# rfslib

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This is a documentation of rfslib.

To create a new development environment, it is recommended to create python virtual environment and install dependencies in requirements.txt

If you want to create a new pdf documentation, you are required to install also texlive on your system.

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# **RFSLIB MODULE**

# class rfslib.pconnection\_settings

Bases: object

This object represents settings appliable for all PConnection instances (instances of class, which inherits from PConnection).

# \_\_init\_\_()

The constructor inicializes the class to default values.

# default\_dmask: int = 18

If mode (permissions) of a directory can't be fetched, this value will be used instead of it.

### default\_fmask: int = 91

If mode (permissions) of a nondirectory file can't be fetched, this value will be used instead of it.

### direct\_write: bool = False

NOT IMPLEMENTED YET. If True, push will write output directly to file. If False all push operations on regular files will create firstly tmp file in target folder and then move result to file.

### local\_crlf: bool = False

Does local files use CRLF? If True, it is supposed, they do. If False, it is supposed, they use LF.

# local\_encoding: str = 'UTF8'

The encoding of local text files. (eg. 'UTF8')

# remote\_crlf: bool = False

Does remote files use CRLF? If True, it is supposed, they do. If False, it is supposed, they use LF.

### remote\_encoding: str = 'UTF8'

The encoding of remote text files. (eg. 'cp1250')

# skip\_validation: bool = False

NOT IMPLEMENTED YED. If True, all validations of input will be skipped. Undefined behavior may happen if input is wrong. Increses performance.

### text\_transmission: bool = False

If true, all files, which will be transmitted, will be recoded from local\_encoding to remote\_encoding and from local\_crlf to remote\_crlf. If False, there will be no encoding done during transmission.

# RFSLIB.ABSTRACT\_PCONNECTION MODULE

### class rfslib.abstract\_pconnection.PConnection(settings:

rfslib.pconnection settings.pconnection settings)

Bases: abc.ABC

\_\_init\_\_(settings: rfslib.pconnection\_settings.pconnection\_settings)

The constructor of a abstract class. If it is not called from child class, the behavior is undefined.

If local\_encoding and remote\_encoding have same values, no recoding is done. Analogically if local\_crlf and remote crlf is same, no substitution between LF and CRLF is done.

**Parameters settings** – A pronnection\_settings object with all generic settings for PConnection. Be sure, that all needed attributes are present, or AttributeError will be raised.

### **abstract \_exists**(*remote\_path: str*) → bool

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns False.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file is exist. False, if remote file doesn't exist

### **abstract** \_**isdir**(*remote\_path: str*) → bool

Protected method which checks, whether a remote file is a directory. The function is DEPRECATED and will be substituted using stat or lstat.

**Parameters remote\_path** – A path of a directory.

Returns True, if remote file is folder. False, if it isn't a folder. Undefined if the file doesn't exist.

### **abstract** $_{\text{lexists}}(remote \ path: str) \rightarrow bool$

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns

KNOWN BUG: Behavior is undefined in case of broken symlinks.

**Parameters** remote\_path – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

# **abstract** \_listdir(remote\_path: str) → List[str]

Protected method which returns a list of files in the folder including hidden files. It might contain '.' and '..'. Undefined if the remote file doesn't exist or isn't a folder.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

### abstract \_mkdir(remote path: str)

Protected method which creates a new directory. Behavior is undefined if remote folder already exist, or destination folder doesn't exist.

**Parameters** remote\_path – A path of a new remote directory.

```
abstract _pull(remote_path: str, local_path: str)
```

Protected method which downloads/pulls a nondirectory file from a remote storage to a local storage in the binary form. Behavior is undefined if source file or destination folder doesn't exist.

### **Parameters**

- remote\_path Path of a remote file to download.
- local\_path Path of a local file, where to download/pull a remote file or local file already
  exists.

# abstract \_push(local\_path: str, remote\_path: str)

Protected method which uploads/pushes a nondirectory file from a local storage to a remote storage in the binary form. Behavior is undefined if destination folder or source file doesn't exist, source is directory or remote file already exists.

#### **Parameters**

- local\_path Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

```
abstract _rename(old name: str, new name: str)
```

Protected method which renames/moves a file. Behavior is undefined, if *new\_name* file exists or *old\_name* file doesn't exist.

### **Parameters**

- **old\_name** Remote path a file to move.
- **new\_name** Remote path to which move the file.

```
abstract _rmdir(remote_path: str)
```

Protected method which removes an empty remote directory. Behavior is undefined if remote directory doesn't exist or it isn't empty.

**Parameters** remote\_path – Path of an empty remote directory to delete.

```
abstract \_stat(remote\ path:\ str) \to os.stat result
```

Protected method which returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file. Undefined behavior if remote file doesn't exist or it is a broken symlink.

**Parameters remote\_path** – Path of a remote file.

**Returns** The function returns os.stat\_result like object, which is further parsed by \_stat\_unpack function. For more details please see source code.

```
abstract _unlink(remote_path: str)
```

Protected method which removes a nondirectory file. Behavior is undefined if remote file doesn't exist or is a directory.

