

# VChannel

**Library version:** RENAT 0.1.11  
**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

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												
Change Log	<code>log_file</code> , <code>mode=w</code>	Stops current log file and create a new log file.  Every log from that point will be saved to the new log file Return old log filename												
Change Prompt	<code>str_prompt</code>	Changes the current prompt of the channel  Returns previous prompt. User should change the prompt before execute the new command that expects to see new prompt.  Example: <table><tr><td>Router.<code>Switch</code></td><td>vmx11</td><td></td></tr><tr><td>`\${prompt}`=</td><td>VChannel.<code>Change Prompt</code></td><td>%</td></tr><tr><td>VChannel.<code>Cmd</code></td><td>start shell</td><td></td></tr><tr><td>VChannel.<code>Cmd</code></td><td>ls</td><td></td></tr></table>	Router. <code>Switch</code>	vmx11		`\${prompt}`=	VChannel. <code>Change Prompt</code>	%	VChannel. <code>Cmd</code>	start shell		VChannel. <code>Cmd</code>	ls	
Router. <code>Switch</code>	vmx11													
`\${prompt}`=	VChannel. <code>Change Prompt</code>	%												
VChannel. <code>Cmd</code>	start shell													
VChannel. <code>Cmd</code>	ls													

		<table><tr><td>VChannel.<a href="#">Change Prompt</a></td><td>\$(prompt)</td><td></td></tr><tr><td>Vchannel.<a href="#">Cmd</a></td><td>exit</td><td></td></tr></table>	VChannel. <a href="#">Change Prompt</a>	\$(prompt)		Vchannel. <a href="#">Cmd</a>	exit							
VChannel. <a href="#">Change Prompt</a>	\$(prompt)													
Vchannel. <a href="#">Cmd</a>	exit													
Close		Closes current connection and returns the active channel name												
Close All		Closes all current sessions and flush out all log files.  Current node name was reset to <code>None</code>												
Cmd	<code>command=, prompt=None, timeout=None, match_err= (unknown command./syntax error, expecting &lt;command&gt;.)</code>	Executes a <code>command</code> and wait until for the prompt.  This is a blocking keyword. Execution of the test case will be postponed until the prompt appears. If <code>prompt</code> is a null string (default), its value is defined in the <code>./config/template.yaml</code>  <code>timeout</code> is the timeout for this <a href="#">Cmd</a> . If <code>timeout</code> is not define, the local <code>vchannel/cmd-timeout</code> or global <code>vchannel/cmd-timeout</code> will be used.  The keyword returns error when the output matches the <code>match_err</code> and the default config value <code>cmd-auto-check</code> is <code>True</code>  Output will be automatically logged to the channel current log file.  See <a href="#">Common</a> for details about the config files.												
Cmd And Wait For	<code>command, keyword, interval=30s, max_num=10, error_with_max_num=True</code>	Execute a command and expect <code>keyword</code> occurs in the output. If not wait for <code>interval</code> and repeat the process again  After <code>max_num</code> , if <code>error_with_max_num</code> is <code>True</code> then the keyword will fail. Ortherwise the test continues.												
Cmd And Wait For Regex	<code>command, pattern, interval=30s, max_num=10, error_with_max_num=True</code>	Execute a command and expect <code>pattern</code> occurs in the output. If not wait for <code>interval</code> and repeat the process again  When the keyword contains <code>not</code> : at the beginning, the matching logic is reversersed.  After <code>max_num</code> , if <code>error_with_max_num</code> is <code>True</code> then the keyword will fail. Ortherwise the test continues.												
Cmd More	<code>cmd=, wait_prompt=.*---(more.*)---, press_key= , prompt=None</code>	Execute a command and press <code>press_key</code> when <code>wait_prompt</code> is displayed until the prompt												
Cmd Yesno	<code>cmd, ans=yes, question=? [yes,no]</code>	Executes a <code>cmd</code> , waits for <code>question</code> and answers that by <code>ans</code>												
Connect	<code>node, name, log_file, timeout=20m, w=80, h=32, mode=w</code>	Connects to the node and create a VChannel instance  Login information is automatically extracted from yaml configuration. By defaultt a virtual terminal (vty100) with size 80x64 is attached to this channel.  If a login was successful, VChannel will create a log file name <code>log_file</code> 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.  Multi sessions to the same node could be open with different names. Use <a href="#">Switch</a> to change the current active session by its name  Examples: <table><tr><td><a href="#">Connect</a></td><td>vmx11</td><td>vmx11</td><td>vmx11.log</td><td></td><td></td></tr><tr><td><a href="#">Connect</a></td><td>vmx11</td><td>vmx11</td><td>vmx11.log</td><td>80</td><td>64</td></tr></table> See <a href="#">Common</a> for more detail about the yaml config files.	<a href="#">Connect</a>	vmx11	vmx11	vmx11.log			<a href="#">Connect</a>	vmx11	vmx11	vmx11.log	80	64
<a href="#">Connect</a>	vmx11	vmx11	vmx11.log											
<a href="#">Connect</a>	vmx11	vmx11	vmx11.log	80	64									
Connect All	<code>prefix=</code>	Connects to <b>all</b> nodes that are defined in active <code>local.yaml</code> .  A prefix <code>prefix</code> was appended to the alias name of the connection. A new log file by <code>&lt;alias&gt;.log</code> was automatiocally created.  See <a href="#">Common</a> for more detail about active <code>local.yaml</code>												
Current Prompt		Return current prompt												
Exec File	<code>file_name, vars=, comment=# , step=False, str_error=syntax,rror</code>	Executes commands listed in <code>file_name</code> Lines started with <code>comment</code> character is considered as comments  <code>file_name</code> is a file located inside the <code>config</code> folder of the test case.  This command file could be written in Jinja2 format. Default usable variables are <code>LOCAL</code> and <code>GLOBAL</code> which are identical to <code>Common.LOCAL</code> and <code>Common.GLOBAL</code> . More variables could be supplied to the template by <code>vars</code> .  <code>vars</code> has the format: <code>var1=value1,var2=value2</code>  If <code>step</code> is <code>True</code> , 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 <code>str_err</code> , that contains multi regular expression separated by a comma. Default value of <code>str_err</code> is <code>error</code>  A sample for command list with Jinja2 template: <pre>show interface {{ LOCAL['extra']['line1'] }} show interface {{ LOCAL['extra']['line2'] }}  {% for i in range(2) %}</pre>												

