(/linux/)

(https://www.baeldung.com/linux/)

tmux in Linux

(/bael-search)

Last updated: February 9, 2024

> Written by: Chin Ming Jun (https://www.baeldung.com/linux/author/chinmingjun)

Administration (https://www.baeldung.com/linux/category/administration)

Processes (https://www.baeldung.com/linux/category/processes)

tmux (https://www.baeldung.com/linux/tag/tmux)

1. Overview

tmux (https://man7.org/linux/man-pages/man1/tmux.1.html) is a terminal multiplexer tool in Linux. Essentially, it enables us to create and maintain multiple pseudo-terminal (/linux/pty-vs-tty#what-is-a-pty)

(PTS) instances. Concretely, it maintains these pseudo-terminals through a server process that’s started whenever a *tmux* command is executed.

(/linux/)
(https://www.baeldung.com/linux/)
(/bael-search)

Because these terminal processes are maintained by a server process, *tmux* provides us the flexibility to detach from any terminal session without killing it. Furthermore, we can reattach any of the terminal sessions at a later time to regain control. This makes it ideal for any long-running process that we can run in the background and reattach to get control once in a while.

In this tutorial, we’ll learn about the *tmux* command in Linux. Particularly, we’ll look at some of the features and subcommands offered by *tmux* as well as specific applications for many of them.

2. *tmux*

Normally, many Linux installations don’t include a terminal multiplexer by default. However, one can come in handy in many situations.

2.1. Installation

We can install *tmux* on Debian-based Linux (such as Ubuntu) using the *apt* (/linux/debian-installing-packages-url#1-apt-advanced-packaging-tool) package manager:

```
$ sudo apt-get update -qq
$ sudo apt-get install -y tmux
```

(/linux/)
(https://www.baeldung.com/linux/)
(/bael-search)

Similarly, we can install *tmux* on RHEL-based Linux (such as CentOS) using the *yum* (/linux/yum-dnf-reinstall#reinstall-original-yellowdog-update-modified-yum) package manager:

```
$ sudo yum update -qq
$ sudo yum install -y tmux
```

Either way, we should now have *tmux* available.

2.2. Basic Usage

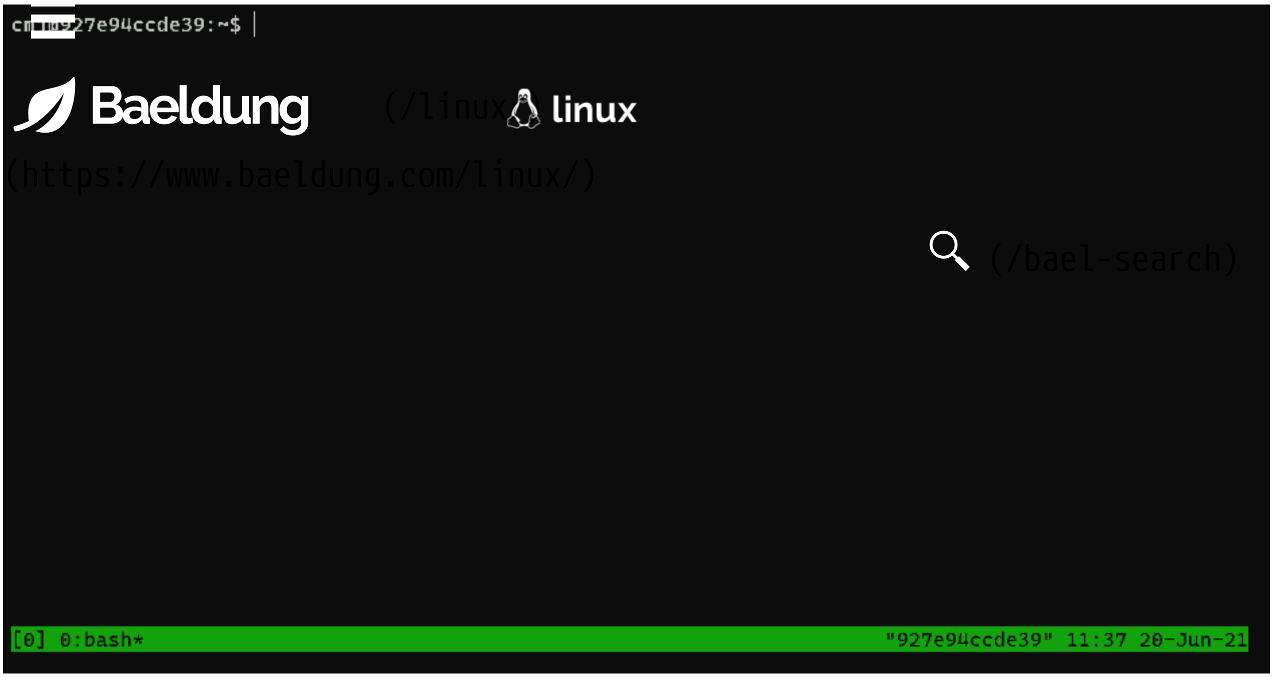
We can launch a new *tmux* session by entering the command alone:

```
$ tmux
```

Without any argument, *tmux* creates a new session with one window and one pane. Additionally, the session is given a default name: *0*.

Immediately after the creation, we're dropped into the *tmux* session:

(/linux
(https://www.baeldung.com/linux/)
(/bael-search)



```
c[illegible]927e94ccde39:~$
```

```
[0] 0:bash*                                          "927e94ccde39" 11:37 20-Jun-21
```

Here, we can see the shell prompt at the top, as well as some session status information at the bottom.

