

# VChannel

**Library version:** RENAT 0.1.13  
**Library scope:** test suite  
**Named arguments:** supported

## Introduction

A basic library that provides Terminal connection to routers/hosts

VChannel is a core RENAT library that maintains input/output to nodes with an attached virtual terminal. It encapsulates the SSH/Telnet connections behind and provides common usage of access and execute commands to the nodes. Each channel instance has its own log file and a virtual terminal.

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## Device, Node and Channel

RENAT has 3 types of connection target. Device, Node and Channel.

### Device

Each device stands for a real physical box that has its own IP address and is defined in the master file `device.yaml`. Users do not directly use device in keywords.

### Node

Node is a logical instance of a device. It could stand for a logical instance of a router or just a virtual terminal to the router. Nodes were defined in `local.yaml` of the test case. Several nodes could point to a same device.

### Channel

Each channel holds a session to a node. Each channel has its own log file and a virtual terminal. Any command used by `Cmd`, `Write` or `Read` will be logged to the log file. Each channel is identified by a name when it is created with `Connect` keyword and is released with `Close` keyword.

**Notes:** multi sessions to a same device could be done with predefined multi nodes to same device in the `local.yaml` file or by using multi `Connect` with different `name`.

## Connections

The library provides a channel to a target node. Each channel is attached with a virtual terminal. Input and output to the node are made through this virtual terminal. This will help to provide the output looks like the output when operator is using the real terminal.

When keywords `Read`, `Write`, `Cmd` are used, if the connection is not available anymore, the system will try to reconnect to the host with the information provided in the 1st connect. It will try `max_retry_for_connect` times and wait for `interval_between_retry` seconds between retries. The values of `max_retry_for_connect` and `interval_between_retry` are defined in `./config/config.yaml`

Usually when RENAT could not make the connections to the target, the system will raise an exception. But if the `ignore_dead_node` is defined as `yes` in the current active `local.yaml`, the system will ignore the dead node, remove it from the global variable `LOCAL[node]` and `NODE` and keep running the test.

## Shortcuts

Broadcast Write With Tag · Change Log · Change Prompt · Close · Close All · Cmd · Cmd And Wait For · Cmd And Wait For Regex · Cmd More · Cmd Yesno · Connect · Connect All · Current Prompt · Exec File · Flush All · Get Channel · Get Channels · Get Current Channel · Get Current Name · Get Ip · Log · Read · Reconnect · Set Log Separator · Snap · Snap Diff · Start Screen Mode · Stop Screen Mode · Switch · Write

## Keywords

| Keyword                  | Arguments                                   | Documentation   |
|--------------------------|---|---|
| Broadcast Write With Tag | <code>cmd</code> , <code>*tag_list</code>   | Broadcasts <code>cmd</code> to all channels   |
| Change Log               | <code>log_file</code> , <code>mode=w</code> | <p>Stops current log file and create a new log file.</p> <p>Default <code>mode</code> is <code>w</code> which overwrite the existed logs. Change to <code>a</code> or <code>a+</code> to append the current existed log files.</p> <p>Every log from that point will be saved to the new log file.</p> <p>Return old log filename</p> |
| Change Prompt            | <code>str_prompt</code>                     | <p>Changes the current prompt of the channel</p> <p>Returns previous prompt. User should change the prompt before execute the new command that expects to see new prompt.</p>   |

