RC8000/RC9000-10

SW8740/1, SW9890I

FTS User's Guide

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Abstract:
This manual gives a general description of the file transport service FTS as it is available on RC8000/RC9000-10 and describes the utility programs wr and rr.

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Table Of Contents

1. Introduction

FTS, File Transport Service, allows users to transfer files between any two RC computer systems attached to the same local area network (LAN).

When a file is transferred between two computer systems by means of FTS, one system must always be the FTS server and the other the FTS user.

The FTS user is the computer running the program which interacts with the human user, i.e. the utility program wr or rr. The FTS server is a permanently running system process which can communicate with many different FTS users in turn.

This guide describes FTS as it can be used from an RC8000/RC9000-10 system, i.e. RC8000/RC9000-10 in the role of FTS user.

In order to run FTS the RC8000/RC9000-10 system must be attached to the LAN by means of an attached device processor (ADP), in the case of an RC8000, or by means of a LAN Controller, in the case of an RC9000-10. For RC8000 the FTS programs are part of the software package (SW8740/1) which supports the ADP. The system administrator's guide for the ADP (ref.1) provides the information which the system administrator needs to make FTS available to general users. For RC9000-10 FTS is included in the Monitor package, and information for the system administrator is included in the general system administrator's guide for RC9000-10 (ref. 2).

Similar information for the other possible FTS server systems with which the RC8000/RC9000-10 can interact is found in the relevant user's guides. For ease of reference Appendix B provides in brief form some naming details concerning the other types of servers.

The utility programs which constitute the user interface are described in chapter 3, but first a general description of how FTS is structured and of its features is given in chapter 2.

The RC8000/RC9000-10 implementation of FTS consists of a program called ftsuser, which - like the FTS server - must run permanently in an internal process, and the utility programs wr and rr which work by passing requests for file transfers to the ftsuser process which then performs the actual communication with the FTS server running on another computer system.

The message interface of the `ftsuser` process can also be used by other internal processes. In this way PRIMO can request that files be transferred for printing via spoolers resident on other computers attached to the LAN (cf.ref.1 or 2).

In the descriptions of program call syntax in chapters 2 and 3 words rendered in italics are metasymbols representing expressions which are defined in the subsequent text. Slash (/) is used to delimit alternative sub-expressions. Parenthesized sub-expressions followed by * may occur repeatedly.

1. Introduction

2. General Description

FTS transfers files from one RC computer system to another. Files may be transferred individually or in groups. FTS supports computer systems of different types, i.e. not just different computers with similar operating systems, but RC8000/RC9000-10 systems, UNIX-type systems and DOS systems. In this guide the phrase 'UNIX-type system' refers to RC39 or RC900-UNIX.

FTS transfers files in their entirety between computer systems. It is not a record-level file access facility.

The destination for a file transfer need not be a disk file, but may also be a printer, normally via a spooler. Thus FTS can be used to share a single printer among users of several computers attached to the same LAN.

A special feature which is only supported on UNIX-type systems is remote command execution.

Files can be transferred in both directions between an FTS user and an FTS server. The wr utility transfers (writes) files from the user to the server, and the rr utility transfers (reads) files from the server to the user. In order to move files between two computer systems it therefore theoretically suffices if one of them provides the FTS user functionality and the other the FTS server functionality. However, the most flexible service is provided if both systems can play both roles, since this allows the user to invoke FTS from the same system she is using for other tasks and/or is most familiar with.

The FTS user function is available on RC8000/RC9000-10, RC750 Partner, RC39 and all RC900 models. The FTS server function is available on the same systems except RC900-DOS.

This guide covers only RC8000/RC9000-10 as FTS user, but discusses all the possible FTS servers that the RC8000/RC9000-10 FTS utilities can communicate with, viz. RC8000/RC9000-10, RC39, RC900-UNIX and RC750 Partner. To use FTS to transfer files between RC8000/RC9000-10 and RC900-DOS, one must use the utility programs on the RC900 in combination with the RC8000/RC9000-10 FTS server.

FTS does not, in general, provide conversion facilities. However, the newline and end-of-file conventions of the individual computers are supported for text files.

