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Wall Street Systems – **Empowering** Treasury Trade and Settlement

WALLSTREET SYSTEMS

Wallstreet Suite

System Administration Guide

Version 7.3.16

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The windows and screen images shown herein were obtained from prototypes during software development. The actual windows and screen images in the software may differ.

First Edition (August 2011)

This edition applies to Wallstreet Suite version 7.3.16 and to all later releases and versions until indicated in new editions or Wall Street Systems communications. Make sure you are using the latest edition for the release level of the Wall Street Systems product.

Contents

Preface

Introduction

This guide is intended for Wallstreet Suite system administrators who maintain the multiple modules of Wallstreet Suite.

How to use this book

Conventions

Examples in this book are shown for both Windows and Unix operating systems. You should make the necessary changes where appropriate, for example:

- Slashes or backslashes: `/usr/bin/` for Unix, and `C:\` for Windows.
- Names of environment variables: `$ENV_NAME` for Unix, `%ENV_NAME%` for Windows.

WebSuite and its modules

WebSuite is Wallstreet Suite's web-based interface that contains either or both of these modules:

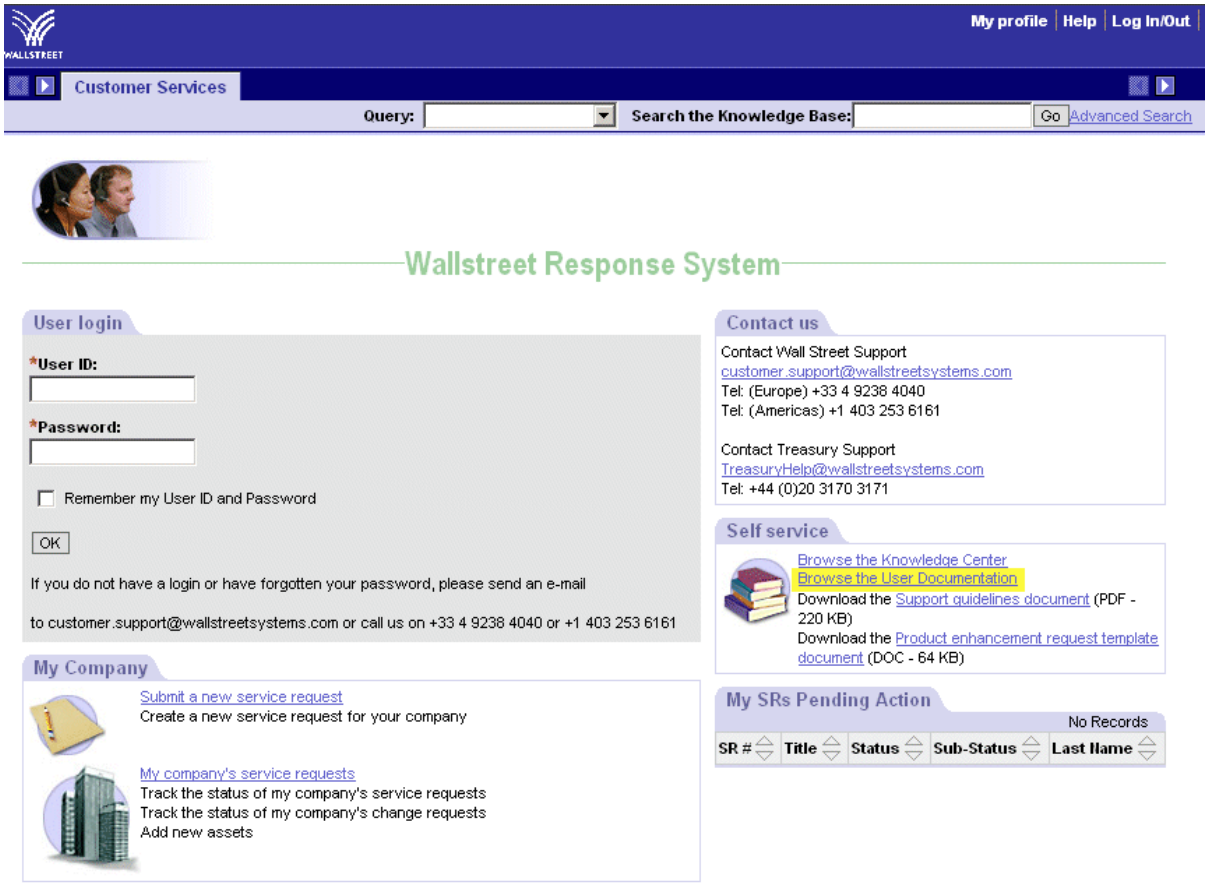
- Cash Management Module (CMM)
- TRMWeb: the web-based version of the Transaction and Risk Management Module (TRM).

When referring to the individual modules of WebSuite, the convention is "WebSuite (CMM)" or "CMM", and "WebSuite (TRM)" or "TRMWeb".

Associated documents

Associated documents can be accessed from the Help menu of Wallstreet Suite applications.

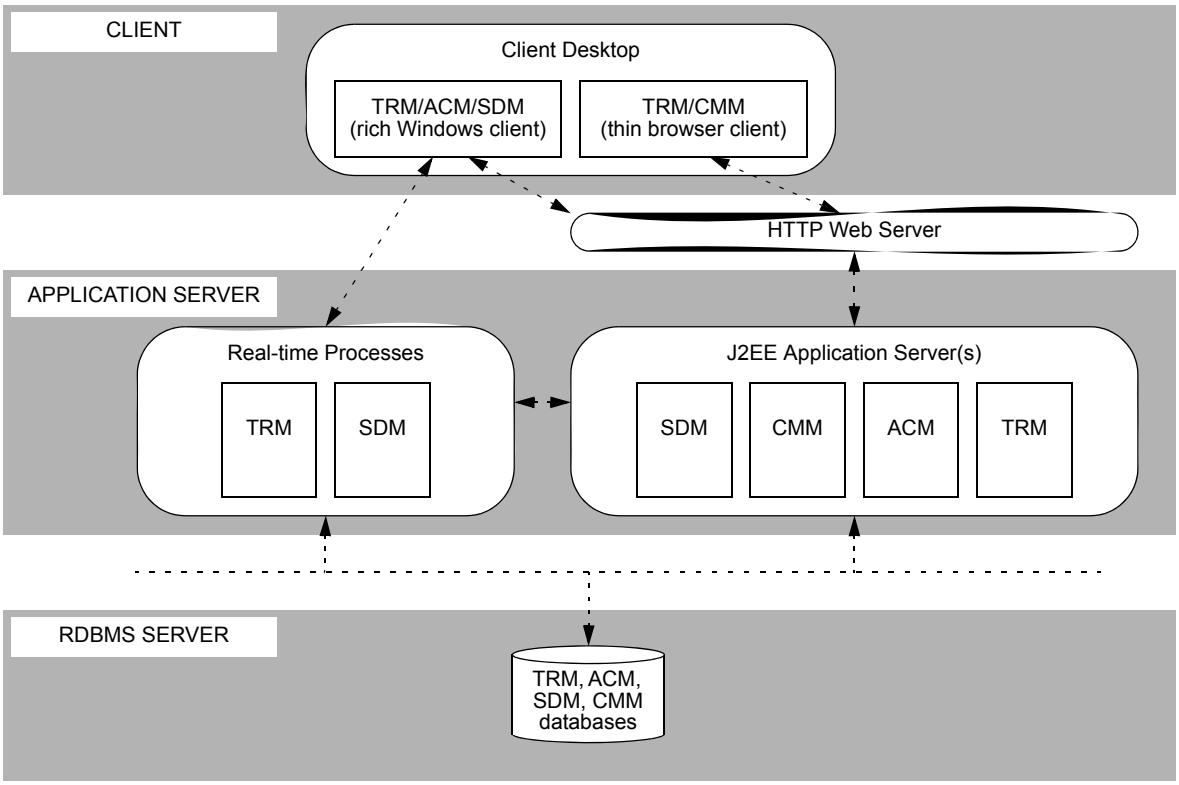
All Wallstreet Suite user documentation can be downloaded from the Customer Support site https://customerservices.trema.com.



Chapter 1 Introduction

1.1 Architecture overview

The diagram below gives an overview of a Wallstreet Suite system that includes Transaction and Risk Management Module (TRM), Cash Management Module (CMM), Accounting Module (ACM), and Static Data Module (SDM).



1.2 Installation

1.2.1 Database

The Wallstreet Suite currently supports the following databases: Oracle, MS SQL Server, and Sybase.

1.2.1.1 Oracle

The Wallstreet Suite can be implemented in one Oracle instance with two schema owners. The first schema owner is for TRM and ACM, and the second for CMM. Some customers may choose to deploy

CMM in a different Oracle instance for performance reasons. Follow the TRM, ACM, and CMM installation instructions for creating the Oracle instance and creating the module schemas.

1.2.2 Application Servers

The Wallstreet Suite uses J2EE application servers to implement the business logic of the following modules:

- WebSuite (TRMWeb part)

  This is a web-based front end to core TRM business logic, achieved by encapsulating CORBA business objects. The interface is delivered in a web application archive (WAR) file.

- WebSuite (CMM part)

  All of the CMM business logic is contained within a WAR file. Users access the business logic through a J2EE servlet that is deployed within the application server.

- Accounting Module (ACM)

  ACM business logic is deployed in the application server as a J2EE application contained in a WAR file. Users access the businesses logic through:

  - Wallstreet Suite activities launched from the Activity Manager
  - ACM Reports using Wallstreet Suite Report Generator
  - The ACM Accounting Entry Manager. The ACM Accounting Entry Manager is built using the Eclipse Rich Client Platform (RCP).

Currently none of the Wallstreet Suite modules are using Enterprise Java Beans (EJBs). This allows the suite to be deployed in lighter weight JSP/Servlet containers such as Tomcat.

1.2.2.1 Tomcat

The Wallstreet Suite installation package contains a Tomcat application server. This package is then preconfigured according to the needs of each module.

1.2.2.2 Weblogic

For customers who prefer a commercially-supported application server, the Wallstreet Suite is certified to run against Weblogic. Customers wishing to use Weblogic must download and install the Weblogic container. The Wallstreet Suite installation package for Weblogic includes steps to customize a pre-installed Weblogic application server. This means that each module delivers a plug-in that can be used to automatically configure an existing Weblogic application server. Refer to the individual installation procedure guides of each module for details.

Chapter 2 Integrating Wallstreet Suite modules

This chapter describes the steps for manually integrating the Wallstreet Suite modules.

Note: If your organization installed Wallstreet Suite using the Suite Installer, these steps have been completed.

2.1 Integrating WebSuite (CMM) with TRM and ACM

Once WebSuite is installed, you must edit the module's `integrated_suite_module_config.xml` file if you are planning to integrate the module with TRM and ACM.

The `integrated_suite_module_config.xml` file indicates which modules are installed in your organization's environment. By default, only CMM is flagged as installed in the file. The file drives CMM functionality related to integration; therefore, you must edit it if TRM, ACM, or both are also installed in your organization's environment.

To edit the `integrated_suite_module_config.xml` file:

1. Log into CMM.
2. Select **Admin - Utilities - Setup - Review CMM Configuration Documents**.
3. In the **Review Configuration Documents** page:
   a. Ensure the list at the top of the page is set to `DefaultData Config Documents`.
   b. Click **integrated_suite_module_config.xml**.
   c. Remove the comment tags (`<!--` and `-->`) surrounding TRM's and ACM's `module` elements:

```
<?xml version="1.0" encoding="UTF-8"?>
  <module_config>
  <module name="cmm" installed="true"/>
  <module name="acm" installed="true"/>
  <module name="trm" installed="true"/>
</module_config>
```

   d. Click **Save**.
4. Log out of WebSuite.
5. Restart the application server.

2.2 Integrating WebSuite (CMM) with TRM

Once CMM and **tcmd** are installed, you need to integrate CMM with TRM so that the following data can be shared:

- TRM to CMM
  - Financial transactions
  - Interest rates
  - Foreign exchange rates
- CMM to TRM
  - Bank balances
  - Forecasts.

For the CMM-TRM integration components to function properly, certain TRM services and the **tcmd** application server must be running.

2.2.1 Starting the TRM integration services

The following TRM services are required for the integrated environment to function and must be started in this order:

1. CORBA naming service (OmniNames)
2. Real-Time Message Delivery Service Daemon (MDSD)
3. TRM-to-CMM forecast services:
   - **Forecast** service running under **serviced**
4. TRM-to-CMM cash movement services:
   - Transaction Daemon (**transd**)
   - Settlement Manager environment variable
5. TRM-to-CMM foreign exchange and interest rate services:
   - Prices Manager Module Daemon (**moduled**).

Note: The following sections assume that you will start these TRM services from a command line shell with all of the TRM environment variables set (in other words, an evaluated shell). To obtain an evaluated shell, select **Shell** from the TRM Application Manager.

2.2.1.1 Starting the OmniNames CORBA naming service

The CORBA naming service holds the references to all of the different integration components. The integration components locate each other through the CORBA naming service. TRM ships with a default CORBA naming service called **OmniNames**.

To start the OmniNames CORBA naming service, enter the following at the command prompt:

```
omninames -start
```

Note: By default, the **OmniNames** naming service caches CORBA object references. Usually, these cache files are stored in `C:\temp` in Windows environments. If all services are being restarted, it is safe to remove these cache files.

2.2.1.2 Starting mdsd

mdsd sends real-time messages to the various TRM services. This daemon notifies the other services when changes occur within TRM.

To start **mdsd**, enter the following at the command prompt:

```
mdsd
```

2.2.1.3 Starting the Forecast service

In Process Monitor, find the Forecast service under **serviced** and start it.

2.2.1.4 Starting the TRM-to-CMM cash movement services

Cash movements are sent to CMM via the TRM Settlement Manager. When a user accepts a payment or receipt in the TRM Settlement Manager, a request is sent to CMM via TCMD. CMM either accepts the payment or receipt, or rejects it. If CMM rejects the payment or receipt, the user is notified with the reason.

transd and one environment variable must be set for this interaction to work.

2.2.1.4.1 Starting transd

transd notifies other TRM services when transactions are being modified. This is required in integrated environments to ensure that the financial forecast services are notified of any changes to the underlying transactions they are monitoring. Specifically, as cash movements are being sent to CMM, the corresponding financial forecasts should be removed.

To start **transd**, enter the following at the command prompt:

```
transd
```

2.2.1.4.2 Adding the FK_CMM_CONNECTION environment variable

To allow the TRM Settlement Manager to send cash movements to CMM, it must know how to locate the running TCMD cash movement service. When TCMD is started (see *2.2.2.2 Starting tcmd* on page 17), it registers the cash movement service to the CORBA naming service. The TRM Settlement Manager needs to know the name of this CORBA instance, and the name is passed to the TRM Settlement Manager via an environment variable.

The value of the environment variable should be the same name as the cash movement service in the TCMD runtime parameter configuration file. Usually, this is `cash-movement`.

Add the following environment variable to the TRM GUI environment:

```
set FK_CMM_CONNECTION=cash-movement
```

2.2.1.5 Starting the TRM-to-CMM interest and foreign exchange rate services

CMM obtains rates using two methods:

- Interest rates are retrieved from TRM via **tcmd**.
- Foreign exchange rates are retrieved via **tcmd**.

TCMD uses a Price Manager service running inside **moduled**.

When starting **moduled**, you specify the name of the CORBA Price Manager instance. Typically, this is `prices`.

To start **moduled**, enter the following at the command prompt:

```
moduled -f prices=default_prices -r 2> integ-prices.txt 1>&2 &
```

2.2.1.5.1 moduled and the --module-no-redirect option

One of the options available for **moduled** is `--module-no-default` that disables the use of the default configuration file. This option also requires the use of `--module-config`, or `--module-alias` and `--module-redirect`.

Therefore, to supply a redirect specified at the command line that is not overridden by one supplied in the configuration file, we recommended that you use `--module-no-redirect` instead.

Run **moduled** with the `--help` option to display a list of possible options and arguments.

2.2.1.6 Starting the TRM integration services using shell scripts

The shell scripts in this section start the TRM services on Unix and Windows.

These shell scripts are examples only and are not intended for a production TRM environment. You need to adjust them for your organization's TRM environment.

Note: **transd** is not included in these shell scripts because it is already running in most TRM environments.

Unix shell script:

To be modified •••

```
$> cat /usr/trema/fk7.1.0/bin/integration-services.sh

#!/bin/sh
eval `/usr/trema/fk7.1.0/bin/environ -e fk710Ident`
PATH=$FK_HOME/sbin:$FK_HOME/bin:$PATH
export PATH
FK_DB_SERVER=FK71DB.CORP.TREMA.COM
export FK_DB_SERVER

FK_LOGIN=DBO/fk71
export FK_LOGIN

kill -9 `cat integ-tmd.pid`
tmd --service-name tmd-cmm 2> integ-tmd.txt 1>&2 &
echo $! > integ-tmd.pid


kill -9 `cat integ-prices.pid`
moduled -f prices=default_prices -r 2> integ-prices.txt 1>&2 &
echo $! > integ-prices.pid


kill -9 `cat integ-tcfd.pid`
tcfd -s -v --portfolio TOP --tmd tmd-cmm --context 3 --column-cashflow-type
2>integ-tcfd.txt 1>&2 &
echo $! > integ-tcfd.pid
```

Windows shell script:

To be modified •••

```
type integration-services.bat

start tmd --service-name tmd-cmm 2> integ-tmd.txt 1>&2 &
start moduled -f prices=default_prices -r 2> integ-prices.txt 1>&2 &

start tcfd -s --portfolio TOP --tmd tmd-cmm --context 3 --column-transaction
--column-cashflow-type 2>integ-tcfd.txt 1>&2 &
```

2.2.2 Starting the CMM integration services

The CMM integration services are handled by a Web-service-based application called **tcmd**.

CMM uses **tcmd** to process messages for the following services:

- TRM-to-CMM forecasts
- TRM-to-CMM cash movements
- Interest rates

- Foreign exchange rates.

2.2.2.1 Setting the tcmd Web Service URL configuration parameter

For CMM to communicate with TRM via the **tcmd** application server, you need to set the TCMD Web Service URL configuration parameter in CMM to the URL used to locate the TCMD application server. (Usually, you only need to change the port.)

For information on setting configuration parameters, see the *WebSuite System Administration Guide*.

2.2.2.2 Starting tcmd

You start **tcmd** using the batch files and shells scripts created by the Suite Installer.

2.2.3 Configuring other integration components

The export of balances from CMM to TRM are handled outside **tcmd**.

2.2.3.1 Configuring balance export

The balance export is done directly from CMM by calling the TRM ImportBalance stored procedure. This procedure inserts data into the database.

A JDBC connection is created from the CMM application server to the database server. The JDBC connection is configured via the `TRM_config.xml` file. This file is automatically generated during the installation of CMM and is located in
`..\<CMM Instance>\InstallationData\installation\database\`

Note: If the `TRM_config.xml` file is incorrect, the export balance interface does not work. Typical mistakes include incorrect user, incorrect password, incorrect database server, and missing file.

Because of how the JDBC driver is used in CMM, it is only possible to obtain the return code from the procedure in failure cases. This may make troubleshooting difficult. In test environments, it is possible to execute the procedure directly to troubleshoot an issue.

Note: Executing these procedures will modify the database.

The following SQL statements allow you to do this.

Oracle:

```
set serveroutput on;
declare result number;
begin
dbms_output.enable(1000000);
result := ImportBalance (
  '<bank account number.',
   <amount>,
  '<client_id>',
  '<currency>',
  '<bank_client_id>',
   <balance_type_id>,
  TO_DATE('<MM-DD-YYYY 00:00:00>','MM_DD_YYYY_HH24_MI_SS'),1);
dbms_output.put_line('Result:' ||result);
end;:
```

SQLServer:

```
exec ImportBalance
  '<bank account number.',
   <amount>,
```

```
  '<client_id>',
  '<currency>',
  '<bank_client_id>',
   <balance_type_id>,
  '<balance_date>', 1
```

2.2.3.1.1 Examples

Oracle:

```
set serveroutput on;
declare result number;
begin
dbms_output.enable(1000000);
result := ImportBalance (
  'IHB_11286FT_EUR',
   10000,
  'DAU-SIRAC',
  'EUR',
  'DAUPHINE-IHB',
  1,
  TO_DATE('05-18-2006 00:00:00','MM_DD_YYYY_HH24_MI_SS'),1);
dbms_output.put_line('Result:' ||result);
end;
```

SQLServer:

```
exec ImportBalance
  'IHB_11286FT_EUR',
  10000,
  'DAU-SIRAC',
  'EUR',
  'DAUPHINE-IHB',
  1,
  '2005/05/18',   1
```

2.3 Integrating WebSuite (CMM) and ACM

This section describes all the necessary settings for integrating ACM and CMM. These must be performed in both modules.

2.3.1 Setup in CMM

Once CMM is installed, complete the following steps:

1. If you have not already done so, edit the `integrated_suite_module_config.xml` file.

   For more information, see *2.1 Integrating WebSuite (CMM) with TRM and ACM* on page 13.

2. Log into WebSuite.
3. Select **Admin - Utilities - Setup - Configuration Parameters**.
4. In the Configuration Parameters Maintenance screen, set the **Multiple Postings** configuration parameter to `True`.

   For more information on the **Configuration Parameters** function, see the *WebSuite System Administration Guide*.

5. Log out of CMM.

2.3.2 Setup in ACM

In order to retrieve accounting data from CMM, ACM communicates with the CMM application server via the Web Services interface.

For ACM integration with CMM, set the `ACM_CMM_INTERFACE_PROXY_URL` server variable to the location where the CMM web service for ACM is located (depends on the CMM configuration):

Unix:

```
$ENV{ACM_CMM_INTERFACE_PROXY_URL}="http://localhost:8081/cmm/iws/acmcmm";
```

Windows:

```
SET ACM_CMM_INTERFACE_PROXY_URL=http://localhost:8081/cmm/iws/acmcmm
```

Values `localhost` and `8081` should be replaced with the actual hostname and port where the CMM web service provider (Tomcat or Weblogic) is running.

The `ACM_CMM_INTERFACE_PROXY_URL` environment variable must be configured before deploying the ACM server to the Tomcat or Weblogic application server. For more details, refer to the section on environment variables in the *ACM System Admin Guide*.

Note: Using `localhost` on a multi-homed computer is not recommended. Either verify that the command `ping localhost` correctly returns the IP address `127.0.0.1`, or use a fully qualified DNS entry or IP address instead.

2.4 Static Data Management

Static Data Management (SDM) can be installed for use with:

- TRM without CMM

  SDM installation is described in the *WSS Database Setup Guide*.

- TRM with CMM

  This requires the installation of the SDM Synchronizer software at the CMM end; see the *WSS Suite Installation Guide*.

For a description of SDM, see the *TRM System Administration Guide*.

2.4.1 Integrating WebSuite (CMM) with SDM

Using a text editor, open the TRM environment file (the file passed as an argument to `fk.bat` when you start Wallstreet Suite). Make sure that the following variables are set:

`MODULES_NAMING_HOST`	The name of the computer where the Corba naming service is running.
`MODULES_NAMING_PORT`	The port on which the naming service is running.
`CMM_HTTP_ADDR`	The URL where the CMM server can be reached.

2.5 Integrating ACM with TRM

If you installed ACM as described in the *WSS Suite Installation Guide*, ACM is already integrated with TRM.

In order to better understand the ACM - TRM relationship from a technical perspective, this section describes the most important aspects.

2.5.1 ACM database objects

ACM database objects (tables, views, stored procedures, etc.) are built into the same database (and schema on Oracle) as TRM. Note the following conditions:

- The database build must be completed before the ACM database build is launched.
- When upgrading, the TRM upgrade must be successfully completed before starting the ACM upgrade.

ACM uses some tables, views, and stored procedures which are installed and maintained by TRM. For example, ACM Editors display values and selection lists based on TRM tables such as domains, clients, and portfolios. The TRM entities shared with ACM are:

- The security model
- Static data (ACM has read-only access)
- Activities management
- Procedures for interfacing.

2.5.2 ACM client components

ACM client components are installed in the TRM directory hierarchy. ACM uses and shares some of the TRM key components:

- ACM editors are based on the Static Data Framework (SDF) used by TRM.
- ACM reports use the TRM Report Generator.
- ACM activities are launched from ACM Activity Manager which is a TRM component that filters only the activities that are delivered with ACM.

2.5.3 ACM security

The ACM security model is based on TRM security mechanisms that include Users, User Groups, Domains, and Object Permissions. Note that:

- ACM security settings are performed via Security KIT which is delivered with TRM.
- Relevant security settings (for example, Users and Domains) defined for TRM are automatically applied in ACM applications.

2.5.4 ACM - TRM interface

The ACM - TRM interface consists of a set of stored procedures that are delivered and installed as a part of the ACM installation.

As long as the TRM activity mechanism (activityd process) is installed and running, and ACM is installed, the TRM - ACM interface is technically operational.

Chapter 3 Cashflow Forecast/TRM interface

3.1 Introduction

From Wallstreet Suite version 7.1, the CMM module includes Cash Flow Forecasting (CFF). In order to support the relevant business processes, cashflow forecasts need to be integrated in risk management (TRM) and hedge accounting (TRM and ACM).

3.1.1 Aggregated forecasts from WebSuite (CMM)

CMM provides aggregated forecasts via an interface to TRM. The aggregated forecasts received are turned into exposures and saved in TRM. The exposures are saved as transactions with a new transaction extension: Forecast Exposure.

TRM uses transactions with Forecast Exposures in figure calculations (both for risk management and hedge accounting) and in the hedge accounting process.

3.1.1.1 Key concepts

Definition of data flows (for cash flows) between CMM and TRM is primarily defined in TRM by configuring a Forecast instrument and defining the relevant transactions using such instruments. This means that the transactions in TRM are first entered into the system manually, preserving the relevant integration information.

It is possible to use the same CMM-detailed underlying forecasts in multiple aggregations to be saved in TRM. This means that the selection and aggregation of forecasts can be fine-tuned depending on their eventual use; for example, saving forecasts for risk management at a different granularity than forecasts for hedge accounting, or for selecting different underlying detailed forecasts to be used for such views.

Note: This is important to bear in mind when configuring the system to avoid double-counting underlying detailed forecasts (for example, in the case of portfolio trees).

The feature described above, together with support for designation by amount, optimizes the aggregation of forecasts for hedge accounting purposes to directly form hedge underlying. The hedge underlying is then used in layers for individual hedging transactions.

3.1.1.2 CMM: important integration concepts

With its cashflow forecasting functionality, CMM enables entry, import, mirroring, and maintenance of detailed cashflow forecasts. Individual forecasts are subject to strict change control (versioning) and an approval process. A variety of outcomes is available for analyzing forecasts in various dimensions, including time and categorizations. Such outcomes can be presented in reports and used as input to TRM.

3.1.1.2.1 Detailed forecasts: selection and aggregation

CMM provides selection and aggregation functionality when preparing the outcomes described above.

It allows the supplying of selection criteria together with some additional parameters such as Report Mapping or Time Bucketing (explained below). Based on these input parameters, CMM filters only the relevant forecasts, and applies the requested categorization (Report Mapping) and time dimension (Time bucketing).

Aggregation criteria then ensure that the detailed forecasts are aggregated to the requested level (technically, the aggregation criteria are applied via a list of requested values; CMM aggregates to a maximum level to supply the outcome of these values).

The selection and aggregation functionality is used for CMM and TRM integration; TRM always asks only for relevant forecasts at the relevant granularity level.

There is a list of fields available for selection and aggregation in CMM. Only some of the fields are relevant for TRM, and these are described later in this chapter.

3.1.1.2.2 Approval Process

The approval process is implemented via a forecast flow. Since risk management and hedge accounting (TRM) are applied only to forecasts from a certain state in the approval process, only the relevant forecasts must be selected. Typically these are "Released" forecasts only. However, the required state is configurable.

3.1.1.2.3 Change Control

Every change of a forecast is logged: a change creates a new version of the forecast, and the older one is expired but not deleted. This allows the reproduction of a historical version of a forecast by using the "as of date" input parameter. Although aggregated forecasts are not saved in CMM, by preserving the history of detailed forecasts, consistency is also achieved for the aggregates (assuming the same selection and aggregation criteria are applied). This is important in the context of usage of aggregated forecasts in TRM, since the figures transferred to TRM can be later examined even after the underlying detailed forecasts have since been updated.

