

Kofax Communication Server

TC/LINK-FI Technical Manual

Version: 10.2.0



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1. OVERVIEW

Important! The Kofax Communication Server and its components formerly used the name TOPCALL. Some screen shots and texts in this manual may still use the former name.

1.1 References

All common TC/LINK features and requirements are described in **TC/LINK Manual**

The message formats used by TC/LINK-FI are described in the **TC XML Manual (TC/XML and TCXL)** and **Open Message Format Manual (TOM)**.

Only differences to these general documents and TC/LINK-FI specialties are described here.

1.2 TC/LINK-FI Features

TC/LINK-FI is used for **File Interface Integration**. Following are its features:

- TC/LINK-FI connects to any system which uses TC/XML, TCXL or the TC Open Message Format for message and data interchange.
- TC/LINK-FI modules are started by the TCSRVS Windows service. They can be installed at any computer running Windows on the Intel platform, such as a TC model 2xx or a Windows based mail server.
- Performs bi-directional message transfer between the KCS server and a specific mail system using a file interface.
- Automatically converts attachments in standard graphical formats (TCI, TIFF, BMP, PCX, DCX and MODCA) to FAX format upon sending
- Automatically converts FAX format to the selected standard graphical format upon reception
- Generates delivery and non-delivery notifications
- Provides attachment conversion for application specific formats
- TC/LINK-FI offers remote control and maintenance with standard Kofax programs
- TC/LINK-FI can be configured to put notifications to a different directory than received messages.
- Several link modules can be run in parallel on several computers for high throughput
- Uses the common TC/LINK architecture for general address mapping, attachment conversion, document conversion, notification handling, directory synchronization, and communication with the KCS server.

1.3 Overview of Operation

TC/LINK-FI works on a set of 4 specific directories. (FI_TO_TC, TC_TO_FI, NOTIF, DIRSYNC).

- It sends messages and notifications from the FI_TO_TC Directory to KCS.
- It puts messages from KCS in the TC_TO_FI directory.
- It puts notifications from KCS in the NOTIF directory.
- It processes files in the DIRSYNC directory to update the KCS user store.

Note:

- NOTIF and TC_TO_FI can be the same directory if no separate handling for messages and notifications from KCS is needed.
- DIRSYNC and FI_TO_TC can be the same directory if no separate DIRSYNC directory is needed.

2. TC/LINK-FI MESSAGE SYNTAX DEFINITION

TC/LINK-FI supports two kinds of message formats: XML and the Open Message Format (TOM). The XML format is described in the **TC XML Manual**. The TOM format is described in the **Open Message Format Manual**.

2.1 Special Notes for TC/LINK-FI

- Transaction files to KCS must always have three character extensions (applies also to DirSync messages!)
- If you place an attachment file into the directory to KCS, make sure that it has an extension shorter than three characters.

2.2 XML Format Support

As alternative to the Open Message Format (TOM) that was used up until now to put and retrieve KCS messages via TC/LINK-FI and TC/LINK-MQ, there is now also the possibility to use the XML message format TC/XML. Using the TC/XML format with FI or MQ is now called TC/LINK-XML.

2.2.1 XML Formats

There are two XML formats used by the Link:

- **TC/XML** is a mapping of the classic TOM structure to XML. This is the format that is recommended to use for the customer.
- **TCXL** (XML Link format) is the mapping of the KCS TCSI structure to XML. This XML format can be transformed directly to the KCS internal used object structure.

The conversion between these two formats is done by XSLT transformation style sheets.
Simple message in TC/XML, the XML message format

```
<?xml version="1.0" encoding="UTF-8"?>
<MESSAGE xmlns="http://www.topcall.com/XMLSchema/2002/tc/xml">
  <SUBJECT>Simple example</SUBJECT>
  <TO>
    <SERVICE>FAX</SERVICE>
    <NUMBER>12345</NUMBER>
  </TO>
  <TXT>
    this is a test message from TC/link-XML
  </TXT>
</MESSAGE>
```

Simple message in TCXL, the internal XML Link format

```
<?xml version="1.0" encoding="UTF-8"?>
<set_entry_ms_mail xmlns="http://www.topcall.com/XMLSchema/2002/tcxl">
  <int_msg_type>49</int_msg_type>
  <un_content.l_env_cont>
    <set_header>
      <ts_ref>minimum example</ts_ref>
      <l_recipients>
        <set_entry_rs>
          <int_del_type>1</int_del_type>
          <l_full_addr>
            <set_full_address>
              <ts_service>FAX</ts_service>
              <un_public_address.set_free_address>
                <ts_free_addr>12345##</ts_free_addr>
```

```

        </un_public_address.set_free_address>
        </set_full_address>
    </l_full_addr>
    </set_entry_rs>
</l_recipients>
</set_header>
<obj_body_part/>
<set_att_obj>
    <int_content_type>1076</int_content_type>
    <un_content.blk_binary.tctext>
this is a test message from TC/link-XML
    </un_content.blk_binary.tctext>
    </set_att_obj>
</un_content.l_env_cont>
</set_entry_ms_mail>

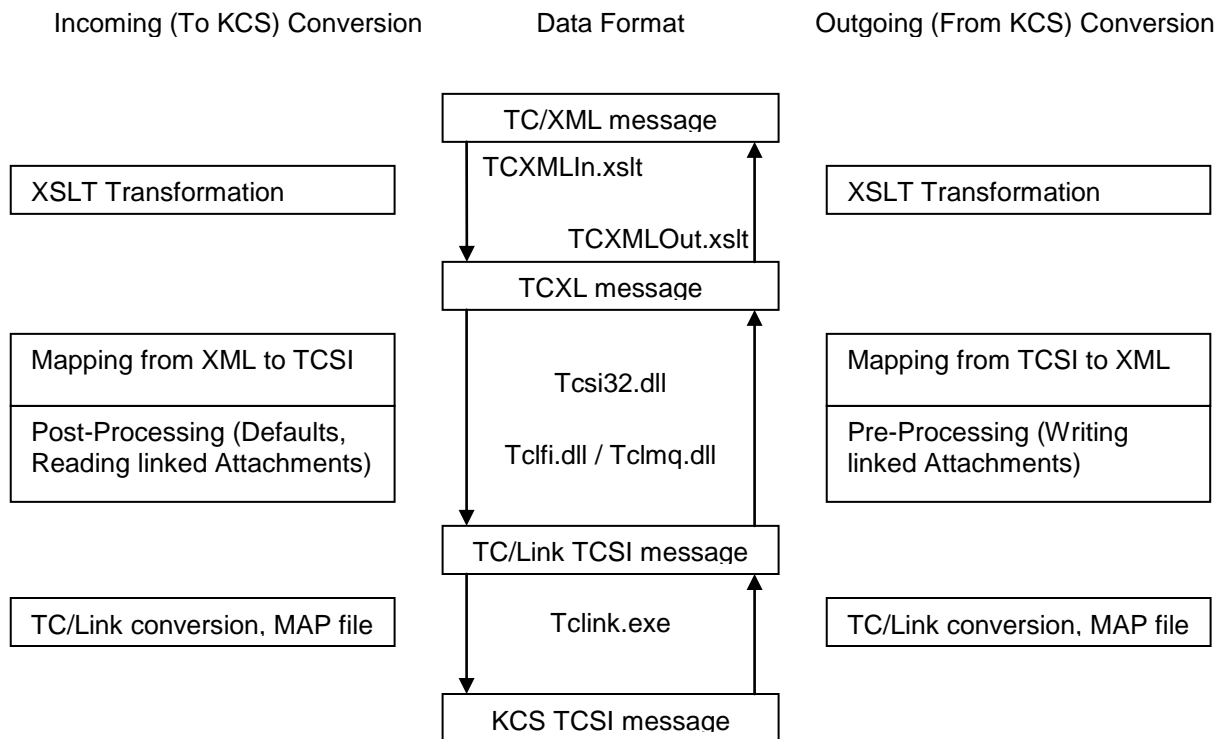
```

See the TC/XML manual for details on the XML formats.

The indentation of the XML message is only for readability, it is neither necessary for an XML message nor is it guaranteed that applications write it like that. To view a badly formatted XML file you can use for example the Internet Explorer, it indents XML files no matter how they are written.

2.2.2 Message Conversion Flow

The following graphic shows the message conversion flow. An incoming TC/XML message is converted to TCXL by the XSLT transformation. This is mapped to the TCSI object, some defaults are added and linked attachments are included. After that it is handed over to the general TC/Link processing. An outgoing message is handled accordingly.



The XSLT transformation style sheets can be customized to support any XML format defined by the customer. It is also possible to skip any KCS side XSLT transformation.

2.2.3 Attachments

Attachments can be embedded in the XML file, or linked similar to the classic TOM format. If the <BINARY> or <un_content.blk_binary> tag is present, the attachment is regarded to be embedded. For outgoing messages this can be configured. The default is that attachments are just referenced and written separately.

Linked (referenced) attachment object in TC/XML.

```
<ATT>
  <NAME>TOM_short.do</NAME>
  <APPLICATION>xyz.doc</APPLICATION>
  <COMMENT>some comment</COMMENT>
</ATT>
```

The physical file name is referenced in the <NAME> tag. The <APPLICATION> tag defines the extension of the attachment and is used later by Document Converter to use the correct application for conversion.

Linked (referenced) attachment object in TCXL.

```
<set_att_obj>
  <ts_comment></ts_comment>
  <ts_appl_id>wm_doc.fsy</ts_appl_id>
  <ts_long_file_name>wm_doc.fsy</ts_long_file_name>
  <ts_file_name>wm_doc.fsy</ts_file_name>
  <int_content_type>1024</int_content_type>
  <ts_tos_folder>C:\TCLFI\TC_TO_FI\TCFI000A.AT</ts_tos_folder>
</set_att_obj>
```

Here the <ts_tos_folder> tag has the reference to the physical file name. <ts_appl_id> defines the extension, <ts_file_name> and <ts_long_file_name> define how the file should be named further on.

The same referenced attachment in classic TOM format

```
:ATT: NAME=C:\TCLFI\TC_TO_FI\TCFI000A.AT, APPLICATION=wm_doc.fsy
```

Embedded attachment object in TC/XML

```
<ATT>
  <NAME>testfi_ATT_from_file.exe</NAME>
  <APPLICATION>testfi_A.exe</APPLICATION>
  <COMMENT></COMMENT>
  <BINARY><NpFkAMAAAAABAAAA//PAAgLAAAAAAAAABAAAAAAAAAAAAAAAAAAAA
  AAAADAAA4wH66AA0mQzhgbAM1cIUhWazBCcy92ZyFWbgMWYu52b0BiYlBic1GIp5GI
  kVmLN0gCkAAAAAAAAAAQUHnn2VY6FJWhpXkYFmeRiWqbGJShpXkIf56RiRY6FJqzhakIF
  oVhpXkIAAAAAAAAAAAAAAAAAAAAAQVEAAwUADAAoUACOOAAAAAAAAAAAA4A8QALegBAAAQ
  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA=</BINARY>
</ATT>
```

The tag <BINARY> includes the binary content of the attachment encoded to Base64 characters as defined in RFC 2045 (see <http://www.faqs.org/rfcs/rfc2045.html>). The <NAME> defines just the logical file name; the extension is also taken from the <APPLICATION> tag.

Embedded attachment object in TCXL

```
<set_att_obj>
  <ts_comment></ts_comment>
  <ts_appl_id>wm_doc.fsy</ts_appl_id>
  <ts_long_file_name>wm_doc.fsy</ts_long_file_name>
  <ts_file_name>wm_doc.fsy</ts_file_name>
  <int_content_type>1024</int_content_type>
  <un_content.blk_binary>
aYUasV2U552YgAlcvZWasVGI2Vmcz12buBSNeQkOcBlcvpWZjRHXslmbrx1dt9FapNHdv
jNgKuoiGspDXBJ3YolmdlxlcyNGXlmlbrx1dtxFZvNWAAAAANXTW90cNZ1z//HAAMAwQU
vJXYnVGAAAAABAAAAAAAAAAAAAAAAAAAA=</un_content.blk_binary>
```



```
</set_att_obj>
```

Here the tag for the binary content is <un_content.blk_binary>. The <ts_tos_folder> tag is not necessary.

2.3 Example Transaction Files in TOM-format

For basic samples of transaction files, see the Open Message Format manual. Some more advanced examples can be found below.

2.3.1 Using Priority Control

```
P=H, PC=L, SUBJ="Test of TC/LINK-FI"
FROM: SN=RF, SE=INT, N=RF
TO: NA=Mr. Test1, DE=Support, CO=TCINT, SE=FAX, N=66133831
CC: NA=Mr. Testcc, DE=Support, CO=TCINT, SE=FAX, N=66133831
TXT:
This is a sample text with priority control.
Test end.
```

Parameters P and PC define the send priority for TO and CC recipients.

2.3.2 Attaching a 'PC' Document

To attach a 'PC' document you have to use the :ATT: command.

If you want to send attachments to services not capable of binary data (e.g., FAX), make sure that the Document Converter is installed correctly for all used document types.

Attachment names to KCS are built by concatenating the filename of the <NAME=> parameter (without path) to the extension taken from the <APPLICATION=> parameter (see example below).

TC/LINK-FI searches for the specified file

1. in the full path given with the NAME= parameter
2. in the TO KCS directory with the given NAME= parameter

```
SUBJ="Test of TC/LINK-FI"
FROM: SN=RF, SE=INT, N=RF
TO: NA=Mr.Test, DE=Supt, CO=TCINT, SE=FAX, N=66133831
TXT:
This is a sample text with an attached WinWord file.
Test end.
:ATT: NA=G:\APIDOCs\MYDOC.DOC, APPL=TEST.DOC, COM=Test document
```

Do not put an attachment with a three-character extension in the TO KCS directory because TC/LINK-FI may then try to send first the attachment, but not the transaction file! Place only attachments with two-character or fewer extensions into the outgoing directory, e.g.:

```
:ATT: NA=G:\FI2TC\MYDOC.DO, APPL=MYDOC.DOC, COM=Testdoc
```

This will be pasted to "MYDOC.DOC" (Name from NA=, extension from APPL=) by TC/LINK-FI!

