment the SNAP system will reside in.

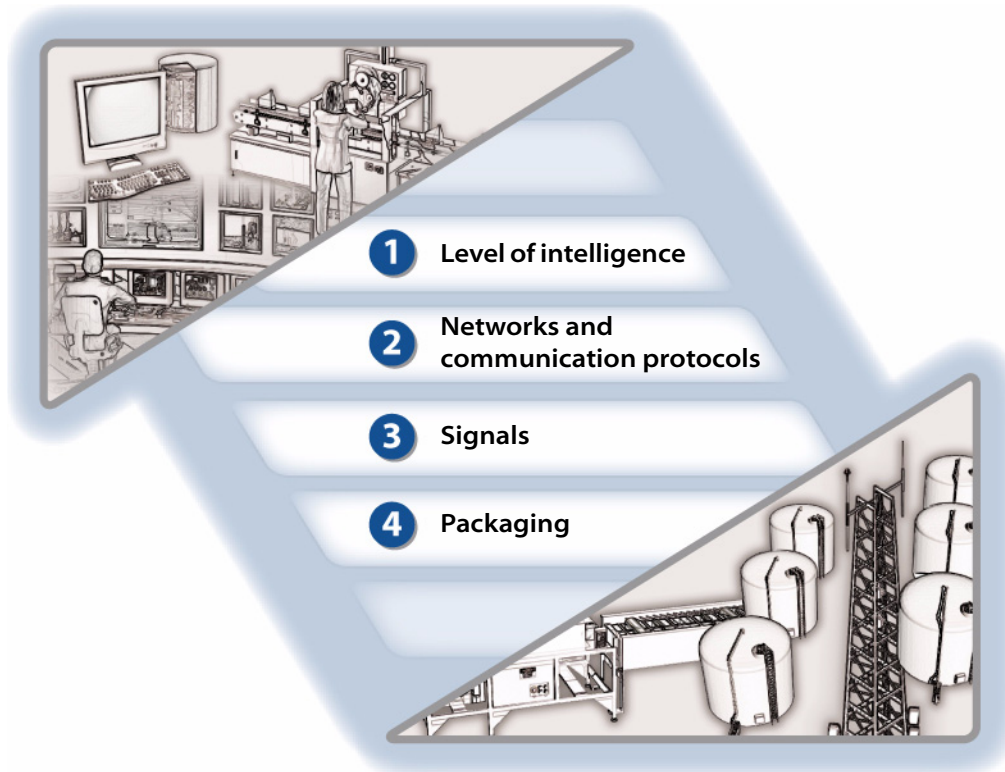
The following pages provide an overview of these requirements and of SNAP system components.

SNAP systems are compact and rugged, suitable for industrial, commercial, or office environments.

Because of the high quality of our products, we can offer a lifetime guarantee on most I/O modules.

In addition, Opto 22 product support is included with your purchase.

Factors affecting choice of SNAP components



If you need help selecting SNAP components, see the *SNAP Selection Guide* (Opto 22 form 1377).

For component part numbers and data sheets, see the *SNAP Component List* (Opto 22 form 788)

For personal assistance with your choices, contact an Opto 22 pre-sales engineer by phone (800-452-OPTO or 951-695-3000) or by e-mail (systemseng@opto22.com).

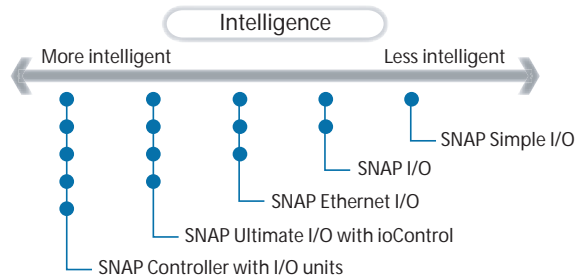
1. Level of Intelligence

The level of intelligence required by your application is crucial to selecting components and, in some cases, your network.

For simple monitoring and data acquisition applications, SNAP Ethernet I/O systems are intelligent enough to be deployed as stand-alone extensions of IT networks. Once on the network, the system gathers data from sensors, actuators, and transmitters, packages this data as formatted ASCII text, and sends the data to applications and databases, including network management tools such as Computer Associates' Unicenter or Hewlett-Packard's OpenView and databases such as SQL, Oracle, or Access. SNMP traps and email messages using SMTP are easily configured using our configuration utility.

For applications requiring some control as well as monitoring and data acquisition, for example low point-count applications (0–64 points), SNAP Ultimate I/O provides substantial additional intelligence. SNAP Ultimate I/O units run programs built with ioProject, our flowchart- and script-based application development and human-machine interface (HMI) software suite. Each SNAP Ultimate I/O unit can stand on its own or control additional I/O units. The Ethernet-based SNAP-LCE industrial controller features additional memory for control; it also runs ioProject software and controls SNAP Simple or SNAP Ethernet I/O units.

