

CreationDirect

Clearstream file transfer connectivity solutions

CreationDirect - Clearstream file transfer connectivity solutions

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Introduction

This document describes the connectivity protocols and ways that Clearstream can use to exchange files with its customers using CreationDirect.

Each solution has to be chosen regarding the kind of file transfer and technology capacity of the external partners. Clearstream connectivity suite is named CreationDirect.

Clearstream's proposals

On the Internet: CreationDirect via Internet

1. HTTPS protocol:
 - Secured solution;
 - Partner can upload or download.
2. FTP protocol with SSL/TLS (FTPS):
 - Secured solution using SSL;
 - Partner can upload or download.
3. SFTP (SSH) protocol:
 - Secured via SSH protocol;
 - Partner can upload or download.

Note: These protocols are also available through the use of the Deutsche Börse AG (DBAG) managed network.

On Orange dial-up VPN: CreationDirect via VPN

IBM Connect: Direct protocol:

- Managed network by Orange with access points across the world;
- Secured via the VPN;
- Secured via the usage of Secure+ encryption solution;
- Partner can upload or download;
- Clearstream can push files to partner side and start a post process on the customer side.

Note: This protocol is also available through the use of DBAG managed network.

On SWIFTNetwork: CreationDirect via SWIFTNet

SWIFTNet FileAct protocol:

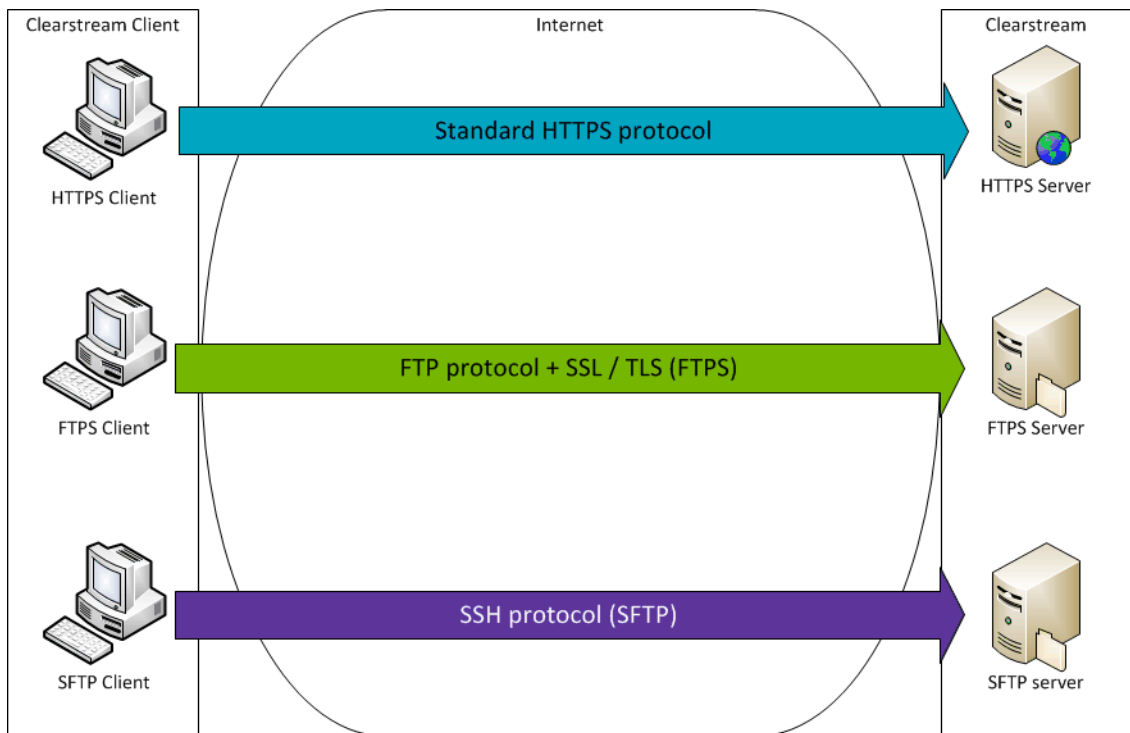
- Managed and secured network by SWIFT;
- Partner can upload;
- Clearstream can push files to partner side.