2.3.3 Other Parameters

```
AR=POS, R=HIGH, SC=NO, HL=NO, TE=FIS/ABCTEMPL, SUBJ= "Test of TC/LINK-FI"
FROM: SN=RF, SE=INT, N=RF
TO: NA=Mr. Test, DE=Support, CO=TCINT, SE=FAX, N=66133831
TXT:
This is a sample text with some more parameters.
Test end.
:INC: NA=FIS/ANFAHRT, COM=Map of Vienna
```

Parameters:

AR archive option
 R sets resolution for sending
 SC defines whether a sending copy is requested. Valid values: NO, ALL, FIRST
 HL defines whether a header line is used
 TE defines the template used in the form TE=folder/msgname or NO if no template should be used
 INC specifies a KCS message which should be included
 COM comment for included message

2.3.4 Multiple Alternative Numbers

You can specify more than one address per originator or recipient. This may e.g. be useful to implement alternative addresses, or to fill some cover sheet variables.

Example (alternative recipient addresses):

```

SUBJECT="Testmessage for multiple originator address", NF=ALL
FROM: NA=Testuser, SE=TCFI, N=TestuserOnTcfi
TO:
SE=FAX,N=66133899,ACTIVE=YES,SE=FAX,N=66133678,ACTIVE=YES,SE=SMTP,N=AI@kofax.com
TXT:

Test for multiple originator address!
  
```

This gives three alternative recipient numbers (FAX 66133899 and 66133678, and a SMTP address).

Example (cover sheet variables):

```

SUBJECT="Testmessage for multiple originator address", NF=ALL
FROM: NA=Testuser, SE=TCFI, N=TestuserOnTcfi, ACTIVE=YES,
      SE=SMTP, N=TestUser@kofax.com, ACTIVE=YES,
      SE=TOPCALL, N=TestUserOnTopcall, ACTIVE=YES
TO: SE=FAX, N=66133899
TXT:

Test for multiple originator address!
  
```

This message will fill all the cover variables as expected (e.g. \$UAdd0SMTP\$ with "TestUser@kofax.com", \$UAdd0TCFI\$ with "TestuserOnTcfi").

2.3.5 Notifications from KCS

If a message in the TO KCS directory could be converted successfully, TC/LINK-FI generates notifications in the NOTIF directory according to the requested notification level (e.g., NF=ALL).

The example below shows a non-delivery notification TC/LINK-FI created, with defined correlation information (C1-C5).

```

TYPE=NOTIF, SUBJECT="NON-Delivery Notif.: Test of TC/LINK-FI", MCORR=00000233053
FROM: ACTIVE=YES, COMPANY=TCINT, DEPT=Support, NAME=Mr. Test1, SERVICE=FAX,
NUMBER=66133831, ACTIVE=YES
TO: ACTIVE=YES, P=HIGH, NF=NO, ARCHIVE=NO, RESOLUTION=NORM, SCOPY=YES, HLINE=YES,
CCTR=TCLFI, REMMSG=YES, C1=00038E64, C2=0000000F, SERVICE=TCFI, NUMBER=TCFITEST,
ACTIVE=YES
NFINFO: STATUS=NONDEL, MCORR=00000233053, C1=Corr. info1, C2=Corr. info2, C3=Corr.
info3, C4=Corr. info4, C5=Corr. info5
TXT:
NON-Delivery Notification
-----
Message 00000233053 NOT sent to Mr. Test1 66133831, no fax machine detected
Reason: XL
  
```

```
Time of last try: 97-03-17 12:03:00
Subject: Test of TC/LINK-FI
Cost: for TCLFI
-----
```

If the same document would have been delivered correctly, the parameter :ATT: would indicate the file name of the backreception document. Parameter APPLICATION would be set to IMAGE.TCI which means that the attachment (backreception document) is a TCI file.

Note: If a transaction file to KCS cannot be processed due to a syntax error, always a non-delivery notification is built. This notification is addressed to the configured default originator. The erroneous transaction file is attached to this notification (see the “Open Message Format Manual” for an example).

2.3.6 Incoming Fax Sent to TC/LINK-FI (Routed via NN99):

The following example shows an incoming fax for user Aichner, routed automatically (via inactive FAX address in shadow user profile) to TC/LINK-FI.

Two files are created: TCFIxxxX.MSG and a TCFIxxxX.AT TCI attachment.

```
TYPE=NORM, SUBJECT=Received from +43166133899, MCCR=ATF0222
FROM: ACTIVE=YES, SNAME=+43166133899, SERVICE=FAX, NUMBER=+43166133899, ACTIVE=YES
TO: ACTIVE=YES, P=NORM, NF=NO, ARCHIVE=NO, RESOLUTION=NORM, SCOPY=YES, HLINE=YES,
CCTR=0, REMMSG=NO, C1=00039134, C2=0000000E, SERVICE=TCFI, NUMBER=Aichner on TCFI,
ACTIVE=YES
TXT:
:ATT: NAME=d:\filink\testdir\TC2\TCFI000A.AT, APPLICATION=IMAGE000.TCI,
COMMENT=TCLINK Image
```

Received fax in TC/LINK-FI (TCFI001A.MSG)

```
++A4H
++FX1
TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq, TZq
...
```

Received fax in TC/LINK-FI (TCFI001A.AT)

2.4 HPF Format Support (for HP MFPs)

2.4.1 Overview

TC/LINK-FI can be used as message delivery service for all HP MFPs/scanners that support the HPF file interface mode.

Apart from TOM and TC/XML formats, it is possible to poll and process HPF transaction files (proprietary file format created by Hewlett-Packard MFPs) with TC/LINK-FI.

If an HP MFP is configured to use the HPF interface file method to give over the sending information and the scanned image files to the delivering application, TC/LINK-FI translates these HPF message description files to TOM format. The TOM messages are sent by TC/LINK-FI as usually, containing the image files as attachments. Note that this TC/LINK-FI functionality concerns only the MFP => TC direction. Here is an example of how the HPF interface file looks like:

```
##fine
##nodelay
##b9600
##noecm
##description Fax from HP MFP Digital Sending Software
##tif
```

```
##nocover
##ScannerName HP4345.tqa-domain.kofax.com
##UserName HP_SCANNER-HP4345@kofax.com
##Creation
##Retry-limit -1 -1
##Filename mfp_test.tif
##dial 456789
```

Here is the corresponding TOM file created by TC/LINK-FI:

```
SUBJECT=" Fax from HP MFP Digital Sending Software"
FROM: SERVICE=SMTP, NUMBER=HP4345@topcall.com, C4=HP4345@kofax.com C5=HP4345.tqa-
domain.kofax.com
TO: SERVICE=FAX, NUMBER=456789
:ATT: NAME=mfp_test.tif, APPLICATION=dummy.tif
```

The processing works as follows:

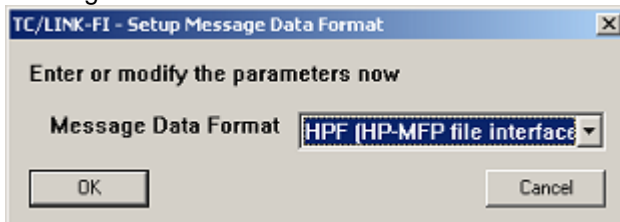
- TC/LINK-FI polls the HP file interface shared folder →
- copies the found messages into its own Tcifi_in folder →
- deletes the original HP message from the MFP folder →
- converts the message to TOM format →
- transfers it to TCOSS

Note that this TC/LINK-FI functionality concerns only the MFP => TC direction. (The “IP Printer” product can be used in the TC => MFP direction.)

2.4.2 TC/LINK-FI Configuration

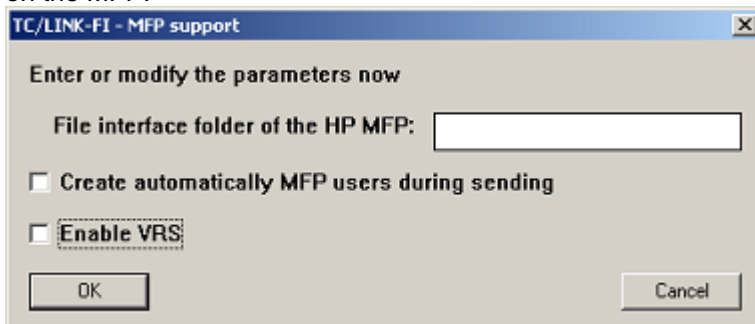
Special configuration at TC/LINK-FI installation:

- 1) On the “Setup Message Data Format” window select the “HPF (HP-MFP file interface)” option in the Message Data Format combobox.



(Corresponding registry setting / value: ...\\TCLINKFI\\Options\\In\\Format = “HP_HPF”)

- 2) On the “MFP support” window set the “File interface folder of the MFP” to the “Common folder” defined on the MFP:



(Corresponding registry setting: ...\\TCLINKFI\\MFP\\CommonFolder)

You can also activate here the automatic MFP shadow user creation. (Corresponding registry setting: ...\\TCLINKFI\\MFP\\ProfileAutoCreate=1.) If this checkbox is selected, then TC/LINK-FI will check during the message transfer whether the MFP shadow user already exists on TCOSS. If it does not exist, it will be created automatically. The TCOSS user-id of this MFP shadow user will be the fully qualified host name of the MFP device. This host name (or corresponding IP address) must be contained in the .HPF file. For more information on this, please refer to the next chapter ("HP MFP Configuration").

Furthermore, you can enable here the VRS (VirtualReScan from Kofax) image processing for better image quality. (Checkbox "Enable VRS".) Learn more about the VRS integration with KCS from the TC/LINK-MFP Manual. Please note that VRS requires a separate license.

3) Make sure that the default services defined on TC/LINK-FI are the following:

...\\TCLINKFI\\Options\\DefaultOriginatorService="SMTP"

This is the originator-service in all messages sent.

...\\TCLINKFI\\Options\\DefaultRecipientService="FAX"

This is the recipient-service in all messages sent.

4) Optionally, use registry setting ...\\TCLINKFI\\MFP\\OriginatorIsMfpHostName=1 to select the following originator addressing mode:

Originator service= "TOPCALL" - or as configured in the Topcall\\TcService registry setting.

Originator number= < fully qualified host name of the MFP >

(See sub-chapter "Message Addressing" below.)

5) With the registry setting ...\\TCLINKFI\\MFP\\MfpUserAttribute you have the explicit possibility to choose an attribute for the automatic creation of the MFP user profile and the originator of the message. For using this attribute as originator, ...\\TCLINKFI\\MFP\\OriginatorIsMfpHostName has to be set to 1.

Example:

...\\TCLINKFI\\MFP\\MfpUserAttribute = "##ScannerHostname"

If this setting is left empty, the attributes "##ScannerName" and "##UserName" are used as described in section "HP MFP Configuration".

Important! Since TC/LINK-FI writes in the common folder of the polled MFPs, the common folder must be readable and writeable. It is also necessary to give sufficient access permission to the user the TC/LINK-FI will be started with.

2.4.3 HP MFP Configuration

First of all, you have to configure the HP MFP to use the HPF file interface mode.
(See: APPENDIX – Configuring the HP MFPs to use the HPF file interface mode.)

Afterwards, make sure that the following special settings are configured on the MFP, because they are preconditions for the delivery:

1) DSS Configuration Utility: set the “Name” field on the “Properties” tab to the host name or IP address of the MFP. This name will then appear in the HPF file in the `##ScannerName` field. The `##ScannerName` field is used by TC/LINK-FI for 2 purposes:

- In the (non-default) `...\TCLINKFI\MFP\OriginatorIsMfpHostName=1` mode the `##ScannerName` will be the originator address when sending a message from MFP.

- The automatic MFP shadow user creation will create the shadow user with this value as KCS user ID. (Activation of this feature: `...\TCLINKFI\MFP\ProfileAutoCreate=1`.) Let's note, that if `##ScannerName` is an IP address or a not fully qualified host name, then it will be translated by TC/LINK-FI to the fully qualified host name before creating the shadow user with this ID.

2) DSS Configuration Utility: set the “Default From Address” field on the “Send to Email” tab to an SMTP address (to be) defined in the MFP shadow user on TCROSS. This setting will then appear in the HPF file in the `##UserName` field. Again, the `##UserName` field is used by TC/LINK-FI for 2 purposes:

- In the default `...\TCLINKFI\MFP\OriginatorIsMfpHostName=0` mode the `##UserName` will be the originator address when sending a message from MFP.

- If the automatic MFP shadow user creation is enabled, then the MFP shadow user will be created with this value as SMTP address.

Important! If you use a different DSS/MFP configuration as described above, and the `##UserName` field in .HPF file contains some other value as the SMTP address of the MFP device (e.g. the login user name), then after the automatic MFP shadow user creation the MFP shadow user will contain an improper SMTP address! In this case this address in the MFP shadow user must be changed or deleted.

2.4.4 Message Addressing

TC/LINK-FI converts the HPF transaction file to TOM format. It fills the originator and recipient address fields in this intermediate TOM message file in the following way:

Originator:

a) Username - default mode of HP (`...\TCLINKFI\MFP\OriginatorIsMfpHostName=0`):

Service= <as configured in registry setting `...\TCLINKFI\Options\DefaultOriginatorService`>
Number= < “Default From Address” field on the “Send to Email” tab configured on MFP with DSS >
(Corresponds to the `##UserName` field in HPF file, without the HP_SCANNER- prefix.)

b) MFP Name (set registry key `...\TCLINKFI\MFP\OriginatorIsMfpHostName=1`):

Service=“TOPCALL” – or as configured in the `Topcall\TcService` registry setting.
Number= <fully qualified host name of the MFP> (Corresponds to the `##ScannerName` field in HPF file.)

Recipient:

Service= <as configured in registry setting `...\TCLINKFI\Options\DefaultRecipientService`>
Number= <user input on MFP console> (Corresponds to the `##dial` field in the HPF file.)

Note, that the addressing described here shows the filling of address fields before the TC/LINK address map file (ARDFI.MAP) transformation. ("Message from mail" section in trace.) Normally, after the ARDFI.MAP-transformation ("Converted message from mail" section in trace) the according originator shadow user (typically: the MFP shadow user) will be found and will be used further as originator.

2.4.5 Other Message Fields:

Subject= < corresponds to the HPF-field *##description*, cannot be configured on TC/LINK-FI side. >

2.5 Xerox XST Format Support (for Xerox MFPs)

2.5.1 Overview

TC/LINK-FI can also be used to transfer scanned messages coming from Xerox MFP, if this MFP is configured to use the Xerox XST file interface.

Processing works as follows:

- TC/LINK-FI polls the Xerox file interface shared folder →
- copies the found messages into its own Tclfi_in folder →
- deletes the original Xerox message from the MFP folder →
- converts the message to TOM format →
- transfers it to TCOSS

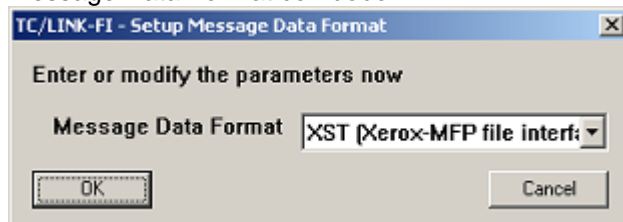
Note that this TC/LINK-FI functionality concerns only the MFP =>TC direction. ("IP Printer" product can be used in the TC => MFP direction.)