3.1.1.2.4 Time Dimension

In addition to the "as of date" concepts explained above, there are three important time-related considerations: time interval for reported forecasts, time span of forecasts, and reporting in time buckets.

Time Buckets: there is an aspect of time-bucketing when reporting. The time bucket set for aggregation is configurable. An important consideration regarding the integration of the CMM forecasting functionality with TRM risk management and hedge accounting is turning time buckets into TRM value dates. The usage of the first or last date of the time bucket can be specified in the configuration. Where a customer requires a different behavior, this can be handled via a Customer Specific Development as described later.

Note: It is recommended that customers use time buckets when aggregating forecasts to minimize the number of transferred forecasts. However, forecast value dates can be used for aggregation instead of time buckets.

Time span of forecasts: detailed forecasts can span a time interval since they have a "date from" and "date to" value dates. In order to provide relevant report outcomes when using time bucketing functionality, the forecast must fit entirely into one time bucket. This must be considered when configuring time buckets and designating the usage of the "date from" / "date to" value date functionality.

Reporting time interval: when outcomes (report or request from TRM) are required from CMM, a Report Date From and Report Date To must be provided, and the outcome is limited accordingly. It includes only forecasts falling entirely within the interval (see above). In addition to exact dates, it is also possible to provide relative dates: for example Report Date To +36m, meaning that the report will contain forecasts with value dates falling from Report Date From up to Report Date From + 36 months.

3.1.1.2.5 Entities relationships

The definition of CMM static data includes a function called "entity relationship". It is possible to define an infinite number of entity relationship types, and to create entity relationships using such types. These groups can then be further used, for example, in selections: it is possible to specify a parent entity and relationship type, and CFF returns data for only those entities that match the relationship of the given type.

3.1.1.2.6 Forecasts Categorization

Detailed forecasts are assigned to Cashflow Types serving as a low level categorization. Cashflow forecasting functionality includes a flexible mechanism of defining Report Mapping, where the low-level instrument types can be further grouped into Report Groups and such Report Groups assigned to higher level Report Categories. Since the usage of detailed forecasts can differ, and the categorization could be important for aggregations, it is important to preserve such functionality (in a limited form providing Report Group) to be mapped to TRM. In other words, it must be possible to request an aggregation of forecasts according to certain Report Mapping definitions and to receive aggregated figures by Report Groups with the Report Group being part of the available information.

The Report Mapping can also be used for filtering a subset of forecasts, since Cashflow Types that are not explicitly included in Report Mapping can be ignored (and so not sent from CMM to TRM).

3.1.2 TRM

Exposures coming from forecasts are managed in TRM as transactions with forecast exposures. One transaction keeps multiple forecast exposures. In order to acquire the relevant forecasts from CMM, the appropriate transactions must be entered into the system first: they serve as a source of information about what CMM forecasts should be considered. TRM then requests the relevant data from CMM, based on information included in the transaction, and according to the XML file attached to the instrument.

3.1.2.1 Request for forecasts

TRM uses its activity management mechanism to pull forecasts from CMM. The request is initiated by manual triggering or by activity scheduling. The activity Forecast Exposures from CMM start-up parameters include:

- Due date: the date when the activity is run.
- Due date offset: number of days to anticipate "as of date" when requesting data from CMM: "due date - due date offset" is calculated, and used as:
  - "as of date": (due date + due date offset) when asking CMM for date.
  - active until: for closing previous versions of the Forecast Exposures - one more day is subtracted for this purpose (as_of_date = active until date).
  - active since: for marking the validity of new versions of the Forecast Exposures (as of date).
- Portfolio: portfolio where all transactions are processed. If the top portfolio is specified, all sub portfolios in the tree are also processed.
- Minimum Transaction State: the transaction state required for transactions to be processed.
- Rate Scenario: used for finding the rate and calculating Base Amount.
- Value Date From: first date (inclusive) forecasts from CMM are considered (this date is supplied to the "Report From" field when requesting data from CMM).
- Value Date To: last date (inclusive) forecasts from CMM are considered (this date is supplied to the "Report To" field when requesting data from CMM).

The transfer of aggregated forecasts are logged via the Activity log.

3.1.2.2 Saving of aggregated forecasts in TRM

To save the forecasts, the existing transaction extension concept is used. This calls for creating a new data structure called Forecast Exposure, extending transaction information for keeping all important information on forecasts. It means the information will not be saved in the form of Cashflows.

Note: For technical reasons, forecast Transaction contains a cashflow that is not of interest to end users.

When the activity is run, the system goes through all transactions in the given portfolio, and for those with a forecast instrument, it calls CMM with relevant aggregation and selection parameters. Once the data is received, a new set of Forecast Exposures is inserted for the transaction, and previous Forecast Exposures are marked as historical.

Reflection of CMM cashflow forecasts in TRM transaction/Forecast Exposure is determined by:

- Selection criteria
- Aggregation criteria
- Mapping from CMM fields to TRM.

All these criteria and parameters are attached to the forecast instrument.

3.1.2.3 Forecast Exposure data structure

As well as some internal fields such as flags and internal types and subtypes, Forecast Exposures have:

- Number: reference to transaction.
- ID: unique forecast exposure record identification (sequential number).
- Leg Group: unique logical forecasts set number (identical for all versions of the given forecast).
- Forecast Id: forecast id for easier identification of the logical forecasts set (the name for a given Leg Group). For example, it can be a period label for forecasts aggregated by time periods, or an individual CMM forecast ID for non-aggregated detailed forecasts. This is configurable.
- Currency id: forecast currency.
- Value date: value date of the forecast.
- Payment Client ID: used for the counterparty where aggregation is done by counterparty.
- Active since: validity of the record.
- Active until: validity of the record.
- Amount.
- Base currency id.
- FX Rate.
- Base amount.
- Parameters (20 Parameter fields).

Leg Group and Forecast ID are especially important. From a logical point of view. they present a hierarchical structure (although saved only on Forecast Exposure):

Transaction

Leg Group / Forecast Id

Forecast Exposure

The Leg Group and Forecast Id are used for differentiating time periods (for example, calendar months). The usage is explained in a detailed example which is available in the supporting documentation. Forecast Id serves to represent the same information as Leg Group in a more user-friendly way (for example, for time period "20050101-20050131", or for forecasts transferred individually "BTI 2345").

Forecast ID composition is definable in the mapping parameters, logical examples corresponding to the above:

```
TRM.Forecast_id = CMM.time_bucket_from, "-", CMM.time_bucket_to

TRM Forecast_id = "BTI ", CMM.source_reference_id
```


3.1.2.4 Forecast instrument data structure

The Forecast instrument is used when entering transactions representing cashflow forecasts.

The main Instrument features are:

- Forecast: ensures proper handling of transaction, reading Forecast Exposures.
- Dual Currency Forecast: ensures handling of forecasts with consideration, see description below.
- Forecast Method: this ensures relevant valuation of forecasts.

  It is necessary to always set-up:

  - Forecast Method feature
  - Either Forecast or Dual Currency Forecast feature.

The Forecast instrument has the following specific information in the Forecast page:

- Name of the XML file for Selection, Aggregation, and Mapping parameters
- Name of the CSD procedure for adjusting Forecast Exposures before saving to the database (hook).

3.1.2.4.1 Selection, Aggregation, and Mapping information

Configuration of selection, aggregation, and mapping is attached to the Forecast instrument, in a configuration file in XML format that holds the relevant information. The information in configuration files can either explicitly express the parameters, or can refer to a value in a CMM aggregated forecast, TRM transaction, instrument (such as Branch Code) or Forecast Exposure.

In TRM, either existing standard fields of the transaction and Forecast Exposure can be used (such as Owner in the transaction, or Payment Client ID, i.e. counterparty in Forecast Exposure), or user-defined Parameter fields can be used for other values.

Note: There are 20 parameters available in a transaction which are used system-wide, and there are corresponding parameters in Forecast Exposure.

3.1.2.4.2 Selection Criteria

The configuration file for selection typically mixes explicit values with links to transaction or instrument information. Here is an example:

```
CMM.Workflow Status = "Released", CMM.entity_id=TRM.Owner
```

For the transaction with Forecast instrument with the XML file described earlier, TRM sends a request only for Released CMM forecasts and for CMM entity_id equal to Owner in the TRM transaction. This means that if there are multiple transactions entered in TRM with different owners, the selection in CMM will differ.

To increase the selection criteria flexibility, the following is also available:

- Multiple values of one parameter can be provided; they are considered as "OR".
- NOT EQUAL is available as an operator for selected parameters, namely for Currency ID.
- In addition to TRM Transaction parameters, Portfolio Base Currency is also available.

As an example, the above allows the selection of all forecasts in a currency different from the Portfolio Base currency:

```
CMM.currency_id NOT= TRM.Portfolio base_currency_id
```

3.1.2.4.3 Aggregation Criteria

Aggregation criteria are always given in the configuration file attached to Instrument. For example:

```
CMM.entity_id, CMM.business_segment_id
```

aggregates selected forecasts according to entity and business segment.

It should be noted that aggregation might not be required at all in some cases and individual CMM forecasts can be transferred. On the other hand, it should be also noted that parameters used for selection or mapping also need to be included in aggregation.

3.1.2.4.4 Mapping

Mapping of CMM forecasts (aggregated or individual, depending on aggregation criteria) is specified field by field. For example:

```
<field from="currency_id" to="currency_id"/>
<field from="forecast_value_date_to" to="value_date"/>
<field from="amount" to="amount"/>
<field from="report_group_id" to="param_19"/>
```

By default, no changes between CMM values and TRM values are supported. For specific cases where individual customers wish to modify values before saving, there is an option for sending the aggregated forecast information into a custom application and to receive the values back. For example, for determining the TRM transaction value date from the CMM time bucket, or for adjustments of exposure (such as certain quotas). The potential CSD procedure name is specified in the relevant field in the Forecast page of Instrument editor.

3.1.2.5 Calculation of Base Amount

CMM data includes only forecast amount and currency. TRM data also includes base currency id, FX Rate and Base Amount.

When inserting the data into TRM, the data is completed in the following way:

- Base currency id: this currency is taken from the portfolio base currency, and can be replaced by a mapped value from the CMM Entity base currency (potential use: where individual entities would not have their own portfolios to reflect base currency, data could still reflect the base currency of the entity in the Forecast Exposure).
- FX Rate: Rate scenario is provided as an Activity input parameter.
- Base amount: is calculated from the values above.

3.1.2.6 Saving Forecast Exposure consideration

The customer may require specific monitoring of forecast exposures. Here are two situations:

- In some cases the Forecast Exposure is monitored from two different perspectives: the exposure owner (i.e. transaction owner) and exposure "hedger". The exposure hedger is interested not only in the Forecast Exposure currency, but since he will hedge it against "his" base currency, he also has to see the exposure of his base currency to the exposure owner base currency.
- For commodity forecasts that are modeled as currencies, it is also necessary to express the pricing currency.

For these purposes there are specific features to allow saving additional Forecast Exposures to ensure the expected monitoring of exposures. This feature is linked to Instrument: there is a specific parameter at instrument level to switch this feature on. The second Forecast Exposure record is created from the original one as follows:

- ID: original forecast ID with the opposite sign.
- Currency id: the currency mapped from CMM parameters (typically commodity currency, which is in one of the CMM customer-defined attributes), otherwise the base currency of the portfolio is used (applicable to "ordinary" foreign currency forecasts).
- Amount: Amount from the original Forecast Exposure amount converted into the currency of the new forecast record, using FX forward rate from Rate Scenario from Activity start-up parameters, with the opposite sign.
- FX Rate: since there might be a triangular calculation involved (typically for commodities), the rate is calculated from Base Amount and Amount to ensure consistency of all figures.
- Base amount: Base Amount from the original Forecast Exposure Amount with the opposite sign.

- All other information is identical to the original forecast.

Example of additional Forecast Exposure for group FX hedging (forecast of 100 USD in EUR portfolio):

Trans. Number	ID	Leg Group	Forecast Id	Currency Id	Amount	Base Currency Id	FX Rate	Base Amount
1	11	1	20050101 - 20050131	USD	100	EUR	1.2	83
1	-11	1	20050101 - 20050131	EUR	-83	EUR	1	-83

Example of additional Forecast Exposure for commodity (forecast of 100 tons of palladium priced/paid in USD in USD portfolio):

Trans. Number	ID	Leg Group	Forecast Id	Currency Id	Amount	Base Currency Id	FX Rate	Base Amount
2	12	1	20050101 - 20050131	XPD	100	USD	186	18600
2	-12	1	20050101 - 20050131	USD	-18600	USD	1	-18600

Example of additional Forecast Exposure for commodity (forecast of 100 tons of palladium priced/paid in USD in EUR portfolio):

Trans. Number	ID	Leg Group	Forecast Id	Currency Id	Amount	Base Currency Id	FX Rate	Base Amount
3	13	1	20050101 - 20050131	XPD	100	EUR	155	15500
3	-13	1	20050101 - 20050131	USD	-18600	EUR	1.2	-15500

3.1.2.7 Managing the change

Forecasts for individual periods (value dates or calendar time buckets), as maintained in TRM, change over time. This change is managed by expiring old Forecast Exposures and entering new ones. Validity is managed via the Active Since / Active Until fields.

When "updating" Forecast Exposures for a specific transaction, all Forecast Exposures in the Value Date From, Value Date To time period (from activity) are expired (Active Until is updated to the day prior to the as-of-date); for new Forecast Exposures, the Active Since date is set to the as-of-date. Where the update is run several times per day, only one (the latest) version of forecasts per day is kept.

Note: Since Forecast Exposures outside Value Date From, Value Date To time periods are kept open (not expired), it is possible to use them in reports (e.g. the Cashflow report).

Individual Forecast Exposure sets and their versions are linked (apart from the forecast header, i.e. transaction) via Leg Group / Forecast Id described earlier. In order to assign the incoming forecast information to the relevant Leg Group (or to create a new Leg Group), the incoming data from CMM is first converted to Forecast Id then compared with the saved Forecast Ids. Where the Forecast Id under the given transaction already exists, a new Forecast Exposure is entered under the same Leg Group. In the opposite case, a new Leg Group is created.

3.1.2.8 Usage in risk management

Usage of Forecast Exposures is transparent to end users in risk management. Once the selection in risk management (e.g. Treasury Monitor or Key Figure Reports) includes transactions with Forecast Exposures, the relevant figures are calculated and shown consistently with other figures.

Forecast Exposures are also shown in the Cashflow report in a consistent way with Cashflows.

3.1.2.9 Parallel Accounting

Forecast transactions must follow the standard setup of contexts and result modes. Forecast exposure is without any context information. However, to be evaluated in Treasury Monitor and for key figures/hedge key figures calculation, the forecast transaction must belong to the appropriate result modes.

3.1.3 Application Programming Interfaces (API)

Integration of CMM and TRM is addressed via internal WSS mechanisms as described above. To enable customers to develop additional specific logic in the area of hedge accounting for forecast cashflow hedging, the following APIs are provided:

- Adjustment of the aggregated forecast coming from CMM before saving to TRM:

  Before saving aggregated forecasts to TRM (after mapping), all data in the forecasts "to be saved" is made available to an external procedure. If this option is used, the external procedure can adjust the data and hand it back to TRM, and the normal saving process resumes.

- Receive/provide TRM transactions/cashflows from/to an external system:

  The TRM comKIT transaction service is available to read and write transactions and cashflows.

- Receive TRM forecast exposures to an external system.

3.2 Configuration

3.2.1 Importing Cashflow forecasts from CMM to TRM

The cashflow forecast is the estimation of a money transfer (payment or receipt) in the future while the exact amount is currently not known. The estimation may change over time. There are two important dates:

- As Of Date: the date when the user is looking at the forecast (usually today but not necessarily).
- Value Date: date when the money transfer is expected to happen (some date in future).

Example: Forecast history in CMM (showing the historical versions of one forecast):

As Of Date	Value Date	Amount
27. 1. 2006	31. 8. 2008	200 000
26. 2. 2006	31. 8. 2008	210 000
12. 3. 2006	31. 8. 2008	190 000
20. 3. 2006	31. 8. 2008	220 000
29. 3. 2006	31. 8. 2008	230 000
14. 8. 2006	31. 8. 2008	225 000

Subsequent import of forecast exposures in TRM:

Active Since	Active Until	Value Date	Amount
31. 1. 2006	27. 2. 2006	31. 8. 2008	200 000
28. 2. 2006	30. 3. 2006	31. 8. 2008	210 000
31. 3. 2006	29. 4. 2006	31. 8. 2008	230 000
30. 4. 2006	30. 5. 2006	31. 8. 2008	230 000
31. 5. 2006	29. 6. 2006	31. 8. 2008	230 000
30. 6. 2006	30. 7. 2006	31. 8. 2008	230 000
31. 7. 2006	30. 8. 2006	31. 8. 2008	230 000
31. 8. 2006	29. 9. 2006	31. 8. 2008	225 000
30. 9. 2006	----------	31. 8. 2008	225 000

Comments:

- Value Date of the forecast does not change in time. CMM offers the possibility to have the Value Date specified as "General". This is not a specific date but a whole month, e.g. August 2008 - the user does not know the exact date but estimates it will be in August in 2008.
- The forecasted amount changes over time -on 15. 2. 2006, the forecasted amount is 200 000, on 15. 3. 2006 there is a forecasted amount 190 000 etc.

  The system (CMM) also lets the user specify the As of Date: imagine that today is 14. 4. 2006 but the user can specify the As of Date differently (backwards in the history) to see that the forecasted amount on 9. 3. 2006 was 210 000 etc.
- In CMM, forecasts may change continuously. However, on the TRM side, the forecasts are imported only via activity. It means that:
  - Some of the "versions" of the forecast may not be reflected in TRM.
  - A new record is created in TRM even if there was no change in CMM.
- Only the date is relevant in Forecast Exposures, and time is not considered: active_until of version N is active_since of version (N - 1). In example above, the first version (amount 200 000) is valid even if looked at as of 27. 2. 2006 at 16:37:53 (even though technically the forecast's active_until is 27. 2. 2006 0:00:00).
- active_until of the last version of a forecast in TRM is not set. This last version is valid from active_since until the import activity is run again, and the active_until is updated).

Note: active_until is set to 1. 1. 5000

3.2.2 CMM Setup

A crucial part of the CMM/TRM interface is the CMM service tcmd (CMM CORBA service), which has to be installed, running, and registered in the CORBA naming service under name `finance-kit/$FK_IDENT/cff-forecast.cmm`.

The property `$FK_IDENT` represents the real `FK_IDENT` from the environment where the TRM activityd is running. There are two entries from tcmd registered in the naming service:

- cff-forecast.cmm
- cash-movement.cmm

Only the first one is needed for the import. For detailed information please refer to the CMM documentation.

3.2.3 Instrument setup

A new instrument must be created with these features:

- FORECAST-METHOD: indicates that the transaction with this instrument represents cashflow forecasts.
- FORECAST-INTERFACE

Either

- FORECAST: indicates that forecasts will be stored as plain forecasts.

Or

- DUAL-CURRENCY-FORECAST: indicates dual currency forecast.

3.2.3.1 Feature Forecast Method

The Feature Forecast Method provides the Forecast page, where detailed information about forecast valuation can be set up.

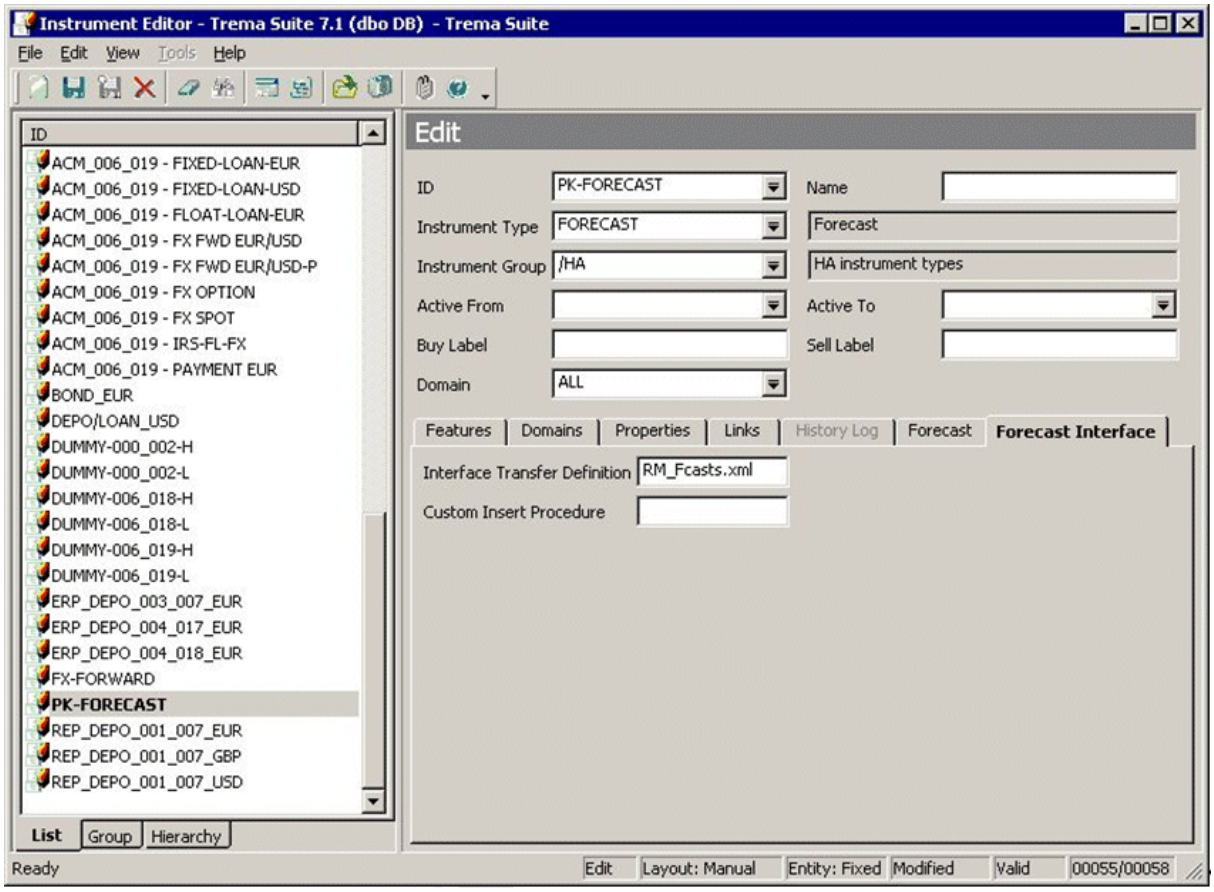
3.2.3.2 Feature Dual currency forecasts

Dual currency forecasts represent a special form of forecast exposures. They consist of two records stored in the ForecastExposure table. The first one is the original plain forecast, identical to a plain forecast and having a positive id. The second record represents the forecast in dual currency and has a negative id; the absolute value of the id is the same as for the first record of the plain forecast. The features FORECAST and DUAL-CURRENCY-FORECAST are exclusive, so only one can be attached to instrument.

3.2.3.3 Feature Forecast Interface

Feature FORECAST-INTERFACE provides a new page called "Forecast Interface" in the Instrument editor. Select the page and set Interface Transfer Definition; the value in this field is the name of the XML file defined above. Note that this is the name and extension but without the full path - the import script has the predefined path specified.

Custom Insert Procedure specifies the stored procedure that is called during the import of forecasts. Before forecasts are inserted into TRM, they can be changed inside this stored procedure.



3.2.3.4 Import XML Definition

The XML file for import has to be placed in the directory `$FK_HOME/etc/cmm/` on the server where the activity service is running.

Note: If the activity service runs on a UNIX platform, then putting the XML file on a Windows client has no effect.

3.2.3.5 Example of XML Definition

The XML definition follows the logical architecture of the CMM/TRM interface, and consists of three parts:

- Selection
- Aggregation
- Mapping.

```
<?xml version="1.0" encoding="UTF-8"?>
<CFF-mapping>
  <selection>
    <entity_id from="transaction.owner_id"/>
    <work_flow_status value="Released"/>
    <currency_id from="transaction.portfolio.currency_id" operator="!="/>
    <business_segment_id from="transaction.param_18"/>
    <report_mapping_id value="RM GS"/>
    <time_bucket_set_id value="timebuckets_1128501007718"/>
  </selection>
```

```
  <aggregations>
    <currency_id/>
    <time_bucket_from/>
    <time_bucket_to/>
    <report_group_id/>
    <business_segment_id/>
  </aggregations>
  <mapping>
    <field from="time_bucket_from+&apos;-&apos;+time_bucket_to" to="forecast_id"/>
    <field from="currency_id" to="currency_id"/>
    <field from="time_bucket_to" to="value_date"/>
    <field from="amount" to="amount"/>
    <field from="report_group_id" to="param_19"/>
    <field from="business_segment_id" to="param_18"/>
  </mapping>
</CFF-mapping>
```

Warning: The Activityd daemon caches the XML file until it is restarted. When modifying an XML file for Forecast Interface instruments, you must restart the Activityd daemon.

3.2.3.6 Selection section

The selection section, based on CFF-mapping.xsd, contains a list of columns specifying criteria for imported forecasts. Only forecasts in CMM which match these criteria are imported.

Element	Attribute	Attribute type/allowed values	Mandatory
forecast_as_of_date	value	date	One of attributes (value, from)
	from	*	
report_from	value	date	One of attributes (value, from)
	from	*	
report_to	value	date	One of attributes (value, from)
	from	*	
entity_id	value	string	One of attributes (value, from)
	from	*	
work_flow_status	value	"Entered" or "Released	"No
currency_id	value	string	One of attributes (value, from)
	from	*	
	operator	**	
business_segment_id	value	string	One of attributes (value, from)
	from	*	
report_mapping_id	value	string	Yes
time_bucket_set_id	value	string	Yes
entity_relationship_type_id	value	string	Yes

***** Attribute "from" refers to the actual value on transaction (or activity).
For example, `<entity_id f --rom="transaction.param_3">` restricts the set of forecasts that are being imported to forecasts for entity having id equal to the value of Parameter #3 on the

corresponding transaction (how the import is tied to a transaction - see below). Possible values for attribute "from":

activity.due_date	activity.due_date-activity.due_date_offset
activity.value_date_from	activity.value_date_to
transaction.portfolio.currency_id	transaction.owner_id
transaction.param_1	transaction.param_2
transaction.param_3	transaction.param_4
transaction.param_5	transaction.param_6
transaction.param_7	transaction.param_8
transaction.param_9	transaction.param_10
transaction.param_11	transaction.param_12
transaction.param_13	transaction.param_14
transaction.param_15	transaction.param_16
transaction.param_17	transaction.param_18
transaction.param_19	

** Attribute "operator" specifies the relationship between the value of the forecast and the value specified by the attribute "from" or "value". Possible values for attribute "operator":

==

!=

>

<

>=

<=

3.2.3.7 Aggregation section

The aggregation section lists columns on forecasts in CMM that will be used for aggregation. Records are grouped together (one resulting record will be stored in TRM) if they have the same value in each of the columns listed in this section.

Possible values:

currency_id

entity_id

time_bucket_from

time_bucket_to

counterparty_id

report_group_id

source_reference_id

parameter_0

3.2.3.8 Mapping section

The mapping section specifies the relationship between columns on forecasts returned from CMM and columns in TRM. This section contains a sequence of field tags, each of them having the attributes "from" (referring to forecast columns in CMM) and "to" (columns in the ForecastExposure table in TRM). Possible values for the "from" attribute:

time_bucket_from

time_bucket_to

time_bucket_from+'-'+time_bucket_to

'BTI'+source_reference_id

forecast_as_of_date

forecast_value_date_from

forecast_value_date_to

cash_flow_type_id

cash_flow_direction

currency_id

counterparty_id

source_reference_id

time_bucket_label

entity_base_currency_id

entity_id

amount

business_segment_id

report_group_id

parameter_0

parameter_1

parameter_2

parameter_3

parameter_4

parameter_5

parameter_6

parameter_7

parameter_8

parameter_9

3.2.4 Creation of transaction

To be able to import forecasts from CMM, the transaction with the Forecast instrument must first be created. It serves only as storage for forecast exposures, and must meet following criteria:

- Transactions must belong to the appropriate result modes.
- The opening date of the transaction should be in the past, generally on or before the start of the period during which the forecasts will be imported from CMM.

