

**Achievement of Market-Friendly Initiatives and Results Program
(AMIR 2.0 Program)**

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SDC IT Needs Assessment

Final Report

**Deliverable for Capital Markets Component, Task No. 661
Contract No. 278-C-00-02-00201-00**

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This report was prepared by Mr. Nicolas Van Zadelhoff and Mr. Ramzi Al-Shishani, in collaboration with Chemonics International Inc., prime contractor to the U.S. Agency for International Development for the AMIR Program in Jordan.

Information Technology Needs Analysis Review

Chapter IV. Securities Depository Center

This chapter reviews for the AMIR 2 Program the Information Technology (IT) requirements for the Securities Depository Center (SDC) after the initial installation of equipment and applications under the AMIR 1 Program. This new assessment focuses on the installed and SDC developed applications and middleware software needed for production, backup, training, tests and development environments, given the existing and future plans of the SDC.

The IT Needs Review first outline the actual stages of developments, implementation and deployment of systems at the SDC as off today. A change in deployment of systems by the SDC was required to meet their plans to achieve Delivery versus Payment (DVP) via various stages.

After reviewing the applications, it defines the additional required hardware, system software and application software. We have listed those new requirements given the known timeframe and planning of the SDC. In the attached SDC Project Plan we have scheduled the purchase of new systems for the SDC applications. Given the required system purchases we then revised the deployment of already available systems.

Over the past couple of months the AMIR Program and the SDC Staff have worked in close and full cooperation to get the new SDC IT Needs Assessment done. Parties are in full agreement on the requirements, specifications and implementation planning as written down.

1. Introduction

In order to perform its functions, the SDC started in 2000 to build their Client Identification System to uniquely identify their customers. In October 2000 Electronic Deeds (Contracts) Processing was added, followed by the Share book Cleansing Process in August 2001. The SDC Client Identification and Deeds Processing are operational. For the Depository, Clearing and Settlement the SDC with the support of AMIR purchased in September 2000 the EFA Equator software.

In August 2001 AMIR provided the SDC with the application (Tantash Group) system for General Ledger, Accounting, Accounts Receivable and Payable and Inventory. The G/L System is operational since January 2002. Later in October 2001 AMIR provided the SDC with a system for Human Resource Management, Payroll and Savings Fund (Delta Group). The HRM and Payroll System is operational since January 2002. In November 2001 AMIR provided the SDC with an Archiving (ZyLab) system. The Archiving System could become operational as soon as the procedures and interfaces are defined and developed. Furthermore the SDC has installed File, Print, Proxy, FTP and other more general back office support functions on PCs.

Further integration and fine-tuning of the various applications including the general back office support functions are required to reach a better controllable and more secure environment. For a number of other applications (Issuer Support, Electronic Clearing & Settlement) preparations are made to go live later this quarter.

2. SDC becoming the Registry and Depository

For the SDC to achieve DVP share books needed to be transferred from the registrars to the SDC. For the SDC to take over the role of the registrars, the SDC needed to make sure that securities under their jurisdiction and accountability were properly identified and authenticated (liability). Second the SDC had to dematerialize the shares and only deposited shares can be traded (book-entry). Presently the SDC is working with the issuers to clean their share books prior to the SDC to take charge.

It must be understood that the SDC could have taken other approaches to achieve taking charge of the share books. However given the 23 years of history regarding the share books and thus the (amount of manual/human) mistakes which appeared in the books, the SDC decided to clean up the book prior to take charge. Following an investigation the process of cleansing share books was developed by the SDC.

Second and even more important, the SDC has taken the approach of gradually moving (evolving) with the market participants to reach its goal of true and irrevocable DVP. The approach taken by the SDC is to avoid any “cold-turkey” effect on the market.

Third, a number of legal, market and policy issues (see attached memorandum of the SDC to the JSC of December 13, 2001) for the 3 Jordan Capital Markets Institutions are still pending and as such are also hampering factors for the SDC to reach the true DVP stage.

3. The SDC goal: true-DVP

It has been the goal of the SDC to adopt the principle of Delivery versus Payment (DVP) in the clearing and settlement cycle where good delivery of securities will be against final and irrevocable payment of funds. Reasons are to boost the image, fairness, reliability and liquidity of the Jordan Capital Markets to attract more local and international investors.

3.1. Reaching true DVP stage

In order for the SDC to reach true-DVP in settlement, the following stages (phases) have been defined by the SDC:

- **Electronic Clearing & Settlement (also called “mini-DVP”)**

Main purpose of the mini-DVP stage is for the SDC to take control of the share book form the Issuers, authenticate them and build the Registry and Depository. By building the Registry and Depository the SDC can then perform electronic clearing and settlement. During the mini-DVP trades will be settled bilateral. The existing payment settlement (now broker to broker) will be replaced in such a way that the SDC will become the payment intermediary. The existing means of payment, i.e. cheques and money transfers, will be accepted. It is expected that the mini-DVP cycle to start early April 2002.

“Mini” DVP will probably last for 3 – 6 months, depending on resolutions of some of the JCM issues (establishing Settlement Guarantee Fund and arranging Letters of Guarantee), before the next stage can starts.

- **“Authenticated mini” DVP**

As soon as a share books in the Depository has reached an “executable” volume of authenticated shares, trades on those authenticated shares could follow the Authenticated-mini DVP process. Payment settlement will be only via wire transfer. Pre-requisite for the

“authenticated mini” DVP is that a Settlement Guarantee Fund and Letter of Guarantee functions have to be in place. During this stage, trades on non-authenticated share will be settled following the mini-DVP process.

- **True DVP**

Having some of the policy and market issues gradually being resolved and put in place, the SDC then can execute true-DVP. The authenticated shareholders will be uploaded to the SDC Equator database. During the upload all securities will be frozen. A broker may request securities from this authenticated Equator sub-register (Depository) to the member’s individual accounts maintained by the broker. The broker’s request must be accompanied with the proper and required SDC documents including their client’s contract. If all documents comply with the SDC requirements, securities will be unfrozen.

Depending on the decisions in the Jordan Capital Market regarding these issues a further definition and description (and thus detailed planning) of the “authenticated mini” and true-DVP stage can be given.

4. Building the Registry and Depository

Systems and procedures are being put in place by the SDC to identify and authenticate shareholders properly and electronic deeds from the trading were issued by the SDC. The same nowadays counts for inheritance and family transfers.

4.1. SDC Taking Charge of Share book (Registry Building)

As per April 2002, the SDC will gradually start to take over the share books from the registrars and upload them via its systems and procedures to the SDC Register. SDC will make certain that the paid up capital of a share book is balanced. SDC also checks that the issuer provides the minimum SDC required information and data in that share book. Information to be provided should contain:

- The shareholder number assigned by the issuer,
- The name of the shareholder,
- The nationality,
- The balance of his securities and
- Any lien or pledge (available balance and actual balance).

The share book is being submitted to the SDC by the issuer in hard- and/or softcopy. Procedures are being put in place that will guarantee that the issuer is responsible for the submitted share book in writing to fulfill the legal requirements of the SDC (sign-off procedure).

Following these procedures, the SDC will achieve complete registering of delivered share books and authenticate all shareholders through procedures that will ensure that all required (identification and authentication) documents have been submitted to the SDC. The SDC will besides physical storing these documents also scan them into their archiving system for easy retrieval and verification purposes. Linkage between the archiving and SDC application systems will be provided.

So far the SDC has received for initial investigation (trial-cleansing) more than 165 share books. In order to achieve even greater cooperation with the Issuer, the SDC has developed the Issuer Support System. The system will allow Issuers to review their submitted share book for inquiry purposes.

4.2. Depository

Fully authenticated and identified shareholders in the Registry will be uploaded to the Equator Depository (see figure 1). The following diagram outlines the process of building the Registry and Depository.

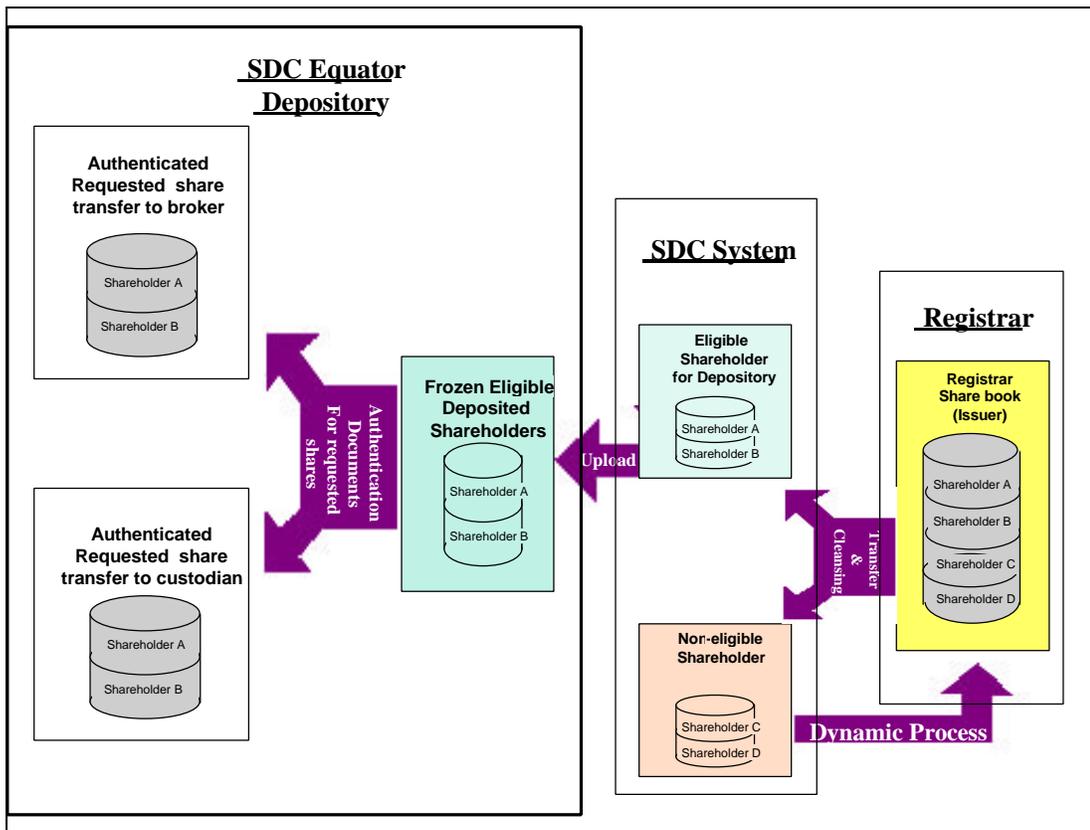


Figure 1: Building the SDC Register and Depository

Having the depository in place the SDC then can execute the clearing and settlement process by activating the relevant Equator functions.

5. IT Review focus

5.1. Overview of Installed Equipment and Applications

The following IT equipment, applications and support on (also on SDC own developed) applications have been provided to the SDC under the AMIR I Program:

Equipment	#	Software	Applications
Servers			
AS400 (primary)	1	EFA Equator rel. 4.3	Depository, Clearing and Settlement
AS400 (secondary)	1	EFA Equator rel. 4.3	Backup, training, development system Equator
NetFinity 7600	2	SDC applications	Client Id, Deeds Process, Issuer support, Cleansing
NetFinity 5000	1	Archiving	ZyTech Archiving Application

NetFinity 232	1	SDC Application	Backup for SDC applications
IBM PC 300GL	1	Tantash G/L systems	G/L and accounting
IBM PC 300GL	1	Delta HR Systems	HRM, Payroll, Savings Fund, etc.
IBM PC 300GL	1	File Server	Backup for SDC PCs
IBM PC 300GL	1	DNS server	
IBM PC 300GL	1	Domain server	
IBM PC 300GL	1	Proxy Server	Proxy Server
IBM PC 300GL	2	Development	Development SDC applications
Workstations			
IBM PC300GL	30	Workstations SDC	For mentioned applications
IBM PC300GL	30	Broker workstations	Installed at brokerage houses
Color Printers	4	Printer stations	Assigned to Departments
Laser Printers	10	Printer stations	Assigned to Departments
Line Printer	1	Production Printer	Assigned to Equator application

Figure 2. List of under AMIR I provided IT Equipment

This main functions and applications the SDC needs to execute for their proper functioning are:

1. **Applications:**
 - a. Registry Applications,
 - b. Depository, Clearing & Settlement,
 - c. Archiving and Workflow management,
 - d. General Ledger and Accounting,
 - e. HRM and Payroll
2. **General Back Office Support functionality:**
 - a. Network and Security Management
 - b. Mail and Web enabling Systems
 - c. Operations Support Systems
 - d. Network Management
3. **Development, testing and training Environment**

After reviewing the above-mentioned applications recommendations are being given to build the appropriate IT environments for these applications. At the same time recommendations are given with regards to operations, maintainability, security and recovery.

5.2. Applications

5.2.1. Registry Applications

The registration function is the maintenance of securities ownership records and the enabling of issuer and shareholder communications. The data contained in the registry is share, shareholder and other information as originally received from issuers and updated over time as changes are taken place.

5.2.1.1. Client Identification System (CID)

When the SDC started their automation 2 years ago, it was decided on the advise of the AMIR business consultant that there should be a system in place for uniquely identifying clients

(shareholders) based on the National Identification Numbering (NIN) of the Jordan Civil Department. The SDC IT-Staff and AMIR in cooperation with the mentioned Civil Department developed a system. Client Identification System (CIS) is up and running. The SDC receives on a weekly basis updates from the Civil Department database.

5.2.1.2. Electronic Deeds Processing (EDP)

Following this CIS application, the next application the SDC developed was the Electronic Deeds (contract) Processing (EDP). For trades as received from the Amman Stock Exchange contracts (deeds) are prepared and printed for further verification and registration by the issuer. Some further extension to this program has been made related to the **inheritance and family transfer** transactions. The EDP system is up and running.

5.2.1.3. Share book Cleansing System (SCS)

A dedicated program has been developed for the take-over, identification and verification of the issuer share book, known as the Cleansing System. The cleansing system verifies share books against the SDC requirements. Once passed the share book will be uploaded to the Registry and further shareholder authentication will take place.