2.5.2 TC/LINK-FI Configuration

Configuration is very similar to the HP MFP support.

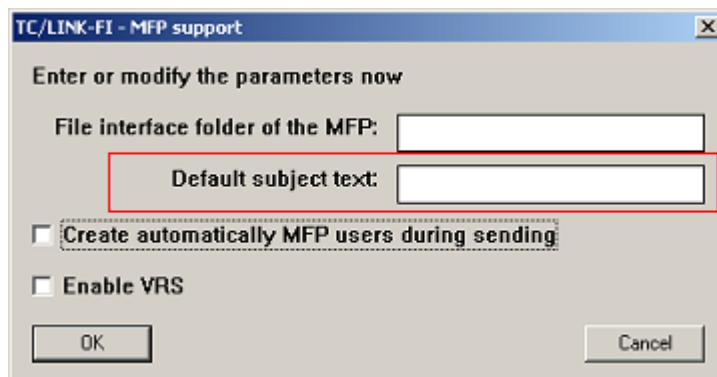
Differences:

1) On the "Setup Message Data Format" window select the "XST (Xerox-MFP file interface)" option in the Message Data Format combobox.



(Corresponding registry setting / value: ...TCLINKFI\Options\In\Format = "XEROX_XST")

2) Subject text of the sent message is always the text you entered in the "Default subject text" field.



3) Optionally, use registry setting ...\\TCLINKFI\\MFP\\OriginatorIsMfpHostName=0 to select the following originator addressing mode:
 Originator service= "TOPCALL" - or as configured in the Topcall\\TcService registry setting.
 Originator number= <Logged in User on Xerox Mfp> according to the NetworkUsername, section [service xrx_svc_general] in the xst file.
 (See sub-chapter "Message Addressing" below.)

Important! Since TC/LINK-FI writes in the common folder of the polled MFPs, the common folder must be readable and writeable. It is also necessary to give sufficient access permission to the user the TC/LINK-FI will be started with.

2.5.3 Xerox MFP Configuration

1. The Xerox MFP must be configured to use the XST file interface send method.
2. If some of the Xerox MFPs served by TC/LINK-FI uses "metadata-block" in the Xerox interface file to take over the fax number, eg:

```
[description xrx_dscript_metadata]
....
2{
    string MetaDataPrompt = "Bitte die Faxnummer eingeben";
    string MetaDataFieldName = "faxnr";
    string MetaDataType = "string";
    string MetaDataValue = "004318635321";
}
```

then an additional configuration is necessary on TC/LINK-FI:
 The according MetaDataFieldName has to be defined in the registry setting

...\\TCLINKFI\\MFP\\XeroxMetaDataFieldName_Recipient (type: REG_SZ, default: 'faxnr').

For the example above, this registry setting must contain: *faxnr*
 It is possible to define more than one MetaDataFieldNames in this registry setting separated with commas, eg.: *faxnr,faxnumber,fax*.

3. If the ProfileAutoCreate feature is intended to use, then the confirmation report printig must be set on the MFP. Reason: TC/LINK-FI uses the 'OutputURL' field in the Xerox interface file to get the fully qualified domain name of the MFP. TC/LINK-FI needs this name, because this will be the UserID of the KCS shadow user (=MFP profile) created automatically on the TCOSS. If the confirmation report printig is not set, then the 'OutputURL' field will be missing in the interface file, and so the ProfileAutoCreate will fail.

2.5.4 Message Addressing

TC/LINK-FI converts the HPF transaction file to TOM format. It fills the originator and recipient address fields in this intermediate TOM message file in the following way:

Originator:

- a) MFP Name - default mode for Xerox (...\\TCLINKFI\\MFP\\OriginatorIsMfpHostName=1):

For MFPs, that are configured to send the fully qualified host name of the MFP in the XST interface file: (This is the case, when the confirmation report printig is configured on the MFP, see also previous section.)

Service="TOPCALL" – or as configured in the Topcall\\TcService registry setting.
 Number= < fully qualified host name of the MFP>

For MFPs, that *does not* send the fully qualified host name of the MFP in the XST interface file:

Service= < as configured in registry setting ...\\TCLINKFI\\Options\\DefaultOriginatorService >
 Number= < as configured in registry setting ...\\TCLINKFI\\Options\\DefaultOriginatorNumber >

b) Username (set registry key ...\\TCLINKFI\\MFP\\OriginatorIsMfpHostName=0):
 Originator service= "TOPCALL" - or as configured in the Topcall\\TcService registry setting.
 Originator number= <Logged in User on Xerox Mfp>
 (According to the NetworkUsername, section [service xrx_svc_general] in the xst file)

Recipient:

Service= < configured in registry setting ...\\TCLINKFI\\Options\\DefaultRecipientService >
 Number= < user input on MFP consol >

Note: At send time, only the recipient number can be changed (by the MFP user). Additionally the originator number may depend on the logged in user. All other address parts are constant – permanently configured either on MFP or on TC/LINK-FI.

2.5.5 Other Message Fields:

Subject= < configured in registry setting ...\\TCLINKFI\\MFP\\DefaultSubject >

2.6 Unicode Support

Since KCS 9.2 TC/LINK-FI supports TOM Unicode transaction files. By default, incoming transaction files are recognized as Unicode by the byte order mark (BOM) of the text file. Outgoing transaction files are by default written in PC code page as before, but can be configured to be written in UTF-8 or UTF-16.

TC/XML transaction files are handled by default as UTF-8 files as before.

See Unicode Installation Guide for general information about Unicode.

HP and XEROX installation variants do not support Unicode.

2.6.1 General Unicode Configuration

General KCS Unicode support is by default enabled. For compatibility with Exit-DLLs it can be disabled during setup by unchecking "Unicode supported".

You can disable Unicode support already before starting setup by changing the file defaults.ini:

```
[TCLINKFI]
Setup\\ModuleSupportsUnicode=1
```

In the [TCLINKFI] section, set ModuleSupportsUnicode=0.

After installation, you can configure Unicode support via Registry:

HKEY_LOCAL_MACHINE\\SOFTWARE\\TOPCALL\\TCLINKFI\\General

| Registry Value | Type | Default | Description |
|------------------|-------|---------|---|
| UnicodeSupported | DWORD | 1 | Enable general TC/LINK support of KCS Unicode |

2.6.2 TOM Configuration for Outgoing Transaction Files

The following registry configuration defines the coding of outgoing TOM transaction files.

HKEY_LOCAL_MACHINE\\SOFTWARE\\TOPCALL\\TCLINKFI\\Options\\Out

| Registry Value | Type | Default | Description |
|----------------|--------|--------------|--|
| TomCodePage | STRING | "PCCodePage" | Coding of outgoing TOM transaction files. Possible |

| | | | |
|--|--|--|---|
| | | | values are: PCCodePage Windows code page as defined by registry key General\PCCodePage Utf8Bom UTF-8 with byte order mark Utf16LeBom UTF-16 Little Endian with byte order mark |
|--|--|--|---|

In order to support Unicode you have to change the setting of this key. The application reading the TOM transaction file has of course also to support Unicode. Depending on this processing you might want to choose the TomCodePage setting.

On TC/LINK-FI side the most efficient setting is "Utf16LeBom", as this is how messages are processed internally.

3. INSTALLATION

3.1 Prerequisites

- Please see the TC/LINK Manual for all common TC/LINK requirements, like operating system!
- A Link user (default: "TCLINK") must be present on KCS. This user is automatically present with new TCOSS installations of KCS 7.22 or higher; it needs to be created manually for older releases.
- TC/LINK-FI needs full access rights in its API directories. This is automatically checked at startup of TC/LINK-FI, and reported to the Windows event log if missing.
- If the "Generate Dependencies" switches are enabled, all other dependencies will be created automatically at startup of TC/LINK-FI (like queue users and default services on KCS, API directories, and some more).
- In order to use TC/LINK-FI with TC/XML on a Windows computer, you have to install Internet Explorer 5.5 or higher.

3.2 Licenses

MFP integration is charged per MFP device (both for SMTP-based and file-based integration). Since version KCS 8.2, TC/LINK-FI actually checks the number of MFP devices. When upgrading from older releases, make sure that you have the appropriate number of new licenses in place (License per MFP device ... – File based integration).

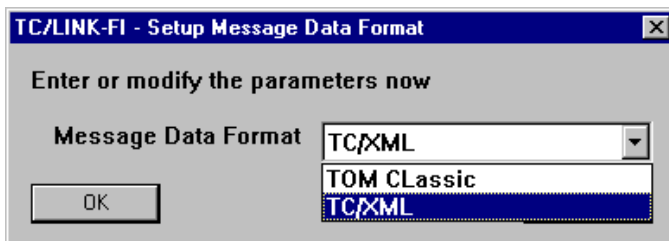
A different, per workstation license, is used for TC/LINK-FI use cases that do not involve MFP devices.

Please refer to *TCLINK Manual*, chapter *Licenses* for more information.

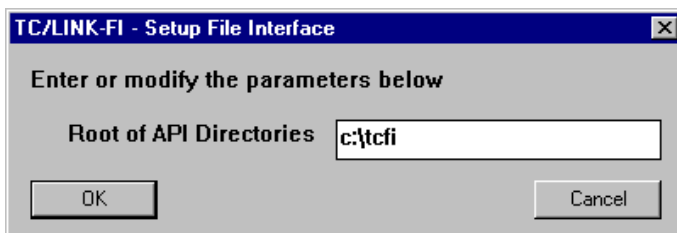
3.3 Easy Installation

Since release 1.09, TC/LINK-FI supports a special "Easy Installation" setup mode. This helps to get TC/LINK-FI up and running within a very short time, while fine-tuning is possible by running "Advanced Installation" later.

Please see the TC/LINK Manual for a description of all common TC/LINK parameters. TC/LINK-FI shows only the following setup screens in "Easy Installation" mode:



This window lets you choose between the classic TOM and the new TC/XML format.



The set of API directories will be created at start-up of TC/LINK-FI.

Example:

For the root “c:\tcfi”, the following directories will be created:

- The root directory itself (“c:\tcfi”)
- C:\tcfi\TC_TO_FI ... for messages from KCS
- C:\tcfi\FI_TO_TC ... for messages/notifications to KCS
- C:\tcfi\Notif ... for notifications from KCS
- C:\tcfi\Dirsync ... for DirSync messages to KCS

3.4 Advanced Installation

Again: See the TC/LINK Manual for all general setup screens.

TC/LINK-FI has the following special setup screens:

3.4.1 Setup File Interface

TC/LINK-FI - Setup File Interface

Enter or modify the parameters now

Dirsync Directory: E:\TCLFI\DIRSYNC

To TOPCALL Directory: E:\TCLFI\FI_TO_TC

From TOPCALL Directory: E:\TCLFI\TC_TO_FI

Notification Directory: E:\TCLFI\NOTIF

Multiple Links on same Directories: YES

Kind of address mapping: Normal

Use ANSI character set: NO

Maximum number of active recipients: 1

Use enhanced TCFI syntax: None

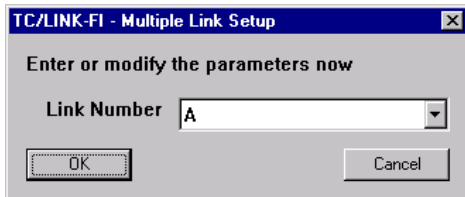
OK Cancel

- Please enter the full path of the TC/LINK-FI transfer directories in this screen. An empty “DirSync Directory” setup disables DirSync functionality. UNC names (like “\\PCAI\TCFI\DIRSYNC”) are allowed.
- If you want to run **multiple TC/LINK-FIs** on the same set of directories, enter YES in the corresponding field.
- **Kind of address mapping:** If you do not maintain shadow users on KCS, switch to “No shadow users”. This setting is also important for obtaining default values: With Setting “Normal”, the template, full name etc. will be taken from the shadow user!
- **Use ANSI character set:** If you want to use ANSI character set (codepage 1250 or 1252) in your transaction files, select “YES”.
- **Maximum number of active recipients:** Select how many active recipients you want to have per message from KCS to TC/LINK-FI. Make sure that the connected application can correctly handle them if you select more than one.
- **Use enhanced TCFI syntax:** If you want some additional fields to be written in transaction files from KCS to TC/LINK-FI, select “LEVEL 1”, “LEVEL 2” or “LEVELS 1 + 2”. Make sure that the connected application can correctly handle them! Especially, two TC/LINK-FI can only exchange messages if that parameter is set to NONE.
See TOM Manual for a description of these levels.

Note: Windows NT does not reconnect mapped drive if no user is logged on. Therefore, when running TC/LINK-FI as a service without desktop, make sure to use either local API directories, or give UNC names!

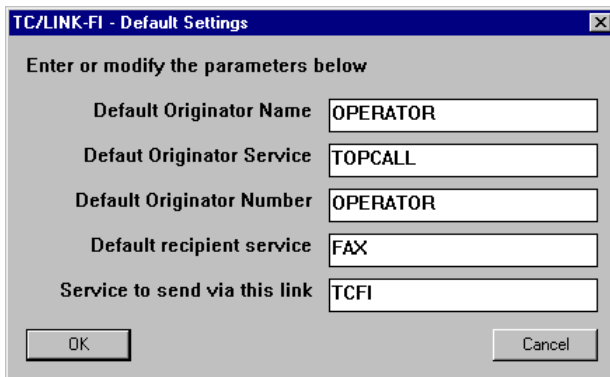
3.4.2 Multiple Link Setup

If you run more than one TC/LINK-FI on the same set of directories, the following screen is displayed:



Link Number: Select an individual Link character for every TC/LINK-FI using the same set of directories. (Possible values: A..T for maximum 20 Links)

3.4.3 Default Settings



All values entered here are taken if the corresponding fields in the message are not set.

Example for the screen above:

- If a message TO KCS is only addressed "TO: N=1234", then the default recipient service FAX will be used.
- A message TO KCS has no "FROM: " field: The default "FROM: SN=OPERATOR, SE=TOPCALL, N=OPERATOR" will be used as originator address.

The configured "**Service to send via this link**" is created automatically on KCS. So, in the example above, you can address to "TCFI,number" on TCfW to send to TC/LINK-FI.

