3.9.5 Means for intersystem connection

3.9.5.1 Overview

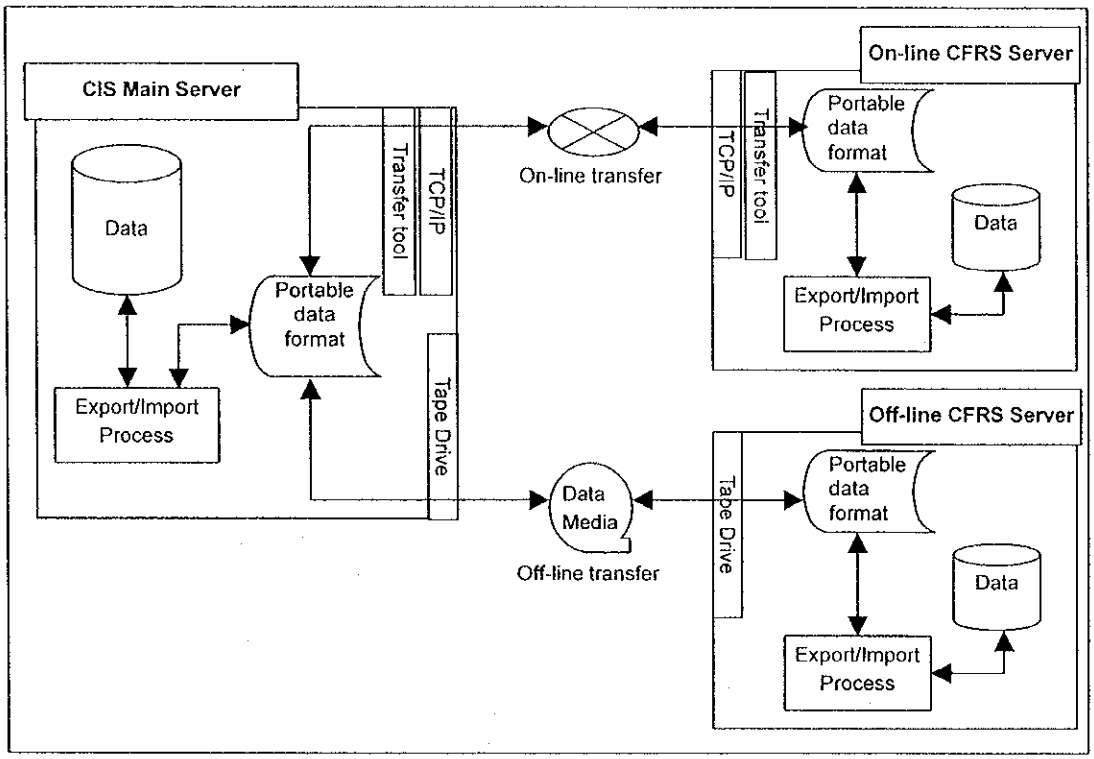


Figure 3.9.5.1-1: Intersystem connection

Intersystem connection refers to the exchange of data between CIS and CFRS.

The data exchange from business processes' point of view is explained in 1.7.2. This subsection describes the actual data transfer between the two systems and lists the requirements to provide the means for data exchange.

3.9.5.2 Requirements

The requirements for the Intersystem Connection are described in the following tables. Each of the functions must exist to provide the means for data exchange between CIS and CFRS.

Table 3.9.5.2-1: On-line transfer requirements

No.	Function	Description
1	Compression	The data exported from the database need to be compressed before being transferred to save bandwith and transfer time. The data transfer tool needs to compress the data because the tool will exist in both system, therefore there will not be any compression format compatibility issue. Network facilities also automatically compress transmitting data.
2	Transfer Control	The transfer tool must be able to monitor the transfer process and confirm successful transfer. Upon detecting failure, the tool must be able to retry the process. To speed up the process, the tool must also be able to perform concurrent transfer to multiple recipients.
3	Log	The transfer tool must have an option to log all of its activities for reporting purposes.
4	Protocol	The transfer protocol must be compatible with the different operating systems that exist in DJBC network.
5	Security	Communication between the transfer software must be secure. This may involve encrypting the data in transfer.

Table 3.9.5.2-2: Off-line transfer requirements

No.	Function	Description
1	Media	In selecting the media, the following criteria must be considered: 1) Compatibility across different systems. 2) Capacity. 3) Transfer rate.
2	Security	Ability to encrypt data before storing the data in the media.

3.9.5.3 File transfer mechanism

This sub-subsection describes outline of when and how the files are transferred.

- Time to transfer files

  The time of on-line file transfer, is differerent from that of off-line transfer:

  1) On-line transfer

     On-line file transfer is performed as a batch process. For general scheduling of batch processes in CIS and the grouping of batch processes, refer to 3.9.2.3.

File transfers from / to CIS is triggered by CIS; CIS requires sending / receiving files to and from CFRS.

- Sending data from CIS

  The data from CIS to CFRS are transferred after CIS has finished creating data for CFRS. The exact time to transfer depends on the completion of preceding batch process.

- Receiving data from CFRS

  CIS gets data from CFRS at predefined time. CFRS should prepare data for CIS before that time.

2) Off-line transfer

Off-line transfer includes both reading / writing portable magnetic media (e.g. QIC tape) by the CIS Main Server and physical transportation of the media by mail or other means.

The reading / writing of media are performed by the CIS operator during on-line operating period. This is to avoid possible side effect to the batch processes if the reading and writing are performed simultaneously with other batch processes. The method of physical transportation of recorded media will be determined during production stage.

- File transfer procedure

All the files for transfer should be prepared by preceding processes.

The following steps are included in file transfer procedure:

- On-line transfer

The on-line file transfer procedure is implemented as shell script. The shell script is called from the operational control software.

1) Sending files

i) Specify files and destination

The preceding process determines the files and destinations. The details are discussed in 1.7.2.

ii) Encrypt files

The shell script encrypt the files using encrypt package. One instance is "crypt" command provided by the OS.

iii) Call file transfer tool

The shell script calls file transfer tool with parameters to specify the target files and destinations. The file transfer tool on CIS communicates the file transfer tool on CFRS. The file transfer packages automatically compress the files before

transmitting through network, and decompress them after transmitting. The tool should retry the transmission for several times upon detecting error. The retrying time should be configurable.

Network hardware also compresses transmitting data automatically.

iv) Check the status

The file transfer package returns the status of the transfer. The shell script returns the status to the operational control software.

2) Receiving files

i) Specify files and destination

The preceding process determines the files and destination. The details are discussed in 1.7.2.

ii) Call file transfer package

The shell script calls file transfer package with parameters to specify the target files and destinations. The file transfer package on CIS communicates the same package on CFRS. The file transfer packages automatically compress the files before transmitting through network, and decompress them after transmitting. The packages retry the transmission for several times upon detecting error. The time to retry is configurable.

Network hardware also compresses transmitting data automatically.

iii) Check the status

The file transfer package returns the status of the transfer. The shell script keeps the status.

iv) Decrypt files

The shell script decrypt the files using encrypt package. One instance is "crypt" command provided by the OS.

v) Return status

The shell script returns the status of whole transfer to the operational control software.

▫ Off-line transfer

The reading / writing of the magnetic media is discussed here.

The method is implemented as shell script. The CIS operator starts up the shell script with the operation of media drive hardware. Followings explain the function of shell script.

1) Writing data

i) Specify files and destination

The preceding process determines the files and destination. The details are discussed in 1.7.2.

ii) Encrypt files

The shell script encrypt the files using encrypt package. One instance is "crypt" command provided by the OS.

iii) Write specified files on the media

The CIS operator must prepare the proper media in the drive hardware beforehand.

The shell script copy encrypted files to the media using standard command provided by the OS.

iv) Check the status

The status of writing is returned from OS command. The shell script displays the status.

2) Reading files

i) Specify files and destination

The preceding process determines the files and destination. The details are discussed in 1.7.2.

ii) Read data from the media

The CIS operator must prepare the proper media in the drive hardware beforehand.

The shell script copies the files from the media using standard command provided by the OS.

iii) Check the status

The status of reading is returned from OS command. The shell script keeps the status.

iv) Decrypt files

The shell script decrypt the files using encrypt package. One instance is "crypt" command provided by the OS.

v) Return status

The shell script displays the status of whole transfer.

3.9.6 Means for end user computing

3.9.6.1 Overview

End user computing (hereinafter referred to as EUC) function is requested for CIS from Revenue Planning Directorate. Here the purpose of EUC is to provide users with functions such as inquiring arbitrarily to CIS database, downloading result of query into end user's PC, and so on.

Means and architecture for EUC should be designed to meet the characteristics of EUC, because they are different from fixed form of business process implemented in other CIS applications.

3.9.6.2 Requirements

This is the outline of requirements for EUC functions from the viewpoint of system architecture design:

- Arbitrary query function for CIS database is required. They are mainly for statistical or summarized information from large raw data.
- Update of target data is required at least daily.
- Providing query function to all the tables of CIS is not required; target tables are limited.
- Updating existing data in CIS database is not required.
- Quick response to query is not severely required.
- Function of downloading result of query into end user's PC is required.
- Editing, printing reports or drawing graphs on the retrieved information are performed on end user's PC after downloading; therefore these functions are not required for CIS.

3.9.6.3 Architecture

The JICA Study Team proposes model of dedicating comparatively inexpensive PC server for EUC at end user's site. In this model, the original data in the CIS database are replicated into EUC server at scheduled time after online operating period (e.g. before daily online operation starts). Client PC connects only to EUC server on the site. Followings are list of reasons why such configuration will be proper to satisfy the requirement:

- Arbitrary queries for large database, especially extracting statistical or summarized information, impose the database with load. This type of load differs from the load imposed

by typical CIS online processes. When both of them are executed on single RDBMS, the performance of online operation will be impaired.

- Since both updating the CIS database and providing access to all the data in the CIS are not required, one-way replication of partial data into EUC server satisfies requirement and provides additional security means to access to unwanted information in the CIS server.
- In case that bulk of data is downloaded, load of network between server and client will increase and influence other traffics on the same network. Separating the EUC server from the CIS server restricts this effect within the site.
- When additional analyzing tools, such as on-line analytic processing (hereinafter referred to as OLAP) tools, are required in the future, they can be constructed on EUC server without changing structure of CIS server.

Figure 3.9.6.3-1 illustrates the EUC model in CIS.

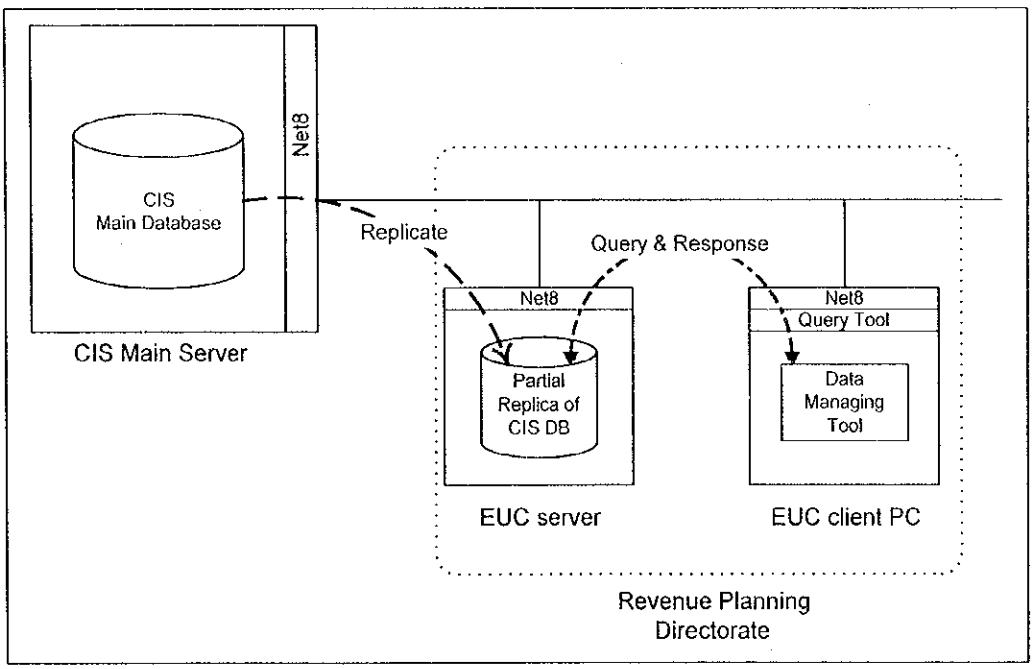


Figure 3.9.6.3-1: EUC model in CIS

These are brief description of each component in the model:

- Necessary data in CIS Main database are replicated from CIS Main Server to EUC server daily.
- EUC server stores replicated data and response query from EUC client PC.
- EUC client PC accesses to replica of the CIS database in EUC client through ready-made query tool. If necessary, the results of query are downloaded into client PC. Processes on

downloaded data (printing reports, drawing graphs, and so on) are performed by ready-made data managing tools. Examples are Microsoft Word, Microsoft Excel and others. End users are responsible to select and use of the data managing tools.

3.9.6.4 Operation

Followings are outline of operation of EUC system:

- Operating period of EUC server

  Replication of CIS database is executed automatically from CIS Main Server. EUC server should be in operation at the time of replication. Powering on and off of EUC server should be managed by central operational control server instead of end user at the site.

- Backup of EUC server

  Data in EUC server are not backed up. The reason is that original data are in CIS Main Server and the data is backed up, following pre-schedule. If data in EUC server are lost, they are re-transferred from CIS Main Server on next replication timing. For the same reason, special disk storage such as RAID system should not be selected for EUC server.

CHAPTER 4 Migration and Test Plan

4.1 Migration Design

4.1.1 Circumstances

In CIS, much information has to be stored in database to start its operation as the CIS initial database. Therefore, before starting CIS operation, DJBC has to import the existing information, which is either electronic data or paper based data, into CIS database. There are two methods to import existing data into the CIS database. First method is to convert existing database into CIS compatible database. This might be as simple as copying the data into CIS, or it might require special tools with a set of procedures to make the conversion into the CIS database. Second method is to input directly paper-based information into the CIS database, which will need a considerable amount of time. It is also conceivable that different kind of information in DJBC may require different method to convert into CIS database.

The JICA Study Team has checked up the existing information which should be imported into the CIS database. Based on the result of this investigation, almost all of information of P2 application system and Inter-Island Transportation information in Prevention and Investigation Directorate have been targeted to migrate data. The other information on them should be inputted directly by manual. DJBC must prepare the existing information in order to import existing data into CIS more effectively. Concerning the existing information in CFRS such as PIB,PIBT and PEB, it might be possible to migrate in advance of starting time of the CIS service.

4.1.2 Categorization of Migration Data

The JICA Study Team has categorized the data which may be migrated CIS initial database into two types. Table 4.1.2 -1 and Figure 4.1.2-1 show them.

Table 4.1.2-1: Type of migration data-1

Type	Description
I	Existing electronic data.
II	Existing paper based data.

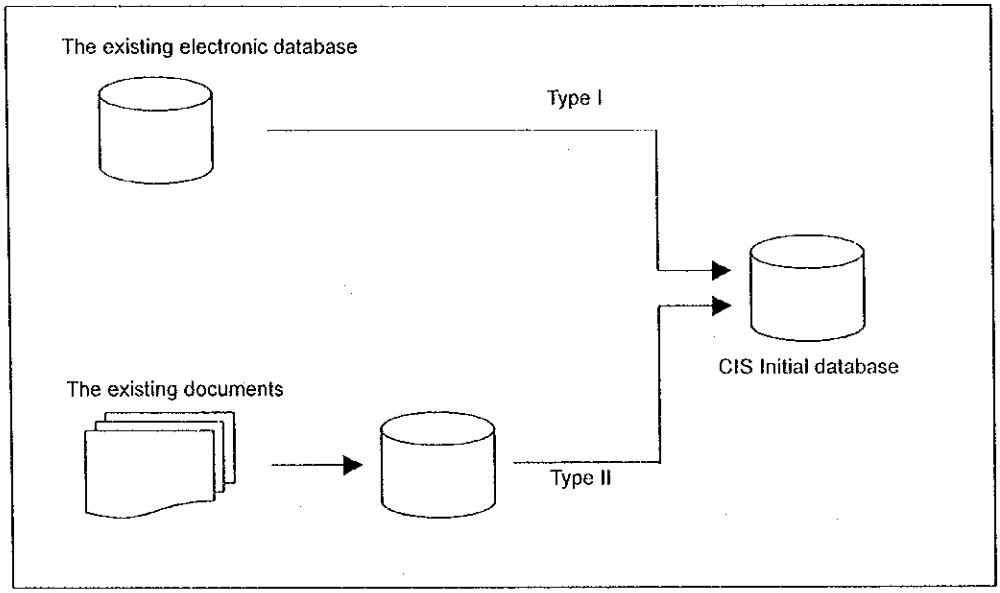


Figure 4.1.2-1: Type of migration data-2

The type-I data mean all of electronic data to be migrated to CIS initial database, such as CFRS, P2-application, SE-11 and the other databases. The type-II data mean all of paper based data to be migrated to CIS initial database.

The JICA Study Team has investigated existing data in DJBC in November 1998. Refer to Table 4.1.2-2 for the result.

Table 4.1.2-2: Categorized of investigated data (1/2)

Type	Data Name	Data Name in Target System	Data Name in CIS • **Main table name** ▫ **Related table name**
Type - I	From P2 Database		
	Importer	Profile NPWP	• Basic Information ▫ Importer
	Customs Broker	Customs Broker Profile	• Basic Information ▫ Customs Broker
	Passenger	Passenger	• Basic Information ▫ Personal Common Information
	Cross Border	Cross Border	• Basic Information ▫ Personal Common Information

Table 4.1.2-2: Categorized of investigated data (2/2)

Type	Data Name	Data Name in Target System	Data Name in CIS • **Main table name** ▫ **Related table name**
Type - I	Sea Transportation	Shipping line and Means Transportation	• Vessel
	Violation	Violation	• Violation and Investigation ▫ Violation of Excise ▫ Violation of Duty free shop ▫ Violation of Storage ▫ Violation of Imp/Exp/Custbrkr ▫ Violation of Passenger ▫ Violation of Shipping line
	Code	Code	• Code • DJBC Office • DJBC Officer • DJBC Position
	Past Record	Past Record	• Past Record and Blocked Importer
	Owner	Owner/Structural	• Owner
	From Inter Island Transportation		
	Rattan	Inter Island Transportation	• Inter Island Transportation • Receiver • Sender
	Wood		
	Palm oil and their products		
	Sea sand		
	Other goods		
	From CFRS		
	PIB / PIBT	PIB/PIBT	• PIB Header • PIB Detail
	PEB	PEB/PEBT	• PEB
Type II	Verification information	(paper base)	• Audit Result

4.1.3 Basic method for migration

The JICA Study Team has considered the technical method of migration for each type of categorized data. After the consideration, Type-I has been divided into three types, and Type-II has been divided into two types. Figure 4.1.3-1 shows these types and each basic migration method.

