# RTSMB Server Manual

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# RTSMB Server Manual

## Chapter One: Introduction

CHAPTER 1

## INTRODUCTION TO THE RTSMB SERVER

When offering SMB services, client machines will see “shares” available for browsing. Each share corresponds with a directory on the server’s file system. The client will attempt to log on to the server and, if successful, will then be able to read and write from the share as if it were a local directory to their machine.

To offer such services with RTSMB, you must first initialize the server, tell it which directories you would like to make available, and then let it process events.

To initialize the server, you just tell RTSMB what ip the server should use, and the broadcast and mask ips to use. (the API call rtsmb_init)

Before anyone can connect to the server, you must tell RTSMB what directories to allow other people to access. You can set a password to allow authorized access only or you can let anyone access the share. (the API call rtsmb_share_add_tree – so called because SMB refers to shares as trees)

If you want, you can, instead of establishing per-directory passwords, set up a list of usernames and passwords to allow access to the whole server or specific shares.

Once you’ve established what shares you want to offer and what access you want to grant, you must repeatedly call the rtsmb_cycle functions to allow the server to process incoming requests. What this does is accept new connections, respond to requests of the server, and do any necessary bookkeeping.

## INTRODUCTION TO THE SMB PROTOCOL

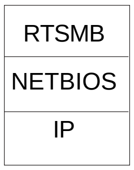
### BASICS

This package implements a CIFS/SMB server. SMB stands for Server Message Block and is a protocol designed by Microsoft, IBM, and others to allow networked computers to share files. CIFS stands for Common Internet File System and is an extension of the SMB protocol designed by Microsoft to increase the functionality of SMB.

Microsoft uses CIFS/SMB to allow Windows machines to make resources such as disk trees (SMB vernacular for directories) and printers available to others on the local network. Linux has similar functionality available with the SAMBA package.

### PROTOCOL HIERARCHY

CIFS/SMB needs some way of associating network names with addresses. It commonly uses NETBIOS for this, and RTSMB does the same. RTSMB uses TCP/IP for basic network communication and thus the protocols will look like this:



### BASIC NETWORKING

There are three major ports of interest: 137, 138, and 139.

137 Name Service port (UDP)
138 Netbios Datagram Service port (UDP)
139 Session Service port (TCP)

The name service handles registering of network names and name challenges.

The netbios datagram service handles announcements of server availability.

The session service handles establishing a connection between servers.

When a server starts up, it registers its name across the name service, sends several announcements across the netbios datagram service, and waits for connections on the session service.

Every time the session service sees a connection, it opens a new port and assigns that session to it. All further inter-computer communications occurs on that TCP/IP port.

### FLOW OF CIFS/SMB COMMUNICATION

A client will connect to a server by initiating a session request on the servers Session Service port. Then, the server waits until the client issues a request, processes each request, and then issues a response, if needed.

### EXAMPLE

Client —————->>>—————— Server
(Connection to port 139; “I want a session”)

Client —————-<<<—————— Server
(New connection opened)

.
.

.

Client —————->>>—————— Server
(“open this file”)

Client —————<<<—————— Server
(“success; this is file id of file”)

The server never initiates a session or a command within a session. Most CIFS/SMB requests take exactly one response.

To start a connection, the client sends a “negotiate” request and receives a response indicating which dialect of SMB will be spoken, as well some server-specific information. Then, the client requests a “session setup” which will log a user in. Finally, to get any work done, that user connects to a share by sending a “tree connect” request. This will allow the user to browse the files on the share (or in the case of IPC$, let the user see what shares are available).

## MODULES

The only file you need to include to have access to RTSMB is srvapi.h, but here is a description of all RTSMB source files:

**Common Headers:**

| | |
|---|---|
| smb.h | - Protocol information |
| smbobjs.h | - Protocol data structures |
| smbconf.h | - Configuration settings (see below) |
| smbdefs.h | - Common defines needed by RTSMB |

**Porting Modules:**

| | |
|---|---|
| psmbfile | - Access to the file system through a common API |
| psmbnet | - Access to the network stack |
| psmbos | - Access to OS-level items like mutexes and timers |

**Modules of Server Code:**

| | |
|---|---|
| srvans | - Code to pack server responses into buffers |
| srvarg | - Parses a config file for share setup |
| srvassrt | - Provides sanity checking for smb processing |
| srvauth | - Password and permission checking |
| srvcfg | - Memory-resident data and configuration |
| srvcmds | - Code to read client requests from buffers |
| srvfio | - Abstraction layer for RTSMB->psmbfile calls |
| srvnbns | - Netbios name service support |
| srvnbss | - Netbios session service support |
| srvnet | - Main networking and control flow code |
| srvrap | - Allows enumeration of shares (IPC$) |
| srvrsrcs | - Semaphore code |
| srvshrare | - Share functions and data structures |
| srvssn | - SMB server packet processing |
| srvtrans2 | - SMB transaction packet processing |
| srvutil | - Server specific support functions |

## PORTING

If you want to port RTSMB to a different platform than RTIP/RT-Kernel, Windows, or GNU/Linux, you need to provide three files: psmbfile.c, psmbnet.c, and psmbos.c.

psmbfile.c is an abstraction layer for your file system. This can support Unicode, but does not need to. Look at windows/psmbfile.c for examples.

psmbnet.c is an abstraction layer for your network stack. This emulates unix-style sockets. Look at windows/psmbnet.c for examples.

psmbos.c is an abstraction layer for various kernel functions like mutex allocation and timing methods. Also, printing functions are stored here.

To build with your files, simply add them from the correct subdirectory to your project so that they get compiled along with the rest of the source code.

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# Chapter Two: Configuring RTSMB

C H A P T E R 2

## PARAMETERS LOCATED IN SRVCFG.C

**CFG_RTSMB_MAX_THREADS**

This controls how many helper threads the server can spawn at one time to increase responsiveness. Sessions are handed off to these helper threads as they come in. If set to 0, multithreading is turned off. ***The default value is 0***.

You might lower this to save on footprint. If you are experiencing bottlenecks with large I/O operations on one session, you might increase this to allow other sessions to be serviced at the same time.

**CFG_RTSMB_MAX_SESSIONS**

This controls how many sessions the server can be handling at one time. Sessions are made once per client machine. ***The default value is 4.***

You might increase this to allow more clients to connect to the server at once. If the server is at maximum, new session requests will be denied.

**CFG_RTSMB_MAX_UIDS_PER_SESSION**

This controls how many users can be logged in on one session at one time. ***The default value is 2.***

Some clients (notably Windows XP) log in many users for one connection and fail if they cannot get enough logins. Thus, lower this value cautiously.

**CFG_RTSMB_MAX_FIDS_PER_SESSION**

This controls how many open files a session can have at one time. ***The default value is 5.***

You might increase this if your clients are doing a lot of intensive reading and writing such that they would need to have many simultaneously open files.

**CFG_RTSMB_MAX_FIDS_PER_TREE**

This controls how many open files a tree can have on one session at one time. Setting this to higher than MAX_FIDS_PER_SESSION is pointless. ***The default value is MAX_FIDS_PER_SESSION.***

You might lower this if you want to restrict how many I/O operations are going on for a particular share. Lowering this would prevent any one user from monopolizing disk resources.

**CFG_RTSMB_MAX_FIDS_PER_UID**

This controls how many open files a user can have on one session at one time. Setting this to higher than MAX_FIDS_PER_SESSION is pointless. ***The default value is MAX_FIDS_PER_SESSION.***

You might lower this if you want to restrict how many open files any user can have at one time. Lowering this would prevent any one user from monopolizing disk resources.

**CFG_RTSMB_MAX_SEARCHES_PER_UID**

This controls how many simultaneous searches a user can have. It is recommended that you do not change this. ***The default value is 2.***

You might increase this if your clients are doing a lot of simultaneous searches. You might lower it if they are not and you want less footprint.