3.5 Special Configuration Hints

3.5.1 Adding Alternative Address for All Messages to TC/LINK-FI

You can configure an OPERATOR as alternate recipient address for all messages sent to the link queue(s). This is done by inserting a line into the **ROUTE section of rr99:

```
**ROUTE  
TCLFIQ~, TCLFIQ~\OPERATOR:
```

(Where TCLFIQ is the link queue and OPERATOR is the TC operator UserId)

3.5.2 Connecting Two KCS Servers via TC/LINK-FI

You can connect two KCS servers using a TC/LINK-FI for every server. To accomplish that, you need to install crossed API directories: The FI_TO_TC directory is the TC_TO_FI directory on the other link, and vice versa. DirSync directory setup must be empty (DirSync disabled), and the NOTIF directory must be the same as the TC_TO_FI directory.

Restrictions:

- As only one TC/LINK-FI is a writer in any directory, the “RenameTCFIFiles” feature must be disabled on both TC/LINK-FIs!
- The enhanced interface level has to be disabled, as the receiving TC/LINK-FI does not recognize the additional parameters. (Registry key ...\\TCLINKFI\\Options\\InterfaceLevel=0)

3.5.3 Addressing Without Shadow User Search

If you disable the “Search for shadow user” switch on TC/LINK-FI (Registry “...\\options\\UseShadowUser” = “no”), then the following major changes occur in the TC/LINK-FI operation:

- Message throughput is increased (TC/LINK-FI does not need to search the user store/address book).
- No originator-dependent templates and cover sheets will be inserted.
- All addressing parameters from the transaction file to KCS are inserted “as they are”; empty fields are never filled from a shadow user.
- Addressing parameters are never overwritten (in “Normal” addressing, Fullname and some more parameters will be taken from the shadow user, overriding the transaction file values!).
- Addressing to KCS address book is disabled.

In general:

If you do not maintain shadow users on KCS, you should use this mode for optimized performance, and to avoid interference with any KCS users.

Note that both address-mapping modes are performed by a single MAP file (no longer two as in previous releases)!

3.5.4 Enhanced Originator Mapping

With TCOSS 7.22 or higher, all inactive addresses from KCS user profiles are used to find a matching shadow user.

Example:

A KCS user “AI” has an inactive address “TCFI,AichnerOnTCFI”.

If a message is sent from TCFI to KCS, and the originator is either “TOPCALL,AI” or “TCFI,AichnerOnTCFI”, then the KCS user “AI” will be inserted as the originator in both cases!

Note:

- This functionality is disabled by disabling the shadow user search (Registry “...\\Options\\UseShadowUser” = “no”)!
- A direct match to the user id has higher preference than an inactive alias (e.g. if the user “AI” has an inactive TOPCALL address “postmaster”, but the postmaster itself exists, then the user “postmaster” will be inserted as the originator).

3.5.5 Using ++TXT Sequences in Messages To KCS

If you send a message to a Fax recipient via TC/LINK-FI, you can use the fax-channel specific directives in the text message.

Example:

```
SUBJECT="Testmessage using ++Sequences", NF=ALL
```

```
FROM: SE=TCFI, N=TestuserOnTcfi
TO: SE=FAX,N=66133899
TXT:
++A4Q
++TXT 1
Text in Large-font (TXT 1) and Landscape (A4Q) format.
Test end.
```

Note:

- This syntax only works when sending to fax. If you send the same message e.g. to SMTP via TC/LINK-SM, the recipient will get simple plain text.
- For details on all allowed ++ sequences, refer to the TCLINK manual.

3.5.6 Changing the Transaction File Extension From KCS

By default, all transaction files created by TC/LINK-FI (in the TC_TO_FI and NOTIF directory) have the extension “.MSG”. As the TC/GATE-FI used to write “.tmp” extensions, it happened that problems arise when upgrading from old TC/GATE to the new TC/LINK architecture.

Therefore, you can now configure the extension to be used via the registry key
“...\Options\TO_FI_Extension”

Note:

- The registry key is created at first TC/LINK-FI startup. To change the configuration, use the NT registry editor.
- The configured extension must always have three characters to match TC/LINK-FI file handling specifications. If a different length is specified, the default “.MSG” is used.
- The configured extension is applied to all transaction files from KCS to TCFI (messages, notifications from KCS, and also immediate notifications, e.g., due to syntax errors).
- Attachment naming is unchanged as all attachments are explicitly referenced in the correlating transaction files.

4. OPERATING

4.1 Viewing and Changing Link Setup

General TC/LINK-FI parameters can be configured via the KCS Setup Program, or via the registry editor.

4.1.1 Special Registry Keys for TC/LINK-FI

The following TC/LINK-FI specific configuration parameters are stored in the Registry:

HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCLINKFI\Options

| Registry Value | Type | Default | Description |
|-------------------------|-------------------|---------|--|
| DeleteRetries | DWORD | 10 | Gives the number of retries TC/LINK-FI shall perform in case of file remove problems. |
| FilesBlackList | Multistring | "" | Stores any file names that cannot be accessed / removed successfully. INTERNAL USE ONLY! DO NOT CHANGE! |
| FileGenExitDll | STRING | "" | Name of the Exit-Module to generate filenames for messages from KCS to FI. For details see section "File-Name Handling Exit". |
| LinkNum | DWORD (1...26) | 1 | This number must be unique for all links working on one directory. It is used for the 8th character of the created filenames: For the first link it should be 1 (translated to 'A'), for the second, it should be 2 (-> 'B'), ... |
| MaxFilesAtInterface | DWORD | 0 | Gives the number of files that are allowed to be in the TC_TO_FI and NOTIF directory. If the number is exceeded, TC/LINK-FI waits until the number drops below the specified limit. |
| NonDelEventLog | DWORD | 0 | When set to 1 for each immediate non-delivery notification an event log entry is created. Immediate non-delivery notifications are created by TC/LINK before a message comes to TCROSS; they are not counted by TC/Monitor. |
| RenameTCFIFiles | DWORD (0 / 1) | 1 | 1: rename all messages to KCS to a unique filename; necessary when more than one link is running. Note: When this value is selected, transaction files with file name TCFIxxxxx.xxx must not be used. 0: do not rename: only allowed, when there is only one link currently running. It increases the performance slightly. |
| Tclfi_dirsync | STRING | "" | full path of the DIRSYNC-Directory. If this is empty, then Dirsync is disabled. |
| Tclfi_in | STRING | "" | full path of the TO KCS-Directory |
| Tclfi_notif | STRING | "" | full path of the NOTIF-Directory |
| Tclfi_out | STRING | "" | full path of the FROM KCS-Directory |
| TO_FI_Extension | STRING | "MSG" | Desired transaction file extension in TC_TO_FI and NOTIF directory. Must be 3 characters long! |
| UseShadowUser | STRING | "yes" | Indicates whether TC/LINK-FI shall search for shadow users or not. ("no" or "yes") |
| Out\AttachmentExtension | STRING | "at" | File-extension of attachments for outgoing messages. If the value is an empty string, the original file extension of the attachment is used. |

| | | | |
|------------------------|--------|---------------|--|
| | | | According to TC/LINK-FI rules this has to be a 2-character extension. However this depends on the receiving application. |
| Out\TomCodePage | STRING | "PCCodePage" | Coding of outgoing TOM transaction files. Possible values are: PCCodePage Windows code page as defined by registry key General\PCCodePage Utf8Bom –UTF-8 with byte order mark Utf16LeBom –UTF-16 Little Endian with byte order mark |
| In\AttachmentExtension | STRING | "tif,pdf,jpg" | List of file extensions (without '.'), comma separated. Used for FI->KCS message transfer. It defines, that files in the FI_TO_TC folder with these extensions should not be picked up by the poller as transaction files. This setting was introduced for MFPconnect message formats (HP_HPF, XEROX_XST), where image attachments with 3 character extensions are used, and so, they would be considered by the poller as transaction files. |
| In\ReadOnlyFlagRemove | DWORD | 1 | The default value 1 will also delete read-only files. If read-only files should not be deleted, you have to set this key to 0 - in this case the file is not deleted and remembered in a files black-list. |

4.1.2 Special Registry Keys for XML Format

The following registry keys are used to configure the TC/LINK-FI format. The "In" parameters are for inbound messages (Mail to KCS); the "Out" parameters are for outbound messages (KCS to Mail).

HKEY_LOCAL_MACHINE\Software\TOPCALL\TCLINKFI\Options\

| Registry Key | Type | Default Value | Description |
|------------------|--------|-------------------------------|--|
| In\Format | STRING | "TOM" | The format used for incoming messages (Mail to KCS); either "TOM", "XML", "HP_HPF", "XEROX_XST" or "NON" for transparent mode. |
| Out\Format | STRING | "TOM" | The format used for outgoing messages (KCS to Mail); either "TOM", "XML" or "NON" for transparent mode. |
| In\XMLTransform | STRING | "C:\TCOSS\TCLP\TCXMLIn.xlst" | Name and path of the transformation style sheet for incoming messages. Two values (style sheets) are possible, separated by ";" (see also 4.1.4). The result of this transformation has to be TCXL. If empty, the transformation is skipped. |
| Out\XMLTransform | STRING | "C:\TCOSS\TCLP\TCXMLOut.xlst" | Name and path of the transformation style sheet for outgoing messages. Two values (style sheets) are possible, separated by ";" (see also 4.1.4). The input of this transformation is TCXL. If empty, the transformation is skipped. |
| Out\XMLEncoding | STRING | "UTF-8" | Outbound XML encoding (only used when there is no Style Sheet conversion, else the style sheet defines the encoding). Valid and tested values: "UTF-8", "UTF-16", "ISO-8859-1". |
| Out\Attachments | STRING | "linked" | Defines if attachments of outgoing messages are only referenced (similar to the classic TOM format) or inside the XML message; either "linked" or "embedded". |

The "In\Format" and "Out\Format" keys define if the classic TOM format is used or the new TC/XML format. Accordingly, the other keys are ignored if the classic TOM format is configured.

Note:

- TC/LINK-FI must be stopped and restarted before the changes become effective.
- For common Registry entries, refer to the TC/Link Manual.
- For any message default settings, refer to the Open Message Format Manual.

4.1.3 Special Registry Keys for MFP Support

The following registry keys are used to configure TC/LINK-FM (the MFP formats HP_HP and XEROX_XST defined by registry ...Options\In\Format).

HKEY_LOCAL_MACHINE\Software\TOPCALL\TCLINKFI\MFP\

| Registry Key | Type | Default Value | Description |
|-------------------------|--------|-----------------|---|
| AttachmentComment | STRING | "" | Attachment comment (SJ compatibility) |
| CommonFolder | STRING | "" | File interface folder of the MFP – this folder has to be readable and writeable by the user TC/LINK-FM is started with. |
| DefaultRecipient | STRING | "SCAN,+ENVELOP" | Default recipient (SJ compatibility) |
| DefaultSubject | STRING | "" | Subject text of the sent message (for XEROX_XST) |
| MfpUserAttribute | STRING | "" | Name of the MFP attribute for the automatic creation of the MFP user profile and the originator of the message (only if OriginatorIsMfpHostName = 1). Example: "##ScannerHostname" |
| Operator | STRING | "" | Operator definition, the recipient of failure reports; for using this feature, Options\Tclfi_notif has to be set to the same folder as Options\Tclfi_in. (SJ compatibility) |
| OriginatorIsMfpHostName | DWORD | 0 | If set to 1, the originator is the service as configured in the Topcall\TcService registry setting, and the originator number is the fully qualified host name of the MFP. |
| ProfileAutoCreate | STRING | 0 | If set to "1", then TC/LINK-FM will check during the message transfer whether the MFP shadow user already exists on TCOSS. If it does not exist, it will be created automatically. The TCOSS user-id of this MFP shadow user will be the fully qualified host name of the MFP device. |
| SJCompatibleAddressing | STRING | "" | Set to "1" for SJ compatibility |

4.1.4 Double XSL Conversion Support

Two XML conversion steps are possible. That makes it easier to create customized conversion style sheets, as the conversion can be done from and to the easier TC/XML format rather than the more complicated TCXL format.

The transformation is done from left to right, that means that first the left style sheet is used, then the right one. See the following examples:

In\XMLTransform: "c:\tcoss\tclp\xmltools\CustomIn.xslt;c:\tcoss\tclp\TCXMLIn.xslt"

"CustomIn.xslt" transforms from the custom format to TC/XML, afterwards "TCXMLIn.xslt" transforms from TC/XML to TCXL.

Out\XMLTransform: "c:\tcoss\tclp\TCXMLOut.xslt;c:\tcoss\tclp\xmltools\CustomOut.xslt"

“TCXMLOut.xslt” transforms from TCXL to TC/XML, afterwards “CustomOut.xslt” transforms from TC/XML to the custom format.

4.1.5 Supported Code Pages

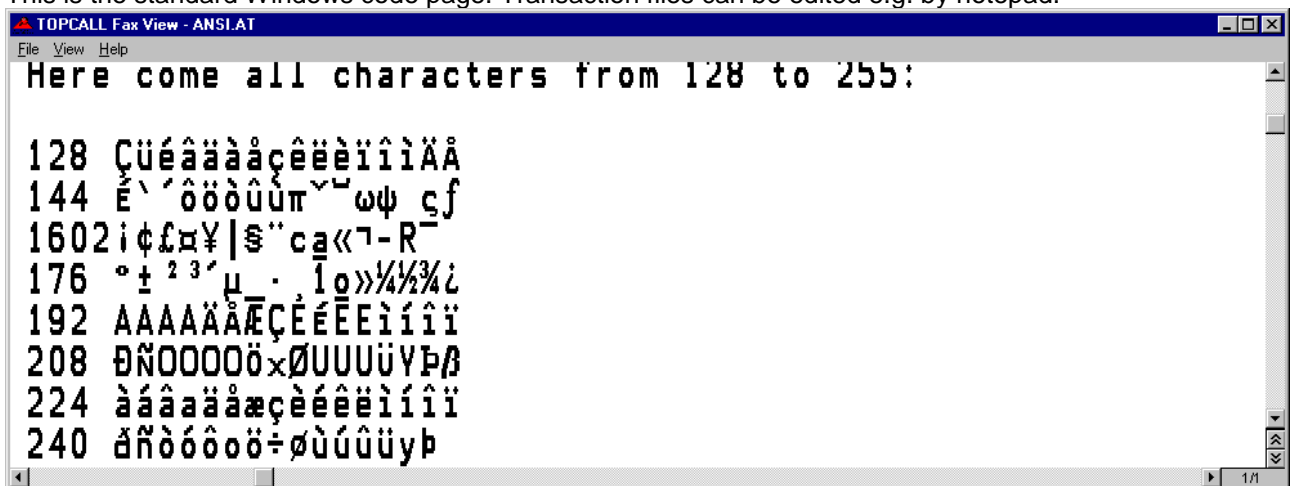
TC/Link-FI supports two basic code pages at the file interface: ANSI and DOS code page. Both of them do not match perfectly to any TCROSS code page; therefore, similar ones replace non-matching characters.