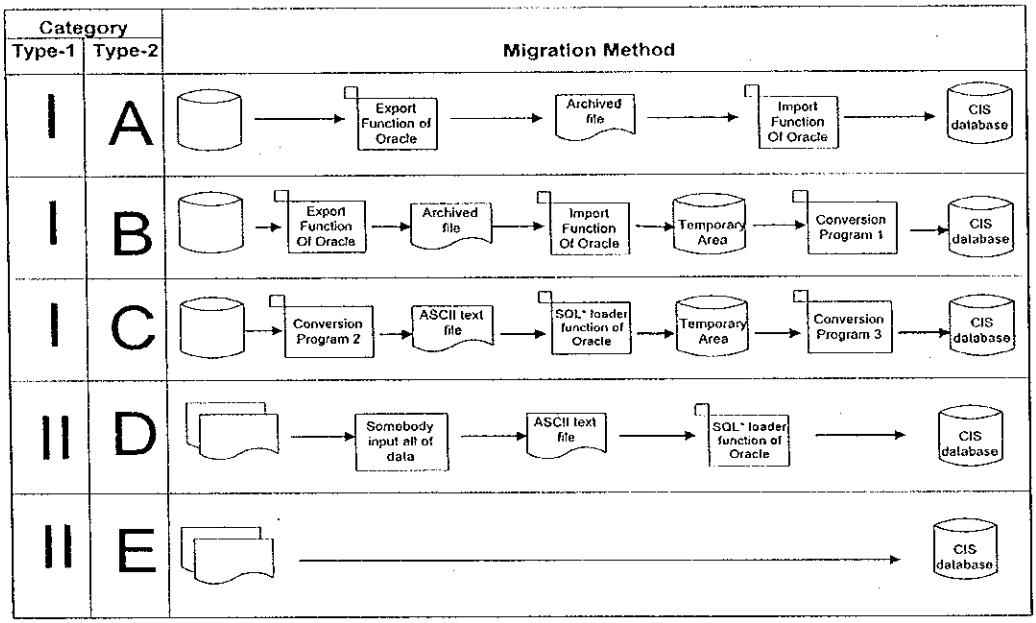


Figure 4.1.3-1: Categorized migration methods

I-A : The target data of migration has been managed by the same product, such as Oracle and the same data structure. The migration can be done with the same method as "data exchange between CIS and CFRS," which is described in 1.5.

I-B : The target data of migration is managed by the same product as Oracle, but it has different data structure. The migration can be done in two steps. First step is almost the same at I-A. After the first step, conversion process is needed for migration.

I-C : The target data of migration is not managed by Oracle but by other product. The migration can be done with several steps. At first, the target data should be converted into ASCII text file.

ASCII text file is the most popular file format of PC. Secondly, the ASCII text file is migrated to CIS by SQL* Loader function of Oracle. This function can convert ASCII text file into Oracle database. Lastly, conversion process is needed for migration, because the data structure is not necessarily the same as CIS data structure.

In the case of the target data is kept by means of paper documents, the migration methods are separated into two ways.

II-D : Data have to be manually inputted with the same structure as CIS into PC one by one and should be saved as ASCII format file. The migration can be done with SQL* Loader function of Oracle from ASCII format file.

II-E : The target data are directly inputted from CIS terminal one by one.

The conversion programs should be developed for migration. They are not included in Oracle function on CIS application.

4.1.4 Detail design of migration

4.1.4.1 Categorization target data into migration methods

Based on result of investigation, the target data of migration have been categorized into five types which are defined in figure 4.1.3-1. Table 4.1.4.1-1 shows result of categorization.

Table 4.1.4.1-1: Data name in Migration methods (1/2)

No.	Data name on source application	Source system name	Type
1	Importer	P2 application	I-B
2	Customs Broker	P2 application	I-B
3	Passenger	P2 application	I-B
4	Cross Border	P2 application	I-B
5	Shipping line and Means Transportation	P2 application	I-B
6	Violation	P2 application	I-B
7	Code	P2 application	I-B
8	Past Record	P2 application	I-B
9	Owner	P2 application	I-B
10	Rattan	Inter Island Transportation application	I-C

Table 4.1.4.1-1: Data name in Migration methods (2/2)

No.	Data name on source application	Source system name	Type
11	Wood	Inter Island Transportation application	I-C
12	Palm oil and their products	Inter Island Transportation application	I-C
13	Sea sand	Inter Island Transportation application	I-C
14	Other goods of Inter Island Transportation	Inter Island Transportation application	I-C
15	Verification Information	—	II-E

According to the result of this categorization, the JICA Study Team has designed detail migration method only for I-B and I-C. If there are further data to be migrated in the future. I-A and II-C might have to be designed. Verification information will be inputted by the CIS application.

4.1.4.2 Correspondence of data items between CIS and target application

The JICA Study Team has done more detail investigation into each target data and has compared them with data structure of CIS database to know how to handle target data, and where the data should be stored.

Based on result of this investigation, every data item are categorized into the following three types, which are shown in table 4.1.4.2-1.

Table 4.1.4.2-1: Categorization of data items

Mark	Type	CIS	Target	Description
S	Satisfy	Yes	Yes	CIS can get the data from target application system.
L	Lack	Yes	No	CIS needs the data, but target application does not have the data. Target application system does not have the data items. Default value should be inputted.
D	Discard	No	Yes	Target application system contains data items, but there are no corresponding items in CIS These items are discarded.

Supplement G shows result of investigation.

4.1.4.3 Detail Method for migration

The following sheets are attached based on detail design. In these documents, I-B is defined as "Migration process using Export / Import method", and I-C is defined as "Migration process from ASCII file into CIS Database format".

Conventions for describing formats are explained in Figure 1.7.2.2-1.

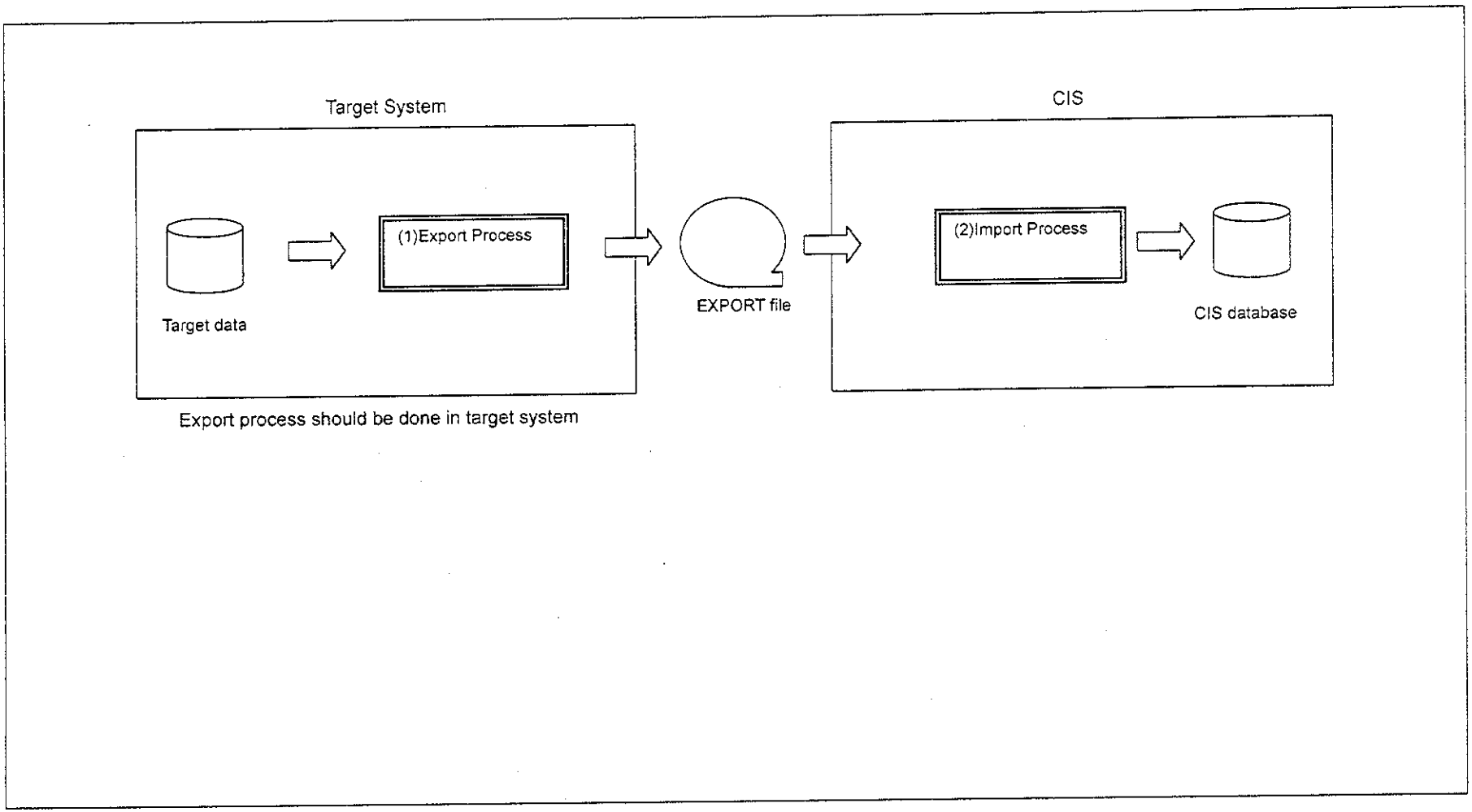


Figure 4.1.4.3-1: Process Overview (Migration Process using Export / Import Method)

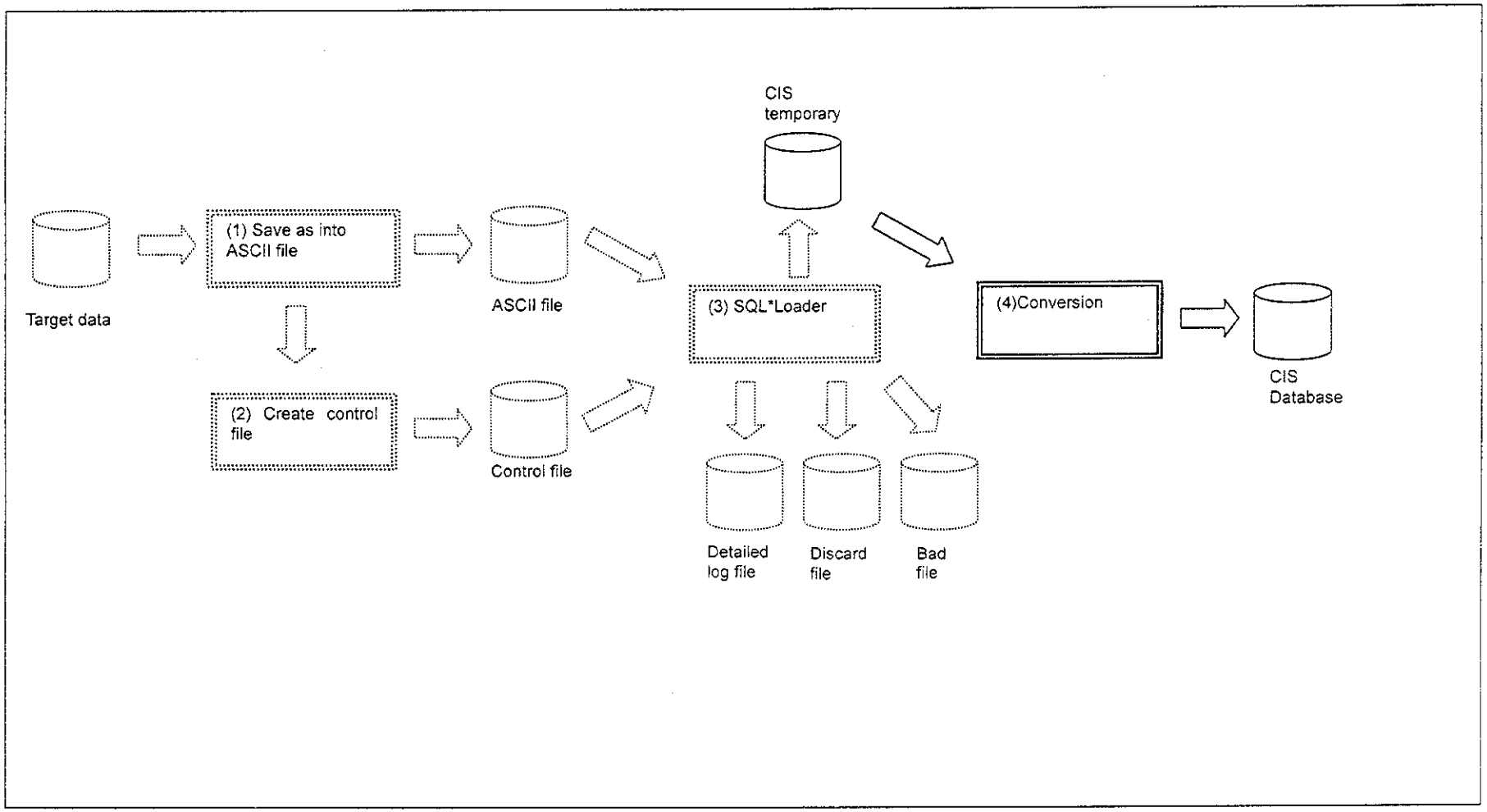


Figure 4.1.4.3-2: Process Overview (Migration Process from ASCII file into CIS Database format)

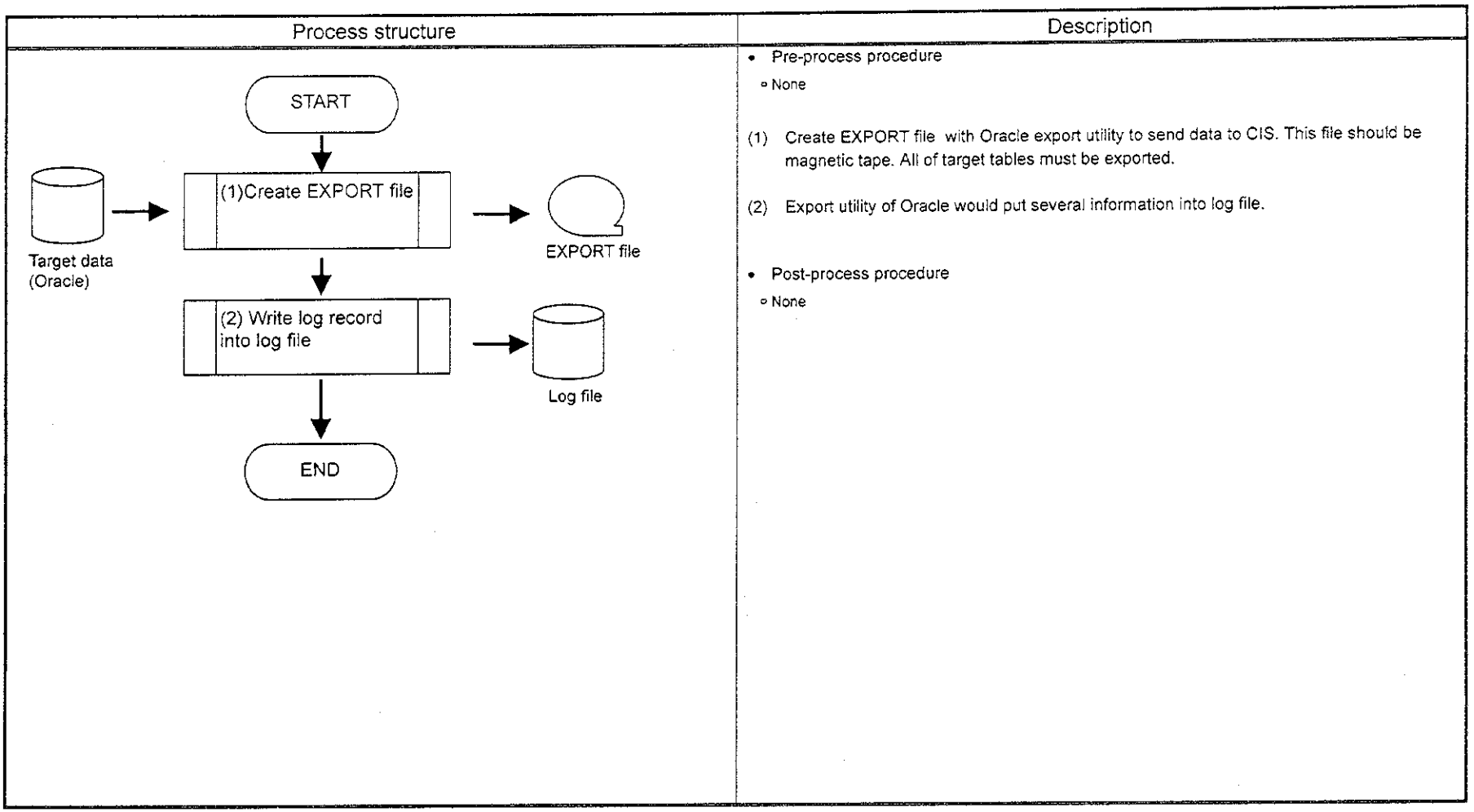


Figure 4.1.4.3-3: Process Structure (Export utility)

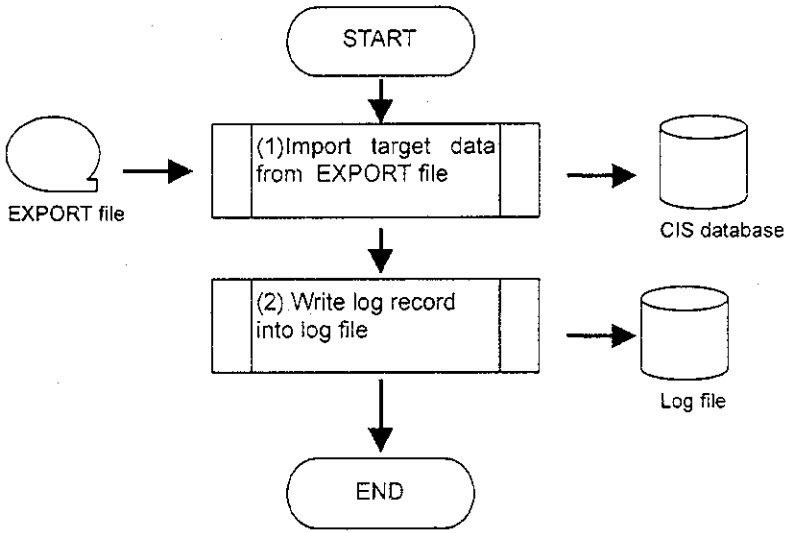
Process structure	Description
	• Pre-process procedure ▫ None (1) Import target data from EXPORT file in magnetic tape. All of contents are imported by import utilityof Oracle. In this case CIS gets information of data definition and table structure from target application. (2) Export utility of Oracle would put several information into log file. • Post-process procedure ▫ None