|                                |  |   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
|--------------------------------|--|---|-----------------------|-------|-------|-------------|--------------------------------|---|----------------------|-------------|-------|----------------------|----|----|--------------------------------|------------|--|----------------------|------|--|
|                                |  | <div>Example:</div> <table><tr><td>Router.<i>Switch</i></td><td>vmx11</td><td></td></tr><tr><td>\$(prompt)=</td><td>VChannel.<i>Change Prompt</i></td><td>%</td></tr><tr><td>VChannel.<i>Cmd</i></td><td>start shell</td><td></td></tr><tr><td>VChannel.<i>Cmd</i></td><td>ls</td><td></td></tr><tr><td>VChannel.<i>Change Prompt</i></td><td>\$(prompt)</td><td></td></tr><tr><td>Vchannel.<i>Cmd</i></td><td>exit</td><td></td></tr></table>  | Router. <i>Switch</i> | vmx11 |       | \$(prompt)= | VChannel. <i>Change Prompt</i> | % | VChannel. <i>Cmd</i> | start shell |       | VChannel. <i>Cmd</i> | ls |    | VChannel. <i>Change Prompt</i> | \$(prompt) |  | Vchannel. <i>Cmd</i> | exit |  |
| Router. <i>Switch</i>          | vmx11  |   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| \$(prompt)=                    | VChannel. <i>Change Prompt</i>   | %   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| VChannel. <i>Cmd</i>           | start shell  |   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| VChannel. <i>Cmd</i>           | ls   |   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| VChannel. <i>Change Prompt</i> | \$(prompt)   |   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Vchannel. <i>Cmd</i>           | exit   |   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Close                          | msg=, with_time=False, mark=***  | Closes current connection and returns the active channel name<br><br>msg is the last message is written to each device's log  |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Close All                      | msg=, with_time=False, mark=***  | Closes all current sessions and flush out all log files.<br><br>msg is the last message the is written to each device's log.<br><br>Current node name was reset to None   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Cmd                            | command=, prompt=None, timeout=None, error_on_timeout=True, prompt_timeout=None, error_on_prompt_timeout=True, remove_prompt=False, match_err= (unknown command. syntax error, expecting <command>.) | Executes a command and wait until for the prompt.<br><br>This is a blocking keyword. Execution of the test case will be postponed until the prompt appears. If prompt is a null string (default), its value is defined in the ./config/template.yaml<br><br>timeout is the timeout for this Cmd. If timeout is not define, the local vchannel/cmd-timeout or global vchannel/cmd-timeout will be used.<br><br>The keyword returns error when the output matches the match_err and the default config value cmd-auto-check is True<br><br>When remove_prompt is \$(TRUE) , the last line (usually the prompt line) will be remove from the return value. But still in this case, the log information is unchanged.<br><br>Output will be automatically logged to the channel current log file.<br><br>See Common for details about the config files.                               |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Cmd And Wait For               | command, keyword, interval=30s, max_num=10, error_with_max_num=True  | Execute a command and expect keyword occurs in the output. If not wait for interval and repeat the process again<br><br>After max_num, if error_with_max_num is True then the keyword will fail. Ortherwise the test continues.   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Cmd And Wait For Regex         | command, pattern, interval=30s, max_num=10, error_with_max_num=True  | Execute a command and expect pattern occurs in the output. If not wait for interval and repeat the process again<br><br>When the keyword contains not: at the beginning, the matching logic is reversed.<br><br>After max_num, if error_with_max_num is True then the keyword will fail. Ortherwise the test continues.   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Cmd More                       | cmd=, wait_prompt=.*---(more.*)---, press_key= , prompt=None   | Execute a command and press press_key when wait_prompt is displayed until the prompt  |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Cmd Yesno                      | cmd, ans=yes, question=? [yes,no] , timeout=5s   | Executes a cmd, waits for question and answers that by ans  |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Connect                        | node, name, log_file, timeout=20m, w=80, h=32, mode=w  | Connects to the node and create a VChannel instance<br><br>Login information is automatically extracted from yaml configuration. By defaultt a virtual terminal (vty100) with size 80x64 is attached to this channel.<br><br>If a login was successful, VChannel will create a log file name log_file for the connection in the current result folder of the test case. This log file will contain any command input/output executed on this channel.<br><br>Multi sessions to the same node could be open with different names. Use Switch to change the current active session by its name<br><br>Examples:<br><table><tr><td>Connect</td><td>vmx11</td><td>vmx11</td><td>vmx11.log</td><td></td><td></td></tr><tr><td>Connect</td><td>vmx11</td><td>vmx11</td><td>vmx11.log</td><td>80</td><td>64</td></tr></table><br>See Common for more detail about the yaml config files. | Connect               | vmx11 | vmx11 | vmx11.log   |                                |   | Connect              | vmx11       | vmx11 | vmx11.log            | 80 | 64 |                                |            |  |                      |      |  |
| Connect                        | vmx11  | vmx11   | vmx11.log             |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Connect                        | vmx11  | vmx11   | vmx11.log             | 80    | 64    |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Connect All                    | prefix=  | Connects to all nodes that are defined in active local.yaml.<br><br>A prefix prefix was appended to the alias name of the connection. A new log file by <alias>.log was automatiocally created.<br><br>See Common for more detail about active local.yaml   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |
| Current Prompt                 |  | Return current prompt   |                       |       |       |             |                                |   |                      |             |       |                      |    |    |                                |            |  |                      |      |  |