If you encounter any problems with the built-in code pages, you can configure your own conversion tables. See the TCLINK manual for details.

All examples below are produced using the built-in default code page conversion, and TCOSS code page 0.

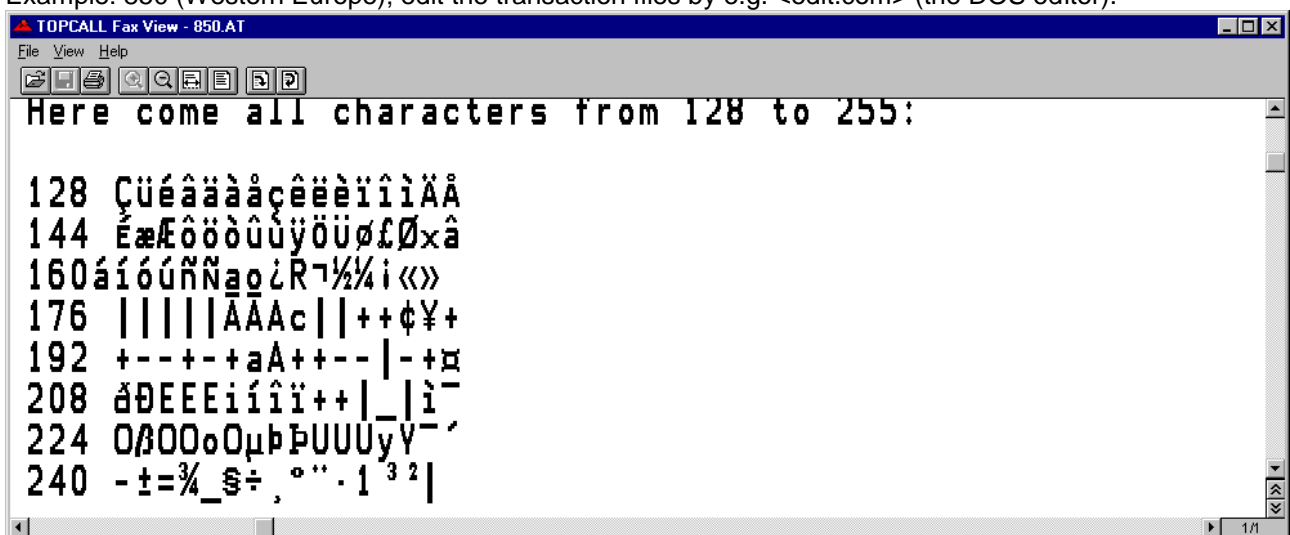
4.1.5.1 ANSI Code Page (1252)

This is the standard Windows code page. Transaction files can be edited e.g. by notepad.



4.1.5.2 DOS Code pages (437, 850, 852, 932 According to the Windows Setup)

Example: 850 (Western Europe); edit the transaction files by e.g. <edit.com> (the DOS editor).



4.2 Troubleshooting

4.2.1 Windows Event Log

If TC/LINK-FI finds any fatal errors during operations, it will report them to the Windows event log. These events can also be used by TC/SNMP to generate traps via SNMP.

4.2.2 Trace File Output

If you encounter any problems in operation, best thing you can do is making a proper trace of TC/LINK-FI operation.

For this purpose, there are three different switches / values:

- The trace level (Registry "General\Tracelevel") can be set to a value from 0 (... no trace output) up to 255 (hex 0xFF ... full trace). For debugging purposes, the maximum value is usually the best.
- Mail Level trace (Registry "General\MailDebug") additionally traces the "raw" message objects at the TC/LINK-FI side (before address mapping, document conversion etc. when sending to KCS).
- TCSI Level trace (Registry "TOPCALL\TCSIDebug") additionally traces all message objects that are posted to / received from the KCS server.

The resulting trace files can be found in the location "C:\TCOSS\TRACE\TCLINKFIx.trc". Any text editor, e.g. notepad, can view it. Searching for the keyword "ERROR" will usually give an indication about what is wrong.

Example:

```
...
14:32:10.349 (9e/a8) TCLFI.DLL: Starting TCLFI.DLL Version 1.07.02 at 07/30/97
14:32:10
14:32:10.349 (9e/a8) TCLFI.DLL:
*****
14:32:10.349 (9e/a8) TCLFI.DLL:   trace_begin:: Setting trace level 255
14:32:10.359 (9e/a8) TCLFI.DLL:   count_files: ERROR: invalid path: d:\API\2TC2\
14:32:10.359 (9e/a8) TCLFI.DLL:   check_API_dirs ERROR: FI_TO_TC directory not
accessible! d:\API\2TC2\
...
```

This indicates that something is wrong with the FI_TO_TC directory.

Note: Do not forget to switch off trace level as soon as you fixed the problem. Otherwise, the system performance will be very poor.

4.2.3 Message Conversion Problems

Mail to KCS

If the mail message cannot be converted to KCS format or if an unrecoverable error occurs during message conversion, TC/LINK-FI will return a non-delivery report to the originator containing the original message as attachment.

KCS to Mail

If an error occurs while a message is being converted, the message is negatively terminated on KCS.

4.2.4 Character Set Problems

If you encounter any scrambled characters, check the following:

- Does the TCOSS code page match the TC/LINK-FI setup?
- Does the desired interface code page match the TC/LINK-FI setup?
- Is your workstation's OEM char set configured correctly?
(HKLM\System\CurrentControlSet\Control\NLS\Codepage\OEMCP must match the TC/LINK-FI PC code page setup)

- Make sure that your DOS editor has the right font configured (HKLM\Software\Microsoft\WindowsNT\CurrentVersion\GRE_Initialize\OEMFONT.FON)
- Do the scrambled characters have a representation in the configured TCOSS / PC code page? (There are e.g. some characters that are available in PC code page 850, that do not have an exact representation on TCOSS, and vice versa). Try configuring a different code page (e.g. ANSI at the File Interface gives a better match to TCOSS CP 0 than PC 850 does).
- Finally: You can configure your own conversion tables for use with TC/LINK-FI; look for details in the TCLINK manual!

4.2.5 Message Delivery Problems

Mail to KCS

If TC/LINK-FI cannot deliver a message to KCS, it will return a non-delivery report to the mail originator. If configured to return notification texts, the report includes a standard error text followed by error messages if available.

KCS to Mail

If TC/LINK-FI encounters a problem when sending a message to any mail type, it will immediately cancel the message and post a retry request to TCOSS. TCOSS decrements the retry counter of the message on KCS, and the last MDA-Note is filled with an error description. The retry interval depends on the retry counter.

In addition, if TC/LINK-FI terminates a mail entry negatively, and if there is an alternate recipient address in the original message (put there by the originating channel), TCOSS sends the message to this alternate address (e.g. a KCS Operator).

4.2.6 Problems with Windows Gateway Service for NetWare

It might happen that during copying of files from a Windows workstation via a Windows server running Gateway Services for NetWare to a Novell server (volume), the copy request (in both directions) aborts with 'timeout occurred'.

The event viewer of the Windows server shows:

```
Event Id 8007: The Microsoft client service for Netware redirector has timed out a request to <NetWare_server_name>
```

Workaround from Microsoft:

```
Unable to Open or Copy Files from a NetWare Server
ID: Q134385      CREATED: 07-AUG-1995   MODIFIED: 25-MAR-1997
```

```
-----
The information in this article applies to:
```

- Microsoft Windows NT Workstation version 3.5 with Service Pack 2
- Microsoft Windows NT Server version 3.5 with Service Pack 2
- Microsoft Windows NT Workstation versions 3.51 and 4.0
- Microsoft Windows NT Server versions 3.51 and 4.0

```
-----
SYMPTOMS
=====
```

```
On your computer running Windows NT, you can view files on a Novell
NetWare server from File Manager, but you cannot open these files or copy them
to a local drive.
```

```
The Event Viewer shows the following error:
```

```
Event Id 8007: The Microsoft client service for Netware redirector has
```

timed out a request to <NetWare_server_name>.

These symptoms occur when you use Windows NT on an Ethernet network segment with Client Services for NetWare (CSNW) or Gateway Services for NetWare (GSNW) installed, and attach to a Novell NetWare server connected to an FDDI ring.

WORKAROUND =====

To work around this problem:

- Decrease the packet size from 4202 to 1514 on the NetWare server.
NOTE: This solution negatively impacts the performance of the NetWare server on the FDDI ring.

-or-

- Set DefaultMaxPacketSize to 1012. To do this:
WARNING: Using Registry Editor incorrectly can cause serious, system-wide problems that may require you to reinstall Windows NT to correct them. Microsoft cannot guarantee that any problems resulting from the use of Registry Editor can be solved. Use this tool at your own risk.

1. Run Registry Editor (REGEDT32.EXE).
2. From the HKEY_LOCAL_MACHINE subtree, go to the following key:

`\SYSTEM\CURRENTCONTROLSET\SERVICES\NWRDR\PARAMETERS`

3. Add the following value:

`DefaultMaxPacketSize:REG_DWORD: 1012 (decimal)`

4.2.7 Problems Connecting to Network Shares

When using Hummingbird 10 on a Windows 2003 computer to connect to NFS shares, you can only access these directories when they are mapped for that user. In any other case you get the error "The system cannot find the specific file".

Therefore, the following method is recommended to connect TC/LINK-FI to such shares:

Create a batch file consisting of the following lines:

```
net use h: \\10.18.146.120\TCFI-NFS /user:nobody
C:\TCOSS\TCLP\TCLINK.EXE "TCLINKFI"
```

The first line maps the network share using anonymous access. You have to adapt it to your needs. The second line starts TC/LINK-FI.

Change the following registry key:

`HKLM\Software\Topcall\TCLINKFI\CommandLine="C:\TCOSS\TCLP\FIStart.bat"`

Where "FIStart.bat" is the batch file you created.

Thus the mapping is made for the same user that starts the link (and will also work when starting the link with the system account).

4.3 XML Specific

4.3.1 Code Page Conversion

The TCOSS code page (0 or 1) can be configured during setup or in the registry. The PC code page is not used with the XML format; instead XML-specific encoding is used.

Incoming XML messages define for themselves the used encoding. The encoding of an outgoing XML message is defined either by the transformation style sheet, or if no transformation is used by the "...\\Options\\Out\\XMLEncoding" registry parameter.

4.3.2 Default Values

For incoming messages (Mail to KCS) default values are set like for the TOM format. The following TCSI parameters are set if they are missing:

SET_HEADER Object:

| Object | Default | Description |
|-------------------------|---------------------|---|
| INT_TERMINATION | NOTIF_NEG | Flags if notifications for non-delivery and delivery have to be returned, the default is for non-delivery only |
| SET_ENTRY_RS_ORIGINATOR | Taken from registry | Originator of the message; default is taken from the registry (...\\TCLINKFI\\Options\\DefaultOriginatorService and ...\\DefaultOriginatorNumber) |

L_RECIPIENT Object:

| Object | Default | Description |
|--------------|---------|--|
| INT_ACTIVE | YES | The recipients have to be set to active |
| INT_DEL_TYPE | TO_ | Delivery Type: To, Cc, Bcc, or Authorize |

4.3.3 Template Parameter in TC/XML

TC/XML supports the Template-Parameter as in the classic TOM format. The name of the tag is <TEMPLATE> and it is a top-level object of the <MESSAGE>. See the following example:

```
<?xml version="1.0" encoding="UTF-8"?>
<MESSAGE xmlns="http://www.topcall.com/XMLSchema/2002/tc/xml">
  <TEMPLATE>FIS\\USERTEMP</TEMPLATE>
  <SUBJECT>simple example</SUBJECT>
  <FROM>
    <SERVICE>TCFI</SERVICE>
    <NUMBER>myself</NUMBER>
  </FROM>
  <TO>
    <SERVICE>TCFI</SERVICE>
    <NUMBER>+43676123456</NUMBER>
    <NF>ALL</NF>
  </TO>
  <TXT>
    this is a test message from TC/link-XML
  </TXT>
</MESSAGE>
```

4.3.3.1 Background

The updated version of the style-sheet TCXMLIn.xslt transforms this XML object to the top-level object <ts_tos_folder> of the TCXL format. This is transformed to the TCSI object. TC/LINK-FI/MQ

parse for the TS_TOS_FOLDER object, read it, delete it and hand it over to the general TC/LINK, which includes the template to the message.

4.3.4 XML Tools

Two tools are copied by setup to the C:\TCOSS\TCLP\xmltools directory. None of these tools is officially supported by Kofax but may help to troubleshoot.

MSXLS.exe is a standard Microsoft tool that performs XSLT transformation. The input parameters are a XML file and a XSLT style sheet that defines the transformation. This tool can be used for testing a customized XSLT transformation style sheet or to transform between TC/XML and TCXL.

XML2tc.exe is a Kofax internal tool that transforms between TCXL and the TC/Link TCSI format you get by turning on the ...\\General\\Maildebug trace. You can use this to validate a message in TCXL format.

4.3.5 Used XML Library

The library used for XML processing is Microsoft XML 4.0. The necessary files are installed by TC/LINK setup. Any restrictions for Microsoft XML 4.0 also apply to TC/LINK-XML.

4.3.6 XML Troubleshooting

Errors are reported in the following way:

- Errors concerning the configuration, resources and failure of the application are reported to the application event log.
- In case of an irrecoverable error or in case of a resource shortage TC/LINK-FI will shut down.
- Message related errors are reported in a non-delivery notification.

For debugging the recommended trace levels are:

| | |
|--------------------------------|--|
| ...\\General\\Tracelevel = 100 | Debugging of tclfi.dll and tclink.exe conversion |
| ...\\General\\Maildebug = 1 | Output of Mail (FI) side TCSI message object |
| ...\\Topcall\\TCSId debug = 1 | Output of KCS side TCSI message object |

In case of problems the following steps are recommended:

- Look for a non-delivery notification.
- Take a look at the event log.
- Take a look at the trace file. If the recommended trace levels are not set already, set them, restart TC/LINK-FI and reproduce the problem.

Non-delivery Notifications:

In case of a syntax error in a TCXL message (no XSLT transformation style sheet used) TC/LINK-FI is able to provide the tag-name or line/column where the error occurred. This is not possible when the XSLT transformation is used. In this case the following is recommended:

- Use the XML-tool msxsl.exe and the configured XSLT transformation style sheet (...\\Options\\In\\XMLTransform) to transform the failed XML message to the TCXL format.
- Use the XML-tool XML2tc.exe to transform the TCXL message to the TCSI format.

