

Common Report Engine
User Guide

Version 5.4

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List of Abbreviations

CRE	Common Report Engine
AP	Access Point
DBAG	Deutsche Börse AG
DSA	Digital Signature Algorithm
ECAG	Eurex Clearing AG
FTP	File Transfer Protocol
IETF	Internet Engineering Task Force
MISS	Member Integration System Server
SSH	Secure Shell
RC	Registered Customer
RSA	Rivest, Shamir and Adleman
SFTP	SSH File Transfer Protocol
VPN	Virtual Private Network

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1 General information

The Common Report Engine (CRE) allows the centralized provision of reports and non-transactional files from multiple exchange markets.

The service is provided as an SFTP server and allows participants to easily retrieve all of their reports and non-transactional files from a single source.

This service is independent from the existing MISS infrastructure, and participants can choose their preferred hardware platform and operating system.

Communication with the CRE is based on OpenSSH. The OpenSSH server authenticates users using the standard methods supported by the SSH protocol (http://www.OpenSSH.com).

All examples provided in this document refer to either the OpenSSH distribution or the PuTTY installable package for Windows.

1.1 Intended audience

This document is intended for system developers, system and security administrators maintaining their systems to interact with the CRE service offered by DBAG. It assumes that the reader has the good understanding of the OpenSSH public/private key pair authentication methods (i.e. handling of public/private key pair) and the use of SFTP clients.

The purpose of this document is to provide an overview on how to obtain access to the CRE, how to deposit keys in the DBAG Member Section (User Administration) and how to manage the downloading of files and reports.

1.2 Conventions used in this document

Cross-references to other sections within this document are always clickable, but not marked separately. Hyperlinks to webpages are blue and underlined.

1.3 SSH file transfer protocol

This document refers to “SFTP” in numerous instances. To avoid misunderstandings, “SFTP” stands for the SSH File Transfer Protocol as defined by the Internet Engineering Task Force (IETF - http://tools.ietf.org/html/draft-ietf-secsh-filexfer-13).

1.4 SSH/SFTP tools

While access to SSH based services is part of most Unix based distributions, PuTTY is an open source software that is available for MS Windows. It can be used to easily establish SSH and SFTP sessions (http://www.putty.org).

1.5 What's new?

- Chapter 3.2.4: Changed wording for re-newal of keys
- Chapter 6: Addition of *.PDF Extension
- Chapter 6: Versioning will take place only with zip files, not with original report files
- Chapter 6.1.2. Harmonisation of intraday naming conventions (new: HHMMSS)
- Chapter 6.4: Updates on report availabilities
- Chapter 8.1: Updated to *.ZIP

2 Overview

2.1 History

As part of the Technology Roadmap, Eurex introduced the CRE service in the second quarter of 2011. Xetra joined with Xetra Release 12.0 in November, 2011 for the following markets: Xetra Frankfurt and Xetra Frankfurt 2. CCP started offering the service by the end of November, 2011.

In 2012 the CRE service was extended to Eurex Bonds and also to some of the DBAG Partner Exchanges such as the Irish Stock Exchange, the Malta Stock Exchange, the Bulgarian Stock Exchange and the European Energy Exchange.

The CRE offers participants a way to retrieve all reports and files for all environments (Production, Simulation and Advanced Simulation) of the respective markets without the necessity for the Member Integrated System Server (MISS) architecture.

For Eurex and Eurex Clearing, the CRE is the sole source for all trading and clearing relevant reports and files after the decommissioning of the MISS infrastructure.

Eurex Clearing Prisma is replacing the current margin methodology (Risk-Based Margining) with a new portfolio-based margin approach.This new methodology will allow for cross margining for Listed derivatives business and between listed derivatives and OTC derivatives business cleared through Eurex Clearing.

The CRE is integrated into DBAG's IT infrastructure and can be accessed via the existing leased line connectivity or via the Internet.

2.2 Features and functionality

- Report Selection: The report selection mechanism differs from market to market as described below:
  - Eurex participants do not need to pre-select reports. All reports and files are generated by default and are made available via the CRE. Eurex participants can download the reports and files they are interested in. The existing report selection functionality for MISS is not affected.
  - CCP participants need to pre-select reports they would like to receive via the CRE on the @X-pert GUI. Only the GUI selected reports are provided.
  - Xetra participants need to pre-select the reports they would like to receive via the CRE on the J-Trader GUI. Only the selected reports are provided including bilateral aggregation reports. Note that performance reports for Specialists, Designated Sponsors and Xetra Best Executors, as well as an instrument reference data file will be provided by default.
- An extended history of minimum 10 business days is kept on the CRE (the current MISS based solution provides five business days only).

- All end-of-line encodings are streamlined to <CRLF>.
- Participants may set up more than one connection to the CRE to access the CRE from different locations depending on their business requirements.
- The reports can be downloaded manually or automated (by using a script).

2.3 Security, authorization and access

In general the setup process for the participant involves the following three steps:

- Generating an OpenSSH compliant public/private key pair
- Creating a CRE user and uploading the public key in the DBAG Member Section
- Logging into the CRE and downloading reports via SFTP client

To provide a secure service, the OpenSSH authentication method is used. This method requires an OpenSSH compliant public/private key pair which the participant has to generate. This process ensures that the participants authenticate themselves against the CRE. The public key has to be generated and uploaded to the DBAG Member Section, while the private key will be kept by the participant. By using a key-based authentication method no login passwords have to be transferred over the Internet at any time.

- Participants need to provide a public/private key pair to access their reports. It is recommended to limit access to the CRE using dedicated IP addresses.
- Security of data will be ensured by the usage of SSH.

The illustration below provides an overview on how to access the CRE and how to set up the access process in order to download all necessary files.

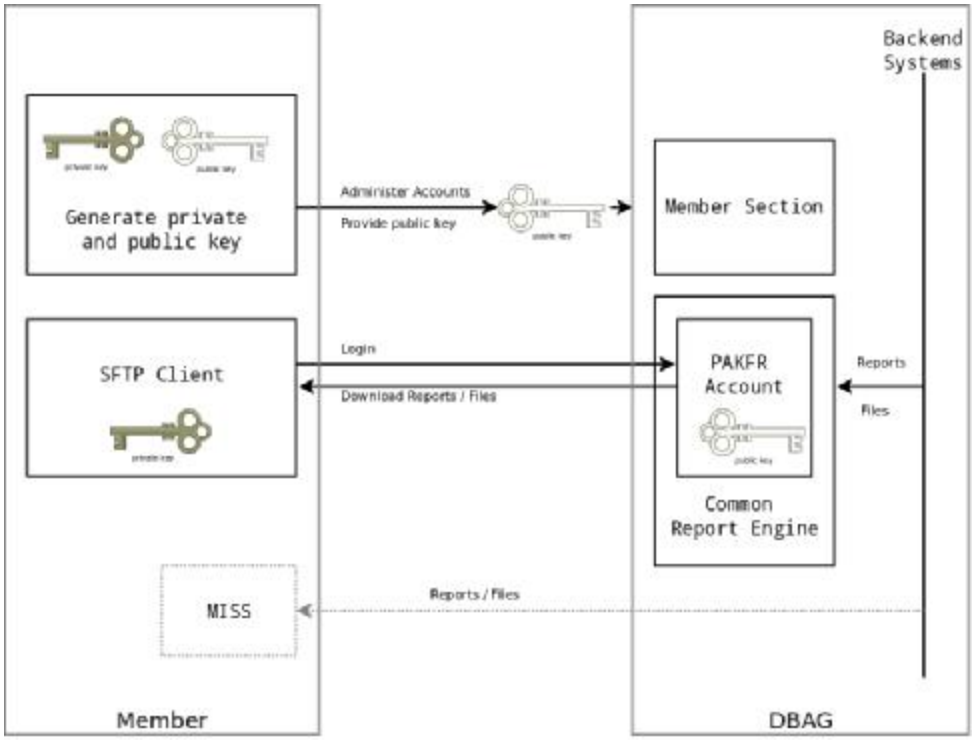


Fig. 1: Process overview to connect to the CRE

Note: The figure above is not a true representation of servers and networks involved, but rather provides a simplified functional overview.

The public key will be provided to the CRE via the business portal.

The private key always remains in the hands of the CRE user. The CRE user will need the individual private key at any time a login to the CRE is committed.

It is recommended to create a public/private key pair for every user connecting to the CRE.

3 Setup process

3.1 Public/private key

3.1.1 Generation process for public/private keys

As mentioned in chapter 2, public/private keys are used for authentication by the CRE infrastructure. The pair of keys must be generated by the participant.

- It is required to use a minimum of 2048 bits for the generated key. The key type should be set on the key algorithms RSA or DSA (RSA is faster in authentication). Once the parameters above are set the key can be generated.
- The key generation process will produce public and private keys. See details about key handling and usage in sections below.
- Save the public key files and private key files for future use.
- In no case should the private key be transferred over an insecure network, e.g. via e-mail, and it should always be kept only by the participant.
- It is highly recommended to protect the key file with a passphrase. This will encrypt the private key when it is saved in a secure location on the local machine. Using passphrases for batch SSH-keys requires familiarity with the SSH-agent authentication subsystem. Participants should be aware that the use of strong encryption methods and encrypted SSH-keys is advisable but will raise administration efforts and system complexity.

To generate an SSH public/private key various freeware tools are available for download from the Internet, such as PuTTY or OpenSSH. Please note that due to OpenSSH limitations, X.509 certificates are not supported by the CRE.

3.1.2 Example for key generation using PuTTY key generator (MS Windows)

See the following example of key pair generation.

- Make sure to have a stable version (i.e. Release 0.62) of PuTTY key generator.
- Set key parameters type and bit number as shown below.
- Follow the instructions on the screen and move the mouse over the blank area for a while.

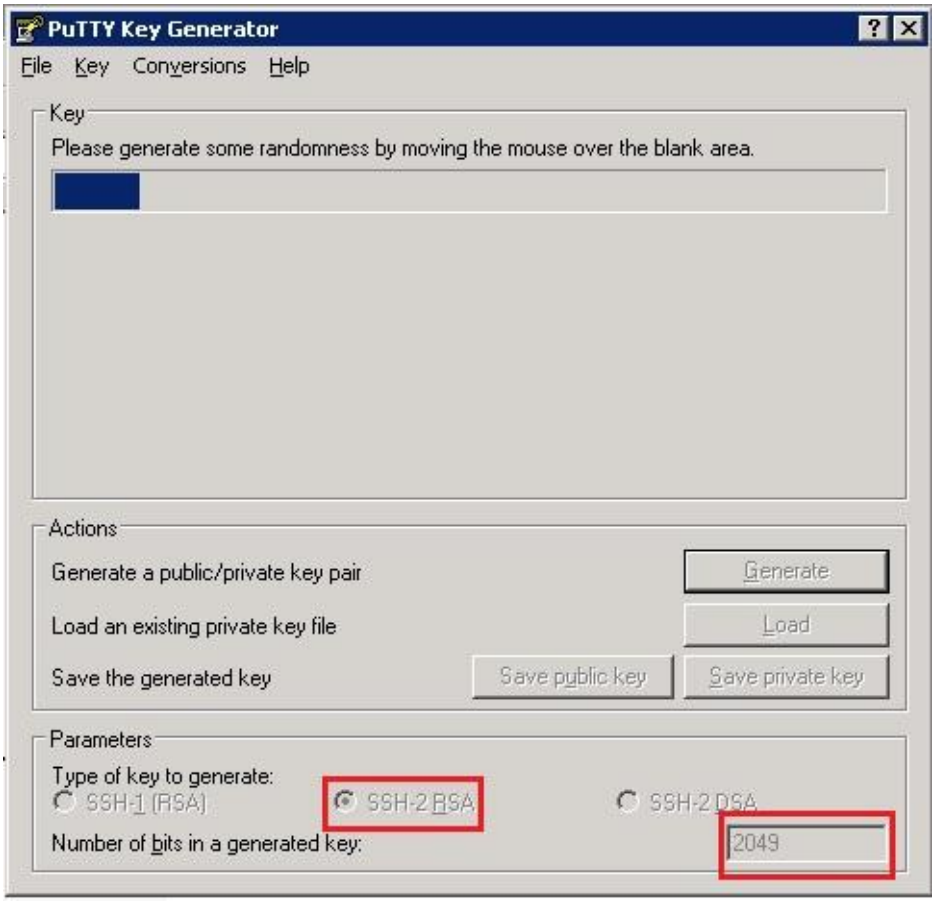


Fig. 2: Generate key (screenshot of PuTTY key generator)

- In some rare cases one key bit gets lost. The DBAG member section requires at least a 2048 bit key to be uploaded. To avoid problems please generate a 2049 bit key.
- The private key must be accessible for the participant´s SFTP client in order to login successfully. By clicking the buttons highlighted in Figure 3, participants can save their private and public keys in the PuTTY format for further use with the PuTTY tools or WinSCP.