**CFG_RTSMB_MAX_SHARES**

This controls how many shares you want the server to be able to offer. ***The default value is 5.***

Increase this if you need to share more directories. If you don't, lower it to decrease footprint.

**CFG_RTSMB_MAX_GROUPS**

The maximum number of groups you want to keep track of. See auth.c for an explanation. ***The default value is 4.***

Increase this if you need more fine-grained control over your users. If you plan to always run in share mode, this can be set to 0 to save memory.

**CFG_RTSMB_MAX_USERS**

The maximum number of users you want to keep track of. See auth.c for an explanation. ***The default value is 8.***

Increase this if you want to allow access to many different people (who each need a username/password). If you plan to always run in share mode, this can be set to 0 to save memory.

**CFG_RTSMB_SMALL_BUFFER_SIZE**

This defines the size of common buffers. Each session has three of these – one for reading, one for writing, and one for scratchwork. ***The default value is 2924.***

Increase this if you want to make network traffic more efficient and can spare the increase in footprint. Decrease this (no lower than 1028!) if you want to save on footprint and can handle more network traffic.

**CFG_RTSMB_BIG_BUFFER_SIZE**

This defines the size of the big buffers. These are only used to support raw reading and writing. The maximum value is 65539, which you will need to use to support raw reads/writes on pre-NT protocols. ***The default value is 65539.***

If you don't need to support pre-NT clients, but want some of the efficiency of raw reads and writes, set this lower, like around 30000.

**CFG_RTSMB_NUM_BIG_BUFFERS**

This sets how many big buffers you want available. This controls how many simultaneous raw reads or writes the server can handle. Setting this to 0 disables raw reading/writing. ***The default value is 0.***

Increase this if you can handle the increased footprint and expect to do large reading and writing. Many clients don't always use raw reads/writes when they can, so you may not get as much mileage from this as you might hope.

**CFG_RTSMB_MAX_TREES_PER_SESSION**

This controls how many shares one session can have open at one time. ***The default value is 10.***

Some clients (notably the Windows NT line) try to connect to many trees at once and fail if they cannot connect. Thus, lower this value cautiously.

**CFG_RTSMB_BROWSE_MAX_SERVER_INFOS**

This controls how many servers we can keep track of at once. The higher this is, the larger networks RTSMB can support. Memory used by this is around 140 bytes per info. ***The default value is 30.***

**CFG_RTSMB_BROWSE_MAX_DOMAIN_INFOS**

This controls how many workgroups we can keep track of at once. The higher this is, the larger networks RTSMB can support. Each domain info block is around 70 bytes. ***The default value is 5.***

# RTSMB Server Manual

# Chapter Three: Porting RTSMB

CHAPTER 3

## RTSMB PORTING: OVERVIEW

The interface from RTSMB to the underlying operating system, network stack, and file system is provided through the following files:

| | |
|---|---|
| **psmbos.c** - | interface to underlying OS, including mutex semaphores, time functions, and printer functions (if printer support is desired) |
| **psmbnet.c** - | interface to TCP/IP network stack; modeled on the BSD sockets interface |
| **psmbfile.c** - | interface to the file system |

This section describes the functions contained within these files, and how to port RTSMB to an environment.

If you want to port RTSMB to a new platform, you need to provide the three porting files – psmbfile.c, psmbnet.c, and psmbos.c.

To build with your files, simply add them from the correct subdirectory to your project so that they get compiled along with the rest of the source code.

## INSTRUCTIONS FOR PORTING USING VISUAL C++:

Two examples of project files are available under the top level directory “Server Example Projects”.

If you want to make a new project configuration for your target, take all the source code (.c) files in the toplevel src directory, except for ncbc_enc.c, and add them to your project. Then, add one of each of psmbfile.c, psmbnet.c, and psmbos.c from whichever subdirectory is appropriate (or the ones you made).

RTSMB does not require any command line defines or special link libraries. Just link the libraries you need for your net, OS, and file porting files and add the following preprocessor includes (under Project->Settings and then the C/C++ tab, category Preprocessor, field “Additional include directories:”):

..\src\include,..\src\include\OPENSSL,..\src

## RTSMB PORTING: PERIODIC CLOCK SUPPORT (PSMBOS.C)

RTSMB requires a periodic clock for protocol-related timeouts. A single function provides the interface to this service:

unsigned long **rtsmb_osport_get_msec** (void)

Returns the system clock time in milliseconds.

## RTSMB PORTING: MUTEX SEMAPHORE SUPPORT (PSMBOS.C)

***Note: Mutex support is only required by RTSMB in a multi-tasking environment. If RTSMB is invoked from a single thread in polled mode, mutex semaphore support is not necessary.***

int **rtsmb_osport_create_mutex** (unsigned long *mutexHandle)

This routine must allocate and initialize a mutex, to the unclaimed status. It must set the unsigned long pointed to by mutexHandle to a value that can be used as a handle to the mutex. If this routine is successful, this routine returns 0. Otherwise, it returns a negative value and the value of *mutexHandle is undefined.

void **rtsmb_osport_claim_mutex** (unsigned long mutexHandle)

This routine takes a mutex handle returned by rtsmb_osport_create_mutex and returns nothing. If the mutex is already claimed, this routine must wait for the mutex to be released and then claim it and return.

void **rtsmb_osport_release_mutex** (unsigned long mutexHandle)

This routine takes a mutex handle returned by rtsmb_osport_create_mutex and releases it. It returns nothing.

## RTSMB PORTING: THREAD SUPPORT (PSMBOS.C)

***Note: Thread support is only required by RTSMB in a multi-tasking environment. If RTSMB is invoked from a single thread in polled mode, thread support is not necessary.***

int **rtsmb_osport_create_thread** (RTSMB_THREAD_FN fn, void *context)

This routine takes two parameters, a thread entry point function and a context pointer to pass into this entry point. It returns 0 if the thread is successfully spawned, a negative value otherwise. The entry point function takes a single value, a void pointer, and returns nothing. This routine should create a thread and start it running, starting at the given function. The context parameter should be passed into the entry point function.

void **rtsmb_osport_exit_thread** (void)

This routine should perform any kernel specific thread termination and clean up operations. It will be the last thing done in any thread created by RTSMB using **rtsmb_osport_create_thread**. It signals the termination of the thread from which it is called.

unsigned **int rtsmb_osport_get_thread_id** (void)

This routine returns some unique identifier for the current thread. This identifier is implementation-specific and no special meaning will be attached to it (except that a one-to-one correspondence from thread to thread id exists).

## RTSMB PORTING: PRINTER SUPPORT (PSMBOS.C)

These functions are only required if printer sharing support is enabled in RTSMB.

A printer, for the purposes of RTSMB, is defined as an output-only device that is uniquely identified by a logical port number. A printer must be opened for exclusive use before data can be written to it, and closed once all data has been written. In addition, an routine is provided to initialize system printers before they are made available over a network.

int **rtsmb_osport_printer_init** (int ioPort)

This routine is called once to initialize each printer (once per logical printer port). The only parameter is an integer identifying the port to initialize. This routine should return 0 if successful, or a negative value if the given port could not be initialized.

int **rtsmb_osport_printer_open** (int ioPort)

This routine opens a printer for writing data. The printer is identified by the ioPort paramater. This routine should return 0 if successful, or a negative value otherwise.

long **rtsmb_osport_printer_write** (int ioPort, unsigned char *buffer, long size)

This routine will only be called on printer ports that have been initialized using **rtsmb_osport_printer_init**, and opened using **rtsmb_osport_printer_open**. It should write size bytes from the given buffer to the printer port, and return the number of bytes successfully written. Either 0 or a negative value may be returned in the event of an error.

int **rtsmb_osport_printer_close** (int ioPort)

This routine is called once all data has been written to a printer. It should free any resources used in the writing process and make the printer available to be opened again by another party. It should return 0 if successful, or a negative value on error.

