

A STUDY OF INTEGRATED SUBMARINE SURVEILLANCE SYSTEM

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Abstract:

This paper describes the integration of the submarine surveillance system by using three types of interface, namely South Bound Interface / Graphical Users Interface / North Bound Interface.

1. INTRODUCTION

The telecom industry is leading to greater bandwidths but at a lower level of investment, and the market of the submarine transmission system is not an exception.

This trend is not only applied to the initial system construction, but also to system upgrades to increase the capacity of existing systems without changing submerged plant. Under these circumstances, it is quite common that equipment supplied by more than one vendor co-exists in a single system and accordingly a consolidated surveillance is necessary from the view point of the system operation and maintenance. This point is beneficial to the system owners as it allows them to be flexible in their selection of the equipment vendor.

It is therefore required to develop an integrated submarine network management system, which is operable not only across the range of equipment supplied by multiple vendors, but also for equipment of different generations from the same vendor.

In order to proceed with the integrated surveillance, generally one of the following major interfaces (IF) is applied..

- 1) SBI [South Bound Interface]
- 2) GUI [Graphical User Interface]

- 3) NBI [North Bound Interface]

The image of each IF is shown in Figure 1.

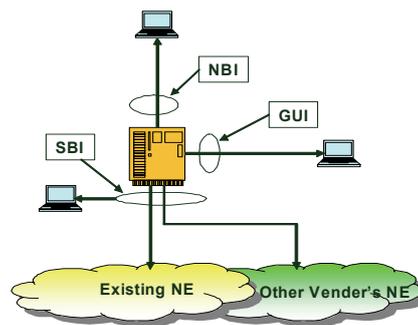


Figure1. Configuration of the each interface

Each IF and its main type of the port are shown in Table1.

Interface Port	
Application	Type
NBI	TMF CORBA
	SNMP
GUI	Web
SBI	SNMP
	CMIP

Table1. Type of Port for each interface

2. EXAMINATION OF INTEGRATED SURVEILLANCE

Examination of an integrated surveillance by these three IFs is described as follows.

2.1 EXAMINATION BY SBI

When an integrated surveillance is realized by SBI, the main type of IF port is SNMP (Simple Network Management Protocol) or CMIP (Common Management Information Protocol).

SNMP is a network management protocol which observes and controls the equipment managed by MIB (Management Information Base) database.

CMIP is a protocol designed against SNMP, and it has a better operational function.

Both protocols have the standard MIB and enhanced MIB in their database, the integration operability depends on the usage rate of each MIB.

If the standard MIB is deployed by each vender, it is a fixed data format so that the data analysis and the data transfer to GUI are relatively smooth.

However, if it leans to more enhanced MIB, the data format is unfixed and its analysis becomes difficult. In order to analyze it, the disclosure of the format is mandatory which is also difficult to process.

Therefore, it is assumed in this report that the standard (or nearly standard) data format is taken into account, and the information to be obtained is also limited to the certain level.

In this case, the most important factor for the operator is the alarm, its category, and also its inventory.

Therefore, when an integrated surveillance is realized by SBI, it is necessary to pay attention to the following for the assessment:

1) If the data format is standard or not.

- 2) If the information can be obtained for the part which is not standard
- 3) If the standard part is large enough, while it is not perfectly standard
- 4) If it is as close as standard, while it is not a standard format

Especially in case of the item 3) or 4) above, it is necessary to analyze the information as little as possible - e.g. limited the alarm, its category, and its inventory

Figure 2 shows the configuration example.

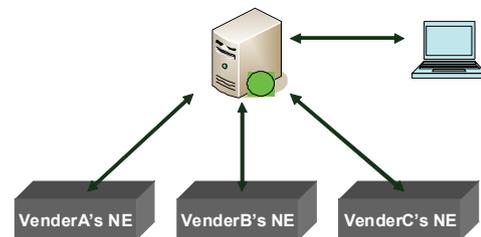


Figure2 Composition example using SBI

2.2 EXAMINATION BY GUI

When an integrated surveillance is realized by GUI, the main method is web.