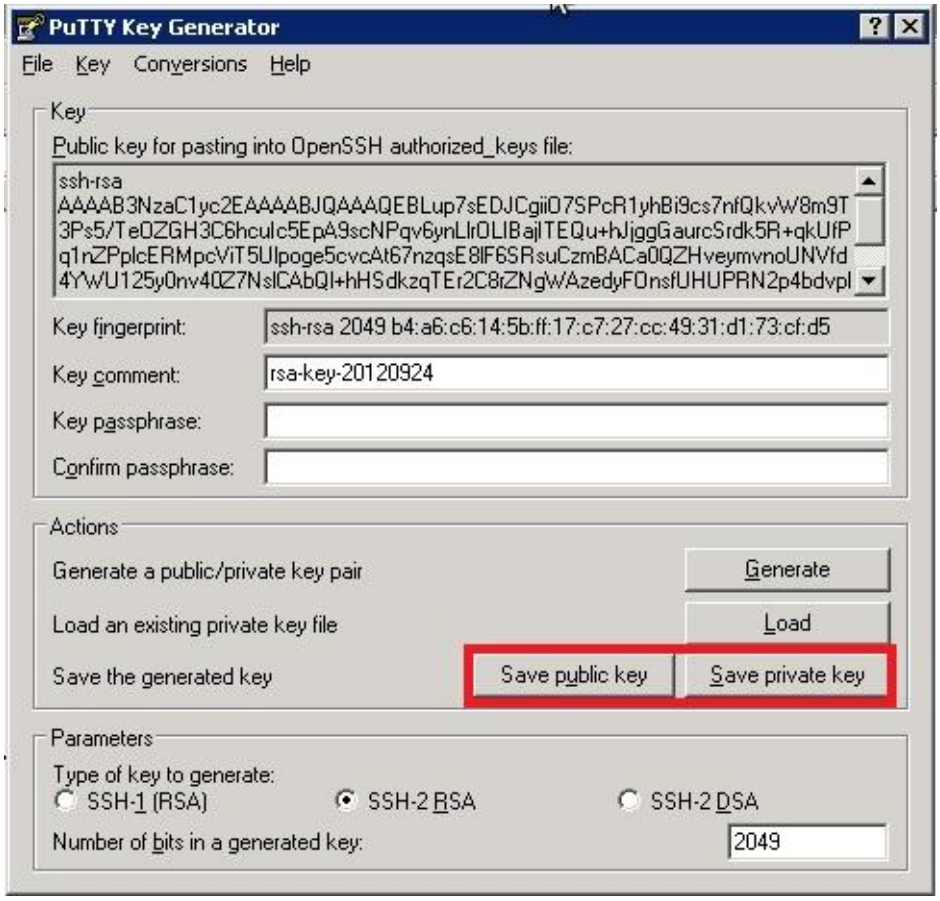


Fig. 3: Saving the generated public and private keys in the PuTTY format
(screenshot from tool PuTTY key generator)

- The OpenSSH private key can also be exported in the OpenSSH format for use with other software working with OpenSSH keys (such as Unix SFTP).

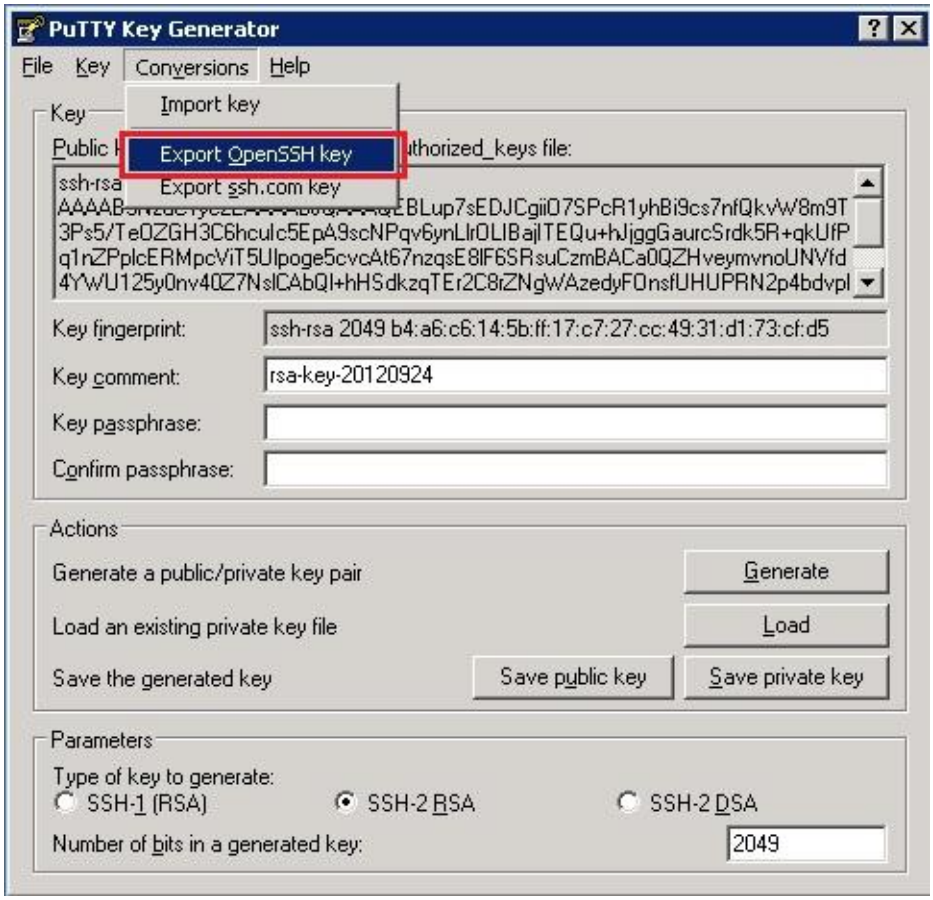


Fig. 4: Saving the OpenSSH private key for future use (screenshot from tool PuTTY key generator)

- The public key must be saved in OpenSSH format to be uploaded to DBAG Member section.
- Copy the marked text from PuTTY key generator to a text editor, such as notepad and save it.
- Make sure that this line has no “End Of Line” character (EOL) at the end!

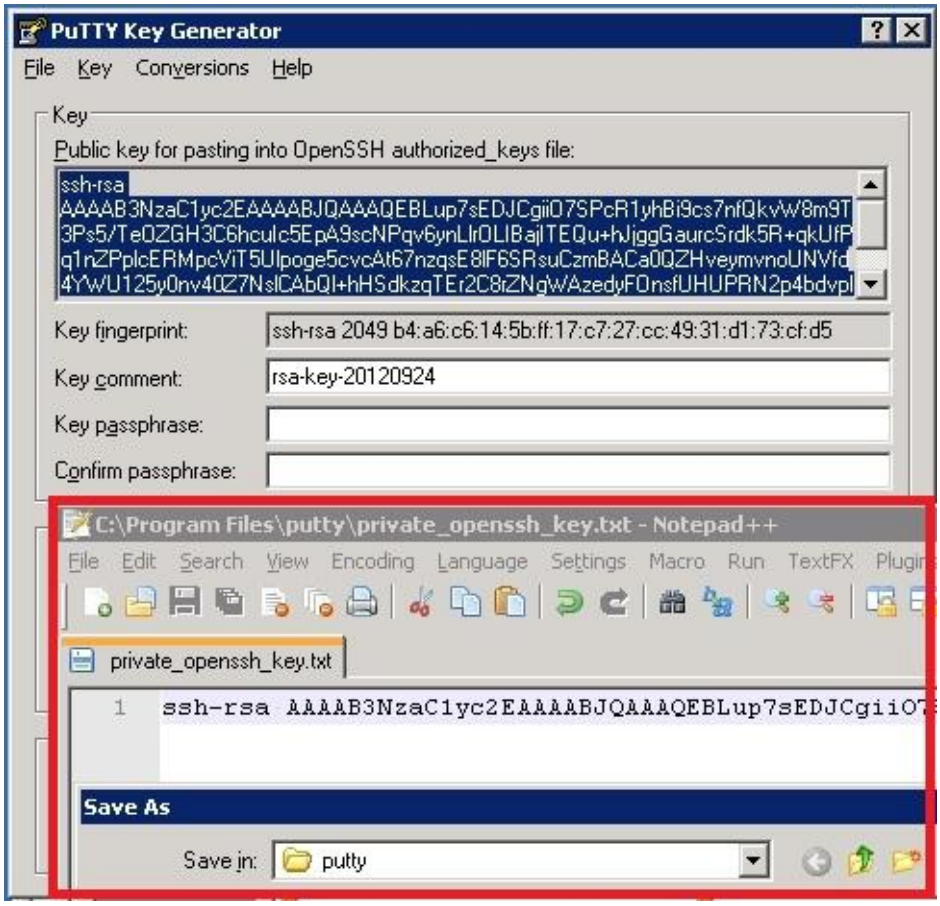


Fig. 5: Saving the public key for DBAG Member section upload
(screenshot from tool PuTTY key generator and Nodepad++)

Public keys must consist of one line only. Only public OpenSSH keys in this format can be used with the CRE and can be successfully uploaded in the DBAG Member section.

After uploading, the participant must wait for the configuration data (users, keys, markets, etc.) to be transferred to the CRE database. Usually this processing takes place in the late evenings, depending on the end-of-day batch processes.

In general, access to the CRE will be after 2 business days.

Changes to existing users will take effect on the next day.

Please note that the public key does NOT have to be signed by a certification authority of the participant for the use with the CRE.

3.1.3 Example for key generation using OpenSSH (Oracle Solaris)

OpenSSH is available for any UNIX operating environment, common Linux distributions, and also for Microsoft Windows. Participants are however free to choose any SSH2-compatible key-generation tool suitable to their needs.

The keys below were generated using the OpenSSH tools using the following command:

```
# ssh-Key generator -b 2049 -t rsa -f /tmp/demo_key -C "Comment for
Demo Key"
```

Alternatively, OpenSSH keys can be generated using the tool PuTTY under Microsoft Windows.

Public keys must consist of one line only. Only keys in this format can be used with CRE and can be successfully uploaded in the DBAG Member section. The sample public key shown below has been shortened for convenience.

The following phrase is an exemplary public key:

```
# cat /tmp/demo_key.pub
ssh-rsa AAAB3NzaC1yc2EAAAABIwAAAQEA <-- SNIP --> wsnw0arcQ==
Comment for Demo Key
#
```

The following phrase is an exemplary private key:

```
# cat /tmp/demo_key
-----BEGIN RSA PRIVATE KEY-----
MIIEogIBAAKCAQEAww+2lQ7Nfrv7P2Ss4At6fH21C1txHe6/qxi6tQiV3wTJCA7r
yt+Cyb89g7JXjvsnu84YjG3Nyo3P/f/kNJHPs6VsJvQkiSu10t9Q22ha7i/D5+Pg
<-- SNIP -->
qCsZZN7Zgw5gU4Sg/CB56AzYWb+poDDk16vknqhgBwvQN8OmwjOkZnmUf6eVpfTQ
rCryT2YS5T1Wp0867sCSlIMeToJ1DxfLwp2yDb4ROzloZPw49oA=
-----END RSA PRIVATE KEY-----
#
```

3.1.4 Public key fingerprint

A public key fingerprint is a short sequence that represents a longer public key, created by applying a hash function to the public key.

SSH utilizes a key fingerprint system for verifying the authenticity of the server when the user connects. The user is prompted to enter “yes” only when connecting for the first time. Future attempts to login are all verified against the saved fingerprint key. The SSH client will alert the user if the saved fingerprint differs from the received fingerprint on future login attempts.