Figure 4.1.4.3-4: Process Structure (Import utility)

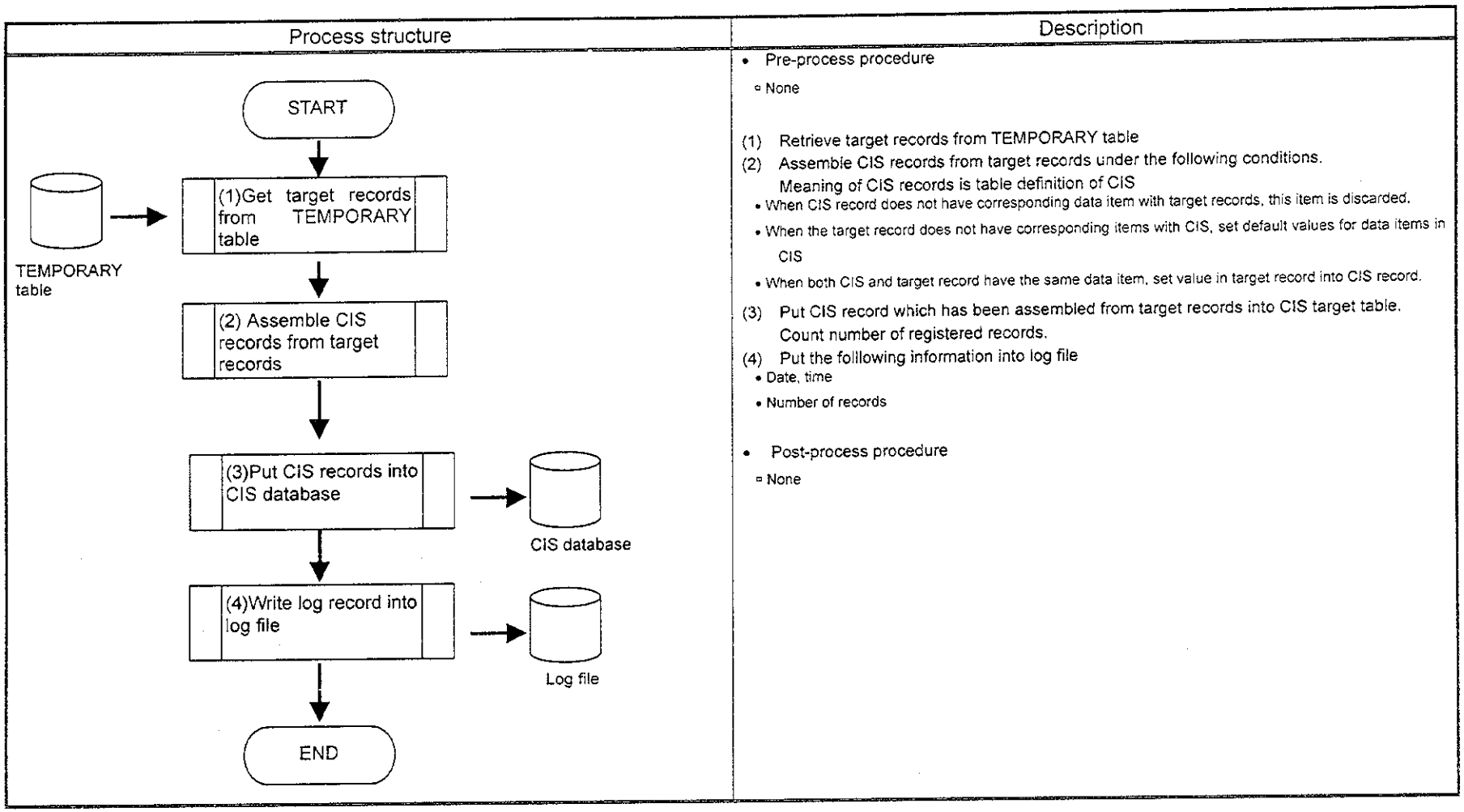


Figure 4.1.4.3-5: Process Structure (Conversion)

4.1.4.4 Basic Schedule for migration

The CIS initial database should exist at starting time of CIS service. Therefore, all of migration process should be finished by that time. The JICA Study Team has defined basic procedures and schedule for migration. Table 4.1.4.4-1 shows basic procedure.

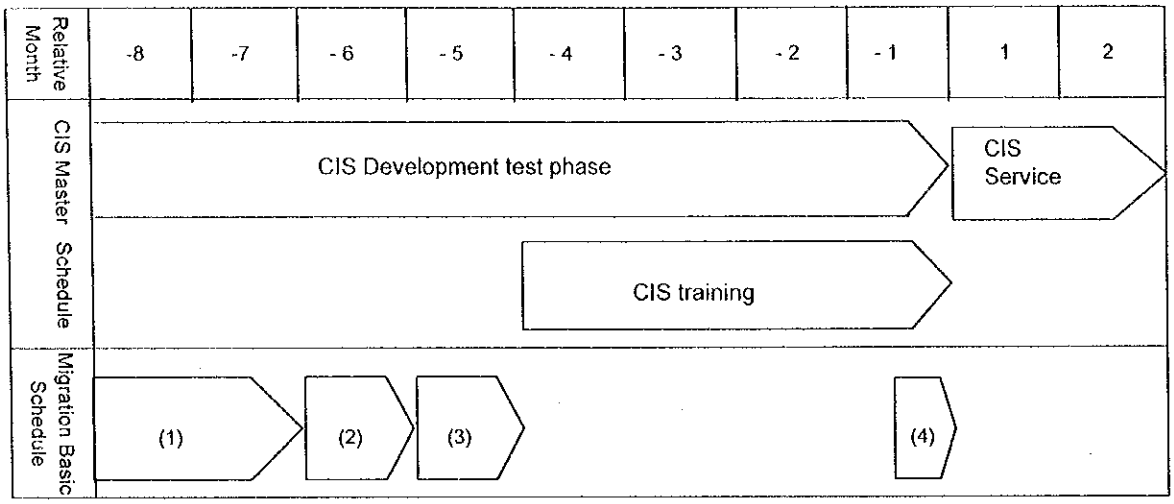
Table 4.1.4.4-1: Basic procedure for migration

No	Procedure name	Description
1	Planning	Re-considering how to make the CIS initial database
2	Designing	Designing processes and applications
3	Development	Developing applications and defining parameters for utilities
4	Migration	Performing migration by running application

In planning and designing procedures, the CIS application designer has to make investigation again. Because, several new data might exist or contents of existing data might be changed. Based on this investigation, several applications should be developed for migration. Migration would be done with those applications.

The JICA Study Team has made basic schedule which can be finished within four months before the start of CIS service. These data will be used for the test and training ,too.

Figure 4.1.4.4-1 shows basic schedule for migration.



Note :

(1) Investigating, planning and designing the application or tools to migrate :
Approximately 2 months

(2) Creating the application or tools :
Approximately 1 month.

(3) Migrating the existing data for training or testing :
Approximately 1 month.

(4) Migrating the latest data at this time again :
Approximately 0.5 month.

Figure 4.1.4.4- 1: Basic Schedule for migration

4.2 Plan of test in CIS Development

4.2.1 Outline of test plan

There are several methodologies to examine the application programs. In this subsection, the JICA Study Team would like to breakdown test process into 4 categories such as Unit test, System Integration, Product test and Running test.

1) Unit test phase (UT)

A single module or the smallest application unit is tested in this phase. This phase is divided into the following sub-phases.

- UT1

  Logic of each module and description format must be tested in this sub-phase.

- UT2

  The interface between modules and functions as servicing item unit must be tested.

2) System Integration phase (SI)

During the System Integration test phase, the programs validated in the Unit test phase are integrated into processes. Each job is tested and verified against the specifications defined in the Detail Design phase. Table 4.2.2-1 shows the scope of examination in each test process. This phase is divided into the following 3 sub-phases.

- SI1

  This test sub-phase validates for each job function which consists of several sets of tailor-made processes and middleware in order to confirm whether each job function is following the specifications of CIS or not. And until this phase or previous phase, the prototype model should validate performance and technical methods and so on.

- SI2

  This test sub-phase validates for each job group which is consists of several job functions in order to confirm whether each job is following the specifications of CIS or not.

- SI3

  This test sub-phase is for the entire CIS job groups whether each job is following the specifications of CIS or not.

3) Product Test phase (PT)

The processes, which were validated in the System Integration phase, are integrated into the complete system and tested in this phase. The tests validate the functionality, performance, reliability, and operability of the developed system. Each is tested and verified against the specifications defined in the Basic Design phase. Table 4.2.2-1 shows the scope of examination in each test processes.

4) Running Test phase (RT)

This test phase is implemented by the end user to certify all the aspects of the developed system. And at this phase, it is tested not only computer system but also organization and rule to operate CIS are validated. Table 4.2.2-1 shows the scope of examination in each test processes.

5) The environment condition

Most of the testing items will be implemented on the dedicated test machine until the end of SI1 phase. However, from around the SI2 phase, the actual machine should be used for the testing. Because most of CIS applications will be needed to be coupled each other on the actual machine environment. This machine environment is to be set up for the CIS operation environment finally. On the other hand, testing machine is to be used for maintenance machine (refer to Table 4.2.1.1-1 (3/3)).

4.2.2 Test Categories in development

The test plan of hardware and package software would be based on the platform characteristics. However the JICA Study Team would like to breakdown into the following essential categories in general. These test categories should be implemented, following the scope of examination in each test process found in Table 4.2.2-1.

1) Normal Operation test

This is for examination of daily and normal system operation. Normal Operation test would be roughly broken down into the following items:

- Job group or Job function normal start, operation, and end test.
- Hardware normal start and stop test.
- Package product software normal start and stop test.
- Network normal connection and disconnection test.
- Security test.
- Monitoring normal events/ Logging normal events.

2) Abnormal Operation test

In case of system failure, hardware or package products usually have some counter measures to protect the user data and to resume the user operation. Therefore, abnormal operation test should be needed to validate whether those counter measures would be correctly working or not. In some cases, computer system may be automatically resumed, and in other cases, system operators may have to take some actions to resume. Therefore, the abnormal operation test has to be implemented in order to clear those actions or procedure, too. The abnormal operation test is roughly broken down into the following items:

- Job group or job function abnormal end, restart, and operation test.
- Hardware abnormal end and restart test.
- Package product software abnormal end and restart test.
- Network abnormal disconnection and re-connection test.
- Reliability test.
- Monitoring abnormal events/ Logging abnormal events.

3) Performance test

Computer performance is one of the most important factors to implement CIS. To confirm the computer performance, the following test should be implemented in the CIS development:

- Prototype test
- Overload test

For items to be checked in the Performance test refer to 3.4.3.

4) Operability test

To ensure the operability of CIS for system administrator or end-user, the following tests should be taken in development:

- Operation schedule test
- Confirmation of operational organization and rule
- Operation management test (Centralized monitoring events/Centralized logging events/Managing system resources)

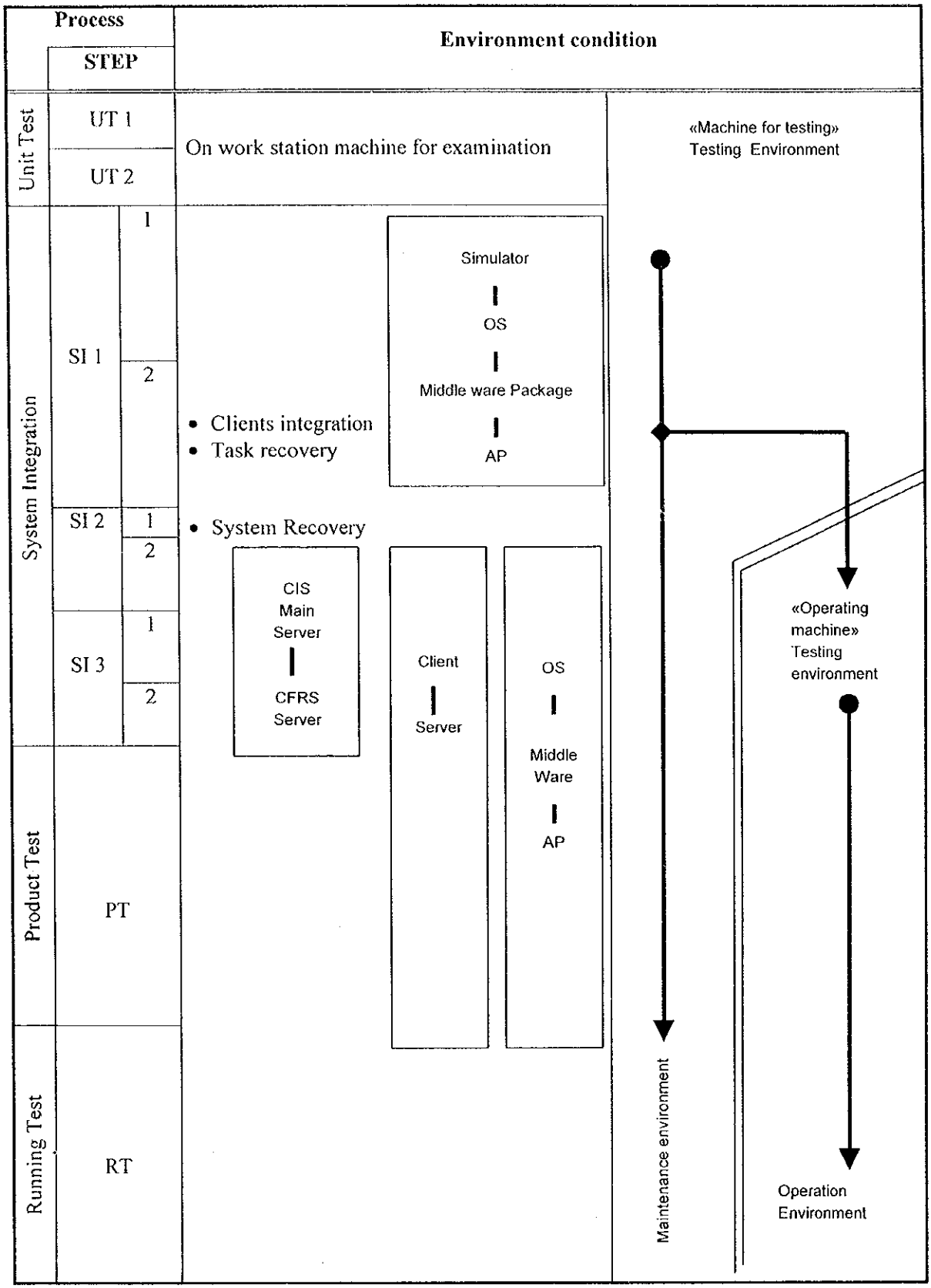
Table 4.2.2-1: Scope of examination for each process (1/3)

Process			Scope of examination	Objectives of examination
	Step			
Unit Test	UT 1		Single module [Complete as a part]	• Logic of module and description format must be validated.
	UT 2		Application process unit	• The interface between modules, and functions as servicing item unit must be validated.
System Integration	SI 1	1	Application process and middle ware package	• Connect application process items to middle package and ensure that: ▫ Normal message conducts normally and does not become an error. ▫ Error message conducts as an error, and does not become normal. • Relations between service items in application in a group must perform normally, which means transactions through files and individual messages.
		2	Between application processes [Confirm till application item level]	
	SI 2	1	Within application	• Transaction between applications must perform normally, which means transactions through files.
		2	Between applications [Confirm till application level]	
	SI 3	1	Within application group (within on-line, within off-line)	• Within on-line, transaction between applications in an application group must perform normally, which means transactions through files. • The on-line within the same application group must perform normally.
		2	Within application group (on and off coupled) [Confirm till application group level]	
Product Test	PT		Connection for other systems (CFRS) Between application groups Transaction ability, reliability, etc. Migration [Confirm overall system]	• Transaction must complete normally and there must not be any problem concerning its operation, reliability and transaction ability.
Running Test	RT		Running test of the system with DJBC, under the same system environment as the actual operation for its acceptance. Rehearsal for migration in order to confirm the operation steps of migration. [Confirm overall system from operating view point	• DJBC must confirm if the system functions as described in specification • The customer must confirm that there is no problem to start the service concerning the overall system.

Table 4.2.2-1: Scope of examination for each process (2/3)

Process			Main point of confirmation	
	Step			
Unit Test	UT 1		• Logic, Description format.	System Perfomance and technical method are to be validated by the prototype moderl. This test process might as weel be held as faster as possible.
	UT 2		• Interface (Argument / Parameter) and function.	
System Integration	SI 1	1	• Standardize with middle package.	
		2	• Coupling between service items by scenario.	
	SI 2	1	• Coupling between applications by scenario. • Limitation values (Max / Min). • Daily transaction.	
		2		
	SI 3	1	• Coupling of ON/OFF within the same application group by scenario. • Operation date (normal day / transfer on next day / end, beginning of month / dead line / yearly dead line).	
		2		
Product Test	PT		• Coupling to other kind of systems. • Coupling of application groups by scenario. • Operation (normal operation / special operation / 24 hour operation . • Task recovery / System recovery / File recovery. • Table maintenance (client, increase / decrease subjects) .	
Running Test	RT		• Operate the system as described in operation manual, and confirm with DJBC as the main subject, whether to actually introduce to the operation.. • Confirm the legality of data subject to migration.	

Table 4.2.2-1: Scope of examination for each process (3/3)



CHAPTER 5 Project Implementation plan

5.1 Development Process and Schedule

This section will briefly explain processes and schedule to develop CIS.

5.1.1 Processes of developing CIS

Development processes are divided into 10 phases as follows.

Table 5.1.1-1: Development process (1/2)

Category	Phase	Definition	Remarks
Investigation Phase	BI	Basic Investigation Phase This phase focuses on investigating and analyzing the requirements from end users. Computer system with high effectiveness is considered and proposed.	The JICA Study Team assigned
Design Phase	BD	Basic Design Phase This phase focuses on the transformation of the business aspects into the computer world. The business area requirements are converted into system specifications that include the basic system function, data structure and security.	The JICA Study Team [Scope of the First stage] / Next Phase [Scope of the Second Stage and the Third Stage]
	DD	Detail Design Phase Following guidelines in BD,system specifications are broken down into the more specific system processes and modules. As part of the design step, these processes are decomposed into individual programs that are designed in the next sub-phase.	
Programming Phase	PD	Program Design Phase This phase focuses on the individual programs. The program structures are designed and the programs are broken down into individual modules.	Next Phase
	M	Making Phase The modules, which are the smallest component of the system, are designed, coded and tested in this phase.	

