



# Technical Specifications

## Automated Trading System

### Description

AURA's Customer has a relationship with a Partner who runs a Sungard system. The Partner performs trust management services for the Customer. The Partner has a new system that allows stock trades to be made through an encrypted private frame connection. This system interfaces with the Customer's mainframe, a Series 11 VMS system.

Our Customer was given a file layout code with which to receive information and make automated E-trades. This makes it possible to have a tickler for file layout of automating information given to the system to conduct multiple trades. Information therefore does not need to be re-entered into every field every time a trade is executed.

Our Customer's business relationship requires the Customer to access the Partner's mainframe through the Sungard system. The project goal was to create a database to take information out of the Customer's mainframe, reformat the information as necessary to maintain data integrity, and migrate the file layout to a format that is acceptable by the Partner's system. On the back end, the Customer receives confirmations that must be reformatted in an acceptable mainframe format.

In summary, AURA created a middle-tier software solution to receive trade files, translate the data, and forward those files to the Sungard system. Once the Sungard system processes the data and completes the trade, it is then sent back through AURA's software solution. Confirmations are also acknowledged through the system.

### Overview

Customer's trading system creates a trade file two times per day, Monday through Friday. The system uploads the trade file to an FTP server. A similar in-kind file is also created once a day and uploaded to the server. AURA's application retrieves and logs these trade files from the FTP server to a Microsoft Access or SQLServer 2000 database. The application converts the file, according to mapping and business rules established in the design phase of the project, to be used as input to the SunGard Direct System. At this point in the process, Customer has the ability to see these trades as pending. After the file has been converted, it is stored on an appropriate network drive. Later, employees of Customer import it into the SunGard system to execute the requested trades. After the brokers execute the trades, settlement information is returned to the SunGard system. The AURA application reads settlement information from the SunGard database and logs the settlement information to the "Access" database. The data is converted to a Customer format file and FTPed to the Customer/Partner FTP server.

Additional files that pass between Customer and Partner are Dividend, Wire, and Position. Dividends are received from SunGard. Once a day, the application collects Customer account dividend information, converts the data to the Customer's format, and copies the file to the Customer/Partner's server.

Customer sends a Wire file to Partner at the end of the day for all 'BUY' trades made that day. The total dollars for this file must match the dollars required for all 'BUY' trades received that day. Likewise, Partner sends a Wire file to Customer at the beginning of the day for all the 'SELL' trades made for day three days prior. The total dollars for this file must match the total dollars from all 'SELL' trades the day three days prior. The files are presented in the Customer's format.

The position file is created daily from account position data in the SunGard database and sent to Customer in Customer's format.

The "Access" database is the control point for adjustments to the trade transactions as they pass from Customer to the SunGard system. It also logs the residuals as they come back with the settlement information. This allows the residuals to be applied to new trades as they pass through the system.

## Technology

The following technologies and environments were used in the development of the Partner's trading system include:

- C/C++ was used to develop the data scrubbing and exchange programs
- **SQLServer 2000** database(s) were implemented for logging transactions and dollar accounting
- **Windows NT 4.0 or 2000** is the Partner's chosen operating system environment.
- Customer or Partner hosts the FTP server for Customer files. Partner and/or Customer provided AURA employees with remote access to this server. AURA's recommendation was that this server also be **Windows NT 4 or 2000**.
- **ODBC** was used to interface with the SunGard Database

## Risks

The following project risks were identified:

- Encryption of data
- Additional file types
- Changes to identified file types
- Access to the SunGard system for testing
- Delays in testing

## Components

### Customer Listener

This component looks for certain files at certain times of the day on the Customer server. If the file is there, it FTPs the file onto the Partner server and decrypts the file. It then copies the file to a specified history directory/file. The system then writes the information contained in the file into the appropriate table(s) in the Partner database. The system also outputs a SunGard format file to be FTPed to SunGard. Dollar trades are written to an exception file for manual processing. The system currently only handles unit trades. This file is stored in a specified directory on the Partner server or LAN and FTPed to the SunGard server. Based upon share prices and Money Market account info from the Partner database, the system also kicks out an exception file that lists trades that have enough money in the money market account to cover a trade. An email is sent with this exception file.