Clearstream file transfer connectivity solutions

CreationDirect via Internet

CreationDirect via Internet is a web-browser based connectivity solution that allows customers to connect to Clearstream applications. CreationDirect via Internet allows Clearstream Banking customers to submit instructions and retrieve reports from a standard workstation equipped with a web browser or any corporate transfer solution. As CreationDirect via Internet has been implemented using standardised protocols, users can use any transfer solution to access the system.

Clearstream does not recommend nor support any specific client.



Clearstream provides 2 systems: a production system as well as a test system.:

System	URL	IP
Production server	https://www.cdinternet.com	194.36.230.109
Test server	https://www.test.cdinternet.com	194.36.230.108

HTTPS protocol

Summary

Usage of the HTTPS protocol requires the use of one certificate. The certificate request has to be requested via CreationOnline under the CreationDirect Management menu, if you are not a CreationOnline customer please contact the Connectivity Helpdesk. It is strongly recommended to create a specific user certificate for this kind of transfer.

The application is also reachable using any browser supporting HTTPS certificates.

HTTPS details

- HTTP over SSL;
- Often called Secure HTTP;
- HTTP over TLS/SSL channel;
- Password is encrypted;
- Transfer is encrypted;
- Uses TCP port 443;
- As defined in RFC 2818 - 2817.

Firewall configuration

CreationDirect access using HTTPS requires TCP port 443 to be opened.

Sample Curl commands

Curl is a freeware transfer solution downloadable on <http://curl.haxx.se/>. It is available on many platforms and allows HTTPS file transfer.

Creating a cookie using HTTPS (this must be done first for download or upload)

```
curl -c cookie -k --cacert ClearstreamBanking.pem --cert cert.pem:Priv_Pass --key key.pem  
https://www.cdinternet.com/
```

List the content of your report folder using HTTPS

```
curl -o weblist.txt -b cookie -k --cacert ClearstreamBanking.pem -cert cert.pem:hPriv_Pass --key key.pem  
https://www.cdinternet.com/Reports
```

Download of PDF reports using HTTPS

```
curl -v -O -b cookie -k --cacert ClearstreamBanking.pem --cert cert.pem:Priv_Pass --key key.pem  
https://www.CDinternet.com/Reports/*.PDF
```

Upload of an ISO instruction using HTTPS

```
curl -v -b cookie -T "dummy.iso" --cacert ClearstreamBanking.pem --cert cert.pem:Priv_Pass --key key.pem  
-k https://www.CDinternet.com/Instruction_inbox/
```

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Figure 1. CreationDirect via Internet screen

FTPS protocol

It is recommended that customers do not use this protocol; for connectivity reasons and ease of trouble shooting.

Summary

Usage of the FTPS protocol requires the use of one certificate and an associated user ID.

The certificate has to be requested via CreationOnline - CreationDirect via Internet management. It is highly recommended that customer creates a specific User ID and names it "FTPS".

The request to use FTPS must be sent either via an authenticated SWIFT message (MT599), fax with two authorised signatures, CreationOnline free format message, or email to customeradmin@clearstream.com.

Please provide the following details in your request:

- Contact details;
- Filestore information;
- Certificate name that you plan to use.

Please never attach the certificate to your email request.

Once the request has been processed, a registered letter containing a User ID and password will be sent to the customer.

FTP/SSL details

- FTP over TLS/SSL;
- Also called FTPS or FTP Secure;
- Plain FTP over TLS/SSL channel;
- Transfer is encrypted;
- Uses TCP port 21 and TCP range 54000 to 55000;
- As defined in RFC 959, RFC 1123, RFC 4217 and RFC 2228;
- Implicit SSL is not supported (port 990).

Firewall configuration

CreationDirect access using FTPS require TCP port 21 + TCP Range from 54 000 to 55 000 to be opened.

Client configuration

- Follow the instructions provided by the third party FTP client supplier to import the keys.
- Clearstream Banking's system only allows passive FTP.
- Create an entry to www.cdinternet.com using the FTPS protocol.

Protocol selected should be:

- FTP with SSL (AUTH SSL - Explicit); or
- FTP with TLS/SSL (AUTH TLS - Explicit).

