TCP/IP NETWORK AS A DATA TRANSPORTATION PLATFORM FOR COLLECTING DATA FROM REMOTE STATIONS TO DATA PROCESSING CENTER IN MARINE INFORMATION SYSTEM

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Abstract

In Marine Information System, data is collected from many measurement stations (buoys) to the host or Data Processing Center. The measurement stations send data periodically to the host through satellite communication. The satellite gives the advantage in the flexibility to place each measurement stations and host.

Growing of TCP/IP network or Internet in the world, also in Indonesia, has established the wide data network. Currently, Internet nodes are available in many large cities in Indonesia. Availability of Internet nodes can be used as an alternative beside the satellite communication system. In this scheme, an intermediate node is needed to bridge the difference of communication media and to store the data temporally. Each intermediate node has two interfaces, the radio communication interface and TCP/IP interface. Data from the remote station is collected by the intermediate node, then it is sent to the host through the Internet periodically. This paper will describe the overview of the system to implement that idea.

1. BACKGROUND

Typical Marine Information System has a configuration as can be seen in the Figure 1. Data are collected from many measurement stations (buoys) to the host periodically to the central station through the satellite communication system. The satellite communication system gives the advantage in the flexibility to place each measuring stations and host, but its need high operational cost and specific communication equipment.

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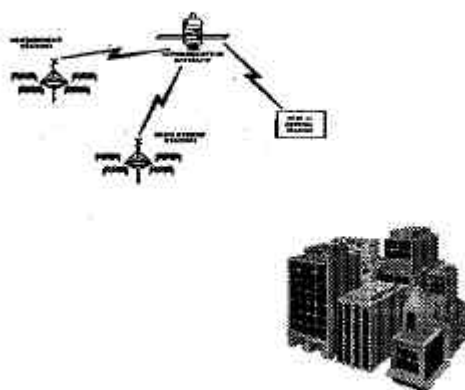
Figure 1. Typical Configuration of Marine Information System

The growing of TCP/IP network or Internet in the world, also in Indonesia, has established the wide data network. Currently, Internet nodes are available in many large cities in Indonesia, including in many coastal cities. Availability of Internet nodes can be used as an alternative for data transportation platform in Marine Information System application.

II. PROPOSED SYSTEM CONFIGURATION

Figure 2 below describe the system configuration of Marine Information System using Internet as a data transportation platform. Unlike the satellite communication system, data cannot transport directly from the measurement station to the host. In this alternative, we need intermediate nodes that have two interfaces. The first interface is a radio communication interface that handles data communication with the measurement station to get measurement data. The second interface is a TCP/IP interface. Data from the remote station is collected by the intermediate node, then it's sent periodically to the host through the Internet.
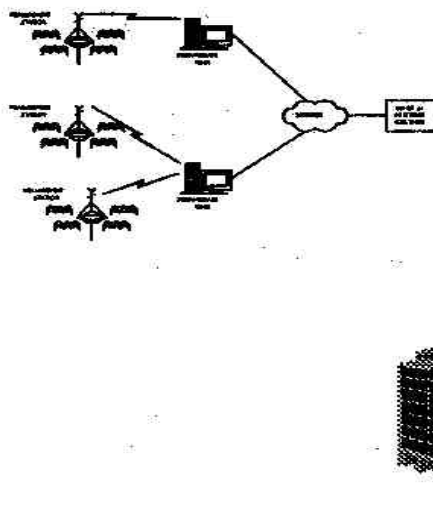
Figure 2. Marine Information System using Internet as a Data Transportation Platform
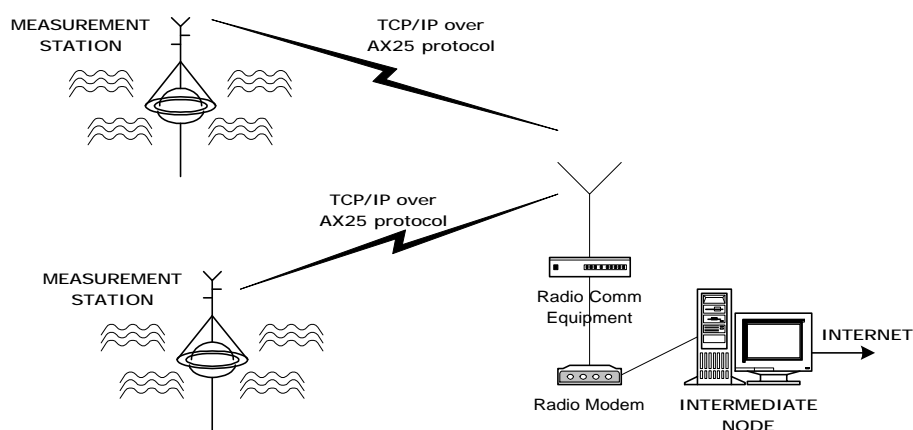

Figure 3. Data Communication between Measurement Station and Intermediate Node

Data communication between measurement station and intermediate node performs using TCP/IP protocol over the radio telecommunication system. AX.25 protocol can be used to establish the data link layer below the TCP/IP protocol. There are several advantages of using AX.25, such as:

- AX.25 can be used to handle multi node,

- Software resources to implement AX.25 widely available,

- Hardware equipment to build this system is not expensive and

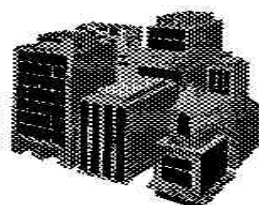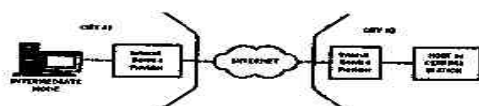- AX.25 can integrate easily with TCP/IP network.

Figure 4. Data Communication between Intermediate Node and Host

Internet or TCP/IP connection between Intermediate node and Host can be established through the nearest ISP (Internet Service Provider). Data from measurement station is sent periodically to the intermediate node. In certain condition, data may be originated from many measurement stations. Collected data store temporally in intermediate node and finally send to the host through the Internet with longer interval time.

III. SECURITY ISSUE

In these system data move from measurement station to intermediate node using the radio communication media. Radio communication is a broadcast system, so anyone with the appropriate tools and equipment can listen and capture all transmitted data from measurement station. This problem can handle easily by encrypt the data before transmission and decrypt those encrypted data in intermediate node.

Internet is open and not secure network. Data pass through the Internet can be trapped anywhere by anyone in any node. In proposed system, data will pass through the Internet from intermediate node to the host. Fortunately there are many schemes can be adopted to establish the secure data communication.

There is two type of solution. In the first type, all data are encrypted before the transmission. Encrypted data will passed non-secure network. In the receiver node, data will be decrypt to get the original data. In the second type, the security layer added to the network. These layers usually work between transport (TCP/IP) layer and application layer, such as http, ftp, etc. Security layer will perform encryption-decryption process automatically for any data pass through this layer. There is no need to do a modification in the application layer. One example of this scheme is an SSL (Secure Socket Layer).

IV.   CLOSING REMARKS

Currently, Internet accesses point available in many large cities in Indonesia, including coastal cities such as Jakarta, Semarang, Surabaya, etc. In such cities, Internet can be used as a data transportation platform for Marine Information System. In the future, more nodes will be available.

REFERENCES

1. Data Communications, **Computer Network and Open Systems**, 4rd edition, Fred Halsall, Addison Wesley, 1996
2. **Network and Internet work Security**, William Stalling, Prentice Hall, 1995
3. **SSL Resource Center**, http://www.phaos.com/sslresources.html, access on Wednesday, March 03, 1999