3.1.4.1 Creating fingerprints with OpenSSH

A fingerprint on a UNIX/Linux based system can be created with the following command from the OpenSSH suite:

```
# ssh-Key generator -l -f /path/to/keyfile/keyfilename.pub
```

The fingerprint of the example public key given above is:

```
99:a5:a2:d0:b6:39:fa:55:59:3d:37:21:97:0f:a9:ec Comment for Demo Key
```

3.1.4.2 Creating fingerprints with PuTTY key generator

A fingerprint is automatically generated and shown by the PuTTY key generator, as shown in Figure 6 below. The generation of key pairs is mentioned in an earlier section of this document.

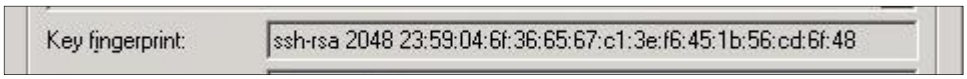


Fig. 6: Fingerprint creation under Microsoft Windows (screenshot of PuTTY key generator)

3.1.5 Comparison between PuTTY and OpenSSH key formats

See the figure below which directly compares the two key formats:



Fig. 7: PuTTY and OpenSSH key format

Only the public key in OpenSSH format can be uploaded via DBAG Member section.

3.2 CRE user administration

Before the CRE can be accessed, a CRE user account has to be set up and the OpenSSH public key has to be uploaded in the DBAG member section. This task can be performed by the “Technical User Administrator”. CRE users and their related keys can be setup and maintained in the DBAG member section: https://member.deutsche-boerse.com/irj/portal/coordinator.

“DBAG Member Section”-> “Technical Connection”-> “Technical User Administration”-> “Report Engine User”

Administration rights to become a “Technical User Administrator” may be requested using the DBAG member section.

For “Central Coordinators” and their deputies the corresponding path will be:

“DBAG Member Section”-> “User Administration & Central Coordinator”-> “Create”-> “Report Engine User”



Fig. 8: CRE users must be maintained in the DBAG member section

An overview of all existing and already created CRE users will be displayed. It is possible to edit, modify or delete existing CRE users by simply selecting them from the list.

All CRE users can be identified by their UserID, which is generated during the account setup process. A UserID looks like this example: 1027709_000001

- The first part, 1027709 is the so-called DBAG business partner ID which is used in the DBAG Member section for identification of a customer of Deutsche Börse AG. A business partner may have different memberships on Eurex and Xetra; each membership is represented by a member ID.
- The second part, 0000001 is a sequential number, automatically assigned by the system.

In addition, new CRE users can be created in the DBAG Member Section:

The new input screen will be opened by clicking on “Create User” where all necessary user information needs to be entered.

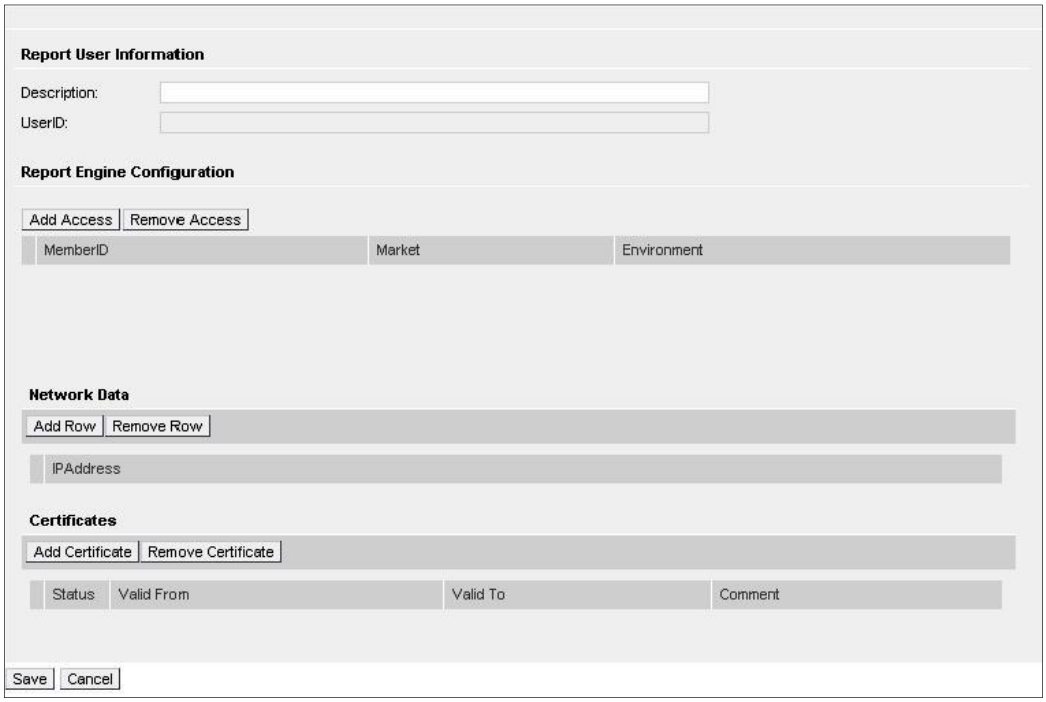


Fig. 9: Input screen in the DBAG Member Section to create a new CRE user

1. Report User Information (Optional):
   In the field “Description” a short description of the user should be given. Please note that the description is not the UserID. Any description of the user may be entered here.
   The UserID field itself will be filled by the system automatically
2. Report Engine Configuration:
   “Add Access” needs to be clicked on to enter the “MemberID”, a “Market” and an “Environment”. A selection of all applicable combinations for this specific user will be displayed from which he can choose.
   Please note that one user can have access for multiple combinations of member IDs, markets and environments. For all market directories supported by the CRE (underlying markets), also the relevant associated markets are now available for selection as a mandatory element during the setup.

Examples of combinations for underlying markets:

Market	Underlying Market
Eurex Bonds	XETRA
EEX Futures	EUREX
Eurex Repo	EUREX
Malta Stock Exchange	XETRA

For a complete overview refer to Appendix C.

3. Network Data (Optional):
   Access for a user can be restricted to a single IP address. An additional IP address will be added by clicking on “Add Row”. This is optional, but highly recommended by DBAG. Select an IP address and click on “Remove Row” to remove it.
   The address pattern entered here will be included in the configuration file for this user account. A wildcard (*) can be used in the pattern to represent zero or more characters. In order to combine multiple patterns, a pattern list can be used; each pattern must be on a new line. To prevent mistakes a logical check of the IP address is provided.

4. Certificate:
   The certificate refers to the public key created as described in chapter 3.1. The certificate/public key is only used to authenticate a user/role. The user/role permissions (i.e. access to member/market/etc.) are assigned at a later stage in the setup process (please refer to step 2 in this chapter).
   It is recommended to create a private/public key pair for every CRE user that may connect to the CRE.
   A public key needs to be uploaded by clicking on “Add Certificate”. Next a popup window will appear where the OpenSSH public key has to be uploaded. Browse to the location of the key and click “Upload”.

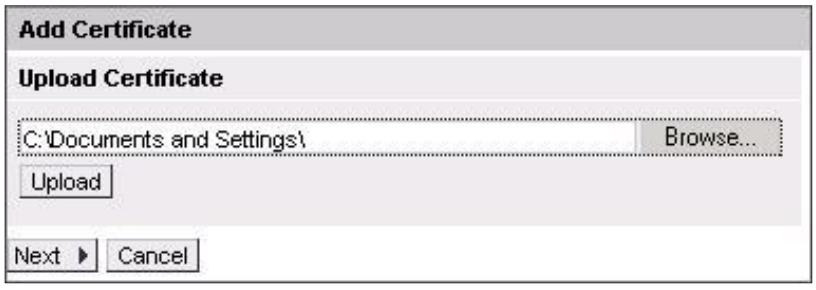


Fig. 10: Popup screen to upload the public key

The private key file must be accessible for the participant’s SFTP client, but should never be sent to DBAG.
Click “Next” to add validity dates and adding comments. A validity period of 90 days is used by default. The certificate/public key is added by clicking “Add Certificate”.

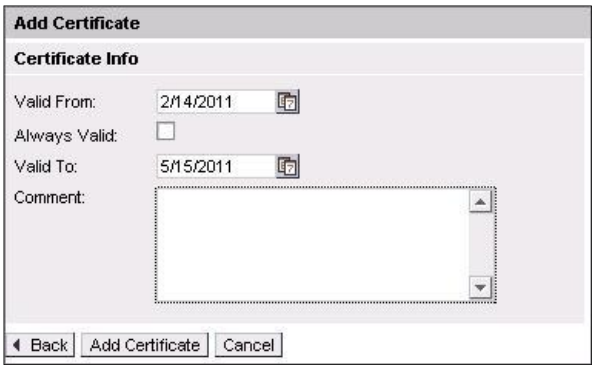


Fig. 11: Screen to enter validity dates and comments for the certificate/public key

Key expiration:

CRE users will be notified by email in due time about upcoming expiration. Latest one day before a certificate/public key will expire, the existing key needs to be prolonged (upload the existing key once more and define a new expiration date) or a new private/public key pair must be generated and the newly generated public key needs to be uploaded.

5. The final step is to save the changes: Click on “Save” to automatically create the UserID.

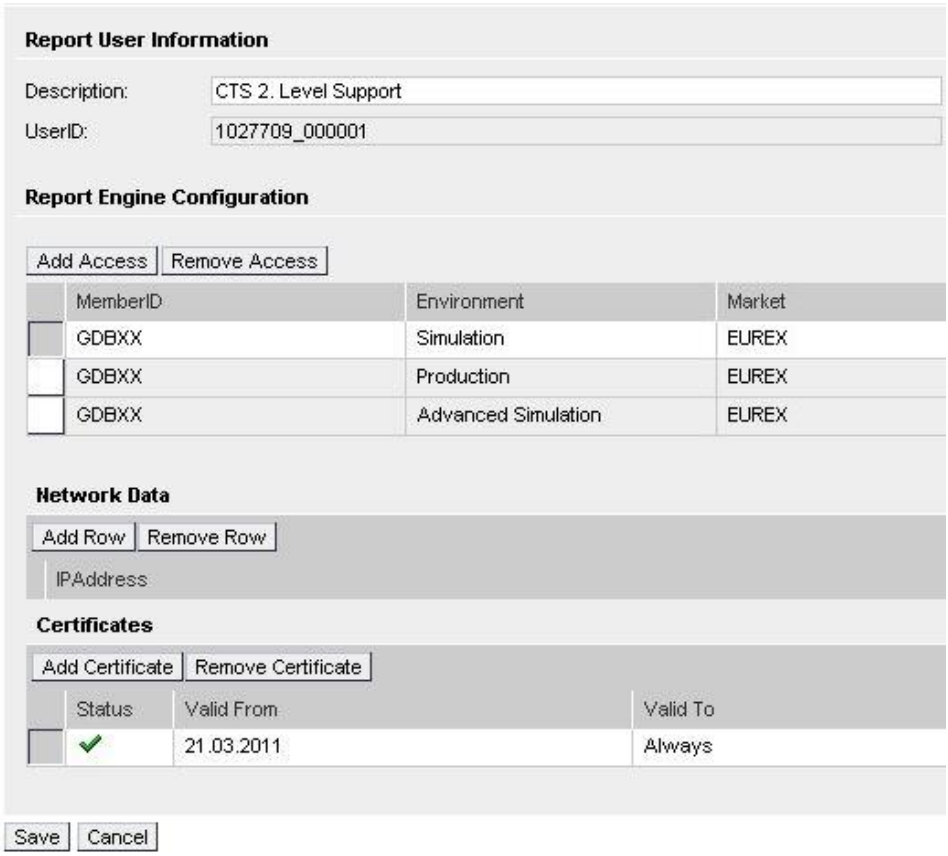


Fig. 12: Exemplary CRE user information after the successful creation of a CRE user

The generated UserID is displayed in the Report Engine User Overview table, as well as in the field UserID when selecting a user in the table on the main screen.

All Central Coordinators and their deputies are informed via e-mail whenever a new CRE user has been successfully setup, modified or deleted.

Due to technical restrictions and introduction of public area, please do not add more than 13 environments per UserID!

Make sure the uploaded public key is in OpenSSH format!