Table 5.1.1-1: Development process (2/2)

Category	Process	Definition	Remarks
Testing Phase	SI	System Integration phase During the System Integration phase, the programs validated in the previous phase are integrated into processes. Each is tested and verified against the specifications defined in the Detail Design phase.	Next Phase
	PT	Product Test phase The processes, which were validated in the System Integration phase, are integrated into the complete system and tested in this phase. The tests validate the functionality, performance, reliability, and operability of the developed system.	
	RT	Running Test phase This test phase is implemented by the end user to certify all the aspects of the developed system.	
Operating Test Phase	OP	Operation phase This phase support user in implementing the system and business operation.	
Maintenance Phase	MA	Maintenance phase In this phase, the system is continually monitored and modified to eliminate bugs and to maintain the system validity. The business trends are also monitored to ensure that the system is always up to date.	

5.1.2 Stages of developing CIS

According to the 4-year CIS development master plan, there are four stages to develop CIS. In effect, the JICA Study Team is trying to actualize the vision written in that master plan. Four stages of the CIS development are scheduled as follows.

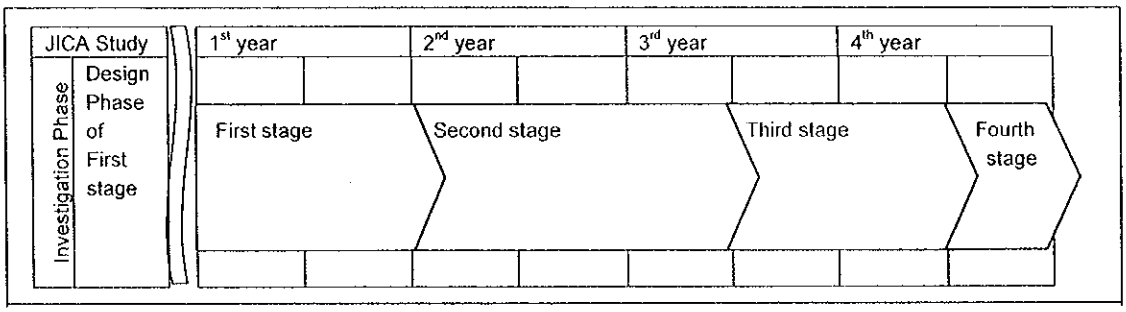


Figure 5.1.2-1: Stages in developing CIS

- First stage: For approximately 13 months.

  The essential CIS application function will be developed at this stage. Approximately 13 months will be needed to develop and to test the CIS application programs and also to provide users with some training on CIS.

- Second stage: For approximately 18 months

  The remaining CIS application programs will be developed at the second stage. CIS will expand to 5 major Regional Offices and their major Service Offices. Approximately 18 months will be needed for the CIS development, installation, testing, and training.

- Third stage: For approximately 12 months

  In the third stage, the focus is on the installation, operation test, and training at each Regional Office and Service Office. Approximately 12 months will be needed to install, test, and train.

- Fourth stage : For approximately 5 months

  Until this stage, further study is needed to understand other ministry's requirement as to accessing to CIS. Should it be limited only to the scope of development, installation, operating test, and training, it can be done within 5 months. This stage is optional because DJBC has yet to decided to connect other ministries and agencies.

Each stage is described in detail as follows.

1) First Stage

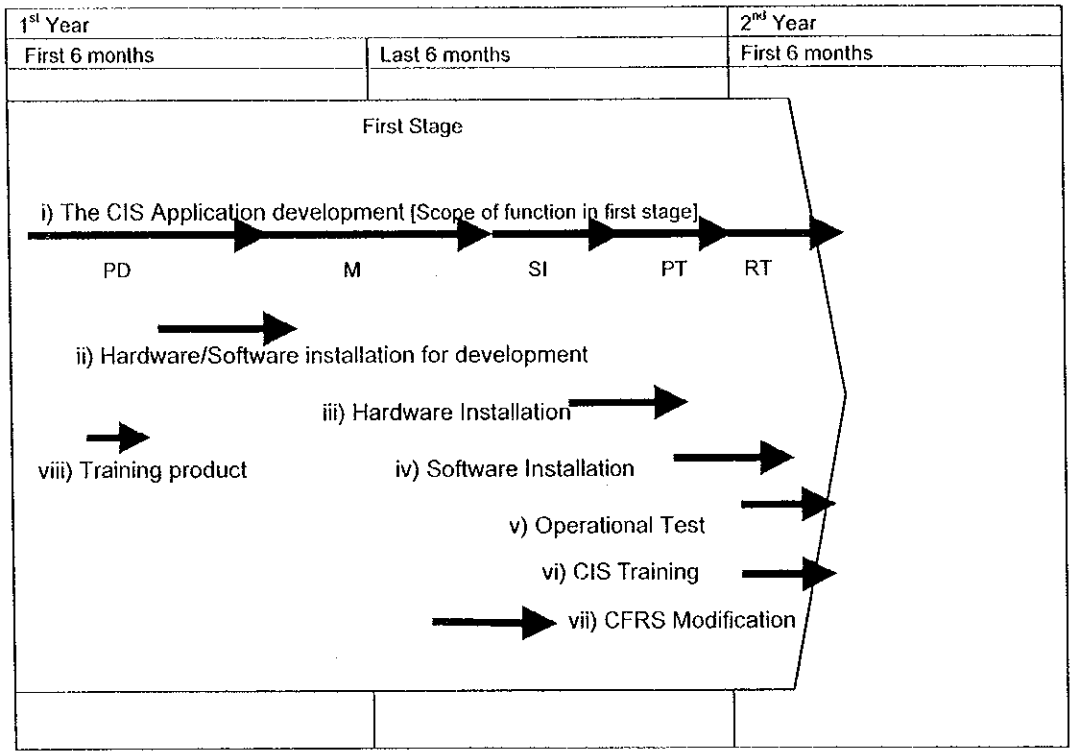


Figure 5.1.2-2: First Stage

This stage is divided into 8 major Categories to develop CIS.

i) The CIS Application development (13 months)

Main function of CIS will be developed in this stage. To finish the CIS software development as planned in the first stage, it needs approximately 13 months. For each development process, refer to Table 5.1.1-1.

ii) Hardware/Software installation for development (2 months)

The server machine and PC for development process need to be prepared. Before installing the target machine, application programs have to be run on the test machine in order to calculate memory size, disk size and CPU range. The CIS application program development continues in further stage, and the target machine can not be used for development, therefore development server machine and PCs are needed from this stage. The server machine for development process could be smaller in size than the target machine. Package software, OS, Oracle and development tool on the development environment must be compatible with the target machine environment.

iii) Hardware Installation (2 months)

About 2 months will be needed to install hardware. This process includes installation of one main server, approximately 90 personal computers, network equipment, network

cabling work, and WAN / LAN line installation. In this stage, CIS will be installed at 5 places, Head Office, Service Office I, Service Office II, Service Office III and Regional Office IV. Hardware installation will be relatively faster than other stages.

iv) Software installation (2 months)

About 2 months will be needed to install package product software and the CIS application programs in the target machine. This process includes the installation of OS, Oracle, other management software, and the CIS application program in the Main Server as well as the installation of OS and the CIS application software in approximately 90 personal computers.

v) Operation test phase (1 month)

About 1 month will be needed to implement the Operation test phase. Users that are involved in the development of CIS will be the main testers in the operation test; therefore, involvement of officers from the Regional Office and Service Offices during the development phase is essential.

vi) The CIS Training (1 month)

The CIS tutorial course of 2 or 3 days has to be held for the end-users in the Head Office, Regional Office, and in each Service Office. In this stage, it will involve many Customs officers who have to understand how to use CIS.

vii) The CFRS (Customs Fast Release System) modification

In this stage, CIS will be connected to CFRS, which is the existing system. Of course, it is not only expected that CIS has the interface with CFRS, but also that CFRS has to have the interface with CIS. CFRS will be able to interface by the end of System Integration test phase in CIS.

viii) Product training (1 month)

This training is for the development team to understand the development tools that will be used in later phases. It will finish in one month and may also include developing-language training for some team members.

2) Second Stage

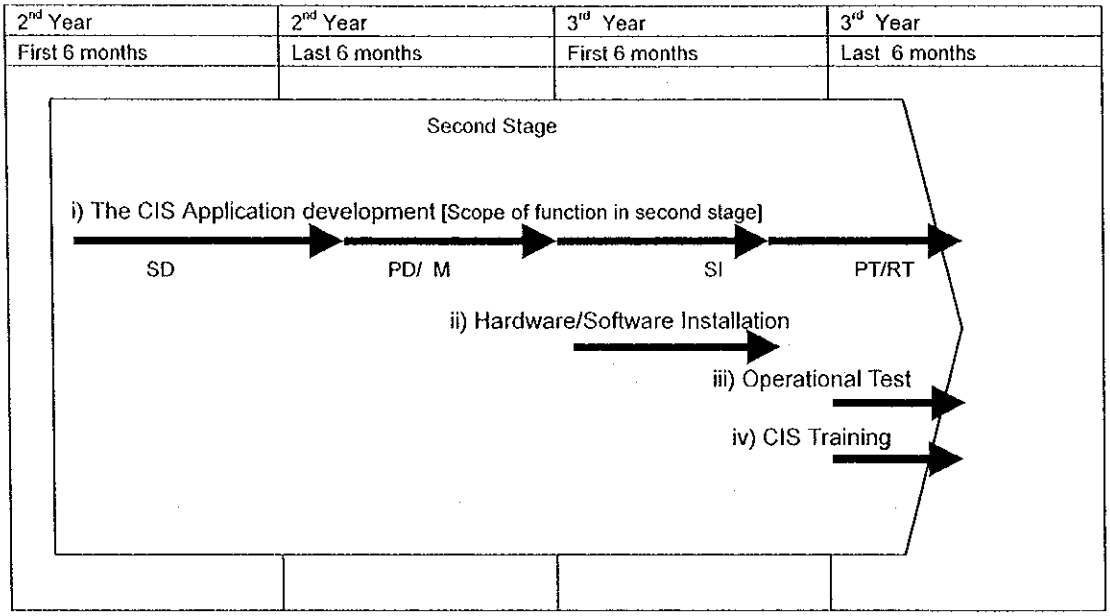


Figure 5.1.2-3: Second Stage

i) The CIS Application development [Scope of function in second stage] (18 months)

Before developing the CIS applications, the scope of the development function must be discussed in more detail. However, the JICA Study Team anticipates that the development process can be completed in 18 months. Since the CIS Regional Server and terminal are installed in 5 major Regional Offices and 5 Service Offices, it takes much time to perform the installation in all offices. It is recommended to start planing the installation and operation test in this phase.

ii) Hardware/Software Installation (4 months)

About 4 months will be needed to install hardware. This process includes installation of 5 Regional Servers, approximately 35 personal computers, network equipment and network cabling work. In this stage, CIS will be installed at 10 places: Regional Office I, IV, V, VI, VII and Service Office-Belawan, Bandung, Soekarno Hatta II, Tanjung Emas, Tanjung Perak. It will take more time to complete hardware installation in this stage than in the first stage.

iii) Operation test phase (2 months)

About 2 months will be needed to implement the Operation test phase. Users that are involved in the development of CIS will be the main testers in the operation test; therefore, the involvement of officers from the Regional Offices during the development phase is essential.

iv) The CIS Training (2 months)

The CIS tutorial course of 2 or 3 days may be held for end-users in each Regional Office. Because Regional Offices are in the distance and the trainers have to travel, it is recommended that the CIS training be incorporated into current training mechanism in DJBC.

3) Third Stage

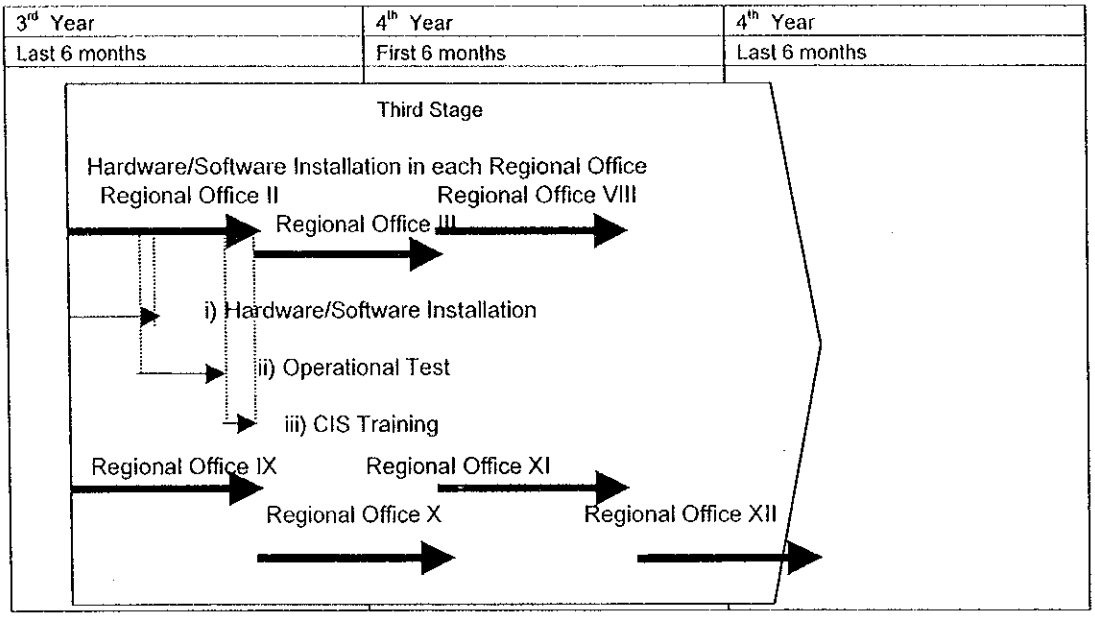


Figure 5.1.2-4: Third Stage

This schedule supposes that CIS will be installed at 7 Regional Offices. Further study of the appropriate installment order prior to this stage may change this schedule.

Hardware/Software Installation in each Regional Office is:

i) Hardware / Software Installation (2 months).

At least 1.5 months will be needed to install hardware/software in one Regional Office.

ii) Operational Test (2 months/Each Regional Office)

At least about 1.5 months will be needed to implement the Operation test phase.

iii) The CIS Training

The CIS tutorial courses of 2 or 3 days may be held for end-users in each Regional Office. However, in this stage, it is strongly suggested that a formal training mechanism for CIS be in place in DJBC. This is to train new officers who have to use CIS in the future and to provide some kind of help desk for existing users. The tutorial provided by outside trainer be regarded only as a supplement to the guidance of the users after the installation is complete.

4) Fourth Stage

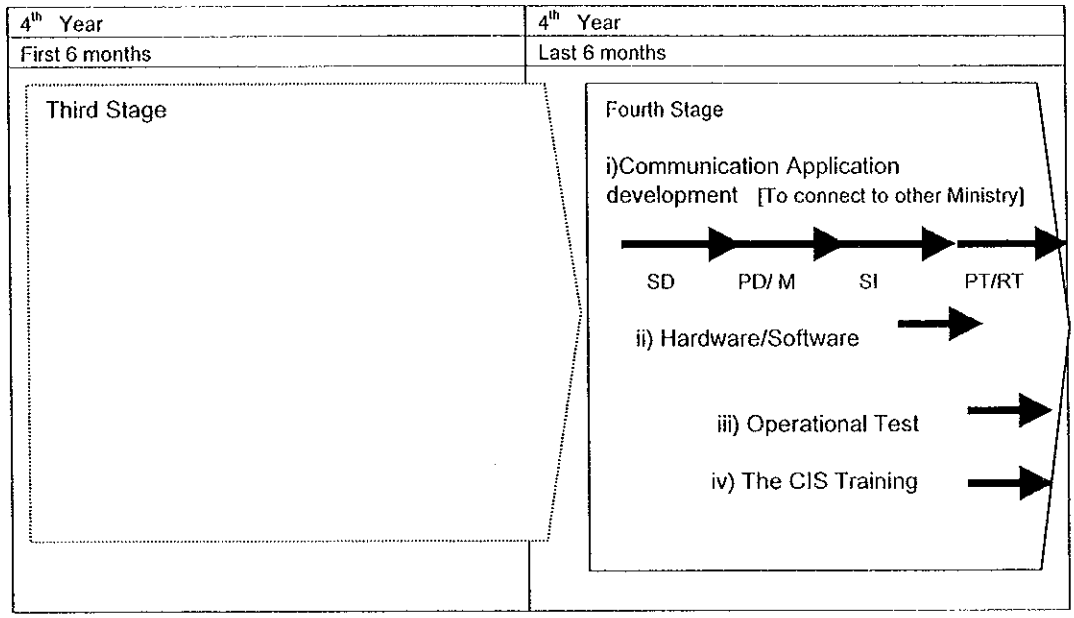


Figure 5.1.2-5: Fourth Stage

Since the scope of CIS does not include connection with other government agencies, the JICA Study Team has not studied this matter in detail. The solution to this matter can vary from the simplest one to the most complex one, and the solution may not be universal for every government agencies that want to access CIS. Among the solutions are:

- Access terminals FTP tools or database tools.
- Integrated access from similar to those in the DJBC offices.
- Data replication by using other government agencies' existing system.

At the beginning of this stage, the following questions must be considered carefully:

- What kind of information do they need?
- How does CIS connect to other computer systems?
- Is it necessary to develop or modify the CIS application?
- Is it enough to install the CIS terminals?
- Will the security of CIS be compromised?

Although the schedule is planned tentatively, the following 4 items must be considered in schedule before the start of this stage.

i) Communication Application development [To connect to other Ministry] (5 months)

ii) Hardware/Software Installation (1 month)

iii) Operational Test (1 month)

iv) The CIS Training (1 month)

5.2 Organization of Development

5.2.1 Organization of Development

The JICA Study Team suggests the organization of the CIS development in this section. The organization of the CIS development is expected to be kept from the first stage to the third stage.