## RTSMB PORTING: NETWORK SUPPORT (PSMBNET.C)

The RTSMB interface to the underlying TCP/IP network stack is modeled after the BSD sockets API, but with some modifications to eliminate dependencies on platform-specific types and structures. As much as possible, the intention is to provide a very direct mapping between RTSMB network porting functions and calls in the sockets API. Referring to a document describing the sockets API, such as the RTIP manual, may therefore be helpful in porting psmbnet to a particular network stack.

***Note: all network addresses are arrays of 4 unsigned chars. All port values are integers in host byte order (port values may need therefore to be converted to network byte order within these routines).***

int **rtsmb_netport_init** (void)

This function should initialize the network stack for operation. If successful, it returns 0, otherwise, it returns a negative value.

int **rtsmb_netport_accept** (int *accepted, int socketId, unsigned char *remoteAddr, int *remotePort)

| | | |
|---|---|---|
| newConnection | - | pointer to a socket handle to set to the socket id of the new connection |
| socketId | - | the socket to accept the connection on |
| remoteAddr | - | (optional) array to fill with the ip address of the remote host |
| remotePort | - | (optional) pointer to int to set to the port of the remote host |

**Description:**

This function should block waiting for a remote host to connect to the port/ip address to which socketId is bound. If a connection is successfully established, it must set *newConnection to the socket for the new connection (socketId continues to listen on its port/ip), and return 0.

In the event of a successful connection, remoteAddr and remotePort should also be set to the ip/port of the remote host that connected. If no connection can be established or an error occurs, the return value is negative, and the values of *newConnection, *remoteAddr, and *remotePort are undefined.

The behavior of this function is undefined in the following cases:

- socketId is not a valid, stream-type socket
- rtsmb_netport_bind was never called on socketId
- rtsmb_netport_listen was never called on socketId

**See Also:**

rtsmb_netport_bind, rtsmb_netport_listen, rtsmb_netport_socket_stream

**Returns:**

0 on success, negative on failure

int **rtsmb_netport_allow_broadcast** (int socketId)

socketId - the socket for broadcasting

**Description:**

This function must be called on any socket over which broadcast messages are to be sent. If it is not called, broadcast messages are not guaranteed to work.

**Returns:**

0 on success, negative on failure

int **rtsmb_netport_bind** (int socketId, unsigned char *ipAddr, int port)

| | | |
|---|---|---|
| socketId | - | the socket to bind |
| ipAddr | - | (optional) the ip address to associate with this socket |
| port | - | the port to associate with this socket |

**Description:**

This function should be called on a socket before calling rtsmb_netport_listen/rtsmb_netport_accept (if the socket is stream-type), or rtsmb_netport_recvfrom (if the socket is datagram-type). The behavior of this function is undefined if socketId is not a valid socket handle.

If the port specified is already in use by another socket, this function must return a negative value.

**See Also:**

rtsmb_netport_accept, rtsmb_netport_listen, rtsmb_netport_socket_stream

**Returns:**

0 on success, negative on failure

int **rtsmb_netport_closesocket** (int socketId)

| | | |
|---|---|---|
| socketId | - | the socket to close |

**Description:**

This function should be called to release a socket and shut down any open connection it has. It is not defined whether this is a hard close.

**See Also:**

rtsmb_netport_accept, rtsmb_netport_connect

**Returns:**

0 on success, negative on failure

int **rtsmb_netport_connect** (int socketId, unsigned char *ipAddr, int port)

| | | |
|---|---|---|
| socketId | - | the socket to connect |
| ipAddr | - | the address to connect to |
| port | - | the port to connect to |

**Description:**

This function is called on a stream-type socket to initiate a connection to a specific ip address and port. This function can block until the connection is established. Behavior is undefined if socketId is not a valid, stream-type socket handle.

**See Also:**

rtsmb_netport_accept, rtsmb_netport_socket_stream, rtsmb_netport_closesocket

**Returns:**

0 on success, negative on failure

int **rtsmb_netport_listen** (int socketId, int queueSize)

| | | |
|---|---|---|
| socketId | - | the socket handle |
| queueSize | - | the max number of requested connections to queue for acceptance |

**Description:**

This function is called on a stream-type socket after rtsmb_netport_bind but before rtsmb_netport_accept to get a socket ready to accept connections from remote hosts.

**See Also:**

rtsmb_netport_accept, rtsmb_netport_bind, rtsmb_netport_socket_stream

**Returns:**

0 on success, negative on failure

long **rtsmb_netport_recv** (int socketId, unsigned char *buffer, long size)

| | | |
|---|---|---|
| socketId | - | the socket to read from |
| buffer | - | pointer to a buffer to place received data in |
| size | - | the maximum number of bytes to read |

**Description:**

This function is called on a connected socket to read data off that socket. It can block until up to size bytes are read or until the connection is closed, signifying that no more bytes are coming. If the connection has been terminated, it can return either 0 or a negative value.

If socketId is not a valid handle to a stream-type socket, behavior is undefined.

**See Also:**

rtsmb_netport_recvfrom, rtsmb_netport_send, rtsmb_netport_sendto, rtsmb_netport_select_n_for_read

**Returns:**

number of bytes read on success, negative on failure

long **rtsmb_netport_recvfrom** (int socketId, unsigned char *buffer, long size, unsigned char *ipAddr, int *port)

| | | |
|---|---|---|
| socketId | - | the socket to read from |
| buffer | - | pointer to a buffer to place received data in |
| size | - | the maximum number of bytes to read |
| ipAddr | - | (optional) pointer to a 4-byte array to fill with the ip address of the sender |
| port | - | (optional) pointer to an int to set to the port of the sending socket |

**Description:**

This function is called on a connectionless socket to read data. This function should block until data is ready, then read at most size bytes into buffer. If the datagram is smaller than size bytes, then only the number of bytes in the datagram must be read into the buffer, and the function must return.

**See Also:**

rtsmb_netport_recv, rtsmb_netport_send, rtsmb_netport_sendto, rtsmb_netport_select_n_for_read

**Returns:**

number of bytes read on success, negative on failure

---

int **rtsmb_netport_select_n_for_read** (int *socketList, int listSize, long timeoutMsec)

| | |
|---|---|
| socketList | - an array of socket ids to select from |
| listSize | - the number of elements in socketList |
| timeoutMsec | - the maximum number of milliseconds to wait before timing out. negative value means wait forever. |

**Description:**

This function must block for at most timeoutMsec milliseconds (or forever if this value is negative) waiting for data to become available for reading on at least one of the sockets listed in the socketList array.

When this function returns, it must have modified the contents of socketList to contain only those sockets which are ready for reading. The return value is the number of sockets on this modified list (i.e. the number of sockets that have data ready to be read).

**See Also:**

rtsmb_netport_recv, rtsmb_netport_recvfrom

**Returns:**

the number of sockets that have data ready to read.

---

long **rtsmb_netport_send** (int socketId, unsigned char *buffer, long size)

| | |
|---|---|
| socketId | - the socket to send over |
| buffer | - pointer to data to send |
| size | - the number of bytes to send |

**Description:**

This function is used to send data over a connected socket. The socket must be a stream-type; behavior is undefined if socketId is a datagram-type (connectionless) socket.

**See Also:**

rtsmb_netport_sendto, rtsmb_netport_recv, rtsmb_netport_recvfrom

**Returns:**

The number of bytes sent if successful, negative if an error occurred

---

long **rtsmb_netport_sendto** (int socketId, unsigned char *buffer, long size, unsigned char *ipAddr, int port)

| | |
|---|---|
| socketId | - the socket to send over |
| buffer | - pointer to data to send |
| size | - the number of bytes to send |
| ipAddr | - the IP address to send to |
| port | - the port number to send to |

**Description:**

Sends size bytes from buffer to the specified ip address/port. The given socket must be a connectionless (datagram-type); otherwise, behavior is undefined.