- The value date and closing date should be in the future (analogous to the opening date - on or after the end of the period for imports).
- Amount and deal rate is not important; it can be set to anything, for example 1.00.

3.2.5 Import Activity

A new activity with activity type Forecast Exposures from CMM must be created with the following parameters:

- Portfolio: portfolio containing forecast transactions.
- Minimum Transaction State: typical value is FINAL or OPEN.
- Value Date From/Value Date To: these two parameters define the time period for the value date of the cashlow forecasts to be imported (only forecasts having a value date inside this period are subject to the import).

  The preferred format is YYYYMMDD (i.e. 20060414 for April 14, 2006). Other formats may work, but they depend on the locale settings of the server.

  Also, it is possible to specify "relative date" (or "date offset"), for example 3M (meaning three months). The real date is then calculated as As Of Date + "date offset").
- Scenario: rate scenario.

3.2.5.1 Running the import activity

After all process steps are completed as described above, the import activity can be started.

Select the activity defined above and enter the Due Date and possibly Due Date Offset. Due Date (adjusted by Due Date Offset) determines the As Of Date (moment at which forecasts will be searched).

It is important to understand that the time specified in the Due Date parameter of the activity has no effect (except for activities scheduled for the future - then it will be started only at the given time, not at midnight) - the time part is not taken into account on the TRM side. On the other hand in CMM, time is a regular part of the As Of Date.

The situation described in the following example should be avoided:

- The forecast is created in CMM today at 10:30 - with amount 1000.
- The forecast is modified today at 14:20 - the amount is now 1200.
- The Import activity is started with Due Date yesterday - forecast is not imported. This is expected behavior because the forecast was not there yesterday.
- The Import activity is started with Due Date today 11:00 - forecast is not imported. This looks strange because the forecast is already in CMM - the user would expect to get the version with the 1000 amount. Because the time part of Due Date is ignored, CMM is asked for forecasts as of today 00:00:00 and the forecast was not yet there at midnight.
- So, to get the forecast, the user must set Due Date to today and Due Date Offset to 1 (or Due Date to tomorrow - but then the activity would be run tomorrow, not now). As Of Date will be tomorrow and the forecast will be imported with the amount 1200. There is no way to import the version with amount 1000.

3.2.5.2 Importing process

1. The Import activity starts a Python script which performs the import of cashflow forecasts from CMM to TRM. This script fetches all active transactions (via the stored procedure ReadPortfolioPeriod) and loops through all these fetched transactions. Each of them checks the instrument - if the instrument does not have FORECAST-METHOD and one of FORECAST, DUAL-CURRENCY-FORECAST features, then the transaction is skipped and no forecasts are imported into TRM for this transaction. Otherwise the import XML file is looked for. If the file

specified on the Forecast Interface page of the instrument is not found then `defaultmap.xml` is used.

2. Values from the "selection" section are evaluated (non-constant values are taken from transaction or activity) and together with the "aggregation" section (and value_date_from and value_date_to activity parameters) a query to CMM is constructed. This query request is sent to tcmd (CMM CORBA service) and aggregated forecasts are obtained.
3. Then - still in the loop for each transaction- the DeactivateForecastExposures stored procedure is called with parameters:
   a. Transaction Number
   b. Value Date From
   c. Value Date To
   d. As Of Date.
4. This procedure finds all records in the ForecastExposure table for the transaction having Value Date between Value Date From and Value Date To that are valid on As Of Date. These records are marked as valid only until As Of Date - 1 day.
5. Then - still in the loop for each transaction - the InsertForecastExposure stored procedure is called for each forecast record returned from CMM. The following types of parameters are supplied:
   a. Parameters taken from the iterated transaction: number, base_currency_id.
   b. Parameters taken from the activity: active_since (As of date), scenario_id.
   c. Constant parameters: active_until - 1. 1. 5000; active_until is mandatory so some value has to be passed and 1. 1. 5000 is considered to be infinity.
   d. Parameters determined by the "mapping" section of the import XML file.
   e. Parameters determined by external logic: fx_rate
6. CSD stored procedure on forecast exposure can be applied.
7. The InsertForecastExposure stored procedure inserts a record into the ForecastExposure table.

3.2.6 Valuation

The valuation of forecast exposures depends on the FX rate, which is taken from Price Manager. The FX rate is the forward rate between As of date and Value Date of the forecast.

For dual currency forecasts, the logic is more complex. As dual currency forecasts are assumed following imported forecasts, either:

- The currency_2_id parameter is specified in the mapping section in the Import XML file and therefore passed to InsertForecastExposure.

or

- The DUAL-CURRENCY-FORECAST feature is set on the transaction's instrument: currency_2_id is set to the base currency of the transaction's portfolio.

For dual currency forecasts, the record inserted into ForecastExposure is duplicated (after being adjusted by the hook procedure) and the following columns are changed:

Column ID	Original forecast value	Dual currency forecast value
id	X	-X
currency_id	@currency_id	@currency_2_id
amount	@amount	-(amount calculated from @amount between currencies @currency_id and @currency_2_id using rate calculated via stored procedure FXBookRate)

Column ID	Original forecast value	Dual currency forecast value
base_amount	@base_amount	-@base_amount
fx_rate	@fx_rate	DCFamount/DCFbase_amount (DCF prefix means values calculated for dual currency forecast)

3.2.7 Custom Insert Procedure API

Before forecast exposures are saved during the import process, the CSD stored procedure on forecast exposure can be applied. There might be, for example, a requirement that the value dates of the forecast are always on the 15th of the month.

The name of the procedure can be specified on the Forecast Interface page of the Instrument Editor, Custom Insert Procedure field.

If the name is not supplied then the Configuration table is examined for a record with

- id 513 : Hook procedure for forecast exposure insert)
- value: name of the hook procedure (the value is different from "<none>").

If such a record exists, the specified stored procedure is used.

The Custom Insert Procedure must define the following list of parameters (only IN/OUT parameters may "adjusted"):

Parameter name	Data type	IN/OUT
stamp	timestamp	IN
number	int	IN
id	int	IN
active_since	datetime	IN OUT
active_until	datetime	IN OUT
leg_group	int	IN OUT
forecast_id	varchar(50)	IN OUT
payment_client_id	ClientId	IN OUT
value_date	datetime	IN OUT
type_id	CashflowTypeId	IN OUT
subtype_id	CashflowSubtypeId	IN OUT
currency_id	CurrencyId	IN OUT
currency_2_id	CurrencyId	IN OUT
amount	Money	IN OUT
base_currency_id	CurrencyId	
IN OUT		
base_amount	Money	IN OUT
fx_rate	float	IN OUT
scenario_id	ScenarioNameId	IN OUT
param_0	varchar(50)	IN OUT
param_1	varchar(50)	IN OUT

Parameter name	Data type	IN/OUT
param_2	varchar(50)	IN OUT
param_3	varchar(50)	IN OUT
param_4	varchar(50)	IN OUT
param_5	varchar(50)	IN OUT
param_6	varchar(50)	IN OUT
param_7	varchar(50)	IN OUT
param_8	varchar(50)	IN OUT
param_9	varchar(50)	IN OUT
param_10	varchar(50)	IN OUT
param_11	varchar(50)	IN OUT
param_12	varchar(50)	IN OUT
param_13	varchar(50)	IN OUT
param_14	varchar(50)	IN OUT
param_15	varchar(50)	IN OUT
param_16	varchar(50)	IN OUT
param_17	varchar(50)	IN OUT
param_18	varchar(50)	IN OUT
param_19	varchar(50)	IN OUT
flags	int	IN OUT
batch_p	bit	IN
debug_p	bit	IN

3.2.8 API for retrieving forecast exposures from TRM

For retrieving existing Forecast exposures in TRM, the stored procedure SearchForecastExposure is used with the following list of parameters:

Parameter name	Type	Mandatory	Default value	Note
number	int	Y		
id	int	N	null	No restriction if null
active_since	datetime	N	today	Fetch only forecasts active on or before specified value *
active_until	datetime	N	today	Fetch only forecasts active on or after specified value *
leg_group	int	N	null	No restriction if null
forecast_id	varchar(50)	N	null	No restriction if null
payment_client_id	ClientId	N	null	No restriction if null
value_date	datetime	N	null	No restriction if null

Parameter name	Type	Mandatory	Default value	Note
type_id	CashflowTypeId	N	null	No restriction if null
subtype_id	CashflowSubtypeId	N	null	No restriction if null
currency_id	CurrencyId	N	null	No restriction if null
base_currency_id	CurrencyId	N	null	No restriction if null
param_0	varchar(50)	N	null	No restriction if null
param_1	varchar(50)	N	null	No restriction if null
param_2	varchar(50)	N	null	No restriction if null
param_3	varchar(50)	N	null	No restriction if null
param_4	varchar(50)	N	null	No restriction if null
param_5	varchar(50)	N	null	No restriction if null
param_6	varchar(50)	N	null	No restriction if null
param_7	varchar(50)	N	null	No restriction if null
param_8	varchar(50)	N	null	No restriction if null
param_9	varchar(50)	N	null	No restriction if null
param_10	varchar(50)	N	null	No restriction if null
param_11	varchar(50)	N	null	No restriction if null
param_12	varchar(50)	N	null	No restriction if null
param_13	varchar(50)	N	null	No restriction if null
param_14	varchar(50)	N	null	No restriction if null
param_15	varchar(50)	N	null	No restriction if null
param_16	varchar(50)	N	null	No restriction if null
param_17	varchar(50)	N	null	No restriction if null
param_18	varchar(50)	N	null	No restriction if null
param_19	varchar(50)	N	null	No restriction if null
flags	int	N	null	No restriction if null

***** The period active_since - active_until specifies a restriction period: selected forecasts must be active during the whole restriction period. If there is a need to fetch forecasts being at least partly active during the restriction period, then the active_since and active_until parameters have to be swapped (that is, active_until is before active_since).

3.2.9 Debugging

It is necessary in certain situations to trace the import process to determine what goes wrong. There should be a log file in $FK_HOME/var/log/activity (name of the file is the name of the activity).

The following environment variables can be set:

- DATABASE_DEBUG (for example, to value 3)
- FK_TRACE_LEVEL (for example, to value 99).

The Activity daemon must then be restarted.

It is also possible to try to run the import Python script from a shell on the server where activityd is running. The command line is similar to the following example:

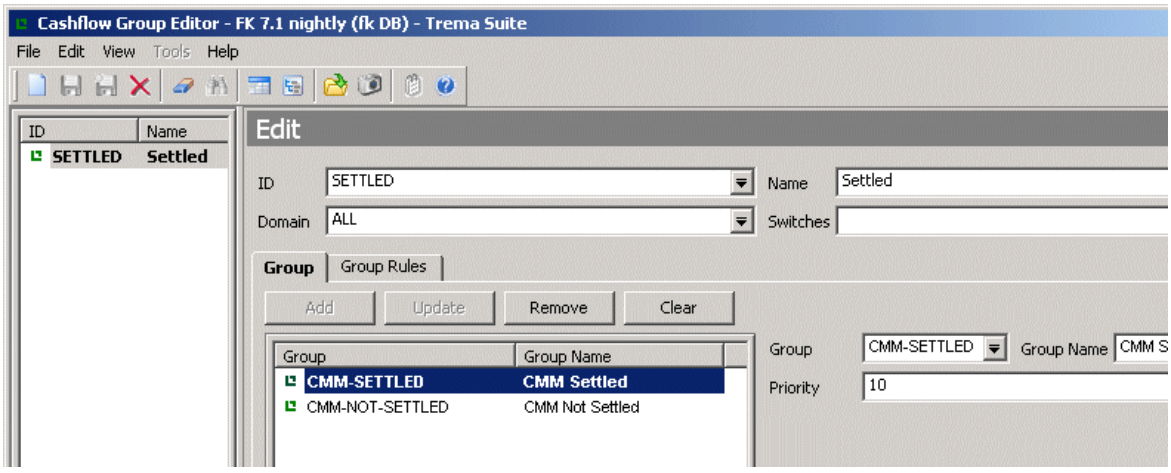
```
python $FK_HOME/bin/run-task.py --task=tasks.cmm.cff_from_cmm portfolio_id=MY-PTF
date=20060414 due_date_offset=0 value_date_from=20070101 value_date_to=20071231
scenario= debug=1
```

The last parameter (`debug=1`) makes the Python script more verbose but the results will not be stored in the database (it is not possible to pass the debug parameter from the activity) - this is the behavior most commonly required when debugging.

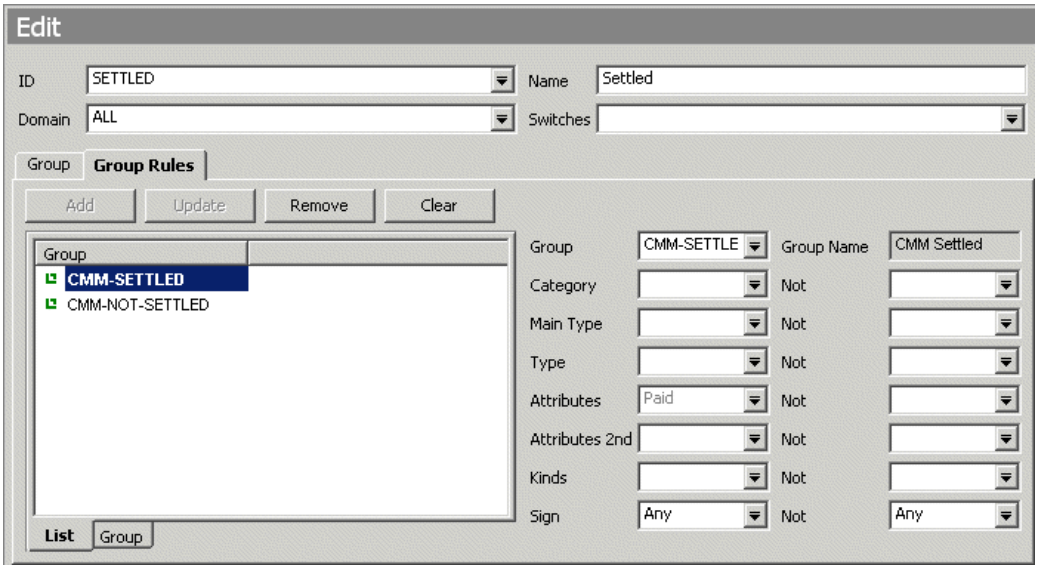
3.3 TRM to CMM forecast interface configuration

The TRM to CMM forecast interface supports the passing of the cashflow group from TRM to CMM to indicate which forecasts have been settled. However, if these cashflow groups are not defined in TRM, then no forecasts will be transferred to CMM. These groups are assigned to cashflows through rules in the TRM Cashflow Group Editor.

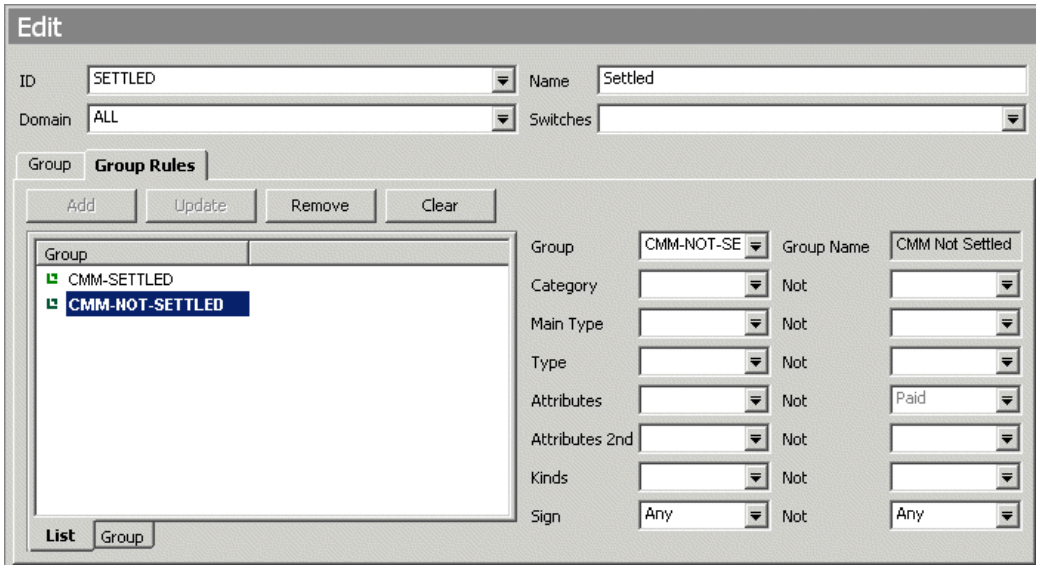
1. Open the Cashflow Group Editor from TRM Application Manager.
2. Create a cashflow group called SETTLED.
3. Create two groups within the SETTLED group: CMM-NOT-SETTLED, CMM-SETTLED.



4. Configure the CMM-SETTLED subgroup to be attached when the cashflow is marked `Paid`.



5. Configure the CMM-NOT-SETTLED sub group to be attached when the cashflow is not marked `Paid`.



3.3.1 TRM to CMM payment interface configuration

The CMM payment method is assigned to a TRM payment based on a mapping from the TRM transfer method and payment advice type.

These mappings are configurable in the `cash_movement_to_cash_record.xml` file in `..\installationdata\installation\templates\handler_based\trm\cash_movement`.

Valid payment advice types:

- CMM-RELEASABLE : The payment will be released in CMM.
- CMM-NON-RELEASABLE: The payment will not be released in CMM.

Valid mapping of releasable payment transfer methods to CMM payment methods are:

- CMM-WT maps to WT (Wire Transfer)
- CMM-ITC maps to ITC (Inter Company)
- All CMM-NON-RELEASABLE advice types map to SETTLED by default.

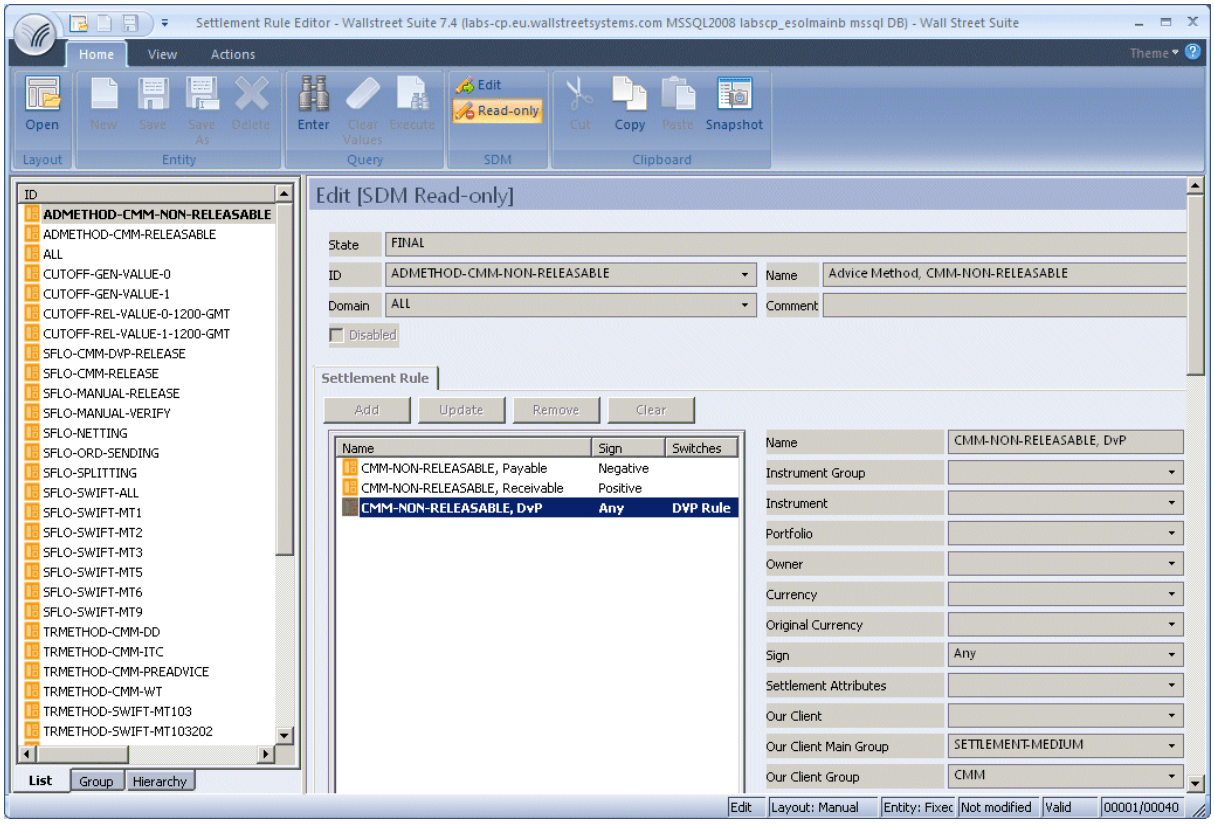
3.4 TRM to CMM Delivery versus Payment (DvP) settlement configuration

This is handled automatically by Wallstreet Suite by using specific factory rules and integrating these rules in the setttlement flow.

3.4.1 Rules

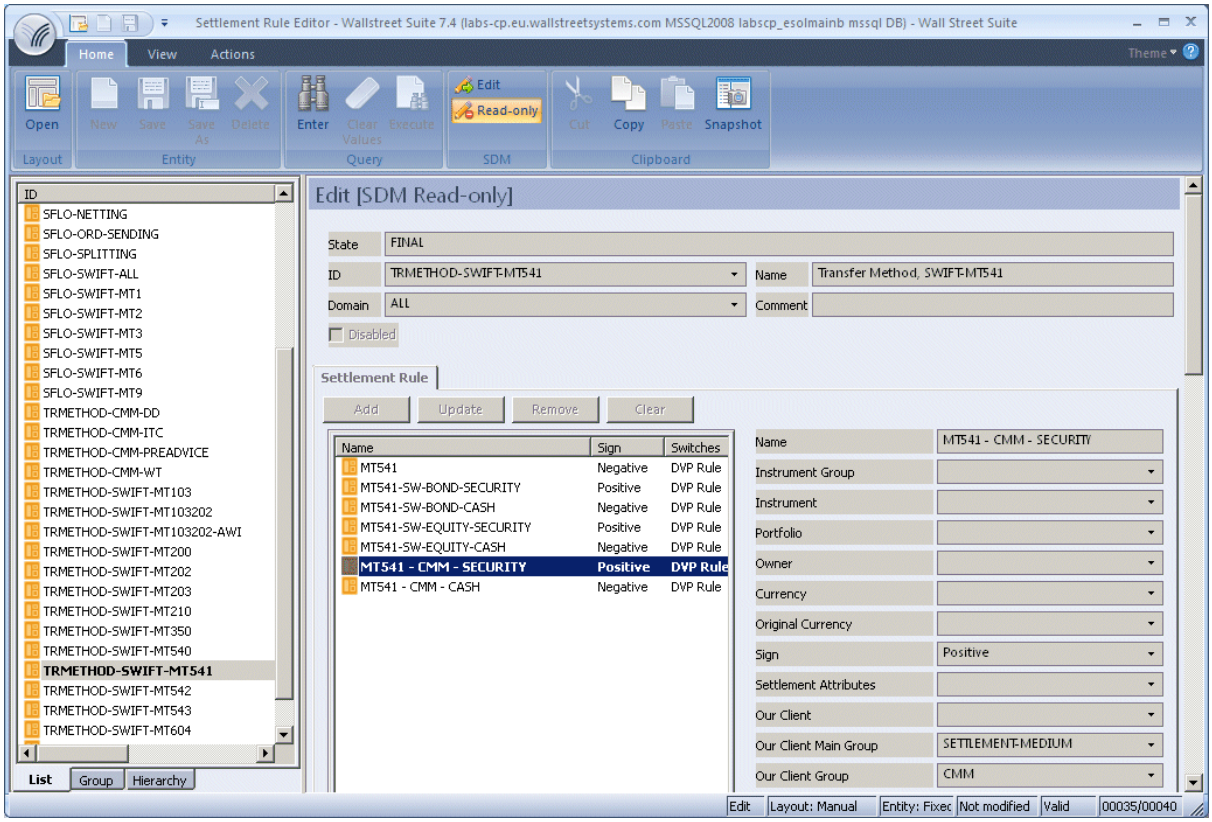
The Factory settlement rule ADMETHOD-CMM-NON-RELEASABLE (see in the TRM Settlement Rule Editor) checks for **Our Client Group** that has the value of `CMM`, and if the settlement is of type "DvP" then all DvP settlements get the advice method CMM-NON-RELEASABLE when the portfolio owner of

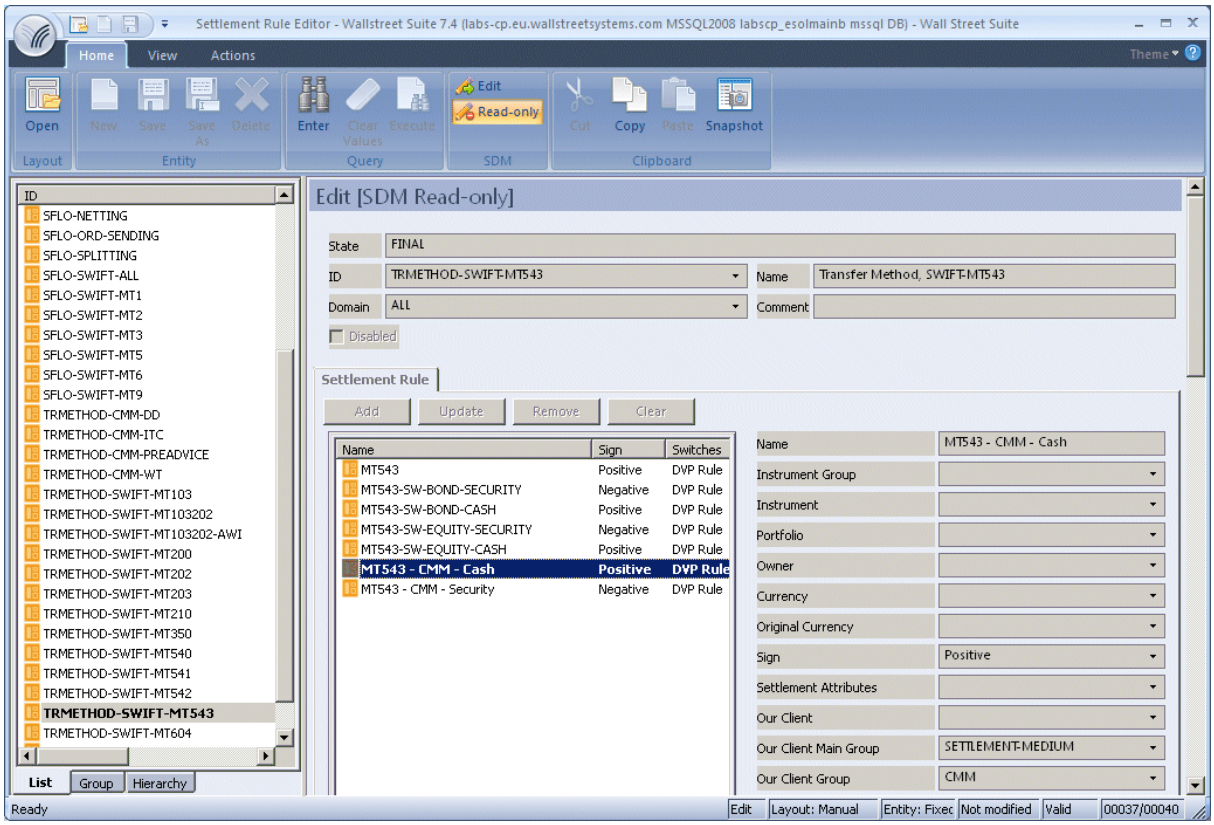
the transaction belongs to the SETTLEMENT-MEDIUM group CMM. All settlements not matching other CMM advice methods automatically get payment method SETTLED in CMM.