|                            |  |   |                          |         |  |                          |               |                        |
|----------------------------|--|---|--------------------------|---------|--|--------------------------|---------------|------------------------|
| <b>Exec File</b>           | <i>file_name</i> , <i>vars</i> =, <i>comment</i> =# , <i>step</i> =False, <i>mode</i> =cmd, <i>str_error</i> =syntax,error | <p>Executes commands listed in <i>file_name</i>. Lines started with <i>comment</i> character is considered as comments</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>▪ <i>file_name</i> is a file located inside the <i>config</i> folder of the test case</li> <li>▪ <i>mode</i>: could be <i>cmd</i> or <i>write</i> which define that if the cmd is executed by VChannel.<i>Cmd</i> or VChannel.<i>Write</i></li> <li>▪ if <i>step</i> is <i>True</i>, after very command the output is check agains an error list. And if a match is found, execution will be stopped. Error list is define by <i>str_err</i>, that contains multi regular expression separated by a comma. Default value of <i>str_err</i> is <i>error</i></li> <li>▪ <i>vars</i> are additional variables in format <i>var1</i>=value1,<i>var2</i>=value2</li> </ul> <p>The command file could be written in Jinja2 format. Default usable variables are <i>LOCAL</i> and <i>GLOBAL</i> which are identical to <i>Common.LOCAL</i> and <i>Common.GLOBAL</i>. More variables could be supplied to the template by <i>vars</i>.</p> <p>A sample for command list with Jinja2 template:</p> <pre>show interface {{ LOCAL['extra']['line1'] }} show interface {{ LOCAL['extra']['line2'] }}  {% for i in range(2) %} show interface et-0/0/{{ i }} {% endfor %}</pre> <p>Examples:</p> <table border="1"> <tr> <td>Router.<i>Exec File</i></td><td>cmd.lst</td><td></td></tr> <tr> <td>Router.<i>Exec File</i></td><td>step=\${TRUE}</td><td>str_error=syntax,error</td></tr> </table> <p><b>Note:</b> Comment in the middle of the line is not supported For example if <i>comment</i> is "#"</p> <pre># this is comment line &lt;-- this line will be ignored ## this is not an comment line, and will be entered to the router cli,</pre> <p>but the router might ignore this</p> <p><i>step</i> is ignored in <i>write</i> mode</p> | Router. <i>Exec File</i> | cmd.lst |  | Router. <i>Exec File</i> | step=\${TRUE} | str_error=syntax,error |
| Router. <i>Exec File</i>   | cmd.lst  |   |                          |         |  |                          |               |                        |
| Router. <i>Exec File</i>   | step=\${TRUE}  | str_error=syntax,error  |                          |         |  |                          |               |                        |
| <b>Flush All</b>           |  | Flushes all remain data into the logger   |                          |         |  |                          |               |                        |
| <b>Get Channel</b>         | <i>name</i>  | Returns a channel by its <i>name</i>  |                          |         |  |                          |               |                        |
| <b>Get Channels</b>        |  | Returns all current vchannel instances  |                          |         |  |                          |               |                        |
| <b>Get Current Channel</b> |  | Returns the current active channel  |                          |         |  |                          |               |                        |
| <b>Get Current Name</b>    |  | Returns the current active channel's name   |                          |         |  |                          |               |                        |
| <b>Get Ip</b>              |  | Returns the IP address of current node Examples:<br><pre>\$(router_ip)= Router.<i>Get IP</i></pre>  |                          |         |  |                          |               |                        |
| <b>Log</b>                 | <i>msg</i>   | Writes the log message <i>msg</i> to current log file of the channel  |                          |         |  |                          |               |                        |
| <b>Read</b>                | <i>silence</i> =False  | Returns the current output of the virtual terminal and automatically logs to file.<br><br>In <i>normal mode</i> this will return the <b>unread</b> output only, not all the content of the screen.  |                          |         |  |                          |               |                        |
| <b>Reconnect</b>           | <i>name</i>  | Reconnects to the <i>name</i> node using existed information<br><br>The only difference is that the mode of the log file is set to 'a+' by default  |                          |         |  |                          |               |                        |
| <b>Set Log Separator</b>   | <i>sep</i> =   | Set a separator between the log of <i>read</i> , <i>write</i> or <i>cmd</i> keywords  |                          |         |  |                          |               |                        |
| <b>Snap</b>                | <i>name</i> , <i>*cmd_list</i>   | Remembers the result of a list of command defined by <i>cmd_list</i><br><br>Use this keyword with <i>Snap Diff</i> to get the difference between the command's result. The a new snapshot will override the previous result.<br><br>Each snap is identified by its <i>name</i>  |                          |         |  |                          |               |                        |
| <b>Snap Diff</b>           | <i>name</i>  | Executes the comman that have been executed before by <i>name</i> snapshot and return the difference.   |                          |         |  |                          |               |                        |