3. Key Bindings

The *tmux* documentation provides information about its many subcommands. They are usually intended for configuring the *tmux* instance. For example, there are commands for creating new windows, splitting panes, and detaching.

To make these commands easier to input, *tmux* defines a number of key bindings, also known as shortcuts or hotkeys. We can utilize the latter to boost our productivity. In fact, we mainly use these key bindings in this article.

When it comes to key bindings in the prefix key table, we can input them via a meta (/linux/meta-modifier-keys) key. **By default, *tmux* sets the prefix key as *Ctrl+B*.** For clarity, we annotate the prefix key with *<prefix>* in the rest of the article.

4. Sessions in *tmux*

A session in *tmux* can group together several pseudo terminals. They are directly under the *tmux* server's management.

(/linux/)

(https://www.baeldung.com/linux/)

(/bael-search)

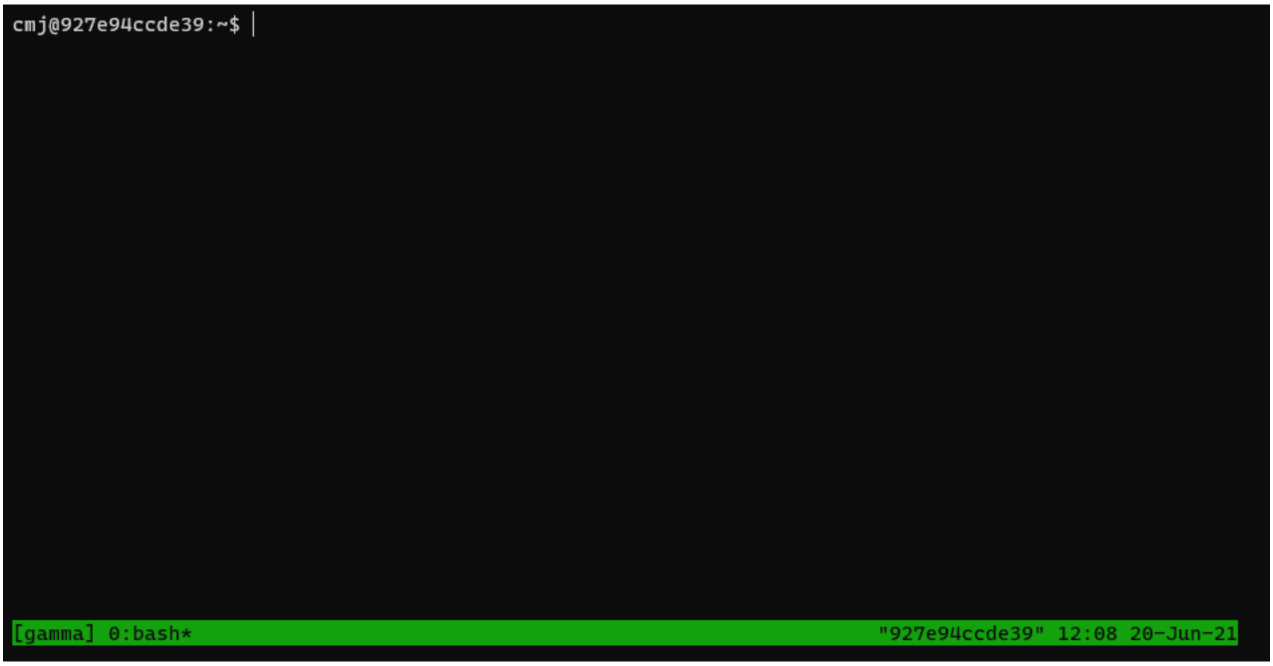
4.1. Creating a Session

We can create a new session in *tmux* using the *new-session* command. The command supports several option flags that enable us to customize the session.

For example, **we can create a session and give it a name using the *-s* flag**:

```
$ tmux new-session -s gamma
```

At this point, we should see the *gamma* session:



```
cmj@927e94ccde39:~$ |




[gamma] 0:bash*                                            "927e94ccde39" 12:08 20-Jun-21
```

In addition to the session name, **we can specify the window name using the *-n* flag**:

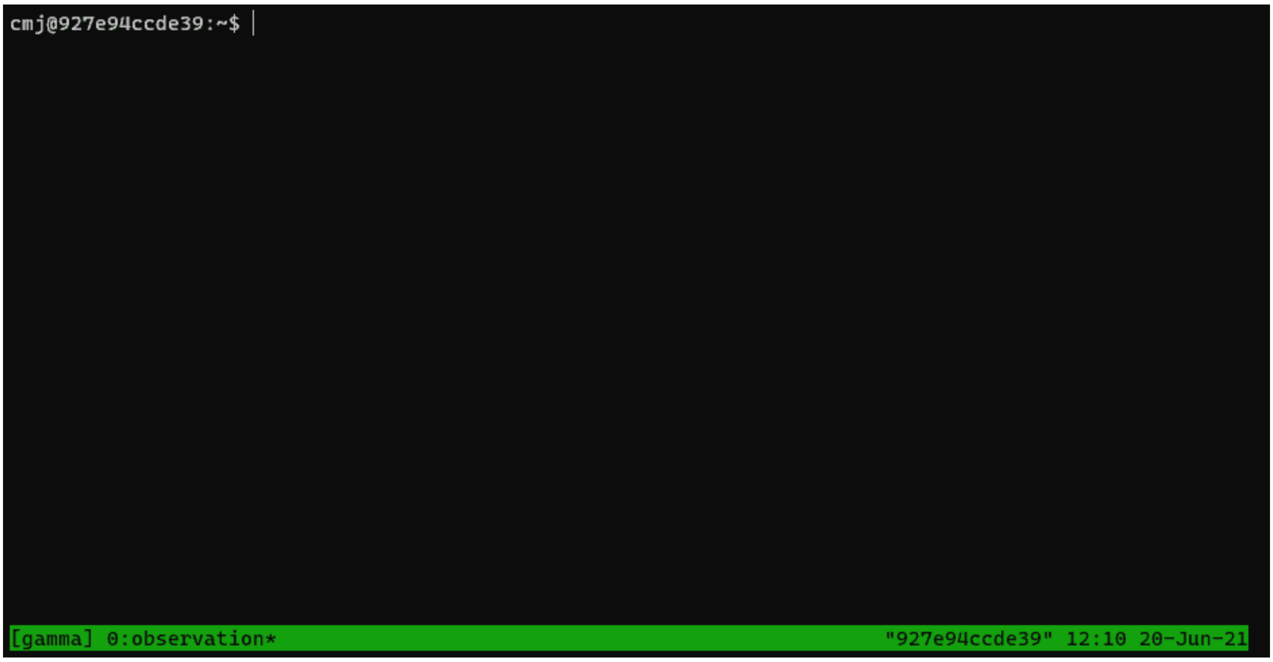
(/linux/)

```
$ tmux new-session -s gamma -n observation
```

(https://www.baeldung.com/linux/)

At this point, we have a named session and a named window:

(/bael-search)



```
cmj@927e94ccde39:~$ |
[gamma] 0:observation*                                    "927e94ccde39" 12:10 20-Jun-21
```

Using the *-d* flag, we can choose not to attach to the newly created session:

```
$ tmux new-session -s gamma -d
$ tmux list-session
alpha: 2 windows (created Sun Jun 20 11:37:35 2021)
gamma: 1 windows (created Sun Jun 20 12:11:41 2021)
```

After we enter the *new-session* command, we'll not see the session due to the *-d*

4.2. Detaching From a Session

To detach the client from a session, we can use *d* after *<prefix>*:

(/linux/)

(https://www.baeldung.com/linux/)

(/bael-search)

```
<prefix> + d
```

At this point, the session disappears and the *tmux* server remains operational only in the background.

4.3. Attaching to a Session

To attach to a session, we can use the *attach-session* command followed by the *-t* flag and the name or number of the session.

For instance, we can attach to the *gamma* session:

```
$ tmux attach-session -t gamma
```

Alternatively, we can use the session number.

4.4. Listing All the Sessions

To view a list of all the sessions currently on the *tmux* server, **we can use the *list-session* command**:

```
$ tmux list-session
alpha: 2 windows (created Sun Jun 20 11:37:35 2021)
gamma: 1 windows (created Sun Jun 20 12:11:41 2021)
```

From the output, we can see that there are currently two sessions running on the *tmux* server: *alpha* and *gamma*. Both of them also have numbers.

(/linux/)

(https://www.baeldung.com/linux/)

4.5. Renaming a Session

(/bael-search)

To rename an existing session, we can use the *rename-session* command:

```
$ tmux rename-session -t alpha beta
$ tmux list-session
beta: 2 windows (created Sun Jun 20 11:37:35 2021)
gamma: 1 windows (created Sun Jun 20 12:11:41 2021)
```

The *rename-session* command requires us to specify the target session to be renamed using the *-t* flag. In this example, we're renaming our session *alpha* to *beta*.

4.6. Terminating a Session

To kill a session, we'll need to first identify the name or number of the session. Then, **we can terminate the session using the *kill-session* command with the *-t* flag**.

So, let's kill one of the sessions we already have:

```
$ tmux kill-session -t gamma
$ tmux list-session
beta: 2 windows (created Sun Jun 20 11:37:35 2021)
```

The *-t* flag specifies the session to kill, which is session *gamma* in our example.

(/linux/)

(https://www.baeldung.com/linux/)

5. Windows in *tmux*

(/bael-search)