Clearstream file transfer connectivity solutions

Sample Curl commands

Curl is a freeware transfer solution downloadable on [HTTP://curl.haxx.se/](http://curl.haxx.se/). It is available on many platforms and allows FTPS file transfer.

List the content of your report folder using FTPS

```
curl -v --FTP-ssl -o webxlist.txt --cacert ClearstreamBanking.pem --cert cert.pem:Priv_Pass  
FTP://www.CDinternet.com/Reports -I --key key.pem -k -u FTP_USER_NM:Pa$$w0rd
```

Upload of an ISO instruction using FTPS

```
curl -v --FTP-ssl -T "dummy.iso" --cacert ClearstreamBanking.pem --cert Cert.pem:Priv_Pass  
FTP://www.CDinternet.com/Instruction_inbox/ -I --key key.pem -k -u FTP_USER_NM:Pa$$w0rd
```

Download of PDF reports using FTPS

```
curl -v --FTP-ssl -O --cacert ClearstreamBanking.pem --cert cert.pem:Priv_Pass  
FTP://www.CDinternet.com/Reports/*. *. *. *.PDF -key key.pem -k -u FTP_USER_NM:Pa$$w0rd
```

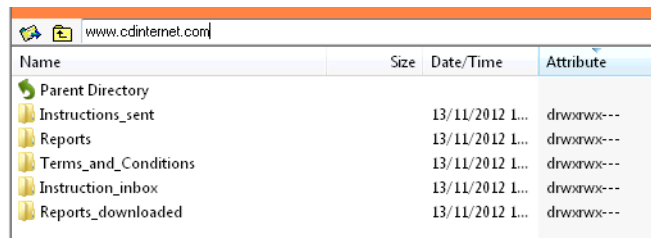


Figure 2. FTP connection to CreationDirect via Internet

Procedure to export .P12 and .CER certificates to external systems

Here are the steps that are needed to take to convert a .P12 certificate generated by CreationOnline in order to use it with a third party FTP tool or on a UNIX system requiring a PEM file (x509 certificate). This procedure is independent of the operating system and can be carried on any machine.

List of necessary software:

- Open SSL library <http://www.openssl.org/source/>
- Any FTP client that is RFC228 compliant curl, cute ftp, ws_ftp, ...

It is assumed that all the mentioned software is correctly installed in one computer.

Convert your certificate from .P12 to .PEM

- openssl pkcs12 -in your_cert.P12 -out client.pem -clcerts -nokeys
- openssl pkcs12 -in your_cert.P12 -out key.pem -nocerts

You can also export the CA key from your certificate

- openssl pkcs12 -in your_cert.P12 -out ca.pem -cacerts -nokeys

or from the CA and subCA certificates (Cer file)

Clearstream International root CA and Clearstream Banking CA can be obtained by connecting to <https://www.creationconnect.com/> and exporting the certificates using internet explorer.

- openssl x509 -in clearstreambanking.cer -inform DER -out Clearstreambanking.pem -outform PEM
- openssl x509 -in Clearstreaminternational.cer -inform DER -out Clearstreaminternational.pem

SFTP (SSH) protocol

Summary

Usage of the SSH protocol requires the use of one certificate and an associated user ID. This certificate is created by the customer by using a tool like Puttygen or Openssh. Only the public key needs to be sent to Clearstream.

In order to generate a user for the SSH service, a certificate request has to be created via CreationOnline by using CreationDirect via Internet management. It is strongly recommended to create a specific User ID for this task and name it "SSH".

The certificate of this user will not be used and can safely be discarded.

The import of the public key for SSH needs to be requested by sending an authenticated message to Clearstream.

This can be done via a CreationOnline free format message containing the public key, filestore and common name.

If the customer has not subscribed to CreationOnline; this can be done by sending an email containing the public key, filestore and common name to customeradmin@clearstream.com and an authenticated SWIFT message (MT599) or a fax with two authorised signatories containing the public key fingerprint.

Our security department will ensure that the fingerprint on the request matches the fingerprint of the certificate sent by CreationOnline free-format message or email prior processing the request.

Please do not attach your private key to your request.

Once the import of the SSH key is completed, you will be informed.

The provided public key format needs to be 2048 bit SSH2- RSA type.