**Parameters remote\_path** – Path of a remote regular file to delete.

# abstract close()

Method to close the opened connection.

```
cp(old names: List[str], new name: str, recursive: bool = False)
```

dcp(old\_names: List[str], target\_dir: str, recursive: bool = False)

```
exists(remote path: str) \rightarrow bool
     Method which checks, whether a remote file exist. Returns False for broken symlinks.
          Parameters remote_path – Path of a remote file.
          Returns True, if remote file exists. False, if remote file doesn't exist.
fcp(old name: str, new name: str)
find(remote\_path: str, child\_first: bool = False) \rightarrow List[str]
     A public method which returns DFS (depth-first search) of remote_path including hidden files. It never
     returns '.' or '..'.
          Parameters child_first - If True, childs of a directory will be returned before the directory
              itself.
          Returns The result of DFS as a list of remote_paths.
fmv(old_name: str, new_name: str)
get default dmask() \rightarrow int
     Returns default_dmask settings. For more details see pconnection_settings.
get_default_fmask() \rightarrow int
     Returns default_fmask settings. For more details see pconnection_settings.
get\_settings() \rightarrow rfslib.pconnection settings.pconnection settings
     The procedure sets all generic settings for PConnection.
          Returns A pronnection_settings object with all generic settings of PConnection.
isdir(remote_path: str)
lexists(remote_path)
     Method which checks, whether a remote file exist. Returns True for broken symlinks.
          Parameters remote_path – Path of a remote file.
          Returns True, if remote file exists. False, if remote file doesn't exist.
listdir(remote_path: str)
     Public method which returns a list of files in the folder including hidden files. It never returns '.' or '..'.
          Parameters remote_path – The remote path of a remote folder.
          Returns A list of files in the remote folder.
ls(remote_path: str)
lstat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
     Returns statistics of a file (eg. size, last date modified,...) Doesn't follow symlinks.
          Parameters remote_path – Path of a remote file.
          Returns An object whose attributes correspond to the attributes of Python's stat structure as
              returned by os.stat, except that it contains fewer fields.
mkdir(remote_path: str)
     A public method, which creates a folder. If directory can't be created, because a file already exist, an
     exception is raised. No other directories on path will be created and if any of them is missing, an exception
     is raised.
```

**Parameters** remote\_path – A path, where to create a new directory.

**mv**(old names: List[str], new name: str)

dmv(old\_names: List[str], target\_dir: str)

```
pmkdir(remote_path: str)
      pull(remote_path: str, local_path: str)
      push(local_path: str, remote_path: str)
           Uploads/pushes a file from a local storage to a remote storage in the binary form.
               Parameters
                    • local_path – Path of a local file to upload.
                    • remote_path – Path on the remote storage, where to upload/push a local file.
      rename(old_name: str, new_name: str)
      rm(remote_path: str, recursive: bool = False)
      rmdir(remote_path: str)
      rpull(remote_path: str, local_path: str)
      rpush(local_path: str, remote_path: str)
      set_settings(settings: rfslib.pconnection settings.pconnection settings)
           The procedure sets all generic settings for PConnection.
               Parameters settings - A pronnection_settings object with all generic settings for PConnec-
                    tion. If some attribute in object is missing, no operation will be done with it.
      stat(remote\ path:\ str) \rightarrow rfslib.abstract\ pconnection.p\ stat\ result
           Returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file.
               Parameters remote_path – Path of a remote file.
                Returns An object whose attributes correspond to the attributes of Python's stat structure as
                    returned by os.stat, except that it contains fewer fields.
      touch(remote_path: str)
      unlink(remote_path: str)
      xls(remote_path: str)
class rfslib.abstract_pconnection.p_stat_result
      Bases: object
      Representation of the attributes of a file (or proxied file). It attemps to mirror the object returned by os.stat as
      closely as possible.
      __init__()
      st_atime: int = None
           This is the time of the last access of file data.
      st_gid: int = None
           This field contains the ID of the group owner of the file.
      st_mode: int = None
           This field contains the file type and mode.
      st_mtime: int = None
           This is the time of last modification of file data.
      st_nlink: int = None
           This field contains the number of hard links to the file.
```

# st\_size: int = None

This field gives the size of the file (if it is a regular file or a symbolic link) in bytes. The size of a symbolic link is the length of the pathname it contains, without a terminating null byte.

# st\_uid: int = None

This field contains the user ID of the owner of the file.

# RFSLIB.SFTP\_PCONNECTION MODULE

class rfslib.sftp\_pconnection.SftpPConnection(settings:

rfslib.pconnection\_settings.pconnection\_settings, host: str, username: str, password: Optional[str] = None, keyfile: str = '~/.ssh/id\_rsa', port: int = 22, no\_host\_key\_checking: bool = False)

Bases: rfslib.abstract\_pconnection.PConnection

Class for SFTP connection. Public interface with an exception of \_\_init\_\_ and close is inherited from PConnection.

\_\_init\_\_(settings: rfslib.pconnection\_settings.pconnection\_settings, host: str, username: str, password:

Optional[str] = None, keyfile: str = '~/.ssh/id\_rsa', port: int = 22, no\_host\_key\_checking: bool = False)

The constructor of SftpPConnection. Opens SFTP connection, when called. If None password is specified, the key authentication will be used. Otherwise the password authentication will be used.

### **Parameters**

- **settings** The settings for the super class PConnection.
- host Remote address of the server.
- **port** Port for the SFTP connection.
- username Remote username
- password Password for a SFTP connection. If None is provided, key authentication will be used.
- **keyfile** A path to key file.
- no\_host\_key\_checking Specifies, whether remote host key should be verified or not.

# \_exists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns False.

**Parameters** remote\_path – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

# \_isdir(remote\_path)

Protected method which checks, whether a remote file is a directory. The function is DEPRECATED and will be substituted using stat or lstat.

**Parameters remote\_path** – A path of a directory.

**Returns** True, if remote file is folder. False, if it isn't a folder. Undefined if the file doesn't exist.

### \_lexists(remote path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns True.

KNOWN BUG: Behavior is undefined in case of broken symlinks.