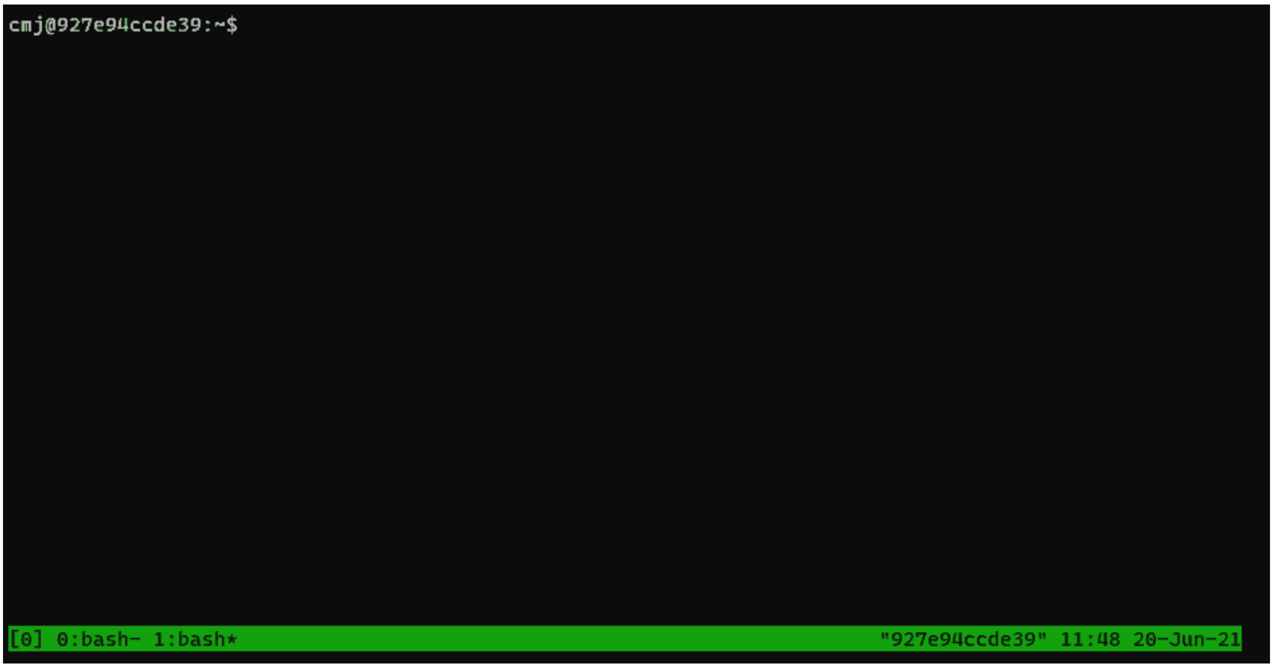
Within each *tmux* session, there are one or more windows. Similar to the session, windows can be created, removed, named, and switched.

5.1. Creating a New Window

To create a new window in a session, we can again use a hotkey:

```
<prefix> + c
```

From the status bar at the bottom of the screen, we see that there are currently two windows in this session:



```
cmj@927e94ccde39:~$

[0] 0:bash- 1:bash*                                    "927e94ccde39" 11:48 20-Jun-21
```

Similar to sessions, each window is assigned an index starting from *0*. Additionally, each window can have a name. By default, the name is the command the window is currently executing. In our example, both of the windows are named *bash* because that’s the currently running process in both windows.

Finally, ***tmux* indicates the active window by placing an asterisk beside the window's name.** From the screenshot, we can tell that we're looking at the window index number *1*.

(/linux/)

(https://www.baeldung.com/linux/)

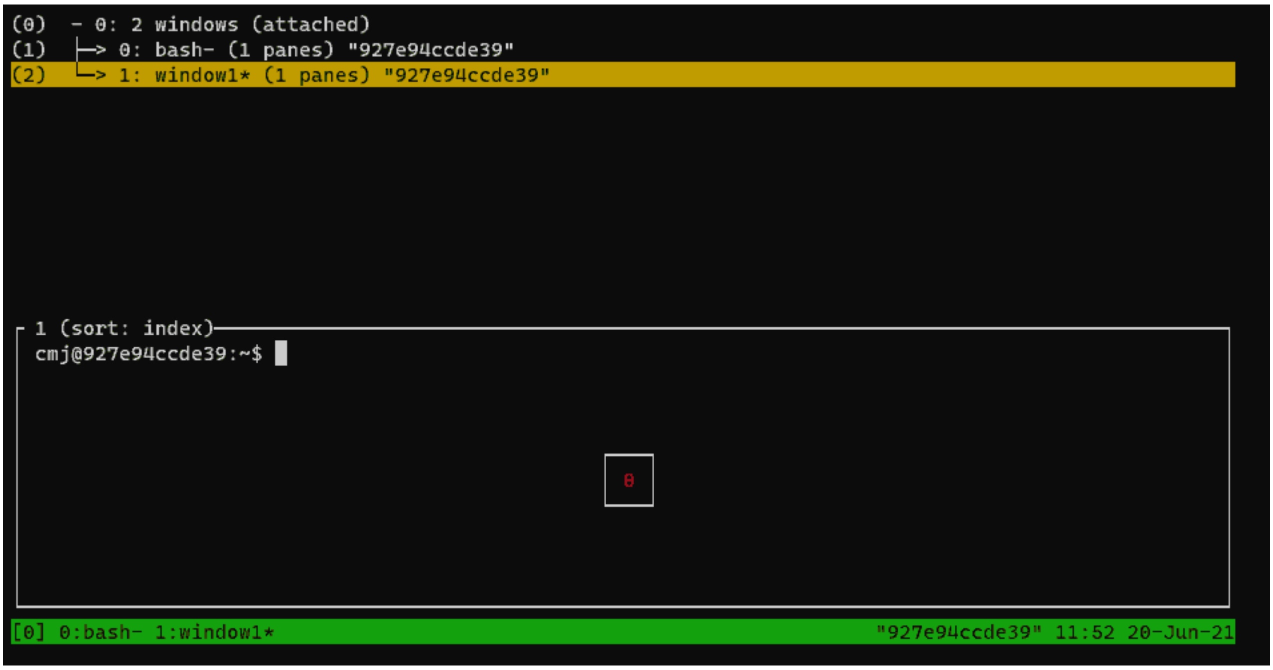
(/bael-search)

5.2. Listing All the Windows

We can display a list of all the windows in this session:

```
<prefix> + w
```

Thus, we see a tree-like view of the windows and associated panes:



```
(0)  - 0: 2 windows (attached)
(1)  ├─> 0: bash- (1 panes) "927e94ccde39"
(2)  └─> 1: window1* (1 panes) "927e94ccde39"

┌ 1 (sort: index)──────────────────────────────────────────────
  cmj@927e94ccde39:~$ █

                                0

[0] 0:bash- 1:window1*                "927e94ccde39" 11:52 20-Jun-21
```

While on the list, we can navigate the list using the *Up* and *Down* arrow keys. Then, we press *Return* to select the window we want to display.