SFTP details

- SSH File Transfer Protocol
- Often called Secure FTP
- SSH File Transfer Protocol
- Password is encrypted
- Transfer is encrypted
- Uses TCP port 22
- As defined in RFC 4251

Firewall Configuration

CreationDirect access using SSH requires TCP port 22 to be opened.

Key generation

This describes the required steps in order to create SSH keys in order to use the SFTP protocol. This procedure is independent of the operating system and can be carried on any machine.

Necessary software, either:

- Puttygen <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html> or
- Openssh <http://www.openssh.com>

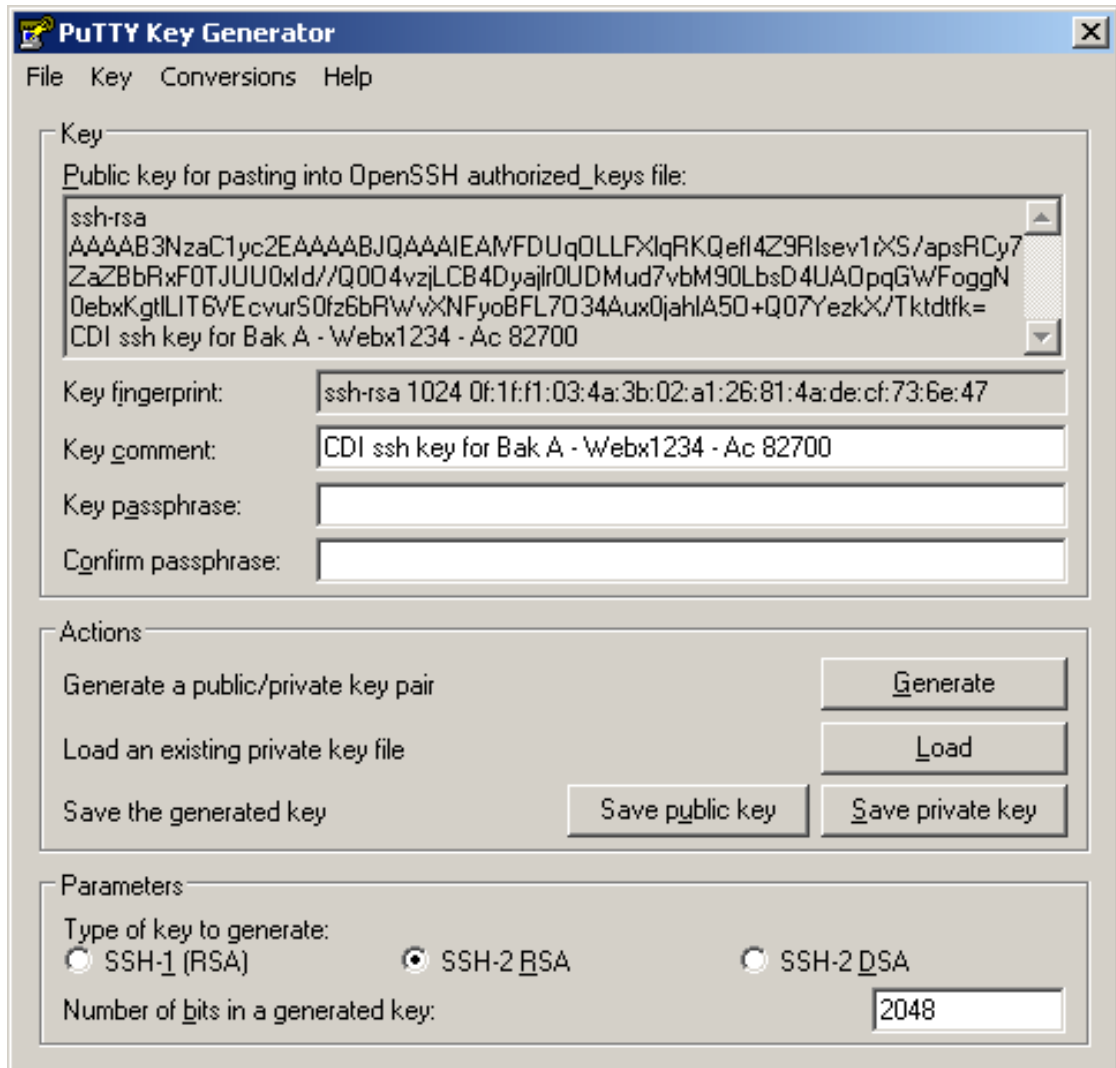
It is assumed that the selected software is correctly installed on one computer.