Either of these two transformations should report an error.

Examples for non-deliveries:**Non-delivery caused by syntax error (TC/XML format):**

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<NOTIFICATION xmlns="http://www.topcall.com/XMLSchema/2002/tc/xml">
<NF>NO</NF>
<ARCHIVE>NO</ARCHIVE>
<REMSG>NO</REMSG>
<TO>
<ACTIVE>YES</ACTIVE>
<SERVICE>TOPCALL</SERVICE>
<NUMBER>MS</NUMBER>
<ACTIVE>YES</ACTIVE>
</TO>
<NFINFO>
<STATUS>NONDEL</STATUS>
<TIME>2003-01-28T19:40:13</TIME>
<LACTION>LN</LACTION>
<LNOTE>XML Parsing Error</LNOTE>
</NFINFO>
<TXT> -----
Found an error in transaction file:
XML Parsing Error

Original transaction file is attached.
-----
</TXT>
<ATT>
<NAME>C:\TCLFI\NOTIF\jA.AT</NAME>
</ATT>
</NOTIFICATION>

```

Non-delivery caused by syntax error (TCXL format):

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<set_entry_ms_mail xmlns="http://www.topcall.com/XMLSchema/2002/tcxl">
  <int_msg_type>10</int_msg_type>
  <set_entry_ms_mail_orig.set_entry_ms_mail>
    <int_state>420</int_state>
    <time_action>2003-01-28T19:44:17</time_action>
    <ts_last_mda_action>LN</ts_last_mda_action>
    <ts_last_mda_note>XML Parsing Error</ts_last_mda_note>
  </set_entry_ms_mail_orig.set_entry_ms_mail>
  <un_content.l_env_cont>
    <set_header>
      <int_termination>786432</int_termination>
      <l_recipients>
        <set_entry_rs>
          <int_active>1</int_active>
          <int_type>1</int_type>
          <l_full_addr>
            <set_full_address>
              <ts_service>TOPCALL</ts_service>
              <int_active>1</int_active>
              <un_public_address.set_tc_address>
                <ts_tc_node></ts_tc_node>
                <ts_tc_userid>MS</ts_tc_userid>
              </un_public_address.set_tc_address>
            </set_full_address>
          </l_full_addr>
        </set_entry_rs>
      </l_recipients>
    </set_header>
    <obj_body_part/>
    <set_att_obj>
      <int_content_type>1076</int_content_type>

```

```

<un_content.blk_binary.tctext> -----
-----
Found an error in transaction file:
XML Parsing Error in l_recipientssdf Line 7, Column 20

Original transaction file is attached.
-----
</un_content.blk_binary.tctext>
    </set_att_obj>
    <set_att_obj>
        <int_content_type>1024</int_content_type>
        <ts_tos_folder>C:\TCLFI\NOTIF\nA.AT</ts_tos_folder>
    </set_att_obj>
</un_content.l_env_cont>
</set_entry_ms_mail>

```

Non-delivery caused by document conversion error (TC/XML format):

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<NOTIFICATION xmlns="http://www.topcall.com/XMLSchema/2002/tc/xml">
<SUBJECT>Delivery Failure: Using TCDCLINK</SUBJECT>
<FROM>
<ACTIVE>YES</ACTIVE>
<SERVICE>FAX</SERVICE>
<NUMBER>8123</NUMBER>
<AB></AB>
<ACTIVE>YES</ACTIVE>
</FROM>
<TO>
<ACTIVE>YES</ACTIVE>
<SNAME>MS</SNAME>
<C1>00000000</C1>
<C2>00000000</C2>
<SERVICE>TOPCALL</SERVICE>
<NUMBER>MS</NUMBER>
<ACTIVE>YES</ACTIVE>
</TO>
<NFINFO>
<STATUS>NONDEL</STATUS>
<TIME>2003-01-22T16:32:50</TIME>
<LACTION>LG</LACTION>
<LNOTE>Document conversion fail</LNOTE>
<COST>0</COST>
</NFINFO>
<TXT>TOPCALL NON Delivery Notification
-----

Message          : "Using TCDCLINK"   (ID: )
  created by      :

could NOT be sent...
  to Receiver     :  ()
  Reason          : Document conversion failed (LG)
  last Retry at   : 22-JAN-2003 16:32:50
  Costs           : 0 for Costcenter:

-----
</TXT>
</NOTIFICATION>

```

Non-delivery caused by faxing error (TC/XML format):

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<NOTIFICATION xmlns="http://www.topcall.com/XMLSchema/2002/tc/xml">
<SUBJECT>Delivery Failure: A Test Message</SUBJECT>

```

```

<FROM>
<ACTIVE>YES</ACTIVE>
<P>NORM</P>
<SERVICE>FAX</SERVICE>
<NUMBER>123</NUMBER>
<AB></AB>
<ACTIVE>YES</ACTIVE>
</FROM>
<TO>
<ACTIVE>YES</ACTIVE>
<P>NORM</P>
<SCOPY>YES</SCOPY>
<HLINE>YES</HLINE>
<RESOLUTION>NORM</RESOLUTION>
<NF>NO</NF>
<ARCHIVE>NO</ARCHIVE>
<REMSG>NO</REMSG>
<EXDATE>2061-01-19</EXDATE>
<EXTIME>03:14:07</EXTIME>
<C1>00AEAD14</C1>
<C2>00000044</C2>
<SERVICE>TCFI</SERVICE>
<NUMBER>MS</NUMBER>
<ACTIVE>YES</ACTIVE>
</TO>
<NFINFO>
<STATUS>NONDEL</STATUS>
<TIME>2003-01-22T17:32:00</TIME>
<DOCNR></DOCNR>
<LACTION>XL</LACTION>
<LNOTE>no fax machine detected</LNOTE>
<MCORR>00011447557</MCORR>
</NFINFO>
<TXT>TOPCALL NON Delivery Notification
-----

Message          : "A Test Message"   (ID: 00011447557)
  created by      :

could NOT be sent...
  to Receiver     : ()
  Reason          : no fax machine detected (XL)
  last Retry at   : 22-JAN-2003 17:32:00
  Costs          :   for Costcenter: GUEST
-----

</TXT>
</NOTIFICATION>

```

Possible problems and solutions:

- Link does not start.
Event-log entry: ID 8400 "TOM/CTomXml::Enable: CoCreateInstance of pStyleSheetIn failed (Return Code: 80040154)"
Cause: The Microsoft XML files are missing or not registered.
Solution: Reinstall the link.
- Link does not start.
Event-log entry: ID 8400 "TOM/CTomXml::Enable: pStyleSheetIn->load failed; Unable to load XSLT Style Sheet: c:\tcoss\tclp\TCXMLInsdf.xslt (Return Code: 1)"
Cause: The transformation style sheet is missing or not correct.
Solution: Set the path correctly or correct the style sheet.
- Link fails after first send-attempt.
Event-log entry: ID 5102 "wLNK_GetMsg: Internal error 5002 (CoCreateInstance of pWtr failed). The parameters of this log entry and previous event log entries may give more information. Check the trace file (tracelevel 100, maildebug, tcsidebug)."

Cause: The Microsoft XML files are missing or not registered.

Solution: Reinstall the link.

4.4 TCI Recognition in Text Body (TOM Format Only)

A new registry key allows recognizing a TCI image in the text body part of TC/LINK-FI transaction files. The characters describing the TCI image is put to a separate TCI image block of the TCOSS message. In TCfW the image is seen as an attachment with the name "image.tci".

This is needed for applications that write TCI-data to TC/LINK-FI transaction files. The message is transferred to TCOSS, where it is faxed to its destination. That works regardless if the TCI-data is in the text part of the message or in a TCI attachment.

At a special customer installation a non-delivery notification is generated in the case of failure and sent to a Notes system, where resend retries are generated. The Notes-Link however manipulates the TCI-data if it is not in a separate image attachment.

Therefore, you can configure to put TCI-data to an image attachment using the following key:

HKEY_LOCAL_MACHINE\Software\TOPCALL\TCLINKFI\Options

| Registry Key | Type | Default Value | Description |
|--------------|-------|---------------|--|
| Msg2TciAtt | DWORD | 0 | 0 No TCI image recognition is done. 1 If TCI-data is recognized in the text body part of a TC/LINK-FI transaction file, the rest of the text is interpreted as TCI and is transferred to TCOSS as image attachment. This key works only if the TOM message format is used! |

TCI data is recognized by a line starting with either "++TXT", "++A4H", "++FX1" or "++FX2". Text before is handled as text. Everything from the "++" line is interpreted as TCI until the end of the transaction file. No further text blocks, attachments or include sections are possible.

4.5 Unique File Naming

In addition to the file naming method used up until now there is also an alternative unique file naming method available.

4.5.1 Classic Method of File Naming

The classic method of TC/LINK-FI to name a file is to look in a certain range of names if a file of that name already exists. If it does, it increments the name and looks for the next, and so on until a non-existing file name is found. The file name of a transaction file in this system looks like "TCFI%%A.msg", where the "%" stands for a character ranging from 0-9 and a-z, and the "A" indicates the number of the link instance.

So TC/LINK-FI starts always looking for a file named "TCFI000A.msg" and proceeds until no file of that name is found. Then a file with that name is written. For the next transaction file the procedure is the same, the search is again started from "TCFI000A.msg". If the foreign mail system has already fetched the last file, a file with the previous name is written.

Attachments are written using the same file naming method independently; only the file ending is different (".at"). There is no correlation in the file name between transaction files and attachments.

4.5.2 Unique File Naming

The new unique file naming method (registry “\Options\FileNameUnique” = 1) does not always start with the same offset, but with the last written file name incremented by one.

By default the file naming of transaction files starts with “0000001A.msg”, where the first seven characters are variable in the range of 0-9 and a-z. The “A” is the default for the first link instance, and “msg” is the default file ending for transaction files. Attachments get the ending “at”.

The number of variable characters is configurable (registry “\Options\FileNameNumberLen”), the default is seven. The last letter and the extension of the transaction file are configurable in the registry exactly as for the classic file naming method: From the registry key “\Options\LinkNum” a letter (A for 1 and so on) is generated, and “\Options\TO_FI_Extension” defines the extension of the transaction file.

Additionally, a prefix is configurable for the new unique file naming (registry “\Options\FileNamePrefix”), the default is an empty string.

The range of a digit is 0-9 and a-z. That means that by default theoretically $36^7 = 78364164096$ unique files could be written. In fact this number is also limited by the registry key that stores the file name in its numeric representation (“\Options\FileNameLast”) as 32 bit value, that means that only $2^{32} = 4294967296$ unique names are possible, after that the naming starts again with “0000000A”.

The counting is the same for transaction files, attachments and notifications, regardless if they have a different file ending or destination directory. That means that the naming is not continuous. Especially, there is no guarantee that there is a correlation between transaction files and attachments. This is because there can be more than just one attachment per transaction file.

Typically the file names will now look similar to this:

```
0000001A.msg
0000002A.at
0000003A.at
0000004A.msg
0000008A.at
0000009A.msg
000000aA.msg
000000bA.at
000000cA.at
000000dA.msg
```

The gap between “0000004A.msg” and “0000008A.at” could mean that notifications have been generated with the missing numbers 5, 6 and 7.

The order of the file naming will not be disturbed unless there are files already in the directory. In this case TC/LINK-FI has to omit already used names and it can happen that an attachment is written e.g. with the name “00004r2A.at”, then TC/LINK-FI would try to name the transaction file “00004r3A.msg”, if this file already exists it will be called “00004r4A.msg”.

So be aware of not leaving any old transaction files, attachments or any other files in the FI directories, or the file order will be disturbed. However, existing files will never be overwritten, and the references inside the transaction file will always be correct. If the configuration and the handling is

done correctly (default configuration, meaning 2^{32} possible file names, and a working polling application that removes the files afterwards) there will not be any problems, even if the polling application fails for hours or days.

4.5.3 Configuration

With the following newly introduced keys the unique file naming can be configured:

HKEY_LOCAL_MACHINE\Software\TOPCALL\TCLINKFI\Options

| Registry Key | Type | Default Value | Description |
|-----------------------|--------|---------------|--|
| FileNameUnique | DWORD | 0 | Defines the file naming method. 0 for the old classic method, 1 for the new unique file naming. |
| FileNameNumber Length | DWORD | 7 | Number of variable characters. Each character has a range from 0-9 and a-z, thus 36 possible values. Only relevant for FileNameUnique=1. |
| FileNamePrefix | STRING | "" | With this key it is possible to define a prefix that is put before each of the generated file names. Only relevant for FileNameUnique=1. |
| FileNamingLast | DWORD | 0 | This key stores the last used file name in its numeric representation. Thus TC/LINK-FI is able to continue numbering after shutdown. Only relevant for FileNameUnique=1. |

The keys are generated automatically after the first startup of TC/LINK-FI. To use the new file naming, set the key "FileNameUnique" to 1. After changing the configuration TC/LINK-FI has to be restarted.

4.6 Transparent Mode

In order to allow customized Link-Exits to implement their own message format, it is possible to switch TC/LINK-FI and TC/LINK-MQ to a transparent mode where the message content is ignored.

For incoming messages (to TOPALL) this means that a transaction file is taken and put as it is to the text part of the TC/LINK message. Some defaults are set for this message, but a special Link-Exit is supposed to parse the text message and complete all necessary message parameters.

For outgoing messages (from KCS) only the text part of the KCS Link message is written to the transaction file, all other message parameters are ignored. Here the Link-Exit is supposed to put all necessary information to the text part of the message.

4.6.1 Defaults for Incoming Messages

For incoming messages (Mail to KCS) default values are set like for the TOM and XML format. The following TCSI parameters are set:

SET_HEADER Object:

| Object | Default | Description |
|-------------------------|---------------------|---|
| INT_TERMINATION | NOTIF_NEG | Flags if notifications for non-delivery and delivery have to be returned, the default is for non-delivery only |
| SET_ENTRY_RS_ORIGINATOR | Taken from registry | Originator of the message, default is taken from the registry (...TCLINKFI\Options\DefaultOriginatorService and ...DefaultOriginatorNumber) |

4.6.2 Configuration

To configure the new transparent mode use the HKEY_LOCAL_MACHINE\Software\TOPCALL\TCLINKFI\Options\In\Format and ...Out\Format registry keys with the value "NON".