(/linux/)

(https://www.baeldung.com/linux/)

5.3. Renaming a Window

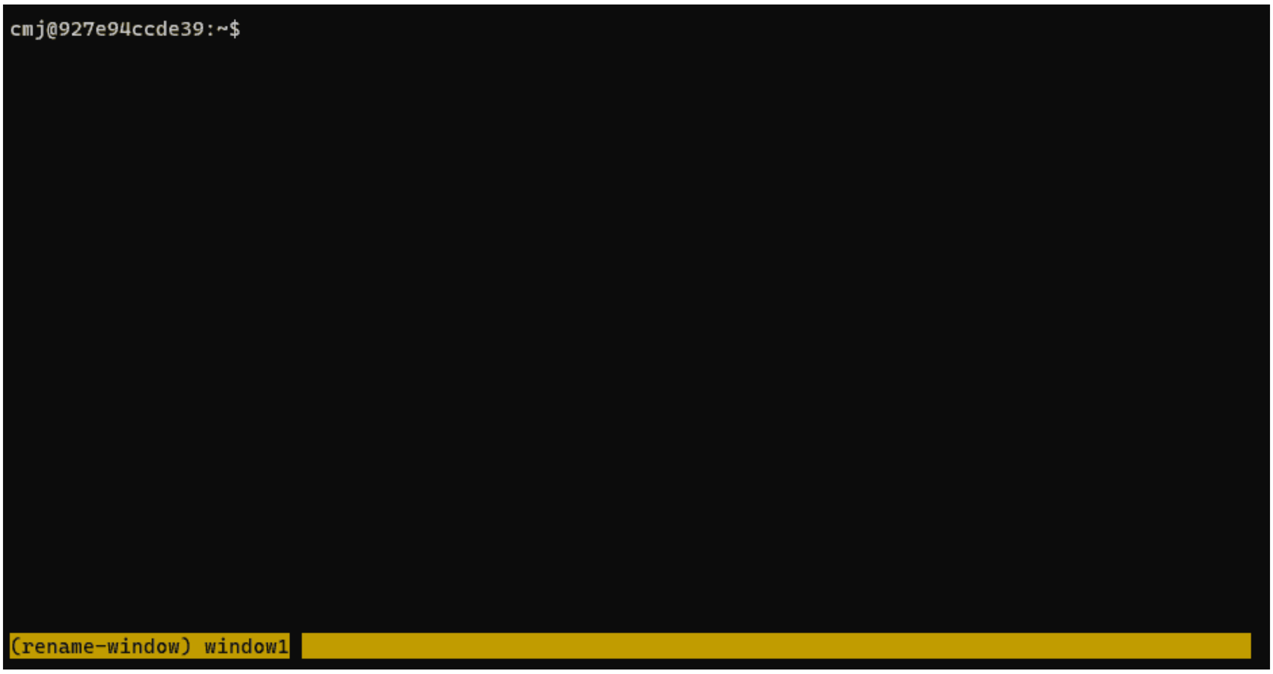
(/bael-search)

To make identification easier, *tmux* enables us to change the window name:

```
<prefix> + ,
```

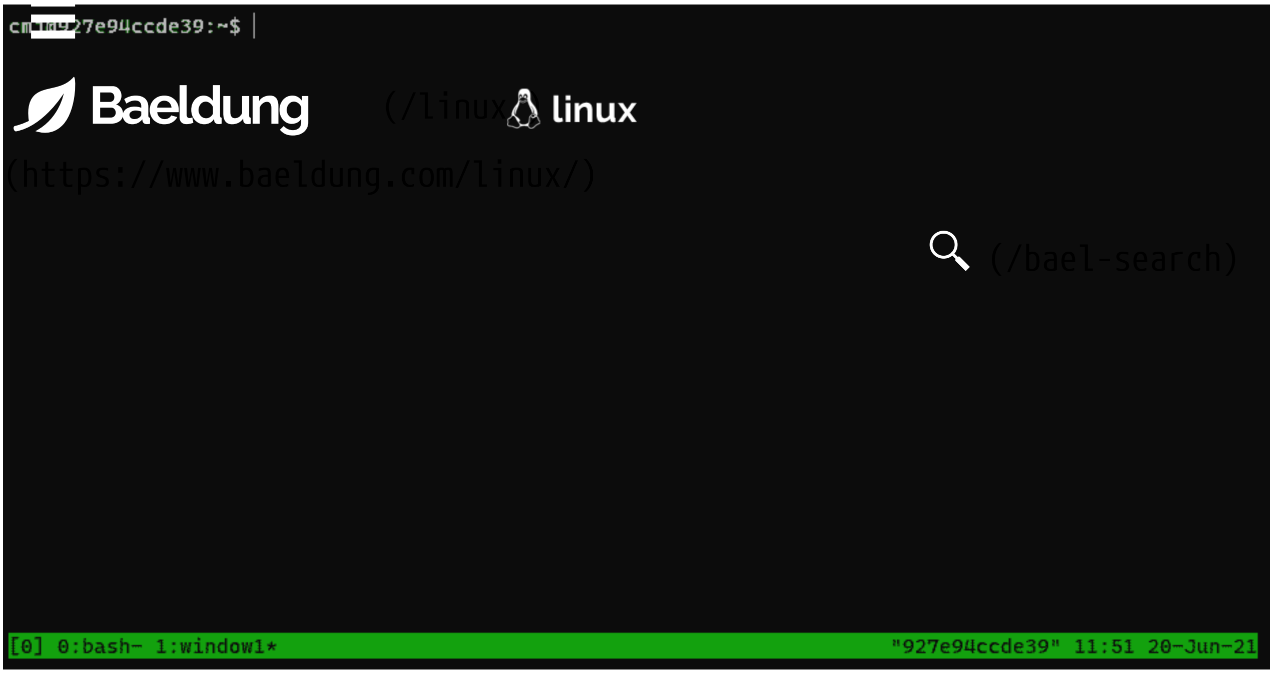
Notably, **the status bar at the bottom of the screen turns yellow.** This indicates that *tmux* is expecting our input, so it currently holds *stdin*.