The Registry will be divided into 2 sub-registries. One register will hold the authenticated shareholders and the other register is for non-authenticated shareholders. The fully authenticated shareholder records will later be uploaded to the Equator Depository.

5.2.1.4. Issuer Support System (ISS)

The last application as developed by the SDC is the Issuer Support System (ISS). With the functions embedded in this application the Issuer can make inquiries on its share book in the Registry once the share book is officially transferred to the SDC. Applications as developed will gradually be transformed into web-based applications.

Besides the above mentioned functions, the SDC applications provide quite some comprehensive surveillance capabilities. Features and functions should be seriously studied by the JSC for embedding these in their procedures and surveillance tasks for the Jordan Capital Markets.

5.2.1.5. SDC Registry Platform (hardware & system software)

The output data of the Registry applications was set as a pre-requisite to build the required Authenticated and Identified Depository for the EFA Equator application on the AS400 systems. The SDC developed applications as described are the “front-end” for the Depository and Clearing & Settlement system.

Mentioned applications for CID, EDP, SCS and ISS are developed using the Oracle Data Base Management System (DBMS) system and running on a clustered (2 server) NetFinity 7600 server installed in the SDC computer room at the JCM Building.

The SDC due to their dependencies on these systems has defined the following recovery requirements in case of failures on their Registry production system:

1. A maximum of 30 minutes downtime (during office hours);
2. No loss of transactions and/or data during the switch over;

The NetFinity 7600 is a clustered server offering high availability. However due to the non-availability of Oracle parallel in the SDC license package all applications are running on one of the 2 servers of the clustered NetFinity 7600. In case of malfunctioning of this initial server the other (standby) NetFinity 7600 server will automatically take over.

Due to the fact that all applications are running on a single server, it is expected that the performance of the NetFinity 7600 server is not sufficient for the upcoming go-live of all these SDC applications for the mini-DVP. The lack of performance is due to the number of (additional) issuers to be connected to the system and the expected increase in transactions and inquiries.

Besides the fail-over capabilities of the NetFinity 7600, the SDC has installed a backup server (NetFinity 232, with 2 processors) in the HBC building. This backup server will via the "Replication" options of Oracle be brought into a hot standby mode.

Backup/Restore: Backup of the system is performed via a DLT 4000 tape drive. Daily (Oracle Data Base), Weekly (full system) and Monthly (full system) backups are defined and are being executed. Presently a full backup of the system takes at least 2 hours. A daily backup will take 1 hour. The proper on- and off-site procedures for storing the backup tapes have to be further defined and executed.

The present software and restore procedures incorporate that in case the Registry Production clustered (2) server fails the backup server can be made operational almost instantly.

Configuration Remarks: Conceptual and actual configurations for these applications are not correct; processing power stands idle. In almost any fail-safe (fail-over) systems environment all components are actively being used.

If Oracle parallel would have been applied for the clustered server, both servers in the cluster could perform the tasks to run these applications, thus giving additional processing power. In case of outage of one of the servers, the other server would take over immediately (fail-over functions). Of course this would reduce the performance of the system. However as many of the applications are for inquiry purposes, this would not cause too many problems and would leave a manageable environment.

Second, the development of the SDC applications has emerged from CIS (only) application to a full blown electronic clearing and settlement system for the mini-DVP cycle. Due to time and development pressure and constraints the database and corresponding applications grew more than a single server could handle. Fine-tuning and rethinking the development path and running environments have never been taken into consideration. In any development there is a time (normally at the start) to define what overall functions a system will have to execute and leading to the definitions and specifications of the environment. It is like as building a house; additional floors can only be added if in the original design the foundation was prepared for it.

5.2.1.6. Reconfiguration Recommendations

The SDC applications are developed under Oracle 8i standard release. Drawback is that the applications given the standard Oracle release cannot take full advantage of the clustered server

functions. Additional functions within Oracle are required (parallel server, failsafe, replication, etc.) to do so.

5.2.1.6.1. Oracle upgrade

In order for the SDC to proceed they need to upgrade their Oracle License. The present license only covers 33 users. The SDC needs to be able to connect to all participants, SDC staff (~20), Brokers (~30) and Issuers (~250). Second, the SDC needs to further upgrade of their existing Oracle license to make use of some of the new embedded functions (especially for clustered server and replication functions).

The new version of Oracle will give the SDC the possibility to “replicate” the transactions and or performed updates from the production servers to the backup servers in order to comply with the SDC uptime requirements. Having the new Oracle release in place will give the SDC the possibility to immediately update the backup server. Downtime will be limited to the time needed to reconfigure the connections to the participants (assignment of IP addresses; a network function).

***Note:** We have been informed by Oracle that in order to be able to runs the required new functions on clustered servers, the clustered servers have to be certified by Oracle. None of the under AMIR I bought servers complies with the Oracle requirement. In this needs we are regrouping the installed clustered servers to tasks, which do not need to be Oracle based (i.e. general back office functions).*

***Recommendation:** In order for the SDC to have sufficient system performance during the upcoming go-live stage of the Electronic Clearing and Settlement, AMIR proposes that the SDC temporarily (until the new servers arrive) reconfigures the NetFinity 7600 to a similar configuration as the NetFinity 232. By reconfiguring performance bottleneck on the system will be eliminated. As mentioned in the Implementation planning (see attachment) the NetFinity 232 will be equipped with a DLT4000 unit and a memory (RAM) upgrade will take place on the NetFinity 7600*

5.2.1.6.2. Server Replacement

As mentioned above the existing servers (NetFinity 7600 and 232) will be re-assigned to other non-Oracle related functions (see configuration diagrams). For the SDC applications we will provide new and Oracle certified equipment (see specifications SDC applications servers (RISC UNIX based) and the required backup configuration). Sizing for the required servers is embedded in the attached procurement documents.

5.2.2. Depository, Clearing and Settlement (Equator)

Via the AMIR Program the SDC acquired the EFA Equator software for Registry, Depository, Clearing and Settlement. The acquired software has been tested and is ready for go-live operations.

5.2.2.1. Equator Main Functions

Equator provides the following main functions for the SDC.

1. Registry
2. Depository,
3. Clearing and Settlement
4. Transfer
5. Pledge and Lien
6. Corporate Actions

5.2.2.2. Equator Platform

The AMIR program has provided the SDC with the 2 identical AS400/820 systems. One system will be used as the production, while the other system will be used as backup, development and training system.

Backup of the production server will under the present software conditions be performed by means of tapes.

5.2.2.3. Reconfiguration Recommendations

The Depository Backup and Recovery procedures are similar to the procedures on the Registry System. The present software and recovery procedures mean that in case the Depository Production Server fails, the backup server can be made operational.

The SDC has a need when proceeding with the 3-stage DVP approach for more adequate application recovery in case of failures on their Depository production system. The following has been defined by the SDC with this regard:

1. A maximum of 30 minutes downtime (during office hours and in non-tightly coupled environment);
2. No loss of transactions and/or data during the switch over;

5.2.2.3.1. MIMIX Middleware

In order to comply with the future SDC requirements additional middleware has to be added to the AS400 systems. For this purpose MIMIX (LakeView) software is recommended and certified by IBM and EFA Software.

MIMIX software will be able besides replication of transactions (from the production server to the backup server) also be able to provide clustered management between the two AS400 systems. During the “authenticated mini” DVP, MIMIX replication for the SDC Equator application is a must given the SDC requirements for uptime and availability.

These uptime requirements will be even more stringent if the Equator system and ASE Trading system need to be *tightly coupled* for order verification (see attached memorandum of the SDC to the JSC of December 13, 2001). If tightly coupling is taken place the requirements for uptime of the Equator system will be increased to hot standby and instant fail-over mode.

5.2.2.4. Cooperation SDC developed and Equator applications

The following diagram (Figure 3) shows the present information flow between the market participants (issuers and Brokers), the Amman Stock Exchange (received and confirmed trades) with SDC own developed applications and the Equator system.

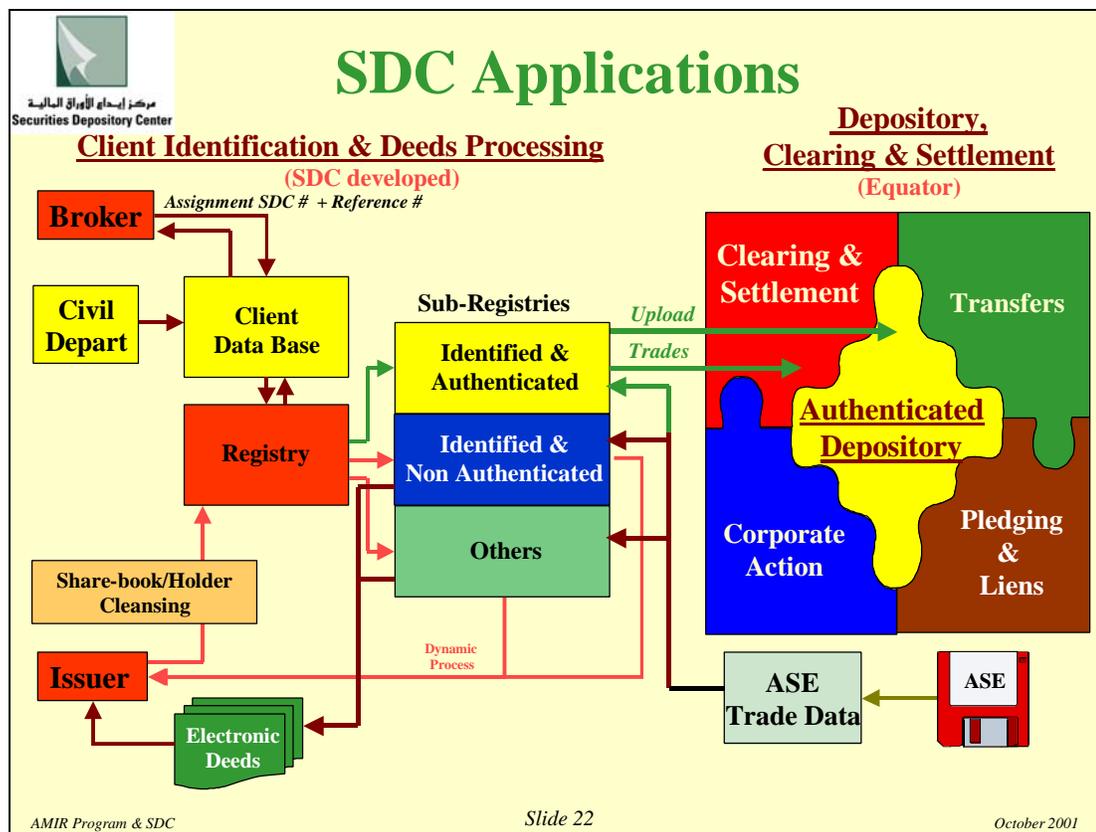


Figure 3: Information flow for Registry and Depository

Regarding the systems (SDC applications and Equator) the following to be mentioned: Both the SDC applications and Equator do provide extensive audit trail (log for any action on the databases) files. Those audit trails are kept on the system for auditing purposes. In both systems the audit log files are system-read-only files, which means they cannot be updated, deleted or modified.

5.2.2.5. Synchronization Equator and SDC applications Databases

As the 2 database systems reside on different platforms and database engine, synchronization of the databases could be an issue of concern. SDC will need to have programs and procedures in place to reconcile the databases on a daily basis. Any discrepancies between the 2 databases have to be worked out immediately.

5.2.3. Archiving System

In the planned 3 phases for the implementation of the true Delivery-versus-Payment (DVP), the archiving of the relevant documents for authentication and identification of shareholders will be a major task to be undertaken by the SDC. Archiving and retrieval of these documents will be needed for ease of access, information gathering and control.

The SDC under AMIR 1 has been supplied with a license of the basic ZyLAB archiving software. The software could be made operational however at present the software is running on a PC due to lack of server capacity.

Linkage between the Archiving System and the SDC developed and Equator applications are being defined. It is the aim of the SDC that during inquiry on certain information on the SDC applications and Equator, the relevant documents can be retrieved from the Archiving system. Some additional software modules or Application Program Interface (API) and or support on the IBM 5250 emulation (Equator terminal emulator) will have to be acquired to interlink those applications.

5.2.3.1.Reconfiguration Recommendations

AMIR will provide an Intel based Windows 2000 Advanced Server for this application (see: Planning SDC Archiving Server Installation and Configurations Diagrams).

5.2.3.2.Workflow Management

The Archiving System needs to be extended in the future with functions for document handling in order for the SDC to properly handle documents within the organization. No further specifications have been given yet for the workflow system and thus no hardware and software specifications have been made.

5.2.4. General Ledger and Accounting

A General Ledger and Accounting system (Tantash group) has been implemented at the SDC. The General Ledger system contains the following modules:

- General Ledger
- Accounts Receivable
- Accounts Payable
- Budget
- Inventory

System has been fully implemented and is operational on a PC due to lack of server capacity. In this needs analysis a server is specified for all administrative processing functions (see also configuration diagrams).

5.2.5. HRM and Payroll system

A Human Resource Management application and Payroll system has been installed. An additional module for Savings Fund Management was added. System is fully operational on a PC due to lack of server capacity.

5.2.5.1. G/L and HRM and Payroll configuration

In this needs analysis a dedicated server is assigned for all administrative processing (see G/L, Accounting and HRM, Payroll system).

5.2.6. General Back-Office functionality

The General Back Office Support functionality has been defined in this Needs Analysis as all those services, which are required and recommended for the proper and secure functioning of all applications and equipment on the WAN/LAN of the SDC community.

In order to increase the security at the SDC separation of functions and applications is important. Any system and organization should have its important applications separated. This acts as systems of checks and balances to make sure that if any one area goes bad it cannot corrupt the whole. The value of separation is recognized in all industries.

The design of separation is also needed on computer systems. It is important to separate information so an attacker (insider or outsider) can't get to all systems. In the IT separation is done via a so-called De-Militarized Zone (DMZ).

In the case of the SDC the Internet is probably the (most vulnerable) external network and what should be put in the DMZ are the first level web-related (Internet) machines (see diagram). The DMZ is to prevent and isolate particular machines within a network from other machines.