**Parameters remote\_path** – Path of a remote file.

**Returns** True, if remote file is exist. False, if remote file doesn't exist

# \_listdir(remote\_path)

Protected method which returns a list of files in the folder including hidden files. It might contain '.' and '..'. Undefined if the remote file doesn't exist or isn't a folder.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

# **\_mkdir**(remote\_path)

Protected method which creates a new directory. Behavior is undefined if remote folder already exist, or destination folder doesn't exist.

**Parameters** remote\_path – A path of a new remote directory.

# **\_pull**(remote\_path, local\_path)

Protected method which downloads/pulls a nondirectory file from a remote storage to a local storage in the binary form. Behavior is undefined if source file or destination folder doesn't exist.

#### **Parameters**

- remote\_path Path of a remote file to download.
- local\_path Path of a local file, where to download/pull a remote file or local file already
  exists.

# \_push(local\_path, remote\_path)

Protected method which uploads/pushes a nondirectory file from a local storage to a remote storage in the binary form. Behavior is undefined if destination folder or source file doesn't exist, source is directory or remote file already exists.

### **Parameters**

- **local\_path** Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

# \_rename(old\_name, new\_name)

Protected method which renames/moves a file. Behavior is undefined, if *new\_name* file exists or *old\_name* file doesn't exist.

### **Parameters**

- old\_name Remote path a file to move.
- **new\_name** Remote path to which move the file.

### **\_rmdir**(remote\_path)

Protected method which removes an empty remote directory. Behavior is undefined if remote directory doesn't exist or it isn't empty.

**Parameters** remote\_path – Path of an empty remote directory to delete.

# \_stat(remote\_path)

Protected method which returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file. Undefined behavior if remote file doesn't exist or it is a broken symlink.

**Parameters remote\_path** – Path of a remote file.

**Returns** The function returns os.stat\_result like object, which is further parsed by \_stat\_unpack function. For more details please see source code.

# \_unlink(remote\_path)

Protected method which removes a nondirectory file. Behavior is undefined if remote file doesn't exist or is a directory.

**Parameters** remote\_path – Path of a remote regular file to delete.

## close()

Method to close the opened connection.

**cp**(old\_names: List[str], new\_name: str, recursive: bool = False)

dcp(old\_names: List[str], target\_dir: str, recursive: bool = False)

dmv(old\_names: List[str], target\_dir: str)

**exists**( $remote\_path: str$ )  $\rightarrow$  bool

Method which checks, whether a remote file exist. Returns False for broken symlinks.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file exists. False, if remote file doesn't exist.

fcp(old\_name: str, new\_name: str)

**find**(remote path: str, child first: bool = False)  $\rightarrow$  List[str]

A public method which returns DFS (depth-first search) of remote\_path including hidden files. It never returns '.' or '..'.

**Parameters child\_first** – If True, childs of a directory will be returned before the directory itself.

**Returns** The result of DFS as a list of remote\_paths.

**fmv**(old\_name: str, new\_name: str)

### $get\_default\_dmask() \rightarrow int$

Returns default\_dmask settings. For more details see pconnection\_settings.

 $get\_default\_fmask() \rightarrow int$ 

Returns default\_fmask settings. For more details see pconnection\_settings.

 $\texttt{get\_settings}() \rightarrow \textit{rfslib.pconnection\_settings.pconnection\_settings}$ 

The procedure sets all generic settings for PConnection.

**Returns** A ponnection settings object with all generic settings of PConnection.

isdir(remote\_path: str)

lexists(remote\_path)

Method which checks, whether a remote file exist. Returns True for broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file exists. False, if remote file doesn't exist.

listdir(remote\_path: str)

Public method which returns a list of files in the folder including hidden files. It never returns '.' or '..'.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

```
ls(remote_path: str)
lstat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
     Returns statistics of a file (eg. size, last date modified,...) Doesn't follow symlinks.
          Parameters remote_path – Path of a remote file.
          Returns An object whose attributes correspond to the attributes of Python's stat structure as
              returned by os.stat, except that it contains fewer fields.
mkdir(remote_path: str)
     A public method, which creates a folder. If directory can't be created, because a file already exist, an
     exception is raised. No other directories on path will be created and if any of them is missing, an exception
     is raised.
          Parameters remote_path – A path, where to create a new directory.
mv(old_names: List[str], new_name: str)
pmkdir(remote_path: str)
pull(remote_path: str, local_path: str)
push(local_path: str, remote_path: str)
     Uploads/pushes a file from a local storage to a remote storage in the binary form.
          Parameters
              • local_path – Path of a local file to upload.
              • remote_path – Path on the remote storage, where to upload/push a local file.
rename(old_name: str, new_name: str)
rm(remote_path: str, recursive: bool = False)
rmdir(remote path: str)
rpull(remote_path: str, local_path: str)
rpush(local_path: str, remote_path: str)
set_settings(settings: rfslib.pconnection_settings.pconnection_settings)
     The procedure sets all generic settings for PConnection.
          Parameters settings – A pronnection settings object with all generic settings for PConnec-
              tion. If some attribute in object is missing, no operation will be done with it.
stat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
```

Returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file.

**Parameters remote\_path** – Path of a remote file.

**Returns** An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields.

```
touch(remote_path: str)
unlink(remote_path: str)
xls(remote_path: str)
```

# RFSLIB.FTP PCONNECTION MODULE

class rfslib.ftp\_pconnection.FtpPConnection(settings: rfslib.pconnection\_settings.pconnection\_settings, host: str, username: str, password: str, port: int = 21, tls: bool = False,  $passive\_mode$ : bool = False,  $debug\_level$ : int = 1,  $connection\_encoding$ : str = 'UTF8',  $dont\_use\_list\_a$ : bool = False)

 $Bases: \ rfslib.abstract\_pconnection.PConnection$ 

Class for FTP connection. Public interface with an exception of \_\_init\_\_ and close is inherited from PConnection.