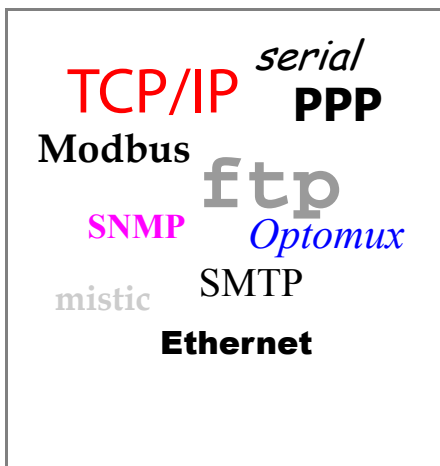
For full-scale industrial control, a SNAP-LCM4 controller with SNAP Serial, SNAP Simple, or SNAP Ethernet I/O units



provides the highest level of intelligence. SNAP-LCM4 controllers can interface with serial, ARCNET, or Ethernet networks and run Opto 22 FactoryFloor®, our English-language, flowchart-based control and HMI software suite.

If you need full-scale control but already have industrial control and HMI software, you'll find SNAP systems to be compatible with third-party software products such as Intellution iFIX®, Wonderware InTouch®, ICONICS GENESIS®, and National Instruments LabVIEW®.

On the other hand, if you are a C programmer or use Microsoft® Visual Basic—for example, in an OEM application—you may decide not to use a controller but have a PC talk directly to the I/O unit. Our communication protocols are open and documented, so anyone programming in C++, Visual Basic, or similar languages can control our serial, ARCNET, or Ethernet-based I/O units using our freely provided development kits.



2. Networks and Protocols

Another criterion for choosing SNAP systems is the type of network (if any) used by your physical assets, and the way your software applications communicate. SNAP systems are available to bridge the networks and protocols used at both ends of your business.

For example, if you have an industrial automation HMI that uses Modbus, SNAP Serial I/O provides the link. For Modbus/TCP, use SNAP Ethernet or SNAP Ultimate I/O. SNAP Serial I/O also provides the link for Mystic® and Optomux® protocols.

Ethernet-based protocols, such as TCP/IP, call for SNAP Ethernet or Ultimate I/O, a SNAP-LCE controller, or a SNAP-LCM4 controller with an Ethernet card. On an application level, SNAP Ethernet I/O, SNAP Ultimate I/O, and the SNAP-LCE are ideal for use with Internet-based protocols such as SNMP, SMTP, and FTP.

3. Signals



Line-of-business physical assets include all kinds of devices and equipment, from a simple light bulb, thermocouple, or barcode reader to a complex robotic arm or facility HVAC system. These assets and the sensors, actuators, and transmitters attached to them present a wide variety of electrical and electronic signals that must be translated into a form computers understand.

The third criterion for choosing SNAP systems is the signals your physical assets generate or consume. On a broad scale, these signals are either digital, analog, or serial. Digital signals have only two states: either on or off. Analog signals encompass a range of values. Serial signals send electronic ones and zeros in a series. Within these three broad categories are many variations; for example, analog signals may be in amps, volts, hertz, ohms, and so on.

The signals your assets use affect the mounting rack, I/O modules, and I/O processor you choose. Digital-only racks and I/O processors are ideal for applications that do not involve analog or serial signals, as they provide twice as many I/O points per I/O unit. Racks and processors that accommodate all three types of signals, on the other hand, give you more flexibility.

4. Packaging

The fourth criterion for choosing SNAP systems is packaging. Systems can be purchased as packaged units or as components. Packaged systems include everything except I/O modules, which need to be selected for the devices in your application. To purchase a packaged system, select the following:

1. Enclosure
2. I/O processor (brain)
 - For flowchart-based control logic, choose a SNAP Ultimate processor.
 - If programmable logic is not required, choose a SNAP Ethernet processor.
3. Power cord (U.S., U.K., or worldwide)
4. I/O modules: digital, analog, and special-purpose, based on your specific needs.

Should You Use Packaged SNAP-IT Units?

Packaged SNAP-IT units are designed for Ethernet networks (either wired or wireless LAN) and public communication networks.

SNAP-IT units are ideal for remote monitoring and data acquisition, either indoors or outdoors.

Although not designed for intensive industrial automation uses, SNAP-IT units can be programmed in a graphical flowchart environment for simple control and data acquisition tasks.

If a packaged unit is not what you need, build your system from SNAP components, shown on the following page.