The external access points to the SDC applications are the broker (connected to the LAN and WAN (leased lines)) and the issuers (via leased lines or dial-up to the LAN) and the connections to the Internet.

- The brokers are connected to the SDC application via the LAN (HBC building) or Leased Lines and are protected via various levels of identification and password on the applications.
- Issuers connected to the SDC application via leased lines are protected via various levels of identification and passwords on the applications.
- For issuer connected via dialup lines, special software (RADIUS) will be installed to monitor their access right, privileges, etc. On top of this here also the applications access protection.
- All entries via the web will be directed to the DMZ for screening and security.
- All outgoing messages to the net will be directed via the Proxy server.

These mentioned support functions and applications have been divided into the following groups:

- Network and security environment
- Mail and Web enabling functions
- Operations Support
- Network Management
- Development, testing and training Environment

5.2.6.1. Network and security environment

In the design for the SDC we have built the network security environment around various security zones. The security zones are:

1. The DMZ zone, identification and checking all incoming web and mail messages
2. Radius zone, checking and authorization all incoming dialup connections
3. DHCP/DNS/WINS (internal) zone, IP-address assignment to new to be installed servers, workstations, etc and IP-Address checking and active directory and subnet masks handling.
4. The Proxy (ISA) zone for all outgoing messages (caching) to the net

The main purpose of the DMZ is that all incoming Web traffic will be directed to the DMZ for checking. Following components are needed to create the DMZ:

- DMZ zone switch
- Incoming Mail relay services including:
 - Server anti-virus software (Norton Enterprise, Trend Micro)
 - E-mail filtering software (E-Mail Essentials)

- Windows Internet Naming Service (WINS) and
- Domain Name System (DNS)

A firewall has previously been installed on the WAN Network. One switch will be installed as the switch for the DMZ. All incoming web traffic will via the firewall be directed to the DMZ. The DNS/WINS, mail-relay, e-mail filtering and anti-virus software will inspect and view all incoming messages. If a message is proven okay messages will via firewall be directed to the internal network.

Proxy zone: Outgoing messages will be sent form the mail-server via the proxy, firewall and ISP-Router to the Internet Service Provider (ISP) to the Internet.

DHCP zone: an additional layer of internal protection (Dynamic Host Configuration Protocol (DHCP) has been embedded in the design. The DHCP is an Internet protocol for automating the configuration of computers that use TCP/IP. DHCP can be used to automatically assign IP addresses, to deliver TCP/IP stack configuration parameters such as the subnet mask and default router, and to provide other configuration information such as the addresses for printer, time and news servers.

For the hardware and software specifications of the Security Zones see the attachments and the configuration diagrams.

The following diagram outlines the design for the SDC Environment.

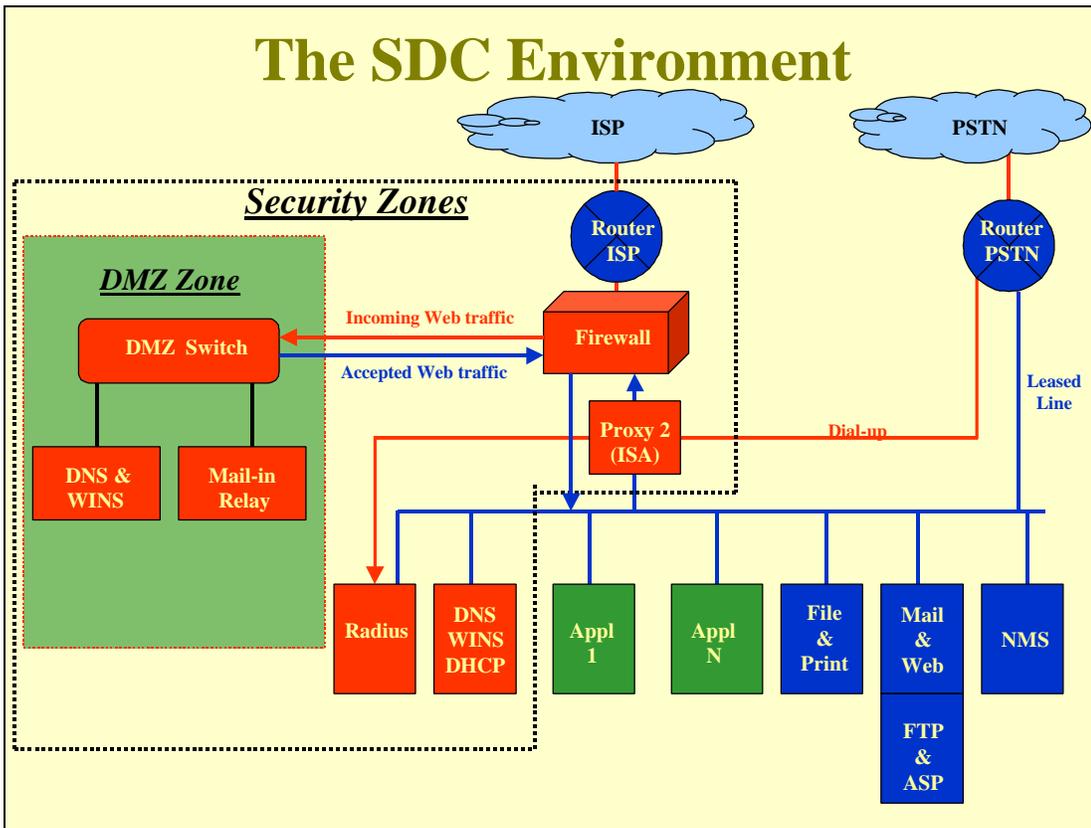


Figure x: The SDC Security and Environment Design

5.2.7. Mail and Web enabling functions

As mentioned in the previous IT Needs Assessment:

“As reported by IOSCO and others, Internet technology is profoundly affecting the evolution of capital markets worldwide. Brokers and other financial service providers increasingly sell securities or provide financial services on the Internet both domestically and globally. At a relatively low cost, the Internet offers unprecedented immediacy, flexibility and interactivity, The Internet provides investors with unparalleled access to financial tools and services worldwide, all at a relatively low cost and with relative ease”.

It is for the reasons mentioned that the SDC has in their development plans to make available in the near future the following web-enabled applications and mail functions for their participants:

- a. Mail (intra and internet) for SDC staff and participants
- b. File Transfer Protocol (FTP)
- c. Updating and Maintaining the SDC’s active web pages
- d. Access for web-enabled applications (future requirements)

5.2.7.1. Mail Functions

The SDC requires an email system with individual addresses for members of its staff. Email will also be used to communicate with brokers, Issuers and with Institutional Investors and Investment Advisers. Brokers and issuers will be given e-mail accounts at the SDC e-mail server.

Remark: As AMIR will provide the SDC with a full Oracle License, further investigations have to be made by the SDC IT staff if they can use and take advantage of the Oracle mail functions. This specially related to further integration of the various applications, web-enabling and mail functions.

5.2.7.2. FTP server

For transfer of data (files and reports) from and to the SDC, the SDC will make available (FTP) services for their staff and the Capital Market participants.

5.2.7.3. Updating, Maintaining Active Web pages

The SDC with the help of the AMIR Program has established an Internet World Wide Web site to promote investment in Jordan and to advise potential investors and market intermediaries of the workings of the depository and SDC regulations. The site will be used to publish a consolidation of SDC rules and procedures. It will facilitate investor access to corporate and market information through electronic databases for reports and legally required disclosure documents, and making the information publicly available.

At present the Web pages are outsourced and web hosting is done. The SDC has voiced their request to maintain, update and host their dynamic web pages locally. In order for the SDC to update some of the data on their web site regularly (daily), the SDC will host the active pages on their own web server. The local web server will be linked to their WWW server. As no further plans have been disclosed, no equipment and software have been assigned.

5.2.7.4. Access for web-enabled applications

The SDC has in its future plans to give the issuers access via web-enabled applications to the SDC Issuer Support Application. It is also for this reasons that we have requested an update on the Oracle license (WEB enabling features). No further development plans are given yet.

5.2.7.5. Recommendations

AMIR proposes that the SDC Management Team together with the other departments carry out an investigation in the marketing opportunities for the SDC to sell and market their information. Based on these the SDC IT staff should develop the required WEB Based applications and interfaces. Any additional hardware and software requirements could be subject to AMIR funding at a later stage.

5.2.8. Operations support

Operations Support is defined as the support functions for the LAN connected PCs and high speed and line printers at the SDC.

5.2.8.1. File Server

A file server is a computer and storage device dedicated to storing files. Any user on the SDC local area network can store files on this server. The File server also provides storage and computer capacity for backup, restore and shared-file facilities for the SDC PCs on their local area network. Local PC files can be stored for backup and retrieval purposes. The file server will also store copies of all provided PC software for recovery and/or re-installation.

5.2.8.2. Print Server

A print server is a computer that manages one or more printers. The Print server main purpose is to provide print and spool management for the high speed line printers connected to the local area network of the SDC.

Given the amount of batch activities required for the SDC and Equator applications quite some large reports will need to be printed.

5.2.8.3. File and Print Server platform

The file server at the SDC will have to support the internal users of the SDC. The file server will mainly be used during daytime operations by the connected PCs. The print server will have approximately 4 high-speed printers and 2 line printers. The print server will be used during the end-of-day processing of the SDC and Equator applications.

Given the expected activities, timeframe of operations and load for the file and print server AMIR does propose an Intel based Windows 2000 Advanced server carrying both functions (see SDC implementation plan and configuration diagrams).

5.2.9. Development, test and training environment

At present the only developments, which are executed, are for the SDC applications (Oracle based). These developments are taking place on PCs. The majority of the developments for the SDC applications have been done.

The SDC does not have proper test and development environments. Developments performed are tested on the actual operational data. Complete separation of production, testing and training environments have to be established in order to comply with general practice, authorization, and auditing and security requirements.

After the installation of the new servers for the SDC applications one of the clustered backup servers will have to be assigned for development, test and training. The other server of the cluster will be used for the “replication” of data from the production server. A similar approach has to be taken for the Equator Systems.

As soon as the SDC requires more developments (Tightly Coupling, Web and Web enabled developments) the need may arise for dedicated development systems.

5.3. Backup and Disaster Recovery

At present the HBC Building (5th floor computer room) acts as the backup site for the SDC. However the HBC Building is in striking distance (500 meters) from the JCM Building and as such does not comply with the general recommendations for disaster recovery (more than 5Km, etc.).

Various options are being reviewed by the SDC to build their disaster recovery site. Options considered are: the ME-NEX site and off-site premises (old military base) far from Amman.

As long as no definite disaster recovery site has been chosen and implemented, regular off-site storing of backup information is becoming even more important and as such should be activated immediately.

5.4. Authorization and Security (Organization)

We do have some concerns regarding the internal security and authorization within the SDC. As the SDC organization (see figure 4) and appointment of staff has not yet been finalized, many of the required functions and with that also the proper authorization of functions, internal security might be lacking.

At present some authorizations are given to the SDC IT development and maintenance staff to perform regular SDC functions on share books and alike. The SDC has put in its charter that it will become the best Middle East Depository, however if the organization is not properly staffed and no proper assignment and authorization are made, the SDC will never reach this stage.

For reference we have embedded here the SDC Organization chart

SDC Organization



Figure 5: SDC Organization Chart

The SDC has to complete the set-up of their organization and with that the proper assignment of functions and authorizations. Most crucial in the next couple of weeks will be assignment of the Operations Manager. A complete review regarding security and authorization has to be performed once the SDC organization is fully in place (see also recommendation as made by the AMIR SDC consultant).

5.5. Planning and Implementation

Clear and outlined plans with detailed requirements, definitions, tasks, jobs, etc. for developments and implementation on all levels of the organization do not exist yet. The need to properly inform and assign staff to all levels of the organization is probably the most urgent task to be executed especially in the upcoming go-live of the various DVP stages. Further delays to do so could backfire in achieving SDC objectives and goals. Only a well-organized team can achieve these goals and objectives.

5.6. IT Department

The IT Department needs an IT Manager to manage and guide the staff in their operations, developments and system approaches (networking as well as computers). After the go-live stage of Electronic Clearing and Settlement, we do expect the SDC to perform quite some development tasks. These developments should be guided in the proper directions.

Second for all of the upcoming phases of the Electronic Clearing and Settlement the IT Procedures have to be clearly defined, described and embedded in the SDC operations manuals.

Furthermore AMIR does recommend that the SDC Developed Applications will have to be audited in order to guarantee their proper functioning. It also helps to boost the required confidence of the institutional investors.

The present IT Organization need to be split in the following functions and are reporting to the (to be appointed) IT Manager.

Functions	Present Staff	Recommended Staffing
IT Manager	0	1
Operations	1	2 or 3
Quality Control	0	2
Development & Maintenance	1	2 or 3
AS400 support	1	2
NetFinity/RS6000 Servers, Network and Security	3	2
Total	6	11 or 13

In order to execute the upcoming tasks the IT Department has to be staffed in a more proper way. Under the title Recommended Staffing we have outlined the number of staff required to execute the operations.

The above mentioned Departments will have to execute the following tasks in the IT Division of the SDC.

1. **Operations**, responsible for the daily operations of all systems (servers) and communications. There should be an operations person be assigned for each type of installed systems / platforms due to the possible difference (and thus knowledge required) in performing this function.
2. **Quality Control**, responsibility to assure that the production systems in operation will function according to the standards set. Problem resolution and acceptance of new feature and functions for the systems are the main tasks of this group. This department will also handle all customer related service/support calls.
3. **Development and Maintenance**, responsible for the Development and Maintenance of the applications in use. New releases of applications will be handed over to Quality Control for acceptance.
4. **System Programming** (AS400 support and NetFinity/RS6000 Servers, Network and Security) responsible for the maintenance and updates of the operating systems and networking. New versions / releases of system software will be handed over to Quality Control for acceptance for production.

The following diagram shows the interaction between the departments at the SDC.