\_\_init\_\_(settings: rfslib.pconnection\_settings.pconnection\_settings, host: str, username: str, password: str, port: int = 21, tls: bool = False, passive\_mode: bool = False, debug\_level: int = 1, connection\_encoding: str = 'UTF8', dont\_use\_list\_a: bool = False)

The constructor of FtpPConnection.

### **Parameters**

- **settings** The settings for the super class PConnection.
- **host** Remote address of the server.
- **port** Port for a connection.
- **username** Remote username.
- password Remote password.
- tls Enables TLS.
- passive\_mode Enables passive mode of FTP connection.
- **debug\_level** Specifies how much logs should be generated. 0 almost non, 1 more, 2 log almost everything
- **connection\_encoding** Encoding used for a connection.
- **dont\_use\_list\_a** Disables usage of LIST -a command and uses LIST command instead. You might consider using option direct\_write when using dont\_use\_list\_a.

# \_exists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns False.

**Parameters** remote\_path – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

### \_isdir(remote path)

Protected method which checks, whether a remote file is a directory. The function is DEPRECATED and will be substituted using stat or lstat.

**Parameters remote\_path** – A path of a directory.

Returns True, if remote file is folder. False, if it isn't a folder. Undefined if the file doesn't exist.

### \_lexists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns True

KNOWN BUG: Behavior is undefined in case of broken symlinks.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

### \_listdir(remote\_path)

Protected method which returns a list of files in the folder including hidden files. It might contain '.' and '..'. Undefined if the remote file doesn't exist or isn't a folder.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

### **\_mkdir**(remote\_path)

Protected method which creates a new directory. Behavior is undefined if remote folder already exist, or destination folder doesn't exist.

**Parameters remote\_path** – A path of a new remote directory.

### **\_pull**(remote\_path, local\_path)

Protected method which downloads/pulls a nondirectory file from a remote storage to a local storage in the binary form. Behavior is undefined if source file or destination folder doesn't exist.

### **Parameters**

- **remote\_path** Path of a remote file to download.
- **local\_path** Path of a local file, where to download/pull a remote file or local file already exists.

# **\_push**(local\_path, remote\_path)

Protected method which uploads/pushes a nondirectory file from a local storage to a remote storage in the binary form. Behavior is undefined if destination folder or source file doesn't exist, source is directory or remote file already exists.

### **Parameters**

- **local\_path** Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

# \_rename(old\_name, new\_name)

Protected method which renames/moves a file. Behavior is undefined, if *new\_name* file exists or *old\_name* file doesn't exist.

### **Parameters**

- **old\_name** Remote path a file to move.
- **new\_name** Remote path to which move the file.

```
_rmdir(remote path)
```

Protected method which removes an empty remote directory. Behavior is undefined if remote directory doesn't exist or it isn't empty.

**Parameters** remote\_path – Path of an empty remote directory to delete.

```
_stat(remote path)
```

Protected method which returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file. Undefined behavior if remote file doesn't exist or it is a broken symlink.

**Parameters remote\_path** – Path of a remote file.

**Returns** The function returns os.stat\_result like object, which is further parsed by \_stat\_unpack function. For more details please see source code.

```
_unlink(remote_path)
```

Protected method which removes a nondirectory file. Behavior is undefined if remote file doesn't exist or is a directory.

**Parameters** remote\_path – Path of a remote regular file to delete.

### close()

Method to close the opened connection.

```
cp(old_names: List[str], new_name: str, recursive: bool = False)
```

```
dcp(old_names: List[str], target_dir: str, recursive: bool = False)
```

dmv(old\_names: List[str], target\_dir: str)

```
exists(remote\ path:\ str) \rightarrow bool
```

Method which checks, whether a remote file exist. Returns False for broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file exists. False, if remote file doesn't exist.

```
fcp(old_name: str, new_name: str)
```

```
find(remote\_path: str, child\_first: bool = False) \rightarrow List[str]
```

A public method which returns DFS (depth-first search) of remote\_path including hidden files. It never returns '.' or '..'.

**Parameters child\_first** – If True, childs of a directory will be returned before the directory itself.

**Returns** The result of DFS as a list of remote\_paths.

```
fmv(old_name: str, new_name: str)
```

```
get_default_dmask() \rightarrow int
```

Returns default\_dmask settings. For more details see pconnection\_settings.

```
\texttt{get\_default\_fmask}() \rightarrow int
```

Returns default\_fmask settings. For more details see pconnection\_settings.

```
get_settings() \rightarrow rfslib.pconnection\_settings.pconnection\_settings
```

The procedure sets all generic settings for PConnection.

**Returns** A pronnection\_settings object with all generic settings of PConnection.

```
isdir(remote_path: str)
```

```
lexists(remote_path)
```

Method which checks, whether a remote file exist. Returns True for broken symlinks.

**Parameters** remote\_path – Path of a remote file.

Returns True, if remote file exists. False, if remote file doesn't exist.

```
listdir(remote_path: str)
```

Public method which returns a list of files in the folder including hidden files. It never returns '.' or '..'.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

```
ls(remote_path: str)
```

 $lstat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result$ 

Returns statistics of a file (eg. size, last date modified,...) Doesn't follow symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields.

```
mkdir(remote_path: str)
```

A public method, which creates a folder. If directory can't be created, because a file already exist, an exception is raised. No other directories on path will be created and if any of them is missing, an exception is raised.

