Software Release Bulletin: RPC and XDR for VOS

Stratus Technologies
R584-00

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Contents

Preface

The *Software Release Bulletin: RPC and XDR for VOS* (R584) documents the Stratus implementation of the Remote Procedure Calls (RPC) and External Data Representation (XDR) facilities for the ftServer V Series platform. This software is an exact port of Release 1.3 of the NFS™ (Network File System) and RPC software available on Continuum Series systems, with the following exceptions:

- NFS is not supported.
- STREAMS TCP/IP (STCP) is the **only** version of TCP/IP supported.

This manual documents RPC and XDR for VOS for ftServer V Series modules running VOS Release 15.1.1 and later.

This manual is intended for system administrators. However, some of the information discussed in this manual may be of interest to application designers, developers, and end users.

Manual Version

This is a new manual.

Related Manuals

Refer to the following Stratus manuals for related documentation.

- *VOS Communications Software: NFS and RPC* (R199)
- *VOS STREAMS TCP/IP Migration Guide* (R418)
- *VOS STREAMS TCP/IP Administrator's Guide* (R419)
- *VOS STREAMS TCP/IP Programmer's Guide* (R420)
- *VOS STREAMS TCP/IP User's Guide* (R421)

Notation Conventions

This manual uses the following notation conventions.

Warnings, Cautions, and Notes

Warnings, cautions, and notes provide special information and have the following meanings:

WARNING

A warning indicates a situation where failure to take or avoid a specified action could cause bodily harm or loss of life.

CAUTION

A caution indicates a situation where failure to take or avoid a specified action could damage a hardware device, program, system, or data.

NOTE

A note provides important information about the operation of a Stratus system.

Typographical Conventions

The following typographical conventions are used in this manual:

- Italics introduces or defines new terms. For example:

  The *master disk* is the name of the member disk from which the module was booted.

- Boldface emphasizes words in text. For example:

  Every module **must** have a copy of the `module_start_up.cm` file.

- Monospace represents text that would appear on your terminal's screen (such as commands, subroutines, code fragments, and names of files and directories). For example:

  ```
  change_current_dir (master_disk)>system>doc
  ```

- Monospace italic represents terms that are to be replaced by literal values. In the following example, the user must replace the monospace-italic term with a literal value.

```
list_users -module module_name
```

- Monospace bold represents user input in examples and figures that contain both user input and system output (which appears in monospace). For example:

```
display_access_list system_default

%dev#m1>system>acl>system_default

w  *.*
```

Key Mappings for VOS Functions

VOS provides several command-line and display-form functions. Each function is mapped to a particular key or combination of keys on the terminal keyboard. To perform a function, you press the appropriate key(s) from the command-line or display form. For an explanation of the command-line and display-form functions, see the manual *Introduction to VOS* (R001).

The keys that perform specific VOS functions vary depending on the terminal. For example, on a V105 ANSI terminal, you press the Shift and F20 keys simultaneously to perform the `INTERRUPT` function; on a V105/V109 EPC terminal, you press the 1 key on the numeric keypad to perform the `INTERRUPT` function.

NOTE

Certain applications may define these keys differently. Refer to the documentation for the application for the specific key mappings.

The following table lists some VOS functions and the keys to which they are mapped on commonly used Stratus terminals. For information about the key mappings for a terminal that is not listed in this table, refer to the documentation for that terminal.

VOS Function	V105 PC/+ 106	V105 ANSI	V105/V109 EPC
CANCEL	5 † or * †	F18	0 †
CYCLE	4 †	F17	4 †
CYCLE BACK	7 †	Shift-F17	7 †
DISPLAY FORM	6 † or - †	F19 or Shift-Help	6 † or Shift-Page Up
HELP	Shift-F8	Help	Shift-F8
INSERT DEFAULT	Shift-F11	F11	Shift-F11
INSERT SAVED	F11	Insert Here	F11
INTERRUPT	1 †	Shift-F20	1 †
NO PAUSE	8 †	Shift-F18	Shift-Insert

† Numeric-keypad key

Online Documentation

The VOS StrataDOC Web site is an online-documentation service provided by Stratus. It enables Stratus customers to view, search, download, print, and comment on VOS technical manuals via a common Web browser. It also provides the latest updates and corrections available for the VOS document set.

You can access the VOS StrataDOC Web site, at no charge, at `http://stratadoc.stratus.com`. A copy of the VOS StrataDOC CD-ROM is included with this release. You can also order additional copies from Stratus.

