



# **The Remote Revolution**

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How real-time data on  
demand is revolutionizing  
inventory management

Prepared by Garner Industries  
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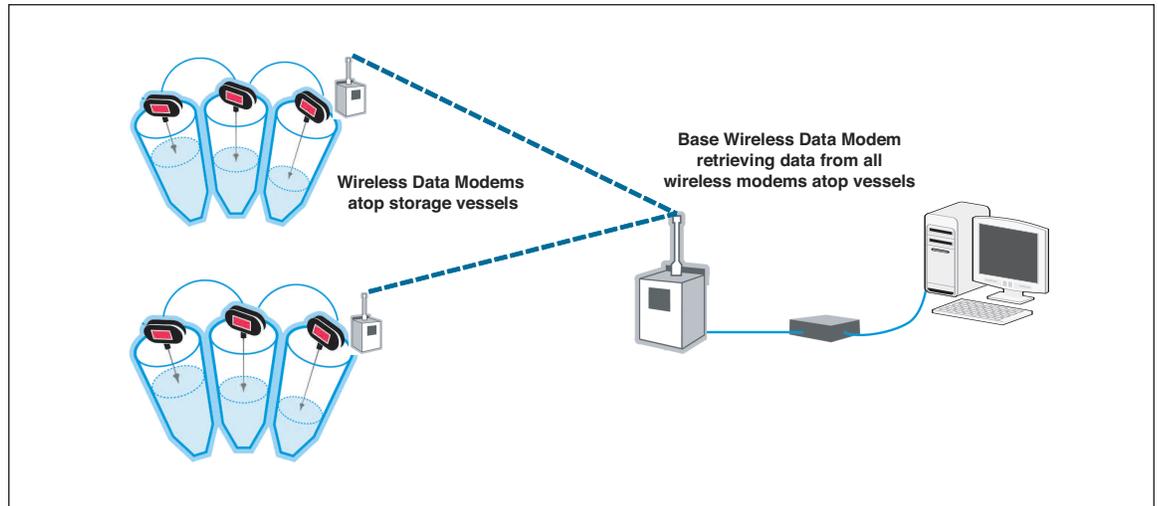
## Introduction

The continual development of remote inventory monitoring devices provides today's process industries with a variety of remote inventory monitoring communication options. With such a diverse menu of options to choose from, a business must first determine an inventory data-sharing objective by asking these four basic questions:

1. What information do I need?
2. Where is the information needed?
3. Who needs to see the information?
4. How do you send the information?

By answering these questions you have already begun to map your data-sharing paths. In this paper, we have outlined some of the more common remote inventory data communication technologies available today. One of these solutions might be right for your business. For your convenience, a glossary of terms is located in the back for your reference.

## Option One



### Wireless Sensor Network

When listening to broadcasts from AM and FM radio stations, the information is transmitted on a single, fixed frequency. While this is ideal for radio stations where you want everyone to be able to tune into the information, many applications require the data to be private.

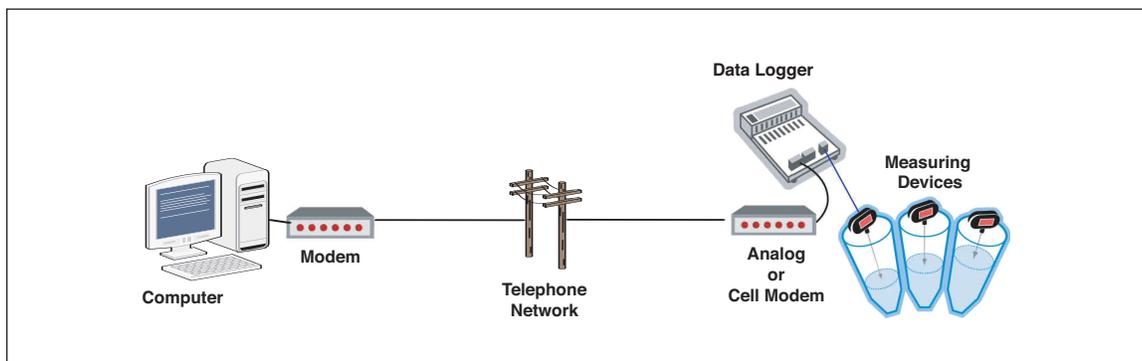
Spread Spectrum technology is designed to spread the broadcasted signal over a larger bandwidth, making the signal more difficult to detect, interfere, or jam. Because of these advantages, spread spectrum has been used by the military for years and has found wide acceptance in consumer markets where reliability and security is necessary. Supported network topologies include peer-to-peer, point-to-point, and point-to-multipoint. Commonly referred to as 900 MHz, 5.7 GHz, and 2.4 GHz, these frequencies are also known as ISM bands. The FCC allows unlicensed use of spread spectrum data communications in these bands.