**Parameters** remote\_path – A path, where to create a new directory.

```
mv(old_names: List[str], new_name: str)
pmkdir(remote_path: str)
pull(remote_path: str, local_path: str)
push(local_path: str, remote_path: str)
```

Uploads/pushes a file from a local storage to a remote storage in the binary form.

### **Parameters**

- local\_path Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

```
rename(old_name: str, new_name: str)
rm(remote_path: str, recursive: bool = False)
rmdir(remote_path: str)
rpull(remote_path: str, local_path: str)
rpush(local_path: str, remote_path: str)
set_settings(settings: rfslib.pconnection_settings.pconnection_settings)
```

The procedure sets all generic settings for PConnection.

**Parameters settings** – A pronnection\_settings object with all generic settings for PConnection. If some attribute in object is missing, no operation will be done with it.

```
stat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
```

Returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file.

**Parameters** remote\_path – Path of a remote file.

**Returns** An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields.

```
touch(remote path: str)
```

unlink(remote\_path: str)
xls(remote\_path: str)

# **RFSLIB.SMB12 PCONNECTION MODULE**

class rfslib.smb12\_pconnection.Smb12PConnection(settings:

rfslib.pconnection\_settings.pconnection\_settings, host: str, service\_name: str, username: str, password: str, port: int = 139, use\_direct\_tcp: bool = False, client\_name: str = 'RFS', use\_ntlm\_v1: bool = False)

 $Bases: \ rfslib.abstract\_pconnection.PConnection$ 

Class for SMB connection version 1 or 2. Public interface with an exception of \_\_init\_\_ and close is inherited from PConnection.

\_\_init\_\_(settings: rfslib.pconnection\_settings.pconnection\_settings, host: str, service\_name: str, username: str, password: str, port: int = 139, use\_direct\_tcp: bool = False, client\_name: str = 'RFS', use\_ntlm\_v1: bool = False)

The constructor of Smb12PConnection. Opens SMB connection version 1 or 2, when called.

### **Parameters**

- **settings** The settings for the super class PConnection.
- host Remote address of the server.
- **service\_name** Name of a shared folder.
- **port** Port for the SMB connection.
- **username** Remote username.
- password Remote password.
- **use\_direct\_tcp** Activates direct tcp mode for SMB.
- **client\_name** Name of this client, which will be sent to a server.
- **use\_ntlm\_v1** Enables NTLM version 1 instead of NTLM version 2.

# \_exists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns False.

**Parameters** remote\_path – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

### \_isdir(remote\_path)

Protected method which checks, whether a remote file is a directory. The function is DEPRECATED and will be substituted using stat or lstat.

**Parameters remote\_path** – A path of a directory.

Returns True, if remote file is folder. False, if it isn't a folder. Undefined if the file doesn't exist.

### \_lexists(remote path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns True.

KNOWN BUG: Behavior is undefined in case of broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file is exist. False, if remote file doesn't exist

# \_listdir(remote\_path)

Protected method which returns a list of files in the folder including hidden files. It might contain '.' and '..'. Undefined if the remote file doesn't exist or isn't a folder.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

# **\_mkdir**(remote\_path)

Protected method which creates a new directory. Behavior is undefined if remote folder already exist, or destination folder doesn't exist.

**Parameters** remote\_path – A path of a new remote directory.

# **\_pull**(remote\_path, local\_path)

Protected method which downloads/pulls a nondirectory file from a remote storage to a local storage in the binary form. Behavior is undefined if source file or destination folder doesn't exist.

#### **Parameters**

- remote\_path Path of a remote file to download.
- local\_path Path of a local file, where to download/pull a remote file or local file already
  exists.

### \_push(local\_path, remote\_path)

Protected method which uploads/pushes a nondirectory file from a local storage to a remote storage in the binary form. Behavior is undefined if destination folder or source file doesn't exist, source is directory or remote file already exists.

# **Parameters**

- **local\_path** Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

# \_rename(old\_name, new\_name)

Protected method which renames/moves a file. Behavior is undefined, if *new\_name* file exists or *old\_name* file doesn't exist.

### **Parameters**

- old\_name Remote path a file to move.
- **new\_name** Remote path to which move the file.

### **\_rmdir**(remote\_path)

Protected method which removes an empty remote directory. Behavior is undefined if remote directory doesn't exist or it isn't empty.

**Parameters** remote\_path – Path of an empty remote directory to delete.

# \_stat(remote\_path)

Protected method which returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file. Undefined behavior if remote file doesn't exist or it is a broken symlink.

**Parameters remote\_path** – Path of a remote file.

**Returns** The function returns os.stat\_result like object, which is further parsed by \_stat\_unpack function. For more details please see source code.

### \_unlink(remote path)

Protected method which removes a nondirectory file. Behavior is undefined if remote file doesn't exist or is a directory.

**Parameters** remote\_path – Path of a remote regular file to delete.

### close()

Method to close the opened connection.

**cp**(old\_names: List[str], new\_name: str, recursive: bool = False)

dcp(old\_names: List[str], target\_dir: str, recursive: bool = False)

dmv(old\_names: List[str], target\_dir: str)

**exists**( $remote\_path: str$ )  $\rightarrow$  bool

Method which checks, whether a remote file exist. Returns False for broken symlinks.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file exists. False, if remote file doesn't exist.

fcp(old\_name: str, new\_name: str)

**find**(remote path: str, child first: bool = False)  $\rightarrow$  List[str]

A public method which returns DFS (depth-first search) of remote\_path including hidden files. It never returns '.' or '..'.