When initially creating a CRE user, the information will be available after two night batches. All subsequent changes to a CRE user become active after the next batch.

4 Connecting to the CRE

Participants may use an SFTP client of their choice to access the CRE server and download their reports.

The CRE does not offer any interactive SSH sessions nor any kind of browser access.

The following information is required to log into the CRE:

- UserID which has been generated by successfully setting up a new user in the DBAG member section.
- The IP address (host name) of DBAG/CRE. DBAG operates two independent sets of SFTP nodes to offer the CRE service.
- One pair of nodes serves the FTP channel of the MISS setup. These SFTP nodes are accessible via leased line only. DBAG does not operate a load balancer for these nodes; participants will receive the IP addresses and hostnames of the corresponding SFTP nodes and have to determine themselves which node is the best to use at any given time.
- SFTP clients connecting via leased lines should connect one of the following gateway IP addresses:

  193.29.90.65 (circuits connecting to Back End half A)
  193.29.90.97 (circuits connecting to Back End half B)

- CRE is available via 10Gbit/s Colocation Eurex ETS/Eurex ETI circuits.

  CRE is not available via 10Gbit/s Colocation Xetra ETS circuits.

  CRE is not available via 10Gbit/s Colocation Eurex EnBS, Xetra EnBS, and Eurex EMDI circuits.

  CRE is not available via circuits, where the circuit has been exclusively ordered for Eurex EnBS or Xetra EnBS.
- The second pair of SFTP nodes is operated to serve all Internet connections. A clustered load balancer provides convenient access to the least utilized node. Participants will receive the IP address and hostname of the load balancer cluster only and have to establish any connection with this virtual node address.
- SFTP clients connecting via the Internet connect to the following gateway IP address:

  193.29.90.129

Please note that further details on connectivity are provided in the document “Network Access to Exchange Applications”, which is available in the DBAG member section.

- Add routes to reach the CRE:

193.29.90.64	255.255.255.224	router IP (connecting to Back End half A)	1
193.29.90.96	255.255.255.224	router IP (connecting to Back End half B)	1

- SFTP port of DBAG for CRE member area is set to 2222.
- SFTP port of DBAG for CRE public area is set to 2221.
- Test the connection using telnet

```
# telnet 193.29.90.65 2222
Trying 193.29.90.65...
Connected to 193.29.90.65.
Escape character is '^]'.
SSH-2.0-OpenSSH_5.3

Protocol mismatch.
Connection to 193.29.90.65 closed by foreign host.
# telnet 193.29.90.97 2222
Trying 193.29.90.97...
Connected to 193.29.90.97.
Escape character is '^]'.
SSH-2.0-OpenSSH_5.3

Protocol mismatch.
Connection to 193.29.90.97 closed by foreign host.
#
```

Fig. 13: Test of CRE using telnet

4.1 MS Windows example using WinSCP

WinSCP is an open source free SFTP client, SCP client, FTPS client and FTP client for MS Windows.

Its main function is file transfer between a local and a remote computer. Beyond this, WinSCP offers scripting and basic file manager functionality.

Source: http://winscp.net/eng/index.php

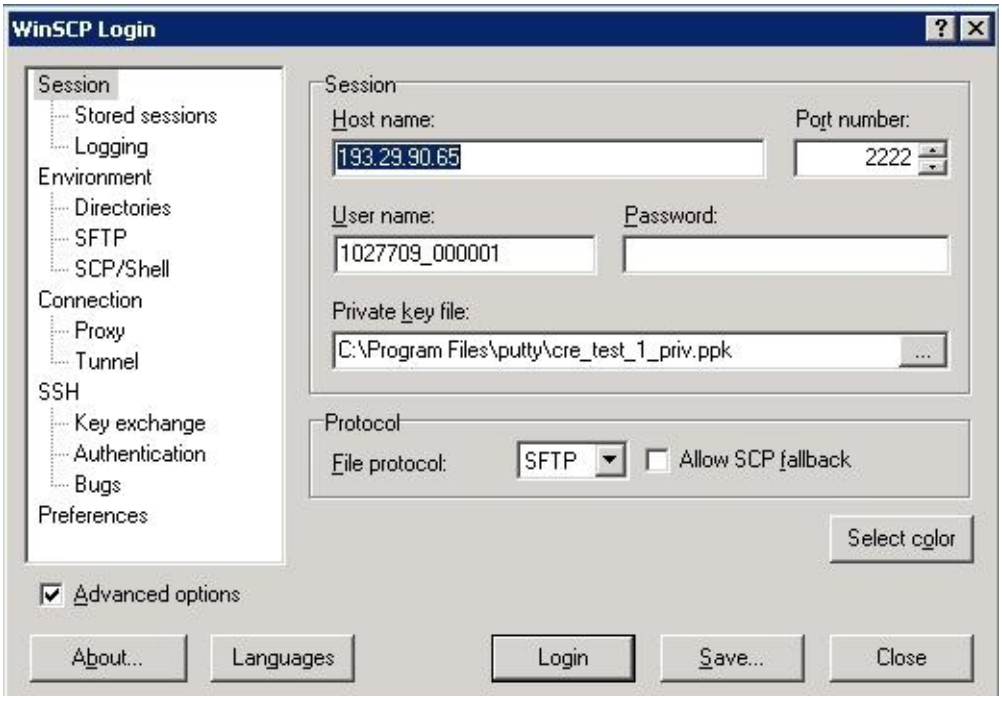


Fig. 14: Input screen required in order to log in to the CRE

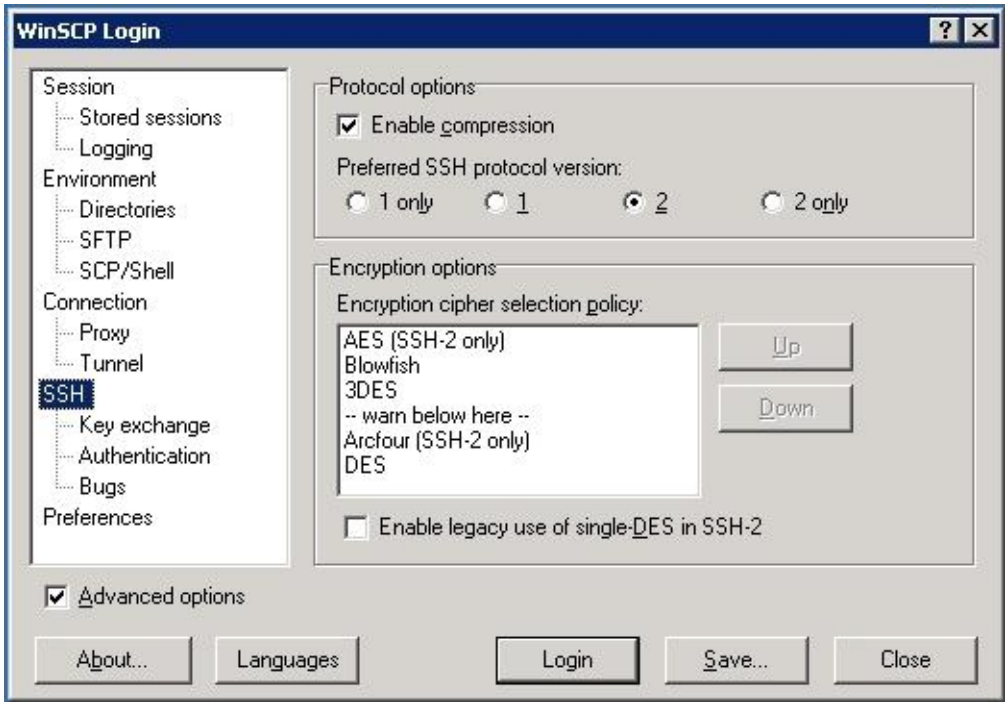


Fig. 15: Enable compression for ssh transfer.

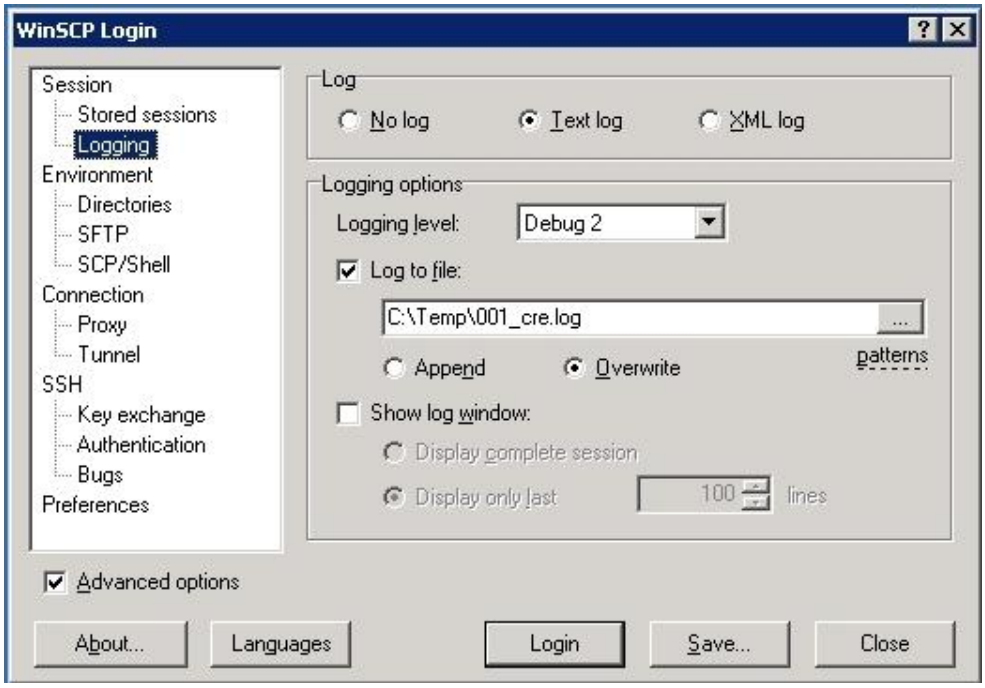


Fig. 16: Enable logging for WinSCP.

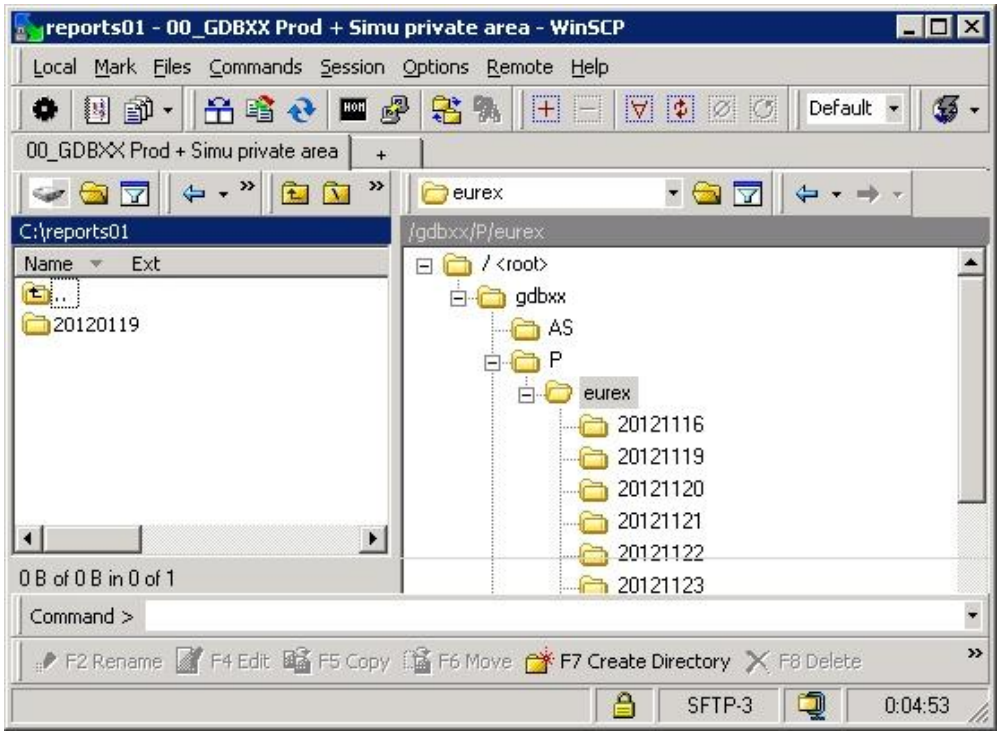


Fig. 17: Successful login to CRE member section with WinSCP.