This manual is available on the VOS StrataDOC Web site.

For information about ordering the VOS StrataDOC CD-ROM, see the next section, “Ordering Manuals.”

Ordering Manuals

You can order manuals in the following ways.

- If your system is connected to the Remote Service Network (RSN™), issue the `maint_request` command at the system prompt. Complete the on-screen form with all of the information necessary to process your manual order.
- Customers in North America can call the Stratus Customer Assistance Center (CAC) at (800) 221-6588 or (800) 828-8513, 24 hours a day, 7 days a week. All other customers can contact their nearest Stratus sales office, CAC office, or distributor; see `http://www.stratus.com/support/cac/index.htm` for CAC phone numbers outside the U.S.

Manual orders will be forwarded to Order Administration.

Commenting on This Manual

You can comment on this manual by using the command `comment_on_manual`. To use the `comment_on_manual` command, your system must be connected to the RSN. Alternatively, you can email comments on this manual to `comments@stratus.com`.

The `comment_on_manual` command is documented in the manual *VOS System Administration: Administering and Customizing a System* (R281) and the *VOS Commands Reference Manual* (R098). There are two ways you can use this command to send your comments.

- If your comments are brief, type `comment_on_manual`, press Enter or Return, and complete the data-entry form that appears on your screen. When you have completed the form, press Enter.
- If your comments are lengthy, save them in a file before you issue the command. Type `comment_on_manual` followed by `-form`, then press Enter or Return. Enter this manual's part number, `R584`, then enter the name of your comments file in the `-comments_path` field. Press the key that performs the `CYCLE` function to change the value of `-use_form` to `no` and then press Enter.

> NOTE
>
> If `comment_on_manual` does not accept the part number of this manual (which may occur if the manual is not yet registered in the `manual_info.table` file), you can use the `mail` request of the `maint_request` command to send your comments.

Your comments (along with your name) are sent to Stratus over the RSN.

Stratus welcomes any corrections and suggestions for improving this manual.

Chapter 1
Introduction

RPC and XDR for VOS is the Stratus implementation of the Remote Procedure Calls (RPC) and External Data Representation (XDR) facilities for the ftServer V Series platform. This software is an exact port of Release 1.3 of the NFS™ (Network File System) and RPC software available on Stratus Continuum Series systems, with the following exceptions:

- NFS is not supported.
- STREAMS TCP/IP (STCP) is the **only** version of TCP/IP supported.

This chapter discusses the following topics:

Release Contents

RPC and XDR for VOS is included on the VOS release tape for VOS Release 15.1.1 or later releases, but must be separately installed. The following is a list of files and directories created during the installation of RPC and XDR for VOS:

- `(master_disk)>system>rpc`
- `(master_disk)>system>rpc>stcp`
- `(master_disk)>system>rpc>stcp>command_library`
  - `portmap.pm`
  - `rpcinfo.pm`

- (master_disk)>system>rpc>stcp>include_library
  - adb.h
  - auth.h
  - auth_unix.h
  - clnt.h
  - nfs_macros.h
  - pmap_clnt.h
  - pmap_prot.h
  - rpc.h
  - rpc_errno.h
  - rpc_macros.h
  - rpc_msg.h
  - rpcrealtime.h
  - rpctypes.h
  - svc.h
  - svc_auth.h
  - xdr.h
- (master_disk)>system>rpc>stcp>object_library
  - adb.obj
  - auth_none.obj
  - auth_unix.obj
  - authunix_prot.obj
  - clnt_perror.obj
  - clnt_raw.obj
  - clnt_simple.obj
  - clnt_tcp.obj
  - clnt_udp.obj
  - get_myaddress.obj
  - get_timeofday.obj
  - getrpcent.obj
  - pmap_clnt.obj
  - pmap_getmaps.obj

  - pmap_getport.obj
  - pmap_prot.obj
  - pmap_prot2.obj
  - pmap_rmt.obj
  - rpc_callmsg.obj
  - rpc_logmsg.obj
  - rpc_prot.obj
  - rpcmem.obj
  - svc.obj
  - svc_auth.obj
  - svc_auth_unix.obj
  - svc_raw.obj
  - svc_simple.obj
  - svc_tcp.obj
  - svc_udp.obj
  - xdr.obj
  - xdr_array.obj
  - xdr_float.obj
  - xdr_mem.obj
  - xdr_rec.obj
  - xdr_reference.obj
  - xdr_stdio.obj