**Parameters child\_first** – If True, childs of a directory will be returned before the directory itself.

**Returns** The result of DFS as a list of remote\_paths.

**fmv**(old\_name: str, new\_name: str)

 $get\_default\_dmask() \rightarrow int$ 

Returns default\_dmask settings. For more details see pconnection\_settings.

 $\texttt{get\_default\_fmask}() \rightarrow \mathsf{int}$ 

Returns default\_fmask settings. For more details see pconnection\_settings.

 $\texttt{get\_settings}() \rightarrow rfslib.pconnection\_settings.pconnection\_settings$ 

The procedure sets all generic settings for PConnection.

**Returns** A ponnection settings object with all generic settings of PConnection.

isdir(remote\_path: str)

lexists(remote\_path)

Method which checks, whether a remote file exist. Returns True for broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file exists. False, if remote file doesn't exist.

listdir(remote\_path: str)

Public method which returns a list of files in the folder including hidden files. It never returns '.' or '..'.

**Parameters remote\_path** – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

```
ls(remote_path: str)
lstat(remote_path: str) → rfslib.abstract_pconnection.p_stat_result
    Returns statistics of a file (eg. size, last date modified,...) Doesn't follow symlinks.
    Parameters remote_path - Path of a remote file.
```

**Returns** An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields.

### mkdir(remote\_path: str)

A public method, which creates a folder. If directory can't be created, because a file already exist, an exception is raised. No other directories on path will be created and if any of them is missing, an exception is raised.

**Parameters remote\_path** – A path, where to create a new directory.

```
mv(old_names: List[str], new_name: str)
pmkdir(remote_path: str)
pull(remote_path: str, local_path: str)
push(local_path: str, remote_path: str)
    Uploads/pushes a file from a local storage to a remote storage in the binary form.
```

### **Parameters**

- **local\_path** Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

```
rename(old_name: str, new_name: str)
rm(remote_path: str, recursive: bool = False)
rmdir(remote_path: str)
rpull(remote_path: str, local_path: str)
rpush(local_path: str, remote_path: str)
set_settings(settings: rfslib.pconnection_settings)
    The procedure sets all generic settings for PConnection.
```

**Parameters settings** – A pronnection\_settings object with all generic settings for PConnection. If some attribute in object is missing, no operation will be done with it.

```
stat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
```

Returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file.

**Parameters remote\_path** – Path of a remote file.

**Returns** An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields.

```
touch(remote_path: str)
unlink(remote_path: str)
xls(remote_path: str)
```

# **RFSLIB.SMB23 PCONNECTION MODULE**

class rfslib.smb23\_pconnection.Smb23PConnection(settings:

rfslib.pconnection\_settings.pconnection\_settings, host: str, service\_name: str, username: str, password: str, port: int = 445, enable\_encryption: bool = False, dont\_require\_signing: bool = False)

 $Bases: \ rfslib.abstract\_pconnection.PConnection$ 

Class for SMB connection version 2 or 3. Public interface with an exception of \_\_init\_\_ and close is inherited from PConnection.

\_\_init\_\_(settings: rfslib.pconnection\_settings.pconnection\_settings, host: str, service\_name: str, username: str, password: str, port: int = 445, enable\_encryption: bool = False, dont\_require\_signing: bool = False)

The constructor of Smb23PConnection. Opens SMB connection version 2 or 3, when called.

### **Parameters**

- **settings** The settings for the super class PConnection.
- **service\_name** Name of a shared folder.
- **host** Remote address of the server.
- port Port for a SMB connection.
- username Remote username
- password Password for a SMB connection.
- **enable\_encryption** Enables encryption for a SMB3 connection.
- dont\_require\_signing Disables signing requirement.

# \_exists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns False.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

# \_isdir(remote\_path)

Protected method which checks, whether a remote file is a directory. The function is DEPRECATED and will be substituted using stat or lstat.

**Parameters** remote\_path – A path of a directory.

Returns True, if remote file is folder. False, if it isn't a folder. Undefined if the file doesn't exist.

### \_lexists(remote path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns True.

KNOWN BUG: Behavior is undefined in case of broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file is exist. False, if remote file doesn't exist

# \_listdir(remote\_path)

Protected method which returns a list of files in the folder including hidden files. It might contain '.' and '..'. Undefined if the remote file doesn't exist or isn't a folder.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

# **\_mkdir**(remote\_path)

Protected method which creates a new directory. Behavior is undefined if remote folder already exist, or destination folder doesn't exist.

**Parameters** remote\_path – A path of a new remote directory.

# **\_pull**(remote\_path, local\_path)

Protected method which downloads/pulls a nondirectory file from a remote storage to a local storage in the binary form. Behavior is undefined if source file or destination folder doesn't exist.

#### **Parameters**

- remote\_path Path of a remote file to download.
- local\_path Path of a local file, where to download/pull a remote file or local file already
  exists.

# \_push(local\_path, remote\_path)

Protected method which uploads/pushes a nondirectory file from a local storage to a remote storage in the binary form. Behavior is undefined if destination folder or source file doesn't exist, source is directory or remote file already exists.

### **Parameters**

- **local\_path** Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

# \_rename(old\_name, new\_name)

Protected method which renames/moves a file. Behavior is undefined, if *new\_name* file exists or *old\_name* file doesn't exist.

### **Parameters**

- old\_name Remote path a file to move.
- **new\_name** Remote path to which move the file.

### **\_rmdir**(remote\_path)

Protected method which removes an empty remote directory. Behavior is undefined if remote directory doesn't exist or it isn't empty.

**Parameters** remote\_path – Path of an empty remote directory to delete.

# \_stat(remote\_path)

Protected method which returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file. Undefined behavior if remote file doesn't exist or it is a broken symlink.