In case of web, HTTP is the major data communication method. Therefore, the integrated surveillance can be realized by collecting the information associated with HTTP.

As an example of the integrated surveillance, the following can be considered:

- To display the collective information of the equipment of each vendor on the top screen
 - To display the number of the alarms on the entire system on the top screen
- If the alarm details are required, it is effective to jump to the monitoring screen of each vendor equipment via the link.

In order to realize such a scheme, it is necessary to consolidate or edit the monitoring information of each vendor equipment which is displayed at the top page of the surveillance system of each vendor.

In this case the development can be limited to the top screen by utilizing each vendor's monitoring function without any modification.

Therefore, in order to take the best position in the market, it is important to examine and consolidate the information collected from the multiple vendor equipment and how to display such information.

Figure 3 shows the composition example.

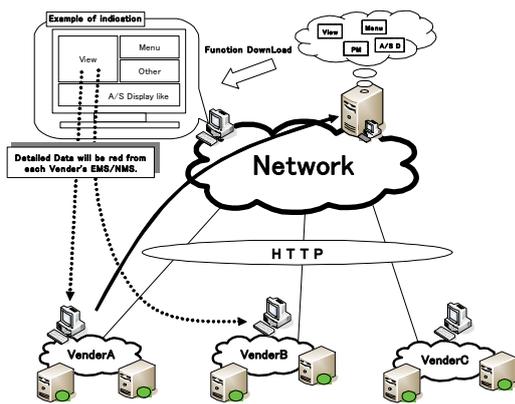


Figure3 Composition example using GUI

2.3 EXAMINATION BY NBI

When an integrated surveillance is realize by NBI, the main method is TMF CORBA (Common Object Request Broker Architecture) or SNMP (Simple Network Management Protocol).

TMF CORBA is a basic specification constructed by OMG (Object Management Group) and it can manage the decentralized processing in various platforms.

The concept of SNMP is the same as SBI above, but it is assumed as the higher IF protocol in this report.

TMF CORBA is originally developed as the integration purpose, so that the integrated surveillance can be realized as long as the equipment meets with its specification.

TMF CORBA is applied to most of the higher layer surveillance equipment, as it can realize the mutual utilization of the software components by IDL (Interface Definition Language).

In case of the equipment which meets with TMF CORBA specification, the information to be exchanged is decided by the definition of IDL.

As same as GUI, the key issue to be differentiated from the others is consolidation of the information collected from multiple vendors' equipment and how to display such information.

In case of the integrated surveillance by SNMP, it is important to examine whether the standard data format is applied or not or even if it is not standard, how far the data format is disclosed. This is the same as SBI as mentioned previously.

Figure 4 shows the composition example.

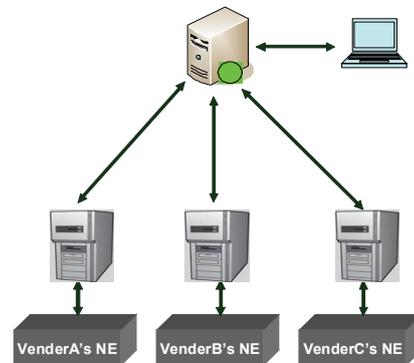


Figure4 Composition example by NBI

3. CONCLUSION

In order to realize the integrated surveillance, the major IFs are SBI, GUI or NBI.

As presently most of the vendors supply equipment which meets the specification of GUI (web) or NBI (e.g. TMF CORBA), therefore the integrated surveillance is likely to be achievable through the process introduced above.

However, GUI or NBI may not be considered in the old equipment supplied before 1990's, and in this case SBI can be an effective method for the integrated surveillance.

In case of SBI, the data format must be standard or as close as standard, but even if it is not standard, the integrated surveillance may be possible if the structure of the data format is disclosed and can be analyzed, or limiting the monitoring information to the minimum.

The change in the market has introduced the demand of the integrated surveillance, and there are some solutions to meet with such demand.