Let’s change the name of our window to *window1*:



```
cmj@927e94ccde39:~$

(rename-window) window1
```

Now, we change the name and press *Return*:



```
cmd@927e94ccde39:~$
```

```
[0] 0:bash- 1:window1*                                    "927e94ccde39" 11:51 20-Jun-21
```

Thus, the name change is reflected in the status bar.

5.4. Terminating a Window

To terminate a window, we can use another hotkey:

```
<prefix> + &
```

Before a window is terminated, *tmux* usually prompts for confirmation. To confirm the termination, we enter *y* and press *Return*.

Destroying a window kills all its associated panes as well.

6. Panes in *tmux*

(/linux/)
(https://www.baeldung.com/linux/)

Windows in *tmux* can be further split into panes. Furthermore, each of the panes runs exactly one standalone terminal instance.

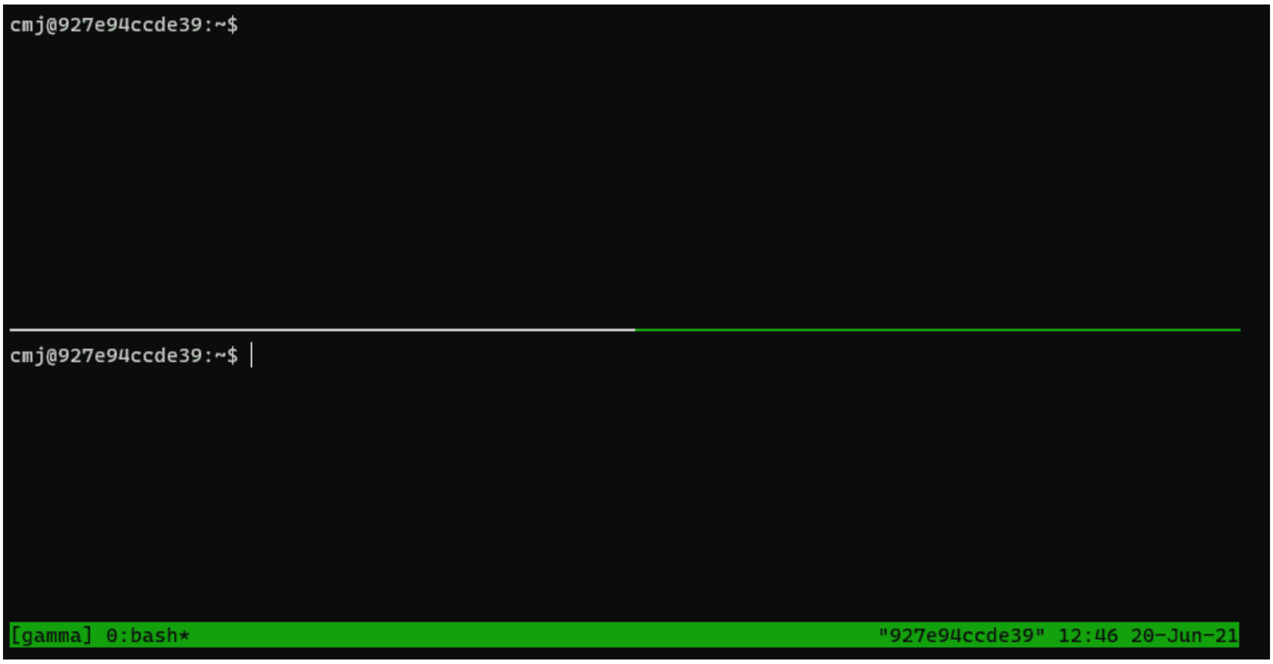
(/bael-search)

6.1. Splitting Window Into Panes

Let's split a window along the horizontal axis into two different panes of equal sizes:

```
<prefix> + "
```

Once we enter the command, the current window should get split into two panes with one at the top and one at the bottom:



```
cmj@927e94ccde39:~$

cmj@927e94ccde39:~$ |

[gamma] 0:bash*                                "927e94ccde39" 12:46 20-Jun-21
```

Alternatively, we can split a window into two panes vertically:

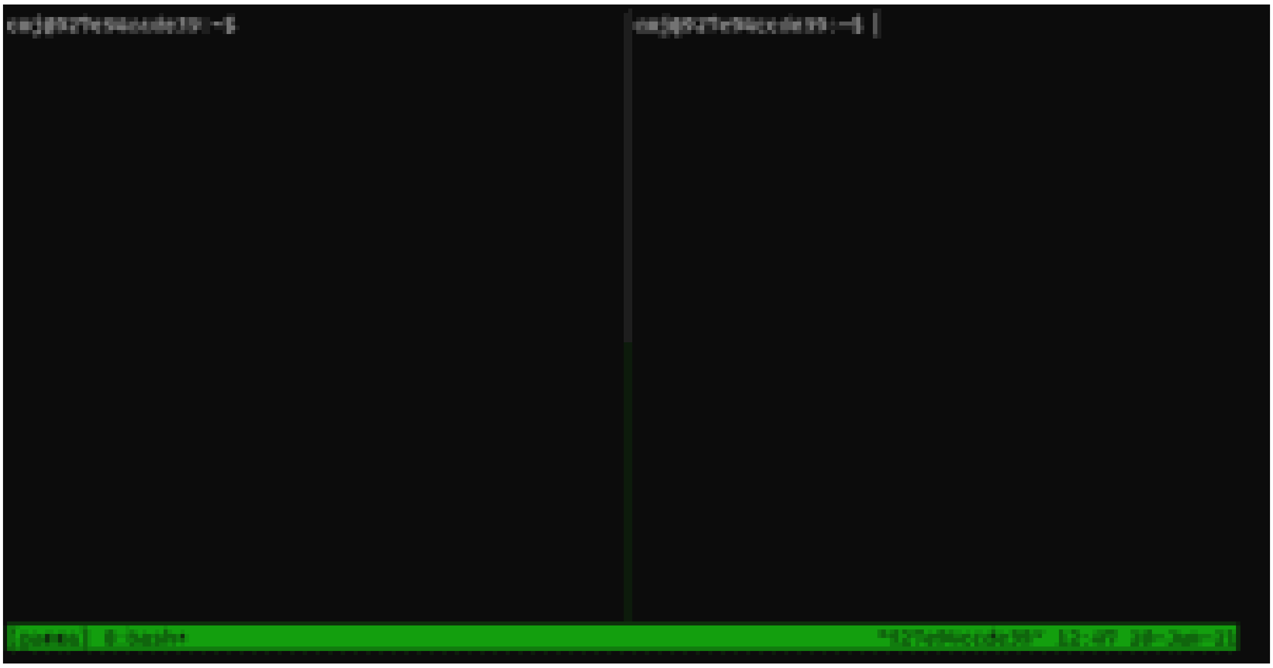
```
<prefix> + %
```

This time, the split is vertical:

(/linux/)

(https://www.baeldung.com/linux/)

(/bael-search)



```
cmj@927e94ccde39:~$                     cmj@927e94ccde39:~$
[panes] 0:bash*                          "927e94ccde39" 12:49 30-Jun-21
```

When we use one or another view depends on the current applications and text wrapping.

6.2. Terminating a Pane

The shortcut for pane termination is simpler than that of windows, since a pane often holds a single process:

```
<prefix> + x
```

Similar to terminating a window, *tmux* should prompt for verification. To confirm the termination, we key in *y* and then press *Return*.

6.3. Breaking a Pane Out to Window

Importantly, we can make a pane into a standalone window.

For example, if we want to turn a window with two panes into two windows, we can explode it via *!*:

```
<prefix> + !
```

Once entered, the effect will take place immediately and we’ll see the new windows.

6.4. Switching to Different Pane

Within a window with several panes, we can switch to a different pane using *<prefix>* and arrow keys:

```
<prefix> + <arrow key>
```

For instance, to switch to the right pane from the left pane, we just press the *<prefix>* key followed by the *Right* arrow key.

Similarly, to switch to the bottom pane, we do the same, but this time with the *Down* arrow key.

7. Copy Mode in *tmux*

As with other textual interfaces, how we copy text is an important part of the interaction.

(/linux/)

(https://www.baeldung.com/linux/)