After a successful login participants can use the full range of functionality of the CRE.

4.2 MS Windows example using PSFTP

PSFTP belongs to PuTTY tools mentioned above. It provides command line SFTP client that uses PuTTY key format.

It offers script capabilities as well.

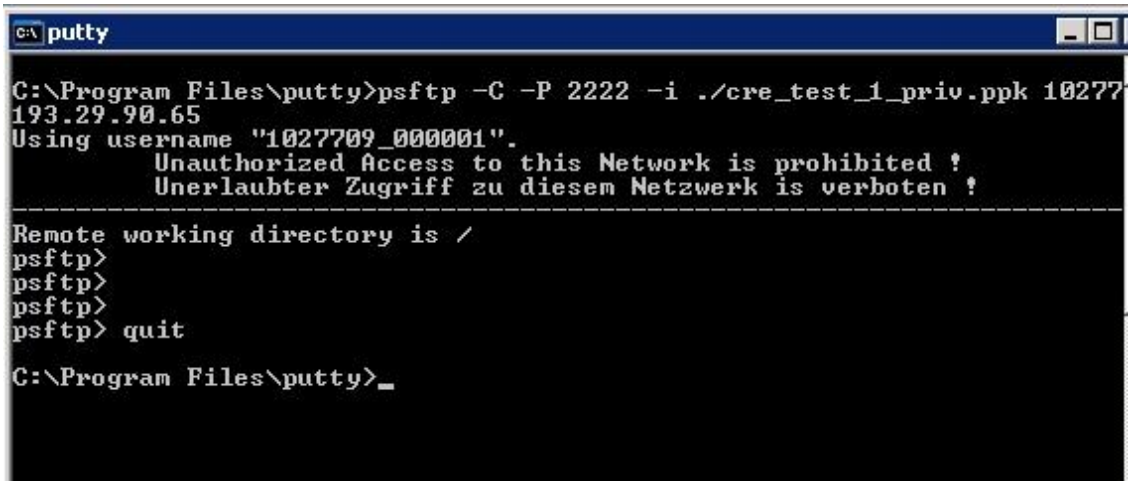


Fig. 18: Successful login to CRE member section with PSFTP.

The command line parameters are similar to Solaris SFTP command.

See detailed explanation in the section below.

4.3 Solaris example using sftp

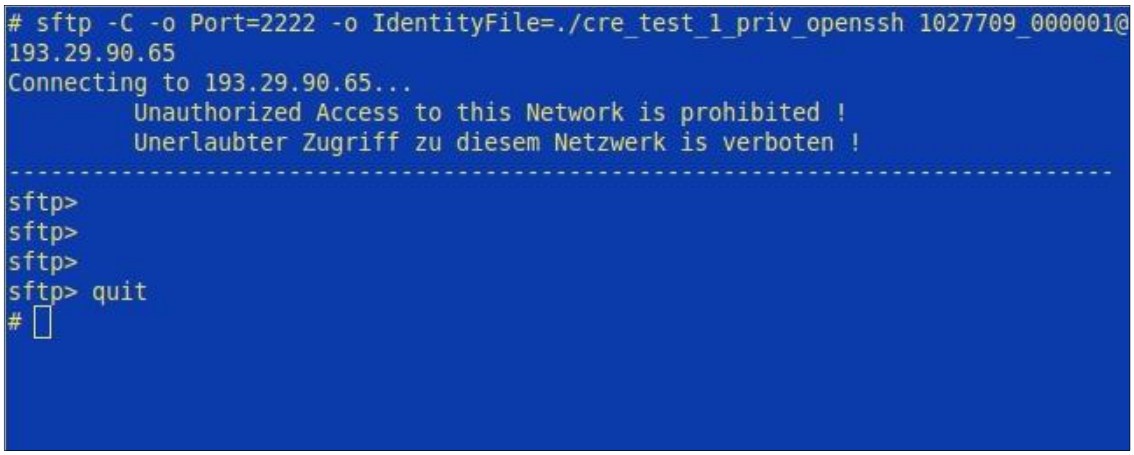


Fig. 19: Successful login to CRE member section with Solaris SFTP.

```
sftp -v -C -o Port=2222 -o IdentityFile=./cre_test_1_priv_OpenSSH
1027709_000001@193.29.90.65
```

-v	Debug switch (v – vvv for debug level 1-3)
-C	Compression switch
-o *	parameters to be passed to ssh
-o Port=2222	port number
-o IdentityFile=./cre_test_1_priv_OpenSSH	private OpenSSH key file
1027709_000001@193.29.90.65	user@host

This is an example. Usage in customer environment needs adaptation!

The private key file must be accessible for the customer's SFTP client, but should never be sent to DBAG. Transferring private keys through insecure channels (e.g. e-mail) causes a severe security risk. It is strongly advisable to replace any key pair where the corresponding private key might be exposed to unreliable persons.

4.4 Troubleshooting and debugging examples

For troubleshooting with or without DBAG Customer Technical Support, it is necessary to have detailed information about what happened exactly.

WinSCP has the ability to log its activities, see Figure 17 above how to configure and utilize that feature.

SFTP provides a debug switch (-vvv, see SSH manual page for details) which prints a detailed connection log into the standard output channel.

See the two most common errors as examples below.

4.4.1 Error 1: No matching SSH key found

```
$ sftp -oPort=2222 -vvv 1027709@193.29.90.65

Connecting to 193.29.90.65...
OpenSSH_4.3p2, OpenSSL 0.9.8e-fips-rhel5 01 Jul 2008
debug1: Reading configuration data /root/.ssh/config
debug1: Reading configuration data /etc/ssh/ssh_config
debug1: Applying options for *
debug2: ssh_connect: needpriv 0
<--- SNIP --->
debug3: preferred gssapi-with-mic,publickey,keyboard-
interactive,password
debug3: authmethod_lookup publickey
debug3: remaining preferred: keyboard-interactive,password
debug3: authmethod_is_enabled publickey
debug1: Next authentication method: publickey
debug1: Offering public key: first_name last_name (2010-10-11)
debug3: send_pubkey_test
debug2: we sent a publickey packet, wait for reply
debug1: Authentications that can continue: publickey
debug1: Offering public key: rsa-key-20110217
debug3: send_pubkey_test
debug2: we sent a publickey packet, wait for reply
debug1: Authentications that can continue: publickey
debug1: Offering public key: rsa-key-20101207
debug3: send_pubkey_test
debug2: we sent a publickey packet, wait for reply
Received disconnect from 193.29.90.65: Too many authentication
failures for 1027709_000001
Couldn't read packet: Connection reset by peer
```

4.4.2 Error 2: No key used at all

```
$ sftp -oPort=2222 -vvv 1027709_000001@193.29.90.65

Connecting to 193.29.90.65...
OpenSSH_4.3p2, OpenSSL 0.9.8e-fips-rhel5 01 Jul 2008
debug1: Reading configuration data /root/.ssh/config
debug1: Reading configuration data /etc/ssh/ssh_config
debug1: Applying options for *
debug2: ssh_connect: needpriv 0

<--- SNIP --->

debug1: Authentications that can continue: publickey
debug3: start over, passed a different list publickey
debug3: preferred gssapi-with-mic,publickey,keyboard-
interactive,password
debug3: authmethod_lookup publickey
debug3: remaining preferred: keyboard-interactive,password
debug3: authmethod_is_enabled publickey
debug1: Next authentication method: publickey
debug1: Offering public key: /root/.ssh/kdump_id_rsa
debug3: send_pubkey_test
debug2: we sent a publickey packet, wait for reply
debug1: Authentications that can continue: publickey
debug1: Trying private key: /root/.ssh/id_rsa
debug3: no such identity: /root/.ssh/id_rsa
debug1: Trying private key: /root/.ssh/id_dsa
debug3: no such identity: /root/.ssh/id_dsa
debug2: we did not send a packet, disable method
debug1: No more authentication methods to try.
Permission denied (publickey).
Couldn't read packet: Connection reset by peer
```

The complete command line switch overview may be found in the SFTP manual page.

Be aware that no interactive session is possible (SCP), only SFTP service is supported.

For troubleshooting with DBAG Technical Support please be able to provide the above mentioned log/debug information via email and/or DBAG member section.

4.5 Retrieving reports and files

Participants may use the SFTP client of their choice to access the CRE's server. After successful login, participants will be able to access their reports and files either manually, i.e. by browsing through their folder(s) on the server, or by downloading them automatically via script.

Participants accessing the CRE via their existing leased line connection should make sure that they do not retrieve reports and files from the CRE while reports and files are transferred to the MISS, as this would significantly increase the transfer time for both the CRE and the MISS.

4.6 Automated download: Sample script

In order to provide an indication of the level of effort to be put into the programming of a script, a sample script for the widely used Bourne-again shell (bash) is provided below:

```
#! /bin/bash


if [ $# -ne 6 ]; then
    echo
    echo "Usage:"
    echo "`basename $0 ` <ssh key file> <sftp user> <CRE node>
<member id> <environment> <market>"
    echo
    exit 15
fi


keyfile=$1
user=$2
node=$3
member_id=` echo -n $4 |tr -s [:upper:] [:lower:]`
env=`echo -n $5 |tr -s [:lower:] [:upper:]`
market=`echo -n $6 |tr -s [:upper:] [:lower:]`

sftp=/usr/bin/sftp
echo=""
date=`date  +%Y%m%d`

echo "
    cd $member_id/$env/$market
    get "$date"*
    exit " | $sftp –C -i $keyfile -b - $user@$node
```

Please keep in mind that this script has been kept simple and universal. It may need customization to meet individual requirements.

Since this is an example for an operating system running a bash shell, please note the WinSCP is also capable of scripting and automated job processing on MS Windows.

5 Structures and naming conventions

5.1 Directory structure in the CRE participant area

After a successful login, the user is placed to the chrooted file system root (/) - the home directory.

A user will not be able to access any files outside his home directory and sub-directories.

A business partner home directory may look like the sample below (user view).

Example 1	Example 2
/ +---abcex ¦ +---P ¦ ¦ +---eurex ¦ ¦ +---date ¦ +---S ¦ +---eurex ¦ +---date +---abcfr +---AS ¦ +---P ¦ +---eurex ¦ +---date +---S +---ccp ¦ +---date ¦ +---eurex ¦ +---date ¦ +---xetra +---date	----pakfr +---AS ¦ +---P ¦ +---xetra ¦ ¦ +---date ¦ ¦ ¦ +---xetra_ffm2 ¦ ¦ +---date ¦ ¦ ¦ +---xetra_dublin ¦ +---date +---S +---xetra ¦ +---date ¦ +---xetra_ffm2 +---date

Examples of directory structure in member area.

The first level of directories is corresponding to the respective MemberID configured, followed by the environment (second directory level) and the market and date, where:

- AS = Advanced Simulation (Available only for Xetra Frankfurt)
- P = Production
- S = Simulation

In example 1, member ABCEX has been configured for the Eurex production and simulation, and ABCFR has simulation environments for Eurex and Xetra and CCP and the production environment for Eurex.

In example 2, member PAKFR has been configured for the Xetra and Xetra Frankfurt 2 and Xetra Dublin production environment and for the Xetra and Xetra Frankfurt 2 simulation environment.

Please note that neither the directory structure nor access permissions can be manipulated by Deutsche Börse or the individual user. Access to member IDs, environments and markets is solely configured by the participant's Central Coordinator/ Technical User Administrator in the DBAG Member Section and "translated" into permissions for directories on the CRE.

Since CRE users will be restricted to read-only access to the CRE file system, file and directory operations will be limited to commands like cd, get, help, ls, pwd, etc. Any operation on directories or files within the file system that may incorporate or require manipulations to the file system content will not be permitted.

5.2 Directory structure in the CRE public area

In the public area, non-transactional and non-participant specific reports and files will be published. Therefore, a virtual participant directory "publi" is provided on the CRE. Participants can browse the virtual participant directory "publi" using the same authorisation mechanisms to access non-transactional and non-participant-specific reports and files. To access the public area, participants must use port 2221 instead of port 2222.