ADP/LAN selection

If the RC8000/RC9000-10 FTS user system is equipped with multiple ADPs/LAN Controllers, usually because it is attached to several LANs, it is necessary to specify the LAN number in the call of wr or rr. This is done by *lanno* parameter. When this parameter is omitted, ADP/LAN Controller number 1 is used.

Server naming

Each FTS server attached to a LAN has a name (the node name) whereby it announces itself and can be addressed on the network. This name must always be specified when a file transfer is requested on an FTS user system.

It is assumed that node names are assigned by the system administrator(s), who must also make them known to general users (see also Appendix B).

User identification and validation

In general, it is necessary to be registered as a user of the FTS server system on which one wishes to access files. However, some files and possibly a spooling service may be accessible to unregistered "visitor" users.

The RC8000/RC9000-10 FTS server has its own user catalog, the FTS user catalog, which describes the (human) users who may access files on the server system from another computer system acting as FTS user. Each user has a catalog entry comprising user name and number, bases and access rights. It is a system administrator task to maintain the FTS user catalog (ref.1).

A UNIX-type FTS server has no such special catalog, but uses the standard UNIX user identification.

In order to identify the (human) user in their communication with the FTS server, so that it may establish file access rights and a file naming environment, the FTS utilities take two (optional) parameters: *user* and *pwd*. The interpretation of these parameters depend on the type of server system.

If the server is a UNIX-type system, *user* and *pwd* are the standard UNIX user-id and password, and the naming environment this establishes is the user's home directory. If *user* and *pwd* are not specified, the user gets visitor access rights and naming environment.

If the server is an RC8000/RC9000-10 system, the *user* parameter specifies the user name and number which together determine the user's entry in the FTS catalog. The form of the *user* parameter is *name.number* or just *name*, which is equivalent to *name.0*. The FTS catalog may contain a visitor entry for users who do not identify themselves. The RC8000 FTS server ignores the *pwd* parameter if it is

specified. An FTS catalog entry also contains a base, the FTS base, which determines the naming environment.

If the server is an RC750 Partner the *user* parameter is usually not necessary. If the disk medium is a CP/M disk, it may specify the user number (0..15), limiting the naming environment to files belonging to the specified user. In the case of a DOS disk medium it is ignored.

File management

Destination files for FTS file transfers are overwritten if they exist, otherwise created if this is possible. This convention may be overruled (*n* parameter).

This is true both for wr when the destination file(s) is (are) on the FTS server system, and for rr when the destination file is on the FTS user.

When an RC8000/RC9000-10 system (both FTS server and FTS user) is the destination of the transfer of a binary file, the exact size of the file is recorded in the entry tail. When such a file is later used as the source of an FTS transfer, the size information is used to determine how much to transmit. If no size information is present in the entry tail of a source file, the whole file (all of last segment) is transmitted.

When files are transferred between two RC8000/RC9000-10 systems, the entry tail is also copied from source file to destination file.

File naming on the server

A disk file on an FTS server, whether it is the source (rr) or the destination (wr) of a file transfer, is named by the *remfile* parameter to wr or rr (or, in the case of wr multifile transfer specified using the *d* parameter, the *localfile* parameter) according to the usual file naming rules of the server system:

UNIX-type server:
Standard UNIX file name, i.e. absolute path name or relative to the user's home directory.

RC8000/RC9000-10 server:
Standard RC8000/RC9000-10 file name as seen from the FTS base. A destination file will always be written with the exact FTS base, overwritten if it already exists. The permkey is set to 3 (user scope). A source file need only be visible from the FTS base.

RC750 server:
Standard Partner file name for CP/M or DOS disk file medium. If the disk identification is omitted from the name, the system disk is used (the disk the FTS server was loaded from). A CP/M file name may be qualified by a user number, if specified by the user parameter.

File naming on the RC8000/RC9000-10 FTS user

A disk file on the RC8000/RC9000-10 FTS user, whether it is the source (wr) or the destination (rr) of a file transfer, is named by the *localfile* parameter to wr or rr according to the usual RC8000/RC9000-10 file naming conventions. A destination file is overwritten if it already exists,

i.e. if it is visible and not protected from the process calling rr; otherwise it is created. When a destination file is created its base is set to the user base of the process calling rr, and its permkey to 3 (user scope). A source file need only be visible.