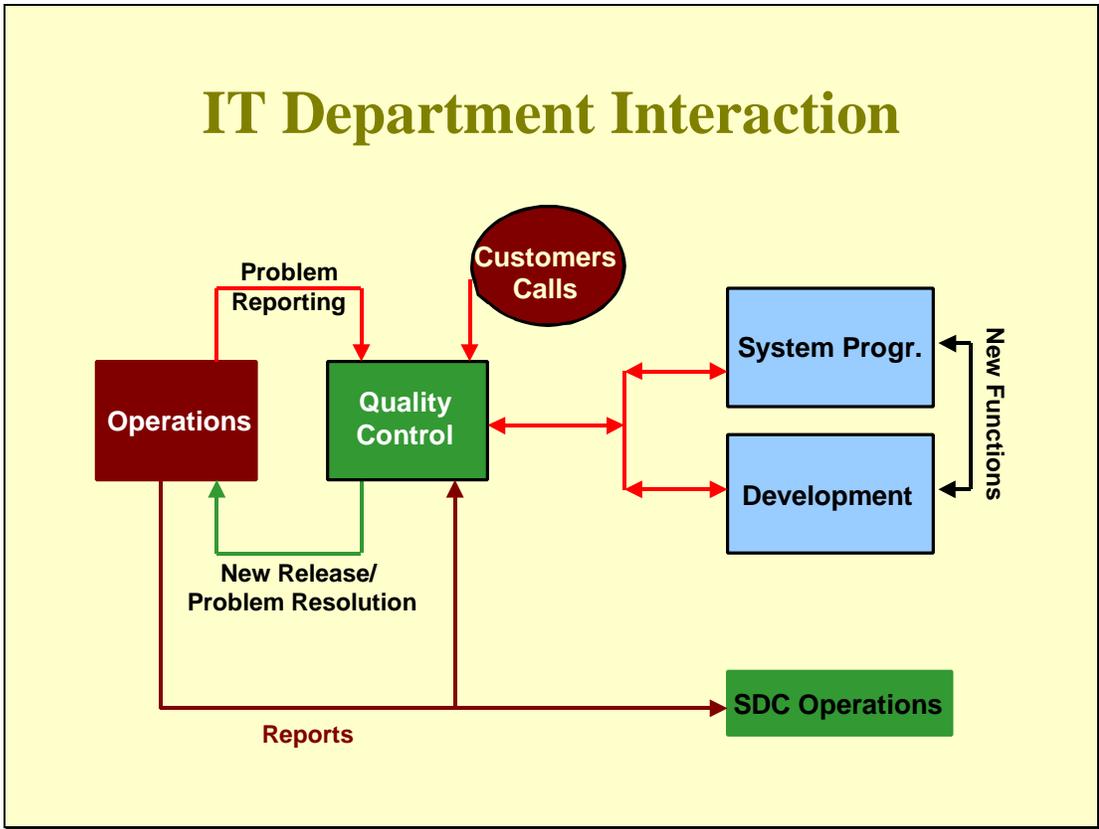


Figure Z: IT departments interaction

Concern: At present all developments are performed by one single person. Dependencies and risks on running an one-man development show (with no program documentation) are well-known. If the SDC for whatever reason wants to maintain their applications the hiring of at least a second developer for these applications should be considered immediately.

5.6.1. SDC IT Staff Training

The SDC IT staff has prepared a list of all required training programs and literature. Lists have been attached for reference and planning for the AMIR Program.

5.7. Windows 2000

At present the SDC is running Windows/NT version on their PCs. We do propose for maintainability and serviceability that all licenses will be upgraded to WIN2000.

5.8. Tape Libraries

As the databases at the SDC will be growing rapidly, especially over the next couple of months, more adequate means for backup will be required. On the AS400 production server it is expected that the database will reach at least 200GB, while on the Registry server this will reach 60GB. Taken all other databases and file systems into consideration, the SDC will soon reach close to one (1) TB of data.

Recovery via single tape drives on servers as supplied with the systems will take at least 12 hours for a full backup of the systems. More general purpose, robust and better-organized ways of taking

backups is to implement a Tape Library System for all installed servers. From an IT Operational point of view it will also limit the number of staff required for Operations.

5.9. Additional Networking Requirements

5.9.1. Extension for the WAN network

The WAN/LAN Network is fully operational for the JCM institutions. However the SDC has some additional requirements for connection of some of the 300 issuers, which are outside the reach of the JTC ISDN primary network. For this purpose the SDC requires a 12 port **Digital Modem Network Module** to be installed in their router (see implementation plan).

Note: In the SDC IT development plans WEB enabling on their applications will be done. Web enabling will effect the connection between the SDC participants and the SDC systems. It is for this reason that we have limited the Digital Modem Network to only 32 ports.

For the issuers within JTC ATM Network the SDC requires and **ATM module** for their router. ATM connection will substantially increase the response times at the issuers.

5.9.2. Network Management and Control

AMIR reviewed the possibilities (covering the 3 institutions) for better Network Management Control of the network. HP OpenView and CISCO Works 2000 would fit the requirements.

Software for remote workstation management is required to take away the load on the support people in the SDC. At present quite some resources are allocated to help (on the spot) the broker community in solving mainly PC problems. If over the next couple of months all (300) issuers are being connected the task will be even more time-consuming. AMIR Program recommends installation of Microsoft System Management for this purpose.

5.10. Other IT related Equipment

5.10.1. High Speed Line Printer

As the SDC will become the central Registry and Depository more reporting will be required in the future. At present the SDC has only one line printer installed. For backup and better print job rescheduling another line printer will be required.

5.10.2. Photo Copier

One copier to be installed for the new SDC office at the HBC Building.

The under AMIR 1 delivered photocopier (Ricoh) at the SDC CEO office should be upgraded with networking and fax functions.

5.10.3. Scanner

One additional A3/A4 scanner (to be used in connection with the Archiving Zylab software) needs to be installed at the new SDC office at the HBC Building.

5.10.4. PCs

An additional 12 PC to be installed at SDC office at HBC building and HBC backup broker room. PCs should be equipped with 17" LCD displays (9 units) and 21" Displays for 3 units (for the Finance Department).

5.10.5. Laptop

Two (2) additional Laptops are required for the support team of the SDC IT department.

6. The SDC Configurations and Implementation Plan

AMIR has worked closely with the SDC Management and IT Staff to plan the activities for the upcoming phased approach to reach the true DVP cycle. Planning as made (see attachment project plan) covers all SDC activities to support the upcoming go-live phases up and including the true DVP phase.

The tasks we have left out from this planning are the tasks to be performed for a possible tight coupling between the trading system of the ASE and the SDC's Equator system. Various non-IT issues have to be resolved before we can start this project.

The SDC Implementation Planning has been divided into the following phases:

1. Electronic Clearing and Settlement
2. Building the SDC DVP Environment
 - a. Creating Security Zones
 - b. Creating Application Environments
3. SDC Development of Enhanced Services
4. SDC's Management Information System Development
5. Implementation of Disaster Recovery

The phases 1 and 2 have been planned in detail (see SDC Implementation Plan attached) and have resulted in the described configurations below. The planning of the Phase 1 and 2 has been made in such a way that all SDC recommended and required services (applications, security and support functions) are fully implemented.

The following diagram shows how the new deployment of the SDC will take place given the above mentioned applications and general back office functions required.

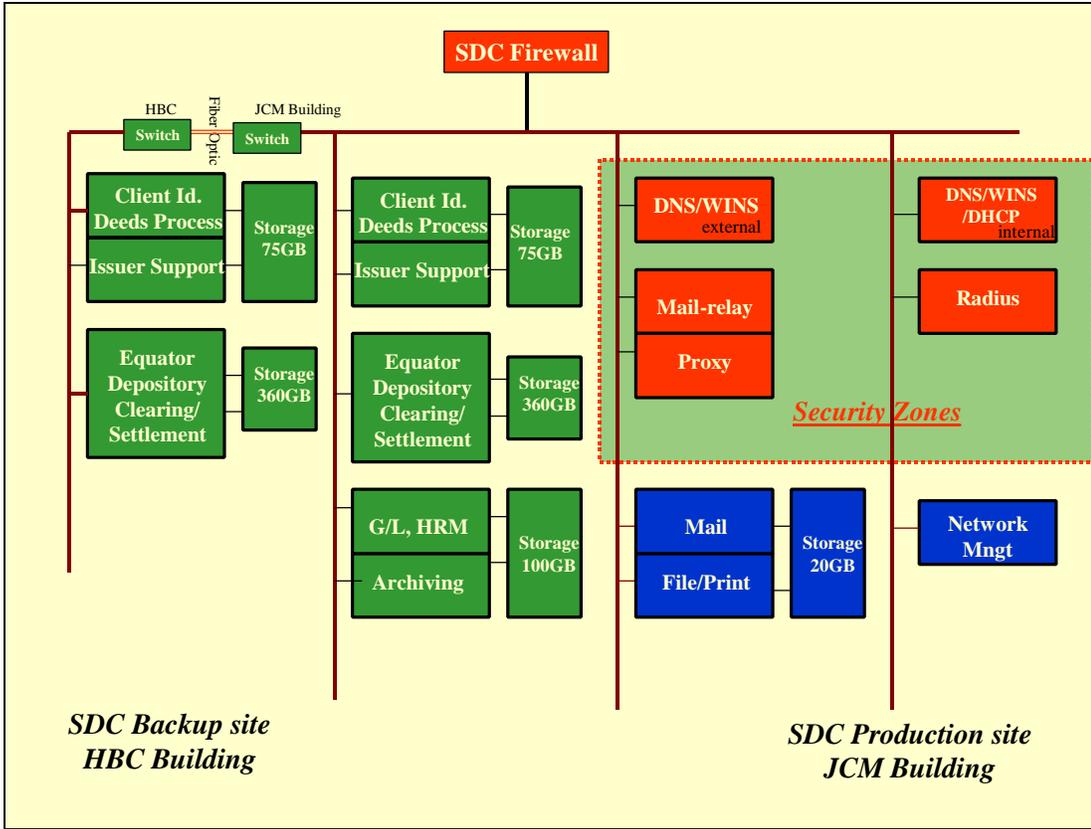


Figure X: Phase 1 & 2 Assigned Applications and Infrastructure

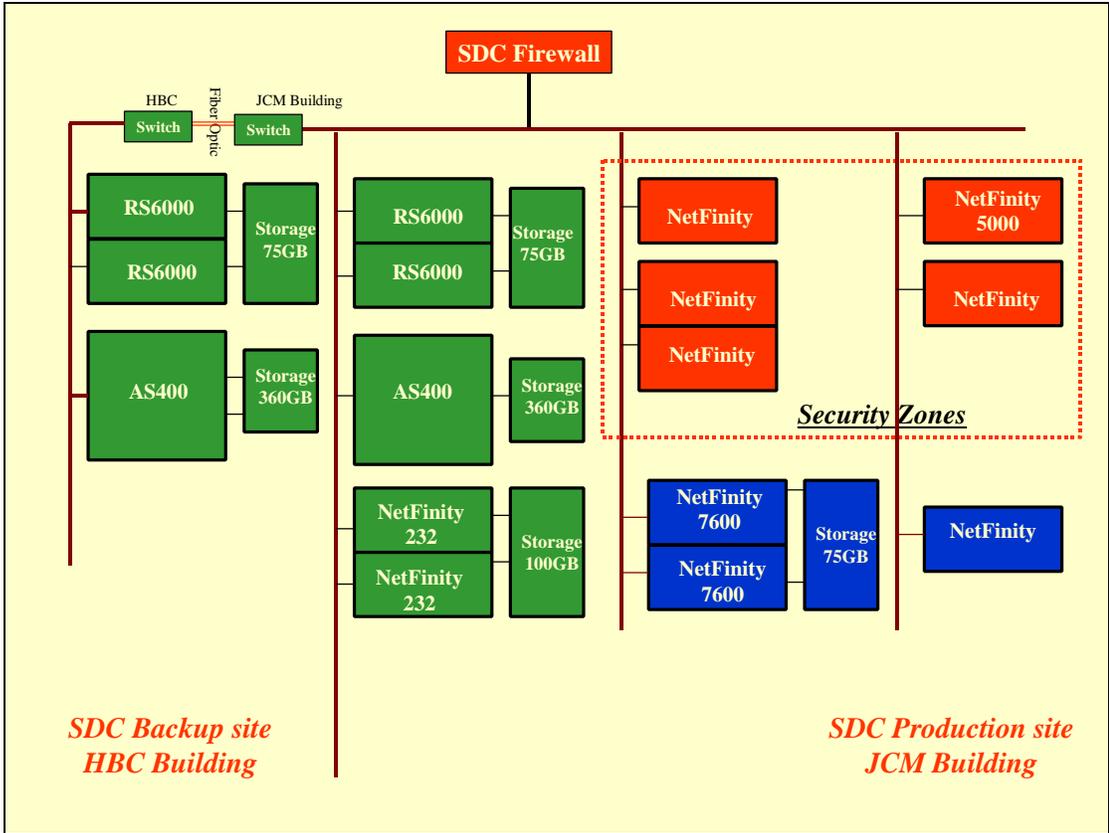


Figure Y:

Phase 1 & 2 Assigned Systems and Infrastructure

As stated earlier, the SDC changed the initial deployment of systems due to their changed needs. This Needs Assessment has defined a number of new servers and a re-deployment of the existing ones in order to meet the initial required SDC Environments for reaching true DVP.

For the later phases (3, 4 and 5) no further specifications and planning have been given as many of the new functions have not been fully and/or are not clearly identified. Once further specifications are available these new functions should be investigated and see if the then installed systems have to be upgraded and or replaced to cover these new requirements.

The SDC and AMIR Program have jointly decided and agreed on the SDC Project Implementation Plan. By the end of phase 2 of this Implementation Plan, the AMIR Program want to have ensured that the required and agreed upon infrastructure of network, applications and support functions are fully implemented on the designated equipment before proceeding with the next phases.

7. SDC Equipment and Specifications

The following appendices specify:

- A. SDC Project Implementation Plan**
- B. Specifications for new required Equipment and Software**
 - i. Specification are embedded in the Project Plan
- C. SDC IT required Training**
- D. SDC IT required Educational Material**

Upgrade from WinNT to Win2000 Professional

The need to upgrade from WinNT to Win2000 Professional is due to the fact that Windows 2000 Professional builds on the traditional strengths of Windows NT Workstation 3.51 and 4.0, providing improved reliability with fewer reboots, an easier-to-use desktop, and increased performance and manageability. It also supports extended Plug and Play and new interfaces, such as Universal Serial Bus (USB) and the 1394 serial interface.