Example 3

```
+---publi
    +---AS
    +---P
    ¦   +---ccp
    ¦   +---eurex
    ¦   +---xetra
    ¦   +---xetra_dublin
    ¦   +---xetra_ffm2
    +---S
        +---ccp
        +---eurex
        ¦   +---20120814
        ¦   +---20120823
        +---xetra
        +---xetra_ffm2
```

Examples of directory structure in public area.

For the CRE public section, the same directory structure is applicable as for the CRE member area. Please refer to chapter 5.1 for further details about the directory structure.

6 Report and file naming conventions

Compared to existing MISS architecture handling of file names is different on the CRE.

The naming conventions in the CRE public area are the same as in the CRE member area, whereas all reports and files in the CRE public area will use the member ID PUBLI.

The CRE has the following REGEX (regular expression) pattern as naming conventions:

```
uncompressed reports or files:
[0-9]{2}[0-9A-Z]{8}[0-9A-Z]{5}[0-9]{8}[A-Z0-9\_\-]{0,34}\.[A-Z]{3}

compressed reports or files:
[0-9]{2}[0-9A-Z]{8}[0-9A-Z]{5}[0-9]{8}[A-Z0-9\_\-]{0,34}\.[A-Z]{3}
\.ZIP
```

Maximum length of a report file name is 64 characters!

Versioning

In case a report or file needs to be corrected (due to inconsistencies, incompleteness or corrupted data) the original zip file name will be modified. A versioning indicator will be added with a convention of -V[0-9]{2}, starting with -V01 and maximum versions of -V99.

Please note: Report names will always be static. Delivery of a new version of a given report can only be observed with the help of the versioning indicator added to the name of the corresponding zip file.

Stepwise introduction of versioning to the CRE is planned: Start was with Eurex T7 2.5 Simulation, followed by Xetra 15.0 Simulation and will continue towards the end of 2014 for all other markets and will be announced with separate individual circulars.

Example for an uncompressed report or file:

Original file/report: 01RPTTC540PAKFR20120301GDBXX.TXT

Examples for compressed reports or files:

Original version: 01RPTTC540PAKFR20120301GDBXX.TXT.ZIP

1st correction: 01RPTTC540PAKFR20120301GDBXX-V01.TXT.ZIP

2nd correction: 01RPTTC540PAKFR20120301GDBXX-V02.TXT.ZIP

[…]

Please note that the versioning indicator additionally applies to all report and file naming conventions for zip containers below.

6.1 General report naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	i.e. 00 Eurex Prod
[0-9A-Z]{8}	Report name	i.e. RPTTC540
[0-9A-Z]{5}	Member ID	i.e. PAKFR
[0-9]{8}	Business date	YYYYMMDD
[A-Z0-9_\-]{0,34}	Flexindicator 1 Flexindicator 2 Timestamp Sequence number …	Optional Optional Optional Optional Optional
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed reports	CSV, LIS, TXT, XML, PDF CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP, PDF.ZIP

Depending on the market the optional Flexindicator 1 and 2 have various meanings.

Flexindicator 1 and 2, timestamp, sequence number and possible future enhancements are optional. Depending on the type of report they may remain empty. Maximum length for all options is 36 characters in summary.

CRE public area:

Reports and Files may also be provided in a compressed format. Compressed reports and files can be identified by the respective suffix. Depending on the market, the suffixes comprise:

Description	Suffix	Example
ZIP Format	(.ZIP)	(FILRDF for Eurex)
Compressed CSV format	(.CSV.ZIP)	(51FTXEONLNGDBXX20121201XETR for Xetra)
Compressed text format	(.TXT.ZIP)	(CB001 for Eurex)
Compressed XML format	(.XML.ZIP)	(CB001 for Eurex)

Compression within CRE member area:

In the upcoming months it is planned to compress also all the private reports and files. This will be done in a stepwise approach and communicated separately.

6.1.1 Eurex report naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	00, 90 Prod, 01, 95 Simu 2 numerics
[0-9A-Z]{8}	Report name	i.e. RPTTC540 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[0-9A-Z]{5}	Flexindicator 1	Only for 00 and 01: Eurex Clearing Member Id 5 alphanumerics
[A-Z]{4}	Flexindicator 2	intraday/end of day identifier 4 chars
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed reports	CSV, LIS, TXT, XML, PDF CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP, PDF.ZIP

Example Eurex report: 01RPTTC540GDBXX20120301PAKFR.TXT

Example Eurex intraday report: 01RPTCP005GDBXX20140211PAKFRINTR.TXT

6.1.2 EurexOTC Clear and Eurex Risk Operation report naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	OTC Clear: 84 EurexOTC Prod, 85 EurexOTC Simu Risk Operation: 00 Prod, 01 Simu All: 2 numerics
[0-9A-Z]{8}	Report name	i.e. RPTCB202 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. GDBXX 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[0-9]{6}	Flexindicator 1	Time HHMMSS, used only for intraday reports 6 numerics
[0-9A-Z]{4}	Flexindicator 2	n.a.
\.	Dot	
[A-Z]{3}	Extension or extension for compressed reports	TXT, CSV, XML TXT.ZIP, CSV.ZIP, XML.ZIP

Example EurexOTC end-of-day Production report: 84RPTCB202GDBXX20121113.XML

Example EurexOTC intraday Production report: 84RPTCI205MNOHB20121113165900.XML

Example Eurex Risk Operations intraday report: 00RPTCI042GDBXX20121113123456.XML

6.1.3 CCP report naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	20 Prod, 21 Simu 2 numerics
[0-9A-Z]{8}	Report name	i.e. RPTCE270 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[0-9]{2}	Flexindicator 1	settlement/continuous run number 2 numerics
[0-9A-Z]{5}	Flexindicator 2	CCP reporting run type 5 alphanumerics
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed reports	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Example CCP report: 21RPTCE270PAKFR2012030104CORPT.XML

6.1.4 Xetra report naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	FFM 51 Prod, 52 Simu, 53 Advanced Simu FF2 61 Prod, 62 Simu ISE 55 Prod 2 numerics
[0-9A-Z]{8}	Report name	i.e. RPTTC810 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
n.a.	Flexindicator 1	n.a.
[A-Z]{4}	Flexindicator 2	MIC Code 4 chars
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed reports	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Example Xetra report: 51RPTTC810PAKFR2012030104XFRA.XML

Current list of valid Xetra MIC codes:

XDUB	Xetra Dublin
XETR	Xetra Frankfurt
XFRA	Xetra Frankfurt 2
XCAY	Xetra Cayman Islands
XBUL	Xetra Bulgaria
XMAL	Xetra Malta
XEUB	Eurex Bonds

6.2 General file naming conventions

Files, such as theoretical price files in Eurex or instrument reference data files are called nontransactional reports.

The naming conventions for nontransactional reports are slightly different from report naming conventions.

6.2.1 Eurex file naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	00, 90 Prod, 01, 95 Simu 2 numerics
[0-9A-Z]{8}	Filename	i.e. FPICPARA 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[A-Z]{4}	Flexindicator 1	intraday/end of day identifier 4 chars
n.a.	Flexindicator 2	n.a.
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed files	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Example:
Eurex intraday theoretical price file: 01FPICPARAPAKFR20120301INTR.TXT
Eurex end-of-day theoretical price file: 01FPICPARAPAKFR20120301.TXT

6.2.2 CCP file naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	20 Prod, 21 Simu 2 numerics
[0-9A-Z]{8}	Filename	i.e. FPICTHEC 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
n.a.	Flexindicator 1	n.a.
n.a.	Flexindicator 2	n.a.
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed files	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Example CCP theoretical price file: 21FPICTHECPAKFR20120301.TXT

6.2.3 Xetra file naming conventions

Field	Meaning	Remark
[0-9]{2}	Environment ID	FFM 51 Prod, 52 Simu, 53 Advanced Simu FF2 61 Prod, 62 Simu ISE 55 Prod 2 numerics
[0-9A-Z]{8}	Filename	i.e. FTXEONLN 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
n.a.	Flexindicator 1	n.a.
[A-Z]{4}	Flexindicator 2	MIC Code 4 alphanumerics
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed files	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Example Xetra instrument reference data file: 52FTXEONLNPAKFR20120301XETR.CSV

Please see Appendix B for an overview about naming conventions for all Xetra instrument reference data files.

6.2.4 Eurex Clearing Prisma file naming conventions for participant specific files

Field	Meaning	Remark
[0-9]{2}	Environment ID	00 Prod, 01 Simu 2 numerics
[0-9A-Z]{8}	File name	i.e. THEOINST 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[0-9A-Z_\-]{0,34}	Flexindicator 1 Flexindicator 2	<clgmember_id> <version> <tech_split_ident> _ <max_split_tech>
\.	Dot	
[A-Z]{3}\.ZIP	Extension or extension for compressed files	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Example:
Open interest theoretical price files:
00THEOINSTABCFR20120821ABCFREODX0001_0001.TXT (EOD batch)
00THEOINSTABCFR20120821ABCFRINTR0001_0001.TXT (INTR batch)

6.2.5 Eurex Reference Data File (RDF) naming conventions in public area

Field	Meaning	Remark
[0-9]{2}	Environment ID	00, 90 Prod, 01, 95 Simu 2 numerics
[0-9A-Z]{8}	Report name	i.e. FILRDF01 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PUBLI 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[A-Z]{4}	Flexindicator 1	MIC Code 4 chars
[A-Z]{4}	Flexindicator 2	MIC Code (optional) 4 chars
[0-9A-Z]{5}	Timestamp	UTC second of the year when the initial file (sequence number 000) was created, base36 encoded 5 alphanumerics
[0-9]{3}	Sequence number	000 – 999 3 numerics
\.	Dot	
[A-Z]{3}\.ZIP	extension for compressed files	XML.ZIP

Example Eurex RDF: 00FILRDF01PUBLI20120903XEURXEEEITS00999.XML.ZIP

6.2.6 Eurex Clearing Prisma file naming conventions in public area

Field	Meaning	Remark
[0-9]{2}	Environment ID	00 Prod, 01 Simu 2 numerics
[0-9A-Z]{8}	Report name	i.e. THEOINST 8 alphanumerics
[0-9A-Z]{5}	Member ID	i.e. PAKFR 5 alphanumerics
[0-9]{8}	Business date	YYYYMMDD 8 numerics
[0-9A-Z_\-]{0,34}	Flexindicator 1 Flexindicator 2	<file_type> <version> <tech_split_ident> _ <max_split_tech>
[A-Z]{3}\.ZIP	Extension or extension for compressed files	CSV, LIS, TXT, XML CSV.ZIP, LIS.ZIP, TXT.ZIP, XML.ZIP

Examples:

Open interest theoretical price file:
00THEOINSTPUBLI20120821OISERIESEODX0001_0003.TXT
00THEOINSTPUBLI20120821OISERIESINTR0001_0003.TXT

Non open interest theoretical price file:
00THEOINSTPUBLI20120821NISERIESEODX0001_0003.TXT
00THEOINSTPUBLI20120821NISERIESINTR0001_0003.TXT

Other files (EOD batch, no technical split needed):
00FOREXCRTPUBLI20120821EODX.TXT
00RISKMEASPUBLI20120821EODX.TXT

6.3 Corrupted reports and files

A report or file not following the naming conventions might be corrupt. Occurrence of such reports should be reported to Deutsche Börse AG Customer Technical Support.

Example for a corrupted report: 01RPTTA111PAKFR20120301GDBXX.TXT_INC

6.4 Report availability

Participants should be aware that reports will be made available on the CRE servers in the same timeframe as on the MISS. Scripts fetching reports automatically from the servers should be configured accordingly.

The CRE servers will run 24/7 with the following exceptions: A few downtimes per year for general hardware maintenance, typically during Saturdays/Sundays. Nevertheless, permanent session log in is not supported. We will run regular member database software maintenance Monday to Friday at about 3.45 am and 2.15 pm (key importing) and at about 5.15 am (member enrolment). If necessary, additional software maintenance runs will take place especially on weekends. After each maintenance run a new login needs to be performed.

Deutsche Börse reserves the right to introduce technical limitations on the amount of requests allowed per timeframe and business partner, if necessary. It is recommended to keep an interval of at least 1 or 2 minutes between individual connection attempts to the CRE.