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Puttygen

Start PuttyGen. In the parameters, select type of keys to generate: SSH-2 RSA. The number of bits in the generated key should be 1024. On the action press Generate and move the mouse to generate some random numbers.

On the key comment field, please add a meaningful message in order for Clearstream to identify the target CreationDirect via Internet filestore and user. The public key can be sent to Clearstream by doing a cut and paste from the Key window or by using the save public key button.



Depending on your SFTP tool, you may need to either save both public and private keys separately or in one single "putty private key" file.

OpenSSH

From the command prompt, issue the command "ssh-keygen -b 2048 -t rsa -f myfile.ppk -C Filestore_user_bankA". Follow the instructions to protect the key with a pass phrase. The key fingerprint is provided at the end of the screen procedure.

SFTP clients configuration

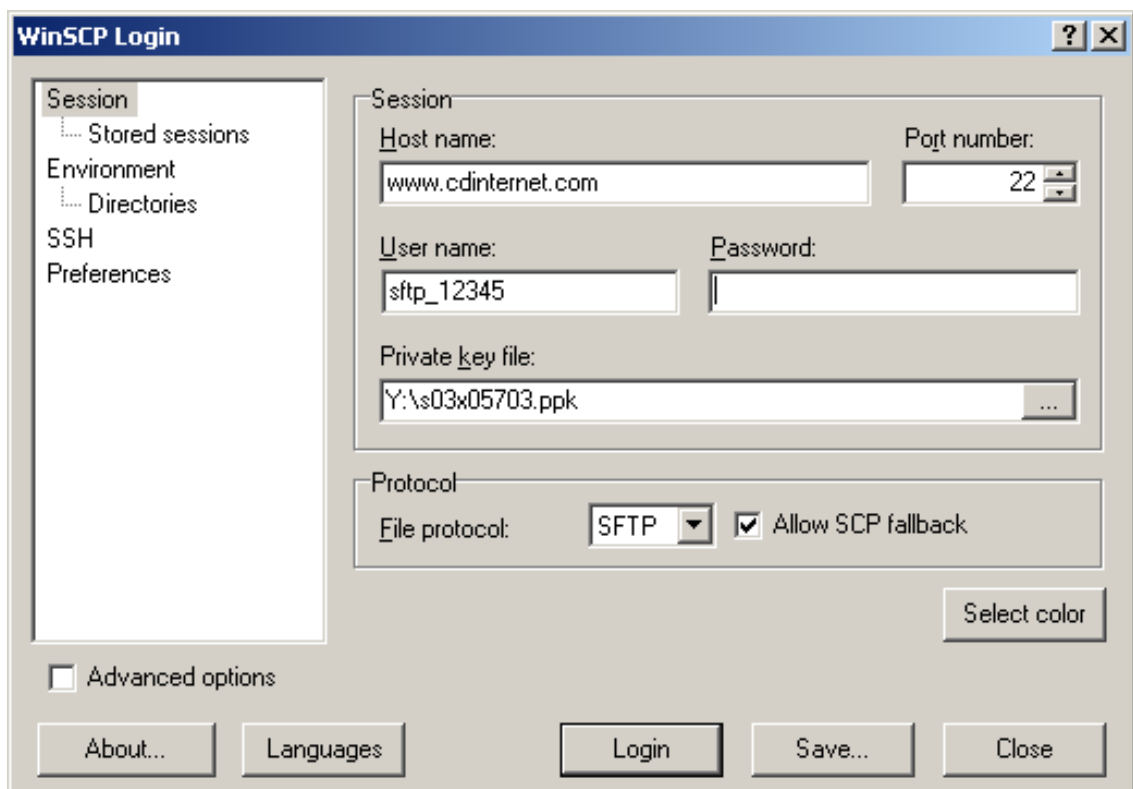
This chapter describes the required steps to use SSH keys in the frame of the SFTP protocol. This procedure needs to be carried on the SFTP machine. Clearstream does not recommend any SFTP client.