**Parameters remote\_path** – Path of a remote file.

**Returns** The function returns os.stat\_result like object, which is further parsed by \_stat\_unpack function. For more details please see source code.

### \_unlink(remote path)

Protected method which removes a nondirectory file. Behavior is undefined if remote file doesn't exist or is a directory.

**Parameters** remote\_path – Path of a remote regular file to delete.

### close()

Method to close the opened connection.

**cp**(old\_names: List[str], new\_name: str, recursive: bool = False)

dcp(old\_names: List[str], target\_dir: str, recursive: bool = False)

dmv(old\_names: List[str], target\_dir: str)

**exists**( $remote\_path: str$ )  $\rightarrow$  bool

Method which checks, whether a remote file exist. Returns False for broken symlinks.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file exists. False, if remote file doesn't exist.

fcp(old\_name: str, new\_name: str)

**find**(*remote path: str, child first: bool = False*)  $\rightarrow$  List[str]

A public method which returns DFS (depth-first search) of remote\_path including hidden files. It never returns '.' or '..'.

**Parameters child\_first** – If True, childs of a directory will be returned before the directory itself.

**Returns** The result of DFS as a list of remote\_paths.

**fmv**(old\_name: str, new\_name: str)

 $get_default_dmask() \rightarrow int$ 

Returns default\_dmask settings. For more details see pconnection\_settings.

 $get\_default\_fmask() \rightarrow int$ 

Returns default\_fmask settings. For more details see pconnection\_settings.

 $\texttt{get\_settings}() \rightarrow \textit{rfslib.pconnection\_settings.pconnection\_settings}$ 

The procedure sets all generic settings for PConnection.

**Returns** A ponnection settings object with all generic settings of PConnection.

isdir(remote\_path: str)

lexists(remote\_path)

Method which checks, whether a remote file exist. Returns True for broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file exists. False, if remote file doesn't exist.

listdir(remote\_path: str)

Public method which returns a list of files in the folder including hidden files. It never returns '.' or '..'.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

```
ls(remote_path: str)
lstat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
     Returns statistics of a file (eg. size, last date modified,...) Doesn't follow symlinks.
          Parameters remote_path – Path of a remote file.
          Returns An object whose attributes correspond to the attributes of Python's stat structure as
              returned by os.stat, except that it contains fewer fields.
mkdir(remote_path: str)
     A public method, which creates a folder. If directory can't be created, because a file already exist, an
     exception is raised. No other directories on path will be created and if any of them is missing, an exception
     is raised.
          Parameters remote_path – A path, where to create a new directory.
mv(old_names: List[str], new_name: str)
pmkdir(remote_path: str)
pull(remote_path: str, local_path: str)
push(local_path: str, remote_path: str)
     Uploads/pushes a file from a local storage to a remote storage in the binary form.
          Parameters
              • local_path – Path of a local file to upload.
              • remote_path – Path on the remote storage, where to upload/push a local file.
rename(old_name: str, new_name: str)
rm(remote_path: str, recursive: bool = False)
rmdir(remote path: str)
rpull(remote_path: str, local_path: str)
rpush(local_path: str, remote_path: str)
set_settings(settings: rfslib.pconnection_settings.pconnection_settings)
     The procedure sets all generic settings for PConnection.
          Parameters settings – A pronnection settings object with all generic settings for PConnec-
              tion. If some attribute in object is missing, no operation will be done with it.
stat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
     Returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file.
          Parameters remote_path – Path of a remote file.
          Returns An object whose attributes correspond to the attributes of Python's stat structure as
              returned by os.stat, except that it contains fewer fields.
touch(remote_path: str)
```

```
unlink(remote_path: str)
xls(remote_path: str)
```

rfslib.smb23\_pconnection.config\_smb23(no\_dfs: bool = False, disable\_secure\_negotiate: bool = False, dfs\_domain\_controller: Optional[str] = None)

The procedure changes global setting for SMB version 2 or 3 across all connection. Don't change value, if any SMB connection version 2 or 3 is active.

# **Parameters**

- no\_dfs Disables DFS support useful as a bug fix.
- **disable\_secure\_negotiate** Disables secure negotiate requirement for a SMB connection.
- **dfs\_domain\_controller** The DFS domain controller address. Useful in case, when rfstools fails to find it themself.

# RFSLIB.FS PCONNECTION MODULE

class rfslib.fs\_pconnection.FsPConnection(settings: rfslib.pconnection\_settings.pconnection\_settings)
 Bases: rfslib.abstract\_pconnection.PConnection

Class for operating with local filesystem. Public interface with an exception of \_\_init\_\_ and close is inherited from PConnection.

**\_\_init\_\_**(*settings*: rfslib.pconnection\_settings.pconnection\_settings)

The constructor of FsPConnection.

**Parameters settings** – The settings for super class PConnection.

### \_exists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns False.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

### \_isdir(remote\_path)

Protected method which checks, whether a remote file is a directory. The function is DEPRECATED and will be substituted using stat or lstat.

**Parameters remote\_path** – A path of a directory.

**Returns** True, if remote file is folder. False, if it isn't a folder. Undefined if the file doesn't exist.

# \_lexists(remote\_path)

Protected method which checks, whether a remote file exist. If the remote file is a broken symlink, it returns True.

KNOWN BUG: Behavior is undefined in case of broken symlinks.

**Parameters remote\_path** – Path of a remote file.

Returns True, if remote file is exist. False, if remote file doesn't exist

### \_listdir(remote\_path)

Protected method which returns a list of files in the folder including hidden files. It might contain '.' and '..'. Undefined if the remote file doesn't exist or isn't a folder.