Text file transfer

UNIX-type systems do not distinguish text and binary files.

When an RC8000/RC9000-10 system (both FTS server and FTS user) is the source of an FTS text file transfer, the EM character (decimal 25) is taken as end-of-file indication, terminating the transfer.

Similarly, when an RC8000/RC9000-10 system (both FTS server and FTS user) is the destination of an FTS text file transfer, an EM character is stored after the received data in the last segment of the disk file to indicate end-of-file.

Print spooling

When a file is transferred to a printer or printer spooler on an FTS server, the printer must be specified by the *printer* parameter to wr. The interpretation depends on the type of FTS server. The default/standard system printer on an FTS server is always specified as lp. The system administrator(s) must make the names of other available printers known to general users.

The RC8000/RC9000-10 server handles print requests by passing them to the RC8000/RC9000-10 print spooler PRIMO.

Remote command execution

Execution of a command line by a shell process may be invoked when the server is a UNIX-type system. The command line is given as the *cmd* parameter. In the fp command line *cmd* can only be given as a single string (e.g. a program name) terminated by a blank. The *v* parameter may be used to enter *cmd* on a subsequent line where it may be given as an arbitrary string enclosed in single quotes, i.e. 'command line'.

The remote shell process may take the transferred file as its input (wr), or the output it produces may be transferred to the FTS user (rr).

If the server is an RC8000/RC9000-10 system, the *cmd* parameter (rr only) may be used to specify the contents of a message (8 RC8000/RC9000-10 words) to be sent to an internal process on the server system. This feature may be used to achieve a similar effect, i.e. start a job.

Messages from wr and rr

The wr and rr programs produce a number of messages. After a successful file transfer the program displays the amount of data that was transferred.

Error messages typically refer to errors in the specified parameters. These messages are intended to be self-explanatory. All messages which refer to the communication with the FTS server have the form

```
*** FTS ...
```

in many cases followed by a second line which originates from the server.

Error messages which mention the *localfile* parameter have to do with problems in accessing the specified file on the local RC8000/RC9000-10 system, e.g.

```
*** cannot open localfile
```

Some messages which will not occur in normal situations require some explanation:

```
*** FTS cannot open port
```

This message is most likely due to lack of resources on the ADP/LAN Controller. The ADP/LAN Controller may require reconfiguration. Consult the system administrator.

```
*** ADP error ...
```

Abnormal response from the ADP/LAN Controller, e.g. if it is not operational or being reset.

```
*** cannot create link
*** cannot reserve link
```

Error in the interaction between the utility program and RC8000/RC9000-10 Monitor. May be caused by misbehavior of another program running on the RC8000/RC9000-10.

3. Utility Programs wr And rr

Syntax summary

The program call is:

wr *(param)* wtransfer-spec*

or

rr *(param)* rtransfer-spec*

param :: =
1.*lanno* / v.yes / s.*server* / u.*user* / w.*pwd* / t.yes / b.yes / n.yes

wtransfer-spec :: =   (f . *remfile localfile*)
                       / (p .*printer localfile*)
                       / (d .*(dest* / yes) *(localfile*)*)
                       / (c .*cmd localfile*)

rtransfer-spec :: =   (f .*remfile localfile*)
                       / (c .*cmd localfile*)

Common parameters

Parameters preceeding the actual transfer specification are identical for
wr and rr.

1.*lanno*
The number of the ADP/LAN Controller used to access the LAN
(usually not necessary, cf. chapter 2, ADP selection). Default is 1.

s .*server*
Name of the FTS server (cf. chapter 2, Server naming).

u.*user*
User identification on the FTS server (cf. chapter 2, User identification
and validation)

w.*pwd*
Password for validation of the user on the server.

If the *user/pwd* combination specified is not valid, the program will prompt for valid values. When a password is entered in response to a prompt, it is not echoed. Notice that omitting the *user* parameter altogether is valid if the FTS server accepts visitor users.

`t.yes`
Text file transfer.

`b.yes`
Binary file transfer (default).

`n.yes`
No overwrite. If a file already exists on the server, it will not be overwritten.