- (master_disk)>system>sample_programs>rpc
  - auth_handles.c
  - auth_handles_stcp.bind
  - callrpc_ex.c
  - callrpc_ex_stcp.bind
  - del_lp.cm
  - getmaps.c
  - getmaps_stcp.bind
  - getport.c
  - getport_stcp.bind

- msg_clnt.h
- msg_svc.h
- pmap_rmtcall_ex.c
- pmap_rmtcall_ex_stcp.bind
- README
- rpc_bind.cm
- rpc_compile.cm
- server_side.c
- server_side_stcp.bind
- stcp_lp.cm
- tcp_client_side.c
- tcp_client_side_stcp.bind
- udp_client_side.c
- udp_client_side_stcp.bind

Software Compatibility

RPC and XDR for VOS requires that the following software also be installed and configured on your system:

- VOS Release 15.1.1 or a later release
- STCP (see the *VOS STREAMS TCP/IP Administrator's Guide* (R419))

Hardware Compatibility

RPC and XDR for VOS requires no additional hardware besides the ftServer V Series system's embedded 10/100/1000-Mbps Ethernet adapters, but supports any Ethernet adapter compatible with ftServer V Series systems and STCP.

Additional Documentation

Additional information about RPC and XDR for VOS can be found in the *VOS Communications Software: NFS and RPC* (R199) manual. When using that manual, remember that RPC and XDR for VOS does not support NFS. The chapters and passages that refer to NFS in that manual do not apply to RPC and XDR for VOS.

The >system>doc Directory

This document is provided in ASCII format in the `>system>doc>rpcxdr_srb.memo` file.

Descriptions of known problems are in the file `rpcxdr_problems_srb.memo` which is also located in the `>system>doc` directory. If no known problems exist that require explanation, this file will not exist.

Installing RPC and XDR for VOS

The RPC and XDR for VOS release includes executable files and objects needed to run the product on your VOS system.

The following sections provide information about installing RPC and XDR for VOS:

- "System Requirements for Installation" on page 1-5
- "Installation Procedure" on page 1-5

System Requirements for Installation

To install RPC and XDR for VOS, you need:

- VOS Release 15.1.1 or later
- approximately 480 blocks of disk space on the master disk

Installation Procedure

Before attempting to install RPC and XDR for VOS, verify that the purchase bit for this product is set on your system. To do so, type the following command:

```
!display_line (software_purchased S048)
```

If the output of this command is `1`, you can proceed with installation. If it is `0`, contact your Stratus customer support representative for assistance.

To proceed with installation, type the following command:

```
install_new_release
```

For information about this command, see the *VOS Installation Guide* (R386).

When installation is complete, the product is ready to run, and no further configuration is required.

Sample Programs

The (master_disk)>system>sample_programs>rpc directory contains the following sample programs:

- auth_handles.c – Creates and returns an RPC authentication handle that contains non-usable and UNIX style authentication information
- callrpc_ex.c – Makes a remote procedure call on the machine hostname
- getmaps.c – A user interface to the portmap, which returns a list of the current RPC program-to-port mapping on the server side
- getport.c – A user interface to the portmap, which returns the port number that the server side services
- pmap_rmtcall_ex.c – A user interface to the portmap, which instructs the portmap on the server side to make an RPC call
- tcp_client_side.c – A client side program that makes TCP-based RPC calls
- udp_client_side.c – A client side program that makes UDP-based RPC calls
- server_side.c – A server side program that handles both TCP/UDP RPC calls and returns appropriate responses to a RPC request

The (master_disk)>system>sample_programs>rpc directory also contains the rpc_compile.cm and rpc_bind.cm command macros. Use these macros to compile and bind all the sample programs.

A .bind file is provided for each sample program. After compiling a sample program, use its .bind file to bind it.

Chapter 2
STCP and RPC and XDR for VOS

This chapter discusses how STREAMS TCP/IP (STCP) interacts with RPC and XDR for VOS. The module on which you install this software must be running the STREAMS TCP/IP (STCP) software.

If you are moving an application from a Continuum Series system that runs OS TCP/IP to an ftServer V Series system, you must be familiar with the *VOS STREAMS TCP/IP Migration Guide* (R418).

This chapter provides information that is specific to STCP. It describes the following STCP commands, files, and procedures that RPC and XDR for VOS requires when it is installed on a system running STCP.