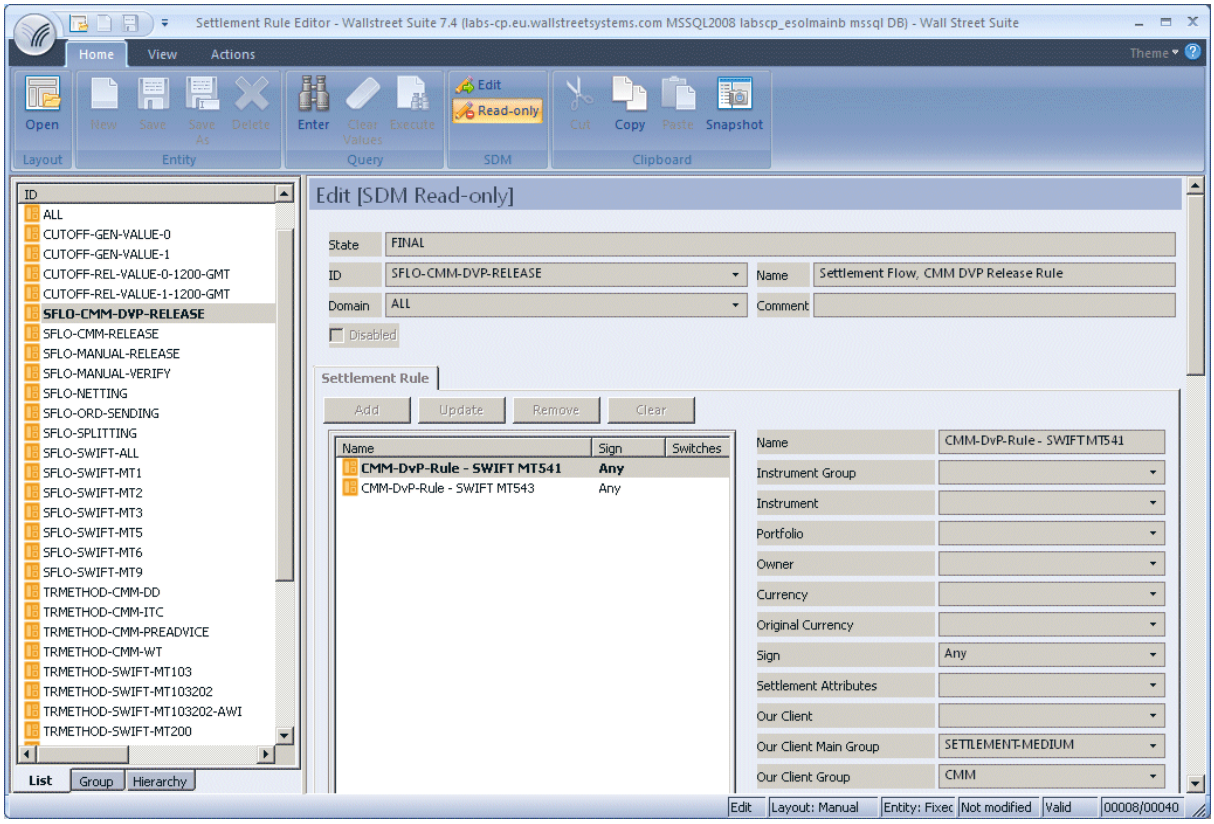
The Factory settlement rules TRMMETHOD-SWIFT-MT541 and TRMMETHOD-SWIFT-MT543 (see in the TRM Settlement Rule Editor) have a set of DvP rules which checks the **Our Client Group** that has

the value of `CMM` to ensure that the transfer method SWIFT-MT541 or SWIFT-MT543 are assigned to DvP settlements when the portfolio owner belongs to SETTLEMENT-MEDIUM group CMM.





The settlement rule SFLO-CMM-DVP-RELEASE identifies DvP settlements to be sent to CMM after the TRMSwift settlement message has been successfully processed.



3.4.2 Flow

In `settlement.py` the ACCEPT operation contains an agent definition that sends a DvP settlement to CMM after it has been successfully processed by TRMSwift (released to SWIFT as acknowledged by EsiAdapter) if it matches the rule SFLO-CMM-DVP-RELEASE:

```
#... to CMM service - if dvp settlement processed first via TRMSwift
(state_between ('SWIFT-HOLD'), mask (0),
rule ('SFLO-CMM-DVP-RELEASE', 'service/entity-broker/settlement@rule'),
service ('service/entity-broker/settlement@cmm-accept')),
```

In `settlement.py` the REJECT operation contains an agent definition that sends a DvP settlement to CMM if it matches the rule SFLO-CMM-DVP-RELEASE when rejected from RELEASED:

```
(state ('RELEASED'), not_mask (1), mask (0),
rule ('SFLO-CMM-DVP-RELEASE', 'service/entity-broker/settlement@rule'),
service ('service/entity-broker/settlement@cmm-reject')),
```

3.4.3 DvP rejection

When rejecting a DvP settlement after the corresponding SWIFT MT541 or MT543 message has been sent and the corresponding cash part has been sent to CMM, you must:

1. Unauthorize the CMM settled cash record.
2. Reject the settlement in TRM so that it reverts to the state "Waiting for SWIFT".

3. Reject the FIN message by sending the cancellation MT541 or MT543 created when the settlement is rejected.

Note: The settlement cannot be rejected before the corresponding cancellation SWIFT message is sent.

Chapter 4 Tracking data across modules

4.1 Introduction

Wallstreet Suite consists of multiple business modules: TRM, CMM and ACM. Each module has its own business functionality, and static data that includes reporting and monitoring tools.

Because the business flow involves multiple modules, there is a need to track information related to one business event across modules.

This chapter highlights key references between transactional data in individual modules, and describes the available reporting and monitoring tools to facilitate the tracking.

4.2 Transactional Data and their References

4.2.1 Key transactional data

Here is a summary of the types of transactional data found in the different modules of Wallstreet Suite. For more detailed descriptions, see the relevant module's documentation.

4.2.1.1 TRM

The Transaction and Risk Module deals mainly with financial transactions. To provide a full picture about the future position it must also provide forecasts from commercial activities.

- Transaction

  Core information on entered or imported financial transactions. the key data entity in TRM holds a relatively large amount of information for modeling various instrument types.

  Information about future positions from financial transactions is also available in CMM.

- Cashflow

  TRM uses a cashflow model to present individual financial instruments. Cashflows are attached to a transaction. One transaction can have one or more cashflows. A single cashflow belongs to one transaction only. Normally, cashflows are automatically generated, based on transaction information and instrument data. In some cases, they can be updated.

- Forecast Exposure

  Imported CMM aggregated forecasts are saved as Forecast Exposures which are simple future cashflows.

- Payment

  Information about payment from a financial transaction: payments are typically generated from transactions and cashflows. One payment can come from one or more cashflows. One cashflow can belong to one payment only.

  As indicated above, cashflows might be netted into one payment, for example by client or currency, which means that payment can be related to multiple transactions. One transaction can have more than one payment.

Payments can be split. A split is recorded on the original payment and a new additional payment is generated. The new additional payment does not contain a reference to the original cashflows.

Payments are also processed in CMM.

- Accounting Event

  Accounting data for further processing in ACM: in TRM, accounting events are created by the processing of transactions and cashflows, according to the relevant configuration setup information.

  Accounting Events are also processed in ACM.

4.2.1.2 CMM

The Cash Management Module deals mainly with information about payments, both commercial (entered or imported) and financial (from TRM). It also keeps cash account information as recorded by an external or in-house bank.

The module also includes Cash Flow Forecasting functionality (sometimes referred to as the Cash Forecasting Module) showing both commercial (entered or imported) forecasts or a financial forecast (from TRM).

- Cash Record

  Typically information about payment in CMM, either manually entered or imported. It could also be could be also other information, such as an adjustment from reconciliation.

- Bank Transaction

  Cash account movements, typically imported or a manually entered bank statement line. These are reconciled with cash records and linked together after successful reconciliation.

- Forecast

  Cash flow forecast as captured or imported into CMM. Key data entity for cash flow forecasting functionality.

  Aggregated forecasts can be transferred to TRM.

- Accounting Event

  Accounting data for further processing in ACM. In CMM, these are created by processing cash records and bank transactions, according to the relevant configuration setup information.

  Accounting Events are also processed in ACM.

4.2.1.3 ACM

The Accounting Module centralizes accounting information from other modules (TRM and CMM) or manual entries, posts it to relevant accounts, and presents it in a sub-ledger.

- Accounting Entry

  Sub-ledger account posting: can be either captured manually or generated by processing the relevant data from TRM and CMM.

  In the accounting entry flow, the entries are mapped into sub-ledger accounts, grouped if relevant, grouped into vouchers, and finally posted.

4.2.2 Key integration points

The business event flow will typically involve multiple modules: for example, a financial transaction entered in TRM, position and results booked in ACM, and payment processed in CMM and booked in ACM.

The modules are tightly integrated to provide seamless business functionality. Key flows for transactional data are:

- Position from TRM financial transactions is available in CMM.
- Aggregated CMM forecasts are available in TRM.
- TRM payments are processed in CMM.
- TRM accounting events are processed in ACM.
- CMM accounting events are processed in ACM.

4.2.3 Key cross-module references

To ensure that the business flow can be followed, there is a referencing schema in place to allow a user to backtrack to the source information. Key references are described below.

4.2.3.1 TRM - CMM

TRM payments are transferred into CMM cash records. In order to be able to backtrack from the CMM cash record to the TRM payment, a unique reference (TRM Settlement ID) is kept in Customer Reference Number and simultaneously the Orig System Code is set to "TRM". The TRM logical transaction number (*affect number* in the cashflow table or *target transaction number* in Transaction Manager) is also available when reporting on the CMM cash record - External Reference(s). We also transfer the TRM Cashflow Type to the CMM Cash Record. This is available by drilling down on a cash record, or in a a cash transaction report such as the Financial Cashflow Type report.

TRM cashflows can be transferred to CMM as forecasts. All cashflows in a portfolio under the portfolio FORECAST-TOP-PORTFOLIO in Configuration Table Editor will have forecasts created as they are processed in the TRM transaction flow. These forecasts expire once the corresponding settlements are sent as cash records to CMM (upon release of the settlement). Forecasts from TRM cashflows contain a reference to the originating TRM cashflow and transaction: cashflow id, logical TRM transaction number, and the technical TRM transaction number.

Some of the CMM aggregated forecasts are transferred into TRM forecast exposures. Since the grouping is flexible, there is no direct referencing schema. However, CMM allows the defining of identical grouping for monitoring in CMM forecast reports, and for the transfer of forecasts to ensure that data validity can be checked.

4.2.3.2 TRM - ACM

TRM hands over the data relevant to accounting via TRM accounting events. ACM processes these events and creates ACM accounting entries. Accounting entries from TRM include "TRM" in Orig Group and also the key reference for back-tracking: TRM Accounting Event ID. In addition, there is the TRM transaction number available in the Reference field.

4.2.3.3 CMM - ACM

CMM hands over the data relevant to accounting via CMM accounting events. ACM processes these events and creates ACM accounting entries. Accounting entries from CMM include "CMM" in Orig Group and also the key reference for back-tracking: CMM Accounting Event ID. In addition, there is the CMM cash record or bank transaction ID available in the Reference field.

4.3 Available tracking tools

The reference data described above can be tracked using various tools across the system, including online applications and onscreen reporting. See the module documentation for descriptions of individual reports and screens. This section provides a logical overview and highlights cross-module integration aspects of individual reports.

- Reporting Tools

Wallstreet Suite currently offers two reporting tools. TRM and ACM both use Report Generator, and CMM uses Data Analyzer. Both are highly configurable by end users who can create customized reports.

Both reporting solutions offer drill-down functionality. CMM Data Analyzer allows drill-downs inside CMM reports. TRM/ACM Report Generator allows drill-downs inside TRM and ACM, and also across TRM and ACM.

You can use certain reports for tracking the IDs of transactions, settlements, and cash records across TRM and CMM:

- CMM Forecast reports

  For forecasts you have references to the originating TRM cashflow and transactions: cashflow id ("Source Ref ID"), cashflow type ("Cashflow Subtype"), logical TRM transaction number/affect number ("External Reference") and the technical TRM transaction number ("Source Ref Event ID").

- CMM Cash Transaction, Cash Position, Cash Monitor, Cash Reconciliation, and Manual Reconciliation reports

  These reports display the transaction number ("External Reference" - logical transaction number).

- Online Applications

  These applications are primarily designed for data entry and maintenance. However, many of them can readily be used for tracking when required.

4.3.1 Reconciliation on a transactional level

4.3.1.1 TRM

4.3.1.1.1 Key reports

Integration Tracing Report	This report is primarily designed to focus on TRM integration points. It provides information (counts) of generated subsequent data used for transaction processing by further modules: accounting events for ACM or payments for TRM.
Transaction Report	Provides relevant information about the transaction as saved in the system. By using formatting and grouping, a variety of useful layouts can be created.
Classification Report	Similar to the Transaction Report, but presenting the transaction in all result modes and showing related classifications. By using report filters, it can also show only those transactions that are not classified - a layout like this can be used as a useful checking report.
Cashflow Report	Provides relevant information about cashflows and forecast exposures (including link to transaction) as saved in the system. It shows both Cashflows and Forecast Exposures fields in a consistent way, enabling the creation of combined reports.
Settlement Report	Provides relevant information about payments as saved in the system. It allows searching: for example, for a specific payment (by providing Payment ID). By using formatting, it is possible to group by payments and expand by transactions, or vice versa.
Settlement Cashflows Report	Similar to Settlement Report, but in addition, shows all of the related cashflows of the transactions.
Accounting Events Report	Provides information about accounting outcomes generated by TRM that are to be processed by ACM. Includes a reference to transaction number. Both daily accounting events and CTB events (key figures) are show in this report.

4.3.1.1.2 Key on-line applications

Transaction Manager	Provides information on financial transactions, including the detailed modelling to transaction, leg, schedule and cashflows. Also allows the calculation of risk and result figures.
Settlement Manager	Provides information on payments, including detailed beakdown to cashflows (with regard to transactions).
Treasury Monitor	Provides information on the position. Can be used for back tracking the actual aggregated TRM forecast position in CMM.

4.3.2 CMM

4.3.2.1 Key reports

Cash Transaction Report	Provides detailed information regarding all transactions that are imported from an external system, such as an accounts-payable or -receivable system. This report also presents manually entered corporate transactions and settled financial transactions from TRM. The report can be used to identify open or unreconciled transactions and can be used in conjunction with the bank statement and CMM's forecast reports to build an accurate and comprehensive understanding of the corporate cash position.
Bank Transaction Report	Provides the ability to report all actual bank records imported from external banks, manually entered or generated by the in-house banks. The bank transactions provide a link back to the cash instruction that it is reconciled to.
Forecast Report	Allows the user to view all the cash flow forecast records that originate from TRM, manually entered, imported, or from any other source. The report is built on the flexible reporting framework and the Custom Forecast reports therefore provide the flexibility to present TRM forecast data in CMM consistently with the forecast reporting available in TRM.
Bank Balance Analysis Report	Provides a view of an entity's, bank's, or bank account group's opening and closing bank balances for a specified date range. This allows the ability to observe and analyse the flow of funds in and out of the related bank accounts. This report in conjunction with the ACM balance report provides a reconciliation of balances in a cash account.
Accounting Events Report	Used to report on accounting events generated for transfer to ACM. This report provides a clear view of the record flow from the CMM to the ACM using the CMM flexible reporting infrastructure to allow the user to customize the format of the report using the Format Editor and the selection criteria using the Criteria Editor.

4.3.3 ACM

4.3.3.1 Key reports

Entry State Report	Provides detailed information on the accounting entries and their complete processing along the ACM flow. Namely, it shows the originating system (column Origin group TRM/CMM or ACM for manual entries) and the relevant details (column Origin, e.g., TRM-via-CMM, then column CMM transaction type recognizing the bank transaction or cash record, Reference is to the transaction ID in the respective source system) as well as aggregation details and status of the entry (for example, status Aggregated, Not-Mapped, Posted).

4.3.3.2 Key online applications

Accounting Entry Manager	This application works with vouchers. It provides details on the entries that are already grouped to voucher; unlike, for example, the Entry State Report which shows all the entries. It can also display and manipulate any non-Final vouchers. For all these, it shows a level of detail similar to the Entry State report. Unlike the Entry State report, it allows advanced query execution.

Chapter 5 Using Process Monitor

5.1 Introduction

Process Monitor is a Wallstreet Suite management system that provides the following features:

- Monitoring functions to view the runtime status of Unix processes and Windows services.
- Monitoring of Wallstreet Suite application logs and for dispatching e-mail notifications.
- Management functions for managing your system configuration and administering the starting and stopping of services within one or more system environments, including:
  - Grouping processes into one or more system environments
  - Defining and enforcing start/stop-related process dependencies
  - Defining system-wide or process-specific environment variables and parameters to pass at process start-up
  - Supporting the segregation of security and operations roles of users.

Note: A system environment is any installation of Wallstreet Suite as part of a self-sufficient system for achieving an operational goal such as the evaluation, test, or production of data generated by Wallstreet Suite.

- Administrative functions include:
  - Centralized configuration, with everything configured at the Process Monitor level
  - Administration access control
  - Secure Sockets Layer (SSL)-based communication among components.

5.2 Components

Process Monitor is made up of three primary components:

- The administration console, **pm_admin**, which is a user-friendly Windows application. It runs on any version of Microsoft Windows with .NET Framework Version 1.1 (such as Windows XP).

  A command line tool, `pm_cmd`, is also available for Windows and Unix.

- The Process Monitor service daemon, **pmsd**, controls the core functions. It is available for Windows and Unix.
- A Process Monitor agent daemon, **pmad**, running on each participating server computer running a Wallstreet Suite process. The agent relays information about client-side processes that can be viewed at the administration console. It is available for Windows and Unix.

5.3 Possible configurations

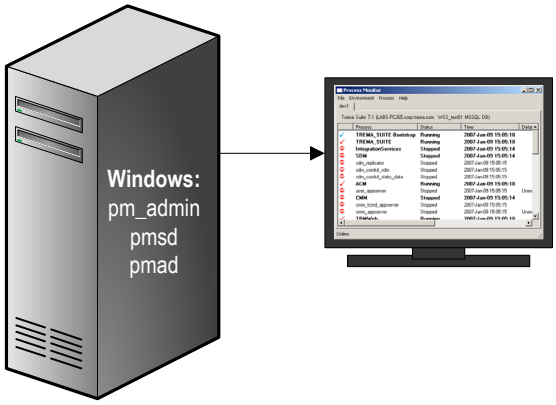
5.3.1 How it works

Depending on the size and load-sharing requirements of your Wallstreet Suite system, the Wallstreet Suite processes/services may be installed on one or multiple machines. These processes/services need starting, stopping, and monitoring. Process Monitor handles this simply and efficiently as follows:

1. On every machine where there are Wallstreet Suite processes/services installed, there must be a copy of the Process Monitor agent daemon (**pmad**). Use either the Windows or Unix version of **pmad**, depending on the target machine's operating system.
2. On a suitable machine, install either the Unix or Windows version of the Process Monitor service daemon (**pmsd**).
3. On a suitable machine, install either the Process Monitor Admin Console application (Windows machine only), or the Unix or Windows version of the command line tool `pm_cmd`.
4. Configure an XML file to tell the Admin program in 3 above where **pmsd** is, and to tell **pmsd** where each **pmad** is.

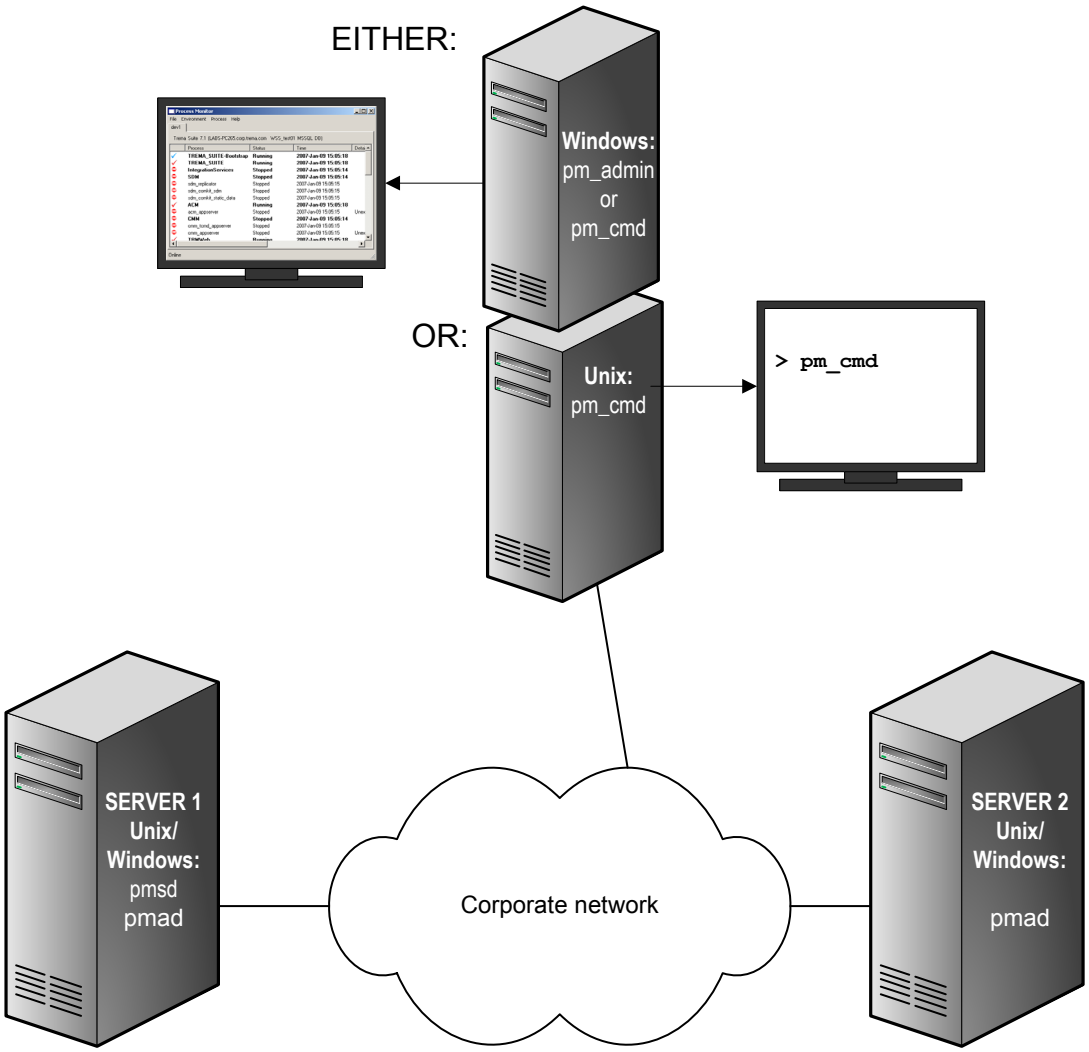
5.3.1.1 Simple case

The diagram below shows a very simple case: one Windows machine that handles all Wallstreet Suite processes, so only one **pmad** is needed. The **pmsd** and the Process Monitor Admin Console application have also been installed on the same machine.



5.3.1.2 Complex case

The next diagram shows a more complex case:



Top machine:

Administration is being done on a separate machine, and this can be either a Unix machine running the command line admin program `pm_cmd`, or a Windows machine running `pm_cmd` or the Process Monitor Admin Console.

Servers 1 and 2:

One can be running Unix, the other Windows. Each server is running Wallstreet Suite processes/services, and therefore must have **pmad** installed. Server 1 also has **pmsd**, but **pmsd** could have been installed on any one of the three machines, or even on a fourth machine.

They are all interconnected via a network, and the Process Monitor traffic is encrypted.

5.4 Installing Process Monitor

All Process Monitor components can be installed on Windows and/or UNIX-based computers, except the graphical administration console which can only be installed on a Windows PC.

There is one Process Monitor installation package per Wallstreet Suite-compliant operating system (for example, Itanium, Sun-Solaris, and Windows).

5.4.1 Installation under Windows using the Suite Installer

If you use the Suite Installer to install Wallstreet Suite, Process Monitor is downloaded and installed as part of the Suite Installer installation process.

Also, by default, **pmad** and **pmsd** are installed as Windows services. To disable them, edit the file `shared\components\pmm\config.properties`, and set this parameter to false:

```
pmm.create.windows.services=false
```

pmad and **pmsd** Windows service names can be set using following parameters :

```
pmm.pmsd.service.name="Wallstreet Suite - pmsd"
pmm.pmad.service.name="Wallstreet Suite - pmad"
```

5.4.2 Downloading the Process Monitor packages

Do the following:

1. From the Wall Street support site, download one or more Process Monitor packages, depending on the operating system(s) used in your Wallstreet Suite installation.
2. Copy and expand the relevant package to a suitable directory on each computer in your Wallstreet Suite installation.

Note: From now on, we use `installDir` to represent the path to the `pmm` folder: the top level Process Monitor folder after you have expanded the package.

5.4.3 Configuring pmsd and pmad

Depending on which platform(s) you are configuring Process Monitor on, see *5.4.3.1 Windows environment* on page 56 or *5.4.3.2 UNIX environment* on page 58.

5.4.3.1 Windows environment

5.4.3.1.1 Configuring the Process Monitor Service (pmsd)

This is required on only one of the Wallstreet Suite servers.

1. Configure an SSL private key certificate. Name these files `pmsd_cert.pem` and `pmsd_key.pem` and overwrite the default demo key and certificate in the `installDir/etc/conf/certs` directory.
2. Open a Windows Command Prompt, go to the `installDir\bin` directory and enter the command:

   ```
   pmsd.exe --unregister
   ```

   The `--unregister` flag checks for a previously registered Process Monitor Service on this computer. If no such Service was registered, a warning is generated. Dismiss the warning and continue. Otherwise, the command unregisters the service. Any existing Process Monitor files are *not* removed.
3. To register **pmsd** as a Windows service, enter the command:

   ```
   pmsd.exe --register --home "installDir" [--port port]
   ```

   where:

   port is the port that will accept connections from the Admin Console application (the default is `8884`).
4. You can start **pmsd** either as a process or a Windows service. Normally, you run it as a process for debugging purposes, then run it as a Windows service once it is working correctly.

- As a Windows service: open the Windows Control Panel, select **Administrative Tools - Services**, and start the **Process Monitor Service Daemon**.
- As a process: to start **pmsd** in debugging mode (which writes log-file entries to the console), open a Windows Command Prompt, change to the `installDir` directory, and run `pmsd_debug.bat`. You should edit the script to configure your specific port if it is different from `8885`.

5.4.3.1.2 Automatically starting up processes

If you want all Wallstreet Suite processes that are flagged as "auto-start" to be started when **pmsd** is launched (either as a process or a Windows Service), do the following:

1. Open the file `%FK_HOME%\sharedconf\components\pmm\config.properties`, and ensure that the following line appears:
   - If **pmsd** is to be run as a process: `pmm.process.auto_start=true`
   - If **pmsd** is to be run as a service: `pmm.pmsd.service.process.auto_start=true`
2. Run the Suite Installer `reconfigure` command, as described in the *WSS Suite Installation Guide*. Here is an example:

   `%si% reconfigure -i` *`installation_directory`* `-e` *`env_name`* `-n` *`env_number`*

5.4.3.1.3 Configuring the Process Monitor Agent (pmad)

1. Configure an SSL private key certificate. Name these files `pmad_cert.pem` and `pmad_key.pem` and overwrite the default demo key and certificate in the `installDir/etc/conf/certs` directory.
2. Open a Windows Command Prompt, go to the `installDir` directory and enter the command:

   `pmad.exe --unregister`

   The `--unregister` flag checks for a previously registered Process Monitor agent service on this computer. If no such service was registered, a warning is generated. Dismiss the warning and continue. Otherwise, the command unregisters the service. Any existing Process Monitor files are *not* removed.
3. To register **pmad** as a Windows service, enter the command:

   `pmad.exe --register --home "`*`installDir`*`" [--port` *`port`*`]`

   where:

   port is the port that will accept connections from Process Monitor Service (the default is `8885`). :

Note: No connection to **pmsd** is possible if this port is not identical to the one specified in the configuration file `pmsd_config.xml`. See XXX.