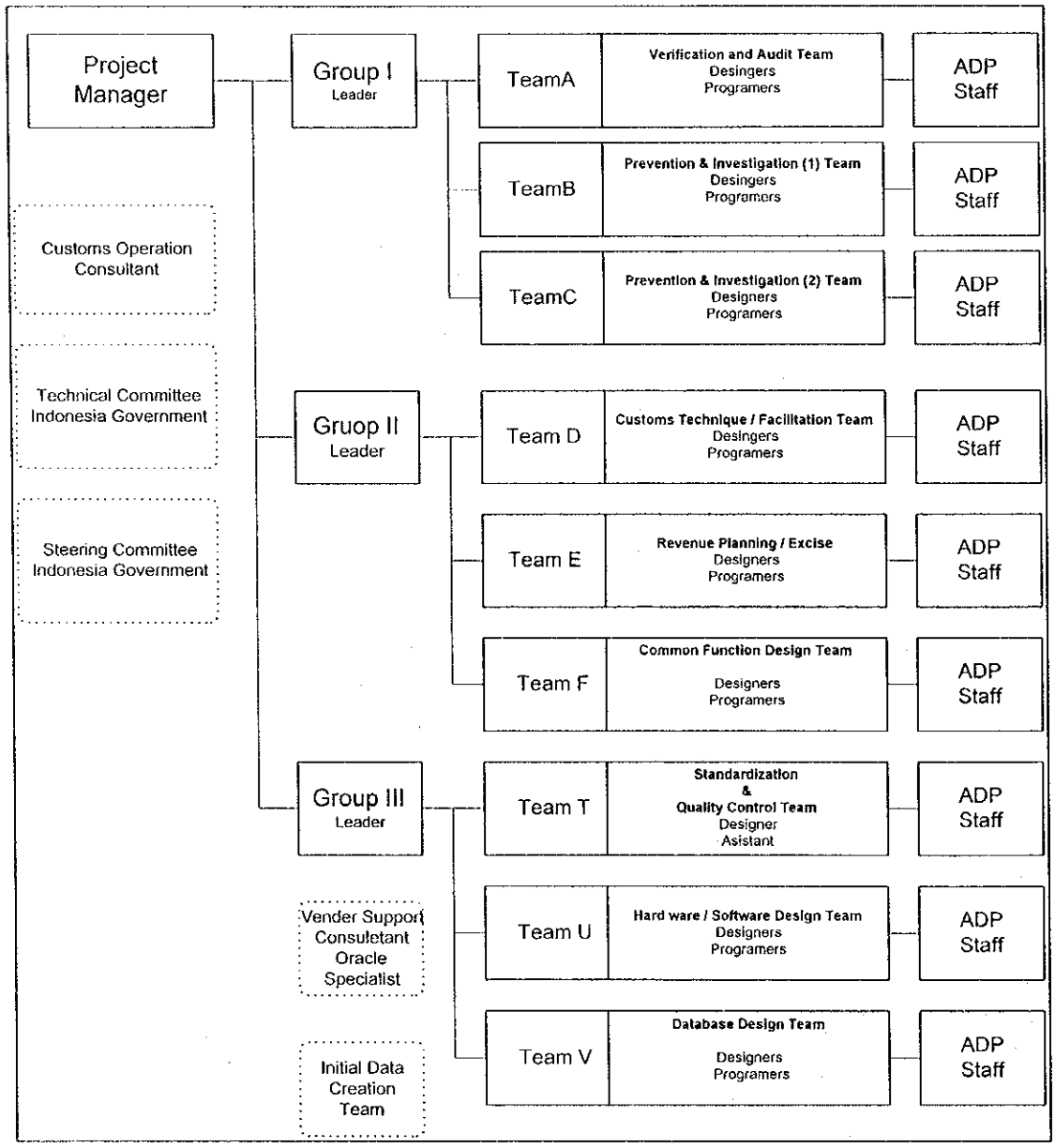


Figure 5.2.1-1: Example of the CIS development organization

- Technical committee

  DJBC would be expected to organize the Technical committee to authorize the CIS specification and technical matters in the CIS development.

- Steering committee

  DJBC would be expected to organize the Steering committee to authorize the CIS specification and direction of the CIS development project

- Project manager

  Project manager must be an expert of system development management. He conducts the CIS project with the experiences in managing large-scale system projects.

- Group leader

  Group leader has to have experiences in developing the computer system and must know the methodology of how to develop the tailor made computer application systems. The group leader must also be able to manage and conduct the process control of development in each team.

- Customs Operation consultant

  Expert of Customs-Excise operation, especially Customs Intelligence database systems, will be needed for development of CIS.

- Vendor support consultant

  In the CIS development project, specific tool products, Oracle, Oracle/developer 2000, PL/SQL will be used based on user requirements. Although system engineers and programmers will be trained before starting the project, they are not experts of Oracle products. Therefore, Oracle specialist will be needed in tuning Oracle DBMS and dealing with trouble shooting, as well as solving technical problems. If any specific products are used in this project, products specialist will be needed from the beginning.

Development staff belongs to the following three groups.

- Group I : The CIS application program development group.
  - Development Team A

    In charge of developing "Verification and Audit" application programs
  - Development Team B

    In charge of developing "Prevention & Investigation (1)" application programs
  - Development Team C

    In charge of developing "Prevention & Investigation (2)" application programs

- Group II : The CIS application program development group
  - Development Team D

    In charge of developing "Customs Technique / Facilitation" application programs
  - Development Team E

    In charge of developing "Revenue Planning / Excise" application programs
  - Development Team F

    In charge of designing common function, e.g. printing function, ID check function and so on.
- Group III : Technical supporting group
  - Technical support Team T

    In charge of Standardization & Quality Control based on ISO9000.
  - Technical support Team U

    In charge of designing Hardware & Software configuration, system tuning, and so on.

    In charge of administrating development environment
  - Technical support Team V

    In charge of designing database, investigating Oracle products, tuning database, and so on.
- ADP staff must be in the CIS development team to gain some knowledge on the information technologies of CIS.
- Initial data creation team will have to be held at each stage.

5.2.2 Requirement Skill

The following technical skills are required in the CIS development.

- The CIS Design knowledge
  - Business process flow (Group I/II)
  - The CIS Application structure (Group I/II, Team V)
  - E-R Diagram of CIS (Team V)
- Oracle knowledge
  - PL/SQL Programming (Team V)
  - Oracle RDBMS management (Team V)
  - SQL Operation (ALL)
- Development language knowledge
  - Programming with 4GL (Group I/II, Team V)
- Unix /Network/Hardware knowledge
  - Operating system based on Unix (Group III, Team U)
  - Unix base server machine (Group III, Team U)
  - Network equipment (Group III, Team U)

Leadership skill is needed to control the team or the group, solve problems, make decisions and take responsibility for all activities of each Group/Team leader. The technical skills of products required are explained in Table 5.2.2-1.

Table 5.2.2-1: Requirement of product skill

Item	Products
RDBMS	Oracle RDBMS (including PL/SQL, SQL)
4th Generation Language	Oracle Developer/2000, Oracle Designer/2000 Visual BASIC, Visual C++

5.3 The Cost Estimation in Implementing CIS

5.3.1 Circumstances

1) Summary of installation plan

According to the research done by the JICA Study Team, Regional Office IV and Service Offices at Tanjung Priok I to III should be covered in the first stage, because they handle nearly half of all customs transactions (PIB and PEB). Four other Regional Offices (I, V, VI, VII) and five Service Offices should be covered in the second stage, which handle roughly a quarter of all customs transaction. Thus, at the end of second stage, about three-quarters of all PEB and PIB transactions would have been handled by CIS.

Therefore, the installation plan is to cover Head Office, Regional Office IV, and Service Offices at Tanjung Priok I to III at the first stage. CIS is expanded to Regional offices I, V, VI, VII and Service Offices at Belawan, Soekarno-Hatta II, Bandung, Tanjung Emas and Tanjung Perak at the second stage. At the third stage, CIS is expanded to Regional Offices II, III, VIII, IX, X, XI, XII. As a result, CIS covers Head Office, 12 Regional Offices, and 8 Service Offices.

The locations of the Regional and Service Offices, which will be installed in this plan, are summarized in Table 5.3.1-1. The JICA Study Team had discussed the CIS development plan and cost with DJBC. The costs of each stage are in Table 5.3.1-2, Table 5.3.1-3, Table 5.3.1-4, and Table 5.3.1-6. Further detail information is described in later sections.

Table 5.3.1-1: Summary of plan

Item	First Stage	Second Stage	Third Stage
Location	1 Head Office 1 Regional Office • Regional Office IV (Jakarta) (Without server) 3 Service Offices • Tanjung Priok I • Tanjung Priok II • Tanjung Priok III	5 Regional Offices • Regional Office I (Medan) • Regional Office IV (Jakarta) • Regional Office V (Bandung) • Regional Office VI (Semarang) • Regional Office VII (Surabaya) 5 Service Offices • Belawan • Soekarno Hatta II • Bandung • Tanjung Emas • Tanjung Perak	7 Regional Offices • Regional Office II (Balai Karimun) • Regional Office III (Palembang) • Regional Office VIII (Denpasar) • Regional Office IX (Pontianak) • Regional Office X (Balikpapan) • Regional Office XI (Ujung Pandang) • Regional Office XII (Ambon)
Function	1) Scale of program: 307 Kilo steps 2) Main functions • PIB verification mgmt. • NI, NHI management • Past record mgmt. • Violation management. • Bonded storage mgmt. • Revenue monitor And so on	1) Scale of program: 464 Kilo Steps 2) Main functions • PEB verification mgmt. • Investigation mgmt. • Facilitation management And so on	No development
Cost Including VAT	US$ 8.3 Million	US$ 8.1 Million	US$ 3.1 Million
Grand total Cost Including VAT	US$ 19.5 Million		

2) General precondition

Before describing the cost estimation in detail later in this chapter, several assumptions or preconditions must be made clear. Further detail information is described in Table 5.3.1-5.

- DJBC had agreed to provide a developing team with office space to accommodate 50–60 persons to develop CIS. Therefore, the JICA Study Team does not estimate office rental fee for this phase. However, before starting "first stage" of CIS development, the developing team must confirm this condition again.
- Contingencies include 10% of the cost. Contingencies are physical only, and price contingencies are not considered.
- During the development, additional cost will be incurred from consumable goods (ink, paper, office supplies, and so on) but the estimation does not take into account additional cost.
- Exchange rate used in the estimation is Rp 7,375 per US$1.00 as of 30 November 1998.
- The estimated costs are based on standard price in Indonesia as of November 1998.
- Hardware, software, and services are local procurement.
- Other equipment that may be needed to install the computer system is not included in the estimation, for example additional air conditioners, computer desks, and so on. DJBC must be aware of this cost.
- Additional hardware, software and modification on CFRS may be required in order to connect to CIS. Those additional costs are not included in this estimation.
- Interest rate is not considered in this estimation.
- DJBC has the specified contract with Oracle. If it is also effective for CIS, the development cost would be reduced. Since Oracle products occupy most part of software product cost, DJBC and vendor should confirm whether this contract is still effective at each stage or not.
- These cost estimation and schedule are based on the specification of the System Design Phase II. If the specification is changed in future, there would be a possibility of changing the cost estimation and development schedule.

Table 5.3.1-2: CIS development cost (US$)

Items	The first stage(*)	The second stage	The third stage
Hardware			
Server machines			
Main Server	786,400	—	—
Regional Server	—	867,700	455,000
Development Server	175,500	—	—
EUC Server	14,500	—	—
Operational control server	12,100	—	—
Personal computers	337,500	94,500	94,500
Network devices	347,800	96,400	92,400
Other miscellaneous hardware	350,700	162,000	126,000
Contingencies	202,500	122,100	76,800
SUB TOTAL	2,227,000	1,342,700	844,700
Software			
Server Package Product			
Main System	611,400	445,000	571,200
Development Server	213,300	—	—
PC Package Product	—	—	—
Production	66,500	24,500	24,500
Development	726,000	—	—
Contingencies	161,800	47,000	59,600
SUB TOTAL	1,779,000	516,500	655,300
Cabling			
Cabling (network & power)	26,900	21,900	21,200
Contingencies	2,700	2,200	2,200
SUB TOTAL	29,600	24,100	23,400
Installation			
Server setup	50,000	59,000	82,600
PC setup	10,000	15,400	15,400
Network serup	15,200	29,700	25,900
Contingencies	7,600	10,500	12,400
SUB TOTAL	82,800	114,600	136,300
Training			
Training	125,500	87,700	56,700
Contingencies	12,700	8,800	5,700
SUB TOTAL	138,100	96,500	62,400
CIS Application Development			
Tailor made application	2,817,000	4,114,700	—
Contingencies	281,700	411,500	—
SUB TOTAL	3,098,700	4,526,200	—
CIS DEVELOPMENT COST TOTAL	7,355,200	6,620,600	1,722,100

Note: The cost of the first stage includes the initial development cost.

Table 5.3.1-3: CIS operation cost during development (US$)

Items	The first stage(*)	The second stage	The third stage
Fixed Cost			
Hardware maintenance cost	2,800	134,400	202,500
Software maintenance cost	191,800	399,100	357,700
Contingencies	19,500	53,400	56,100
SUB TOTAL	214,100	586,900	616,300
Variable cost			
Network fee (instalation)	2,200	6,000	17,700
Network fee (running cost)	12,800	131,600	378,000
Contingencies	1,500	13,800	39,600
SUB TOTAL	16,500	151,400	435,300
CIS OPERATION COST TOTAL	230,600	738,300	1,051,600

Note: The cost of the first stage includes the initial development cost.

Table 5.3.1-4: Grand total of CIS development cost (US$)

Items	The first stage(*)	The second stage	The third stage
Totals	7,585,800	7,358,900	2,773,700
VAT 10%	758,600	735,900	277,400
Totals (VAT 10%)	8,344,400	8,094,800	3,051,100
GRAND TOTAL	19,490,300		

Note: The cost of the first stage includes the initial development cost.

Table 5.3.1-5: Preconditions in cost estimation (1/2)

Category	Detail	Description
Common	—	• The estimation does not include the cost for consumable goods (ink, paper, office supplies, etc.). • Exchange rate is RP 7,375 against US$ 1 as of 30 November 1998. • The estimated costs are based on standard price in Indonesia as of November 1998. • This estimation does not include the modification cost of CFRS. • CFRS has to be estimated with "the application modification cost'", "the additional hardware costs'" and "the additional package software costs". • Interests rate is not considered in this estimation. • Hardware, software, and services are local procurement • Contingencies include 10% of the cost. (Physical contingencies only, price contingencies are not considered). • DJBC will provide office space for development. • Cost estimation of other equipment, for example air conditioners, desks and so forth are not included.
CIS Development Cost	Cabling	• Actual cost for cabling will vary based on each site survey.
	Installation	• The installers are not responsible for system design. All necessary setup information must be provided for the installers. • Engineers from the third party company (ORACLE, UNIX vendor, Microsoft, and so forth.) are needed for installation and setup of software of the third party company in the development phase and first stage. • Cutover support for each stage is estimated for 1 month supported by two persons. On-site support in remote areas is not included in the estimation.
	Development of Application	• Overtime is calculated at 110% of the standard unit price. • Five foreign staffs are included in the development team at the first stage. Three foreign staffs are included in the development team at the second stage. • New business operation or major specification changes are not included. • Man/Month unit price: Foreign SE rate is based on average rate in Japan. Income tax in Indonesia and other related tax are not included. • Man/Month unit price: Local SE rate is based on average rate in Jakarta. • Foreign SE's accommodation cost is included. • General overhead cost is included.

Table 5.3.1-5: Preconditions in cost estimation (2/2)

Category	Detail	Description
Operation Cost	Maintenance for hardware and software	• Maintenance costs related to third party companies exclude travel and accommodation for areas outside Jakarta. • Maintenance service by third party companies is business hour only (Monday to Friday, 9:00AM to 5:00PM).
	Maintenance for software	• Software maintenance cost is estimated after installation. • Cost included in the estimation covers basic support only, which provides the following: ▫ Software error corrections. ▫ Maintenance release. ▫ Enhancement updates. ▫ Technical bulletins. ▫ Technical Q&A over the phone. • For software related to the third party company, availability of the above items, except for Technical Q&A, depends on the corresponding third party vendor.
	Network fee	• Network fee is based on the Telkom price list as of November 1998.
	ADP staff training to support CIS	• ADP staff training cost is not included in the estimation. DJBC needs to prepare the budget for training courses. (Oracle, UNIX, other developing tool, etc.)
	Direct Labor Cost	• Direct labor cost is not included in the estimation because ADP staffs would be in charge of the operation of CIS.
	Power & Utility	• Power & utility cost is not included in the estimation.
	Minor Specification Change	• Cost of minor specification changes is not included in the estimation. This cost should be needed to modify the minor specification in CIS after cutover.

Table 5.3.1-6: CIS operation cost (US$)

Items	Monthly	Annually
Fixed Cost		
Hardware maintenance cost	33,500	402,000
Software maintenance cost	33,600	403,200
Contingencies	6,800	80,600
SUB TOTAL	73,900	885,800
Variable cost		
Network fee (instalation)	—	—
Network fee (running cost)	44,900	538,800
Contingencies	4,500	53,900
SUB TOTAL	49,400	592,700
TOTALS	123,300	1,478,500
VAT 10%	12,300	147,900
TOTALS (VAT 10%)	135,600	1,626,400

3) Cost estimation of CIS development budget package plan.

Table 5.3.1-2 shows summary of the CIS development cost. It costs approximately US$ 8.3 million at the first stage, US$ 8.1 million at the second stage, and US$ 3.1 million at the third stage. Total development cost is about US$ 19.5 million. However, further discussion and consideration regarding the CIS development cost would be needed in order to implement the development of CIS within the expected budget of BAPPENAS (Badan Perencanaan Pembangunan Nasional). The JICA Study team recommends the following 4 budget package plans for the application development and hardware installment of CIS. Package Plan 1 implements the first-stage application development and the first-stage hardware installment. Package Plan 2 implements the first and second-stage application development and the first-stage hardware installment. Package Plan 3 implements the first-stage and a half of the second-stage application development and the first-stage hardware installment. Package Plan 4 implements the first-stage application development and the first and second-stage hardware installment (refer to Table 5.3.1-7 for comparisons).

Table 5.3.1-7: Budget package plan and cost

	Budget package plan				Total Cost
	First Stage	Second Stage			
	Implementing hardware and all application at first stage. (39 applications)	Implementing no hardware and all application at second stage (80applications)	Implementing no hardware and half of application at second stage (40 applications)	Implementing hardware only at second stage	
Package Plan 1	√ (US$ 8.3M)	—	—	—	US$ 8.3 million
Package Plan 2	√ (US$ 8.3M)	√ (US$4.5M)	—	—	US$12.8 million
Package Plan 3	√ (US$ 8.3M)	—	√ (US$2.3M)	—	US$10.6 million
Package Plan 4	√ (US$ 8.3M)	—	—	√ (US$2.1M)	US$ 10.4 million

5.3.2 Tailor made application software

The JICA Study Team has been estimated the cost of developing tailor made application software of CIS, based on user requirement. These cost estimation and schedule are based on the specification of the System Design Phase II. If the specification is changed in the future, there would be a possibility of changing the cost estimation.

The estimation method the JICA Study Team used in this report is as follows. This is one of the popular methods to estimate the scale of application program, the man-month and the cost.

1) Estimation of the scale of tailor made application software based on the specification.(5.3.2.1)
2) Estimation of the man-month to develop application software based on the scale.(5.3.2.2)
3) Estimation of the cost based on the man-month.(5.3.2.3)

5.3.2.1 Estimation of the scale

The JICA Study Team estimated the number of screens of CIS by degree of difficulty based on specification of each application. There are many ways to estimate the scale of program. The function points (hereinafter referred to as FP) and the steps of program are popular measurements. To estimate the cost of software development, the data accumulation, such as the scale of program, the man-month, and the period is very important.
The JICA Study Team used Kilo steps (Kilo steps, Ks; converted COBOL program) as a ground of estimation, because the team has an experience of estimation using Kilo steps for CIS in Japan.