**See Also:**

rtsmb_netport_send, rtsmb_netport_recv, rtsmb_netport_recvfrom

**Returns:**

Returns the number of bytes sent if successful, negative if an error occurred

---

int **rtsmb_netport_socket_stream** (int *socketId)

socketId - pointer to an int to set to the socket handler

**Description:**

Allocates, if possible, a stream (TCP, connection-based) type socket. If return value is negative, the value of *socketId is undefined.

**Returns:**

0 if successful, negative otherwise

---

int **rtsmb_netport_socket_datagram** (int *socketId)

socketId - pointer to an int to set to the socket handler

**Description:**

Allocates, if possible, a datagram (UDP, connectionless) type socket. If return value is negative, the value of *socketId is undefined.

**Returns:**

0 if successful, negative otherwise

## RTSMB PORTING: FILE SYSTEM SUPPORT (PSMBFILE.C)

The interface to the underlying file system is provided through a structure containing a set of pointers to routines for performing file operations. This structure is called SMBFILEAPI. The default file system interface is pointed to by the global symbol prtsmb_filesys (a pointer to an SMBFILEAPI). The following routines are required to port RTSMB to a particular file system:

int **rtsmb_fileport_init** (void)

This routine must do any file system specific initialization, initialize prtsmb_filesys to point to an SMBFILEAPI instance, and initialize the members of prtsmb_filesys to point at functions for accessing the underlying file system. If all of these operations are successful, this routine returns 0; otherwise it returns a negative value.

SMBFILEAPI is defined as follows:

```
typedef struct smbfileapi
{
    RTSMB_FS_OPENFN         fs_open;
    RTSMB_FS_READFN         fs_read;
    RTSMB_FS_WRITEFN        fs_write;
    RTSMB_FS_LSEEKFN        fs_lseek;
    RTSMB_FS_TRUNCATEFN     fs_truncate;
    RTSMB_FS_FLUSHFN        fs_flush;
    RTSMB_FS_CLOSEFN        fs_close;
    RTSMB_FS_RENAMEFN       fs_rename;
    RTSMB_FS_DELETEFN       fs_delete;
    RTSMB_FS_MKDIRFN        fs_mkdir;
    RTSMB_FS_RMDIRFN        fs_rmdir;
    RTSMB_FS_SETCWDFN       fs_set_cwd;
    RTSMB_FS_PWDFN          fs_pwd;
    RTSMB_FS_GFIRSTFN       fs_gfirst;
    RTSMB_FS_GNEXTFN        fs_gnext;
    RTSMB_FS_GDONEFN        fs_gdone;
    RTSMB_FS_STATFN         fs_stat;
    RTSMB_FS_CHMODEFN       fs_chmode;
    RTSMB_FS_GET_FREEFN     fs_get_free;
    RTSMB_FS_SET_ATIMEFN    fs_set_atime;
    RTSMB_FS_SET_WTIMEFN    fs_set_wtime;
    RTSMB_FS_SET_CTIMEFN    fs_set_ctime;
    RTSMB_FS_SET_HTIMEFN    fs_set_htime;
} SMBFILEAPI;
```

The following function pointers may be null if the file system does not support unicode. Their semantics are the same as their ASCII counterparts, but instead of a 'char *' for the filename, they take an 'unsigned short *'.

```
    RTSMB_FS_GET_FREEFN     fs_get_free;
    RTSMB_FS_WOPENFN        fs_wopen;
    RTSMB_FS_WRENAMEFN      fs_wrename;
    RTSMB_FS_WDELETEFN      fs_wdelete;
    RTSMB_FS_WMKDIRFN       fs_wmkdir;
    RTSMB_FS_WRMDIRFN       fs_wrmdir;
    RTSMB_FS_WSETCWDFN      fs_wset_cwd;
    RTSMB_FS_WPWDFN         fs_wpwd;
    RTSMB_FS_WGFIRSTFN      fs_wgfirst;
    RTSMB_FS_WSTATFN        fs_wstat;
    RTSMB_FS_WCHMODEFN      fs_wchmode;
    RTSMB_FS_WGET_FREEFN    fs_wget_free;
    RTSMB_FS_WSET_ATIMEFN   fs_wset_atime;
    RTSMB_FS_WSET_WTIMEFN   fs_wset_wtime;
    RTSMB_FS_WSET_CTIMEFN   fs_wset_ctime;
    RTSMB_FS_WSET_HTIMEFN   fs_wset_htime;
```

The functions in SMBFILEAPI that must be pointed to by the prtsmb_filesys struct are defined as follows:

int **fs_open** (char * name, unsigned short flag, unsigned short mode)

| | |
|---|---|
| name | - name of the file to open |
| flag | - one or more of the following flags bit-wise OR'ed together: |
| RTSMB_O_RDONLY | - open for reading only |
| RTSMB_O_WRONLY | - open for writing only |
| RTSMB_O_RDWR | - open for reading and writing |
| RTSMB_O_APPEND | - open for appending |
| RTSMB_O_CREAT | - create file if it does not exist |
| RTSMB_O_TRUNC | - truncate file |
| RTSMB_O_EXCL | - open exclusive |
| RTSMB_O_BINARY | - open in binary mode (DOS/ Windows) |
| RTSMB_O_TEXT | - open in text mode (DOS/ Windows) |

mode - one of the following:

| | |
|---|---|
| RTSMB_S_IWRITE | - sets the file as writable when creating a file |
| RTSMB_S_IREAD | - sets the file as readable when creating a file |

**Description:**

Opens a file according to the flags and mode specified

**Returns:**

file descriptor value on success, negative on failure

long **fs_read** (int fd, unsigned char * buf, long count)

| | |
|---|---|
| fd | - file descriptor to read from |
| buf | - buffer to put data in |
| count | - max number of bytes to read |

**Description:**

Reads data from an open file.

**Returns:**

number of bytes read on success, negative on failure

long **fs_write** (int fd, unsigned char * buf, long count)

| | |
|---|---|
| fd | - file descriptor to write to |
| buf | - buffer of data to be written |
| count | - max number of bytes to write |

**Description:**

Writes data to an open file.

**Returns:**

number of bytes written on success, negative on failure long **fs_lseek** (int fd, long offset, int origin)

| | | |
|---|---|---|
| fd | - | file descriptor to set pointer of |
| offset | - | position (byte offset) to seek to |
| origin | - | point of reference for offset; one of the following: |

| | | |
|---|---|---|
| RTSMB_SEEK_SET | - | seek from beginning of file |
| RTSMB_SEEK_CUR | - | seek from the current read/write position |
| RTSMB_SEEK_END | - | seek from end of file |

**Description:**

Sets the file read/write position.

**Returns:**

the new position in bytes from the beginning of the file

int **fs_close** (int fd)

fd - file descriptor to close

**Description:**

Closes an open file.

**Returns:**

0 on success, negative on failure

char **fs_truncate** (int fd, long offset)

| | | |
|---|---|---|
| fd | - | file descriptor |
| offset | - | position to truncate at |

**Description:**

Cuts off a file to offset bytes.

**Returns:**

non-zero on success, 0 on failure

char **fs_flush** (int fd)

fd - file descriptor

**Description:**

Flushes all buffers associated with the given open file to the disk.

**Returns:**

non-zero on success, 0 on failure

char **fs_rename** (char * from, char * to)

| | | |
|---|---|---|
| from | - | the current file path |
| to | - | the new file path |

**Description:**

Renames/moves a file.

**Returns:**

non-zero on success, 0 on failure

char **fs_delete** (char * d)

d - file name to delete

**Description:**

Deletes the given file.

**Returns:**

non-zero on success, 0 on failure

char **fs_mkdir** (char * d)

d - path of new directory to create

**Description:**

Creates a directory if not already present.