4. You can start **pmad** either as a process or a Windows service. Normally, you run it as a process for debugging purposes, then run it as a Windows service once it is working correctly.
   - As a Windows service: open the Windows Control Panel, select **Administrative Tools - Services**, and start the **Process Monitor Agent Daemon**.
   - As a process: to start **pmad** in debugging mode (which writes log-file entries to the console), open a Windows Command Prompt, change to the `installDir` directory, and run `pmad_debug.bat`. You should edit the script to configure your specific port if it is different from `8885`.

   Repeat this process for all Windows computers in your Wallstreet Suite system.

5.4.3.2 UNIX environment

5.4.3.2.1 Configuring the Process Monitor Service (pmsd)

This is required on only one of the Wallstreet Suite servers:

1. Configure an SSL private key certificate. Name these files `pmsd_cert.pem` and `pmsd_key.pem` and overwrite the default demo key and certificate in the `installDir/etc/conf/certs` directory.
2. Configure your `pmsd.sh` script
   - It is recommended to start and stop the Process Monitor service using the `pmsd.sh` shell script. You may customize this script with your own parameters.
   - You can set the debugging mode (`DEBUG="--debug"`) which writes log file entries to the console, and change the `PORT` variable (default `8884`) on which **pmsd** will accept connections from the administration interface (pm_admin/pm_cmd).
3. Start the Process Monitor service through your system's start mechanism. To start, go to the `installDir` directory and type:

   ```
   ./pmsd.sh start
   ```

   To stop, type:

   ```
   ./pmsd.sh stop
   ```

5.4.3.2.2 Automatically starting up processes

If you want all Wallstreet Suite processes that are flagged as "auto-start" to be started when **pmsd** is launched, do the following:

1. Open the file `$FK_HOME/sharedconf/components/pmm/config.properties`, and ensure that the following line appears:

   ```
   pmm.process.auto_start=true
   ```

2. Run the Suite Installer `reconfigure` command, as described in the *WSS Suite Installation Guide*. Here is an example:

   ```
   python $SIPM_HOME/tpm.py reconfigure -i installation_directory -e env_name -n env_number
   ```

5.4.3.2.3 Configuring the Process Monitor agent (pmad)

1. Configure an SSL private key certificate. Name these files `pmad_cert.pem` and `pmad_key.pem` and overwrite the default demo key and certificate in the `installDir/etc/conf/certs` directory.
2. Configure your `pmad.sh` script
   - It is recommended to start and stop the Process Monitor agent using the `pmad.sh` shell script. You may customize this script to your own parameters.
   - You can set the debugging mode (`DEBUG="--debug"`) which writes log-file entries to the console and change the `PORT` variable (default `8885`) on which **pmad** will accept connections from **pmsd** to the value that you configured in `pmsd_config.xml`.
3. Start Process Monitor agent through your system's start mechanism.

   To start, go the the `installDir` directory and type:

   ```
   ./pmad.sh start
   ```

   To stop, type:

   ```
   ./pmad.sh stop
   ```


5.4.3.3 Configuring the Process Monitor admin

Edit the `admin.sh` file and set the `PORT` variable (default 8884) to the port on which pmsd is listening for connections (see Configuring the Process Monitor Service), and by changing the `HOST` variable (default `localhost`) to the address of the host on which you have configured pmsd.

5.4.3.3.1 Configuring the Process Monitor Admin Console

Edit the `Admin.bat` file and replace the port (default `8884`) by the one you have used in your **pmsd** setup, and by changing the host address (default `localhost`) to the host address of the computer on which you have installed **pmsd**.

5.5 Security considerations

5.5.1 Controlling access

The following components enable security specialists and system administrators to control access and processes based on the roles assigned to users and the permissions required to log into or start applications.

- You may create an **agent_<*agent-name*>.accounts** for a Windows-based agent in the `installDir/etc/conf/private` directory of the pmsd installation. This accounts file allows you to configure window processes to be launched under explicit credentials (other that the pmad's account credentials which is the default).
- When confidential or sensitive parameters, such as a privileged account's password, are needed for a process under Process Monitor's management, you can create a file **env_<*environment-name*>.secret** in the `installDir/etc/conf/private` directory to make that information available to privileged administrators while preventing system operators and other users from seeing it.

See *5.6.1 Setting up configuration files* on page 61 for more information about the accounts and secret files.

Keep in mind these additional security considerations:

- The file **pmsd_passwd**,located in `installDir/etc/conf/private`, contains user names and the associated passwords in encrypted form. Removing the entries for a user prevents that user from using the administration console. For that reason, access to the working directory should be restricted to privileged users.
- The Process Monitor agents must run under a sufficiently high privileged account to enable them to read and write data as well as launch and stop the processes that they manage.
- pmsd's core configuration file `pmsd_config.xml` enables you to identify which users are allowed to edit the configuration and who, as operators, are allowed only to start or stop processes. Users with edit permission automatically have "manage" rights, and users having a valid login to pmsd have the right to view the status of any system environment. User names referred to in the configuration file must exist at runtime. (User names, stored in the pmsd_passwd file, are created in the administration console.) In an initial installation, one user with id `admin` and password `password` is provided. The password of the admin user should be changed on the first connection. For more information, see *5.6.2 pmsd_config.tmpl* on page 62.
- Only unauthenticated Simple Mail Transfer Protocol (SMTP) transport is supported by Process Monitor for mail notifications.

5.5.2 Setting up private key certificate authentication

Each computer running pmsd and/or pmad requires private key certificate authentication. Contact your local Certificate Authority to obtain and install this protection.

5.5.2.1 Installing and configuring a test private key certificate

While operating Wallstreet Suite and Process Monitor in a test environment, you can use a test (temporary) private key certificate for 60 days. To obtain the temporary key and certificate, you will need `openssl`, which is distributed with TRM and also obtainable as a downloadable package from `http://www.openssl.org`. The file `testsslconfig.txt` provided with `openssl` contains a default certificate configuration and may be edited for tailoring it to your test environment.

To create the temporary private key certificate:

1. Install the full `openssl` package.
2. Set up the path to the installed directory where `openssl.exe` is located.
3. Run the utility `create key&cert.bat`. The files `newkey.pem` and `newcert.pem` are created.
4. Rename those newly created files to:

   For the service: `pmsd_key.pem` and `pmsd_cert.pem`

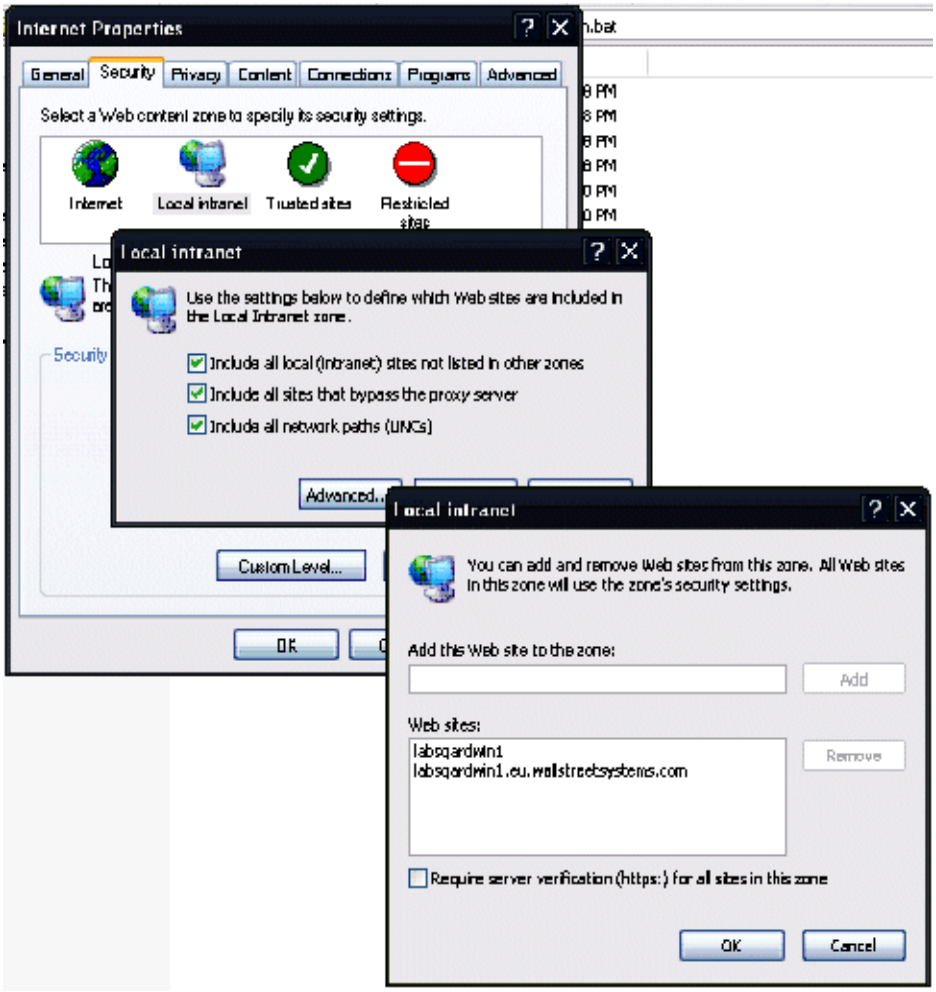
   For an agent: `pmad_key.pem` and `pmad_cert.pem`.
5. Copy the newly renamed files to the `installDir/etc/conf/certs` directory.
6. For each additional set of agent files needed, rerun the utility, rename the files, and copy them to the working directory set up for pmad on that agent's computer.

5.5.3 Setting up .NET security

Before running `pm_admin.exe` which is located on a shared network drive `(\\<remote_host>\...\pmm\<remote_host>_admin.bat)` on a local Windows PC, set up .NET Security as in the following example:

1. Raise the .NET security level for the local intranet group.
   - Access **Control Panel/Administrative Tools/Microsoft .NET Framework 1.1 Wizards**
   - Click **Adjust .NET Security**
   - Select **Local Intranet**
   - Move slider to Full Trust
2. Include the remote host (which hosts pm_admin.exe) in your Local Intranet group
   - Access **Control Panel/Internet Options/Security tab**
   - Click **Local intranet**

– Turn on the Include settings as in this example:



5.6 Configuring Process Monitor

After installing its components, you must configure Process Monitor by setting up the following:

- Configuration files that define parameters for Process Monitor components and operations
- User IDs and passwords for users of the administration monitor.

5.6.1 Setting up configuration files

The following files are used to configure Process Monitor:

- **pmsd_config.xml**, the core configuration file, located in `installDir/etc/conf`, defines global parameters for Process Monitor. This file identifies the location of agent (pmad) computers, the system environments, the mail server for dispatching notifications, and access rights for Process Monitor administrators. See *5.6.2 pmsd_config.tmpl* on page 62 for more information on this file.
- **agent_<*agent-name*>.accounts**, an optional file to be created in the `installDir/etc/conf/private` directory for any Windows agent, provides the means to identify user accounts on each agent computer. (Mechanisms available on UNIX do not require the explicit knowledge of account passwords.) These accounts can be used to launch processes with a better control on their access rights within their host.

Specify each user account on its own line in the file using the following syntax:

```
id=accountRef,userid=windowsUserID,password=userPassword
```

The user ID (*windowsUserID*) and password (*userPassword*) combination must already exist as a user account on the agent's Windows computer. Assign an ID (*accounReft*) to this user account, and use that ID as the value of the <manage> tag's account attribute to identify the user account to apply to the process. For more information, see the `<manage>` tag.

- **env_<*environment-name*>.xml** defines specific parameters for the named system environment. The configuration identifies the processes that make up the system environment and their monitoring and management parameters as well as their interdependencies. See *5.6.3 env_ <environment-name>.xml* on page 63 for more information on this file. This configuration file is required for each system environment to be monitored by Process Monitor.
- **env_<*environment-name*>.secret** is an optional, "secret" file in the `installDir/etc/conf/private` directory, in which you can store confidential or sensitive parameter values for the named system environment. Any string in the form [<<*text*>>] appearing in command parameters, environment variables, or stdio interactions within the named system environment is substituted by a defined secret value without making it visible to the operator.

  For example, to configure the batch user password `1A2B3C4Z` (which you want to conceal from users), add the following line to the secret file:

  ```
  MYPASSW=1A2B3C4Z
  ```

  Then, to access that password, use the string [$(MYPASSW)].
- **override.settings** allows you to specify higher values for parameters related to the communication protocol between monitor and agents. Create a file named `override.settings` in the `etc/conf` directory, and specify the new values, each on a separate line.

  The currently supported settings are:

  ```
  AgentInitialPacketSize=<memory in KB>
  AdminInitialPacketSize=<memory in KB>
  AgentCommandTimeout=<time in ms>
  ```

  The size, in KB, represents the initial size of the internal receive buffer for the relevant application (`AgentInitialPacketSize` applies to **pmad**, and `AdminInitialPacketSize` to pm_cms and the GUI).

  In 7.3 versions of WSS, this size is not dynamic and needs to be increased manually when adding more environments to monitor or more processes to the agent. In 7.4 onwards, the values of `Agent|AdminInitialPacketSize` expand automatically if the packets sent by the remote entity are bigger than the current buffer size.

  `AgentCommandTimeout` represents the time in milliseconds allowed to a command issued by the agent to complete (e.g. start/stop **activityd**, or any other kind of monitored process).

5.6.2 pmsd_config.tmpl

The core configuration file `pmsd_config.xml`, located in the `installDir/etc/conf` directory on the pmsd-designated computer, has the following structure:

```
<monitor id="id" [desc="description"] [notify="email"]>
[<smtphost address="address" port="port" />]
<agents>
  <agent id="id" [desc="description"]>
    <host address="address" port="port" />
  </agent>
    ...
</agents>
```



```
<environments>
  <environment id="id" [desc="description"]>
    <access_rights>
      <edit userids="admin user1 user2" />
      <manage userids="admin user3" />
    </access_rights>
  </environment>
</environments>
</monitor>
```

Note: Items in italics within quotation marks are variables. Replace the variable by the desired value. For example, in the syntax `userids="admin user1 user2"`, replace *user1* and *user 2* with the user IDs you want.
Brackets around an element or attribute (as in the **[**desc=*"description"***]** attribute) indicate an optional element or attribute and are not part of the tagging syntax. If you use the optional element or attribute in your xml file, **omit** the brackets.

The ID and description of the instance of Process Monitor can be any alphanumeric string. The optional notify email parameter will receive system-level notifications such as inability to reach as configured agent.

The optional `<smtphost>` tag specifies the IP address and port of an accessible SMTP server on the network. No notification is sent when this parameter is unspecified.

The `<agents>` section should have one entry for each computer where pmad components reside. The entry identifies the agent's IP address and the port on which pmad is listening for connections. The port parameter in `pmsd_config.xml` must match the port parameter supplied on the command line of the corresponding pmad. The default is 8885.

The `<environments>` section lists all system environments that pmsd manages. At least one system environment should be specified.

You can identify which users are allowed to edit the configuration and who, as operators, are allowed only to start or stop processes. Users with edit permission automatically have "manage" rights, and users having a valid login to Process Monitor have the right to view the status of any system environment.

User names in the `<access_rights>` section must exist at runtime. Use the administration console to create the desired user names. In an initial installation, one user with id `admin` and password `password` is provided. The password of the `admin` user should be changed on the first connection.

5.6.3 env_<environment-name>.xml

Each environment defined in the `pmsd_conf.xml` file must have an associated environment-configuration file named `env_environment-name.xml` in `installDir/etc/conf`.

The environment configuration file looks like this:

```
<environment>
  <notifications>
    <notify severity="BENIGN|SERIOUS|CRITICAL" email="user@domain" />
    ...
  </notifications>
  <common_variables [include="path"]>
    <set var="name" value="value" [export="true|false"] />
    ...
  </common_variables>
  <processes>
    <process id="id" [desc="description"] agent="agentId"
      [kind="WINDOWS_SERVICE|APPLICATION|VIRTUAL"]
       [importance="MISSION_CRITICAL|IMPORTANT|USEFUL"] >
      [<log [id="identifier"] file="path">
```

```
        [<filters>
          <filter>
            <match>regexp</match>
            [<not_match>regexp</not_match>]
            <message severity="BENIGN|SERIOUS|CRITICAL">msg</message>
          </filter>
          ...
        </filters>]
      </log>

      …

      <log>

        …

      </log>]
      <windows_service name="serviceName" />
      [<application [name="process name"] [pidfile="path"] />
      [<spy command="path" [arguments="arguments"] />]
      [<manage control="MANUAL|AUTOMATIC "[account="account"]
        <start [timeout="milliseconds"] [wait="milliseconds"]
                    [autorestart="true|false"] >
          <command path="executablepath" [arguments="arguments"]
[final="true|false"] />
            [<variables [include="path"] [useAgentEnvironment=”true|false”] >
              <set var="name" value="value" />
              ...
            </variables>]
            [<stdio>
              <enter text="text" [after_prompt="something"]
[after_delay="millisecs"] />
              ...
            </stdio>]
        </start>
        <stop [timeout="milliseconds"] [kill="normal|brutal|normal_then_brutal"]>
          [<command [path="executablepath"] [arguments="arguments"] />]
            [<variables [include="path"] [useAgentEnvironment=”true|false”] >
              <set var="name" value="value" />
              ...
            </variables>]
        <stop>
        <dependencies>
          [<requires process="processId" [stop_on_stop="true|false"] />
          ...]
          [<uses process="processId" [start_on_start=”true|false” />
          ...]
        </dependencies>
      </manage>]
    </process>
    ...
  </processes>
</environment>
```

The elements that make up the `env_environment-name.xml` file are described in this section. The following notational conventions are used in the above structure:

- Items in italics within quotation marks are variables. Replace the variable by the desired value. For example, in the syntax file=*”path”*, replace *path* with the actual path of the file that will contain the log data.

- Brackets around an element or attribute (as in the **[**include="*path*"**]** attribute) indicate an optional element or attribute and are not part of the tagging syntax. If you use the optional element or attribute in your xml file, *omit* the brackets.
- A vertical bar between words (as in the optional attribute kind="WINDOWS_SERVICE**|**APPLICATION") means "or". For example, when specifying the attribute kind for the <process> tag, your tagging should be either kind="WINDOWS_SERVICE" or kind="APPLICATION".

5.6.3.1 notifications

The <notifications> element identifies at what level of warning a notification e-mail should be sent to an e-mail address. You can repeat the <notify> sub-element to notify several recipients.

5.6.3.2 common_variables

The <common_variables> element identifies environment variables. If the export attribute is set to true (which is the default), the variable will be copied in the environment of any process launched by Process Monitor. Otherwise it will only be accessible by pmsd itself in the xml configuration. You can repeat the <set> sub-element so that multiple variables can be passed at the start-up of Process Monitor. With the include attribute, you can specify the path to a file that contains one or more environment variable settings expressed in the following form:

```
variable_name=value
variable_name=value
.
variable_name=value
```

The path can be a fully qualified path statement or one relative to the installation directory for pmsd. Note all variables included from such a file are automatically exportable.

Variable names used in the element can be subsequently referenced by name or through the use of the string $(*variable_name*). For example:

```
home=C:\my_work
address=$(home)\test
messages=3000
bufsize=$(messages)
```

5.6.3.3 processes

The <processes> element identifies each process in the system environment and enables process-specific control and management. For each process identified by a <process> tag, the sub-elements shown in the following table provide additional control.

Unlike Services on Windows, processes present obstacles to efficient monitoring and managing:

- The executable file of a process may be hidden by a batch process, script, or other utility program.
- Two or more processes running simultaneously may have identical names.

Two techniques are provided so that, by fine-tuning the configuration, you identify the most critical elements of the process to be monitored:

1. At least one of the following must be defined in the <process> element in order for pmad to monitor the process:
   - The <windows_service> sub-element for a Windows service
   - The actual executable file for the <command> sub-element (specified as final="true")
   - A process-generated Process ID (PID) file for the <pidfile> sub-element
   - A plug-in for the <spy> sub-element

2. The <manage> element provides the capability to exert control over the process.

Sub-element	Description
process	The <process> tag identifies the user-defined ID, descriptive text, and pmad agent name (the ID of the agent as defined in the pmsd_config.xml file) for the computer running the process. The kind attribute governs how Process Monitor starts and stops the process. The importance attribute is mapped internally to the notification severity to determine with what urgency to send notifications. For example, the unexpected malfunction of a process whose importance is "mission critical" causes a "critical" notification to be sent. By default, the kind attribute is APPLICATION, and the importance attribute is USEFUL. A VIRTUAL process does not have a real executable. It serves materialize a group of processes that, together, provide a function. The group of processes making up the virtual process is defined by means of the dependencies in the <manage> tag.
log	If the application generates a log file, this sub-element can make it accessible to Process Monitor. The path identifies the location of the log file generated by the application or Service. The default is no logging. Several log files may be configured in which case you should make sure they are uniquely identified by the id attribute. Note: Process Monitor does not generate process-related log files, nor does it manipulate log files.

filters/filter	One or more log filters can be used for each process log to detect noteworthy activity and trigger an event or an alert. You specify the applicable rule to apply and the priority level of the matching messaging when the rule applies. The default is to not apply filters. Each rule is constructed by means of a regular expression that must match an input line (<match>regexp</match>) and an optional excluding regular exception (<not_match>regexp</not_match>). A message with the desired severity will be generated when the match expression is satisfied and the not_match expression is not satisfied (or not defined).
	For example, suppose the log contains an entry such as the following:
	`Fatal Err 1036 - Out of memory`
	Constructing the rule
	`<filter>`
	`<match>Fatal Error (.*)</match> <message severity="CRITICAL">FATAL_ERR $2 </message> </filter>`
	searches log lines for the string "Fatal Error" followed by a space and then any text until the end of the line. When a match is found, a message FATAL_ERR followed by the remainder of the line (.*, which is 1036 - Out of memory) and of severity CRITICAL is sent to pm_admin and optionally by email.

windows_service	The name of the Service when the process is specified with the kind attribute WINDOWS_SERVICE.
application	The <pidfile> subelement allows you to specify the path to the PID file that the process is known to generate (when applicable). Otherwise, a process name that will be looked up by pmad can be specified in the <name> subelement. However, if more than one instance of such a process may be running the process name method will not function deterministically.
spy	The path to a custom "spy" plugin. A spy plugin can be used to better test the state of a process. A spy plugin can be written in any language as long as it is capable of returning a result code. A result code 0 indicates that the spied process is running smoothly. A result code of 1 indicates that it is hanging or otherwise seriously impaired. A result code of 2 indicates that the process is not running.

Sub-element	Description
manage	<manage> enables you to exert control over the process. If the <manage> section is omitted, Process Monitor can monitor the process but has no ability to control it. The control attribute specifies how you want the process started: MANUAL enables direct start/stop user control over the process; however, the process will be started automatically if some other process that depends on it is started. AUTOMATIC disables direct user control on the process and lets Process Monitor decide automatically when the process needs to be started or may be stopped based on dependencies. The default setting for the control attribute is AUTOMATIC. The account attribute specifies an account reference under which a Windows process should be started. The associated user name and password must be specified in the agent_agent-name.accounts file.
manage <start> tag	The <start> tag gives you control over the start-up of the process. The timeout attribute expresses in milliseconds the time after which the attempt to start the process times out. The default is 30000 (thirty seconds). The wait attribute specifies the delay in milliseconds of the start-up. The default is 1000 (one second). The autorestart attribute indicates whether an attempt to restart a recently stopped process should be made automatically. The default is false.
manage <command> tag	The <command> tag enables you to specify the path of a command to use to start the process, arguments to pass to that command, and whether the command is the actual process executable file ("true") or if the process is indirectly executed through an intermediary shell script ("false"). The default is "false."
manage <variables> tag	The <variables> tag defines environment variables to be passed to the process at launch. You can repeat the <set> sub-element so that multiple variables can be passed. You can also specify variables with the include attribute. By defining useAgentEnvironment="true" (default is false), you can pass all the variables that are defined in the agent's environment to the process.
manage <stdio> tag	(APPLICATION process only) The <stdio> tag, optionally used for processes of the APPLICATION kind, makes it possible to simulate the prompting and entry of input (for example, simulating the prompting of a user login, followed by the entry of the valid login). The text attribute is the text to be obtained as input. The after_prompt attribute identifies the prompting message. The after_delay is the time, in milliseconds, after which the text is sent to the process.
manage <stop> tag	The <stop> tag gives you control over the stopping of processes (except for Windows services). The timeout attribute expresses in milliseconds the time after which the attempt to stop the process times out. The default is 30000 (thirty seconds). The kill attribute specifies how the process should be killed in the absence of a kill command on a Unix system. "normal" is the equivalent of a kill -9, "brutal" corresponds to a kill -15, "normal_then_brutal" performs a brutal kill only if a preceding normal kill failed to stop the process. The default is normal_then_brutal.
manage <command> and <variables> tags	The <command> and <variables> tags provide the same functionality for stopping processes than the corresponding tags defined in the <start> tag (see above)

Sub-element	Description
manage <dependencies> tag	The <dependencies> tag enables you to specify IDs of processes that the current process might require for operation or, with the uses attribute, optionally (not of necessity) work with. The stop_on_stop attribute within the <required> tag makes it possible to stop the current process if the "requires" process crashes or is otherwise unavailable (default is false). The start_on_start attribute within the <uses> tag makes it possible NOT to automatically start the dependent process (if set to false) when set to false (default is true).

The "secret file"(env_environment-name.secret) involves the use of a confidential string or parameter value. The contents of the secret value are expanded in the following in the environment configuration:

<common_variables> value attribute

<command> arguments attribute

<variables> value attribute

<stdio> text attribute

<stop> arguments attribute

5.6.4 Customizing the Process Monitor configuration from the site directory

To do this:

1. Move the Process Monitor's pmm directory and contents under the ws-suite directory.
2. Create a pmm/etc/conf directory structure in your site directory:

   <site>/base/pmm/etc/conf

3. Copy the environment file you want to modify and modify it.
4. Perform a site command:
   a. Execute setup.bat/.sh from *<installation_directory>*\SI_Manager\packagemanager, where *<installation_directory>* is the directory where you unzipped the product. This evaluates the environment.
   b. %si% site -s c:\ws-suite*<site>* -i c:\ws-suite\7.*n.n* -e *dev* -n *1*

5.7 Creating new users

To create a new user for accessing the administration console, do the following on the server where pmsd is running:

1. Select **File - Create User**. The Create User dialog is displayed.
2. Type a new user name and associated password.
3. Click **OK**.

Newly created users and their associated passwords are stored in the pmsd_password file in the working directory set up for pmsd.