|                              |   |   |                              |                           |   |                              |                         |                    |
|------------------------------|---|---|------------------------------|---------------------------|---|------------------------------|-------------------------|--------------------|
|                              |   | Difference is in <code>context diff</code> format   |                              |                           |   |                              |                         |                    |
| <b>Start Screen Mode</b>     |   | <p>Starts the screen mode .</p> <p>In the screen mode , the output is just the same with the real terminal. It means that any real-time application likes <code>top</code> will be captured as-is. Consecutive <code>read</code> from this VChannel instance may produce redundancy output.</p>   |                              |                           |   |                              |                         |                    |
| <b>Stop Screen Mode</b>      |   | <p>Stops the screen mode and returns to normal mode</p> <p>In screen mode , <code>Write</code> does not return any thing and no output is logged. In normal mode , escape sequences are not processed by the virtual terminal.</p>  |                              |                           |   |                              |                         |                    |
| <b>Switch</b>                | <i>name</i>   | <p>Switches the current active channel to <code>name</code> . There only one active channel at any time</p> <p>Returns the current <code>channel_id</code>, <code>local_channel_id</code> and the output of current terminal.</p> <p><b>Notes:</b> There is no assurance that the output of previous <code>Write</code> command will be in the retur output because keywords like <code>Logger.Log All</code> will update every channels.</p> <p>Examples:</p> <pre>VChannel.Switch vmx12</pre>   |                              |                           |   |                              |                         |                    |
| <b>Write</b>                 | <i>str_cmd=, str_wait=0s, start_screen_mode=False</i> | <p>Sends <code>str_cmd</code> to the target node and return after <code>str_wait</code> time.</p> <p>If <code>start_screen_mode</code> is <code>True</code> , the channel will be shifted to Screen Mode . Default value of <code>screen_mode</code> is <code>False</code>.</p> <p>In normal mode , a new line char will be added automatically to the <code>str_cmd</code> and the command return the output it could get at that time from the terminal and also logs that to the log file.</p> <p>In screen Mode , if it is necessary you need to add the new line char by your own and the ouput is not be logged or returned from the keyword.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>▪ <code>str_cmd</code> : the command</li> <li>▪ <code>str_wait</code> : time to wait after apply the command</li> <li>▪ <code>start_screen_mode</code> : whether start the screen mode right after writes the command</li> </ul> <p>Special input likes <code>Ctrl-C</code> etc. could be used with global variable <code>\${CTRL-&lt;char&gt;}</code></p> <p>Returns the output after writing the command the the channel.</p> <p>When <code>str_wait</code> is not <code>0s</code>, the keyword <code>read</code> and return the output after waiting <code>str_wait</code>. Otherwise, the keyword return without any output.</p> <p><b>Notes:</b> This is a non-blocking command.</p> <p>Examples:</p> <table border="1"> <tr> <td>VChannel.<code>Write</code></td> <td>monitor interface traffic</td> <td><code>start_screen_mode=\${TRUE}</code></td> </tr> <tr> <td>VChannel.<code>Write</code></td> <td><code>\${CTRL_C}</code></td> <td># simulates Ctrl-C</td> </tr> </table> | VChannel. <code>Write</code> | monitor interface traffic | <code>start_screen_mode=\${TRUE}</code> | VChannel. <code>Write</code> | <code>\${CTRL_C}</code> | # simulates Ctrl-C |
| VChannel. <code>Write</code> | monitor interface traffic                             | <code>start_screen_mode=\${TRUE}</code>   |                              |                           |   |                              |                         |                    |
| VChannel. <code>Write</code> | <code>\${CTRL_C}</code>                               | # simulates Ctrl-C  |                              |                           |   |                              |                         |                    |