**Returns:**

non-zero on success, 0 on failure

char **fs_rmdir** (char * d)

d - path of directory to remove

**Description:**

Removes a directory if present.

**Returns:**

non-zero on success, 0 on failure

char **fs_set_cwd** (char * to)

to - path of new current working directory

**Description:**

Sets the current working path for this thread. This is the path prepended to relative paths to resolve an absolute path.

Returns:

non-zero on success, 0 on failure

char **fs_pwd** (char * to, long size)

to - string buffer to print the working directory path in
size - max bytes to write to the buffer

**Description:**

Retrieves the current working directory path into the given buffer.

**Returns:**

non-zero on success, 0 on failure

char **fs_gfirst** (PSMBDSTAT dirobj, char * name)

| | |
|---|---|
| dirobj | - pointer to an uninitialized SMBDSTAT struct |
| name | - the pattern to use in searching (can include path) |

**Description:**

This routine retrieves the first entry in the given directory. It must populate the given SMBDSTAT struct with the relevant information for the first directory entry. The SMBDSTAT struct is defined as:

```
struct smbdstat
{
   PSMBFILEAPI fs_api;
   #if (INCLUDE_RTSMB_UNICODE)
   char        filename[SMBF_FILENAMESIZE * 2 + 2];
   char        short_filename[26];
   #else
   char        filename[SMBF_FILENAMESIZE + 1];
   char        short_filename[13];
   #endif

   char unicode;  /* set it to zero if
   filename is ascii, or non-zero when it is unicode */
   unsigned short fattributes;
   unsigned long fsize;

   TIME fatime64; /* last access time */
   TIME fwtime64; /* last write time */
   TIME fctime64; /* last create time */
   TIME fhtime64; /* last change time */

   unsigned char fs_obj[RTSMB_DSTAT_FS_OBJ_SIZE];

};
```

where fs_api is a pointer to the file system interface being used, filename is the last found found, unicode is a boolean value indicating whether the contents of filename are in unicode or not, fattributes is one or more of the following, bitwise OR'd together:

| | |
|---|---|
| SMBF_ATTRIB_ISROOT | - current entry is the root directory |
| SMBF_ATTRIB_ISDIR | - current entry is a directory |
| SMBF_ATTRIB_ISVOL | - current entry is a volume |
| SMBF_ATTRIB_RDONLY | - current entry is marked read-only |
| SMBF_ATTRIB_WRONLY | - current entry is marked write-only |
| SMBF_ATTRIB_RDWR | - current entry is marked read and write |

The TIME type is a 64-bit struct defined as follows:

```
typedef struct {
dword low_time;
dword high_time;
} TIME;
```

It holds the number of 100-nanosecond intervals since January 1st, 1601. There are conversion routines (to and from) for both unix epoch time and DOS time if those are simpler for your file system to use.

**Returns:**

non-zero on success, 0 on failure (directory is empty)

char **fs_gnext** (PSMBDSTAT dirobj)

dirobj - pointer SMBDSTAT initialized by gfirst

**Description:**

Gets the next entry in a directory. See gfirst for description of the format of the entry information contained in the SMBDSTAT struct.

**Returns:**

non-zero on success, 0 on failure (there are no more entries)

void **fs_gdone** (PSMBDSTAT dirobj)

dirobj - pointer SMBDSTAT initialized by gfirst

**Description:**

When a directory's entries have been enumerated through gfirst, gnext, it must finally be closed using this routine. This routine should free any resources allocated by gfirst/gnext.

**Returns:**

nothing

char **fs_stat** (char * name, PSMBFSTAT stat)

| | |
|---|---|
| name | - file path to retrieve information for |
| vstat | - pointer to an SMBFSTAT struct to fill with file information |

**Description:**

If the file is present, fills the given SMBFSTAT struct with information about the file. SMBFSTAT is defined as:

```
struct smbfstat
{
   unsigned short f_mode;
   unsigned long f_size; /* file size, in bytes */
   TIME f_atime64; /* last access time */
   TIME f_wtime64; /* last write time */
   TIME f_ctime64; /* last create time */
   TIME f_htime64; /* last change time */

};
```

where f_mode is the file mode; one or more of :

| | |
|---|---|
| RTSMB_FMODE_IFDIR | - is a directory |
| RTSMB_FMODE_IFREG | - mode is regular (?) |
| RTSMB_FMODE_IWRITE | - Write permitted |
| RTSMB_FMODE_IREAD | - Read permitted. |

The TIME type is a 64-bit struct defined as follows:

```
typedef struct {
dword low_time;
dword high_time;
} TIME;
```

It holds the number of 100-nanosecond intervals since January 1st, 1601. There are conversion routines (to and from) for both unix epoch time and DOS time if those are simpler for your file system to use.

**Returns:**

non-zero on success, 0 on failure

---

char **fs_chmode** (char * name, unsigned char attributes)

---

name - file path

attributes - new attributes

**Description:**

Changes the attributes of a file. See open for a description of attribute flags.

**Returns:**

non-zero on success, 0 on failure

---

char **fs_get_free** (char * name, unsigned long *blocks, unsigned long *bfree, unsigned long *sectors_per_block, unsigned short *bytes_per_sector)

---

| | |
|---|---|
| name | - a filename on the hard disk to check |
| blocks | - a return value for the total number of units |
| bfree | - a return value for the number of free units |
| sectors_per_block | - a return value for the number of sectors per unit |
| bytes_per_sector | - a return value for the number of bytes per sector |

**Description:**

Gets the number of total units and free units in the file system.

**Returns:**

non-zero on success, 0 on failure

---

char **fs_set_time** (int fd, TIME atime, TIME wtime, TIME ctime, TIME htime)

---

fd – file descriptor of file to alter

atime – the last access time of the file

wtime – the last modified time of the file

ctime – the creation time of the file

htime – the last chmode date of the file

**Description:**

If the file is present, sets appropriate time attribute for the file to the value of the TIME struct. If the time passed in is NULL, the time attribute is ignored.

The TIME type is a 64-bit struct defined as follows:

```
typedef struct
{
   dword low_time;
   dword high_time;
}TIME;
```

It holds the number of 100-nanosecond intervals since January 1st, 1601. There are conversion routines (to and from) for both unix epoch time and DOS time if those are simpler for your file system to use.

**Returns:**

non zero on success, 0 on failure (invalid file handle)

# RTSMB Server Manual

# Chapter Four: RTSMB Server API

CHAPTER 4

## SERVER API OVERVIEW

The following pages document each call to the RTSMB API. But first, a quick categorical overview of the functions.

### PROGRAM FLOW

**rtsmb_srv_init**
This initializes the server and allows the rest of the API functions to be used.

**rtsmb_srv_cycle**
This runs one ‘iteration’ of the server – that is, the server will handle at most one waiting request on each connection. This blocks waiting for network input up to a specified timeout.

**rtsmb_srv_shutdown**
This stops the server.

### CONFIGURATION

**rtsmb_srv_read_config**
This reads the specified file and sets up users/shares according to what the file specifies. The file format is similar to .ini files; you can see an example in the file smbconf.txt.sample.

**rtsmb_srv_set_mode**
This sets the server mode to either user- or share-mode.

**rtsmb_srv_get_mode**
This returns whether the server is in user- or share-mode.

### USER MANAGEMENT

**rtsmb_srv_register_group**
This initializes the specified group.

**rtsmb_srv_register_user**
This initializes the specified user, granting him or her access.

**rtsmb_srv_delete_user**
This deletes the specified user, denying access to him or her.

**rtsmb_srv_add_user_to_group**
This adds a user to the specified group.

**rtsmb_srv_remove_user_from_group**
This removes a user from the specified group, dropping their access rights from that group.