### Inputs

Customer Trade File - expected times available on server, 10:30 AM and 2:00 PM

Customer Wire File - 3:30 PM

Customer Dividend Wire File - 12:00 PM

Customer In-Kind File - 8:00 AM

### Outputs

SunGard Trade File

Trade Exception File - Trade requests that have enough money in the account to cover a trade

Email Notification - to person(s) that are responsible for sending trades to SunGard.

Wire Exception Reports - When the wire from Customer does not match "BUYS".

History Files - copies of files in history directory

Customer Wire File input to Partner database. Matched against "BUYS" for the day.

Customer Dividend Wire File input to Partner database and matched against declared and paid dividends.

## Functionality

### Connect:

This module connects to the Customer server

**Test Case:** We can connect to Customer server.

### Copy File:

This module copies the Customer file to a history file.

**Test Case:** The file is successfully copied to the history directory and file.

### Get File:

This module gets the Customer file and FTP it to the Partner server.

**Test Case:** We can FTP files from Customer server to Partner server.

**Test Case:** What happens when file is not there.

### Decrypt File:

This module decrypts the file we get from Customer.

**Test Case:** The file is in a readable format we expect when decrypted.

### Process Files: Trade, Wire, Dividend Wire, and In-Kind

These modules processes the four different input files.

**Test Case:** We can create correct SunGard Trade files that match the Customer inputs.

**Test Case:** Customer wire file matches to all 'BUY' trades in database for the day.

**Test Case:** Customer dividend wire file matches to all declared and paid dividends in database for the day.

### Write to Database:

This module writes data to the Partner database.

**Test Case:** Successful return message from DB.

**Test Case:** The data in our database is correct and matches to Customer files.

### Write to Exception File:

This module writes exception records to a file for manual processing.

**Test Case:** File is created and contains exceptions. File is not created when there are no exceptions.

### Create and Send Email:

This module creates and send emails based on various events that may happen, primarily the creation of an exception file.

**Test Case:** Emails can be created and sent to the correct recipient.

### Create SunGard file:

This component sends the SunGard file to SunGard interface. We create the file and FTP it to a predetermined server.

**Test Case:** SunGard can get files and use them to complete trades.

## Assumptions

- Customer files would be available on the server at the specified time.
- Customer files are correct.
- Encryption method has been determined.
- All business rules have been identified.

File layouts and descriptions are contained in Appendix A to this document.

## Partner Data Engine

This component looks for settlement information of Customer trades at certain times of the day. It gets the required settlement data, writes it to the appropriate records in the Partner database, and creates a

settlement file to be FTPed to Customer. Two dividend files, Stock/Cash and Cash Reinvestment, are created from SunGard dividend data and sent to Customer. It also creates and sends the Sell Wire File and Position File. All created files are copied to a history file.

**Inputs:**

Trade Confirmation Dollars - SunGard DB will be queried at 12:20 PM and 3:50 PM  
Trade Confirmation Shares - SunGard DB will be queried at 11:15 AM and 2:45 PM  
In-Kind Confirmation Shares - SunGard DB will be queried at 9:00 AM  
Dividend Declaration Stock/Cash - SunGard DB will be queried at 8:30 AM  
Dividend Declaration Cash Reinvestment - SunGard DB will be queried at 12:00 PM  
SELL Wire Dollars - SunGard DB will be queried for settled trades at the end of the trading day  
Customer Position Data - SunGard DB will be queried for account positions at the end of the trading day

**Outputs:**

Trade Confirmation Dollars File - Customer can expect file on server at 12:20 PM and 3:50 PM  
Trade Confirmation Shares File - 11:15 AM and 2:45 PM  
In-Kind Confirmation Shares File - 9:00 AM  
Dividend Declaration File (Stock/Cash) - 8:30 AM  
Dividend Declaration File (Cash Reinvestment) - 12:00 PM  
Wire File (SELL) - 8:30 AM  
Customer Position File - 8:00 AM

Partner Wire File must match "SELLS" for the day.