`v.yes`
The rest of the fp command line is ignored, and the program proceeds to read from current input (subsequent lines) according to UNIX-style syntax, i.e. each option or transfer specification is preceeded by -, and fp dots are not used. This makes it possible to enter parameters which would break fp syntax rules. To read more than one line from current input, the newline must be escaped by an Ø (or backslash) character.

wr transfer specification

The utility program wr which transfers one or more files (source files) from RC8000/RC9000-10 (the FTS user) to an FTS server accepts four forms of transfer specification, corresponding to four different types of destination:

`f.`*remfile*
A single file is transferred and stored as a disk file. The destination is specified by *remfile* (cf. chapter 2, File naming on the server)

`p.`*printer*
The transferred file will be printed, either directly or via a spooler. The printer to use is specified by *printer* (cf. chapter 2, Print spooling).

`d.`(*dest*`/yes`)
Several files are transferred to the server. The names of the individual destination files are the same as those of the source files, cf. *localfile* below. If the destination is not an RC8000/RC9000-10 system, the letter ø, if it occurs in a source file name (*localfile*) will be converted to dot (.) in the destination file name.

The way multifile transfers work depends on the type of server system:

UNIX-type server:
All the files are placed in the same directory. If `d.yes` is specified, this is the user's home directory. If `d.`*dest* is specified, *dest* is used as the file name of the destination directory (cf. chapter 2, File naming on the server).

RC8000/RC9000-10 server:
The form must be `d.yes`. The destination file names are used in the

same way as a name specified as *remfile* for a single file transfer (cf. chapter 2, File naming on the server).

RC750 server:
The form d.*dest* may be used to specify a disk on which the files will be written and, in the case of a DOS disk medium, also a directory in which to place the files. To specify just a disk, *dest* must have the form d:, where *d* is one of the letters A. .P. If this specifies a DOS disk medium, the root directory will be used. To specify another directory, *dest* must be its pathname. If *dest* is omitted (d.yes), the files are written on the system disk.

c.*cmd*
The server must be a UNIX-type system. The transferred file becomes the standard input for a shell process which executes *cmd* as a command line, while standard output is dropped unless it is redirected (cf. chapter 2, Remote command execution).

localfile
Name of the source file on the RC8000/RC9000-10 system where wr is executed (cf. chapter 2, File naming on the RC8000/RC9000-10 FTS user). When the d parameter is used to specify a multi-file transfer several files may be listed. In the other cases (f, p and c) *localfile* may be omitted whereby the source file for the transfer will be read from current input.

wr examples

```
wr s.venus u.peter f.tofile fromfile
```

The RC8000/RC9000-10 file named fromfile is transferred to the file named tofile belonging to user peter on the server named venus.

```
wr s.venus p.lp loveletter
```

The RC8000/RC9000-10 file named loveletter is printed on the standard printer of the server named venus.

```
wr 1.2 s.jupiter u.root v.yes
-w Marie -n -f /etc/util.a useful
```

The RC8000/RC9000-10 file named useful is transferred via LAN no. 2 to the file with absolute path name /etc/util.a on the server named jupiter. This server is assumed to be a Unix-type system where the superuser (root) has password Marie. The -n option ensures that the file is not overwritten if it existed already. Note the Unix-style syntax of the second line which is used because fp would not except the password Marie or the slashes and the dot in the file name /etc/util.a.

```
wr s.mars t.yes p."2" list
```

The RC8000/RC9000-10 text file named list is printed on printer number 2 on the server named mars. This server is assumed to be a Partner which identifies printers by number. The number must be given in quotes because of fp syntax rules.

```
wr s.jupiter u.peter d.yes file1 file2 file3
```

The three files `file1`, `file2` and `file3` are transferred to the home directory of user `peter` on server `jupiter` (assumed to be a Unix-type system). If `peter` has a password it will be prompted for and not echoed when it is entered.

rr transfer specification

The utility program `rr` which transfers a file from an FTS server to RC8000/RC9000-10 (the FTS user) accepts two forms of transfer specification, corresponding to two different types of source:

f .*remfile*
The source of the transfer is a disk file. It is specified by *remfile* (cf. chapter 2, File naming on the server).

c.*cmd*
(cf. chapter 2, Remote command execution).