Following expression (formula) is applied to calculate function points and program steps after estimation of screens, and some adjustment has conducted based on the difficulty of program.

FP = (Easy screen number)×7FP+(Medium screen number)×12FP+(Difficult screen number)×15FP

Ks = an integer number of Kilo step [FP×100] (revaluation)

The total scale is as follows.

The First Stage	= 2884FP, 307ks
The Second Stage	= 4276FP, 464ks

Table 5.3.2.1-1 shows application name, number of screen, estimated size of FP and estimated size of program steps.

Table 5.3.2.1-1 : Estimated Scale of CIS Tailor Made Application Software (1/6)

No.	Site	Department	Application Name	Note	Number of screens by degree of difficulty			Estimated size of FP	Estimated size of ks
					Easy	Medium	Hard		
C-1 (0-1)	Client Job Processing	Common	User ID, Password Check	—	1	1	0	19FP	2ks
C-2 (0-2)			Job Menu	—	22	8	3	150FP	15ks
C-3 (0-3)			Change Password	—	1	0	0	7FP	1ks
C-4 (3-7)			PIB Monitor	—	0	6	0	72FP	8ks
C-5 (3-8)			PEB Monitor	—	0	5	0	72FP	8ks
C-6 (3-15)			Company/person summary monitor	—	1	0	1	100FP	10ks
V-1 (1-1)		Verification & Audit	PIB Verification Management	—	1	5	3	112FP	13ks
V-2 (1-2)			PIB Verification Monitor	—	3	6	0	93FP	10ks
V-2-1			PIB Verification Monitor II (quarterly report)	2nd stage	1	0	1	23FP	3ks
V-3 (1-3)			PEB Verification Management	2nd stage	1	2	2	61FP	7ks
V-4 (1-4)			PEB Verification Monitor	2nd stage	1	3	0	43FP	5ks
V-5 (1-5)			BC. 2.3 Verification Management	2nd stage	1	2	2	61FP	7ks
V-6 (1-6)			BC. 2.3 Verification Monitor	2nd stage	1	3	0	43FP	5ks
V-7 (1-7)			Excise Verification Management	2nd stage	1	1	3	53FP	6ks
V-8 (1-8)			Excise Verification Monitor	2nd stage	3	2	0	45FP	5ks
V-9 (1-9)			Audit Management	—	1	4	3	100FP	10ks
V-10 (1-10)			Audit Monitor	—	3	5	0	81FP	9ks
V-11 (1-11)			Auditor Management	2nd stage	1	1	0	19FP	2ks
V-12 (1-12)			Audit plan support	2nd stage	1	1	1	34FP	4ks
V-13 (1-13)			Evaluation of PFPD	2nd stage	1	1	1	34FP	4ks
V-14			Verification selectivity process	2nd stage	2	0	0	70FP	7ks

Table 5.3.2.1-1 : Estimated Scale of CIS Tailor Made Application Software (2/6)

No.	Site	Department	Application Name	Note	Number of screens by degree of difficulty			Estimated size of FP	Estimated size of ks
					Easy	Medium	Hard		
P-1 (2-3)	Client Job Processing	Prevention & Investigation	Arrival/Departure of means of Transportation Management	2nd stage	0	4	0	48FP	5ks
P-2 (2-4)			Arrival/Departure of means of Transportation Monitor	2nd stage	1	4	2	85FP	9ks
P-3 (2-5)			Manifest Management	2nd stage	0	2	0	100FP	10ks
P-3-1			Manifest Management (FD)	2nd stage	3	0	0	70FP	7ks
P-4 (2-6)			Manifest Monitor	2nd stage	1	0	3	52FP	6ks
P-5 (2-7)			Bay plan Management	2nd stage	0	2	0	24FP	3ks
P-6 (2-8)			Bay plan Monitor	2nd stage	1	1	0	19FP	2ks
P-7 (2-9)			NI/NHI Management	—	0	0	8	120FP	12ks
P-8 (2-10)			NI/NHI Monitor	—	1	0	9	142FP	15ks
P-9 (2-11)			Violation Management	—	0	0	4	60FP	6ks
P-9-1			Violation Management for post package	2nd stage	0	3	0	36FP	4ks
P-10 (2-12)			Violation Monitor	—	1	0	4	67FP	7ks
P-10-1			Violation Monitor for post package	2nd stage	1	0	3	52FP	6ks
P-11 (2-13)			Investigation Management	2nd stage	0	0	6	90FP	9ks
P-12 (2-14)			Investigation Monitor	2nd stage	1	0	4	67FP	7ks
P-13 (2-15)			Risk Indicator Management	2nd stage	0	0	2	30FP	3ks
P-14 (2-16)			Risk Indicator Monitor	2nd stage	1	0	1	22FP	3ks
P-15 (2-17)			Past record and blocked importer Management	—	0	0	2	30FP	3ks
P-16 (2-18)			Past record and blocked importer Monitor	—	1	0	7	112FP	12ks
P-17 (2-19)			AWB Management	2nd stage	0	8	0	96FP	10ks
P-18 2-20)			AWB Monitor	2nd stage	1	8	0	103FP	11ks

Table 5.3.2.1-1 : Estimated Scale of CIS Tailor Made Application Software (3/6)

No.	Site	Department	Application Name	Note	Number of screens by degree of difficulty			Estimated size of FP	Estimated size of ks
					Easy	Medium	Hard		
P-19 (2-21)	Client Job Processing	Prevention & Investigation	Company profile Management	—	0	0	4	60FP	6ks
P-20 (2-22)			Company profile Monitor	—	1	0	9	142FP	15ks
P-21 (2-23)			Foreign exporter Management	2nd stage	0	0	4	60FP	6ks
P-22 (2-24)			Foreign exporter Monitor	2nd stage	1	0	9	142FP	15ks
P-23 (2-25)			Intelligence Report Management	2nd stage	0	4	0	48FP	5ks
P-24 (2-26)			Intelligence Report Monitor	2nd stage	1	0	7	112FP	12ks
P-25 (2-27)			Intelligence List-book Management	2nd stage	0	4	0	48FP	5ks
P-26 (2-28)			Intelligence List-book Monitor	2nd stage	1	6	0	79FP	8ks
P-27 (2-29)			Inter-island transportation Management	—	0	4	0	48FP	5ks
P-28 (2-30)			Inter-island transportation Monitor	—	1	4	2	85FP	9ks
P-29 (2-31)			B/L Management	2nd stage	0	6	0	72FP	8ks
P-30 (2-32)			B/L Monitor	2nd stage	1	6	0	79FP	8ks
P-31 (2-33)			Intelligence Process-note Management	2nd stage	0	4	0	48FP	5ks
P-32 (2-34)			Intelligence Process-note Monitor	2nd stage	1	6	0	79FP	8ks
P-33 (2-35)			Sea Patrol Management	2nd stage	0	2	0	24FP	3ks
P-34 (2-36)			Sea Patrol Monitor	2nd stage	1	2	0	31FP	4ks
P-35 (2-37)			Operation Management	2nd stage	0	2	0	24FP	3ks
P-36 (2-38)			Operation Monitor	2nd stage	1	2	0	31FP	4ks
P-37 (2-39)			Informant Information Management	2nd stage	0	0	2	30FP	3ks
P-38 (2-40)			Informant Information Monitor	2nd stage	1	0	4	67FP	7ks
P-39 (2-41)			International Agency Management	2nd stage	0	2	0	24FP	3ks

Table 5.3.2.1-1 : Estimated Scale of CIS Tailor Made Application Software (4/6)

No.	Site	Department	Application Name	Note	Number of screens by degree of difficulty			Estimated size of FP	Estimated size of ks
					Easy	Medium	Hard		
P-40 (2-42)	Client Job Processing	Prevention & Investigation	International Agency Monitor	2nd stage	1	2	0	31FP	4ks
P-41 (2-43)			RILO Management	2nd stage	0	2	0	24FP	3ks
P-42 (2-44)			RILO Monitor	2nd stage	1	2	0	31FP	4ks
P-43 (2-45)			POLICE and other organization Management	2nd stage	0	2	0	24FP	3ks
P-44 (2-46)			POLICE and other organization Monitor	2nd stage	1	2	0	31FP	4ks
P-45 (2-47)			Modus Operandi Management	2nd stage	0	2	0	24FP	3ks
P-46 (2-48)			Modus Operandi Monitor	2nd stage	1	3	0	43FP	5ks
P-47 (2-49)			Court Decision Management	2nd stage	0	2	0	24FP	3ks
P-48 (2-50)			Court Decision Monitor	2nd stage	1	1	0	19FP	2ks
P-49 (2-51)			Passenger & border crosser Management	—	0	0	4	60FP	6ks
P-50 (2-52)			Passenger & border crosser Monitor	—	1	0	3	52FP	6ks
P-51 (3-13)			Physical examination result Management	—	1	3	0	43FP	5ks
P-52 (3-14)			Physical examination result Monitor	—	0	3	0	36FP	4ks
P-53			Cruise ship & yacht Management	2nd stage	0	0	4	60FP	6ks
P-54			Cruise ship & yacht Monitor	2nd stage	1	0	3	52FP	6ks
P-55			Private & public transportation Management	2nd stage	0	0	4	60FP	6ks
P-56			Private & public transportation Monitor	2nd stage	1	0	3	52FP	6ks
P-57			Blocked importer Monitor	2nd stage	1	3	0	43FP	5ks
P-58			Retail store for excisable goods Management	2nd stage	0	0	4	60FP	6ks
P-59			Retail store for excisable goods Monitor	2nd stage	1	3	0	52FP	6ks

Table 5.3.2.1-1 : Estimated Scale of CIS Tailor Made Application Software (5/6)

No.	Site	Department	Application Name	Note	Number of screens by degree of difficulty			Estimated size of FP	Estimated size of ks
					Easy	Medium	Hard		
F-1 (3-3)	Client Job Processing	Customs Facilitation	Bonded storage Management	—	1	9	0	115FP	12ks
F-2 (3-4)			Bonded storage Monitor	—	0	9	0	108FP	11ks
F-3 (3-11)			Facilitation Management	2nd stage	1	3	0	43FP	5ks
F-4 (3-12)		Customs Facilitation	Facilitation Monitor	2nd stage	0	3	0	36FP	4ks
F-5			Bonded storage activity Management	2nd stage	1	6	0	80FP	8ks
F-6			Bonded storage activity Monitor	2nd stage	1	6	0	80FP	8ks
T-1 (3-5)		Customs Tehnique	Temporary Admission Management	—	1	7	4	151FP	16ks
T-2 (3-6)			Temporary Admission Monitor	—	0	7	0	84FP	9ks
T-3 (3-1)			Goods Management	2nd stage	1	6	0	79FP	8ks
T-4 (3-2)			Goods Monitor	2nd stage	1	4	0	55FP	6ks
T-5 (3-9)			Pre-Entry Classification Profile Management	2nd stage	0	3	0	36FP	4ks
T-6 (3-10)			Pre-Entry Classification Profile Monitor	2nd stage	0	2	0	24FP	3ks
T-7			Temporary storage Management	2nd stage	1	9	0	115FP	8ks
T-8			Temporary storage Monitor	2nd stage	1	9	0	108FP	8ks
R-1 (4-5)		Revenue Planning	Revenue Management	2nd stage	0	4	0	48FP	5ks
R-2 (4-6)			Revenue Management for EUC	—	10	0	0	70FP	7ks
R-3			Revenue data collection for EUC	2nd stage	0	4	0	48FP	5ks
R-4 (4-3)			PIB data collection for EUC	—	13	0	0	91FP	10ks
R-5 (4-4)			PEB data collection for EUC	—	8	0	0	56FP	6ks
E-1 (4-1)		Excise	Retail Price of Excisable Goods Management	2nd stage	1	3	0	43FP	5ks
E-2 (4-2)			Retail Price of Excisable Goods Monitor	2nd stage	1	2	0	31FP	4ks

Table 5.3.2.1-1 : Estimated Scale of CIS Tailor Made Application Software (6/6)

No.	Site	Department	Application Name	Note	Number of screens by degree of difficulty			Estimated size of FP	Estimated size of ks
					Easy	Medium	Hard		
E-3 (4-7)	Client Job processing	Excise	Excise company Management	—	0	4	0	48FP	5ks
E-4 (4-8)			Excise company Monitor	—	0	2	0	24FP	3ks
E-5			Storage for excisable goods Management	2nd Stage	0	0	4	60FP	6ks
E-6			Storage for excisable goods Monitor	2nd Stage	1	3	0	52FP	6ks
S-1 (A-1)	Server Job Processing	Common	Registration, change and deletion of User Information	—	2	3	1	65FP	7ks
S-2 (A-2)			Deletion of Intelligence Information after the retention period	2nd stage				130FP	15ks
S-3 (B-1)			Registration of information on Import Declaration	—				87FP	10ks
S-4 (B-2)			Registration of information on Export Declaration	—				87FP	10ks
S-5 (C-1)			Creating Profile of suspicious importers	—				35FP	4ks
S-6 (C-2)			Preparing Item Profile	2nd stage				26FP	3ks
S-7 (C-3)			Registering Tax Payment Information	2nd stage				44FP	5ks
S-8			Registration of information on blocked importer	2nd stage				90FP	9ks
S-9			Registration of manifest information	2nd stage				100FP	10ks
S-10 (D-4)		Initial Data Transfer Process (*)		—				—	—
S-11		Code Data Maintenance Process (*)		—				—	—

Total Scale of the First Stage: 2884FP 307ks
Total Scale of the 2nd stage: 4276FP 464ks

Note: S-10 "Initial transfer process" and S-11 "Code data maintenance process" will be designed during implementation phase.

5.3.2.2 Estimation of the man-month

The JICA Study Team estimated the total man-month (hereinafter referred to as MM) based on the scale of tailor made application program. Basically, MM is obtained by dividing the scale by the productivity.

The important thing is the productivity of system development. The productivity is different from each project. 500steps/MM is a hypothesis productivity (from design to cutover) of system developing.

Following expression (formula) is applied to calculate man-month after the estimation of the scale.

Total MM = Scale of program (Kilo steps) ÷ Productivity (500steps/MM)

The man-month is as follows.

The first stage MM = 474MM

The total MM of the first stage is calculated to 614MM using above-mentioned formula. The total MM means the necessary MM from design to cutover. The first stage MM (474MM) can be obtained by subtracting the MM covered by the JICA Study Team and the MM derived from cooperation of customs officials, from the total MM (614MM). And also the first stage MM is obtained by adding the MM required for developing initial data transfer and code data maintenance. The cost is estimated based on this first stage MM (474MM).

The second stage MM = 838MM

The total MM of the second stage is calculated to 928MM using above-mentioned formula. The second stage MM (838MM) can be obtained by subtracting the MM derived from cooperation of customs officials from the total MM (928MM). The cost is estimated based on this second stage MM (838MM).

The MM is divided to MM table. MM table is one hypothesis that shows how to use manpower to develop the system. The table defines a kind of profession, a period of development and a necessary manpower per month. Table 5.3.2.2-1 shows the first stage MM table, Table 5.3.2.2-2 shows the second stage MM table.

Table 5.3.2.2-1: Man-month table (The first stage)

Man-Month Table

CIS 1st Precondition; 474MM (Original 307Ks, 614MM)

474MM = 446MM + 80MM(initial transfer) +13MM(code maintenance)- 65MM(officials)

Adjustment of 80MM(initial transfer) = 40ks 80MM

Adjustment of 13MM(code maintenance) = 1M*13months

Adjustment of 65MM(officials) = 5M*13month(=10officials*13month)

446MM = 614MM(original&all) - 168MM(The JICA Study)

After The JICA Study

	Phase	The JICA Study									PD			M			SI			PT			RT/OP/TR			Sub Total (MM)	Total (MM)	%
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	-	-			
Management	Project manager	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	13	52	11%
	Group Leader*, Team Leader*					-	-	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	39		
Development	Designer	-	-	-	-	-	-	-	-	-	6	6	6	6	6	6	6	6	6	6	6	6	6	80	13	171	238	50%
	Programmer	-	-	-	-	-	-	-	-	-	12	12	12	12	12	12	10	10	10	8	8	8	6	-	-65	67		
Technical Support	GL*, TL*, Consultant*			-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	13	96	20%
	Designer	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	26		
	Programmer	-	-	-	-	-	-	-	-	-	5	5	5	5	5	5	5	5	5	3	3	3	3	-	-	57		
Others	Technical Interpreter			-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	13	88	19%
	Secretaries	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	13		
	Assistant	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	13		
	Data Creation	-	-	-	-	-	-	-	-	-	5	5	5	5	5	5	5	5	5	1	1	1	1	-	-	49		
	Sub Total	0	0	0	0	0	0	0	0	0	38	38	38	38	38	38	36	36	36	28	28	28	26	80	-52	474	474	100%
	Total	0			0			0			114			114			108			84			26	80	-52	474	-	
	%	0.0%			0.0%			0.0%			24.1%			24.1%			22.8%			17.7%			5.5%		-	94.1%		

Table 5.3.2.2-2: Man-month table (The second stage)

preconditions

464Ks

838MM = 928MM -90MM(officials)

Adjustment of 90MM(officials) = 5MM*18month(=10officials*18month) ; Development programmer minus 90MM

All process

		BD/DD							PD/M				SI/PT						RT/OP/TR			Sub Total (MM)	Total (MM)	%
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	-	-			
Management	Project manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18	36	4%
	Group Leader	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18		
Development	GL, TL, Designer	12	12	12	16	16	16	16	17	17	17	17	16	16	16	16	12	12	12	-	-	268	438	52%
	Programmer	4	4	4	16	16	16	16	24	24	24	24	16	16	16	16	8	8	8	-	-90	170		
Technical Support	GL, Consultant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18	262	31%
	GL, TL, Designer	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	-	-	108		
	Programmer	4	4	4	8	8	8	8	12	12	12	12	8	8	8	8	4	4	4	-	-	136		
Others	Technical Interpret	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18	102	12%
	Secretaries	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18		
	Assistant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18		
	Data Creation	-	-	-	4	4	4	4	4	4	4	4	4	4	4	4				-	-	48		
	Sub Total	32	32	32	56	56	56	56	69	69	69	69	56	56	56	56	36	36	36	-	-90	838	838	100%
	Total	320							276				296						36	-	-90	838	-	
	%	38.2%							33%				35.3%						4.3%		-	110.7%		

5.3.2.3 Estimation of the cost

The JICA Study Team estimated the cost of developing a tailor made application software based on MM table.

The prices of engineers are based on the standard market prices in Japan for foreign engineers and the standard market prices in Indonesia for local engineers.

Following prices of engineers are applied to calculate the cost.