Enclosures



1U thin-profile rack mount for interior environments



Desktop, table, or rack mount for interior environments



Panel mount for outdoor and industrial environments

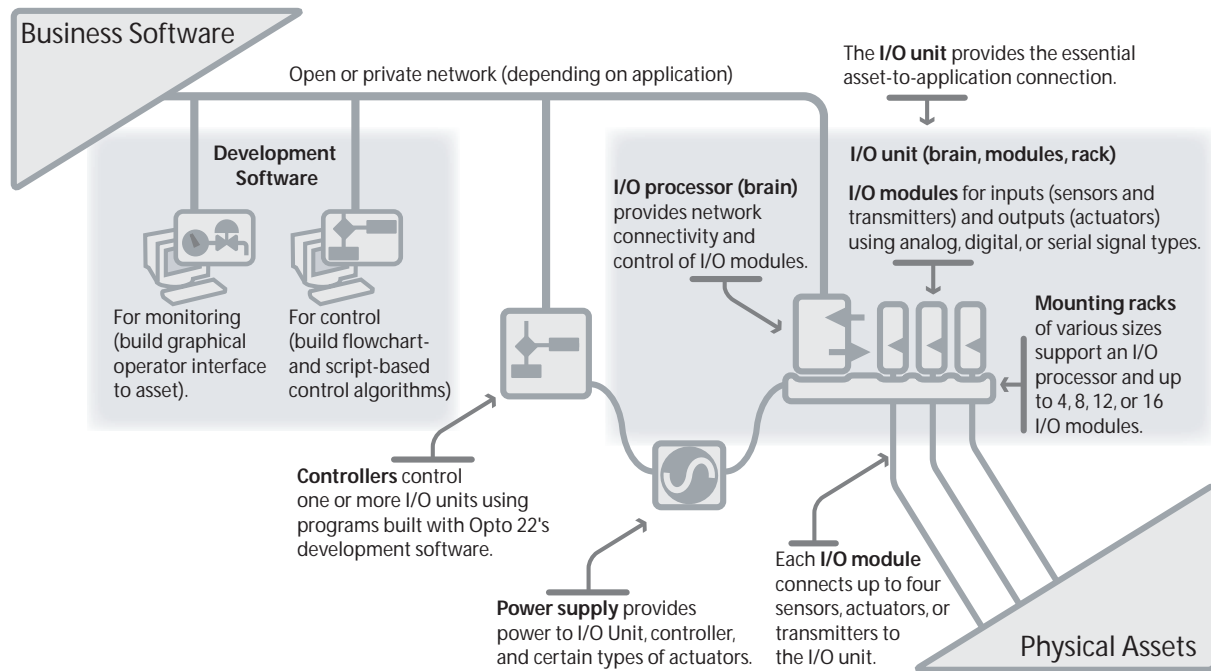
SNAP System Components

If a SNAP-IT packaged system does not suit your needs, choose system components.

As shown in the diagram below, the I/O unit (brain, modules, and mounting rack) forms the heart of the system. A power supply is needed to power the system. A controller and development software are added for applications requiring programmable logic.

For help in selecting components, see Opto 22 form 1377, the *SNAP Selection Guide*. For a list of part numbers, see form 788, the *SNAP Component List*. Both forms are available on our Web site at www.opto22.com.

If you have any questions on SNAP products or would like personal assistance, contact an Opto 22 pre-sales engineer by phone (800-452-OPTO or 951-695-3000) or by email (systemseng@opto22.com).



More About Opto 22

Other Software and Hardware

Software developer kits (SDKs), diagnostic utilities, and support for the Linux operating system are also available from Opto 22.

Quality

In delivering hardware and software solutions for worldwide device management and control, Opto 22 retains the highest commitment to quality. We do no statistical testing; each product is tested twice before leaving our 160,000-square-foot manufacturing facility in Temecula, California. That's why we can guarantee solid-state relays and optically isolated I/O modules for life.

Product Support

Opto 22's Product Support Group offers comprehensive technical support for Opto 22 products. The staff of support engineers represents years of training and experience, and can assist with a variety of project implementation questions. Product support is available via phone or email in English and Spanish Monday through Friday, 7 a.m. to 5 p.m. Pacific Standard Time.

Opto 22 Web Sites

www.opto22.com

ordering.opto22.com

support.opto22.com

nvio.opto22.com

www.internetio.com (live Internet I/O demo)

Other Resources

- OptoInfo CDs
- Custom integration and development
- Hands-on customer training classes.

About Opto 22

Opto 22 manufactures and develops hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's input/output and control systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, and electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel. Founded in 1974 and with over 80 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability.

Opto 22 products are sold through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-OPTO or visit our Web site at www.opto22.com.



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