The existing number of workstations in the SDC is 68 and they all have WinNT installed, the cost for upgrading License is 219\$ per license.

Specifications SDC Security Servers

Five (5) IBM xSeries servers.

The servers are grouped into two groups as follows:

DMZ Servers:

1. DNS-External Server - *item # 36*
2. Mail-Relay Server - *item # 34*
3. Proxy Server - *item # 35*

Other :

1. Radius Server - *item # 40*
2. DNS-Internal/WINS/DHCP Server - *item # 42*

Item #: *refers* *to* *the* *SDC* *Project* *Plan* *line* *number*

Each of the five (5) Intel-servers will have the following identical specifications:

Processor	<ul style="list-style-type: none"> ▪ IBM xSeries 360 ▪ One (1) Xeon 1.4 GHz Processor MP upgradeable to FOUR Processors
Cache	<ul style="list-style-type: none"> ▪ L3 512 KB
Memory	<ul style="list-style-type: none"> ▪ One (1)GB SDRAM upgradeable to 8GB
Internal Storage	<ul style="list-style-type: none"> ▪ Three (3) x18.2GB – RAID5, 10k Rpm ▪ Hot-Swappable
Multimedia	<ul style="list-style-type: none"> ▪ One (1) 32x Speed CD-Rom ▪ One (1) 3.5 Floppy Disk
NIC	<ul style="list-style-type: none"> ▪ Two (2) 10/100 Mbps Ethernet
Additional PCI	<ul style="list-style-type: none"> ▪ PCI Ultra160 SCSI Adapter
Power Management	<ul style="list-style-type: none"> ▪ Two (2) x370 Watts Hot-plug Redundant Power Supply ▪ Redundant Cooling System 6 Fans ▪ 220-240 V, 50Hz, ▪ Power connectors MK3
Manageability and serviceability	<ul style="list-style-type: none"> ▪ Advanced Light Path Diagnostics and Integrated System Management Processor standard providing intelligent systems management and reliability
Graphics and Video Resolution	<ul style="list-style-type: none"> ▪ S3 Savage LT Graphics Acceleration
Security	<ul style="list-style-type: none"> ▪ Power-on password, Privileged access password, Selectable boot, Unattended start-up
Operating System	<ul style="list-style-type: none"> ▪ Windows 2000 Server ▪ Software for LTO connection and/or LTO sharing
Expansion ports	<ul style="list-style-type: none"> ▪ Display, Keyboard, Mouse
Warranty	<ul style="list-style-type: none"> ▪ <u>Three (3)-Year International Warranty covering Parts</u>
Maintenance Contract	<ul style="list-style-type: none"> ▪ <u>Three (3) Year Maintenance</u> for hardware and software. Required response time of two (2) hours. A maximum MTTR of 24 hours
Dimensions HxWxL	<ul style="list-style-type: none"> ▪ 13.4x70.1x44.2 (centimeters)

On top of the above listed server hardware specifications for each of the xSeries servers, it is important to mention that all five (5) xSeries servers will be housed in one (1) rack with the following options:

<p>Rack – Model ‘NetBAY42’ / 42U</p>	<ul style="list-style-type: none"> ▪ Dimensions HxWxD ‘208x60x100cm’ ▪ Should support multi. Power outlets ‘MK3’ ▪ The Rack should also include a KVM switch,
<p>8-Ports Patch Panel for Display, Keyboard and Mouse sharing</p>	<ul style="list-style-type: none"> ▪ 8-Ports patch panel <ul style="list-style-type: none"> ○ One Console, Mouse and Keyboard will be used in the Rack - will be shared between the xSeries Servers
<p>Backup Media Drive</p>	<ul style="list-style-type: none"> ▪ ONE Rack-Mounted LTO tape drive library 100GB/200GB ▪ This tape drive library will be shared by all five (5) servers <ul style="list-style-type: none"> ○ Direct connection to one (1) server ○ LAN connection for the other Four Servers ▪ Any additional hardware and software requirements in order to make the LTO Tape Dive Sharable to all xSeries Servers ▪ Compatible with the LTO Tape-Library we intend on purchasing by the end of this year ▪ Should be connected to the dedicated Integrated PCI card on 1 server ▪ 30 Tape Drives LTO 100GB (media) ▪ 4 Cleaning Cartridge (media)
<p>Rack Console KIT</p>	<ul style="list-style-type: none"> ▪ NetBAY 1U Rack Mounted Console Kit – this KIT should also include the necessary Keyboard, Mouse and the necessary kit required to make all five (5) Servers be able to share the Display, Keyboard and Mouse
<p>Installation</p>	<ul style="list-style-type: none"> ▪ Installation of the servers and their parts will have to be provided by a local (IBM or IBM-reseller) company.

Line Item # 37

RFP

Mail Essentials

SDC**Required Features:**

Mail essentials should provides the following features:

- ***Email content checking/filtering.*** Mail essentials needs to check all inbound and outbound mail for objectionable content. Mail essentials needs to check for:
 - Dangerous attachments, such as .exe and .vbs. As these file types are likely to carry viruses or worms, it is best to quarantine them immediately before they get distributed to the users. An administrator needs the possibility to review quarantined mail for further action, either approval or rejection.
 - Script code within the body of the message itself.
 - Offensive content or confidential content (by keyword).
 - Other attachments as you see fit, such as .mp3 or .mpg, which are space and bandwidth hogs.
- ***Automatic removal of HTML scripts.*** HTML mail is a real danger to the network. It is possible for unscrupulous people to embed command in HTML mail that can cause damage the network clients. Mail essentials needs to detect and remove these commands before the mail makes it into the network.
- ***Automatic quarantining of Microsoft Word documents with macros.*** Any Microsoft Word or Excel documents that cross into the network via incoming email will be scanned for macros. If macros are found the message will be quarantined, awaiting administrative action. This serves to protect against all current and future macro viruses.
- ***Virus checking.*** Mail essentials features the enterprise level Norman anti-virus engine as an integral part of its system. All messages coming to or leaving the network need to have their attachments scanned for viruses, preventing the spread of viruses on the network and saving you the embarrassment of dealing with infections caused by the outgoing messages. The virus definition files need even to be automatically updated by Mail essentials, further increasing the level of safety and protection.
- ***Rule-based configuration.*** The possibility to configure multiple content checking and file checking rules, which allow complete control and flexibility in how to check message traffic coming into and going out of the network.

- **Control quarantined mail.** In case of quarantined mail, two ways in which to deal with. You can work with quarantined mail via an e-mail client, typically done by the administrator, or by using the Moderator Client. Using the Moderator Client allows you to delegate this responsibility to other administrative personnel.
- **Detects attachment extension hiding.** Email attachments with scripts (for example *.vbs) can be disguised as *.txt files by using the CLSID of the extension instead of the actual file extension. Mail essentials detects this and quarantines script or executable files, even if they are disguised as *.txt files, for example.
- **Anti-spam.** Mail essentials uses a fairly smart anti-spam scanner to detect typical spam practices, such as incorrect Reply To addresses, From headers with incorrect domains, etc. Because spam is stopped at the door, you save time and money.
- **Personalized server-based auto replies with tracking number.** When running on Windows 2000, Mail essentials needs to give more than just a standard “out of the office” reply. Automatic replies can be assigned tracking numbers and contain custom text, letting the outside contacts know that their message was received and is traceable.
- **POP3 downloader.** Mail essentials can download, forward and distribute mail retrieved from Internet POP3 mailboxes to the Exchange Server mailboxes—something Exchange simply can’t do on its own.
- **Reporting.** The ability to create reports on just about all facets of Mail essentials operation, including: daily statistics, detailed log of sent mail, reports per user, etc. These can be used for costing or tracking as you see fit.
- **Automatic disclaimer text.** Because companies are seen as being responsible for the mail that employees generate, it can serve to protect the company by placing a disclaimer on all outgoing mail. Additionally, you can place a standard footer on all outgoing mail, such as a slogan, location or public key.
- **Mail archiving to a database.** Although this will be viewed as a bad thing by some, Mail essentials allows you to archive all incoming and outgoing messages in an ODBC database of the choosing. This can use to create an additional backup of the messages, for quality control or legal purposes.

Pricing: Mail essentials, from \$275 for 10 users to \$3,995 for 1000 users Virus updates, from \$95 a year for 25 users to \$495 for 1000 users

Line Item # 39

Radius Software

Centralized Administration of all Remote and Wireless LAN Users

RADIUS/AAA server lets you centrally manage all your remote and wireless LAN (WLAN) users and equipment, and enhance the security of your network.

By performing a powerful trio of functions - user authentication, authorization, and accounting - for all remote and WLAN access users, Steel-Belted Radius significantly alleviates your administrative burden. Now, you won't have to set up and maintain separate authentication databases on each network access device. Instead, let Steel-Belted Radius validate remote and WLAN users against a central database that you can easily administer. What's more, if you're already using NT/2000, Solaris, or NetWare for your LAN authentication, you can use it for your remote and WLAN user authentication as well, with almost no additional administration.

And, because Steel-Belted Radius works with the widest variety of network access equipment and methods, it can simultaneously manage users who connect via dial-up, the Internet, VPNs/tunnels, ISPs, and WLAN - even if the network access and wireless access point devices you're using come from different vendors. Steel-Belted Radius even tracks and documents all remote and WLAN access to your network.

Finally, when managing WLAN user access, Steel-Belted Radius plays the additional role of providing information to the WLAN access point, enabling it to configure a secure connection to the user and further protecting your network.

Step up to the next level of remote and WLAN access and security - Steel-Belted Radius.

Centrally Administer all Remote and Wireless LAN Users

Steel-Belted Radius simplifies management of remote and WLAN users by enabling authentication procedures to be performed from one database. This relieves you of the need to administer separate authentication databases for each network access or WLAN access point device on your LAN.

As a complete implementation of the widely used RADIUS (Remote Authentication Dial-In User Service) protocols, Steel-Belted Radius performs three vital functions:

- **Authentication** - validates any remote or WLAN user's username and password against a central security database to ensure that only individuals with valid credentials will be granted network access.
- **Authorization** - for each new connection, provides information to the remote access or WLAN access point device, such as what IP address to use, session time-limit information, or which type of tunnel to set up.
- **Accounting** - logs all remote and WLAN connections, including user names and connection duration, for tracking and billing.

When a user connects to the network via a remote access server, firewall, router, access point, or any other RADIUS-compliant network access device, that device queries Steel-Belted Radius to determine if the user is authorized to connect. Steel-Belted Radius accepts or rejects the connection based on user credential information in the central security database, and authorizes the appropriate type of connection or service. When the user logs off, the network access device informs Steel-Belted Radius, which in turn records an accounting transaction.

Centrally Manage all your Network Access Equipment

Steel-Belted Radius works with the remote and wireless access equipment and methods you already have in place. Whether you've set up dial-in, Internet, VPN, outsourced, WLAN, or any other form of access - in any combination - Steel-Belted Radius can manage the connections of all your remote and wireless users. That includes:

- **Dial-in users** who connect via remote access servers from 3Com, Cisco, Lucent, Nortel, and others.
- **Internet users** who connect via firewalls from Check Point, Cisco, and others.
- **Tunnel/VPN users** who connect via routers from 3Com, Microsoft, Nortel, Red Creek, V-One, and others.
- **Remote users** who connect via outsourced remote access services from ISPs and other service providers.
- **Wireless LAN users** who connect via access points from Cisco, 3Com, Avaya, Ericsson, Nokia and others.
- **Users of any other device** that supports the RADIUS protocols.

Moreover, Steel-Belted Radius supports a heterogeneous network, interfacing with remote and wireless access equipment from different vendors simultaneously. Steel-Belted Radius automatically communicates with each device in the language it understands, based on customized dictionaries that describe each vendor's extensions to the RADIUS protocol.

Choose any Combination of Authentication Methods

Steel-Belted Radius not only works with the widest variety of remote and wireless access equipment, but it also makes it possible to authenticate remote and WLAN users according to any authentication method or combination of methods you choose.

In addition to Steel-Belted Radius's native database of users and their passwords, Steel-Belted Radius supports "pass-through" authentication to information contained in:

- **NT/2000, UNIX, and NetWare** security systems you've already established for your LAN, including Windows 2000 Active Directory, NT Domains and Hosts, UNIX Network Information Services (NIS) and NIS+, and NetWare NDS and Bindery users, groups, and organizational units. This saves countless hours by allowing you to use the same database to authenticate LAN, remote, and WLAN users.
- **Token-based authentication systems** such as RSA Security ACE/Server, CryptoCard, and VASCO DigiPass.
- **SQL databases**, including Oracle and Sybase, for Steel-Belted Radius running on Windows NT and Solaris. Steel-Belted Radius works with your existing SQL table structure, eliminating the need for database redesign, and can authenticate against one or more SQL databases, even if they're from different vendors.

- **LDAP directories**, for Windows NT and Solaris versions of Steel-Belted Radius.
- **Any ODBC-compliant database**, for Steel-Belted Radius for Windows NT.
- **TACACS+**, for Windows NT and Solaris versions of Steel-Belted Radius.
- **Other RADIUS servers**, for proxy authentication against a RADIUS server at another site.

Steel-Belted Radius can simultaneously authenticate many users for super-fast performance. If you are combining authentication methods, you can even specify the order in which each is checked. Result: streamlined administration as well as one-stop authentication.

Secure your Wireless LAN

In addition to authenticating wireless LAN users, Steel-Belted Radius also plays a pivotal role in securing their connections. To perform these functions, Steel-Belted Radius supports:

- **Extensible Authentication Protocol (EAP)**, the transport protocol specified in the 802.1x protocol which is used to negotiate the connection between the WLAN user and the access point.
- **EAP authentication methods**, including EAP-MD-5 and EAP-Cisco Wireless. EAP authentication methods are vendor-developed security mechanisms which secure the credential exchange, data transmission, or both. Steel-Belted Radius fully supports EAP-MD-5 and EAP-Cisco Wireless, including their requirements for key generation and exchange.