4.7 Lock Folder Implementation for WebDAV Server

WebDAV makes it possible to integrate file access via HTTP to the Windows file system. However, due to problems with the Microsoft Internet Explorer cache when multiple instances of TC/LINK-FI (or TC/LINK-XML) are polling a single directory on a WebDAV server, a special integration for KCS is necessary. The standard locking of files does not work, and the following changes were necessary according to Microsoft recommendations.

A separate Lock Folder can now be configured to provide a fail-safe method of access control. This feature has to be enabled manually and is only used for the direction to KCS.

Note: This is only necessary when using a WebDAV server! It affects both the TC/XML and the TOM format.

4.7.1 Configuration

The following keys have to be set to enable this feature.

HKEY_LOCAL_MACHINE\Software\TOPCALL\TCLINKFI\Options\

| Registry Key | Type | Default Value | Description |
|---------------|--------|---------------|---|
| UseLockFolder | DWORD | 0 | Specifies whether the new lock mechanism is enabled (1) or disabled (0). |
| Tclfi_Lock | STRING | "" | Full path of the LOCK-Directory. Note: This must be a separate folder on the WebDAV server. |

4.7.2 Processing Sequence

TC/LINK-FI polls the FI_TO_TC directory. When it finds a transaction file, it creates a zero-length file of the same name in the Tclfi_Lock directory – the file properties of this file are set to "EXCLUSIVE". The transaction file is processed in the standard way. When finished, the file in the Tclfi_Lock directory is removed.

This method ensures that another instance of TC/LINK-FI polling the same directory does not process the locked file. The other instance will fail to create the file in the Tclfi_Lock directory and continue with the next transaction file.

4.7.3 Background

WebDAV stands for Web enabled Distributed Authoring and Versioning. It provides a collaborative environment for users to edit/manage files on web-servers. Technically, DAV is an extension to the HTTP protocol.

Here is a brief description of the extensions provided by DAV:

| | |
|------------------------|--|
| Overwrite Protection: | Lock and Unlock mechanism to prevent the "lost update problem". DAV protocol support both shared and exclusive locks. |
| Properties: | Metadata (title, subject, creator, etc) |
| Name-space management: | Copy, Rename, Move and Deletion of files |

| | |
|-----------------|--|
| Access Control: | Limit access to various resources. Currently DAV assumes access control is already in place, and does not provide strong authentication mechanism. |
| Versioning: | Revision control for the documents. Versioning is not implemented yet. |

5. PERFORMANCE

This section describes a performance test and the results in the following environment:

5.1 TC/LINK-FI Server

Hardware: KCS server, Xeon E5-2630v3 - 4 CPUs 2.40GHz - 2 CPUs - 4 cores, 4 GB RAM

Poll cycle: 10 seconds; Trace level: 10

Windows Server 2016 Datacenter and Microsoft Office

oTC/LINK running via TCMON in Background – interact with Desktop enabled

TC/LP 2.14.03

5.2 TCOSS Server

Hardware: KCS server, Xeon E5-2630v3 - 4 CPUs 2.40GHz - 2 CPUs - 4 cores, 4 GB RAM

Poll cycle: 10 seconds; Trace level: 10

Windows Server 2016 Datacenter

TCOSS running via TCMON in Background – interact with Desktop enabled

TC/SP 7.64.03

TCOSS with 50 Nulltum Channels

5.3 Documents Send

The following documents have been used for the performance test:

- Plain Text: Plain Text, 4 KB, 1 page
- Word 1 page: Word Attachment, 22 KB, 1 page
- Word 70 pages Word Attachment, 332 KB, 70 page

5.4 Results

The following table shows the number of messages that have been processed within an hour by TC/LINK-FI.

- FI to KCS: Tests have been done sending from TC/LINK-FI to TCOSS Nulltum channels with and without document conversion for an hour.
- KCS to FI: Tests have been done sending from KCS to TC/LINK-FI for an hour. The TC_TO_FI directory has been cleared every 10 minutes with a batch job.

Note: During the test from KCS to TC_TO_FI directory a batch job was running that deleted the files in the directory every 10 minutes.

Tests have shown that depending on the number of files in the directory the Link-FI performance slows down dramatically (e.g. 20.000 files can slow down the performance from 100% to 16%).

Normally the TC_TO_F directory should be polled by an application that moves the files and works with it.

KCS messages processed per hour by TC/LINK-FI

Sending from Link-FI

| | One Link-FI | Two Link-FI on one system | Two Link-FI on two systems |
|--|--------------------|----------------------------------|-----------------------------------|
| Plain Text (1 page, 4 kb) | 69368 msg/h | 133333 msg/h | 94830 msg/h |
| Small Attachment (1 page, 27kb) | 67839 msg/h | 123287 msg/h | 68666 msg/h |
| Big Attachment (51 pages, 653 kb) | 39754 msg/h | 53601 msg/h | 56181 msg/h |

Receive by Link-FI, No TCDC

| | One Link-FI | Two Link-FI on one system | Two Link-FI on two systems |
|--|--------------------|----------------------------------|-----------------------------------|
| Plain Text (1 page, 4 kb) | 24000 msg/h | 48000 msg/h | 32660 msg/h |
| Small Attachment (1 page, 27kb) | 24000 msg/h | 48000 msg/h | 36000 msg /h |
| Big Attachment (51 pages, 653 kb) | 18678 msg/h | 33541 msg/h | 26324 msg/h |

Received with KFXConverter

| | One Link-FI | Two Link-FI on one system | Two Link-FI on two systems |
|--|--------------------|----------------------------------|-----------------------------------|
| Plain Text (1 page, 4 kb) | 24000 msg/h | 48000 msg/h | 32660 msg/h |
| Small Attachment (1 page, 27kb) | 1770 msg/h | 3529 msg/h | 3454 msg/h |
| Big Attachment (51 pages, 653 kb) | 587 msg/h | 1121 msg/h | 1141 msg/h |

5.5 Hints on Performance

- If your NOTIF or TC_TO_FI directory holds many files from KCS, overall performance is degraded (as it takes longer for TC/LINK-FI to find a “free” filename). Therefore, make sure that connected applications are always active.
- If you do not need DirSync functionality, leave the corresponding directory configuration empty. This disables polling of the DIRSYNC directory, and thereby increases performance.
- If you need DirSync, and have running multiple links in parallel, enable DirSync on only one of them (leave the other DirSync path configurations empty).

- If you have a single TC/LINK-FI polling a directory, disable renaming for optimum throughput.
- Tests have shown that disabling interact with desktop speeds up the performance up to factor 1.4 on this test environment (amongst others it depends on the graphic card).

6. RESTRICTONS

6.1 Restrictions Compared to TC/Gate-FI

- The parameter C6 (used together with notifications) is no longer available (used by TC/LINK-FI internally). Use C1..C5 instead.
- The filename format "TCFI*.MSG" (e.g. TCFI001a.MSG, TCFIabcd.MSG) is reserved for internal use. It must not be used in the TO KCS and DIRSYNC directory.

6.2 Changes to TC/GATE-FI

An inconsistency of TC/GATE TCFI was cleared in TC/LINK-FI:

TC/LINK-FI does not fill the SNAME=, NAME= and TXT= fields in messages FROM KCS without existing shadow user as this information is not available (TC/GATE filled it with some other data not really matching the meaning of the fields). Use the address fields instead (SERVICE, NUMBER, ...) to deliver the messages.

6.3 Restrictions in TC/XML Functionality

- Only TCROSS 0 and 1 code pages are supported. Other code pages like 932 will be supported on request.

6.4 Other Restrictions

- **TCI Recognition in Text Body:** After a TCI data block in the text part of a TC/LINK-FI transaction file is identified by a line starting with "++..." no further text blocks, attachments or includes are possible. TCI text blocks are only recognized if the registry key Msg2TciAtt is set to 1.
- **TCI Recognition in Text Body:** This works only if the TOM message format is used.

7. APPENDIX

7.1 TC/LINK-FI Transaction Handling

This chapter gives some details of internal message handling.

For each direction there is a writer (puts the transaction file plus attachments (if any) into the directory) and a reader (reads and removes the files from the directory).

The TCFI client (TCFI based mail system) is a writer in the TO KCS directory and a reader in the FROM KCS directory.

TC/LINK-FI is a writer in the FROM KCS directory and a reader in the TO KCS directory.

The following protocol ensures that no messages will be lost and no files left over on the interface even if there is an unexpected power failure:

7.1.1 Writing

1. The writer creates the transaction file under a temporary name with a maximum extension of 2 bytes (example 12345678.TT).
2. The writer creates attachment files (if any) with unique names (example 000124.AT). (Before creating an attachment file it first creates the corresponding attachment entry in the transaction file and flushes the transaction file. This ensures that the attachments can be found and deleted even if a power failure occurs.)
3. When the transaction file and all attachment files are closed, the writer renames the transaction file, giving it any 3 character extension (example 50508235.959). (Renaming ensures that there is no dependency on file locking.)
4. After successful renaming, the writer internally marks the message as AT THE INTERFACE or SENT.

Error handling: When the writer is restarted it looks for any temporary files left over and if it finds any it will first delete any referenced attachments and then the temporary files themselves.

7.1.2 Reading

1. The reader searches all files with 3-character extensions.
2. If such a file is found, it will be treated as the transaction file.
3. After processing, the reader deletes any attachments first, and then it deletes the transaction file. (This ensures that there are no attachment files left over in the event of a power failure.)
4. Immediate non-delivery notifications for messages with syntax error are created before the original message is removed. No message can be lost in the event of power failure between these transactions.

Error handling: Processing is (by definition) always successful. If there is a corrupt transaction file, the reader must remove the transaction file from the interface (it may create a non-delivery notification at the interface or pass on the corrupted message to a local operator).

Note:

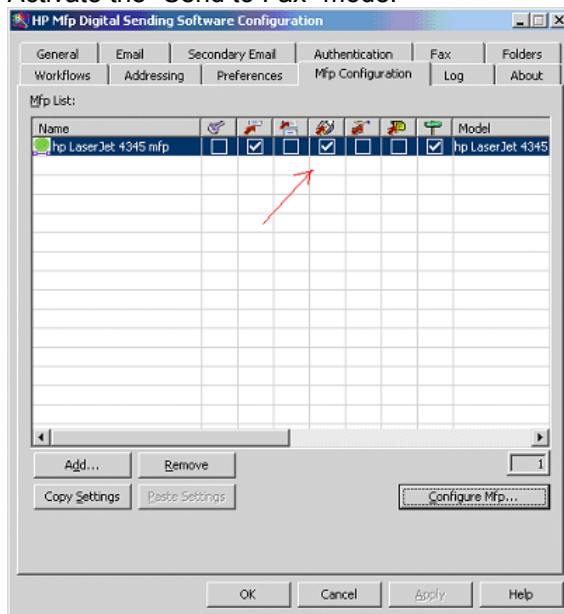
- You can enter any three characters you want for the transaction file extension. This gives you maximum flexibility in naming your files. But DO NOT USE TCFI*.MSG which is reserved for internal use.
- TC/LINK-FI reads the file-information of all files of the transaction directory, and starts processing with the oldest file (using the creation time). That way it is ensured that messages are not delayed due to inscrutability of the file finding and reading methods. If there is a separate dirsnc-directory, the files there are read and processed first.

7.2 Configuring the HP MFPs to Use the HPF File Interface Mode

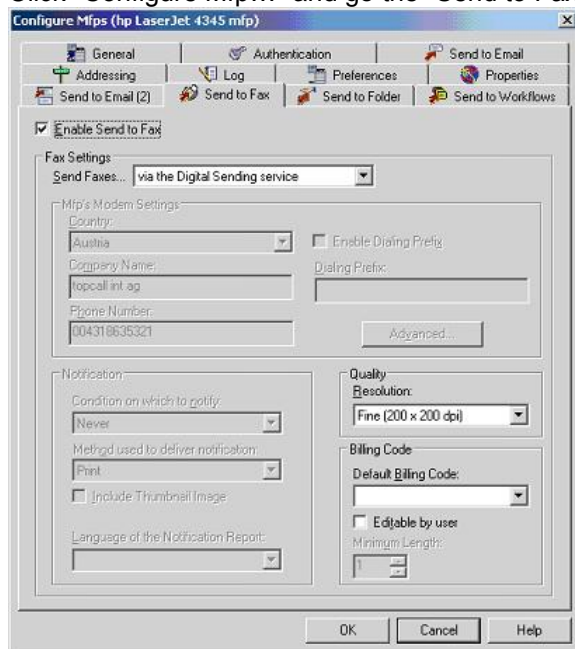
Prerequisite: the HP MFP must be operated with the HP DSS software. (“HP MFP Digital Sending Software”).

With the “Configuration utility” of the DSS you have to do the following configurations:

Activate the “Send to Fax” mode:



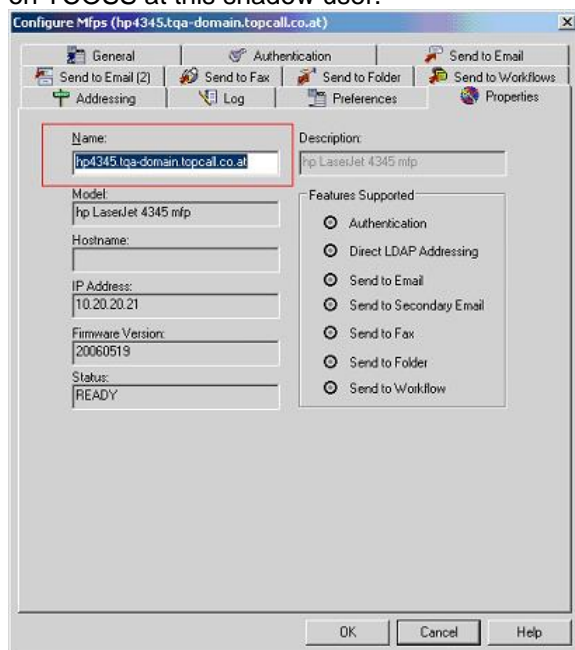
Click “Configure Mfp...” and go the “Send to Fax” configuration panel, and do the following settings



On the “Properties” tab set the “Name” to the host name or IP address of the MFP.