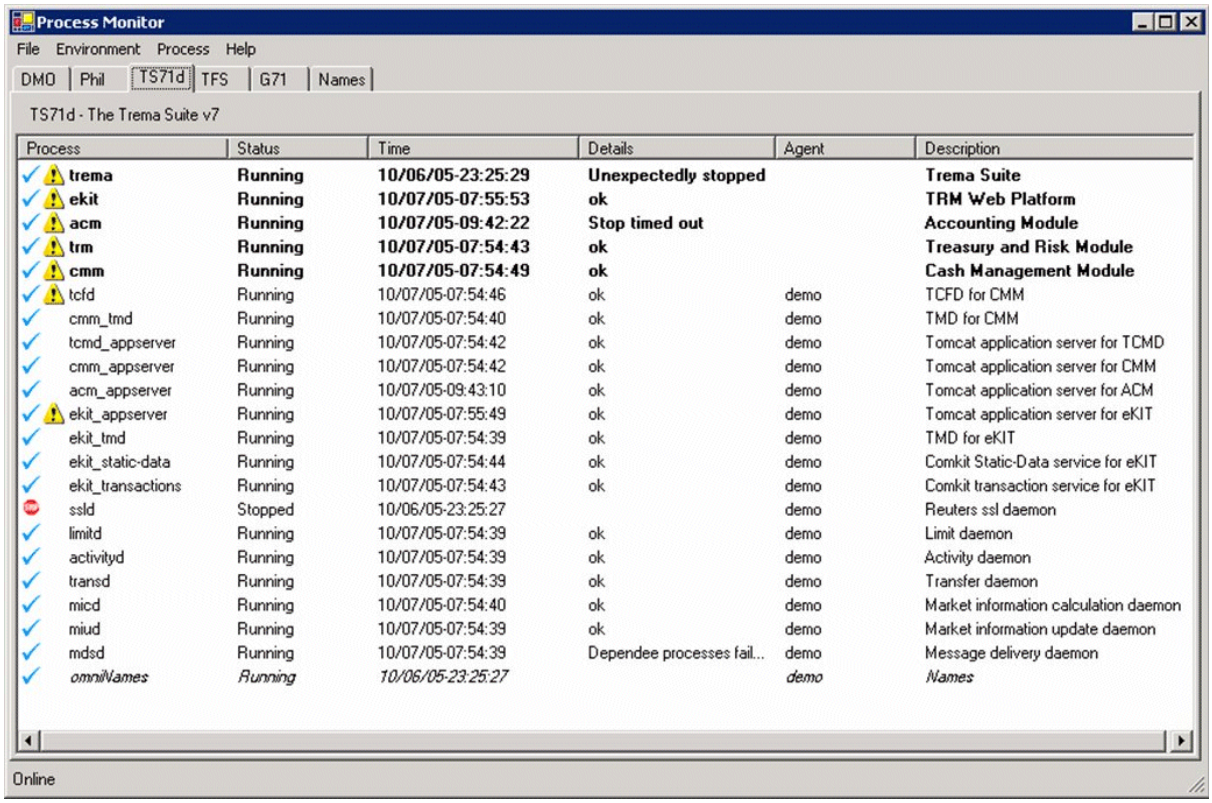
5.8 Managing processes

To manage Wallstreet Suite processes, you can use either or both the following applications:

- Process Monitor
  This is a Windows-only application that provides a detailed and versatile real time control and display of all processes, and their dependencies. See *5.8.1 Using Process Monitor* on page 69.
- pm_cmd
  This is a Windows and Unix-based command-line application, which provides control and display of all processes and also enables the user to script the starting and stopping of any Wallstreet Suite processes. See *5.8.3 Using pm_cmd* on page 72.

5.8.1 Using Process Monitor

The Process Monitor application, shown below, provides a tool for viewing and managing processes in each system environment defined in the file `pmsd_config.xml`.



For each system environment, the following information is displayed:

- Process—The name of the process, configured for the system environment as the process ID. (See *5.6.3.3 processes* on page 65 for more information.) The yellow information icon indicates that one or more alerts exist for that process.
- Status—One of the following:

  – Offline—The agent cannot be reached. (The agent has not been started, or communication with the agent cannot take place.)

  – About to start—The start command is queued for the process.

  – Starting—The start command has been issued, and starting is in progress.

  – Started—The process has been started successfully.

  – Running—The process is ready for use.

– Hanging—The process is present but is not responding. (This status is optionally available for processes monitored by a process monitor spy.)

– About to stop—The stop command is queued for the process.

– Stopping—The stop command has been issued, and stopping is in progress.

– Stopped—The process has been stopped successfully.

– Died—The process stopped unexpectedly (not as the result of a Process Monitor action).

- Details—Additional information about the status (for example, an error code for a failed action)
- Agent—The ID of the Process Monitor Agent defined in the pmsd_config.xml file.
- Description—The description for the agent taken from the pmsd_config.xml file.

Also, lines displayed in italic font indicate AUTOMATIC process that cannot be launched by direct user control and lines in bold font indicate VIRTUAL processes (e.g. trm, acm, cmm, …).

To access the administration console:

1. Run `<TS_App_Server_Name>_admin.bat` in the `pmm` directory. A login dialog is then displayed.

   Without arguments, this batch file assumes that the pmsd service is on the same server as `pm_admin.exe`, and that the pmsd port number is 8887.

   With arguments: `<TS_App_Server_Name>_admin.bat <PMSD_HOST> <PMSD_PORT>`
2. Use the preset user name `admin` and preset password `password` to log in the first time.
3. To change the password, check **Change Password** in the login dialog. A new field is displayed to enable you to enter a new password. Click **OK** to complete the password change.
4. To log off the console, select **File - Logoff**.

Changing the title

Additional information can be displayed in the title of the PM Admin GUI console window. If you specify the --title switch when launching the console:

`installDir\bin\pm_admin.exe --title <title>`

The title <title> is appended to the default "Process Monitor" title.

5.8.2 Working with processes in a system environment

5.8.2.1 Working with all processes

To work with all processes in a single system environment:

1. Ensure that the desired environment is the one currently selected and visible in the administration console.
2. Select **Environment** from the main menu.
3. Select one of the following menu items:

Menu item	Description
Refresh	Update the administration console with the most recent status of processes.
Clear All Alerts	Clear the status of all alerts in the selected system environment.
Configuration	Start the Configuration Editor for the selected system environment.

5.8.2.2 Working with a single process

To work with a process:

1. Ensure that the desired environment is the one currently selected and visible in the administration console.
2. Select the desired process. (Note: Double-clicking a process has the same effect as the View Alerts menu item, described in the table below.)
3. Select **Process** from the main menu.
4. Select one of the following menu items:

Menu item	Description
Start	Launch the currently selected process.
Stop	Stop the currently selected process. Stopping a Windows-based process has the same effect as killing it. **Important**: When a process is configured to be managed by Process Monitor, never start or stop a process manually. Use Process Monitor's Stop function to stop processes.
View Alerts	Display notifications, if any, of unexpected changes of status or log filter results for the selected process.
View Log	Display the Log Viewer showing log messages for the selected process. (The log file must already be configured in the environment file.)
View Agent Log	Display the Log Viewer showing log messages for the agent associated with the selected process.

A right-mouse click on a process will display a contextual menu allowing a short access to start, stop and also kill. Note that the kill command bypasses all dependencies check to forcefully shut a process down. It should normally never be used. Finally, a dependencies sub-menu in the contextual menu will display all the dependencies of the selected process.

5.8.2.3 Using Configuration Editor

Use Configuration Editor to view the pmsd_config.xml file for the currently selected system environment in the administration console.

To open `pmsd_config.xml` in the editor, select **File - Service Configuration**.

The on-line editing of the configuration through the administration console is not yet available. Whenever a configuration file is changed (`pmsd_configuration.xml` or `env_...xml`) the Process Monitor service (pmsd) must be stopped and restarted for the changes to take effect. The agents need not be restarted.

5.8.3 Using pm_cmd

The command-line version of Process Monitor is pm_cmd, which runs on Unix and Windows. It is also useful for scripting the starting and stopping of processes.

pm_cmd is located in the `bin` directory of the pmm installation path.

5.8.3.1 Getting help

Get help on the command by entering:

```
pm_cmd -h
```

Which displays (Windows version shown):

```
SYNTAX: pm_cmd.exe <user>/<password>@<host>:<port> <command> [<args>]
where <command> [<args>]:
  env                    list environments
  proc                   list processes and their status
  conf                   displays configuration of service
  conf <env>             diplays configuration of environment <env>
  log                    displays log of service
  log <agent>            diplays log of agent <agent>
  log <proc>@<env>       diplays log of process <proc> in environment <env>
  start <proc>@<env>     start process <proc> in environment <env>
  stop <proc>@<env>      stop process <proc> in environment <env>
  restart <proc>@<env>   restart process <proc> in environment <env>
  kill <proc>@<env>      kill process <proc> in environment <env>
  alerts <proc>@<env>    displays alerts for process <proc> in environment <env>
```

5.8.3.1.1 Syntax

For the `<host>:<port>` URL, `<host>` is a valid DNS name or IP address of the machine where **pmsd** is running, and `<port>` (for example `8887`) is the port to which **pmsd** listens.

5.8.3.1.2 Finding out process names

To get a list of all Wallstreet Suite process names, as well as their current status, use the `proc` command. For example:

```
pm_cmd.exe IT1/password1@localhost:8887 proc
```

5.8.3.1.3 Starting and stopping processes

Once you have the process names (and the environment name that they belong to) you can start them and stop them using the `start`, `stop`, `restart`, and `kill` commands.

Some examples:

```
pm_cmd.exe it1/password1@localhost:8887 start WALLSTREET_SUITE@dev1

pm_cmd.exe it1/password1@localhost:8887 restart WebSuite@dev1

pm_cmd.exe it1/password1@localhost:8887 stop TRMSwift@dev1
```

Note: Just like the graphical Process Monitor application, pm_cmd respects all configuration dependencies, and the AUTOMATIC or MANUAL start/stop setting for each process.

5.9 Troubleshooting

5.9.1 Configuration and customization-related problems

- Check that names for all system environments and environment variables are correct. You can verify that the settings are correct by running successfully a Process Monitor-controlled service outside Wallstreet Suite (and pmsd) environment. To do so on Windows, open a Command Prompt outside the TRM environment, then execute the service from the command line.
- Ensure that pm_admin was installed on a local drive, not on a network drive.
- Ensure that the .NET framework is installed on the computer running pm_admin.
- Check that users requiring edit rights (to modify configurations) or manage rights (to start and stop processes) from administration console are set up properly in `pmsd_config.xml`.
- Ensure that the private key certificate used for temporary testing has not expired.
- Ensure that pmad has sufficient privileges for running the processes that it manages.

5.9.2 Communication and network-related problems

Ensure that the port addresses and host names used to install Process Monitor components match across computers.

Check that each process agent name correctly identifies the agent on the computer where the process is running.

5.9.3 Log levels

The Process Monitor GUI allows you to associate a debug level with a single process or group of processes (virtual processes).

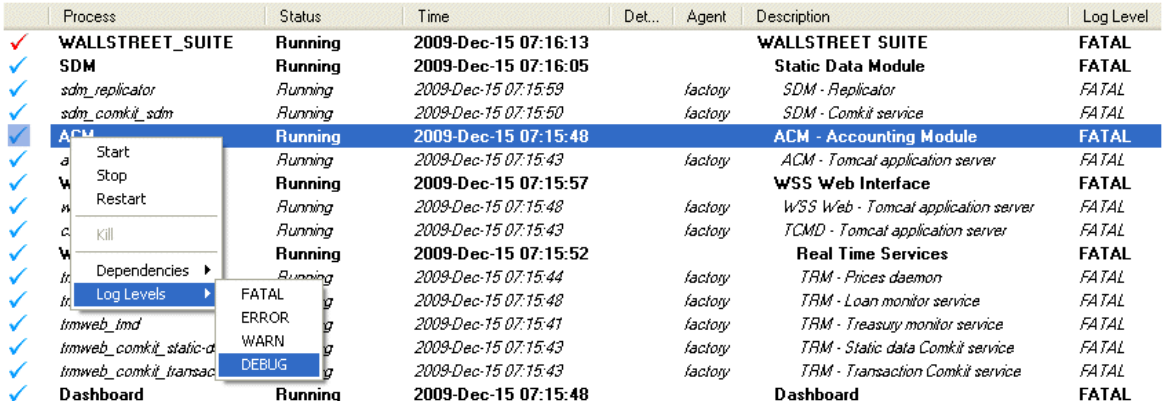
Changing the log level for a group of processes automatically changes the debug level for processes in the group. Each process uses the debug level of its group unless a specific log level is assigned to it.

The default log level is **FATAL**. This displays errors only.

If you change the log level of a process you must restart it to see the effect. This configuration is not dynamic.

To change the log level for one process or group of processes:

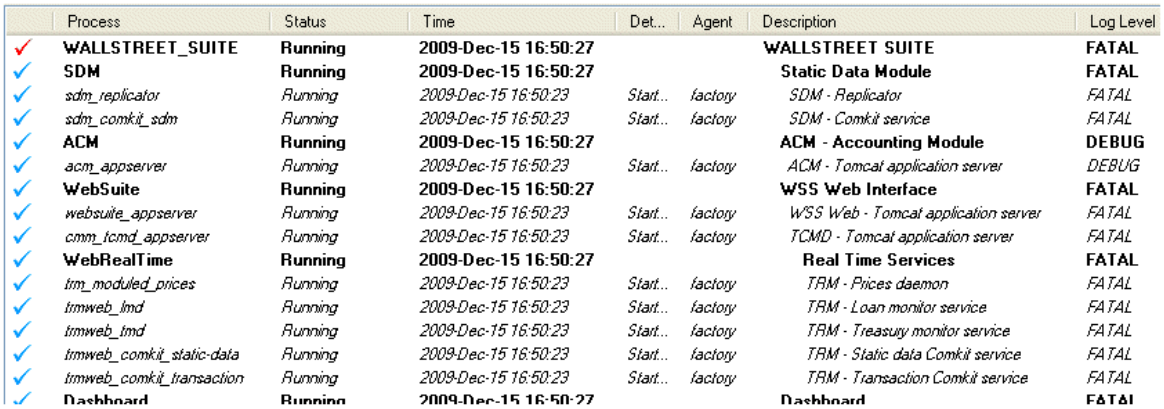
1. Right click on the process and choose a new value for "Log Levels":



This operation forces a rewrite of the `pmsd xml` configuration file.

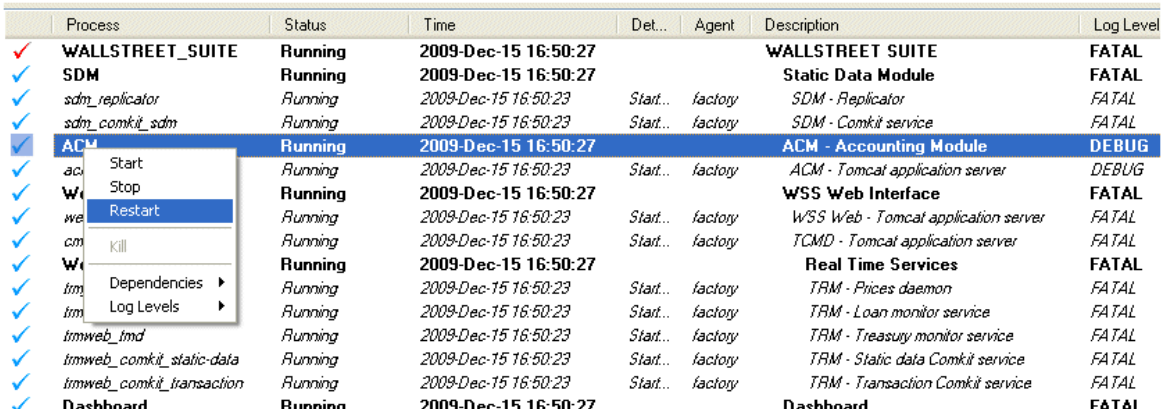
Note: During this operation which takes a few seconds, Process Monitor displays a a question mark before displaying the process status.

When the reload is completed, the **Log level** column displays the new value for the process(es).



Process	Status	Time	Det...	Agent	Description	Log Level
WALLSTREET_SUITE	Running	2009-Dec-15 16:50:27			WALLSTREET SUITE	FATAL
SDM	Running	2009-Dec-15 16:50:27			Static Data Module	FATAL
sdm_replicator	Running	2009-Dec-15 16:50:23	Start...	factory	SDM - Replicator	FATAL
sdm_comkit_sdm	Running	2009-Dec-15 16:50:23	Start...	factory	SDM - Comkit service	FATAL
ACM	Running	2009-Dec-15 16:50:27			ACM - Accounting Module	DEBUG
acm_appserver	Running	2009-Dec-15 16:50:23	Start...	factory	ACM - Tomcat application server	DEBUG
WebSuite	Running	2009-Dec-15 16:50:27			WSS Web Interface	FATAL
websuite_appserver	Running	2009-Dec-15 16:50:23	Start...	factory	WSS Web - Tomcat application server	FATAL
cmm_tcmd_appserver	Running	2009-Dec-15 16:50:23	Start...	factory	TCMD - Tomcat application server	FATAL
WebRealTime	Running	2009-Dec-15 16:50:27			Real Time Services	FATAL
trm_moduled_prices	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Prices daemon	FATAL
trmweb_lmd	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Loan monitor service	FATAL
trmweb_tmd	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Treasury monitor service	FATAL
trmweb_comkit_static-data	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Static data Comkit service	FATAL
trmweb_comkit_transaction	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Transaction Comkit service	FATAL
Dashboard	Running	2009-Dec-15 16:50:27			Dashboard	FATAL

2. A **Restart** is required so that the new **Log Level** takes effect:



Process	Status	Time	Det...	Agent	Description	Log Level
WALLSTREET_SUITE	Running	2009-Dec-15 16:50:27			WALLSTREET SUITE	FATAL
SDM	Running	2009-Dec-15 16:50:27			Static Data Module	FATAL
sdm_replicator	Running	2009-Dec-15 16:50:23	Start...	factory	SDM - Replicator	FATAL
sdm_comkit_sdm	Running	2009-Dec-15 16:50:23	Start...	factory	SDM - Comkit service	FATAL
ACM	Running	2009-Dec-15 16:50:27			ACM - Accounting Module	DEBUG
acm_appserver	Running	2009-Dec-15 16:50:23	Start...	factory	ACM - Tomcat application server	DEBUG
WebSuite	Running	2009-Dec-15 16:50:27			WSS Web Interface	FATAL
websuite_appserver	Running	2009-Dec-15 16:50:23	Start...	factory	WSS Web - Tomcat application server	FATAL
cmm_tcmd_appserver	Running	2009-Dec-15 16:50:23	Start...	factory	TCMD - Tomcat application server	FATAL
WebRealTime	Running	2009-Dec-15 16:50:27			Real Time Services	FATAL
trm_moduled_prices	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Prices daemon	FATAL
trmweb_lmd	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Loan monitor service	FATAL
trmweb_tmd	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Treasury monitor service	FATAL
trmweb_comkit_static-data	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Static data Comkit service	FATAL
trmweb_comkit_transaction	Running	2009-Dec-15 16:50:23	Start...	factory	TRM - Transaction Comkit service	FATAL
Dashboard	Running	2009-Dec-15 16:50:27			Dashboard	FATAL

5.9.3.1 Add a custom Log Level

1. Open the pmsd xml configuration file (`PM_HOME/etc/conf/env_<env>.xml`)
2. Add one row to the `loglevels` section : in this example, the log level is called `CUSTOM1`.

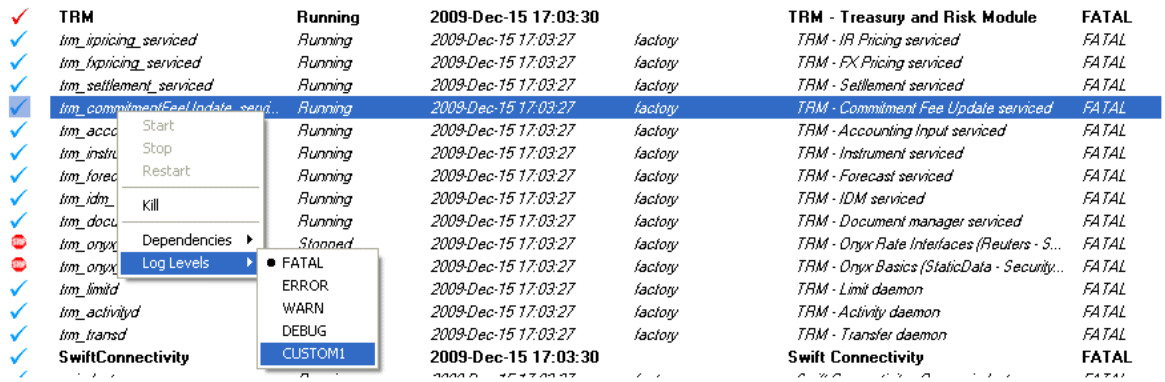
```
<loglevels>
 <loglevel databaselevel="0" id="1" log4jlevel="FATAL" name="FATAL" tracelevel="0"/>
 <loglevel databaselevel="0" id="2" log4jlevel="ERROR" name="ERROR" tracelevel="0"/>
 <loglevel databaselevel="0" id="3" log4jlevel="WARN" name="WARN" tracelevel="5"/>
 <loglevel databaselevel="1" id="4" log4jlevel="DEBUG" name="DEBUG" tracelevel="40"/>
 <loglevel databaselevel="1" id="5" log4jlevel="DEBUG" name="CUSTOM1" tracelevel="20"/>
</loglevels>
```

Attributes are:

Attribute	Description	Values for custom log level
`id`	Unique id.	Numeric value: `5` or higher.
`name`	Name displayed in the Process Monitor screen.	Alphanumeric value.
`tracelevel`	C++ specific tracing level, corresponding to `--trace-level` parameter passed to TRM processes.	Numeric values between `0` and `99`.
`log4jlevel`	Log4j debug mode. Most Java processes have their own log4j config file, which defines Debug's level.	`DEBUG`, `INFO`, `WARN`, `ERROR`, `FATAL`, `ALL`, `OFF`.
`databaselevel`	Defines if database traces are required (it corresponds to `DATABASE_DEBUG=1`).	`0` or `1`.

3. Restart **pmsd**.

4. Use the new Log Level:



5.9.4 Message logs

Several files are produced to log the messages and alerts that Process Monitor generates:

- pmsd.log, created in pmsd's directory when the Process Monitor Service is executed, can be viewed by means of the Log Viewer. To view log messages in the Log Viewer:
  - **a.** Select **File - Service Log**.
  - **b.** Click **Refresh** to update the list with the most recent log messages.
  - **c.** Click **Done** to close the Log Viewer.
- `pmad.log`, created in pmad's directory when the Process Monitor Agent is executed, logs agent-side messages.
- `process@environment.alerts`, located in pmsds's working directory, stores log scanning alerts per process.
- `process@environment.pid`, located in pmad's working directory, is a temporary file per process that stores relevant PIDs (for "final" processes).

1.

Chapter 6 Transferring data: DBLoader

6.1 Introduction

The DBLoader tool is a software package that allows the transfer of data from one database to another with the possibility of storing the data in XML files as an intermediate step. DBLoader can:

- Be used from the command line or via its own graphical user interface.
- Copy data from a database.
- Copy data to a set of files.
- Copy data to a database.
- Use the features of the data to perform the extraction and loading.
- Use an object-based approach rather than table-based.
- Query particular data within an object.
- Remap system-generated keys.
- Be database-independent for Sybase, Oracle and MSSQL.
- Support objects from TRM, ACM and CMM.
- Support automatic foreign key data extraction.
- Support update or not of existing data.
- Support removal or not of extra data.

6.1.1 Restrictions and recommendations

Although DBLoader can handle many different categories, only the ACM Factory, TRM Factory, and All Factory categories have been certified by Wallstreet Systems. When working with other categories, extreme care should be taken. Using DBLoader for transferring transaction data is not recommended.

6.1.1.1 Transaction data

DBLoader is not the recommended tool for copying transactions from one database to another. Simple non-linked transactions (FXSpot/Forward, FXSwap and Depo Loans) can be copied, but transactions that are linked to other transactions (including rollovers and repos) lose their link information and thus become single transactions in the new database.

6.1.1.2 Large objects

There are performance problems with large objects when the object has children; for example, `SetupMapHeader` and VaR tables if VaR is being used. DBLoader has some optimizations for large single table-based objects, for example Prices. But for multiple table objects such as `SetupMapHeader`, optimization is not possible.

In the destination database, the performance of this object can be enhanced if the tables associated with the object are empty. Also, much of the data stored in this object is not really needed, so use query parameters to extract only the instances that are needed.

Memory usage is normally capped. but it will be high when copying `SetupMapHeader` from one database to another. The python scripts are set to use a maximum of 1024 Megabytes of memory.

Hint:

Use `user_id=DBO` to copy the factory-created objects only.

6.1.2 Terminology

6.1.2.1 From and To

DBLoader always requires a source and a destination. Depending on the situation:

- *From* and *Source* is used to describe where the data is read from.
- *To* and *Destination* will be used to describe where the data is to be written.

Note that either could be a directory containing XML files, or a database.

6.1.2.2 Object and Object Instance

Object is used to describe a grouping of tables with one table being the parent.

For example, the object `Currency` consists of the table `Currency` as the parent, and `CurrencyCross`, `CurrencyCrossFixed`, `CurrencyGroupMap`, `CurrencyJournal`, `CurrencyModeSetup`, and `CurrencySetup` as child tables. Typically the unique key of the parent is the main non-unique key within the children.

An object *instance* is one row of data of the parent and all rows with the same parent key from all the children.

The terms *Entity* and *Subentity* are also used, where Entity means the same as Object and Subentity means the child of an Entity.

6.2 Operation

6.2.1 Where to find DBLoader

You can find DBLoader in the following places within the TRM file structure (`$FK_HOME`):

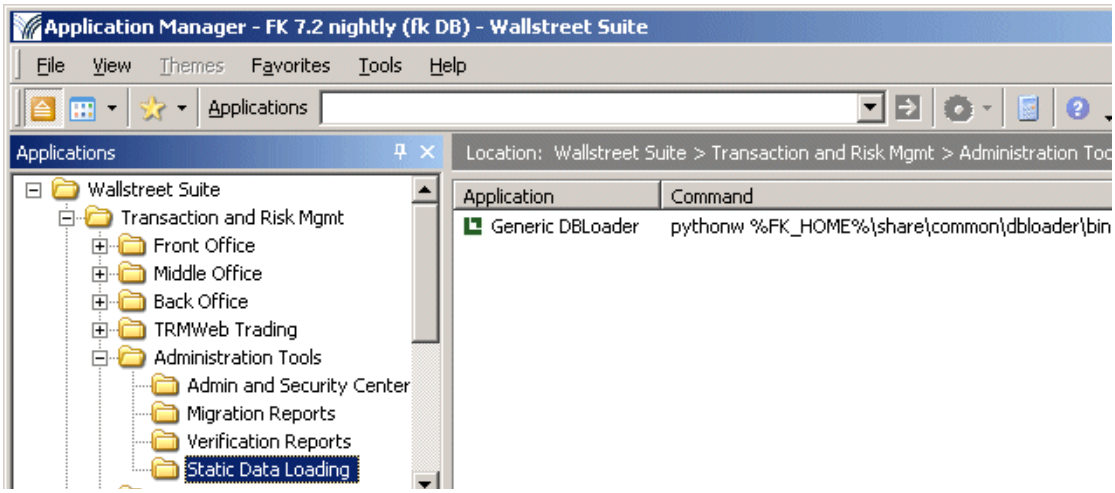
- The location of python scripts for running DBLoader is in `share/common/dbloader/bin`.
- The setup for debugging, `log4j.xml`, is in j`ava/conf/log4j/dbloader`.
- The location of category files and object definition XML files is `share/common/dbloader/def`.
- Properties files with connection details can be located anywhere; however, the entry in the Application Manager looks for properties files in `share/common/dbloader/def`.
- The jar file, `biz.wss.trm.program.dbloader_VERSION.jar` is located in `java/Jupiter/plugins` but should never need to be accessed.

6.2.2 How to run DBLoader

To make it easier to run DBLoader, the following python file scripts are available in `$FK_HOME/share/common/dbloader/bin` (see table below for descriptions of arguments used with DBLoader and the python scripts):

- `generic.py` *`props-dir`*

Displays the full graphical user interface to gather information. This is also available from Application Manager:



- `file-to-db-nowin.py` *`from-file.properties to-db.properties xx.category`*

  Non-window copying from a file set to a database.

- `db-to-file-nowin.py` *`from-db.properties to-file.properties xx.category`*

  Non-window copying from a database set to a file.

- `script.py` *`xml_script_file`*

  Window-based, but uses all information from the supplied script file *`xml_script_file`*.

- `encrypt-pw.py`

  Generates an encrypted password suitable for inclusion in the properties files.

Argument	Description
`from-type`	Can be either `database` or `file`, and specifies where the data is coming from.
`from-info`	A properties file for the `from-type`. See *6.2.2.1 Properties file contents* on page 80.
`to-type`	Can be either `database` or `file`, and specifies where the data is going to.
`to-info`	A properties file for the `to-type`. See *6.2.2.1 Properties file contents* on page 80.
`objects`	The name of a category file to be used as the list of wanted objects.
`no-win`	Either `true` or `false` and specifies whether the windows should be displayed or not. Note: All other arguments must be also specified for this to have an effect.
`script`	Use the specified XML file as the complete definition of connections and objects to work with.
`props-dir`	Directory containing multiple connection detail properties files.