In addition, Steel-Belted Radius provides additional security on a WLAN by:

- **Protecting against rogue access points.** Steel-Belted Radius ignores communications from any access point that is not registered with it. This prevents network intrusion from illegally installed or used equipment.
- **Supporting time session limits, time-of-day restrictions,** and other RADIUS attributes which let you impose additional security constraints on WLAN usage.

For example, you could specify that WLAN access can only occur during business hours, or force re-authentication after a specified amount of time.

Steel-Belted Radius also makes it possible to manage both wireless LAN and remote users from a single database and console, greatly reducing your administrative burden by eliminating the need for two separate authentication systems.

Market-Leading Performance

Whether you're managing remote access, WLAN access, or both, Steel-Belted Radius can easily handle your RADIUS traffic. It:

- Handles 400 RADIUS packets per second per 400 MHz CPU.

- Scales to an unlimited number of users, making it possible to simultaneously support both wired and wireless access as well as the inevitable surge in demand as wireless usage in your organization grows.

Easily Manage Tunnel/VPN Authentication

Steel-Belted Radius can centralize the management and administration associated with VPN/tunnel access. Steel-Belted Radius supports:

- **All standard RADIUS tunneling attributes**, as well as the vendor- specific attributes supported by many popular vendors.
- **MS-CHAP authentication**, for full support of Microsoft RAS and PPTP connections.
- **Tunnel authorization based on username format (user@tunnel, tunnel#user), or the dialed number (DNIS).**

Efficiently Handle Proxy Authentication

Proxy RADIUS is a powerful feature of the RADIUS specification that permits one RADIUS server to pass authentication requests to another RADIUS server which has the necessary database to perform authentication.

Steel-Belted Radius fully supports proxy RADIUS; it can:

- **Forward proxy RADIUS requests** to other RADIUS servers
- **Act as a target server** that processes requests from other RADIUS servers
- **Use DNS services** to forward proxy RADIUS requests to other RADIUS servers (roaming)
- **Pass accounting information to a target server**, either the one performing the authentication or a different one.

You'll save countless hours in maintenance if you employ proxy RADIUS when you have multiple sites that remote users could potentially connect to; instead of storing everyone's authentication information on each possible server, you can simply store pointers to the appropriate authentication database.

Track and Bill with RADIUS Accounting

Steel-Belted Radius logs all authentication transactions, so you'll be able to view the entire history of authentication requests and the resulting responses. If your network access device supports RADIUS accounting, you'll also be able to track how long each user stays connected - and even have the security of being able to see exactly who's connected at any time and on which port.

Accounting data can easily be exported to spreadsheets, databases, and specialized billing software. Or, you can choose to log data directly to your SQL database.

System Requirements

Steel-Belted Radius is available in three versions.

- **Steel-Belted Radius for Windows NT/2000** runs on Windows 2000 or an NT 4.0 workstation or server. It's administered from Windows 9x or Windows NT/2000.
- **Steel-Belted Radius for Solaris** runs on Solaris 2.6, Solaris 7, or Solaris 8 running on SPARC or UltraSPARC. It's administered using a Java-based administration program that requires Netscape 4.03 or later, or Microsoft Internet Explorer 4 or later.
- **Steel-Belted Radius for NetWare** runs on a NetWare 3.12 or 4.x server. It's administered from Windows 9x or Windows NT/2000.
- Choose the **LDAP Configuration Interface (LCI)** add-on to configure Steel-Belted Radius from the command line. Click [here](#) for more information on LCI.

Refers to Item # 46 of the SDC Project Implementation Plan

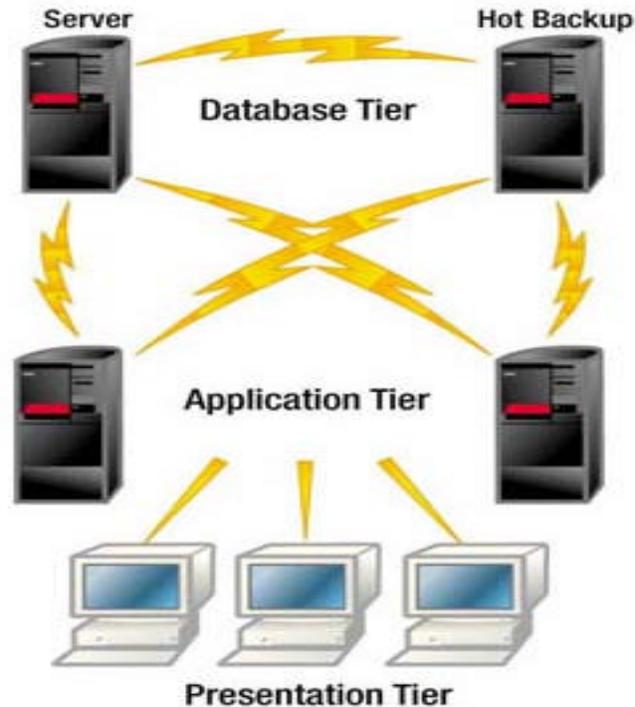


LAKEVIEW TECHNOLOGY

Price Quote for

Securities Depository Center (Jordan)

MiMiX.....Always Available



Lakeview Technology is the world's leading provider of availability management software solutions for the IBM AS/400. Since 1987, Lakeview has been committed to delivering innovation in its products to meet the needs of the midrange marketplace.

Lakeview has four offices to support its customers' needs:

The Worldwide Headquarters, with over 60 employees, is located in Chicago, Illinois (USA) where the Consulting Services, Distribution, Education/Training, Executive, Finance/Accounting, Human Resources, Marketing, Technical Support, and Worldwide Sales Departments reside.

The Research and Development Office, with more than 50 employees, is located in Rochester, Minnesota (USA),

Lakeview's European office of seven employees which provides Consulting Services and Technical Support is located near Brussels, Belgium.

Lakeview's Asia Pacific office of four employees provides Consulting Services, Technical Support, Sales and Marketing, and is located in Hong Kong.

MIMIX DB2 and Object Replicator for the AS/400.

MIMIX Replicate consists of two products, MIMIX DB2 Replicator for AS/400 and MIMIX Object Replicator for AS/400. These two products provide real-time replication of DB2/400 data

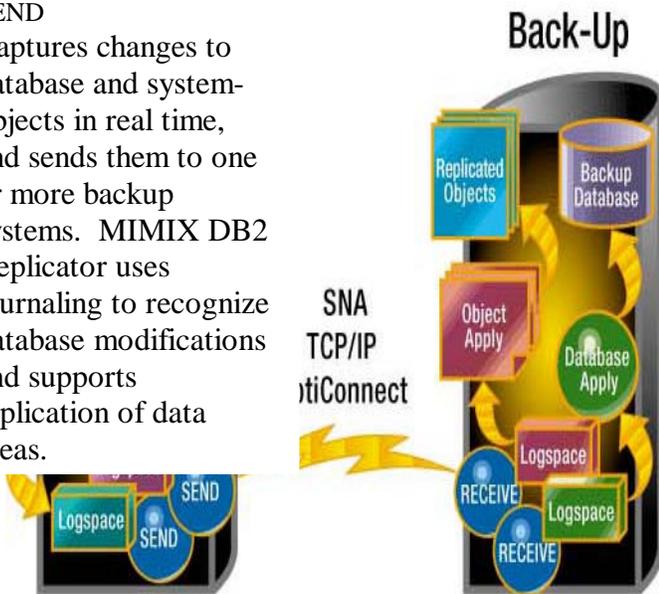
and all other non-database objects including application objects, system objects, configuration objects, document library objects and integrated file system objects. MIMIX DB2 Replicator and Object Replicator share product libraries, configuration elements, message logs, menus, data groups and data libraries which greatly simplify implementation and ongoing management of the availability management environment. While these products can be used separately, the tight integration of these components enables centralized management, automatic broadcast of configurations and switchover for your AS/400 environment.

MIMIX Replicator processes operate on both the production and backup systems to optimize use of computing resources with the lowest overhead rates, while achieving high volume replication.

Core processes of MIMIX Replicator include:

SEND

Captures changes to database and system-objects in real time, and sends them to one or more backup systems. MIMIX DB2 Replicator uses journaling to recognize database modifications and supports replication of data areas.



MIMIX Object Replicator uses the security audit journal to recognize object modification events and also supports replication of data queues. Both data and object changes are moved off of the primary system as quickly as possible to ensure the highest levels of data and application currency.

- Filtering ensures that only the changes that absolutely need to be replicated are replicated. Filtering can be performed either on the sending system or the receiving system which allows companies to optimize their CPU and communications resources, auxiliary storage use and performance on the clustered systems.
- Performance stamps recorded during the Send process and followed throughout the replication cycle are used to identify performance bottlenecks and communication capacity shortfalls. Timestamping is important for any recovery actions that might need to be either automatically or manually invoked.

- Event-driven Cooperative Processing for new or changed physical files allows MIMIX Object Replicator to automatically enroll database files into MIMIX DB2 Replicator for data replication, while MIMIX Object Replicator manages the existence and attributes of the file.

RECEIVE Collects transactions and object changes from the Send process, and stores and manages them on the backup system for processing by the Apply process.

- Staging allows information to be pushed off the sending system as quickly as possible, while allowing independent processing on the secondary system. This assures both information currency and operational flexibility on the backup system.
- Variable-length logspace entries make the most efficient use of available CPU and DASD resources.
- Automatic journal and log management minimizes auxiliary storage usage.

APPLY Reads all transactions and updates of secondary system(s) on either a real-time or scheduled basis.

- Data group file entry manages file name aliases, defines files down to the member level, and locks files during the Apply process for maximum configuration flexibility and to prevent them from becoming unsynchronized.
- Logspaces provide a powerful storage and manipulation mechanism that allows for easy management, usability and flexibility, achieves greater performance and reduces DASD, while protecting against data loss in the event of a production system outage.
- Replication history kept on both the production and backup systems provides accurate information on the object replication process even after a system failure, and ensures smooth switchover and restore processes.
- Objects in Error view provides error information and allows delete and retry options for ongoing object integrity. A command interface also allows automation of error resolution.
- Automatic retry is used when objects are not available for replication. If an object being replicated is in use by another application, the replication process will automatically delay the request and try again later before failing the request. Both short and long retry intervals are configurable making it possible for the replication process to proceed without operator intervention thus reducing operational costs.

MIMIX Promoter for the AS/400

MIMIX Promoter reorganizes database files while users retain access to their files. You can reorganize a database file thereby claiming unused space while keeping the original file on line. File update activity is captured and applied to the new file. After rebuilding is complete, MIMIX Promoter will automatically and transparently swap the new files into production. Downtime from your database reorganization is virtually eliminated.

MIMIX Monitor for the AS/400

MIMIX Monitor is like having that extra person you need but just don't have the budget for. MIMIX Monitor keeps an eye on your AS/400 environment 24 hours a day, checking systems and software for events and conditions, and then automatically responding to those conditions. MIMIX Monitor actions can range from report generation when a specified condition occurs, notification when ASP levels reach a certain level, or initiation of automatic switchover to a backup system in case of production system failure. MIMIX Monitor reviews the status of your system at scheduled intervals, leaving you free to tackle more challenging work.

Centralized Monitoring - Ready Access to All Monitors

MIMIX Monitor for AS/400 presents all monitor programs on a single screen with a uniform set of commands, minimizing the time and effort required for inserting or removing monitors or changing their parameters. Other data monitoring tools created by customers and third-party companies can be easily added through this interface. MIMIX Monitor includes prepackaged UPS monitor programs that check to ensure backup power levels are adequate.

Automatic Switching for Data and Application Availability

MIMIX Monitor, used with MIMIX Replicator, enables a completely automated switchover process from production system to backup system during unplanned downtime. MIMIX Monitor determines the need to switch to a backup system by examining specific events, and then triggering the logical and physical switches for network communications and hardware devices necessary to move users to the backup system. The MIMIX Monitor switch capability can also be used to offload your production system during planned downtime (i.e. routine system maintenance, nightly backups). Customization determined by the customer's environment and recovery time goals are necessary to determine the events leading up to the switch.

How MIMIX Monitor Enables Automated Switchover Capabilities

MIMIX Monitor manages both logical and physical switching. The logical switch controls the TCP/IP attributes and the timing of the communications switchover. The physical switch automatically and directly communicates with the gang switch controller to effect a switch. A variety of combined events can trigger a switch including monitoring communication objects, message queues, journals or scheduling a switchover.

Implementation Services

The proposed implementation services by Lakeview Technology and TRAX help you get the most out of your availability management solution using the MIMIX suite of products. They cover the gamut from planning to installation to training and are a standard part of every MIMIX solution. Upon completion of these services, you will have a working MIMIX environment and a staff that is trained in the use of MIMIX for your operations. In addition, your staff will be introduced to the appropriate support organizations for ongoing assistance as needed.

Following is a detailed explanation of the implementation process from start to finish.

- **MIMIX Planning Service**
 - **Integration and Planning form**
 - **Planning and Integration estimation**
 - **Planning Agenda**
 - **Planning report (signed by customer)**
 - **Planning Acceptance form (signed by customer)**
 - **Status report**

- **MIMIX Integration Service**
 - **MIMIX software (provided by Lakeview)**
 - **MIMIX documentation (hardcopy and CD, provided by Lakeview)**
 - **Access codes to enable the MIMIX software (provide by Lakeview)**
 - **Integration acceptance form (signed by customer)**
 - **Status report**

- **MIMIX Skill Enhancement Service**
 - **Operations reference handouts (customized for each implementation)**
 - **Skill Enhancement evaluation form**
 - **Skill Enhancement acceptance form (one per operator/administrator)**
 - **Status report**

- **MIMIX Initial Audit Service**
 - **Mimix Switch Procedures Document (customized for each implementation)**
 - **Project acceptance form (signed by customer)**
 - **Status report**

Software Maintenance

The option of one year of maintenance services is included in the price provided within this proposal.