**rtsmb_srv_set_group_permission**
This sets what shares to which a group has access and what kind of access.

### SHARE MANAGEMENT

**rtsmb_srv_share_add_tree**
This sets up a directory to be shared to SMB clients.

**rtsmb_srv_share_add_printer**
This sets up a printer to be shared to SMB clients.

**rtsmb_srv_share_add_ipc**
This sets up the required administrative IPC share with the given password.

**rtsmb_srv_share_remove**
This stops sharing the specified share.

Any function that takes a string has a complement function with the same name but a suffix of “_uc” to indicate it takes a Unicode string instead of an ASCII string. These functions only exist if the server was compiled with Unicode support.

**rtsmb_srv_set_ip**
This sets up ip and subnet to use.

## RTSMB_SRV_SHARE_ADD_TREE ()

**Function:**

Set up a new disk share.

**Summary:**

#include "srvapi.h"

int rtsmb_share_add_tree (name, comment, api, path, flags, permissions, password)

| | |
|---|---|
| PFCHAR name | - The name of share |
| PFCHAR comment | - Comment about share |
| PVFILEAPI | - The vfile api used for this share |
| PFCHAR path | - The file path to share directory |
| byte flags | - Flags detailing share properties |
| byte permissions | - Default permissions for share. Only used when server is in share mode. |
| PFCHAR password | - Password used to give default permissions. Setting this to NULL will disable password checking for this share. Only used while server is in share mode |

**Description:**

This function initializes a share for use. NULL can be passed for the comment parameter. If the api parameter is NULL, the default filesystem API is used (this is usually what you want if you have only one filesystem). The name parameter cannot be longer than 12 characters. The comment parameter cannot be longer than 30 characters. The permissions parameter can be one of SECURITY_READ, SECURITY_WRITE, SECURITY_READWRITE, or SECURITY_NONE. It is only used in share mode.

The flags parameter is a bitwise or of zero or more of the following flags:

**SHARE_FLAGS_8_3**

SHARE_FLAGS_8_3 causes RTSMB to mangle all incoming filenames so that they fit the DOS 8.3 filename format. Use this if your file system cannot handle long filenames.

**SHARE_FLAGS_CASE_SENSITIVE**

SHARE_FLAGS_CASE_SENSITIVE causes RTSMB to uppercase all incoming filenames so that Windows clients don't get confused when a filename they create as FileName.txt cannot be accessed as FILENAME.TXT. Use this if your filesystem is case sensitive.

**SHARE_FLAGS_CREATE**

SHARE_FLAGS_CREATE causes RTSMB to create the shared directory. Thus, sharing "C:\path\that\does\not\exist" would cause RTSMB to call mkdir on each component of it.

**Returns:**

Returns 0 on success and a negative value on failure (not enough share buffers left).

## RTSMB_SRV_SHARE_ADD_IPC ()

**Function:**

Set up an IPC$ share.

**Summary:**

#include "srvapi.h"

int rtsmb_share_add_ipc (password)

| | |
|---|---|
| PFCHAR password | - Password used to give access. Setting this to NULL will disable password checking for this share. Only used while server is in share mode |

**Description:**

This function initializes the Inter-Process Communication share. Clients connect to this share to get the list of other shares. After this call, a share called "IPC$" is created.

You will *need* to call this at least once. Clients expect the IPC share to exist. However, you don't need to call it more than once.

**Returns:**

Returns 0 on success and negative value on failure (not enough share buffers left).

## RTSMB_SRV_SHARE_REMOVE ()

**Function:**

Removes a share.

**Summary:**

#include “srvapi.h”

int rtsmb_share_remove (name)

| | | |
|---|---|---|
| PFCHAR name | - | The name of share to remove |

**Description:**

This function unshares a previously added share. Access to it from this point on will be denied (after requests currently being processed are done). This function may block for a little while in order to give processes using the share a chance to quit (if not in POLLOS mode).

**Returns:**

Returns 0 on success and negative value on failure (share not found).

## RTSMB_SRV_SET_MODE ()

**Function:**

Sets the authorization mode of server.

**Summary:**

#include “srvapi.h”

void rtsmb_set_mode (mode)

| | | |
|---|---|---|
| byte mode | - | The authorization mode to use. Can be AUTH_USER_MODE or AUTH_SHARE_MODE |

**Description:**

This function tells RTSMB how to authorize clients. If the mode is user-based, each client will have to provide a valid username/password pair. If the mode is share-based, each client provides a password for each share they want to use. The default is share mode.

**Returns:**

Nothing.

## RTSMB_SRV_GET_MODE ()

**Function:**

Gets the authorization mode of server.

**Summary:**

#include “srvapi.h”

byte rtsmb_get_mode ()

**Description:**

This function gets the authorization mode of the server.

**Returns:**

This function returns the authorization mode of the server. The mode is either AUTH_SHARE_MODE if operating in share mode or AUTH_USER_MODE if operating in user mode.

## RTSMB_SRV_REGISTER_GROUP ()

**Function:**

Registers a group.

**Summary:**

#include “srvapi.h”

BBOOL rtsmb_register_group (name)

PFCHAR name - The name of the group

**Description:**

This function registers a group name to be used by:

**rtsmb_set_group_permission**,
**rtsmb_add_user_to_group**, and
**rtsmb_remove_user_from_group**.

***Note: Only used if server is in user mode.***

**Returns:**

This function returns 1 on success, 0 on failure (if too many groups already registered).

## RTSMB_SRV_REGISTER_USER ()

**Function:**

Registers a user.

**Summary:**

#include “srvapi.h”

BBOOL rtsmb_register_user (name, password)

| | |
|---|---|
| PFCHAR name | - The name of the user |
| PFCHAR password | - The plaintext password of the user |

**Description:**

This function registers a username/password pair to be used when authenticating clients. This username can be passed to:

**rtsmb_delete_user**,
**rtsmb_add_user_to_group**, and
**rtsmb_remove_user_from_group**.

***Note: Only used if server is in user mode.***

If the special constant AUTH_GUESTNAME is passed as a username, the server will allow users who cannot login (i.e. do not know a username/password) to login with this user’s access rights. If you enable this, it is wise to limit this guest’s access to shares. The guest’s password is ignored.

**Returns:**

This function returns 1 on success, 0 on failure (if too many users already registered).

## RTSMB_SRV_DELETE_USER ()

**Function:**

Deletes a user’s information.

**Summary:**

#include “srvapi.h”

BBOOL rtsmb_delete_user (name)

| | |
|---|---|
| PFCHAR name | - The name of the user |

**Description:**

This function deletes a username/password pair registered by:

**ebmsb_register_user**

***Note: Only used if server is in user mode.***

**Returns:**

This function returns 1 on success, 0 on failure (invalid name).

## RTSMB_SRV_INIT ()

**Function:**

Initializes RTSMB.

**Summary:**

#include “srvapi.h”

void rtsmb_srv_init (ip, mask, net_name, group_name)

| | |
|---|---|
| PFBYTE ip | - The four-byte array representing the server’s ip |
| PFBYTE mask | - The four-byte array representing the server’s ip mask |
| PFCHAR net_name | - The ASCII name that the server will use as a Netbios name |
| PFCHAR group_name | - The ASCII workgroup that the server will connect to |

**Description:**

This function initializes the SMB server for use. This must be called before any other API routine. In addition, the native network stack must be initialized before calling this.

If mask is passed as NULL, then the default mask of 255.255.255.0 will be used. If net_name is NULL, then the value of **CFG_RTSMB_DEFAULT_NET_NAME** in smbconf.h will be used. If group_name is NULL, then the value of **CFG_RTSMB_DEFAULT_GROUP_NAME** will be used.

**Returns:**

Nothing.

## RTSMB_SRV_SET_GROUP_PERMISSIONS ()

**Function:**

Determines a group’s access rights to one share.