If the server is a UNIX-type system, a shell process is executed with *cmd* as its command line on the server. The standard output from the process becomes the source of the transfer. The process has empty standard input, except if provided by redirection.

If the server is an RC8000/RC9000-10 system, the FTS server will interpret *cmd* as a specification of a message to be sent to an internal process on the server system.

Before sending the message the FTS server sets its catalog base as specified for the FTS user in the FTS user catalog.

No file data is transferred to the FTS user (always 0 bytes), but the FTS server produces an error message if appropriate. There is no feedback from the internal process on the server system.

The specification of the message must be given in the following way:

cmd :: =procname.contents

procname
is the name of the internal process to which the message is sent.

contents : : =	newjob.*jobfile*
	/ newjob.*jobfile.printer*
	/ *operation.modifier(.words)* *

The `newjob` form specifies a `newjob` message, where *jobfile* is the job file name which is passed in the message, and *printer* (max. 6 characters) may be used, if the message is sent to BOSS, to specify a remote printer for the job.

The last form of the contents specification may be used to specify the message word by word. The first word will be *operation* < 12 + *modifier*. Both *operation* and *modifier* must be even values in the range

0..4094. The FTS server protects itself by filtering the following operations: 2 (finis), 4 (break), 10 (replace), and 28 (timer).

words ::=   *"string"*
              / number
              / hw.*hwl.hwr*

Values specified as words are used to fill the message from the second word onwards. A *string* may be any character string. It will be extended with nulls to occupy an integral number of words. A *number* is a decimal number which takes up a whole word. A word may also be given as two numeric halfword values, using the hw form. This yields *hwl* < 12 + *hwr*. Note that the maximum length of the message is 8 words.

localfile
Name of the destination file on the RC8000/RC9000-10 system where rr is executed. The name is a standard RC8000/RC9000-10 file name. It may be omitted, in which case the transferred file is written on current output.

rr examples

```
rr s.venus u.peter f.fromfile tofile
```

The file with name fromfile belonging to user peter on server venus is transferred to the RC8000/RC9000-10 file tofile.

```
rr s.jupiter t.yes c.who
```

Assuming the server named jupiter is a Unix-type system, the program who, which lists currently active users is executed. The list is displayed on current output. Note that the list is a text.

```
rr s.pluto v.yes
-c 'newjob.boss.job7.lp17'
```

Assuming the server named pluto is an RC8000/RC9000-10 system, a newjob message is sent to the operating system BOSS on this system, requesting that a job be started with the file job7 as jobfile and the printer lp17 as its printer.

A. References

Part numbers in references are subject to change as new editions are issued and are listed as an identification aid only. To order, use package number.

(1)   PN 991 11030, part of SW8740/1-D
        RC8000 Attached Device Processors
        System Administrator's Guide

(2)   PN 991 11257, available as SW9911I-D
        RC9000-10 System Administrator's Guide

(3)   SW95307I-D
        AT&T UNIX V.3/386 User's Manual Set

(4)   PN 991 11030, part of SW95702I
        RC900 LANCOM

(5)   PN 991 11106, part of SW1553
        FTS750 Partner Brugervejledning

(6)   PN 991 10561, available as SW3998-D
        RC39 Brugervejledning

(7)   PN 991 10769, available as SW3998I-D
        RC39 User's Guide

B. Server-Dependent Naming Conventions

Server name

RC8000:
Host name. May in special cases be specified differently for different ADPs.

RC9000-10:
PU name. May be overridden by a host name specified for the LAN controller.

RC900-UNIX:
The RC900 UNIX nodename. This is the name that the RC900 system is known by on communications networks in general (see uname(1) in (ref.2)).

RC39:
RC39 system name from the file /etc/.name.

RC750 Partner:
The name is a parameter supplied when the FTS server is started.

Printer names

RC8000/RC9000-10:
RC8000/RC9000-10 printer name, i.e. name of catalog entry describing the printer to the print spooler PRIMO.

RC900-UNIX:
Class or printer name of the UNIX LP spooling system. The standard printer is the LP default destination.

RC39:
lpr printer identification, i.e. lp, p2, .., p15. The standard printer is lp.

RC750 Partner:
Printer number (0..15). The standard printer is number 0.