Maintenance includes:

- Complete access to twenty-four hour, seven days per week telephone support
- New releases of the MIMIX software
- Software program changes and updates

Pricing List:**Configuration and prices for Securities Depository Center (Jordan)**

Two AS/400 Model 820 – 2395

Pricing**MIMIX Suite for IBM AS/400 9406 model 820, processor 2395 :**

MIMIX DB2 Replicator	\$6,000		
E. MIMIX Object Replicator		\$5,000	
MIMIX Monitor	\$4,000		
F. TOTAL SOFTWARE	for One system	\$15,000	

Three Years Maintenance that will cover all future S/W upgrades = \$9,000

MIMIX Suite for IBM AS/400 9406 model 820, processor 2395 :

MIMIX DB2 Replicator	\$6,000		
G. MIMIX Object Replicator		\$5,000	
H. TOTAL SOFTWARE	for the 2 nd system	\$11,000	

Three Years Maintenance that will cover all future S/W upgrades = \$6,600

NOTE: We only need MIMIX Monitor on one system.

Total MIMIX Investments with Three years Maintenance = \$41,600

Installation and Services for ten days = 10,000 USD Plus Expenses.

Expenses Include:

airfare (From Belgium to Amman)	\$1,500 Estimation
Hotel (\$150 A night)	\$1,500 Estimation
Misc	\$2,000 Estimation
Total Expenses and travel for ten days	\$ 5,000

Total Implementation with the BP Rate include expense \$15,000

Total Investment = \$55,600

Discount applied from list price is 23%

Thank you for the opportunity to work with you and for your interest in the MIMIX suite of software products. This proposal is valid through June 30,2002. Prices and terms may change upon expiration.

Best Regards,

Ahmad Khattab

Director of International Channels, EMEA.

SDC Applications servers specifications

Two (2) Clustered IBM RS/6000 servers items # 49, 50.

Each clustered configuration will consist of two (2) servers. The specified (4) servers will be housed in two racks (one for the Production and one for the Backup site).

The following are the specifications for each of the four (4) identical servers:

Machine Type	<ul style="list-style-type: none"> ▪ IBM pSeries 660 , ▪ Rack-drawer (5U-Processor / 5U – I/O)
Processor	<ul style="list-style-type: none"> ▪ 64-bit RISC Processor Architecture ▪ Two (2) -way 600 MHz RS64 IV (CPU speed) ▪ Future upgradeable to six (6) processors ▪ 4MB L2 Cache per processor
Memory	<ul style="list-style-type: none"> ▪ Two (2) GB ECC RAM ▪ Future upgradeable to 32 GB ECC RAM
Internal Storage	<ul style="list-style-type: none"> ▪ Two (2)x 18.2GB Ultra 3 SCSI – Mirror Protected (RAID 1)
Storage Controller	<ul style="list-style-type: none"> ▪ SCSI 2 F/W Internal controller ▪ ULTRA 2 SCSI external port for tape drive
Storage Interfaces	<ul style="list-style-type: none"> ▪ SSA Advanced Serial RAID, 160 MB/s
Multimedia	<ul style="list-style-type: none"> ▪ One (1) 32x Speed CD-Rom ▪ One (1) 3.5 Floppy Disk
NIC	<ul style="list-style-type: none"> ▪ Three (3) 10/100 Mbps Ethernet Interfaces ▪ <i>Should provide expansions for either SCSI and/or Fiber Connection to a Tape library – Future requirement.</i>
Integrated Ports	<ul style="list-style-type: none"> ▪ Key board, mouse connector ▪ Four (4) serial, ▪ One (1) parallel port
Expansion Slots	<ul style="list-style-type: none"> ▪ Fourteen (14) Hot-plug-able slots

Power	<ul style="list-style-type: none"> ▪ Redundant hot-plug power supply and cooling (n+1 principle) ▪ 220-240 V, 50Hz, ▪ Power connectors MK3
Manageability and Serviceability	<ul style="list-style-type: none"> ▪ Predictive failure analysis support ▪ Light path diagnostic
Operating System, Clustering Software and license agreement	<ul style="list-style-type: none"> ▪ AIX 5L, Ver5.1 license for unlimited number of users ▪ AIX Clustering Software (<u>HACMP 4.4</u>) ▪ <u>Concurrent Resource Manager</u> ▪ Three-years software upgrade subscription
Warranty	<ul style="list-style-type: none"> ▪ <u>Three (3)-Year International Warranty covering Parts</u>
Maintenance Contract	<ul style="list-style-type: none"> ▪ <u>Three (3) Year Maintenance</u> for hardware and software. Required response time of two (2) hours. A maximum MTTR of 24 hours

The specified four (4) servers will be housed in two racks (one for the Production and one for the Backup site) respectively.

Each rack will house 2 servers. The following are the specifications and required options for each of the two (2) racks:

Rack – Model 7014-T42	<ul style="list-style-type: none"> ▪ Fully equipped 7014-T42 IBM pSeries rack cabinet ▪ Should support multi power outlets ‘MK3’ ▪ The rack should also include a KVM switch,
Rack Console	<ul style="list-style-type: none"> ▪ 15” TFT Console – IBM 7316 TF1 ▪ Keyboard and Mouse should be integrated with the Rack Console
Patch Panel for Display, Keyboard and Mouse sharing	<ul style="list-style-type: none"> ▪ To be able to control up to eight (8) servers

Storage Expansion Unit 7133-D40	<ul style="list-style-type: none"> ▪ Min. 100 GB, ▪ Future expandable to 300 GB ▪ Disk drive size of 18.2GB (SSA Drives 7133-D40 'Storage Expansion Unit) ▪ <i>Cluster should be performed on the external storage</i> ▪ RAID-5 Protected ▪ Hot-swappable Power Supply and hot swappable Disk Drives ▪ Should be connected to the dedicated Integrated SCSI card on the Host
Tape Drive	<ul style="list-style-type: none"> ▪ Two (2) rack-mounted LTO tape drives 100GB/200GB, ▪ Each LTO drive will be connected to one server
Backup Media	<ul style="list-style-type: none"> ▪ 60 Tapes LTO 100GB/200GB ▪ 6 Cleaning Cartridges
Installation	<ul style="list-style-type: none"> ▪ Installation of the servers and their parts will have to be provided by a local (IBM or IBM-reseller) company.

Important Note: The RS6000 clustered servers will have to be Oracle 9i certified. This means that the servers will be able to take full advantage of all Oracle features and functions (Oracle parallel, replication, etc.)

Points for consideration in the RFP and procurement:

SDC prefers to acquire the IBM's pSeries – RS/6000 – for the following reasons:

- SDC has already acquired a number of IBM servers (NetFinity 7600, NetFinity 232, NetFinity 5000 and two (2) AS400 systems) and has maintenance agreements with UBM through AMIR-Program for the AS400 systems.
- The SDC likes to build a strong business relationship with a well-established and capable technology-provider. The Technology Provider should be able to support the SDC on the Hardware, Software, Training services and Technology Transfer for now and in the future (after AMIR Program),
- UBM – local IBM representative and agent – provides the above mentioned services with very knowledgeable and experienced staff,
- The ASE, has previously acquired pSeries servers for which UBM was the supplier and maintenance provider. The ASE is content with the services UBM has / and still is providing,

- A more (business) connected service provider relationship does have a positive impact on their services. With a bigger volume (and value) of installed equipment, the SDC also will be in a better position to negotiate future service contracts.
- The pSeries servers are extremely reliable. The SDC has conducted its own investigation, which shows RS6000 RISC machines are preferred for running Oracle based applications,
- pSeries servers are proven to be cost and value effective. pSeries servers provide high-performance even on entry-level servers compared with other market rivals.

Performance Indicators for the servers:

- *Average Daily Transactions: at least 25000 during office hours, divided in:*
 - *Daily trades 5000 (including OTC)*
 - *Daily Settlement transactions 10,000*
 - *Issuer, broker and other transactions 10,000*
- *On average every transaction updates 20 tables in the Oracle Dbase,*
- *History and audit trails are kept on the system (for 16 years by law), audit trail entries can't be deleted,*
- *End-of-day process takes one (1) hour to complete, excluding corporate actions processing,*
- *100 users connect concurrently to the system,*
- *It is expected that average users will perform 15-20 complex queries per day ,*
- *Actual Database size is 20GB,*
- *Data base size increase in historical and audit files is 15MB/day,*
- *Additional web-enabled applications and web-enabled services are being prepared by the SDC and to be implemented by early 2003,*
- *Tightly coupling to the ASE trading system for order verifications is taken into consideration. Number of daily orders for verification is 10,000 at normal day, peak runs at 2.5 times the average. Order verification takes place during trading hours (9:30 and 12:00Hrs)*

Specifications have been discussed and sizing done given the above criteria

WAN Management Software

CISCO WORKS

The CiscoWorks2000 line of products provides solutions targeted at the wide-area and local-area operations of enterprise networks. There are now four major solutions; The LAN Management Solution offers advanced management of the award-winning Catalyst multilayer switches. The Routed WAN Management Solution provides monitoring, traffic management, and access control to administer the routed infrastructure of multiservice networks. The Service Management Solution manages and monitors service-level agreements. The VPN/Security Management Solution optimizes VPN performance and security administration.

The Cisco Management Connection integration tool, allows Cisco, third party, or user-developed Web-based tools to be integrated into a single Web desktop. This Web-based management intranet simplifies accessibility and deployment of CiscoWorks2000 solutions.

Line Item # 15, 16

Workstations

QTY= 12

Processor and Chipset	Intel Penitum 4 Processor with minimum speed of 1.8 GHz Intel 860 Chipset with 400 MHz System Bus 512 KB-L2 Cache integrated on processor	
Memory	256 MB of RAM (with future expandibility to 1 GB)	
Hard Drives	1* 40 GB , 7200 RPM Hard Drives	
I/O Ports	PS/2 Key Board Connector PS/2 Mouse Connector Integrated Intel PRO/100 Network Connector 4 USB -Compliant Connectors	
Audio, Graphics Cards , CD ROM and Floppy	Compatible Sound card provided by the Manufacturer Compatible Graphics Card provided by the Manufacturer Compatible CD ROM & Floppy Drive	
Monitors	17" Monitor Flat Monitors 19" Monitor	QTY=9 QTY=3
Keyboard & Mouse	PS/2 Keyboard and Mouse, Provided by the Manufacturer	
Communications	Integrated Newtork Interface Card 10/100 PCI with Wakeup LAN	
Slots	5 PCI Slots	
Software	Microsoft Windows 2000 Professional and MS Office 2000 (arabic enabled) pre-installed Manufacturer Software	
Power	Norton Anti Virus 220-240Volt/ 50 Hz	
Conditions	3 years International Warrenty,covering spareparts. Spareparts should be available locally	
Note	Specs are similar to IBM Netvista or Compaq EV series	

Line Item # 17

AMIR

Printers **QTY=2**

Printing Colors	Black and White
Print Speed	Black-Normal : 25 Page Per Minute (PPM) (A4 Sheet)
Print Quality	Black : 1200x1200 dpi + ability to print in arabic
Paper Trays	Max 2
Memory	Memory 32 MB with future expandibility to 256 MB
Connectivity	Compliant Ethernet 10/100Base -TX
Conditions	1 Year Warranty. Spareparts and consumables should be available locally
Power	220-240V \ 50 Hz
Note	Specs. are similar to HP 4100 Series

Bundled Drivers	TWAIN, ISIS TM Compatible
ADF Capacity	50 Sheet
Scanning Mode	1 bit(line art, Halftone) 8 bit(256 levels greyscale) 24 bit(16.7 million color)
Speeds	20 ppm, A4 @ 200 dpi black and white 5 ppm , A4 @ 200 dpi color
software enhancements	Brightness,contrast, gamma, color matching
Power Source	220-240V AC, 50-60Hz
Consumption	35watts

1 year International warranty + availabilty of spare parts in the local market should be compatible with ZyLab Archiving Software, best is Avison Scanners

Note The best spces for the ZyLab software is
Avison 820c Scanners

Photo Copier **QTY=1**

Warms up under 30 Seconds
15 Pages per Minute
Reduction, Enlargment and 61%-141% Zoom in
Automatic Document Feeder
Automatic Image Density and photo mode
Energy saver mode
Copy size 5 1/2" x 8" to 11"x 17"
Power 220-240V AC, 50-60Hz

Note Specification Similart to Richo FT 4015

SWITCH (CISCO)**QTY=2**

Performance	<p>10Base-T/100Base-TX autosensing ports, each delivering up to 200 Mbps of bandwidth to individual users</p> <p>Two built-in, GBIC-based Gigabit Ethernet ports, delivering up to 4 Gbps aggregated bandwidth to Gigabit Ethernet backbones, Gigabit Ethernet servers, or between switches</p> <p>10.8 Gbps switching fabric and up to a 8.0-million- packets-per-second forwarding rate</p> <p>8 MB DRAM and 4 MB Flash memory onboard</p> <p>Full-duplex operation on all ports, delivering up to 200 Mbps on 10/100 ports or 2 Gbps on 1000Base-X ports</p> <p>4 MB memory architecture shared by all ports</p> <p>8192 MAC addresses</p>
Management	<p>SNMP Management Information Base (MIB) II, SNMP MIB extensions, Bridging MIB (RFC 1493)</p>
POWER	220-240v/50 Hz
Warranty	Lifetime Limited Warranty
Notes	<p>connectivity to JCM CISCO WAN</p> <p>Specifications similar to CISCO Catalyst 3524-PWR XL Stackable 10/100 Ethernet switch</p>

Line Item # 23

UPGRADE for existing Photo copier (RICOH Aficio 1035)

- Printer DIMM** for local printing
- Network Interface Card** for Network printing
- FAX Option** for sending faxes
- Smart Net Monitor** for Monitoring activities