Argument	Description
xx.category	Category files are used to group useful data into one selection. By default the following category files are provided, but individual sites can generate their own: • trm.category All available trm objects. • TRM-Factory.category A subset of the most useful trm objects. • TRM-Templates.category All trm template objects. • acm.categeory All acm objects. • ACM-Factory.category A subset of the necessary acm objects. • cmm.category A subset of necessary cmm objects. • ALL-Factory.category A complete set of Factory data for all modules. A category file contains only the name of the Object, one per line. The .category suffix is mandatory, but the file name can be any name that is unique in the directory. Category files are placed in the share/common/dbloader/def directory along with the Object Definition XML files.

6.2.2.1 Properties file contents

Database connection

For a database connection the following data must be supplied (shown with example values):

Type=oracle

Can be sybase, oracle_rac, mssql, db2 or oracle. Case is not important.

sybase uses a jconnect5.5 and is unsuitable as a driver for the **To** connectivity.

oracle_rac is for connecting to an Oracle RAC database cluster. You can only connect to one cluster, so the machine name and port number should reflect this. RAC systems normally have a "main" connection that connects to any cluster node, but when using DBLoader you can only connect to one cluster node (therefore the machine name/port number should be different to the "main" one.

Server=server.corp.company.com

Port=1521

Owner=DBO

The actual owner of the database, important for Oracle.

Instance=cfactory

The database name

User=dbo

Database login name

Password=xxxxx

The password. The password can be entered as clear text or encrypted by encrypt-pw.bat.

Service=SYBASE

This only needed for the creation of tables and is the same value as the **-S** option for the build script (Sybase and mssql) or **-D** for oracle.

File properties

A file properties file contains:

`Directory=`*the directory where the files are to be found.*

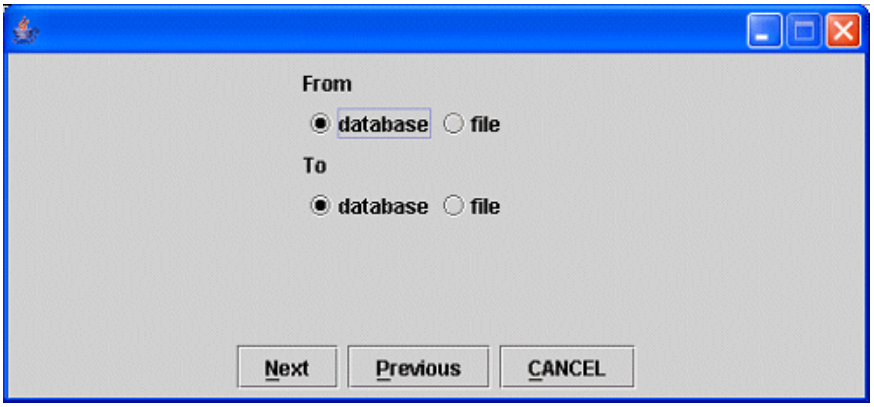
6.2.3 User interface description

This section describes all screens that can appear when running the `generic.py` or the other python launcher scripts already described.

Note: In the screens that follow, the **Save Settings** function may not be available in the current version of DBLoader.

6.2.3.1 Source and destination

Indicate what type of storage the data is coming from and for what type of storage the data is going to. This screen is not shown if `from-type` and `to-type` are specified.

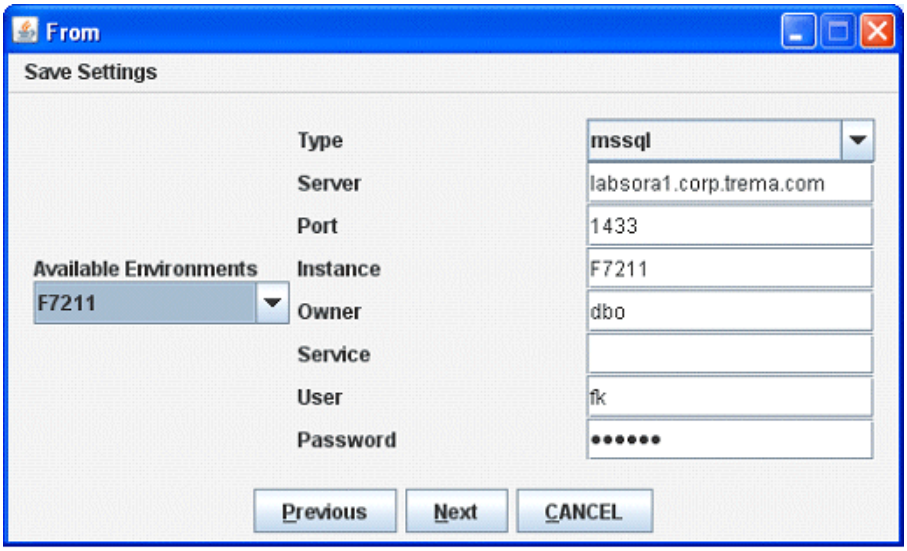


After clicking **Next**, the screen displayed depends on whether the source is a database or a directory. In either case, the fields can be filled in by hand or by choosing from a list of predefined properties files. Property files can also be saved from the application if the details are new but would be needed in the future. Note that the properties files need to be in the same location. In a standard installation, the directory is `$FK_HOME/share/common/dbloader/def`.

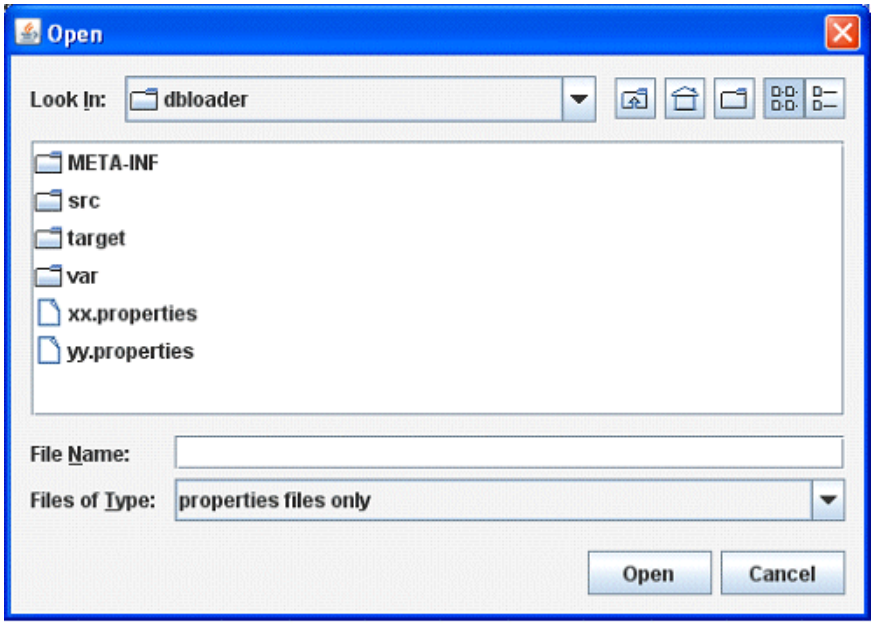
6.2.3.2 Database connection

Fill in the fields, or select a previously saved environment (if any) from the **Available Environments** drop-down.

Server	The machine that the database server is running on.
Port	The actual port that the database server is listening on.
Instance	Typically the name of the database but the meaning is slightly different for Oracle.
Owner	The database owner. Normally this will be `dbo` but with Oracle it may be changed.
Service	This is only needed if tables are going to be created (see later). It is the same as the `-S` option for `build.pl`.
User	The user ID. Normally use the superuser but the issue is the permissions on the objects to be written.
Password	The password of the user. Note: If kept in properties files it should be encrypted.



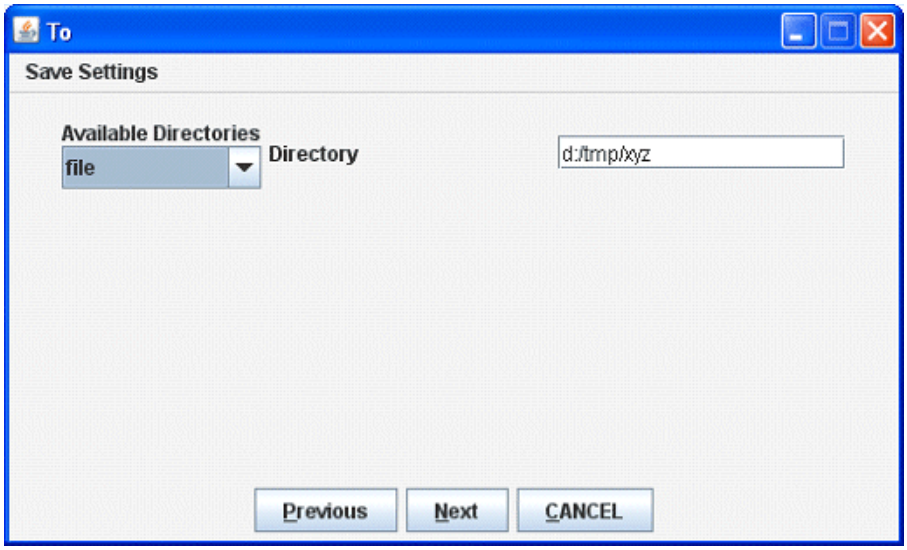
6.2.3.3 Save Settings



6.2.3.4 The To screen

Describe the destination entity, which can be either a database or a directory. In this example a directory is being used but if a database was used then the needed information would be the same as the From example above. The directory does not need to exist when creating the XML files but must exist when reading them.

Right-click in the **Directory** field to open a navigation dialog.

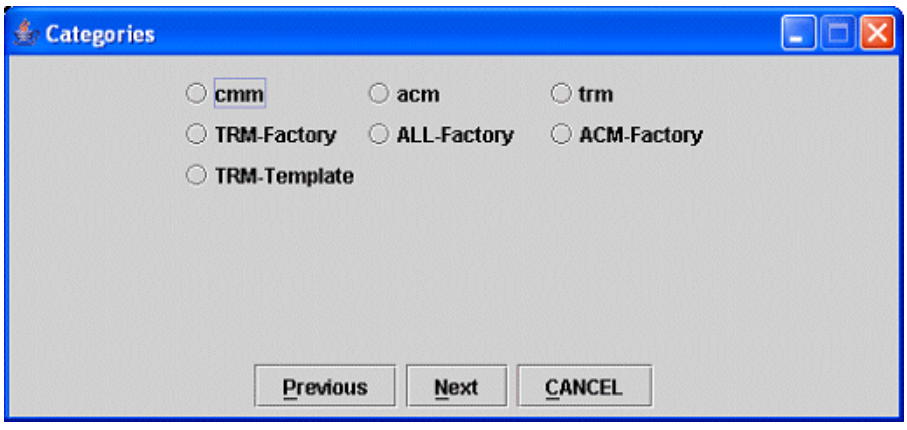


6.2.3.5 Categories

Categories are a way of setting up groups of objects so that they can be dealt with as a single entity. This streamlines the selection in the subsequent screen. More categories can be created by placing `.category` files in the `def` directory. This screen allows for a setup so that, for example, smaller subsets of the total set of objects can be presented to facilitate the work of choosing which objects to copy.

cmm	A subset of necessary cmm objects.
acm	All acm objects.
trm	All available trm objects.
TRM-Factory	A subset of the most useful trm objects.
ALL-Factory	A complete set of Factory data for all modules.
ACM-Factory	A subset of the necessary acm objects.
TRM-Templates	All trm template objects.

Note: You can select more than one category.

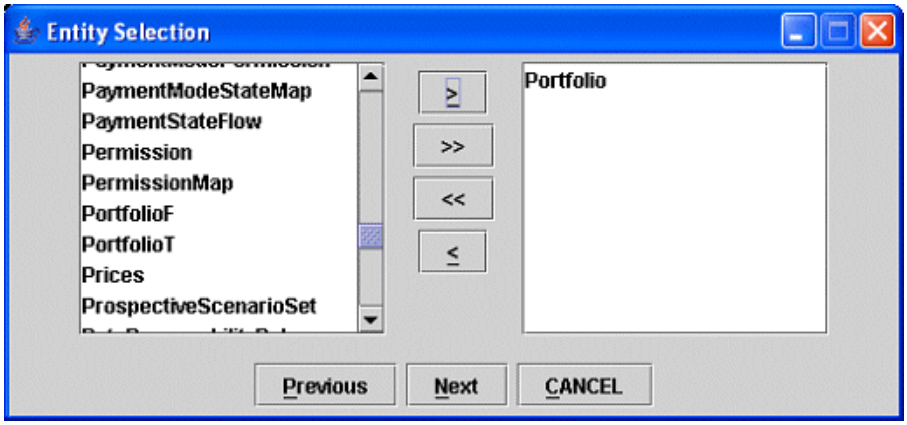


After clicking **Next**, a list of all available objects is displayed.

6.2.3.6 Entity selection

Selected entities appear in the right list, available entities in the left list. The buttons work like this:

>	Moves the entity highlighted in the left list to the right list
>>	Moves all entities in the left list to the right list.
<<	Moves the entity highlighted in the right list to the left list
<	Moves all entities in the right list to the left list.



Right-clicking a selected entity displays a dialog where further actions can be performed on the entity.

6.2.3.7 Additional parameters

6.2.3.7.1 Query criteria

- Operates on the **From** database.
- Default is: no criteria.
- Has lookup lists where there is a List procedure associated with the field. This may be on the parent table of the object itself or on any of its foreign keys.
- If the value is not numeric then wildcards are generally acceptable.

6.2.3.7.2 Switches

Include Foreign Keys

Acts on the **From** Database and is only active when the **From** source is a database. Only active if one object is chosen. It is assumed that if multiple objects have been selected then the user wants to control the process. Finds the data for the objects using the foreign key specification for the whole object: the parent table plus all of the children tables.

For example: you are copying Yield Curve X from database A to database B; the Yield Curve is in currency DKK, and the currency DKK is not present in database B. Then the application will automatically copy currency DKK in addition to instrument X. This assumes that currency is a foreign key in the Yield Curve definition.

Update or Leave

If the object exists in the target database, use the unique key as the query. Two modes of operation are available:

1. The data is updated: all non-key values are set to the value of the incoming object.
2. The data is not updated. For example, the data itself has been updated in the target database, so the changes are not to be reverted.

The default behavior is to update.

Leave Children

With subentities of existing object instances there are two approaches to what should happen with the rows that do not match the incoming data.

1. Remove the non matching rows so the sub entity looks the same as the incoming entity.
2. Leave the additional rows. The default action is to delete the non matching rows which can be overridden with the **Leave Children** switch.

Delete Extra

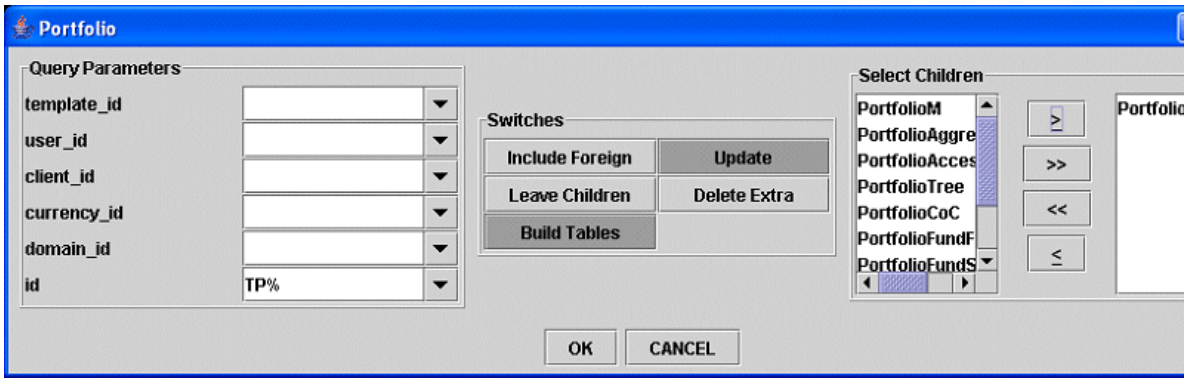
Use this switch if you want the destination database to look exactly like the source database at the object level; any objects in the destination database that do not exist in the source database are removed from the destination database.

Rebuild Tables

With TRM and ACM this switch enables the creation of the database tables associated with the object. The tables are built by calling the appropriate `build` script. It relies on the correct environment being in place and that the service entry has been filled in for the database connection.

Select Children

This switch allows for selecting the subentities that will be included in the object.

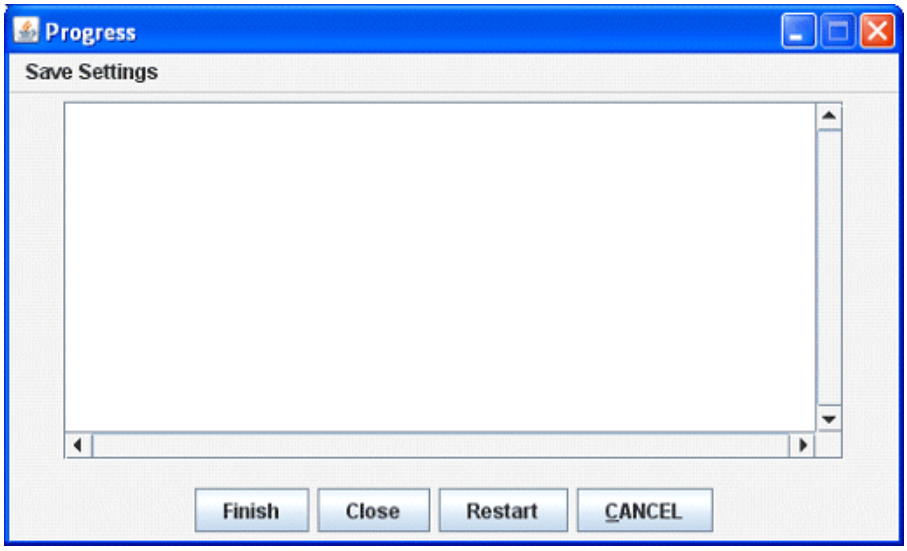


6.2.4 Progress screen

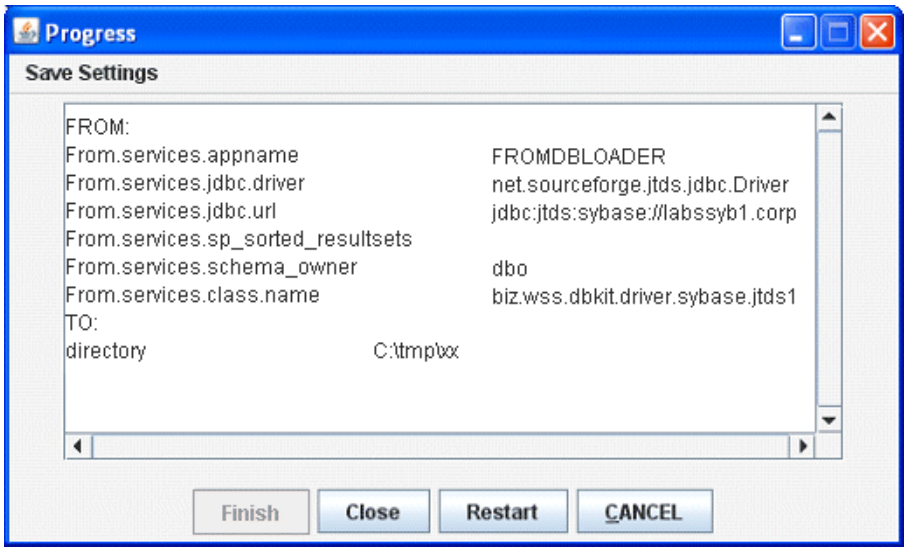
Note: The **Restart** button may not be available in the current version oif DBLoader.

Save Setting	Use this to save the entire setup for replaying using the `script.py` script. Opens a navigation dialog.
Finish	Starts the transfer process.
Close	Closes the whole application.

Restart	Allows for the whole process to be started again by returning to the first screen.
Cancel	Click at any time to abort the whole process.



Once you click **Finish**, the detail of the **To** and **From** connections are shown, and the status of each transfer to the destination. Success is reported on the Object instance but Failure is reported on the actual insert that has failed. Failures are usually supplied with reasons for failure. This information is also written to `warning.log`.



6.3 Issues and setup

6.3.1 Errors

Failures and warnings are reported both in the Progress screen and in a file called `warning.log` which is written to the current directory, normally the users' home directory. Typically there can be two types of output:

- Where there is an sql failure, which is reported as such.
- Where a stored procedure has reported a non zero return result; this is reported with the value. The values have the following meanings:

  1. DB_ERROR
  2. PERMISSION_DENIED
  3. NOT_FOUND
  4. DOES_EXIST
  5. DOES_NOT_EXIST
  6. CHANGED

Error numbers **2**, **5**, and **6** are the most common, and indicate that either the database is being updated by someone else or the setup is inappropriate for this type of operation by the user.

Chapter 7 Secure setup for ActiveMQ

This chapter dewscribes how to secure the communication between the Wallstreet Suite modules and the message broker ActiveMQ.

7.1 Prerequisites

- Install WallStreet Suite
- Do not start any processes before the procedures described in this chapter.

7.2 Generate certificates and public and private keys

Generate a certificate and private and public key for each component which will communicate with message broker over SSL. Wallstreet Suite comes with tool that does this: see the *WebSuite Cash Management Connectivity Guide* and search for *ssl certificate generation*.

Store the generated certificates and public and private keys for the following components in the following places:

Active MQ	`<suite-root>/envs/<environment>/var/active-mq/conf/certs`
Onyx	`<suite-root>/components/trm/fk72/etc/onyx/configuration/context/keys`
RCP Suite	`<suite-root>/components/trm/fk72/java/jupiter/configuration/keys`. Copy only the file `rcpsuite.ts` to this path.
serviced	You can save certificates anywhere in the file system. See *7.4.4 10_base.bat* on page 91, and look at the example of environment variable FK_MQ_BROKER_URL_CPP "telling" serviced where they are located.

7.3 Encrypt passwords

The passwords that you chose in the previous section to protect generated public and private keys need to be encrypted. See the *WSS Suite Installation Guide* and search for *password encryption*.

7.4 Changes required to configuration files

7.4.1 activemq.xml

Path: `<suite-root>/envs/<environment>/var/active-mq/conf/`

Comment out in <beans>/<broker>/<transportConnectors> everything except the tag <transportConnector name="ssl"...>:

```
<beans>
  ...
  <broker brokerName="localhost" useJmx="true" xmlns="http://activemq.org/config/1.0">
    ...
    <transportConnectors>
      <transportConnector name="ssl" uri="ssl://<machine>:<port>?wantClientAuth=true"/>
    </transportConnectors>
    ...
  </broker>
  ...
</beans>
```

Do not change <machine>:<port> - keep what was in the file.

In <beans>/<broker>/<plugins>, uncomment the tags <jaasAuthenticationPlugin> and <messageSigningPlugin>, and replace <encrypted-password> with the encrypted password for the keys for ActiveMQ which you already obtained using the password encryption tool:

```
<beans>
  ...
  <broker brokerName="localhost" useJmx="true" xmlns="http://activemq.org/config/1.0">
    ...
    <plugins>
      <propertyDecrypterPlugin xmlns="http://xbean.wss.biz/schemas/plugin"/>

      <jaasAuthenticationPlugin xmlns="http://xbean.wss.biz/schemas/plugin"

principalMappingConfiguration="${activemq.base}/conf/security/principal_mapping_config.x
ml"/>

      <messageSigningPlugin xmlns="http://xbean.wss.biz/schemas/plugin"

certificate="${activemq.base}/conf/certs/localhost/localhost.p12"
                            certificateAlias="localhost"
                            certificatePassword="<encrypted-password>"/>

      <timeStampingPlugin xmlns="http://xbean.wss.biz/schemas/plugin"/>
    </plugins>
    ...
  </broker>
  ...
</beans>
```

7.4.2 wss.bat (.sh)

Path: <suite-root>/envs/<environment>/var/active-mq/conf/

Change the following four lines to give ActiveMQ the location and passwords of the key store and truststore:

```
set SSL_OPTS=%SSL_OPTS% -Djavax.net.ssl.keyStorePassword=<encrypted-password>
set SSL_OPTS=%SSL_OPTS% -Djavax.net.ssl.trustStorePassword=<encrypted-password>
set SSL_OPTS=%SSL_OPTS%
-Djavax.net.ssl.keyStore="%ACTIVEMQ_BASE%\conf\certs\localhost\localhost.ks"
set SSL_OPTS=%SSL_OPTS%
-Djavax.net.ssl.trustStore="%ACTIVEMQ_BASE%\conf\certs\localhost\localhost.ts"
```

7.4.3 database.properties

Path: <suite-root>/envs/<environment>/var/active-mq/conf/security/wss/

Modify the properties jdbc.driver and jdbc.url - examples are in comments at the beginning of the file.

7.4.4 10_base.bat

Path: <suite-root>/envs/<environment>/etc/environment/parts/

In variables FK_MQ_BROKER_URL_CPP and FK_MQ_BROKER_URL_JAVA:

- Replace **tcp:** by **ssl:**
- Change the port to the port defined in <suite-root>/envs/<environment>/var/active-mq/conf/activemq.xml:

  <transportConnector name="ssl" uri="ssl://<machine>:**<port>**..."/>

  (The SSL port number is usually one higher than the TCP port number).

  Example before change:

```
SET
FK_MQ_BROKER_URL_CPP=tcp://localhost:20160?transport.ResponseCorrelator.maxRespo
nseWaitTime=10000

SET FK_MQ_BROKER_URL_JAVA=failover:tcp://localhost:20160
```

  and after change:

```
SET
FK_MQ_BROKER_URL_CPP=ssl://localhost:20161?transport.ResponseCorrelator.maxRespo
nseWaitTime=10000

SET FK_MQ_BROKER_URL_JAVA=failover:ssl://localhost:20161
```

  (The real port numbers will most probably be different to those in the example above.)

  With FK_MQ_BROKER_URL_CPP set as above, **serviced** (and all other components that are not written in Java) will communicate with the message broker over SSL. But they will not send their certificate to the message broker, nor verify the message broker's certificate. If you want these components to use certificates, you must change the variable FK_MQ_BROKER_URL_CPP as follows:

```
set
FK_MQ_BROKER_URL_CPP=ssl://172.24.17.185:20361?transport.ResponseCorrelator.maxR
esponseWaitTime=10000
&tcpTracingEnabled=true
&commandTracingEnabled=true
&sslCAFile=CA.cert.pem
&sslCertFile=serviced.cert.pem
&sslKeyFile=serviced.key.pem
&sslPassword=<encrypted-password>
&sslVerifyPeer=true
&sslCiphers=AES
```

Note: The value of this variable should be exporessed on a single line. Here, it has been split over multiple lines for easier readability.

7.4.5 spring-tech.xml

Path: <suite-root>/components/trm/fk72/etc/onyx/configuration/context/

Uncomment:

```
<!-- SSL -->
<alias name="JMSFactorySenderSSL" alias="JMSFactorySender"/>
<alias name="JMSFactorySSL" alias="JMSFactory"/>
```

and comment out TCP:

```
<!-- TCP
<alias name="JMSFactorySenderTCP" alias="JMSFactorySender"/>
<alias name="JMSFactoryTCP" alias="JMSFactory"/>
-->
```

7.4.6 credentials.properties

Path: `<suite-root>/components/trm/fk72/etc/onyx/configuration/context/properties/`

Change the values of the following two properties to the encrypted passwords of truststore and keystore for Onyx:

```
# SSL connection passwords
ssl.connection.keyStorePassword=<encrypted-password>
ssl.connection.trustStorePassword=<encrypted-password>
```

7.4.7 RCPSuite.bat

Path: `<suite-root>/components/trm/fk72/java/jupiter/`

Change the value of following property to the encrypted password of truststore for RCP Suite:

```
set PARAMS=%PARAMS% -Djavax.net.ssl.trustStorePassword=<encrypted-password>
```

Appendix A Onyx

A.1 Introduction

Onyx is a Java Bean container developed by Wallstreet Systems, based on the Spring framework. This chapter describes how to configure the relevant property files for the services of Onyx, including the Enterprise Swift Integration Adapter (ESIAdapter). See the *WSS SWIFT Connectivity Guide*.