Wireless “data modems” are commonly used for wireless remote transfer of

data from sensors atop a storage vessel to a location on the ground at a single location. Typical spread spectrum systems have an indoor range of up to 2,000 feet unobstructed, and 400 feet through standard walls. Outdoor propagation depends on factors mentioned above as well as antenna height, curvature of the earth, distance between two systems, and obstructions in the path. Typically, spread spectrum has an outdoor range of up to 25 miles under ideal conditions.

One significant advantage of wireless modems is that they eliminate the need for running long spans of communication cable by providing affordable, two-way wireless data communication. This information can be disseminated at the plant site with a PC, PLC, or a simple manual console. The data being brought to a centralized location at a facility can then be distributed off-site by a variety of data sharing solutions.

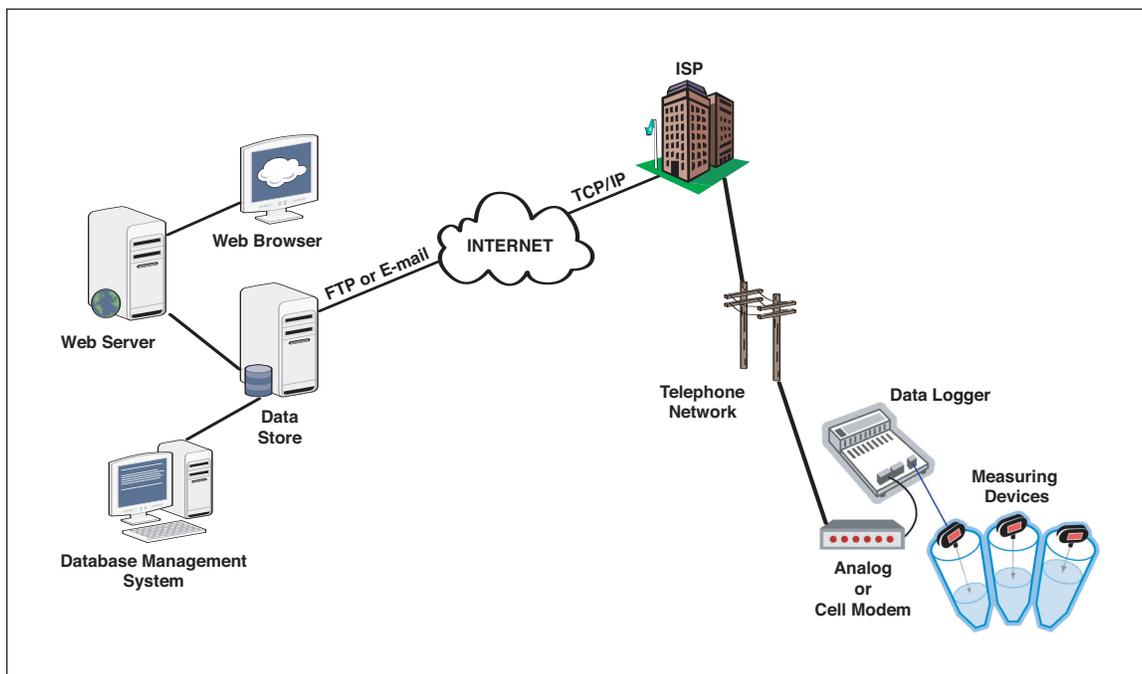
## Option Two



### Communication Module using Modem to Modem Dial Up

YMODEM is a point-to-point connection protocol for file transfer used between two modems using an analog or cellular telephone connection. Normally at the vessel site there is a communication Module that collects the data from level measurement devices. A modem at a central location would dial the modem at the remote vessel site and request a YMODEM transfer of the measurement data. A simple program, such as HyperTerminal, can be used to request and receive data files at the remote location. Or, more sophisticated communication software packages are available that will automatically dial out and harvest data from one or multiple vessel sites.

## Option Three



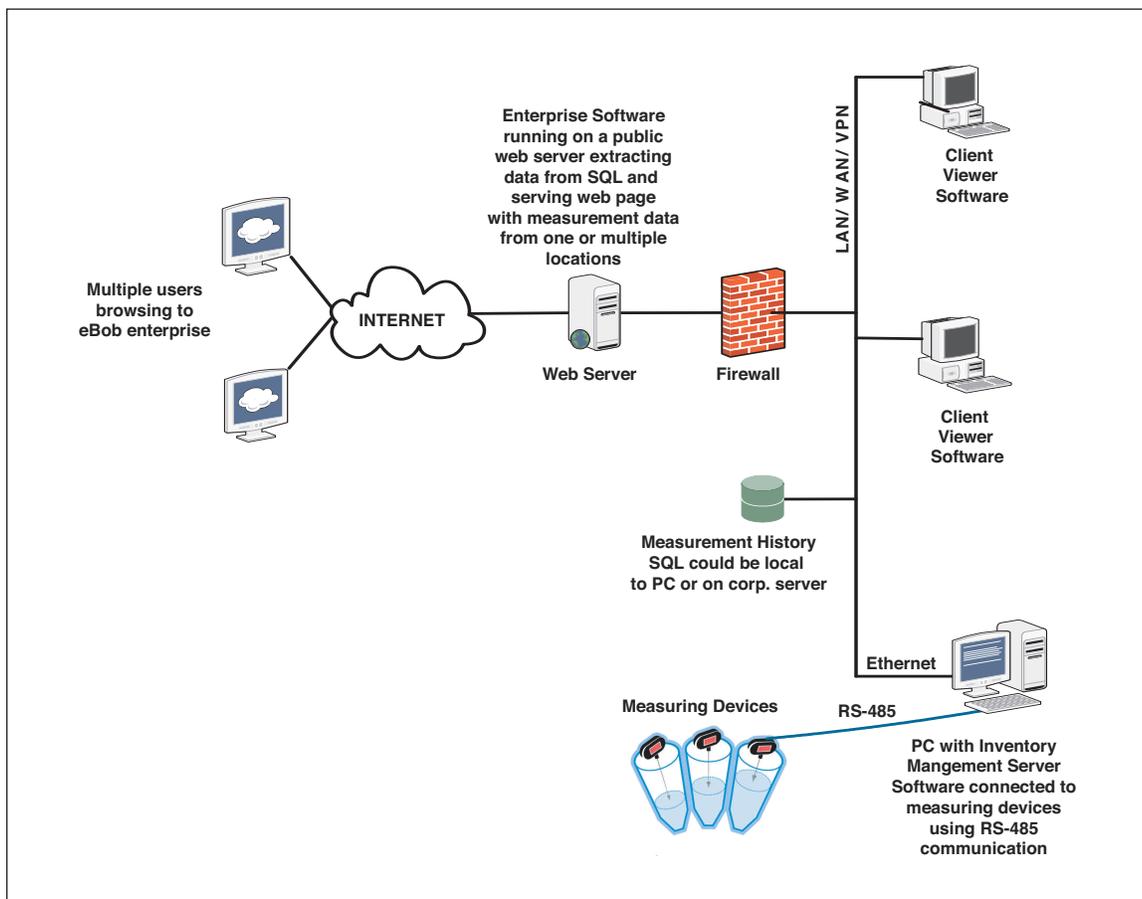
### Communication Module using Modem to a Dial-Up ISP

In some cases, a broadband Internet connection is not available at the storage vessels. An economical solution, then, may be to use a device with Point to Point Protocol functionality (PPP) using a cellular or analog modem to dial up a local ISP to connect to the Internet. The measurement data at a remote location could be sent and viewed by one of two methods:

1. Sending the data to a remote location(s) and viewing as an e-mail.
2. Sending a file attachment with an e-mail or via FTP protocol to a secured data store. This e-mail in-box or FTP drop box would then be scanned regularly to check for new files and read its contents. This data could be integrated into a web site or a program could be written to view the data with a program like Crystal Reports.



## Option Five



### PC Inventory Management Software

Inventory tracking software provides a more comprehensive visualization and added functions. Software will typically provide a simple and turnkey operation.

Typically, measuring devices are connected to a single computer via a serial or USB port. The computer connected to the measuring devices collects the data and stores it in a database. This database may be local to the computer connected to the measuring devices or on a corporate server. Once the data is collected there are a variety of ways to provide access to a remote user:

1. Sending the data as an email file attachment to multiple remote locations.
2. Loading inventory-tracking software on multiple computers on a LAN/WAN/VPN and pulling the data from the database on the network storing the measurement data.
3. Have software running on a public web server extracting data from the database where the measurements are being stored and serving a web page(s) with data from one or multiple locations

## Conclusion

The demand for remote monitoring is growing rapidly. No wonder, since it's a quick and economical way for companies to improve their business operations while also reducing costs. A diverse menu of options offers a wide range of monitoring capabilities and trend analysis. More importantly, remote monitoring of bulk storage can provide insight into overall operations and arm personnel with instant information to better track inventory, improve advance warning and alarm notifications, and reduce downtime due to running out of product or making after-hour emergency deliveries.

If you're thinking about adding real-time data on demand to your operation, one of the best first steps is to contact BinMaster. With more communication options than anyone else in the industry, BinMaster is the perfect solution for any application or budget. The BinMaster experts can also help you navigate through the various options to arrive a customized solution that best fits your needs. Consultation is free. Call **800-278-4241** or email **[info@binmaster.com](mailto:info@binmaster.com)**.

# Glossary of Terms

## Browser

You are probably using a browser to read this right now. A Web browser, often just called a “browser,” is the program people use to access the World Wide Web. It interprets HTML code including text, images, hypertext links, JavaScript, and Java applets. After rendering the HTML code, the browser displays a nicely formatted page. Some common browsers are Microsoft Internet Explorer, Mozilla Firefox, Netscape Communicator, and Apple Safari

## Ethernet

Ethernet is the most common type of connection computers use in a local area network (LAN). An Ethernet port looks much like a regular phone jack, but it is slightly wider. This port can be used to connect your computer to another computer, a local network, or an external DSL or cable modem.

## Firewall

While the term “firewall” creates a powerful visual picture, in reality, it doesn’t involve any fire or pyrotechnics. A computer firewall is used to protect a networked server or client machine from damage by unauthorized users. The firewall can be either hardware or software-based. A router is a good example of a hardware device that often has a built-in firewall. Software programs that monitor and restrict external access to a computer can also serve as firewalls. A network firewall allows only certain messages from the Internet to flow in and out of the network.

## FTP

Stands for “File Transfer Protocol.” It is a common method of transferring files via the Internet from one computer to another.

## HTML

Stands for “Hyper-Text Markup Language.” This is the language that Web pages are written in. Also known as hypertext documents, Web pages must conform to the rules of HTML in order to be displayed correctly in a Web browser. The HTML syntax is based on a list of tags that describe the page’s format and what is displayed on the Web page.