Line Item # 24

Laptop**QTY=2**

Processor	Intel Pentium III-M Processor with Intel Enhanced SpeedStep technology at 866 MHz- M, 1.2 GHz-M On-die 512 KB Cache 32 KB Internal Cache(L1) 133 MHz external BUS frequency
Memory	128 MB SDRAM standard, upgradeable to 1024 MB Maximum 2 SoDIMM sockets, both are user-accessible
Media Bay	Floppy Drive, CD ROM should be not be swapable, all in the base unit
I/O Ports	9-pin serial connector 25-hole pin parallel connector serial infrared communications port audio jacks 15-pin monitor connector 6-pin PS/2-style keyboard, mouse and keypad USB 4-pin connector RJ11& RJ45 Connector or PCMCIA CARDS
Power	4-cell"intelligent" Lithium Ion battery AC Adapter, Input voltage: 90 to 264 VAC -50Hz
Display& Graphics Cards	15" TFT XGA active-matrix display with up to 1024x768 x16 M resolution Compatible graphics card provided by the manufactruer
Hard Drives	Min 40 GB Ultra ATA hard drive
Optical Devices	50x CD-ROM
Sounds Cards	SoundBlaster compatible voice and music sound card
Software	Microsoft Windows 2000 Professional & Office 2000 Proffesional (english/arabic enabled) Noron Anti-Virus 2002
Conditions	3 Year Warranty ,spareparts should be available locally
Accessories	Laptop Hand Bag

Line Item # 26

Digital Modems(CISCO)		QTY=30
Digital Modem Network Modules for CISCO 3600 Plat form(NM 30DM)		30 Digital Modem Network Module
Modem Protocol Supported	V.90, K56 flex, ITU-T V.23 at 75/1200 bps, Bell 103 at 300 bps,ITU-T V.22 at 1200 bps, ITU-T V.21 at 300 bps, V.32 terbo up to 19,200 bps, V.34 up to 28,800 bps	
Error Correcting link-access protocols:	V.42 Link Access Procedure on the D channel (LAPM), MNP 2-4	
Compression protocols: Upgradability	V.42bis (includes MNP-5) Modems are software-upgradable to accommodate future modem and fax standards.	
Notes	connectivity to JCM CISCO WAN	
Warranty	Lifetime limited warranty	
POWER	220-240V AC, 50Hz	

Line Item # 27

ATM Modem (CISCO)**QTY=1****Specifications**

PCI interface to the host
 ID serial eeprom
 Standard Cisco 3600 Series enable LED
 Hardware SAR function based on the IDT 77211 chip
 Hardware and software support for ATM Adaptation Layer 5
 Hardware and software support for per channel traffic shaping
 Hardware support for variable bit rate and unspecified bit rate for ATM traffic

Hardware support for operation and maintenance for ATM F4 and F5 cell types
 Software support for unspecified bit rate for ATM traffic and operation and maintenance for ATM F5 cell type

Full support for PVC connections
 Support for 1024 virtual channels on the network module itself

Support for ATM Forum User
 Network Interface (UNI) 3.1 and 4.0 for SVC

Interim Local Management
 Interface address registration
 RFC 1483 and RFC 1577 encapsulation
 Support for Cisco PPP over ATM
 MIB support for the ATOM MIB,
 ILMI MIB, Chassis MIB, and Interface MIB

Full 25.6 Mbps connectivity to an external ADSL modem or ATM switch.

Can be used for ADSL applications as well as desktop applications for connection to ATM backbones

Notes

Specifications Similar to :1-Port ATM-25 Network Module for the Cisco 3600 Series

connectivity to JCM CISCO WAN

Dot Matrix Printer Specifications

QTY=2

FEATURES

Fast Print speed
 Convenient & reliable paper handling(four paper feed paths)
 Convertible push/pull tractor
 Versatile switch panel
 Dual interface
 Supports full Arabization processing

PRINTING FEATURES

Print Method	24 Pin impact dot matrix printer	
Print Speed @ 15 cpi	DP	450 cps
	LQ	150 cps
No. of Characters Per Line	cpi	
	10	136
	12	163
	13.3	180
	15	204
	17	233
	20	272
No. of lines per inch	3,4,6,8,10.3	
Copy Capability	1 Original + 4 Copies	
Emulation Modes	Epson LQ (ESC/P2) Epson Fx IBM Pro Printer ANSI HP CITOH	
Paper feed Method	Friction feed(front/rear) Push tractor feed(Rear) Push-pull tractor feed(Front/Rear)	
Input Data buffer	64KB	
Interface	Centronics Parallel RS-232 serial	

ARABIC FEATURES

Bilingual Operating Modes 7-bit Arabic with SWCs, with
balancing SWCs with ESCs

8-bit Arabic Pure
with neutrals
with SWCs
with balancing SWCs
with ESCs

a special driver developed by SEDCO to enhance the
printing speed in ARABIC and Latin from Windows
Application

Electrical Requirments

Rated Voltage 220-240VAC
50Hz

Important Notes **ability to print in arabic is a must**
Conectivity to AS/400 server

1 year warranty on maintenance and spare parts,
spare parts should be available locally

Specs are similar to the ULTIMA 45 plus Dot matrix
printers

<u>Required IT Books and Publications</u>				
Seq	Book Name/Description	Author	Prtly	Clarification
	<u>AS/400 and OS/400</u>			These books are required for building the knowledge base of the IT staff which will assist them in providing better support and enhancement of the AS/400 servers
1	<u>Fortress Rochester: The Inside Story of the IBM iSeries</u>	Frank G. Soltis	H	
2	<u>Starter Kit for the IBM iSeries & AS/400</u>	Gary Guthrie & Wayne Madden	H	
3	<u>Implementing AS/400 Security, 4th Edition</u>	Carol Woodbury & Wayne Madden	H	
4	<u>SQL/400 Developer's Guide</u>	Paul Conte & Mike Cravitz	H	
5	<u>TCP/IP and the AS/400</u>	Michael Ryan	H	
6	<u>The OS/400 and Microsoft Office 2000 Integration Handbook, 2nd Edition</u>	Brian Singleton and Chris Peters	H	
7	<u>Mastering AS/400 Performance</u>	Alan Arnold, Jim Stewart, Rick Turner and Charly Jone	H	
8	<u>DDS Programming for Display and Printer Files - 2nd Edition</u>	James Coolbaugh	H	
9	<u>DDS Keyword Reference</u>	James Coolbaugh	H	
10	<u>iSeries and AS/400 APIs at Work (with CD)</u>	Doug Penceand and Ron Hawkins	H	
11	<u>CL Programming for the AS/400 - second edition</u>	Bryan Meyers and Dan Riehl	H	
12	<u>Jim Sloan's CL Tips and Techniques</u>	Jim Sloan	H	
13	<u>AS/400 Primer, Third Edition</u>	Doug Pence, Ernie Malaga, Ron Hawkins	H	
14	<u>AS/400 Programmer's Handbook, Volume II: More Toolbox Examples for Every AS/400 Programmer (with CD)</u>	Mark McCall	H	
15	<u>Developing Your AS/400 Internet Strategy</u>	Alan Arnold	H	
16	<u>Database Design & Programming for DB2/400</u>	Paul Conte	H	

Seq	Book Name/Description	Author	Prt	Clarification
17	Using Query/400	Patrice Gapen and Catherine Stoughton	H	
18	SQL/400 by Example	James Coolbaugh	H	
19	OPNQRYP by Example	Mike Dawson and Mike. Manto	H	
20	iSeries and AS/400 RPG IV at Work New!	Doug Pence and Ron Hawkins	H	
21	Subfiles in RPG IV: Rules, Examples, Techniques, and Other Cool Stuff (with CD) New!	Kevin Vandever	H	
22	Essentials of Subfile Programming and Advanced Topics in RPG IV	Phil Levinson	H	
23	RPG IV by Example	George Farr and Shailan Topiwala	H	
24	ILE by Example	Mike Cravitz	H	
25	RPG IV Jump Start, Fourth Edition: Your Guide to the New RPG New!	Bryan Meyers	H	
26	Mastering the AS/400 3rd Edition	Jerry Fottral	H	
27	iSeries and AS/400 RPG IV at Work	Doug Pence Ron Hawkins	H	
28	e-RPG: Building AS/400 Web Applications with RPG (with CD) New!	Bradley V. Stone	H	
29	Programming in RPG IV, Second Edition	Bryan Meyers Judy Yaeger	H	
30	VisualAge for RPG by Example	Bryan Meyers Jef Sutherland	H	
31	Building AS/400 Client/Server Applications	Michael Otey	M	
32	E-Business: Thriving in the Electronic Marketplace	Nahid Jilovec	M	
33	A to Z of EDI - Second Edition	Nahid Jilovec		
34	Understanding AS/400 System Operations	Mike Dawson Marge Hohly		
35	Java Application Strategies for iSeries and AS/400, 2nd Edition (with CD) New!	Don Denoncourt		
	<u>Other Books</u>			

36	Software Engineering		L	
37	Project Management		H	
38	UML		L	
39	Developing Web Application		M	
40	Security		H	
41	e-Business		H	
42	e-Commerce		H	
43	Networking and Communication		H	
Seq	Book Name/Description	Author	Prtly	Clarification
44	Technical Dictionary		H	
45	Business Dictionary		H	
46	Risk Management Tool Kit for Project Managers - CD ROM	Tech Republic	H	
47	Cisco CCNP Smart Pak	Tech Republic	H	
48	IT Professional's Guide to Policies and Procedures - CD ROM	Tech Republic	H	
49	Securing Your Enterprise: A Guide to Network Threat Management	Tech Republic	H	
50	Tech Tips for Windows Administrators	Tech Republic	H	
51	Administrator's Guide to TCP/IP	Tech Republic	H	
52	Administrator's Guide to Disaster Planning and Recovery	Tech Republic	H	
53	Administrator's Guide to Active Directory	Tech Republic	H	
54	Administrator's Guide to Active Directory	Tech Republic	H	
55	2002 IT Manager's Tool Kit	Tech Republic	H	
	<u>CISCO Books</u>			
56	CCNP switching - exam certification guide	CISCO PRESS	H	
57	Designing CISCO Network	CISCO PRESS	H	

58	CCDA Exam Certification Guide	CISCO PRESS	H	
59	CCNP Remote Access - Exam Certification Guide	CISCO PRESS	H	
60	CCNP Routing - Exam Certification Guide	CISCO PRESS	H	
61	CISCO CCNA Exam #640-607 - Certification Guide	CISCO PRESS	H	
	<u>IT Publications and Periodicals</u>			
62	iSeries News		H	AS/400 oriented
63	Computer World		H	IT updates and business news. \ INFORMATIVE
64	Microsoft TechNet		H	
65	PC Magazine		H	PC-Hardware and Peripherals
	<u>ANY BUSINESS NEWS BULITEN THAT CAN USEFUL TO US.</u>			
	<u>Priority Levels :</u>			
	H : Highest Priority - <i>Delivery within a maximum of THREE Weeks</i>			
	M : Medium Priority - <i>Delivery Within a maximum of SIX Weeks</i>			
	L : Lowest Priority - <i>Delivery within a mximum of TWELVE Weeks</i>			

IT TRAINING REQUIREMENTS

Seq	Course Description	Prty	Clarification
1	Oracle		For SDC's applications development and administration
	DBA Track	M	
	Development Track	M	
2	AS400		To be able to better operate, efficiently support and enhance AS/400 application.
	DB2 for AS/400 SQL Programming Workshop (OL31)	H	
	AS/400 Recovery and Availability Manager (OL51)	H	
	DB2 UDB for AS/400 Fundamentals (OL45)	H	
	Accessing the AS/400 Database Using SQL(OL37)	H	
	AS/400 Communication Introduction (OL70)	M	
	AS/400 Control Language Programming Workshop (OL20)	M	
	Developing AS/400 Applications Using SQL (OL38)	M	
	AS/400 Internet Access & TCP/IP (OL92)	M	
	AS/400 RPG IV Programmers' Workshop Advanced Topics (OL88)	H	
	AS/400 RPG IV Programming Workshop (OL86)	H	
	AS/400 System Administration & Control (OL19)	H	
	DB2 UDB for AS/400 SQL Advanced Programming (OL39)	M	
	AS/400 V3R1 Security Concepts & Planning (OL50)	H	
	IBM Firewall for AS/400(OL11)	L	
	DB2/400 Relational Database Coding & Implementation (OL62)	H	
		IBM AS/400 Query Workshop (OE14)	M
OS/400 Structure, Tailoring & Basic Tuning (OL23)		H	
iSeries 400 Logical Partitioning (LPAR)		H	
Seq	Course Description	Prty	Clarification
	AS400 Tracks		The following URLs highlight the Tracks Specification :

	iSeries Operations and System Management	L	http://www-5.ibm.com/services/learning/uk/as4_dev_map.html
	iSeries Application Development	L	http://www-5.ibm.com/services/learning/uk/as4_ops_map.html
	iSeries Technical Certification Preparation Workshop	L	http://www-5.ibm.com/services/learning/uk/tairis.nsf/(ExtCourseNr)/AS41GB
	iSeries Connectivity and the Internet	L	http://www-5.ibm.com/services/learning/uk/as4_con_map.html
3	Cisco Certifications		To be to provide support for the CISCO equipment at SDC
	CCNA + CCNP (Network Installation & Support)	L	
	CCDA + CCDP (Network Engineering & Design)	L	
4	Security (<i>Web + Network + Internet + Intranet</i>)		To be able to design, configure and implement a security policy
	Operating Systems : Windows, Unix and AS/400	M	
	Network : Mainly VPN, e-Signature and Radius	M	
5	Unix		To be able to operate, support and enhance Unix application
	Basic Unix Training + Unix Installation + System Administration + Unix Security	L	
6	EFA-Equator		For new SDC Staff and to Train-the-Trainers
	Technical Training	H	
	Business Training	H	
7	UML training	L	To be able to analyze, design and document new systems and to reverse engineer current systems.
8	Java Programming and tools	L	To be able to develop portable software
9	Microsoft		To support and better make use of the variety of Microsoft products available at SDC
	MCSE	L	
	MS Project	M	
	MS Office	M	
	Exchange	L	
	Proxy	M	
	IIS	M	
	Web master courses	L	
Seq	Course Description	Prty	Clarification

10	English Language	H	To improve the SDC's staff English language skills
11	Flash (Macromedia)	L	To produce Computer Based Training material for SDC staff and members. To enhance SDC website
12	Certified Information System Auditor - CISA	M	To enhance the IT Auditing skills
13	Web Development	L	
14	Internet Usage	M	To improve the SDC's staff internet usage skills
15	SWIFT	L	Required for Bank Transfers
16	Project Management Course	M	Needed to enhance the SDC's staff management's skills
Priority Levels :			
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L : Lowest Priority - <i>Delivery within a maximum of TWELVE Weeks</i>			