A.2 JDBC property file setup

The file is called `jdbc.properties`, and is located in `<Client_Installation_directory>\components\trm\fk72\etc\onyx\configuration\context\properties`

A.2.1 Example:

```
jdbc.tahoe.host=10.35.0.121
jdbc.tahoe.database=WS7REA5
jdbc.tahoe.port=1531
jdbc.tahoe.show.sql=true
jdbc.tahoe.username=dbo
jdbc.tahoe.password=trema
jdbc.tahoe.driver=oracle.jdbc.OracleDriver
jdbc.tahoe.url=jdbc:oracle:thin:@${jdbc.tahoe.host}:${jdbc.tahoe.port}:${jdbc.tahoe.
database}
jdbc.tahoe.hibernate.dialect=org.hibernate.dialect.Oracle9Dialect
jdbc.tahoe.hibernate.poolsize=5
jdbc.tahoe.hibernate.showsql=true

jdbc.host=10.35.0.121
jdbc.database=WS7REA5
jdbc.port=1531
jdbc.show.sql=true
jdbc.username=dbo
jdbc.password=trema
jdbc.driver=oracle.jdbc.OracleDriver
jdbc.url=jdbc:oracle:thin:@${jdbc.host}:${jdbc.port}:${jdbc.database}
jdbc.hibernate.dialect=org.hibernate.dialect.Oracle9Dialect
jdbc.hibernate.poolsize=5
```

A.3 Environment property file setup

The file is called `jdbc.properties`. The `wss.env.name` parameters have to set to the `FK_IDENT` environment variable.

A.3.1 Example

```
#
The environment name used to identify this instance
#
Wss.env.name=rea5
```

A.4 ssl.properties file

Onyx, (and thus ESIAdapter) uses the standard Java Virtual Machine parameters for configuring SSL connections.

For more information, see the following documentation provided by Sun:

- Java Secure Socket Extension: `http://java.sun.com/javase/6/docs/technotes/guides/security/jsse/JSSERefGuide.html`
- Java SE Security: `http://java.sun.com/javase/technologies/security/`
- Key Stores: `http://java.sun.com/j2se/1.5.0/docs/api/java/security/KeyStore.html`
- Secure Sockets Layer Wikipedia: `http://en.wikipedia.org/wiki/Secure_Sockets_Layer`

The following is a simplified overview of SSL. For the complete SSL/TLS protocol, see `http://tools.ietf.org/html/rfc4346`

There are three main concepts when configuring SSL connections. From the client's (Onyx) perspective:

- Whom does the client trust?
- How does the client present itself to the server?
- How does the client encrypt data?

A.4.1 Whom does the client trust?

In an installation, the TrustStore contains one or more certificates for trusted entities. This implies that the client uses information from the TrustStore to verify the server in the SSL connection. Typically, this trusted entity is a Certificate Authority (CA) and it is the public key of the CA which is imported into the TrustStore. Normally the CA has generated public/private key pairs for both server and the client (onyx), and is in the position to trust both.

A.4.2 How does the client presents itself to the server?

The KeyStore is used to answer the second and third questions, how do I present myself to the server, and how do I encrypt data.

The client presents itself to the server by obtaining its public key from the KeyStore and communicating it via the SSL/TLS protocol. The client uses its private key (found in the KeyStore) to sign a challenge provided by the server. The server is then able to verify the client by using the CA's public key obtained from its own TrustStore (a store on the server), and the client's public key sent to the server. The client is then able to communicate to the server.

A.4.3 How does the client encrypt data?

At this point the server and the client negotiate a symmetric key to encrypt the channel.

A.4.4 JVM parameters

The following JVM parameters are used to configure the KeyStore and TrustStore. They have common behavior, and differ in the names of the properties only.

- `javax.net.ssl.trustStore/javax.net.ssl.keyStore`

  The path to the Store, typically a file.

- `javax.net.ssl.trustStorePassword/javax.net.ssl.keyStorePassword`

  The password used to open the Store, if it is password protected.

- `javax.net.ssl.trustStoreType/javax.net.ssl.keyStoreType`

  The format of the Store, for example if the Store has been created with the Java keytool then typically the format is JKS. If `openssl` or other tools are used then format will not be JKS, but will be documented by the tool. For example it is possible to use `PKCS12`-formatted Stores with the Sun JDK.

All of these are documented fully in Java Secure Socket Extension:
http://java.sun.com/javase/6/docs/technotes/guides/security/jsse/JSSERefGuide.html

A.5 Troubleshooting

A.5.1 Setting log and traces

In `log4j.xml`, use the default `BackupRollingFileAppender` that keeps only the most recent files.

If you do need email notification, you can use the following setting:

```
<appender name="MAIL" class="org.apache.log4j.net.SMTPAppender">

    <param name="To" value="Anthony.Leach@wallstreetsystems.com"/>

    <param name="SMTPHost" value="mailhost"/>

    <param name="Subject" value="ESIADAPTER Problem"/>

    <param name="From" value="system@client.com"/>

    <param name="BufferSize" value="1"/>

    <layout class="org.apache.log4j.PatternLayout">

      <param name="ConversionPattern" value="%d %5p [%t] (%F:%L) - %m%n" />

    </layout>

  </appender>
```

A.5.1.1 Working system

When there are no problems, you may see the following traces:

```
2008-06-18 13:31:38,076 DEBUG [Thread-2] (MQSeriesAPI.java:201) - Received
Content:{1:F01AREVFRP0AXXX0000000000}{2:I101BSUIFRP0XXXXN2020}{3:{108:0071814}}{4:
:20:0071814
:28D:1/1
:50L:COMPANY SA
:50H:/FR7631489000100014323912447
COMPANY SA
PARIS FR
:52A:BSUIFRP0XXX
:30:080619
:21:0071814
:23E:INTC
:32B:EUR100,
```

```
:57A:ZYAEFRP0XXX
:59:/FR7630004008280001056442376
COMPANY SA
PARIS FR
:70:Test virement trEso
:71A:OUR
-}
2008-06-18 13:31:58,405 DEBUG [Thread-2] (MQSeriesAPI.java:109) - Received from ack
feedback=275
2008-06-18 13:31:58,405  INFO [Thread-2] (MQSeriesAPI.java:210) -
handleAckMessage(feedback=275)
2008-06-18 13:31:58,405 DEBUG [Thread-2] (MQSeriesAPI.java:201) - Received
Content:{1:F21AREVFRP0AXXX0211000630}{4:{177:0806181531}{451:0}{108:0071814}}{S:{CON:}{T
RN:0071814}}
2008-06-18 13:32:23,655 DEBUG [Thread-2] (MQSeriesAPI.java:109) - Received from ack
feedback=275
2008-06-18 13:32:23,655  INFO [Thread-2] (MQSeriesAPI.java:210) -
handleAckMessage(feedback=275)
2008-06-18 13:32:23,655 DEBUG [Thread-2] (MQSeriesAPI.java:201) - Received
Content:{1:F01AREVFRP0AXXX0211000555}{2:O0111332080618DYMFXXXXHXXX000054007608061815325}
{4:{175:1531}{106
:080618AREVFRP0AXXX0211000630}{108:0071814}{175:1531}{107:080618BSUIFRP0AXXX4223246243}}
{5:{CHK:5103888ABA6A}{SYS:}{TNG:}}{S:{COP:P}}
```

This shows that ESIAdapter:

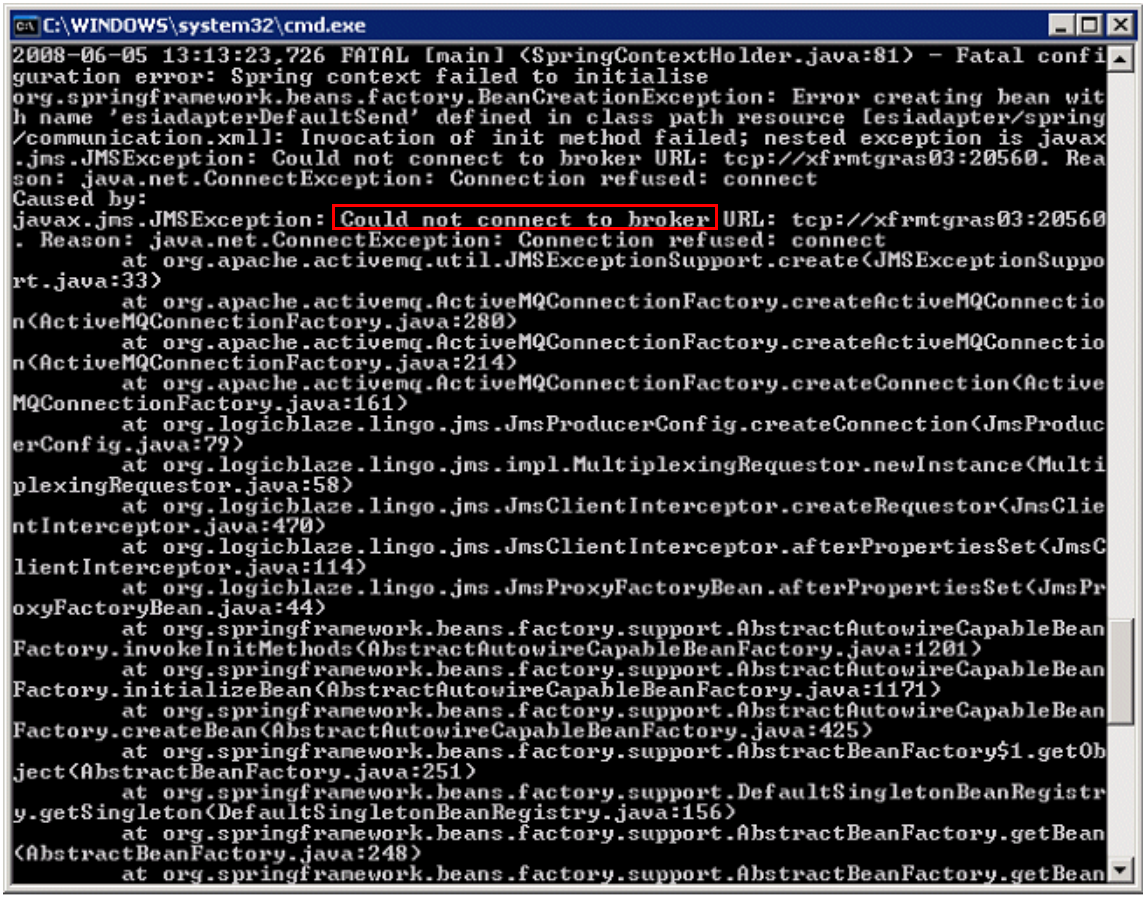
- Received an M101.
- Received an ACK from the library
- Received a service bureau ACK
- Received a bank acknowledgement 011.

To enable this level of debug, edit `log4j.xml` and add or update the section:

```
<category name="biz.wss.esiadapter.onyxservice.api.impl.MQHelper">
  <priority value="DEBUG" />
</category>
```


A.5.1.2 "could not connect to broker" message

In this case of message:



You can see `could not connect to broker`. Verify on the PMM that the ActiveMQ is running, and if the broker is not correct, check the variable `FK_MQ_BROKER_URL`.

```
telnet <hostname> <port number>
```

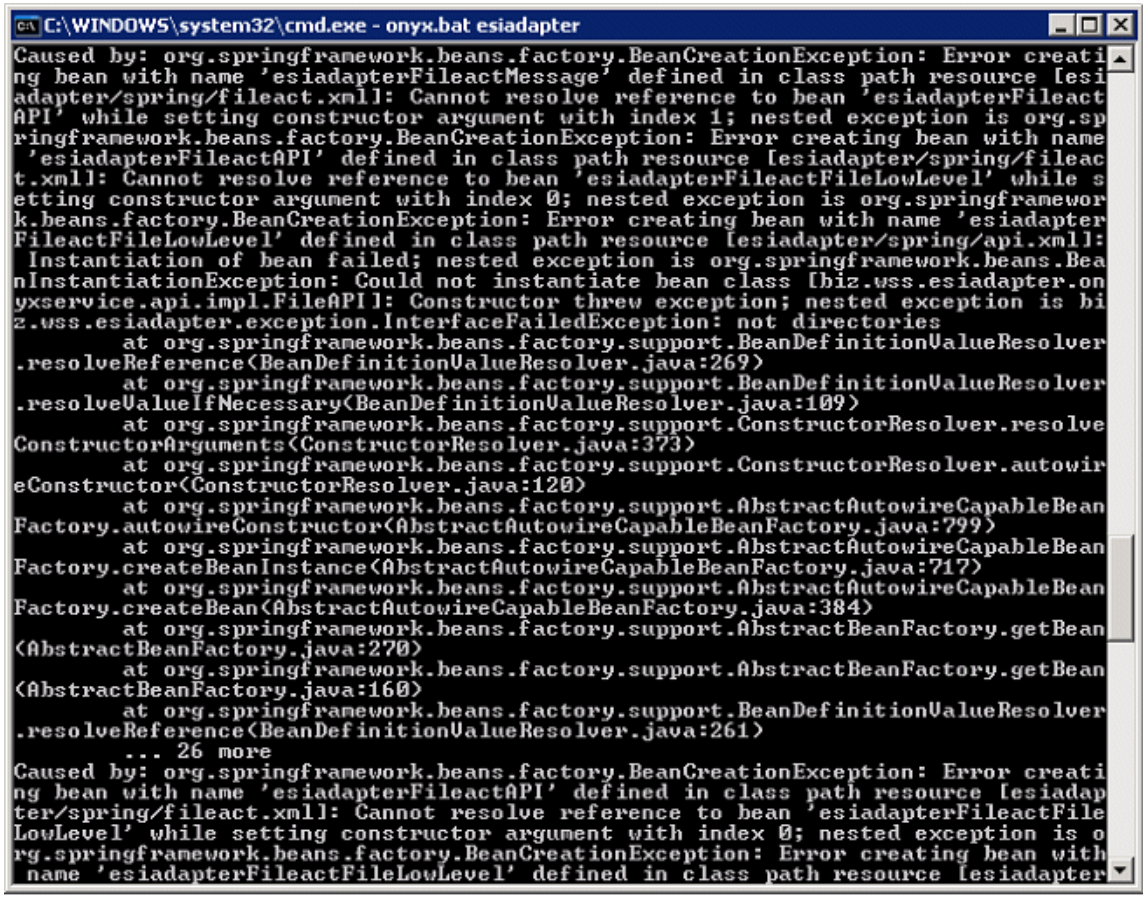
Interpretation

- telnet can not connect:
  - Test that this is the good server/port.
  - Test if the server ID is down.

    From the server host run
    either: `hwr_chksrv.bat <port number>`
    Or: `netstat -a | grep <port number> on *nix`
  - The server is not reachable:

    `traceroute` to the host server).

A.5.1.3 "Error creating bean with name..." message



Check in the file `..\site\components\trm\fk72\etc\onyx\configuration\context\properties`.

The paths of `esiadapter.fileactfile.topdirectory` must match the folder you created before.

```
*nix> fgrep directory esiadapter.properties
Dos> hwr_ckdirprop.bat esiadapter.properties
```

There are several folders to create

A.5.1.4 IBM-MQ 2397 and IBM-MQ 2055

Try to turn on the SSL traces in `ssl.properties`.

```
javax.net.debug=ssl,handshake,all
```

A.5.1.4.1 SSL traces

The log will looks like:

```
init context
trigger seeding of SecureRandom
done seeding SecureRandom
instantiated an instance of class com.sun.net.ssl.internal.ssl.SSLSocketFactoryImpl
                          04:55:41 [1213721741708] Thread: main Class: SSLHelper creating
SSL socket
```



```
                          04:55:41 [1213721741942] Thread: main Class: SSLHelper setting
enabled cipher suites to 'SSL_RSA_EXPORT_WITH_RC4_40_MD5'

                          04:55:41 [1213721741942] Thread: main Class: SSLHelper Setting
protocol to SSLv3

                         04:55:41 [1213721741942] Thread: main Class: SSLHelper Supported
Protocols are SSLv2Hello, SSLv3, TLSv1,

                          04:55:41 [1213721741942] Thread: main Class: SSLHelper calling
startHandshake
```

Remove the channel definition file from esiadapter.properties:

```
init context
trigger seeding of SecureRandom
done seeding SecureRandom
instantiated an instance of class com.sun.net.ssl.internal.ssl.SSLSocketFactoryImpl
%% No cached client session
*** ClientHello, SSLv3
RandomCookie:  GMT: 1213656645 bytes = { 80, 1, 3, 23, 116, 231, 60, 146, 111, 140, 12,
190, 215, 226, 162, 225, 135, 114, 212, 34, 204, 122, 247, 26, 164, 110, 1
Session ID:  {}
Cipher Suites: [SSL_RSA_EXPORT_WITH_RC4_40_MD5]
Compression Methods:  { 0 }
***
[write] MD5 and SHA1 hashes:  len = 45
0000: 01 00 00 29 03 00 48 57   EE 45 50 01 03 17 74 E7  ...)..HW.EP...t.
0010: 3C 92 6F 8C 0C BE D7 E2   A2 E1 87 72 D4 22 CC 7A  <.o........r.".z
0020: F7 1A A4 6E C2 C5 00 00   02 00 03 01 00           ...n.........
main, WRITE: SSLv3 Handshake, length = 45
[Raw write]: length = 50
0000: 16 03 00 00 2D 01 00 00   29 03 00 48 57 EE 45 50  ....-...)..HW.EP
0010: 01 03 17 74 E7 3C 92 6F   8C 0C BE D7 E2 A2 E1 87  ...t.<.o........
0020: 72 D4 22 CC 7A F7 1A A4   6E C2 C5 00 00 02 00 03  r.".z...n.......
0030: 01 00                                              ..
main, received EOFException: error
main, handling exception: javax.net.ssl.SSLHandshakeException: Remote host closed
connection during handshake
main, SEND TLSv1 ALERT:  fatal, description = handshake_failure
main, WRITE: TLSv1 Alert, length = 2
[Raw write]: length = 7
```

If the problem is at the other side of the network, contact the service bureau or the other party involved.

A.5.1.5 Follow-up on a job

A successful job log looks like this.

Import Export Log Detail

Job Log ID	11563
Job Type	ImportExportJob
Job Name	Bank Payment File
Data Location	
Import Date	18/Jun/08
File Identifier	CM-11563
Sender ID	
Receiver ID	CALYON_FR
Error Count	0
Record Count	1
Status	Complete
Message	Final Status Message for the export log id (11563)is received, the transaction message/file was successfully delivered to the dest

- ○ User Errors
- ○ System Errors
- ○ Status Messages
- ◉ All

Select Message Type

Communication Log Detail

Unique ID	Process Name	Operation	Data Source	Data Destination	Job Status	Detailed Message
185	SWIFTNet Adaptor	build Msg	UNKNOWN	UNKNOWN	Success	FIN message was built successfully
186	SWIFTNet Adaptor	send msg	UNKNOWN	UNKNOWN	Success	FIN adaptor message was sent to adaptor suc 11563].
187	SWIFTNet Adaptor	Status In	UNKNOWN	UNKNOWN	Success	Intermediate Message Received: SENT. Systen
188	SWIFTNet Adaptor	Status In	UNKNOWN	UNKNOWN	Success	Intermediate Message Received: TRANSMISSIC
189	SWIFTNet Adaptor	Status In	UNKNOWN	UNKNOWN	Success	Final Message Received: DELIVERY. System R

However, you may want to look at the ESIAdapter tables:

```
-- Oracle --
SELECT
id,owner_id,module_id,max_state_id,current_state_id,from_client,to_char(request_time,'DD
-MON-YYYY HH24:MI:SS') "request time"
FROM AdapterRequestEntry
where module_id like '%11563%'
ORDER BY request_time desc

163   finswift    CM-11563   4   4   1   18-JUIN -2008 13:31:33
```

The `module_id` is a reference provided by the system sending information to ESIAdapter.

Here, it is built from CM (the name of the requester system) and 11563 (the job ID).

Note: Another requester system will use another reference.

```
select <s.ID>, s.owner_id, s.system_module_id, s.current_state_id
from AdapterSentEntry s; AdapterRequestEntry r
where r.module_id like '%11563%'
and   s.owner_id = r.id
```



```
order by 1

164   163   SWIII21C-CM-11563 4
```

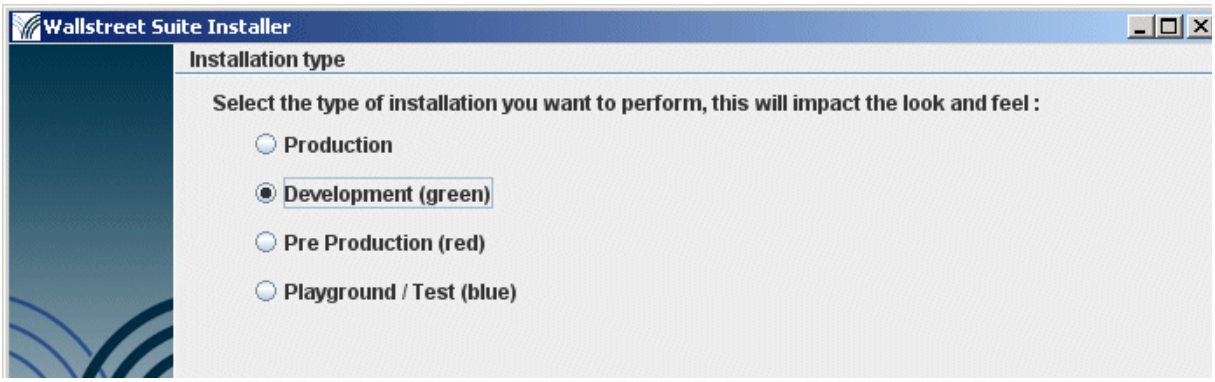
The `system_module_id` is a reference used in exchange with another system. It may or may not look similar to the `joblogid`. Yyou need to use the join to retrieve related records.

Appendix B Environment color schemes

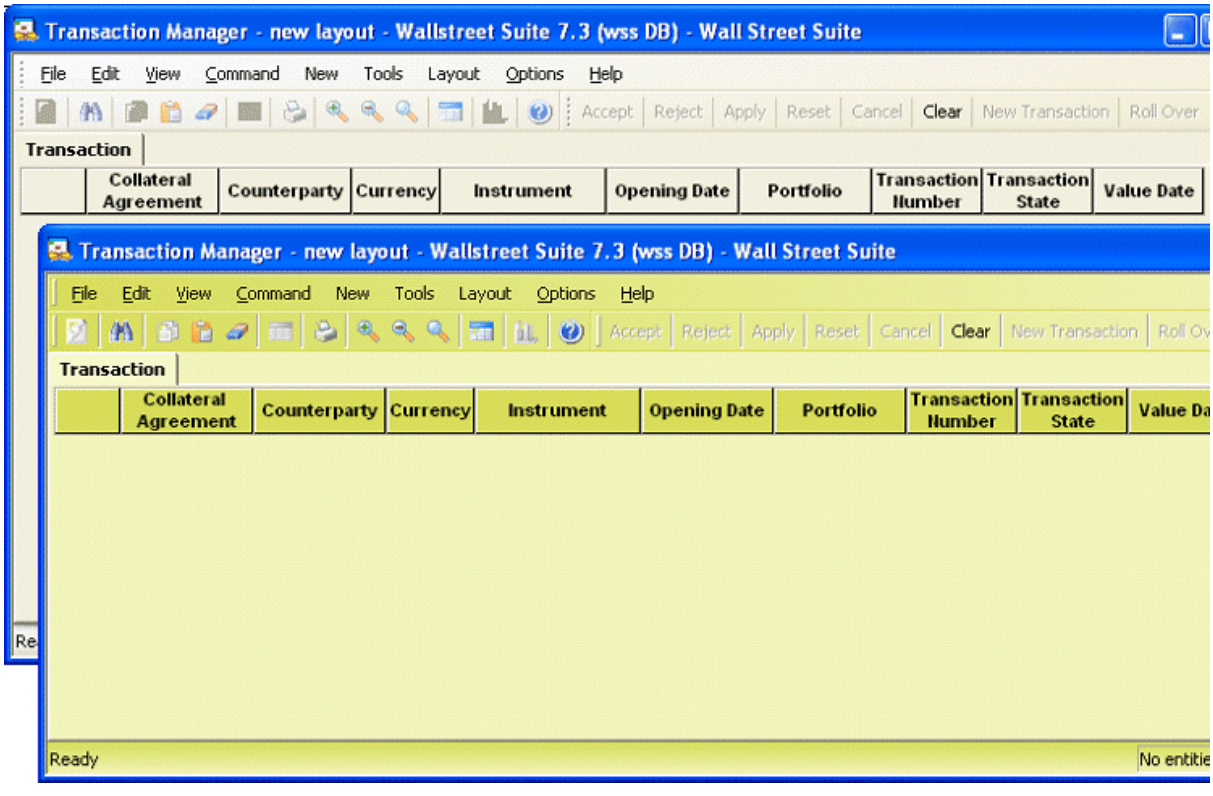
B.1 Introduction

From version 7.3.3 of Wallstreet Suite, you can differentiate between Wallstreet Suite environments by color-coding them.

You can select one of four color schemes. You choose the initial color scheme and change it later using the Wallstreet Suite Installer:



The color scheme that you choose is applied to the user interfaces of all Wallstreet Suite applications including WebSuite. The effect is to apply a tint to them. The screenshot below shows Transaction Manager running in an environment that uses the "Production" scheme (no tinting at all), then the same application running in an environment using the "Development" scheme (tinted green):



This enables you to color-code up to three environments (the fourth is untinted, and should be used for the "live" or production environment only).

B.2 How it works

Suite Installer sets the environment variable `FK_COLOR_ENV_TYPE` to one of four possible values, depending on the installation type you choose:

Installation type	FK_COLOR_ENV_TYPE value
Production	`prod`
Development	`dev`
Pre Production	`preprod`
Playground	`playground`

Suite Installer sets the environment variable `FK_COLOR_SCHEME` to a particular color value depending on the value of `FK_COLOR_ENV_TYPE`. Here are the factory values:

Installation type	FK_COLOR_ENV_TYPE value	FK_COLOR_SCHEME value	Effect on TRM/ACM applications
Production	`prod`	`null`	nothing (no color tint)
Development	`dev`	`d2d859,eceeb7,f0f2c7,939823`	green tint
Pre Production	`preprod`	`d77e82,edc6c8,f1d2d4,be3940`	red tint
Playground	`playground`	`b2c2e5,dee5f3,e5eaf6,5478c6`	blue tint

Both these environment variables are reflected in the `\sharedconf\environment.properties` file (in the example below, the installation type is set to Production):

```
# Color properties to defined basically some color to distinguish environment
ts.env.color.scheme=
# env.type must be one of this (prod, dev ,preprod, playground)
ts.env.color.env.type=prod
```

WebSuite also depends on the value of `FK_COLOR_ENV_TYPE` for its color scheme, but handles it in a different way.

B.2.1 WebSuite theming components

These are all stored in this path:

`<installation_dir>\ws-suite\components\wss-web\websuite\resources\style\classic`

and consist of the following files, where `<env_type>` is the value of `FK_COLOR_ENV_TYPE`: `prod`, `dev`, `preprod`, or `playground`:

- **Stylesheets**

  `\style\theming\login\login_<env_type>.css`

  Used by login and password expiry/change HTML files.

- **Background images**

  `\image\nav\gradient_<env_type>.jpg`

Used by login and password expiry/change HTML files in the login box, and by the portal HTML file.

- **HTML portal files**

  `\ekit_theming\ekit_nav\ekit_nav_<env_type>.html`

  This is the header of each WebSuite screen apart from the login screens.

- **HTML login files**

  `\ekit_theming\ekit_login\ekit_login_<env_type>.html`

- **HTML password expiry files**

  `\ekit_theming\ekit_expiry\ekit_login_expiry_<env_type>.html`

- **HTML password change files**

  `\ekit_theming\ekit_change\ekit_login_change_<env_type>.html`

Example of a WebSuite "Preprod" password change screen: