Data Handling Mechanism for SAS codes for Rock-Cavern Type Disposal

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1. Introduction

During the last two years, Site Information and Total Environmental database management System (SITES) ver. 1.0 was developed. The SITES is composed of two main modules as SITES Database Module (SDM) and Monitoring & Assessment (M&A). The M&A module are subdivided into two sub-modules called Safety Assessment System (SAS) and Site Environmental Monitoring System (SEMS). The SITES ver. 2.0 is including newly developed SAS and SEMS modules. This paper is to introduce the design of the SAS module focusing on the integration of safety assessment codes for rock-cavern type disposal.
. The SAS module is developed for the application and analysis of the data from the SDM and for the systematic management of the data resulted from the safety assessment. It is designed as a control program of safety assessment, as well as the data analysis program of the input data for the safety assessment and the program of GIS application.

2. SAS design for inclusion of the safety assessment codes for rock-cavern type disposal

SAS is operated in Windows environment, besides safety assessment codes are operated under the various operating systems (DOS, Windows, and UNIX). For example, the safety assessment codes for rock-cavern type disposal (NAMMU/NAM-DATA, NAPSAC, and MASCOT/ MOP) are run under UNIX system. Therefore to communicate between the data from these systems operated under the different operational environment, the various steps are needed to be developed.

2.1 Data communication between severs

The first step is to produce input data and to transfer the data to the assessment codes. A user could produce input data in direct (producing file) or by selecting the menu in the SAS client program. Each time the input data is saved at SAS database. Under Windows, SAS main server detects this process and produces input file from SAS database.

The second step is data communication between Windows and UNIX server. The SAS server program under Windows sends input data to UNIX server using TCP/IP protocol.

The third step is performance assessment and production of result. When the assessments complete normally, assessment result files are produced for each code.

The forth step is transferring the result files to the main Windows server from the UNIX server.

Figure 1 shows the configuration of data communication system for handling safety assessment codes for rock-cavern type disposal. Table 1 shows input/output data file type of the cavern type disposal codes.

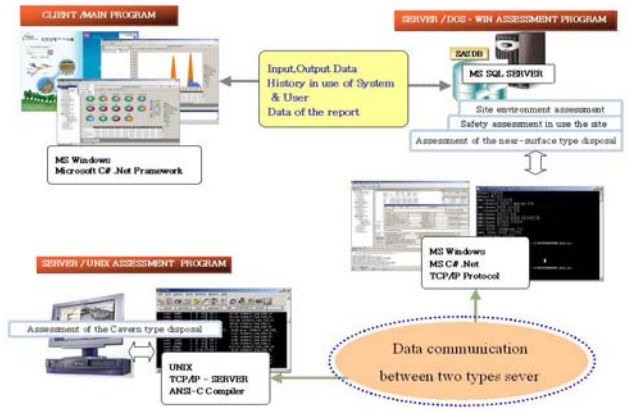

Figure 1. Configuration of data communication system

Table 1. Input / Output Data File

SAS assessme-nt code	Input data	Output data	Remark
NAMMU	File name.dat	File name.ps File name.out	Transfer 2 output file
NAPSAC	File name.dat	File name.ps File name.out	Transfer 2 output file
MASCOT	File name . masin File name .masprof	File name.masrun File name.masdump File name.masout	Transfer only“File Name .masout” type file

2.2 Data transfer method

Data must be transferred without data loss or deformation. For the reliability of data communication between severs, we use the TCP/IP protocol. There are two methods, namely TCP and UDP protocol, available for the data communication using Internet. Both TCP and UDP protocol transmit data among application programs using IP protocol, whereas IP protocol is the data transmission protocol between host and host.

The difference in between UDP and TCP is its convenience and speed for the data control. TCP is designed for accurate data communication but data transmission processing speed is late due to error check during data transmission. Table 2 shows the command code of TCP/IP data communication used in SAS development.

Table 2. The command code of TCP/IP data communication

Step	CLINT (Window)		SERVER (UNIX)		Function	Remark
	Success	Fail	Success	Fail		
1	101				Start	
2			201		Ready	
3	Input file name				Notice the input file name	
4			202		Check the input file name	
5	Input file				Transmit input file	
6			203		Check receiving input file	
7	102				Notice the client waiting	
8			Safety assessment		Link assessment code	
9			204	000	Notice complete (or fail)	
10	103				Notice client ready	
11			Output file name		Notice the output file name	
12	104				Check the output file name	
13			Output file		Transmit output file	
14	105				Check receiving output file	
15			205		Notice complete communication	
16	Delete input file		Delete output file		Delete working file	

3. Conclusion

The main sever for SAS is located in a Windows (MS Windows 2003) sever because SAS database is running under Windows, whereas safety assessment codes are operated under DOS, Windows, or UNIX. During evaluation using UNIX based assessment codes, input files, evaluation order, and output files are produced. To interface input/output files, communication protocol must be defined among main sever program under Windows and the NAMMU, NAPSAC, and MASCOT programs being operated under UNIX.

Therefore we use TCP/IP protocol for development of data communication program. Delicate logic development is needed to prevent data loss or deformation during data communication. Delicate logic implement means noticing the present step and checking the normality of data condition before moving to next step. When error is detected at each step, error code is transmitted to the other sever and then the protocol finishes the operation, resulting in reducing the unnecessary program waiting time.

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