- Foreign engineers
  - Project manager US$ 22,000
  - Group Leader, Team Leader US$ 16,000
- Local engineers
  - Team Leader, Designer US$ 4,250
  - Programmer US$ 2,900
  - Technical Interpreter US$ 6,000
  - Secretaries US$ 1,000
  - Assistant US$ 1,000
  - Data creation US$ 2,900 (the price is same as programmer)

The JICA Study Team researched the standard market prices of designer and programmer in Jakarta. Table 5.3.2.3-1 shows the result of research.

Table 5.3.2.3-1: Result of research

The name of company	The cost of Designer (USD per month)	The cost of Programer (USD per month)	The style of contract	Remarks
1) A Company	10560	7000	USD CONTRACT	—
2) B Company	3000	2000	USD or Rp CONTRACT	—
3) C Company	5500	3500	USD CONTRACT	—
4) D Company	3500	3000	USD CONTRACT	—
5) E Company	3750	3000	USD CONTRACT	—
6) F Company	5500	3000	USD CONTRACT	—
7) G Company	2000	1500	USD CONTRACT	—
AVERAGE(1-7)	4830	3286	—	—
AVERAGE(2-6)	4250	2900	—	—

The cost of tailor made software is as follows.

- The first stage
  - Development cost total: 2.56 (excluding over time 10%)
    - Management: US$ 0.91 Million
    - Development: US$ 0.92 Million
    - Technical support: US$ 0.48 Million
    - Others: US$ 0.24 Million
- The second stage
  - Development cost total: 3.74 (excluding over time 10%)
    - Management: US$ 0.68 Million
    - Development: US$ 1.63 Million
    - Technical support: US$ 1.14 Million
    - Others: US$ 0.28 Million

Table 5.3.2.3-2 shows the tailor made software cost of the first stage. Table 5.3.2.3-3 shows the tailor made software cost of the second stage.

Table 5.3.2.3-2: The cost of tailor Enter software (The first stage)

CIS tailor made software cost estimation

pre condition : 1st stage, 307Ks, 474MM = 614MM-168MM(JICA)+80MM(initial transfer)+13MM(code maintenance)-65MM(officials)

(After PD Process)

Profession		MM Price US$	Man month	Cost	Sub Total	%
Management	Project manager*	$22,000	13	$286,000	$910,000	36%
	Group Leader*, Team Leader*	$16,000	39	$624,000		
Development	TL, Designer	$4,250	171	$726,750	$921,050	36%
	Programmer	$2,900	67	$194,300		
Technical Support	GL*, TL*, Consultant*	$16,000	13	$208,000	$483,800	19%
	TL, Designer	$4,250	26	$110,500		
	Programmer	$2,900	57	$165,300		
Other	Technical Interpreter	$6,000	13	$78,000	$246,100	10%
	Secretaries	$1,000	13	$13,000		
	Assistant	$1,000	13	$13,000		
	Data creation	$2,900	49	$142,100		
		Total	474	$2,560,950	$2,560,950	100%
		Grand Total	plus over time 10%		$2,817,045	

Note:
- Currency is US dollar.
- " * "mark in profession means foreign engineers whose unit prices are market prices in Japan.
- No mark in profession means Indonesian engineers whose unit prices are market prices in Indonesia.
- The 10 officials from ADP is considered as the project member. (65MM=5p*13m)
- The foreign engineers are limited to 5 persons.

Table 5.3.2.3-3: The cost of tailor Enter software (The second stage)

(precondition : 2nd stage, 464Ks, 838MM=928MM-90MM(officials), ALL Process)

Profession		MM Price US$	Man month	Cost	Sub Total	%
Management	Project manager*	$22,000	18	$396,000	$684,000	18%
	Group Leader*	$16,000	18	$288,000		
Development	GL*, TL*, Designer*	$4,250	268	$1,139,000	$1,632,000	44%
	Programmer	$2,900	170	$493,000		
Technical Support	GL*, Consultant*	$16,000	18	$288,000	$1,141,400	31%
	GL, TL, Designer	$4,250	108	$459,000		
	Programmer	$2,900	136	$394,400		
Other	Technical Interpreter	$6,000	18	$108,000	$283,200	8%
	Secretaries	$1,000	18	$18,000		
	Assistant	$1,000	18	$18,000		
	Data creation	$2,900	48	$139,200		
		Total	838	$3,740,600	$3,740,600	100%
		Grand Total	plus over time 10%		$4,114,660	

Note:
- Currency is US dollar.
- " * "mark in profession means foreign engineers whose unit prices are market prices in Japan.
- No mark in profession means Indonesian engineers whose unit prices are market prices in Indonesia.
- The 10 officials from ADP is considered as the project member. (90MM=5p*18m)
- The foreign engineers are limited to 3 persons.

5.3.3 Hardware and software cost in CIS

Besides the cost of hardware that would be installed in the actual CIS implementation, the cost of hardware and its installation for the development of CIS application should also be estimated. The development process requires a client server environment similar to the working environment for CIS. There will be one server to hold the database and to run the server applications, and a number of PCs for coding and testing. Therefore, in estimating the cost for development process, hardware and its installation cost as well as the software cost to be used to develop CIS should be included. The size and capacity of the development server will be similar to those of the Regional Server.

During the development stage, another server that functions as an operational control server would be needed. This server manages the software resources to control quality in the development stage and later stage. The server is also used to control and monitor the processes in CIS in later stages. This server and extra WAN network device are installed in the development stage for testing and helping the developers simulate real production situation.

Table 5.3.3-1 and Table 5.3.3-2 show the number of hardware and software required for implementation of CIS. In this subsection, the cost in the development stage and in the first stage are calculated separately. However, total cost in the first stage is the sum of the costs in the development and first stage.

Table 5.3.3-1: Number of hardware

No.	Item		Number of Item			
			Development	First Stage	Second Stage	Third Stage
1	Set of Main Server		0	1	0	0
2	Set of Regional Server type I		0	0	1	0
3	Set of Regional Server type II		1	0	2	0
4	Set of Regional Server type III		0	0	2	7
5	Operational control server		1	0	0	0
6	End User Computing server		0	1	0	0
7	Desktop PC		30	95	35	35
8a	Network device (LAN)		2	18	9	7
8b	Network device (WAN)		2	20	14	14
9	Miscellaneous	Laser printer	2	45	9	7
		UPS for PC	1	7	9	7

Note: Existing 20 PCs are expected to be installed for development

A set of server is a server complete machine equipped with storage, monitors and other peripherals required to run the server. It also includes line printer and UPS. In this estimation, Regional Server type III is only cost estimation to upgrade the existing server.

Network devices for WAN and LAN are separated because they can not be grouped together as one category of Network Device. The number of WAN device depends on the number of connections to which local CIS network is connected. For example, Regional Office of Bandung has three connections; one connection goes to the Head Office and the other two connections go to its Service Offices. Each Service Office in Tanjung Priok has three connections, two connections (primary and backup) go to Head Office in the first stage, but go to Regional Office in second stage and one connection goes to CFRS network. However, the number of LAN devices depends on the number of equipments in the LAN.

The WAN device includes complete routers with necessary expansion ports and software, for example, serial port or ISDN port. The LAN device includes switch and hub. Miscellaneous devices include UPS and laser printers.

Table 5.3.3-2: Number of software and license

Machine Type	Item	Number of Item			
		Develop-ment	First Stage	Second Stage	Third Stage
Main/ Regional Server	Server software set	1	1	5	7
	Client database access license	30	95	35	35
PC Client	OS & other software	30	95	35	35
	Development tools	30	—	—	—
EUC Server	Server software set	—	1	—	—
	Client database access license	—	8	—	—
Operational Control Server	Server software set	1	—	—	—
	Client access license	30	95	35	35

Server software set for CIS and EUC server includes the operating system and other system software, such as disk management and backup tools. For the Main Server, it also includes cluster management software to control the dual server and print management software. Operational Control software set includes operating system and operational control software.

Client Access License is a license for users to access the software on the server. It includes license for the operating system and other software set. CIS and EUC server consists of database access license. In this cost estimation, quantities for client access are estimated per license. However, different software vendors offer licenses set in different quantities and have different policies regarding user license (e.g. concurrent access or number of registered users). Therefore, the actual number of licenses purchased may be different for each kind of software.

1) Cost of hardware and software for development

The size of the server used for development process could be smaller than the size of the actual main server. The development server also serves as a gauge to decide the main server capacity. The development server could have similar specification as the regional server type II. Table 5.3.3-3 shows the cost for both hardware and software required for development.

The estimation also includes training cost for the developer in this estimation. This is because the CIS development team utilizes sophisticated development and database tools and therefore there is a possibility that the tools are new for the programmers.

Table 5.3.3-3: Unit cost for development hardware, software, and training

No.	Item	Quantity	Unit Cost
1	Set of Development server (Similar to set of Regional Server II, with larger storage capacity)	1	$ 175,500
2	Operational Control server	1	$ 12,100
3	Desktop PC	30	$ 2,700
4a	Network device (LAN)	2	$ 2,000
4b	Network device (WAN)	2	$ 17,700
5	Laser printer	2	$ 5,300
6	UPS for PC	1	$ 12,700
7	Development Server software set	1	$ 93,200
8	Operational Control Server software set	1	$ 9,100
9	Client database access license (per license)	30	$ 3,300
10	Client operational control license	30	$ 400
11	OS, development software & other software for workstations	30	$ 24,200
12	Developer training	60(*)	$1,100

Note: Some rounding errors may exist.
(*) The total cost on training includes 6 training courses; each attended by 10 developers.

Table 5.3.3-4 shows the total cost for hardware, software, and training for the development stage.

Table 5.3.3-4: Total cost of development hardware and software

No.	Item	Amount
1	Hardware cost	$ 331,300
2	Software cost	$ 939,300
3	Developer training	$ 66,000

Note: Some rounding errors may exist.

2) Installation Cost of Hardware and Software for Development

Installation of hardware and software for development include the installation of the servers, workstations, network equipment, and cabling. However, it does not include any system/network design.

To install and setup all the software, engineers from the third party companies may be required.

Table 5.3.3-5: Unit cost for development hardware and software installation

No.	Item	Quantity	Unit Cost
1	Server setup (per server).	2	$ 10,000
2	PC setup (per PC)	30	$ 80
3	Network device setup (per Office)	1	$ 1,900
4	Network cabling material(per node)	34 (*)	$ 120
5	Network cabling service(per Office and building)	1	$ 750

Note: Some rounding errors may exist.
(*) One node is one server, one PC, or one printer. Thirty-four (34) nodes consist of 2 servers, 30 PCs, and 2 printers.

Total installation and cabling fees to start the development stage are in table below.

Table 5.3.3-6: Total installation and cabling fee for development

No.	Item	Amount
1	Total installation fee	$ 24,300
2	Total cabling fee	$ 4,800

Note: Some rounding errors may exist.

3) Cost of hardware and software in CIS

Besides the cost of CIS itself, other supporting software and hardware is also required in implementing CIS. Major hardware categories required in the CIS implementation are server machines, networking equipment, client workstations, and other miscellaneous hardware such as printers.

Table 5.3.3-7: Unit cost of hardware in CIS

No.	Item		Quantity in Stage			Unit Cost
			1st	2nd	3rd	
1	Set of Main Server (Dual)		1	0	0	$ 786,400
2	Set of Regional Server type I		0	1	0	$ 454,900
3	Set of Regional Server type II		0	2	0	$ 141,400
4	Set of Regional Server type III (Cost of upgrading existing machines per unit)		0	2	7	$ 65,000
5	Set of End User Computing Server		1	0	0	$ 14,500
6	Desktop PC		95	35	35	$ 2,700
7a	Networking device (LAN)		18	0	0	$ 5,800
			0	9	7	$ 2,000
7b	Networking device (WAN)		20	0	0	$ 10,200
			0	14	14	$ 5,600
8	Miscellaneous	Laser Printer	45	9	7	$ 5,300
		UPS for PC	7	9	7	$ 12,700

Note: Some rounding errors may exist
UPS for server is included as part of server set.

DJBC has expected to use the existing machines for Regional Server type III and therefore, the cost consists of estimation to upgrade the existing servers.

The prices for Networking Device are divided into two. First amount is the unit cost for the first stage; the second amount is unit price for second and third stage. The difference is because the set of equipment used in the first stage is different from those used in the second and third stage. For example router in the Head Office will connect 12 Regional Offices, while router in each Regional Office will only handle a smaller number of connection. To install similar type of router as the Head Office router in Regional and Service Offices is inefficient.

LAN device includes switch and hub in the first stage and only hub in later stages. WAN device includes router complete with OS, and all necessary port modules (ISDN, serial). WAN device costs do not include the equipment that provides the WAN links, such as equipment required for leased line and VSAT. Costs for such equipment is part of the connection installation in Table 5.3.4-4.

Table 5.3.3-8: Unit cost of software in CIS

No.	Item	Quantity in Stage			Unit Cost
		1st	2nd	3rd	
1	Main Server software set (Dual)	1	0	0	$ 227,800
2	Regional Server software Set	0	5	7	$ 63,100
3	EUC Server software set	1	0	0	$ 5,700
4	Client database access license (per license)	103*	35	35	$ 3,300
5	Client operational control license (per license)	95	35	35	$ 400
6	OS & other software (PC)	95	35	35	$ 700

Note: Some rounding errors may exist

(*) Client database access license in the first stage consists of 95 licenses for Main Server and eight licenses for the EUC server.

Server software set includes the distribution kit of the software (installation media, documentation, and so on.) Since the Main Server requires additional software to control the dual system and more advanced software set to manage larger amount of data, the server software set for the Main Server is separated from that of the Regional Server. Client database access license is estimated using the average price per user license for connection to the database server. Client Operational Control license estimates the average price per client license for connection to the operational control server. Actual price per user license may vary depends on the number of license purchased and agreement with each respective vendor. If the numbers of user licenses differ greatly during the implementation, then the unit costs may also change substantially.

Table 5.3.3-9 below summarizes the total cost for software and hardware for each stage.

Table 5.3.3-9: Total cost of software and hardware in CIS

No.	Item	First Stage (*)(**)	Second Stage (**)	Third Stage (**)
1	Hardware Cost	$ 1,693,200	$ 1,220,600	$ 767,900
2	Software Cost	$ 677,900	$ 469,500	$ 595,700

Note: Some rounding errors may exist.

(*) The cost of the first stage in the above table excludes the hardware and software acquired and installed in the developme ıı phase. To get the total cost for the first stage in table 5.3.1-2, the costs of hardware and software for development purposes must be added.

(**) The total costs in the above table do not include contingency. Final costs for the estimation include 10% contingency for each category.

4) Installation and Cabling Cost

Installation fee is estimated by calculating the number of servers, PCs, and other network components. Server installation includes all the supporting software needed by CIS.

DJBC is required to provide adequate space to install the computers in the Head, Regional, and Service Offices. Additional cost that may be incurred to provide adequate space is not included in the estimation.

Cut over support for each stage is estimated for 1 month supported by 2 persons. On-site support in remote areas is not included in the estimation.

Table 5.3.3-10: Installation and cabling unit cost

No.	Item	Unit Cost
1	Server setup (per server).	$ 10,000
2	PC setup (per PC)	$ 80
3	Network device setup (per office)	$ 1,900
4	Cabling material (per PC plus printer)	$ 120
5a	Cabling service (per office and building) 1st stage	$ 750
5b	Cabling service (per office and building) 2nd & 3rd stage	$ 500
6	Travel and accomodation cost (per location)	$ 1,800

Note: Some rounding errors may exist.
Travel and accommodation cost includes the average of airplane fare and accommodation for two or three persons.

The estimated setup costs exclude accommodation and travel fee for locations outside Jakarta. To greatly simplify the calculation, the travel and accommodation costs are estimated at $1,800 per location and will be included in the total costs.

Cabling service is divided into two unit costs because on average the buildings or offices in the first stage have more PCs and servers to install. Cabling cost is estimated without actual site survey on each location. Therefore, actual cabling cost may vary greatly based on the condition of each location. Some conditions that may effect the cost greatly are locations and distance of computers, presence of working LAN, presence of objects that may cause interference, and so on. In this cost estimation, cabling for power and data are treated as identical.

Table 5.3.3-11: Installation and cabling unit

No.	Item	Quantity		
		First Stage	Second Stage	Third Stage
1	Server setup (per server)	3	5	7
	Travel and accomodation cost for server setup (per location)	—	5	7
2	PC setup (per PC)	95	35	35
	Travel and accomodation cost for PC setup (per location)	—	7(*)	7
3	Network device setup (per office)	7	9	7
	Travel and accomodation cost for network device setup (per location)	—	7(*)	7
4	Cabling material (per PC plus printer)	140	40	42
5	Cabling service (per office and building)	7	9	7
	Travel and accomodation cost for cabling service (per location)	—	7(*)	7

Note: Some rounding errors may exist.
The Main Server is counted as two, because it consists of two units of server machines.
(*) The numbers of travel do not match the number of offices because there are Service Offices that are in the same location as their Regional Offices; therefore, their travel costs are counted as one.

Table 5.3.3-12: Installation and cabling total Cost

No.	Item	First Stage(*)	Second Stage(**)	Third Stage(**)
1	Total installation cost	$ 50,900	$ 104,100	$ 123,900
2	Total cabling cost	$ 22,100	$ 21,900	$ 21,200

Note: Some rounding errors may exist.
(*) The cost of the first stage in the above table excludes the installation of hardware and software acquired and installed in the development phase. To get the total installation cost for the first stage in table 5.3.1-2, the costs of installation of hardware and software for development purposes must be added.
(**) The costs in the second and third stage include travel and accommodation fee as explained in previous page.

5) Training Cost

Table below estimates the unit costs on training for the system administrators and end users. Training trip cost is only applicable for training in area outside Jakarta.

Table 5.3.3-13: Training unit cost estimation

No.	Item	Unit Cost
1	System administrator training	$ 3,700
2	End user training	$ 800
3	Training trip	$ 1,800
4	Manual	$ 21,000

Table 5.3.3-14: Number of training and manual for CIS

No.	Item	First Stage	Second Stage	Third Stage
1	System administrator training (*)	3	5	7
2	Manual for system admininistrator	1	1	0
3	System administrator training trip	0	5	7
4	End-user training (**)	8	7	7
5	Manual for end users	1	1	0
6	End user training trip (***)	0	7	7

Note: (*) System Administrator training will be held three times in the Head Office and once in each Regional Office.
(**) End user training will be held in both Regional and Service Offices. Multiple training will be held in first stage due to large number of users.
(***) The numbers of travel do not match the number of offices because there are Service Offices that are in the same location as their Regional Offices, therefore their travel costs are counted as one.

The next table lists the total estimated costs to provide training for system administrators and end users.

Table 5.3.3-15: Total estimated training cost on CIS

No.	Item	First Stage	Second Stage	Third Stage
1	System administrator training	$ 32,100	$ 48,500	$ 38,500
2	End-user training	$ 27,400	$ 39,200	$ 18,200

Note: The total costs of training in the above table exclude the training cost for the developer in the development phase. To get the total training cost in the first stage in table 5.3.1-2, the cost of developer training (found in table 5.3.3-4) must be added to the above costs.

5.3.4 Operation cost in CIS

1) Maintenance cost

ADP staff is responsible for first line support for end users and some regular daily maintenance. Maintenance fee is calculated only for basic maintenance contract with the hardware and software vendor. The annual cost for maintenance is estimated at 10% of hardware cost for hardware maintenance cost and 15% of software cost for software maintenance cost. Table below explains the annual maintenance cost for hardware and software installed in each stage.

Table 5.3.4-1: Annual maintenance cost

No.	Item	Development	First Stage	Second Stage	Third Stage
1	Maintenance for Hardware	$ 33,400	$ 169,600	$ 122,300	$ 77,000
2	Maintenance for Software	$ 141,100	$ 101,900	$ 70,700	$ 89,500

Note: Some rounding errors may exist.

Maintenance costs do not include travel and accommodation costs, and the maintenance only cover only business hours (Monday – Friday, 9:00 AM to 5:00 PM).

For software maintenance cost, the estimation only provides basic support, which includes the following:

- Software error corrections,
- Maintenance Release,
- Enhancement Updates,
- Technical Bulletins, and
- Technical Q&A over the phone

However, availability of the above items depends on the corresponding third party vendor.

Hardware maintenance cost is estimated to be due one year after the cutover. Hardware maintenance cost during the first year from the cutover will be covered by the warranty. In calculating cumulative maintenance cost due in each stage, cutover for all locations in each stage is estimated at the end of each stage, except for development hardware, which is estimated at the beginning of first stage.

Software maintenance cost is estimated at the start of each stage after installing the software package. The exception is the software for the first stage development, which are expected to be installed in the middle of the first stage.

However, depending on the contract with vendor, different location and different hardware and software set may have different cutover date. Detail of the calculation can be found below.

Table 5.3.4-2: Cumulative maintenance cost

No.	Item	First Stage	Second Stage	Third Stage
1	Maintenance for Hardware	$ 2,800	$ 134,400	$ 202,500
2	Maintenance for Software	$ 191,738	$ 399,083	$ 357,683

Note: Some rounding errors may exist.

Table 5.3.4-2 above shows the cumulative estimated maintenance cost due at each stage. The calculation for each stage is as follow (note that there may be some rounding error):

- First stage:
  - Hardware: 1 month maintenance fee for development hardware
  - Software: 12 months maintenance fee for development software and 6 months maintenance fee for first stage software.
- Second stage:
  - Hardware: 18 months maintenance fee for development hardware and 6 months maintenance fee for first stage hardware
  - Software: 18 months maintenance fee for development and first stage software. 6 months maintenance fee for second stage software.
- Third stage:
  - Hardware: 12 months maintenance fee for development and first stage hardware
  - Software: 12 months maintenance fee for development, first, and second stage. 6 months maintenance fee for third stage software.

Maintenance fee for hardware in the third stage is estimated to be due one year from the cutover of the third stage.

Table 5.3.4-3 shows the total annual cost for maintenance of all hardware and software in all stages.

Table 5.3.4-3: Total annual maintenance cost

No.	Item	Cost
1	Hardware Maintenance	$ 402,300
2	Software Maintenance	$ 403,200

Note: Some rounding errors may exist.

2) ADP staff training to support CIS

The ADP staff would act as a first line support for the CIS users. In order to do this; the ADP staff should have knowledge not only on CIS, but also on the underlying components of CIS, for example the development application, the OS of the server, and the network/connection.

Although the vendor may be able to give initial training on the software and other equipment, it is advisable that DJBC incorporates CIS on DJBC existing training curriculum and budget.

3) Direct labor cost

The ADP staff would be in charge of operating CIS. For daily staffing and scheduling of CIS operation, refer to 3.5.2 of Volume II..Whether DJBC decides to hire new officers or assign existing officers is entirely up to DJBC. The direct labor cost incurred varies, depending on DJBC policy on salary. Therefore, direct labor cost is not in the estimation.

4) Network fee

In this estimation, cost estimation to install and maintain the connection between office use the rate from PT Telkom to install and maintain leased line, ISDN, and VSAT connection. Nowadays, network services are dramatically changing in Indonesia. The JICA Study Team just investigated the current situation. Further study on the service and service area will be needed.

Table 5.3.4-4: Connection cost

Connection		Type	Speed (Kbps)	Monthly cost	Install cost (*)	Stage
From	To					
Kantor Pusat	Kantor Pusat	LC	256	765	271	D
Kantor Pusat	KanWil IV, Tanjung Priok	LC	256	765	271	1
Kantor Pusat	KP, Tanjung Priok I	LC	256	765	271	1
Kantor Pusat	KP, Tanjung Priok II	LC	256	765	271	1
Kantor Pusat	KP, Tanjung Priok III	LC	256	765	271	1
Kantor Pusat	KanWil IV, Tanjung Priok	ISDN	128	11	203	1
Kantor Pusat	KP, Tanjung Priok I	ISDN	128	11	203	1
Kantor Pusat	KP, Tanjung Priok II	ISDN	128	11	203	1
Kantor Pusat	KP, Tanjung Priok III	ISDN	128	11	203	1
Kantor Pusat	KanWil I, Medan	VSAT	64	3,825	1,700	2
Kantor Pusat	KanWil V, Bandung	LC	64	892	271	2
KanWil V, Bandung	KP, Soekarno Hatta	LC	128	1,258	271	2
KanWil V, Bandung	KP, Gede Bage	VSAT	64	3,825	1,700	2
Kantor Pusat	KanWil VI, Semarang	VSAT	64	3,825	1,700	2
Kantor Pusat	KanWil VII, Surabaya	LC	64	1,243	271	2
Kantor Pusat	KanWil II, Balai Karimun	VSAT	64	3,825	1,700	3
Kantor Pusat	KanWil III, Palembang	VSAT	64	3,825	1,700	3
Kantor Pusat	KanWil VIII, Denpasar	VSAT	64	3,825	1,700	3
Kantor Pusat	KanWil IX, Pontianak	VSAT	64	3,825	2,975	3
Kantor Pusat	KanWil X, BalikPapan	VSAT	64	3,825	2,975	3
Kantor Pusat	KanWil XI, Ujung Pandang	VSAT	64	3,825	3,188	3
Kantor Pusat	KanWil XII, Ambon	VSAT	64	3,825	3,400	3

Note: LC= Leased Line.
D = Development.
The costs are in US dollar.
Costs on ISDN line are only the monthly base cost with no usage. Additional usage will incur additional costs.
(*) The installation costs include installation in both ends and additional hardware required for the connection. For example, VSAT installation cost includes one pair of satellite dish for each location.

Table 5.3.4-4 above describes the connection cost using combination of leased lines, ISDN and VSAT from PT Telkom. First and second column list the locations connected the service. The third column is the name of the service , the number in the fourth column is the bandwidth. Next column is the monthly basic fee per line (in US dollar) for the corresponding line. Fifth column is the installation fee per line (in US dollar). The sixth column is the stage when the connections are to be installed.

Table 5.3.4-5 below gives the summary of connection cost for each stage. The costs listed below are not cumulative cost. For cumulative network running-costs during the implementation, please refer to Table 5.3.4-6.

Table 5.3.4-5: Network fee

No.	Item	Develop-ment	First Stage	Second Stage	Third Stage
1	Installation fee	$ 300	$ 1,900	$ 6,000	$ 17,700
2	Monthly fee	$ 800	$ 3,200	$ 14,900	$ 26,800
3	Annual fee	$ 9,600	$ 38,400	$ 178,800	$ 321,600

Note: Some rounding errors may exist.

During the development, it is conceivable that the development team will need to test the application through actual WAN connection. Therefore, the estimation includes installation of network in two locations and network running fee for 12 months.

Table 5.3.4-6: Cumulative network operation cost during implementation

Item	First Stage	Second Stage	Third Stage
Total network running cost	$12,800	$131,600	$378,000

Note: Some rounding errors may exist

The calculations for the above table are as follow:

- First Stage: 1 month to connect four locations to Head Office at $ 3,200 total per month plus 12 months testing lines at $ 800 per month.
- Second Stage: 18 months of the first stage connection (including the lines for testing) at $ 4,000 per month plus 4 months of the second stage connection at $ 14,900 per month.
- Third Stage: 12 months of the first and second stage connection plus 6 months of the third stage connection fee at $ 26,800 per month.

Six months to estimate network running-cost for corresponding stage are chosen to simplify the estimation. Some location may be installed earlier in the stage and some are later in the stage.

Table 5.3.4-7: Cumulative network operation cost after implementation

No.	Item	Cost
1	Monthly network running cost	$ 44,900
2	Annual network running cost	$ 538,800

Note: Some rounding errors may exist

5) Power and utility cost

Monthly or annual cost of electricity to run the servers and air conditioners in the server room is not included in this estimation. The cost is part of DJBC general expense. The costs vary by location because each location has different electricity rates. Although it is absorbed by DJBC general expense, DJBC should consider this cost and make some estimation regarding the electricity usage.

6) Minor specification change

It is conceivable that DJBC may require minor specification changes in CIS after cutover. Although this cost is not included in the estimation, DJBC should be aware of this cost. A conservative estimation for this cost is 10% of the development cost annually.

7) The CFRS modification

Due to the difficulties in estimating cost to make some modifications on CFRS to connect to CIS, the JICA Study Team does not include any estimation regarding that matter.

As a guideline, the following items should be considered if the CFRS modification is needed:

- Application modification cost in order to include the following functionality in CFRS:
  - Transferring Files.
  - Processing data received from CIS.
  - Selecting data to be sent to CIS.
- Additional hardware cost
  - Network device to establish physical connection with the CIS network.
- Additional package software cost:
  - Package software to support additional functionality mentioned above.
  - Package software to support network connection to CIS (TCP/IP protocol)

APPENDIX A

How to View the Application Design documents for System Design Phase I

A.1 How to view the Process Diagrams

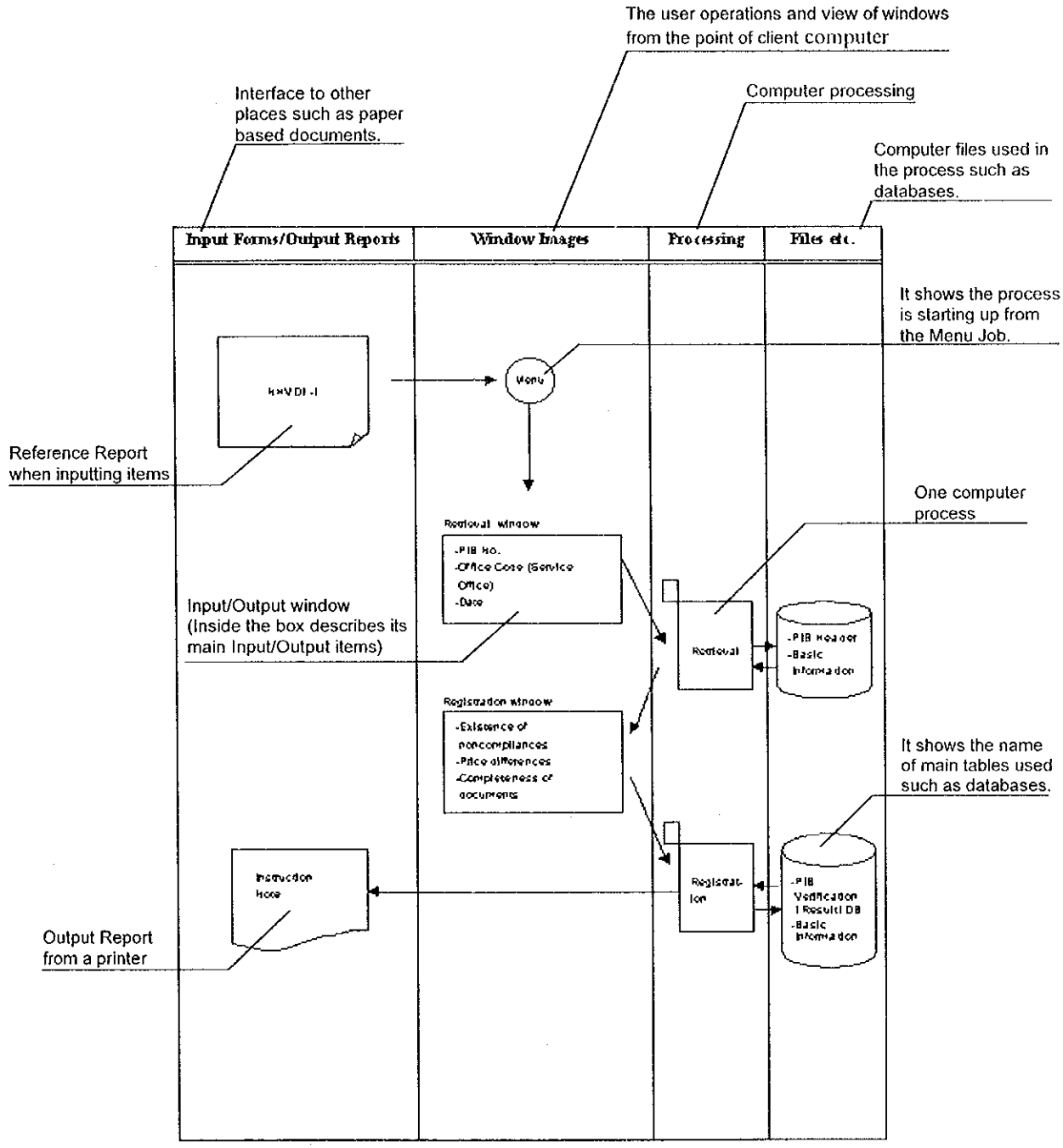
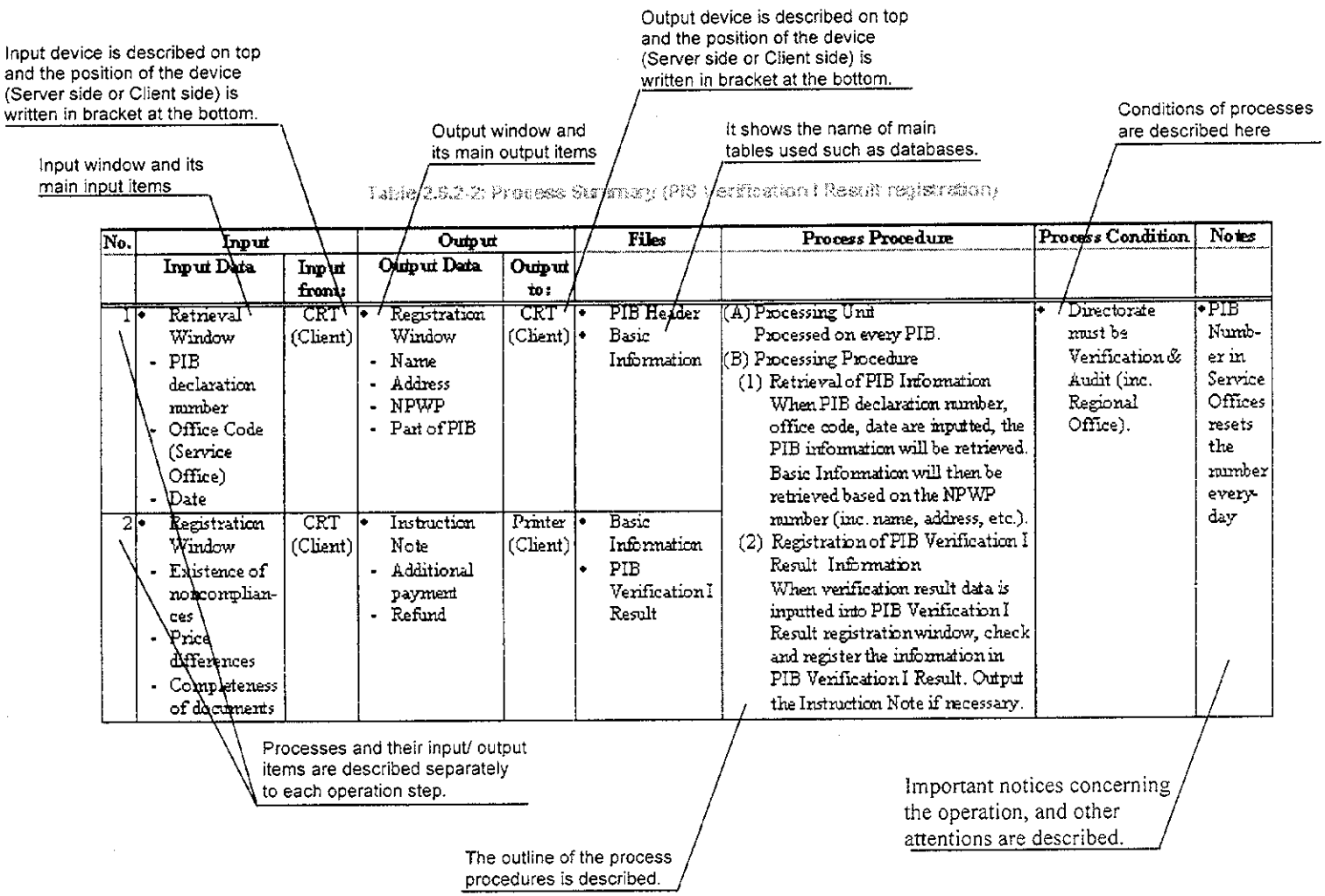


Figure 2.6.2-2: Process Diagram (PIB Verification I Result registration)

Figure A.1-1: How to view the Process Diagram

A.2 How to view the Process Summary



No.	Input		Output		Files	Process Procedure	Process Condition	Notes
	Input Data	Input from:	Output Data	Output to:				
1	• Retrieval Window - PIB declaration number - Office Code (Service Office) - Date	CRT (Client)	• Registration Window - Name - Address - NPWP - Part of PIB	CRT (Client)	• PIB Header • Basic Information	(A) Processing Unit Processed on every PIB. (B) Processing Procedure (1) Retrieval of PIB Information When PIB declaration number, office code, date are inputted, the PIB information will be retrieved. Basic Information will then be retrieved based on the NPWP number (inc. name, address, etc.). (2) Registration of PIB Verification I Result Information When verification result data is inputted into PIB Verification I Result registration window, check and register the information in PIB Verification I Result. Output the Instruction Note if necessary.	• Directorate must be Verification & Audit (inc. Regional Office).	• PIB Number in Service Offices resets the number every-day
2	• Registration Window - Existence of noncompliances - Price differences - Completeness of documents	CRT (Client)	• Instruction Note - Additional payment - Refund	Printer (Client)	• Basic Information • PIB Verification I Result			

Figure A.2-1: How to view the Process Summary