Necessary software:

WinSCP <http://winscp.net>

It is assumed that the selected software is correctly installed on one computer.

After starting WinSCP fill in your Session information. Host is `www.cdinternet.com`, port is TCP 22, and the user name is the one provided on the registered letter. Password will be left blank. Please indicate your private key file location and press Login.



Depending on customer needs, a different client can be used.

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CreationDirect via VPN

CreationDirect via VPN is a highly secure and reliable system-to-system connectivity solution that enables extensive data exchange between Clearstream Banking and its customers and can be seamlessly integrated with customers' in-house systems. CreationDirect is fully automated, making it an ideal component in a straight-through processing (STP) environment.

Clearstream provides 2 systems: production system as well as a test system.

Summary

CreationDirect via VPN relies on IBM (previously Sterling Commerce) Connect: Direct (C:D) protocol. This protocol was called initially Network Data Mover (NDM). The data flows are encrypted by a compatible add-on: Secure+. This combination has multiple advantages:

- Allows job scheduling as well as event driven file transfer;
- Supports checkpoint restart; automatic recovery from network interruptions;
- Interfaces with operating system security for user authentication;
- Provides a complete audit trail of data movement through extensive statistics logs;
- Enables data encryption;
- Supports a wide range of platforms (from Mainframe - Unix - Linux - Windows).

With this solution, Clearstream is able to deliver reports as soon as they are generated. The file transfer can also generate a process at customer side to continue processing.

C:D details

- C:D File Transfer Protocol
- Transfer is encrypted
- Uses TCP port 1364
- Proprietary protocol from IBM

Firewall Configuration

CreationDirect VPN access requires TCP port 1364 to be opened on both directions.

For further information please refer to the [CreationDirect via VPN User Manual](#).

System	NODE Name	IP
Production server	VPN_SVR_PRD	194.235.205.177
Test server	VPN_SVR_SEB	194.235.205.166

CreationDirect via SWIFTNet FileAct

Summary

CreationDirect via SWIFTNet, jointly operated by Clearstream Banking and SWIFT, provides Clearstream customers with a connectivity option through SWIFTNet, using a file-based communications mechanism.

CreationDirect via SWIFTNet implements high degrees of availability, robustness and security as is required for solutions that transport sensitive and confidential information.

SWIFTNet FileAct details

- Rely on SWIFT network
- Transfer is encrypted
- FileAct protocol is used
- File compression is an option

This implementation requires that you are a SWIFT member or participant with a SWIFT network connection. Your infrastructure must include a SWIFTAlliance Gateway, operational and ready to access the FileAct services.

You and Clearstream must request that SWIFT create a closed user group in order to start exchanging files. You must provide your DN (Distinguished Name).

Clearstream provides 2 systems: a production system as well as a test system:

System Address

System	BIC	Name
Production server	CEDELULL	clearstream.cd
Test server	CEDELULL	clearstream.cd!p

Clearstream file transfer connectivity solutions

Further information

For further information or if you have specific questions regarding CreationDirect , please contact the Clearstream Connectivity Help Desk as follows:

	Luxembourg	Frankfurt	London
Tel:	+352-243-38110	+49-(0) 69-2 11-1 15 90	+44-(0)20-786 27100
Fax:	+352-243-638110	+49-(0) 69-2 11-6 1 15 90	+44 (0) 20-786 27254
Email:	connectlux@clearstream.com	connectfrankfurt@clearstream.com	connectlondon@clearstream.com

Before contacting Clearstream Banking, please ensure that you have the following information to hand:

- Your organisation name and account number with Clearstream Banking;
- Your telephone number, fax number and email address;
- Details of the problem (please have full details available);
- If you have received an error message, full details of the error, with the error message number;
- Your organisation's Distinguished Name (DN);
- If you are using FTI, any FTI error code received.

Customers should note that, as is normal practice within financial organisations, Clearstream has implemented telephone line recording to ensure that the interests of Clearstream and of its customers are protected against misunderstandings or miscommunications.

Areas subject to telephone line recording include Customer Services, the Treasury Dealing Room and back office operations. The recorded lines are the subject of an on-going formal maintenance and quality control programme to ensure their continued effective and appropriate deployment and operation.

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