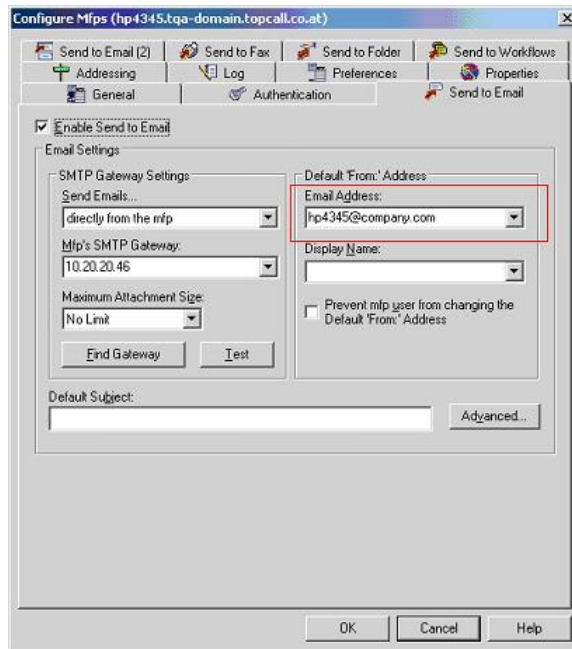
(If the IP address or not fully qualified host name is given, it will be translated internally by TC/LINK-FI to the fully qualified domain name.)

This name appears then as “##ScannerName” in the HPF file. This name is at the same time the User-ID of the TCOSS shadow user of the MFP. If this shadow user does not exist yet, it will be created automatically during the message transfer. The VRS profile belonging to the MFP is stored on TCOSS at this shadow user.

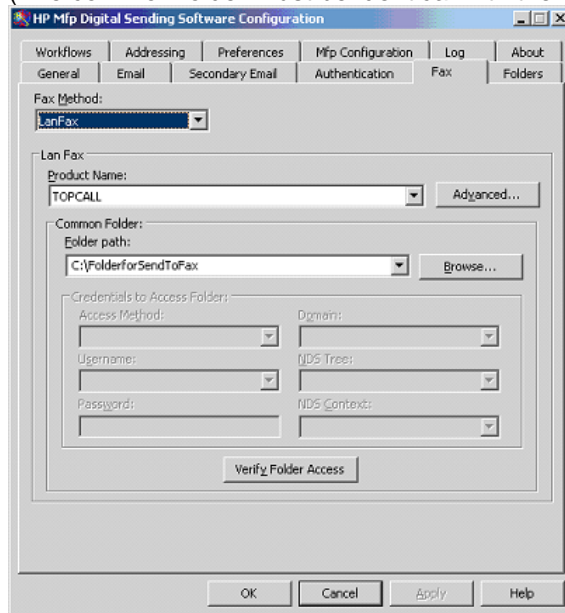


Set the “Default From Address” field on the “Send to Email” tab to an SMTP address defined on the MFP shadow-user on TCOSS. This text will appear as “##UserName” in the HPF file. If it is not defined, the login user (on the MFP or on the machine running the DSS) will appear as “##UserName” in the HPF file.

The value of the “##UserName” field will be the originator address of the sent message.



After that, on the “Fax” tab on the DSS main window, you have to do the following settings:
(The common folder must be identical with the TC/LINK-FI “mail-to-KCS” folder)



7.3 Upgrading TC/LINK-SJ to TC/LINK-FI (HP_HP_F Mode)

The functionality of TC/LINK-FI in HP_HP_F mode is *similar* to that of TC/LINK-SJ. Nevertheless, TC/LINK-FI has one more advantage: it can be configured to use the Kofax VRS image enhancement feature (see chapter “HPF Format Support (for HP MFPs)”).

The major differences between TC/LINK-SJ and TC/LINK-FI consist in the message addressing syntax (TC/LINK-FI follows the MFPCoconnect addressing conventions) and in the notification behavior. By default, TC/LINK-FI does not offer a mechanism similar to the TC/LINK-SJ operator notification in case of failure.

Nevertheless, TC/LINK-FI can be configured to imitate the TC/LINK-SJ way of working.

This means that any .HPF transaction file coming from an HP-MFP or HP-scanner will be processed just the same way as with TC/LINK-SJ. Furthermore, all functionalities offered by TC/LINK-SJ will be available also with TC/LINK-FI in HP_HPFI mode (see chapter “Functionality” in the TC/LINK-SJ manual).

The following 3 configuration steps are necessary for TC/LINK-FI to behave like TC/LINK-SJ:

1) Set registry setting *<linkfi-name>\MFP\SJCompatibleAddressing* = “1” (Type: String / REG_SZ)
This step activates the addressing syntax described in the chapter “Building Proper Addresses” in the TC/LINK-SJ manual.

2) Each TC/LINK-SJ specific registry setting has its TC/LINK-FI counterpart:

Common folder of the HP scanner or MFP

- TC/LINK-SJ: *<linksj-name>\Options\APIDirectory*
- TC/LINK-FI: *<linkfi-name>\MFP\CommonFolder*

Recipient address used if “*” has been entered as address on the MFP panel (corresponds to the “attach from scanner” functionality of TC/LINK-SJ if “SCAN,+ENVELOP.” is defined in this setting)

- TC/LINK-SJ: *<linksj-name>\Options\DefaultRecipient*
- TC/LINK-FI: *<linkfi-name>\MFP\DefaultRecipient*

Recipient service used if no service information has been given on the MFP panel

- TC/LINK-SJ: *<linksj-name>\Options\DefaultRecipientService*
- TC/LINK-FI: *<linkfi-name>\Options\DefaultRecipientService*

Operator definition (recipient of failure reports)

- TC/LINK-SJ: *<linksj-name>\Options\Operator*
- TC/LINK-FI: *<linkfi-name>\MFP\Operator*

Comments for attachments

- TC/LINK-SJ: *<linksj-name>\Options\Comment*
- TC/LINK-FI: *<linkfi-name>\MFP\AttachmentComment*

Transfer the TC/LINK-SJ specific registry values to the corresponding TC/LINK-FI registry settings.

3) Set *<linkfi-name>\Options\Tclfi_notif* to the same directory as *<linkfi-name>\Options\Tclfi_in*.
This ensures that all failure notifications will be forwarded to the operator configured in *<linkfi-name>\MFP\Operator*.

Note: There is no need to change the configuration on the HP scanner / MFP devices when upgrading TC/LINK-SJ to TC/LINK-FI. TC/LINK-FI ensures that the .HPF files and the corresponding attachments continue to be processed in the same way as with TC/LINK-SJ.

7.4 File-Name Handling Exit

TC/LINK-FI/XML provides a programming interface to determine custom file naming for messages from KCS to the file system. This programming interface can be used by Professional Services to implement customer specific requirements regarding file naming.

7.4.1 Configuration

The module handling the customized file naming has to be configured in the registry. If there is no module specified (default) the standard TC/LINK-FI/XML file naming is used.

HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCLINKFI\Options

| Registry Value | Type | Default | Description |
|----------------|------|---------|-------------|
|----------------|------|---------|-------------|

| | | | |
|----------------|--------|----|--|
| FileGenExitDll | STRING | "" | Name of the Exit-Module to generate filenames for messages from KCS to FI. |
|----------------|--------|----|--|

7.4.2 API Specification

The File Handling Exit module has to implement the following functions.

7.4.2.1 Initialize

```
int TCLIB Initialize ( IN GENFILE_INIT * pInit );
```

Initializes the Exit DLL during start-up of the link.

```
struct GENFILE_INIT {
    WORD4      nApiVersion;    // see below
    int        nLinkNr;       // as used by link
    TCHAR *    szFormat;      // TOM, XML from link config
    TCHAR *    szTc2Fi;       // as used by link
    TCHAR *    szMask2Fi;     // as used by link
    TCHAR *    szOutAttExt;   // as used by link
    TC_HANDLE  h_AppSession;  // as used by link
    const LINKEXIT_ARGS *p_ext; // Additional (extensible) init arguments
                                // valid if 0x201 <= nApiVersion <= 0x2ff
};
```

The TCSI Application Session is passed to the Exit to allow retrieval of additional information from the server. The other initialization values are the values as used by the link.

nApiVersion is the version expected by the link and identifies the format of the structures and arguments passed to the exit dll. The value consist of a major number (bits 8 to 16) and a minor number (bits 0 to 7). The major number represents the expected format of the functions exported by the DLL. The minor number represents the provided format of the structures passed to the functions. It is expected that structures remain compatible and new members get appended without changing the current order or purpose of existing members.

Exit DLLs adhering to the specs of this document should safely be able to accept versions in the range from 0x100 to 0x2ff, else an error should be returned. If the own minor version is higher than the one expected by the link, provisions should be taken by the Exit DLL to deal with the missing information, else an error has to be returned. The version specific changes can be found in chapter 7.4.2.4 API Version history.

p_ext is available since KCS 10.1.1 (nApiVersion 0x201) and provides the general Link (tclink.exe) version number and call-back functions for License checks. It uses the LINKEXIT_ARGS structure as defined for the general Link exit. More details are available on request in the TC/Link implementation documentation and header file exits.h.

Returns:

```
EXITRV_OK ... 0
```

Any other value indicates an error.

If the Exit DLL does not initialize properly (e.g. because of invalid licenses, or incompatible API), the link should not continue to start.

7.4.2.2 Deinitialization

```
int TCLIB DeInitialize (void);
```

Dinitializes the Exit DLL during link shutdown.

Returns:

```
EXITRV_OK ... 0
```

Any other value indicates an error.

7.4.2.3 InitializeFGExit and DeInitializeFGExit

These functions are supported since KCS 10.1.1 (nApiVersion >= 0x201). If InitializeFGExit is found then InitializeFGExit+DeInitializeFGExit are called instead of Initialize+DeInitialize so that the same exit DLL can be used both as file generation and as general link exit.

7.4.2.4 API Version history

Here is a history of known versions:

| nApiVersion | Introduced with | Description |
|-------------|-----------------|--|
| 0x100 | Initial version | Initial version. Type TCHAR is char |
| 0x100 | KCS 9.2 * | Unicode version. Type TCHAR is wchar_t |
| 0x200 | KCS 10.0 | nApiVersion increased so that character type can be detected |
| 0x201 | KCS 10.1.1 | Additional initialization info p_ext added. Support alternative init/deinit with InitializeFGExit+DeInitializeFGExit |

Note:

- nApiVersion was not increased during change of character type with KCS 9.2! This means that Exits that supports API version 0x100 should be able to deal with both options.

7.4.2.5 File Creation

```
int TCLIB GenerateFile (
    IN const TCHAR * szDefaultPath, // path as passed by TOM
    IN TOMFileType  nType,          // TOM_Create file types
    OUT TCHAR *     pszFilePath,    // resulting filename incl. path
    HANDLE *        phFile         // handle of file being opened
    GENFILE_INFO *  pInfo          // additional information
);
```

The *GenerateFile* function is similar to the link internal TOM_Create function which is called by TOM. It generates a file name and also opens the file for further reading and writing. Depending on the specific application any necessary directories can be created as well.

On exit of the function the output parameter pszFilePath contains the full path to the file being opened.

Returns:

```
EXITRV_OK ... 0
EXITRV_IGNORE_CHANGES ... 1
EXITRV_FORCE_MSG_ERROR ... 2 // stop processing message
```

If the function returns EXITRV_IGNORE_CHANGES the caller should continue operation as if there were call to the exit DLL.

Any other non-zero return value represents an error.

The parameter szDefaultPath should be a valid path as configured for the link (for nType not being FT_CREATE_RENAME_UNIQUE).

For nType = FT_CREATE_RENAME_UNIQUE the parameter szDefaultPath has to be a valid path to a file.

nType represents the type of file to be created. Following values are possible:

```
FT_CREATE_RENAME_UNIQUE
```

Renames the temporary transaction file specified by szDefaultPath into a new filename. This is the last call to GenerateFile() when a message is exported.

```
FT_CREATE_MSG_TRANSACTION_ANY
```

```
FT_CREATE_NTF_TRANSACTION_ANY
```

Generates a transaction file for a message of a notification. The file name generated is considered temporary and has a 2 character extension typically. This is the first call in the sequence when a message is exported. The file generated with this call gets renamed with the call using type

```
FT_CREATE_RENAME_UNIQUE.
```

```
FT_CREATE_MSG_ATTACHMENT_ANY
```

```
FT_CREATE_NTF_ATTACHMENT_ANY
```

```
FT_CREATE_NTF_ATTACHMENT_TXT
```

Generates an attachment file for a message or a notification. This call can be made multiple times during the message export sequence.

pszFilePath receives the resulting file name including the fully qualified path. The string must not be longer than 260 characters.

phFile receives the resulting file handle of all calls to create a transaction file or an attachment.

The structure GENFILE_INFO is used to pass additional information to the Exit DLL. This information can be used by the file name generation algorithm to determine the file name and path to generate.

```
struct GENFILE_INFO {  
    TC_HANDLE      hMsg; // handle of message  
    TC_HANDLE      hAtt; // handle of current attachment or 0  
    WORD4          nAttNr; // nr of hAtt in content (if hAtt != 0)  
};
```

The handle to the message hMsg must always be valid. The handle to the attachment hAtt is only valid if the Type of message indicates an attachment. nAttNr is valid only if hAtt is valid.

7.4.3 Implementation Specifics

The handle to hAtt and the number of the attachment within the message content are available only within TOM.

In order to pass those values to the exit function, they have to be passed back to tclfi (via TOM_Create) which is only a minor modification to TOM.

Alternatively, the entire exit handling can be done within TOM, which has the advantage that the functionality can also be available to other links e.g. MQ, but is more modification in TOM and compatibility with MQ has not been verified yet.

8. SETUP CHECKLIST

| | |
|---|--|
| TCOSS Server CPU number (1) | |
| Link Server CPU number | |
| TCOSS version | |
| Link Server license or TC/LINK-XX license (1) | Key: Expire Date: Registrations: |
| Postscript license (1) (optional) | Key: Expire Date: Registrations: |
| PCL5 license key (optional) | Key: Expire Date: Registrations: |
| GIF license key (optional) | Key: Expire Date: Registrations: |
| File Reporter license key (optional) | Key: Expire Date: Registrations: |
| DirSync license key (optional) | Key: Expire Date: Registrations: |
| KCS Server Name | |
| Link Type to KCS Server, transport type PRC or Native | |
| Secondary KCS Server Name (for tandem servers only) | |
| Link Type to secondary KCS Server (for tandem servers only) | |
| KCS Link User Name | |
| KCS Link User Password | |
| NT Link User Name | |
| NT Link User Domain | |
| NT Link User Password | |
| NT TCDCEXE User Name (foreground TCDC only) | |
| NT TCDCEXE User Password (foreground TCDC only) | |
| NT TCDCEXE User Domain (foreground TCDC only) | |
| TCFI interface codepage (ANSI, 437, 850, 852) | |
| TCFI API Directories path | |

(1) For TCOSS < 7.08 in combination with TCOSS tandem servers these licenses have to be entered for both CPU numbers of the primary and the secondary TCOSS server.