**Summary:**

#include “srvapi.h”

BBOOL rtsmb_set_group_permission (group, share, mode)

| | |
|---|---|
| PFCHAR group | - The name of the group |
| PFCHAR share | - The name of the share |
| Byte mode | - The access mode for group. May be **SECURITY_READ**, **SECURITY_WRITE**, **SECURITY_READWRITE**, **or SECURITY_NONE** |

**Description:**

This function assigns a group certain access rights to one share. Whenever a user belonging to this group logs in, they are granted at least these rights. If this is not called for a particular share, the group has SECURITY_NONE access to that share by default.

**Returns:**

This function returns 1 on success, 0 on failure (invalid group name, share name, or mode).

## RTSMB_SRV_ADD_USER_TO_GROUP ()

**Function:**

Adds a user to a group.

**Summary:**

#include “srvapi.h”

BBOOL rtsmb_add_user_to_group (user, group)

| | |
|---|---|
| PFCHAR user | - The name of the user. |
| PFCHAR group | - The name of the group. |

**Description:**

This function assigns a user to a group. This means they have whatever access rights the group as a whole has.

**Returns:**

This function returns 1 on success, 0 on failure (invalid user or group name).

## RTSMB_SRV_REMOVE_USER_FROM_GROUP ()

**Function:**

Removes a user from a group.

**Summary:**

#include “srvapi.h”

BBOOL rtsmb_remove_user_from_group (user, group)

| | |
|---|---|
| PFCHAR user | - The name of the user. |
| PFCHAR group | - The name of the group. |

**Description:**

This function removes a user from a group. They no longer will have the same access rights as the group.

**Returns:**

This function returns 1 on success, 0 on failure (invalid user or group name).

## RTSMB_SRV_SHUTDOWN ()

**Function:**

Shuts down RTSMB.

**Summary:**

#include “srvapi.h”

void rtsmb_shutdown ()

**Description:**

This function shuts down the SMB server.

**Returns:**

Nothing.

## RTSMB_SRV_READ_CONFIG ():

**Function:**

Parses a configuration file.

**Summary:**

#include “srvapi.h”

void rtsmb_read_config (filename)

PFCHAR filename - The filename of the config file to read.

**Description:**

This function reads in the config file and parses it for parameters. By doing this, you can avoid recompiling a program to change how shares are set up or what the password for user ‘bob’ is. See Appendix B for an example config file.

**Returns:**

This function returns 0 on success, else on failure (invalid syntax, couldn’t read file).

## RTSMB_SRV_CYCLE ():

**FUNCTION:**

Runs one step of RTSMB server in blocking mode.

**Summary:**

#include “srvapi.h”

void rtsmb_cycle (timeout)

| | | |
|---|---|---|
| long timeout | - | The maximum amount of time to block in milliseconds. If negative, there is no maximum. |

**Description:**

This function process incoming requests and performs internal housekeeping. This needs to be called periodically for RTSMB Server to work correctly. If you can’t afford to block on the network, just pass in 0 as a timeout.

**Returns:**

Nothing.

## RTSMB_SRV_SET_IP ():

**Function:**

Changes RTSMB’s idea of what its IP is.

**Summary:**

#include “srvapi.h”

void rtsmb_srv_set_ip (ip, mask)

| | | |
|---|---|---|
| PFBYTE ip | - | The four-byte array representing the server’s IP. |
| PFBYTE mask | - | The four-byte array representing the server’s subnet mask. |

**Description:**

This function changes the IP’s that RTSMB uses to send data to and from.

Use this if your IP has changed or you want to switch subnets.

If mask is passed as NULL, then the default mask of 255.255.255.0 will be used.

# RTSMB Server Manual

## Appendix A: Examples

APPENDIX A

## APPENDIX A – EXAMPLE CODE

The following program shows how to initialize and run the RTSMB server.

Before this code sample is run, it is assumed that networking has been initialized.

This code initializes the server, configures the available shares, configures the users allowed to log on, and calls the server cycle functions, which allow the server to process requests.

As a result of this code, the server makes itself a member of the network group and makes its shares available. Any requests that come in are handled.

### Sample Program

```
#define "srvapi.h"
*/ Before this function is called, the network stack must be initialized */
int run_rtsmb (PFBYTE ip, PFBYTE mask, PFCHAR name, PFCHAR workgroup)
{
      /* Initialize rtsmb server with the specified tcp/ip information */
      rtsmb_srv_init (ip, mask, name, workgroup);
       /* To make it interesting, let's set the server to user mode. The default is share mode. In user mode, users must authenticate
        themselves to the server using a username and password pair. In share mode, they must provide a share-specific password for each
        share. Because we set this as user mode, we can safely set no passwords for the shares we set up, since those passwords are only    used
        in share mode.
      */
      rtsmb_srv_set_mode (AUTH_USER_MODE);
      /* Now, let's set up a share for the users to enjoy.
      We'll set up a basic share, one that uses the default filesystem API
      This is a windows share, so we specify that the server should use the 8.3 file naming format (where any filename must be only 8
       characters long with an extension of three characters).
      */
      rtsmb_srv_share_add_tree ("c", "c drive", NULL, "C:\\", SHARE_FLAGS_8_3, SECURITY_NONE, NULL);
      /* Now, let's add an IPC share without a password so users can browse the other shares. */
      rtsmb_srv_share_add_ipc (NULL);
      /*We need at least one group to add users to. We also define the access rights "colors" has to each share. If not specified, no
      rights are granted.
      */
      rtsmb_srv_register_group ("colors");
      rtsmb_srv_set_group_permission ("colors", "c", SECURITY_READWRITE);
      rtsmb_srv_set_group_permission ("colors", "IPC$", SECURITY_READWRITE);
      /* Now, we setup all the users we want to allow, with passwords.
      In this case, it's just the user "red" and the user "blue."
      We also add them to the group colors, so they can actually access some shares.
      */
      rtsmb_srv_register_user ("red", "12beh;bal3");
      rtsmb_srv_add_user_to_group ("red", "colors");
      rtsmb_srv_register_user ("blue", "hello");
      rtsmb_srv_add_user_to_group ("blue", "colors");
      /*   Main Loop
      Now we'll continually run the server and process requests until the user hits a 'g' on the console.
      */
      while(1)
      {
            /*   Process one packet from all the main thread sockets.
            These include the session socket and name service socket as well as
            any sessions the main thread happens to be handling.
            */
            rtsmb_srv_cycle ();
            /*  Quick check to see if user at console wants to stop server. */
            if(kbhit())
            {
                  int ch = getch();
                    if (ch == 'd')
                   {
                              /* Stop main loop if user hits 'd'. */
                                break;
                   }
                    else if (ch == 'o')
                  {
                              /* Just for kicks, let's revoke blue's access if user hits 'o'. */
                                  rtsmb_srv_delete_user ("blue");
```

```
                }
                 else if (ch == 'g')
                {
                        /* And add him again if user hits 'g'. */
                rtsmb_srv_register_user ("blue", "hello");
                rtsmb_srv_add_user_to_group ("blue", "colors");
                }
        } //end if
    } //end while

    /* Shutdown and stop the server */
    rtsmb_srv_shutdown ();
    return 0;
}//end run_rtsmb
```