For more information about STCP, see the following manuals.

- *VOS STREAMS TCP/IP Migration Guide* (R418)
- *VOS STREAMS TCP/IP Administrator's Guide* (R419)
- *VOS STREAMS TCP/IP Programmer's Guide* (R420)
- *VOS STREAMS TCP/IP User's Guide* (R421)

For more information about RPC and XDR, see the manual *VOS Communications Software: NFS and RPC* (R199).

Issuing the portmap Command

To start the Portmap server, issue the portmap command. The following example illustrates a typical invocation of the portmap command issued on a module running STCP.

```
start_process '>system>rpc>stcp>command_library>portmap' -process_name &+
   portmap -output_path >system>rpc>stcp>command_library>portmap.out &+
   -privileged -priority 8
```

The STCP Database Files

STCP uses several database files to perform operations such as referencing host and network names and addresses, identifying services and protocols used by your system, resolving network routing, and configuring interfaces. These files, which are located in the directory (master_disk)>system>stcp, are as follows:

- The hosts database file typically contains the names and Internet addresses of hosts to which you want to connect using STCP.
- The networks database file contains the names, Internet addresses, and aliases of the networks to which you want to connect using STCP.
- The services database file contains a list of the services available on your system. (Typically, these services are used by the Internet.)
- The protocols database file contains a list of the protocols supported on your system. (Typically, these protocols are used by the Internet.)
- The inetd.conf database file contains the name of each service that you want the inetd process to invoke when it receives an Internet connection request for that service.
- The resolv.conf database file contains routing information that is read by the name-resolution routines when they are first invoked by a process.

For more information about these files, see the *VOS STREAMS TCP/IP Administrator's Guide* (R419). For information about the name-resolution routines, see the *VOS STREAMS TCP/IP Programmer's Guide* (R420).

Selecting Sockets

For information about selecting sockets using RPC function calls, see the manual *VOS Communications Software: NFS and RPC* (R199). For information specific to STCP sockets, see the *VOS STREAMS TCP/IP Programmer's Guide* (R420), which discusses creating sockets, setting and checking their options, and other topics concerning communicating through STCP sockets.

Library Paths

You must ensure that the RPC and STCP command, include, and object library paths are added in the correct order.

The `(master_disk)>system>sample_programs>rpc` directory contains the `del_lp.cm` and `stcp_lp.cm` command macros. Issue the `del_lp.cm` command macro to delete the previous RPC and STCP library paths, then issue the `stcp_lp.cm` command macro to add the RPC and STCP library paths in the correct order.

If you choose to set up your environment manually and not use the `del_lp.cm` and `stcp_lp.cm` command macros, make sure that your library paths are in the following order:

```
(master_disk)>system>rpc>stcp>command_library
(master_disk)>system>stcp>command_library

(master_disk)>system>rpc>stcp>include_library
(master_disk)>system>stcp>include_library
(master_disk)>system>stcp>include_library>arpa
(master_disk)>system>stcp>include_library>bsd
(master_disk)>system>stcp>include_library>bsd>sys
(master_disk)>system>stcp>include_library>compat[1]
(master_disk)>system>stcp>include_library>net
(master_disk)>system>stcp>include_library>netinet
(master_disk)>system>stcp>include_library>prototypes

(master_disk)>system>rpc>stcp>object_library
(master_disk)>system>stcp>object_library
(master_disk)>system>stcp>object_library>common
(master_disk)>system>stcp>object_library>net
(master_disk)>system>stcp>object_library>sbsd
(master_disk)>system>stcp>object_library>socket
(master_disk)>system>posix_object_library>bsd
(master_disk)>system>posix_object_library
(master_disk)>system>c_object_library
```

See the *VOS Commands Reference Manual* (R098) for more information about the `add_library_path` command.

[1] This library is included so that the sample programs written for OS TCP/IP will compile and bind for use with STCP.

Object Modules

After compiling an RPC source program, you must bind the program's object module with the appropriate STCP and RPC object modules. See ''Library Paths'' on page 2-3 and the manual *VOS Communications Software: NFS and RPC* (R199) for more information about these object modules.

Debugging Tools

You can use the STCP `ping`, `packet_monitor`, and `netstat` commands to get information about the network and help isolate a variety of problems, including problems on the network and with programs using the network. For more information about these commands, see the *VOS STREAMS TCP/IP Administrator's Guide* (R419).