		<pre>show interface et-0/0/{{ i }}</pre> <pre>{% endfor %}</pre> <p>Examples:</p> <table border="1"> <tr> <td>Router.<a href="#">Exec File</a></td><td>cmd.lst</td><td></td></tr> <tr> <td>Router.<a href="#">Exec File</a></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 comment is "# "</p> <pre># this is comment line &lt;-- this line will be ignored</pre> <pre>## this is not an comment line, and will be entered to the router cli,</pre> <p>but the router might ignore this</p>	Router. <a href="#">Exec File</a>	cmd.lst		Router. <a href="#">Exec File</a>	step=\${TRUE}	str_error=syntax,error
Router. <a href="#">Exec File</a>	cmd.lst							
Router. <a href="#">Exec File</a>	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:						
		<code>\$(router_ip)= Router.<a href="#">Get IP</a></code>						
<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=False</i>	Returns the current output of the virtual terminal and automatically logs to file.  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  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, *cmd_list</i>	Remembers the result of a list of command defined by <i>cmd_list</i>  Use this keyword with <a href="#">Snap Diff</a> to get the difference between the command's result. The a new snapshot will override the previous result.  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 <i>context diff</i> format						
<b>Start Screen Mode</b>		Starts the <i>screen mode</i> .  In the <i>screen mode</i> , the output is just the same with the real terminal. It means that any real-time application likes <i>top</i> will be captured as-is. Consecutive <a href="#">read</a> from this VChannel instance may produce redundancy ouput.						
<b>Stop Screen Mode</b>		Stops the <i>screen mode</i> and returns to <i>normal mode</i>  In <i>screen mode</i> , <a href="#">Write</a> does not return any thing and no output is logged. In <i>normal mode</i> , escape sequences are not processed by the virtual terminal.						
<b>Switch</b>	<i>name</i>	Switches the current active channel to <i>name</i> . There only one active channel at any time  Returns the current <i>channel_id</i> , <i>local_channel_id</i> and the output of current terminal.  <b>Notes:</b> There is no assurance that the output of previous <a href="#">Write</a> command will be in the retur output because keywords like <i>Logger.Log All</i> will update every channels.  Examples:  <code>VChannel.<a href="#">Switch</a> vmx12</code>						
<b>Write</b>	<i>str_cmd=, str_wait=0s, start_screen_mode=False</i>	Sends <i>str_cmd</i> to the target node and return after <i>str_wait</i> time.  If <i>start_screen_mode</i> is <i>True</i> , the channel will be shifted to <i>Screen Mode</i> . Default value of <i>screen_mode</i> is <i>False</i> .  In <i>normal mode</i> , a <i>new line</i> char will be added automatically to the <i>str_cmd</i> and the command return the output it could get at that time from the terminal and also logs that to the log file.  In <i>screen Mode</i> , if it is necessary you need to add the <i>new line</i> char by your own and the ouput is not be logged or returned from the keyword.  Parameters: <ul style="list-style-type: none"><li>▪ <i>str_cmd</i> : the command</li><li>▪ <i>str_wait</i> : time to wait after apply the command</li><li>▪ <i>start_screen_mode</i> : whether start the <i>screen mode</i> right after writes the command</li></ul> Special input likes Ctrl-C etc. could be used with global variable <code>\$(CTRL-&lt;char&gt;)</code>						

Returns the output after writing the command the the channel.

When *str\_wait* is not *0s*, the keyword `read` and `return the output` after waiting *str\_wait*. Otherwise, the keyword return without any output.

**Notes:** This is a non-blocking command.

Examples:

VChannel. <i>Write</i>	monitor interface traffic	start_screen_mode=\${TRUE}
VChannel. <i>Write</i>	\${CTRL_C}	# simulates Ctrl-C

Altogether 29 keywords.

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