For the simulation of Xetra Frankfurt and Xetra Dublin markets there is only one common Back-End system. All information regarding the markets is contained in one and the same simulation report.

6.5 Historical reports: Restore directory

A new ‘restore’ directory can be created on the business day directory level of the member area. This directory is created and populated if participants manually order the retransmission of historical files and reports that are no longer available on the CRE.
As usual ordering of historical reports needs to be arranged with the help of the Technical Key Account Managers. It will also be created and populated with reports or files that outdate the history keeping period. An existing ‘restore’ directory will also be available for a minimum of 10 business days.

6.6 Streamlined EOL encoding

All reports and files available on the CRE will use a carriage return line feed character <CRLF> as line separator.

This is different to current reports available on MISS servers.

7 Appendix A

See examples of log file / output of successful connections to the CRE below.

7.1 Example of successful WinSCP connection log file

```
Debug level 1 is set:


. 2012-08-01 13:27:08.342 ------------------------------------------------
-------------------------
. 2012-08-01 13:27:08.342 WinSCP Version 4.3.2 (Build 1201) (OS 5.2.3790
Service Pack 2)
. 2012-08-01 13:27:08.342 Login time: Wednesday, August 01, 2012 1:27:08 PM
. 2012-08-01 13:27:08.342 ------------------------------------------------
-------------------------
. 2012-08-01 13:27:08.342 Session name: 1027709_000001@193.29.90.65
. 2012-08-01 13:27:08.342 Host name: 193.29.90.65 (Port: 2222)
. 2012-08-01 13:27:08.342 User name: 1027709_000001 (Password: No, Key
file: Yes)
. 2012-08-01 13:27:08.342 Tunnel: No
. 2012-08-01 13:27:08.342 Transfer Protocol: SFTP
. 2012-08-01 13:27:08.342 Ping type: -, Ping interval: 30 sec; Timeout: 15
sec
. 2012-08-01 13:27:08.342 Proxy: none
. 2012-08-01 13:27:08.342 SSH protocol version: 2; Compression: Yes
. 2012-08-01 13:27:08.342 Bypass authentication: No
. 2012-08-01 13:27:08.342 Try agent: Yes; Agent forwarding: No;
TIS/CryptoCard: No; KI: Yes; GSSAPI: No
. 2012-08-01 13:27:08.342 Ciphers: aes,blowfish,3des,WARN,arcfour,des;
Ssh2DES: No
. 2012-08-01 13:27:08.342 SSH Bugs: -,-,-,-,-,-,-,-,-
. 2012-08-01 13:27:08.342 SFTP Bugs: -,-
. 2012-08-01 13:27:08.342 Return code variable: Autodetect; Lookup user
groups: Yes
. 2012-08-01 13:27:08.342 Shell: default
. 2012-08-01 13:27:08.342 EOL: 0, UTF: 2
. 2012-08-01 13:27:08.342 Clear aliases: Yes, Unset nat.vars: Yes, Resolve
symlinks: Yes
. 2012-08-01 13:27:08.342 LS: ls -la, Ign LS warn: Yes, Scp1 Comp: No
. 2012-08-01 13:27:08.342 Local directory: default, Remote directory: home,
Update: No, Cache: Yes
. 2012-08-01 13:27:08.342 Cache directory changes: Yes, Permanent: Yes
. 2012-08-01 13:27:08.342 DST mode: 1
. 2012-08-01 13:27:08.342 ------------------------------------------------
-------------------------
. 2012-08-01 13:27:08.358 Looking up host "193.29.90.65"
```

```
. 2012-08-01 13:27:08.358 Connecting to 193.29.90.65 port 2222
. 2012-08-01 13:27:08.358 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:08.358 Detected network event
. 2012-08-01 13:27:08.373 Detected network event
. 2012-08-01 13:27:08.373 Server version: SSH-2.0-OpenSSH_5.3
. 2012-08-01 13:27:08.373 We believe remote version has SSH-2 ignore bug
. 2012-08-01 13:27:08.373 Using SSH protocol version 2
. 2012-08-01 13:27:08.373 We claim version: SSH-2.0-WinSCP_release_4.3.2
. 2012-08-01 13:27:08.373 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:08.373 Detected network event
. 2012-08-01 13:27:08.373 Doing Diffie-Hellman group exchange
. 2012-08-01 13:27:08.373 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:08.420 Detected network event
. 2012-08-01 13:27:08.420 Doing Diffie-Hellman key exchange with hash SHA-1
. 2012-08-01 13:27:08.639 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:08.639 Detected network event
. 2012-08-01 13:27:08.967 Host key fingerprint is:
. 2012-08-01 13:27:08.967 ssh-rsa 2048
3b:c0:a4:8d:a2:a0:f7:2b:a1:2e:0c:b7:f4:02:9d:c7
. 2012-08-01 13:27:08.967 Initialised AES-256 SDCTR client->server
encryption
. 2012-08-01 13:27:08.967 Initialised HMAC-SHA1 client->server MAC
algorithm
. 2012-08-01 13:27:08.967 Initialised AES-256 SDCTR server->client
encryption
. 2012-08-01 13:27:08.967 Initialised HMAC-SHA1 server->client MAC
algorithm
. 2012-08-01 13:27:08.967 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:09.014 Detected network event
. 2012-08-01 13:27:09.014 Reading private key file "C:\Program
Files\putty\cre_test_1_priv.ppk"
! 2012-08-01 13:27:09.014 Using username "1027709_000001".
. 2012-08-01 13:27:09.014 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:09.076 Detected network event
. 2012-08-01 13:27:09.092 Offered public key
. 2012-08-01 13:27:09.092 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:09.092 Detected network event
. 2012-08-01 13:27:09.092 Offer of public key accepted
! 2012-08-01 13:27:09.092 Authenticating with public key "rsa-key-20110318"
. 2012-08-01 13:27:09.514 Waiting for the server to continue with the
```

```
initialisation
. 2012-08-01 13:27:09.670 Detected network event
. 2012-08-01 13:27:09.670 Access granted
. 2012-08-01 13:27:09.670 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:09.873 Detected network event
. 2012-08-01 13:27:09.873 Opened channel for session
. 2012-08-01 13:27:09.873 Waiting for the server to continue with the
initialisation
. 2012-08-01 13:27:10.076 Detected network event
. 2012-08-01 13:27:10.076 Started a shell/command
. 2012-08-01 13:27:10.076 ------------------------------------------------
------------------------
. 2012-08-01 13:27:10.076 Using SFTP protocol.
. 2012-08-01 13:27:10.076 Doing startup conversation with host.
> 2012-08-01 13:27:10.076 Type: SSH_FXP_INIT, Size: 5, Number: -1
. 2012-08-01 13:27:10.076 Sent 9 bytes
. 2012-08-01 13:27:10.076 There are 0 bytes remaining in the send buffer
. 2012-08-01 13:27:10.076 Waiting for another 4 bytes
. 2012-08-01 13:27:10.076 Detected network event
. 2012-08-01 13:27:10.076 Received 99 bytes (0)
. 2012-08-01 13:27:10.076 Read 4 bytes (95 pending)
. 2012-08-01 13:27:10.076 Read 95 bytes (0 pending)
< 2012-08-01 13:27:10.076 Type: SSH_FXP_VERSION, Size: 95, Number: -1
. 2012-08-01 13:27:10.076 SFTP version 3 negotiated.
. 2012-08-01 13:27:10.076 Unknown server extension posix-
rename@OpenSSH.com="1"
. 2012-08-01 13:27:10.076 Unknown server extension statvfs@OpenSSH.com="2"
. 2012-08-01 13:27:10.076 Unknown server extension fstatvfs@OpenSSH.com="2"
. 2012-08-01 13:27:10.076 We believe the server has signed timestamps bug
. 2012-08-01 13:27:10.076 We will use UTF-8 strings for status messages
only
. 2012-08-01 13:27:10.076 Limiting packet size to OpenSSH sftp-server limit
of 262148 bytes
. 2012-08-01 13:27:10.092 Getting current directory name.
. 2012-08-01 13:27:10.092 Getting real path for '.'
> 2012-08-01 13:27:10.092 Type: SSH_FXP_REALPATH, Size: 10, Number: 1296
. 2012-08-01 13:27:10.092 Sent 14 bytes
. 2012-08-01 13:27:10.092 There are 0 bytes remaining in the send buffer
. 2012-08-01 13:27:10.092 Waiting for another 4 bytes
. 2012-08-01 13:27:10.092 Detected network event
. 2012-08-01 13:27:10.092 Received 27 bytes (0)
. 2012-08-01 13:27:10.092 Read 4 bytes (23 pending)
. 2012-08-01 13:27:10.092 Read 23 bytes (0 pending)
< 2012-08-01 13:27:10.092 Type: SSH_FXP_NAME, Size: 23, Number: 1296
. 2012-08-01 13:27:10.092 Real path is '/'
. 2012-08-01 13:27:10.092 Listing directory "/".
```

```
> 2012-08-01 13:27:10.092 Type: SSH_FXP_OPENDIR, Size: 10, Number: 1547
. 2012-08-01 13:27:10.092 Sent 14 bytes
. 2012-08-01 13:27:10.092 There are 0 bytes remaining in the send buffer
. 2012-08-01 13:27:10.092 Waiting for another 4 bytes
. 2012-08-01 13:27:10.092 Detected network event
. 2012-08-01 13:27:10.092 Received 17 bytes (0)
. 2012-08-01 13:27:10.092 Read 4 bytes (13 pending)
. 2012-08-01 13:27:10.092 Read 13 bytes (0 pending)
< 2012-08-01 13:27:10.092 Type: SSH_FXP_HANDLE, Size: 13, Number: 1547
> 2012-08-01 13:27:10.092 Type: SSH_FXP_READDIR, Size: 13, Number: 1804
. 2012-08-01 13:27:10.092 Sent 17 bytes
. 2012-08-01 13:27:10.092 There are 0 bytes remaining in the send buffer
. 2012-08-01 13:27:10.092 Waiting for another 4 bytes
. 2012-08-01 13:27:10.248 Detected network event
. 2012-08-01 13:27:10.248 Received 1903 bytes (0)
. 2012-08-01 13:27:10.248 Read 4 bytes (1899 pending)
. 2012-08-01 13:27:10.248 Read 1899 bytes (0 pending)
< 2012-08-01 13:27:10.248 Type: SSH_FXP_NAME, Size: 1899, Number: 1804
> 2012-08-01 13:27:10.248 Type: SSH_FXP_READDIR, Size: 13, Number: 2060
. 2012-08-01 13:27:10.248 Sent 17 bytes
. 2012-08-01 13:27:10.248 There are 0 bytes remaining in the send buffer
. 2012-08-01 13:27:10.248 Read file '.' from listing
. 2012-08-01 13:27:10.248 Read file '..' from listing
. 2012-08-01 13:27:10.248 Read file 'gdbxx' from listing
. 2012-08-01 13:27:10.248 Waiting for another 4 bytes
. 2012-08-01 13:27:10.248 Detected network event
. 2012-08-01 13:27:10.248 Received 32 bytes (0)
. 2012-08-01 13:27:10.248 Read 4 bytes (28 pending)
. 2012-08-01 13:27:10.248 Read 28 bytes (0 pending)
< 2012-08-01 13:27:10.248 Type: SSH_FXP_STATUS, Size: 28, Number: 2060
< 2012-08-01 13:27:10.248 Status code: 1
> 2012-08-01 13:27:10.248 Type: SSH_FXP_CLOSE, Size: 13, Number: 2308
. 2012-08-01 13:27:10.248 Sent 17 bytes
. 2012-08-01 13:27:10.248 There are 0 bytes remaining in the send buffer
. 2012-08-01 13:27:10.248 Startup conversation with host finished.
. 2012-08-01 13:27:10.311 Session upkeep
. 2012-08-01 13:27:10.311 Detected network event
. 2012-08-01 13:27:10.311 Received 28 bytes (0)
. 2012-08-01 13:27:14.498 Session upkeep
. 2012-08-01 13:27:14.529 Closing connection.
. 2012-08-01 13:27:14.529 Sending special code: 12
. 2012-08-01 13:27:14.529 Sent EOF message
```