**Functionality:**

All modules as specified above in the Customer Listener.

**Put File:**

This module FTPs Customer settlement files to the Customer server.  
**Test Case:** We can FTP files from Partner server to Customer server.

**Encrypt File:**

This module encrypts the file to send to Customer.  
**Test Case:** Customer can decrypt the file to a readable specified format.

**Connect and Retrieve Data from SunGard Database:**

This module connects to the SunGard DB and retrieves relevant Customer trade and dividend settlement data.

**Test Case:** Successful return message from DB.

**Test Case:** We are able to retrieve desired data from the SunGard DB.

**Assumptions:**

- We can connect to the SunGard database - ODBC has been set up and we have a login to the DB.
- Relevant tables and columns in SunGard DB were identified.
- All business rules have been identified.

## Appendix A - File Layouts

**Trade / Confirmation File Layout:**

The trade file contains all the trade requests from Customer; Partner sends a confirmation file to confirm that the trades were placed. There are several fields that Partner fills out as a result of the information returned from the broker. Customer sends a trade file at both 10:30AM CST and 2:00PM CST. Customer

sends back confirmation on share trades at 11:15AM CST and 2:45PM CST and confirmation on dollar trades at 2:45PM CST.

#### **Wire File Layout**

The wire file is used to communicate the trades that make up the wire that will be sent that day. Customer sends a file at 3:30PM CST for all the dollar purchases for the day as well as any share trades that were confirmed before 3:00PM CST. Partner sends a file at 8:30AM CST for all the redemption trades that are included in the wire for that day.

#### **Dividend Declaration File Layout**

The dividend declaration file is used to inform Customer of the dividends that have been declared on the investments. Partner sends the file at 8:30AM CST for the stock dividends and the cash dividends. The cash dividends reinvested in stock are in a separate file at 12:00PM CST.

#### **Dividend Wire File Layout**

The dividend wire file tells Partner when to wire the cash dividends to Customer. Customer sends the file at 12:00PM CST listing the dividends and amount to be wired by the end of the day.

#### **In-Kind File Layout**

The in-kind file is used to inform Partner of DTC in-kind requests that need to be processed. All paper in-kind requests remain with the current manual process. The in-kind file is sent to Partner at 8:00AM CST. Partner then requests the trade and sends back confirmation when the re-registration has taken place. The timing is within 3 days of the initial request. Partner sends the file at 9:00AM CST.

#### **Position File Layout**

The position file tells Customer of the settled position on Partner's side as of the end of business the previous night. This position includes the shares in the investment along with the money market account and the cash account. Partner sends the file at 8:00AM CST.

NOTE: This includes any dividends that are currently being held in the money market or cash accounts as well as interest.

## SunGard Trustware 11 Record Layout for Transaction

Field Name	Format	Description
'BUY' or 'SELL'	Character	Required 'BUY' or 'SELL'
External Source ID	Alpha-Numeric	Optional
Account Number	Numeric	Required
Account Name	Character	Auto-Filled by SunGard
Cusip Number	Alpha-Numeric	Required
Security Name 1	Alpha-Numeric	Auto-Filled by SunGard
Security Name 2	Alpha-Numeric	Auto-Filled by SunGard
Security Name 3	Alpha-Numeric	Auto-Filled by SunGard
Security Name 4	Alpha-Numeric	Auto-Filled by SunGard
Fee Base	Character	Optional
Portfolio	Character	Required
Trade Service Number	Numeric	Optional
Trade Date	MMDDYY	Required
Transaction	Character	Auto-Filled by SunGard
Price Per Unit	8.6 Numeric	Conditional
Units	11.6 Numeric	Conditional