**Here is a code snippet that shows how to use groups effectively.**

```
*/   Multiple Groups
Assume that before this, the share "cat" was created, as well as the standard IPC share.
Put the server into user mode. (It defaults to share mode)
*/
rtsmb_srv_set_mode (AUTH_USER_MODE);
rtsmb_srv_register_group ("a");
rtsmb_srv_set_group_permission ("a", "cat", SECURITY_WRITE);
rtsmb_srv_set_group_permission ("a", "IPC$", SECURITY_READ);

/* Set up a group called 'b' which can read files in the test directory.  Note that both 'a' and 'b' groups can browse the files in the
"cat" share.  Only 'a' can write to them and only 'b' can read them, though.  To prevent someone from browsing the shares, the user
needs to have SECURITY_NONE privileges. */
rtsmb_srv_register_group ("b");
rtsmb_srv_set_group_permission ("b", "cat", SECURITY_READ);
rtsmb_srv_set_group_permission ("b", "IPC$", SECURITY_READ);
/*
Set up a group for those we don't trust.  This will be used for guests.
*/
rtsmb_srv_register_group ("untrusted");
rtsmb_srv_set_group_permission ("untrusted ", "cat", SECURITY_NONE);
rtsmb_srv_set_group_permission ("untrusted ", "IPC$", SECURITY_READ);
/*
Define a guest account, but attach it to group 'untrusted' only (don't want to give guests write access here).  SMB_GUESTNAME
defaults to "".
*/
rtsmb_srv_register_user (SMB_GUESTNAME, NULL);
rtsmb_srv_add_user_to_group (SMB_GUESTNAME, "untrusted");

/*
Set up a real user, called 'bob' with password 'finagle'.  Add him to the 'a' group.
User names are not case sensitive.  Passwords may be depending on protocol negotiated.
*/
rtsmb_srv_register_user("BOB","finagle");
rtsmb_srv_add_user_to_group("Bob","a");

/*
Add the user kris, with 'blarg' as the password.  Here, she is a member of both the 'a' and 'b' groups.  She can now read and write
to the "cat" share.  Again, as you can see, user names are not case sensitive.
*/
rtsmb_srv_register_user("kris","blarg");
rtsmb_srv_add_user_to_group("kRis","a");
rtsmb_srv_add_user_to_group("KRIS","b");
/*
Now, Bob can write all he wants to "cat", but cannot read files in it.  Meanwhile, Kris can read and write to her heart's content.
Guests are given no access to the share, but can browse the list of shares (via their read privileges with the IPC$) wistfully.  A user
has, for a given share, the sum of all access rights of his/her groups.
As long as the user has non-NONE status, they can connect to the share and browse through the files on the share.  Thus, as for the IPC$, all
that matters is you have some access to browse the list of shares.  Having NONE access on the IPC$ does not prevent you from accessing
shares you know the name of.
*/
```

**Here we define a main loop that blocks on network sockets.**

```
/*      Smarter Main Loop
One problem with the main loop in the first example is that you waste a lot of CPU cycles calling rtsmb_srv_cycle in non-blocking mode.  Here is
an example to use blocking mode effectively.
*/

void rtsmb_srv_loop ()
{
        while (1)
        {
                rtsmb_srv_cycle ();
        }
}

/* This function is only called after user-initialization and shares have been set up.
For an example of how to do that, look at example 1.  */
void rtsmb_srv_start ()
{
/*spawn off a process to handle main loop just by itself. */
os_spawn_task (TASKCLASS_USER_APPTASK, rtsmb_srv_loop, 0, 0, 0, 0);
/* now check for input like we did before, sleeping for 1 sec each time */
while(1)
{
        sleep (1);
        /* Quick check to see if user at console wants to stop server. */
        if(kbhit())
        {
                int ch = getch();
                if (ch == 'd')
                {
                      /* Stop main loop if user hits 'd'.  */
                      break;
                }
                else if (ch == 'o')
                {
                      /* Just for kicks, let's revoke blue's access if user hits 'o'. */
                       rtsmb_srv_delete_user ("blue");
                }
                else if (ch == 'g')
                {
                      /* And add him again if user hits 'g'.  */
                       rtsmb_srv_register_user ("blue", "hello");
                      rtsmb_srv_add_user_to_group ("blue", "colors");
                }
        }//end if
}//end while

rtsmb_srv_shutdown ();
}
```

# RTSMB Server Manual

## Appendix B: Example Config File

A P P E N D I X B

## APPENDIX B – EXAMPLE CONFIG FILE

```
# Comments are introduced by a '#' character

# A config file is broken up into sections.  Valid sections include
# global, ipc, share, printer, group, and user.
#
# Each section is processed as the file is read.  So, it is best to specify
# all shares first, then users and a global.

# The ipc section has only one optional variable, password.  This controls the # password
# needed to get a list of available shares on the server.  If the password is unspecified, no
# password is needed.

[ipc]
[end]

# A share section will set up a file share's availability.  There can be many share sections.
# Each share uses the default file system.  The following options are available:
#
# name : The share's name as it appears in Network Neighborhood
# comment : The share's comment  (optional)
# path : The directory to share
# flags : Configurable options for share.  Valid flags are dos_names,
#      case_sensitive, and create
#            dos_names : This enforces 8.3 syntax to filenames
#            case_sensitive : The filesystem is case sensitive
#            create : The path will be created if it doesn't exist
#      The default for all of these is off.  Adding the flag names in a space#delimited line turns the options on.
# permission : The permission granted to users who specify the correct # share password.  This is only used when the server is in share mode.
# password : The password for share mode.  If omitted, no password is needed.
[share]
name = test
comment = native fs
path = c:\rtsmb
flags = create
permission = rw
password = smb
[end]

# Printer shares are defined by [printer] sections.
#
# It has all the same variables as the [share] section, except for a few changes.
# There isn't a permission variable, since that is not customizable for a printer,
# and there are a few additional configuration parameters.  The reason you# need to set up all the share variables is that each printer must have
some# filesystem space for its temporary files.
#
# The unique variables:
#
# number : the number of the port the printer is connected to, 1-based.
#            (i.e. parallel port 0 is number = 1)
# drivername : the name of the driver to use (you have to know correct string)
#        This is the same as the string Windows uses to describe the driver.

[printer]
name = Printer
comment = Test Printer
path = c:\rtsmb\printer
flags = create
#password =
number = 1
drivername = HP LaserJet 1100
[end]

# A group section will register a group to which users can belong.  The group
# concept is invisible to the user.  It is only included to make administration
# easier.  There can be many group sections.  The valid variables are name and shares.
#
# name : Specify the name of the group.
# shares : A space-delimited list of shares and permissions.  The syntax is as
#      follows: share:permissions
#      For example, if a share is called "music" and you wanted to give this
#      group write only access to it, you would say music:wo.
#          If you also wanted to give this group read-write access to the share "books,"
#          you could say "music:wo books:rw".
#            The valid permission flags are
#                                              ro : read only
#                                              wo : write only
#                                              rw : read and write
#      If you omit a share:permission pair, or type "share:" (e.g. "music:")
#      with no permissions, access is none.
#    When a permission is set to write only, the user can still browse the listings
#    of files, but cannot read any of them.  Therefore, they can only upload files,
#    and can't download them.
#
#    When a permission is set to read only, the user can still browse the listings and
#    view the contents of files, but cannot delete, create, or modify any files on the share.
#
#      Under almost any circumstance, you will want to grant every group read
#      and write access to the ipc$ share (this allows them to browse the list of
#      available shares).

[group]
name = trusted
shares = test:rw ipc$:rw Printer:rw
[end]

[group]
name = marketing
shares = test:ro ipc$:rw Printer:rw
[end]

[group]
name = untrusted
shares = test:ro ipc$:rw Printer:
[end]

# A user section sets up a user with a name, password, and group designations.
# Valid variables are name, password, and groups.
#
# name : User name.  This is not case sensitive.
# password : Password for user.  If omitted, user needs none.
# groups : Space-delimited list of groups user belongs to.  This user will have
# the most favorable access to any given share that any one of his or her
# groups allows.

[user]
name = mike
password = blarg
groups = trusted marketing
[end]

[user]
name = bob
password = hopscotch
groups = marketing
[end]

# The global section has three variables:  mode, guest, and guestgroups.
# If mode is set to "user", user-mode authentication will occur.
# If mode is set to "share", share-based authentication will occur.
# The default is share.
#
# If guest is set to "yes", a guest account will be created that will be used if a
# user does not have a username.
#
# If guest is set to "yes", then guestgroups will be a space-delimited list of groups
# guest belongs to and the permissions.  See the user section above for specifics
# on the syntax.
#
# You only need one global section.
```

```
[global]
mode = user
guest = yes
guestgroups = trusted
  [end]
```