**Parameters** remote\_path – The remote path of a remote folder.

**Returns** A list of files in the remote folder.

# \_mkdir(remote\_path)

Protected method which creates a new directory. Behavior is undefined if remote folder already exist, or destination folder doesn't exist.

**Parameters remote\_path** – A path of a new remote directory.

### **\_pull**(remote\_path, local\_path)

Protected method which downloads/pulls a nondirectory file from a remote storage to a local storage in the binary form. Behavior is undefined if source file or destination folder doesn't exist.

### **Parameters**

- **remote\_path** Path of a remote file to download.
- local\_path Path of a local file, where to download/pull a remote file or local file already
  exists.

### \_push(local\_path, remote\_path)

Protected method which uploads/pushes a nondirectory file from a local storage to a remote storage in the binary form. Behavior is undefined if destination folder or source file doesn't exist, source is directory or remote file already exists.

#### **Parameters**

- **local\_path** Path of a local file to upload.
- **remote\_path** Path on the remote storage, where to upload/push a local file.

```
_rename(old_name, new_name)
```

Protected method which renames/moves a file. Behavior is undefined, if *new\_name* file exists or *old\_name* file doesn't exist.

#### **Parameters**

- **old\_name** Remote path a file to move.
- **new\_name** Remote path to which move the file.

### **\_rmdir**(remote\_path)

Protected method which removes an empty remote directory. Behavior is undefined if remote directory doesn't exist or it isn't empty.

**Parameters remote\_path** – Path of an empty remote directory to delete.

```
_stat(remote_path)
```

Protected method which returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file. Undefined behavior if remote file doesn't exist or it is a broken symlink.

**Parameters remote\_path** – Path of a remote file.

**Returns** The function returns os.stat\_result like object, which is further parsed by \_stat\_unpack function. For more details please see source code.

### \_unlink(remote path)

Protected method which removes a nondirectory file. Behavior is undefined if remote file doesn't exist or is a directory.

Parameters remote\_path - Path of a remote regular file to delete.

# close()

Method to close the opened connection.

```
cp(old_names: List[str], new_name: str, recursive: bool = False)
dcp(old_names: List[str], target_dir: str, recursive: bool = False)
dmv(old_names: List[str], target_dir: str)
exists(remote_path: str) → bool
```

Method which checks, whether a remote file exist. Returns False for broken symlinks.

**Parameters** remote\_path – Path of a remote file.

**Returns** True, if remote file exists. False, if remote file doesn't exist. **fcp**(old name: str, new name: str) **find**( $remote\_path: str, child\_first: bool = False$ )  $\rightarrow$  List[str] A public method which returns DFS (depth-first search) of remote\_path including hidden files. It never returns '.' or '..'. Parameters child\_first - If True, childs of a directory will be returned before the directory **Returns** The result of DFS as a list of remote\_paths. **fmv**(old\_name: str, new\_name: str)  $get\_default\_dmask() \rightarrow int$ Returns default\_dmask settings. For more details see pconnection\_settings.  $get\_default\_fmask() \rightarrow int$ Returns default\_fmask settings. For more details see pconnection\_settings.  $get\_settings() \rightarrow rfslib.pconnection settings.pconnection settings$ The procedure sets all generic settings for PConnection. **Returns** A pronnection\_settings object with all generic settings of PConnection. isdir(remote\_path: str) lexists(remote path) Method which checks, whether a remote file exist. Returns True for broken symlinks. **Parameters** remote\_path – Path of a remote file. **Returns** True, if remote file exists. False, if remote file doesn't exist. listdir(remote\_path: str) Public method which returns a list of files in the folder including hidden files. It never returns '.' or '..'. **Parameters remote\_path** – The remote path of a remote folder. **Returns** A list of files in the remote folder. **ls**(remote\_path: str) **lstat**( $remote\_path: str$ )  $\rightarrow rfslib.abstract\_pconnection.p\_stat\_result$ Returns statistics of a file (eg. size, last date modified,...) Doesn't follow symlinks. **Parameters remote\_path** – Path of a remote file. Returns An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields. **mkdir**(remote path: str) A public method, which creates a folder. If directory can't be created, because a file already exist, an exception is raised. No other directories on path will be created and if any of them is missing, an exception is raised. **Parameters remote\_path** – A path, where to create a new directory. **mv**(old\_names: List[str], new\_name: str) pmkdir(remote\_path: str)

Uploads/pushes a file from a local storage to a remote storage in the binary form.

pull(remote\_path: str, local\_path: str)
push(local\_path: str, remote\_path: str)

#### **Parameters**

- **local\_path** Path of a local file to upload.
- remote\_path Path on the remote storage, where to upload/push a local file.

```
rename(old_name: str, new_name: str)
rm(remote_path: str, recursive: bool = False)
rmdir(remote_path: str)
rpull(remote_path: str, local_path: str)
rpush(local_path: str, remote_path: str)
set_settings(settings: rfslib.pconnection_settings)
The procedure sets all generic settings for PConnection.
```

**Parameters settings** – A pronnection\_settings object with all generic settings for PConnection. If some attribute in object is missing, no operation will be done with it.

```
stat(remote\_path: str) \rightarrow rfslib.abstract\_pconnection.p\_stat\_result
```

Returns statistics of a file (eg. size, last date modified,...) Follows symlinks to a destination file.

**Parameters** remote\_path – Path of a remote file.

**Returns** An object whose attributes correspond to the attributes of Python's stat structure as returned by os.stat, except that it contains fewer fields.

```
touch(remote_path: str)
unlink(remote_path: str)
xls(remote_path: str)
```

**CHAPTER** 

## **EIGHT**

# RFSLIB.PATH\_UTILS MODULE

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