## HTTP

Stands for “Hypertext Transfer Protocol.” This is the protocol used to transfer data over the World Wide Web. That’s why all Web site addresses begin with “http://”. Whenever you type a URL into your browser and hit Enter, your computer sends an HTTP request to the appropriate Web server. The Web server, which is designed to handle HTTP requests, then sends to you the requested HTML page.

**Internet**

The massive connection worldwide of millions of computers, digital resources, communication devices, etc. Many people think the Internet and the World Wide Web are the same thing. They're not! The World Wide Web is what you browse to look at Web sites. It is one of the many features of the Internet. E-mail, FTP, and Instant Messaging are also features of the Internet.

**Intranet**

A company network thought of as the connection of a group of computers and computing devices with resources to share information to be served on the web.

**IP**

Internet protocol. A set of rules for how Internet computers connect.

**IP Address**

Also known as an "IP number" or simply an "IP," this is a code made up of numbers separated by three dots that identifies a particular computer on the Internet. Every computer, whether it is a Web server or the computer you're using right now, requires an IP address to connect to the Internet. IP addresses consist of four sets of numbers from 0 to 255, separated by three dots. For example "66.72.98.236" or "216.239.115.148". Your Internet Service Provider (ISP) will assign you either a static IP address (which is always the same) or a dynamic IP address, (which changes every time you log on).

**ISP**

Stands for "Internet Service Provider." In order to connect to the Internet, you need an ISP. It is the company that you pay a monthly fee to in order to use the Internet. If you use a dial-up modem to connect to your ISP, a point-to-point protocol (PPP) connection is established with another modem on the ISP's end. That modem connects to one of the ISP's routers, which routes you to the Internet "backbone." From there, you can access information from anywhere around the world. DSL and cable modems work the same way; except after you connect the first time, you are always connected.

**LAN**

Stands for "Local Area Network," and is pronounced like "land" without the "d". (Computer people will think you're weird if you pronounce it "L-A-N"). A LAN is a computer network limited to a small area such as an office building, university, or even a residential home. Most mid to large-sized businesses today use LANs, which makes it easy for employees to share information. Currently, the most common type of LANs are Ethernet-based and use software from Novell or Oracle. However, with the emergence of wireless networking, wireless LANs have become a popular alternative.

**PPP**

Stands for “Point to Point Protocol.” It is the Internet standard for dial-up modem connections. PPP is a set of rules that defines how your modem exchanges packets of data with other systems on the Internet. If you connect to your ISP with a dial-up modem, you are most likely using PPP.

**VPN**

Stands for “Virtual Private Network.” This is a network term that most computer users don’t need to know, but at least you can impress your friends by talking about it. A VPN refers to a network that is connected to the Internet, but uses encryption to scramble all the data sent through the Internet so the entire network is “virtually” private. For example, a large company that has offices in multiple locations may need to send data to the different locations via the Internet. To keep the information secure, the company might first set up a VPN with an encrypted connection. It’s basically like having a secure Intranet over the Internet.

**WAN**

Stands for “Wide Area Network.” It is similar to a Local Area Network (LAN), but it’s a lot bigger. Unlike LANs, WANs are not limited to a single location. Many wide area networks span long distances via telephone lines, fiber-optic cables, or satellite links. They can also be composed of smaller LANs that are interconnected. The Internet could be described as the biggest WAN in the world.

**Web Host**

In order to publish a website online, you need a Web host. The Web host stores all the pages of your website and makes them available to computers connected to the Internet. The domain name, such as “sony.com,” is actually linked to an IP address that points to a specific computer. When somebody enters your domain name into their browser’s address field, the IP address is located and Web site is loaded from your Web host.

**YMODEM**

A point-to-point connection protocol for file transfer used between two modems using an analog or cellular telephone connection.