7.2 Example of successful SFTP connection on Solaris

```
Debug level 2 is set:


% sftp -vv -C -o Port=2222 -o IdentityFile=./cre_test_1_priv_OpenSSH
1027709_000001@193.29.90.65
Connecting to 193.29.90.65...
Sun_SSH_1.1.4, SSH protocols 1.5/2.0, OpenSSL 0x0090704f
debug1: Reading configuration data /etc/ssh/ssh_config
debug1: Rhosts Authentication disabled, originating port will not be
trusted.
debug1: ssh_connect: needpriv 0
debug1: Connecting to 193.29.90.65 [193.29.90.65] port 2222.
debug1: Connection established.
debug2: key_type_from_name: unknown key type '-----BEGIN'
debug2: key_type_from_name: unknown key type 'Proc-Type:'
debug2: key_type_from_name: unknown key type 'DEK-Info:'
debug2: key_type_from_name: unknown key type '-----END'
debug1: identity file ./cre_test_1_priv_OpenSSH type -1
debug1: Logging to host: 193.29.90.65
debug1: Local user: gateadm Remote user: 1027709_000001
debug1: Remote protocol version 2.0, remote software version OpenSSH_5.3
debug1: match: OpenSSH_5.3 pat OpenSSH*
debug1: Enabling compatibility mode for protocol 2.0
debug1: Local version string SSH-2.0-Sun_SSH_1.1.4
debug1: use_engine is 'yes'
debug1: pkcs11 engine initialized, now setting it as default for RSA, DSA,
and symmetric ciphers
debug1: pkcs11 engine initialization complete
debug2: kex_parse_kexinit: diffie-hellman-group-exchange-sha1,diffie-
hellman-group14-sha1,diffie-hellman-group1-sha1
debug2: kex_parse_kexinit: ssh-rsa,ssh-dss
debug2: kex_parse_kexinit: aes128-ctr,aes128-cbc,arcfour,3des-cbc,blowfish-
cbc,aes192-ctr,aes192-cbc,aes256-ctr,aes256-cbc
debug2: kex_parse_kexinit: aes128-ctr,aes128-cbc,arcfour,3des-cbc,blowfish-
cbc,aes192-ctr,aes192-cbc,aes256-ctr,aes256-cbc
debug2: kex_parse_kexinit: hmac-md5,hmac-sha1,hmac-sha1-96,hmac-md5-96
debug2: kex_parse_kexinit: zlib,none
debug2: kex_parse_kexinit: i-default
debug2: kex_parse_kexinit: first_kex_follows 0
debug2: kex_parse_kexinit: reserved 0
debug1: Failed to acquire GSS-API credentials for any mechanisms (No
credentials were supplied, or the credentials were unavailable or
inaccessible Unknown code 0)
debug1: SSH2_MSG_KEXINIT sent
debug1: SSH2_MSG_KEXINIT received
```

```
debug2: kex_parse_kexinit: diffie-hellman-group-exchange-sha1,diffie-
hellman-group14-sha1,diffie-hellman-group1-sha1
debug2: kex_parse_kexinit: ssh-rsa,ssh-dss
debug2: kex_parse_kexinit: aes128-ctr,aes128-cbc,arcfour,3des-cbc,blowfish-
cbc,aes192-ctr,aes192-cbc,aes256-ctr,aes256-cbc
debug2: kex_parse_kexinit: aes128-ctr,aes128-cbc,arcfour,3des-cbc,blowfish-
cbc,aes192-ctr,aes192-cbc,aes256-ctr,aes256-cbc
debug2: kex_parse_kexinit: hmac-md5,hmac-sha1,hmac-sha1-96,hmac-md5-96
debug2: kex_parse_kexinit: hmac-md5,hmac-sha1,hmac-sha1-96,hmac-md5-96
debug2: kex_parse_kexinit: zlib,none
debug2: kex_parse_kexinit: zlib,none
debug2: kex_parse_kexinit: i-default
debug2: kex_parse_kexinit: i-default
debug2: kex_parse_kexinit: first_kex_follows 0
debug2: kex_parse_kexinit: reserved 0
debug2: kex_parse_kexinit: diffie-hellman-group-exchange-sha256,diffie-
hellman-group-exchange-sha1,diffie-hellman-group14-sha1,diffie-hellman-
group1-sha1
debug2: kex_parse_kexinit: ssh-rsa
debug2: kex_parse_kexinit: aes128-ctr,aes192-ctr,aes256-
ctr,arcfour256,arcfour128,aes128-cbc,3des-cbc,blowfish-cbc,cast128-
cbc,aes192-cbc,aes256-cbc,arcfour,rijndael-cbc@lysator.liu.se
debug2: kex_parse_kexinit: aes128-ctr,aes192-ctr,aes256-
ctr,arcfour256,arcfour128,aes128-cbc,3des-cbc,blowfish-cbc,cast128-
cbc,aes192-cbc,aes256-cbc,arcfour,rijndael-cbc@lysator.liu.se
debug2: kex_parse_kexinit: hmac-md5,hmac-sha1,umac-64@OpenSSH.com,hmac-
ripemd160,hmac-ripemd160@OpenSSH.com,hmac-sha1-96,hmac-md5-96
debug2: kex_parse_kexinit: hmac-md5,hmac-sha1,umac-64@OpenSSH.com,hmac-
ripemd160,hmac-ripemd160@OpenSSH.com,hmac-sha1-96,hmac-md5-96
debug2: kex_parse_kexinit: none,zlib@OpenSSH.com
debug2: kex_parse_kexinit: none,zlib@OpenSSH.com
debug2: kex_parse_kexinit: first_kex_follows 0
debug2: kex_parse_kexinit: reserved 0
debug2: mac_init: found hmac-md5
debug1: kex: server->client aes128-ctr hmac-md5 none
debug2: mac_init: found hmac-md5
debug1: kex: client->server aes128-ctr hmac-md5 none
debug1: Peer sent proposed langtags, ctos:
debug1: Peer sent proposed langtags, stoc:
debug1: We proposed langtags, ctos: i-default
debug1: We proposed langtags, stoc: i-default
debug1: SSH2_MSG_KEX_DH_GEX_REQUEST sent
debug1: expecting SSH2_MSG_KEX_DH_GEX_GROUP
debug1: dh_gen_key: priv key bits set: 123/256
debug1: bits set: 1014/2048
debug1: SSH2_MSG_KEX_DH_GEX_INIT sent
debug1: expecting SSH2_MSG_KEX_DH_GEX_REPLY
```

```
debug1: Host '193.29.90.65' is known and matches the RSA host key.
debug1: Found key in /var/GATE/gateadm/.ssh/known_hosts:1
debug1: bits set: 1010/2048
debug1: ssh_rsa_verify: signature correct
debug2: kex_derive_keys
debug1: newkeys: mode 1
debug1: set_newkeys: setting new keys for 'out' mode
debug1: SSH2_MSG_NEWKEYS sent
debug1: expecting SSH2_MSG_NEWKEYS
debug1: newkeys: mode 0
debug1: set_newkeys: setting new keys for 'in' mode
debug1: SSH2_MSG_NEWKEYS received
debug1: done: ssh_kex2.
debug1: send SSH2_MSG_SERVICE_REQUEST
debug2: service_accept: ssh-userauth
debug1: got SSH2_MSG_SERVICE_ACCEPT
         Unauthorized Access to this Network is prohibited !
         Unerlaubter Zugriff zu diesem Netzwerk is verboten !
-------------------------------------------------------------------------
---
debug1: Authentications that can continue: publickey
debug1: Next authentication method: publickey
debug1: Trying private key: ./cre_test_1_priv_OpenSSH
debug1: PEM_read_PrivateKey failed
debug1: read PEM private key done: type <unknown>
Enter passphrase for key './cre_test_1_priv_OpenSSH':
debug1: read PEM private key done: type RSA
debug2: we sent a publickey packet, wait for reply
debug1: Authentication succeeded (publickey)
debug1: fd 5 setting O_NONBLOCK
debug2: fd 6 is O_NONBLOCK
debug1: channel 0: new [client-session]
debug1: send channel open 0
debug1: Entering interactive session.
debug2: callback start
debug1: ssh_session2_setup: id 0
debug1: Sending subsystem: sftp
debug1: channel request 0: subsystem
debug2: callback done
debug1: channel 0: open confirm rwindow 0 rmax 32768
debug2: channel 0: rcvd adjust 2097152
debug2: Remote version: 3
debug2: Init extension: posix-rename@OpenSSH.com
debug2: Init extension: statvfs@OpenSSH.com
debug2: Init extension: fstatvfs@OpenSSH.com
sftp> quit
debug1: channel 0: read<=0 rfd 5 len 0
```

```
debug1: channel 0: read failed
debug1: channel 0: close_read
debug1: channel 0: input open -> drain
debug1: channel 0: ibuf empty
debug1: channel 0: send eof
debug1: channel 0: input drain -> closed
debug1: client_input_channel_req: channel 0 rtype exit-status reply 0
debug1: channel 0: rcvd eof
debug1: channel 0: output open -> drain
debug1: channel 0: obuf empty
debug1: channel 0: close_write
debug1: channel 0: output drain -> closed
debug1: channel 0: rcvd close
debug1: channel 0: almost dead
debug1: channel 0: gc: notify user
debug1: channel 0: gc: user detached
debug1: channel 0: send close
debug1: channel 0: is dead
debug1: channel 0: garbage collecting
debug1: channel_free: channel 0: client-session, nchannels 1
debug1: fd 0 clearing O_NONBLOCK
debug2: fd 1 is not O_NONBLOCK
debug1: Transferred: stdin 0, stdout 0, stderr 0 bytes in 3.5 seconds
debug1: Bytes per second: stdin 0.0, stdout 0.0, stderr 0.0
debug1: Exit status 0
%
```

8 Appendix B

8.1 Naming conventions for Xetra instrument reference data files

Public area:

Backend Environment	Environment	Exchange Segment	Examples
Xetra Frankfurt	Production		51FTXEONLNPUBLI20121201XETR.CSV.ZIP
Xetra Frankfurt 2	Production	Xetra Specialist	61FTXEONLNPUBLI20121201XFRA.CSV.ZIP
Xetra Frankfurt 2	Production	Structured Products	61FTXEONLSPUBLI20121201XFRA.CSV.ZIP
Xetra Dublin	Production		55FTXEONLNPUBLI20121201XDUB.CSV.ZIP
Xetra Frankfurt	Simulation		52FTXEONLNPUBLI20121201XETR.CSV.ZIP
Xetra Frankfurt 2	Simulation	Xetra Specialist	62FTXEONLNPUBLI20121201XFRA.CSV.ZIP
Xetra Frankfurt 2	Simulation	Structured Products	62FTXEONLSPUBLI20121201XFRA.CSV.ZIP
Xetra Frankfurt	Advanced Simulation		53FTXEONLNPUBLI20121201XETR.CSV.ZIP

9 Appendix C

9.1 Markets and markets included:

Market	Environment	Included Market
CCP	PRODUCTION	CCP SEC Lending
	SIMULATION	CCP SEC Lending
EUREX	PRODUCTION	EUREX EUREX REPO EEX Futures OTC
	SIMULATION	EUREX EUREX REPO EEX Futures OTC
XETRA	PRODUCTION	XETRA EUREX BONDS MALTA SE Cayman Islands SE BULSE
	SIMULATION	XETRA EUREX BONDS XETRA Dublin MALTA SE Cayman Islands SE BULSE
	ADVANCED SIMULATION	XETRA
XETRA FFM2	PRODUCTION	XETRA FFM2
	SIMULATION	XETRA FFM2
XETRA DUBLIN	PRODUCTION	XETRA Dublin

9.2 Environment numbers:

00 - Eurex Production
01 - Eurex Simulation
~~03 - Eurex Advanced Simulation~~ (removed mid of 2013)
20 - CCP Production
21 - CCP Simulation
51 - Xetra Production
52 - Xetra Simulation
53 - Xetra Advanced Simulation
55 - Xetra Dublin Production
~~57 - Xetra International Market~~ (removed end of 2013)
61 - Xetra FFM2 Production
62 - Xetra FFM2 Simulation
84 - Eurex OTC Production
85 - Eurex OTC Simulation
90 - Eurex T7 Production
95 - Eurex T7 Simulation