7.1. Copy and Paste With the *tmux* Clipboard

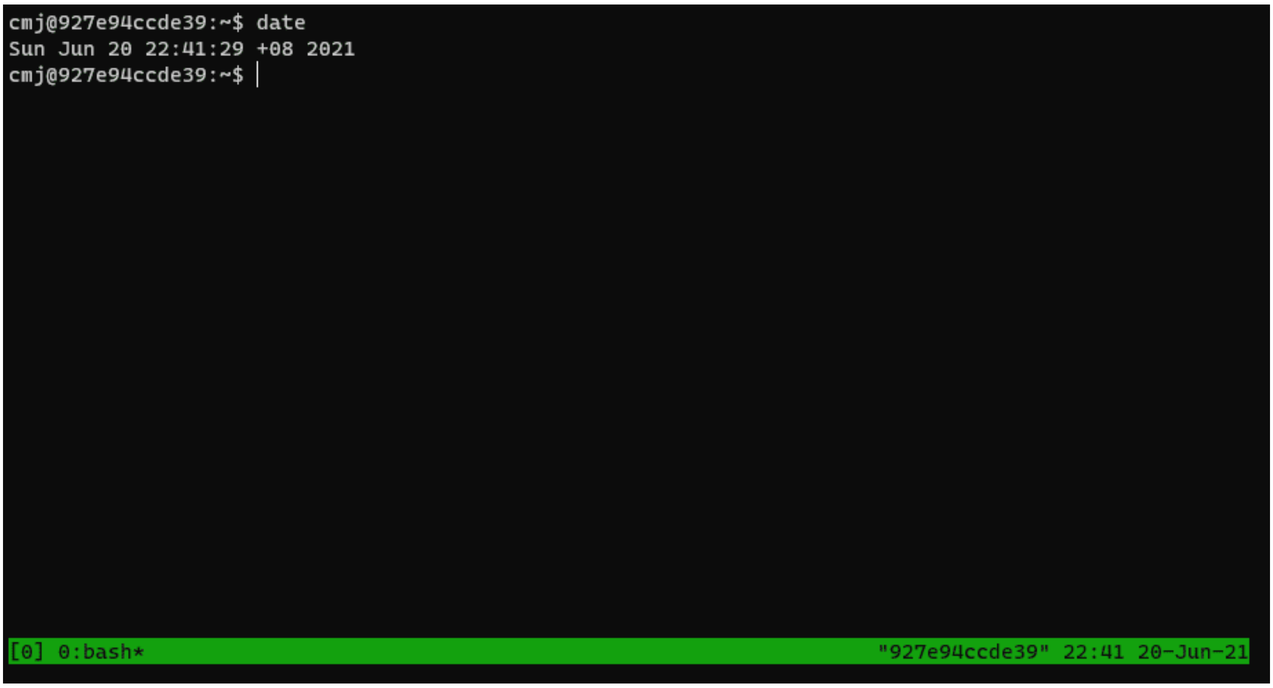
(/bael-search)

Copying text in *tmux* is a bit more involved than the simple *Ctrl+C* and *Ctrl+V* we have in many other interfaces.

Generally, we first need go into copy mode. Only then can we select a portion of text to copy. Finally, we can paste the text from the *tmux* clipboard.

So, let’s look at the exact steps to copy and paste in *tmux*.

To make the explanation easier, we copy the output from the *date* command while we’re still inside *tmux*:



```
cmj@927e94ccde39:~$ date
Sun Jun 20 22:41:29 +08 2021
cmj@927e94ccde39:~$ |
```

```
[0] 0:bash*                                              "927e94ccde39" 22:41 20-Jun-21
```

First, we use the shortcut to go into copy mode:

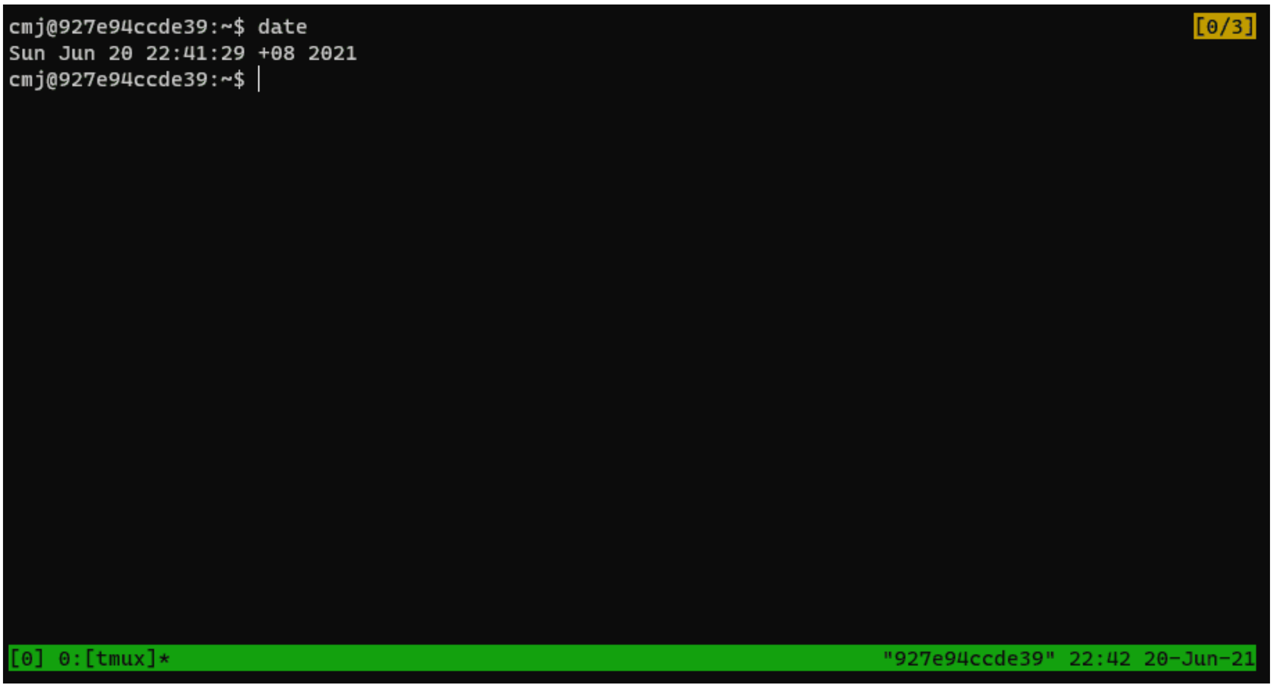
```
<prefix> + [
```

When in copy mode, there’s an annotation with two numbers at the top right:

(/linux/)

(https://www.baeldung.com/linux/)

(/bael-search)



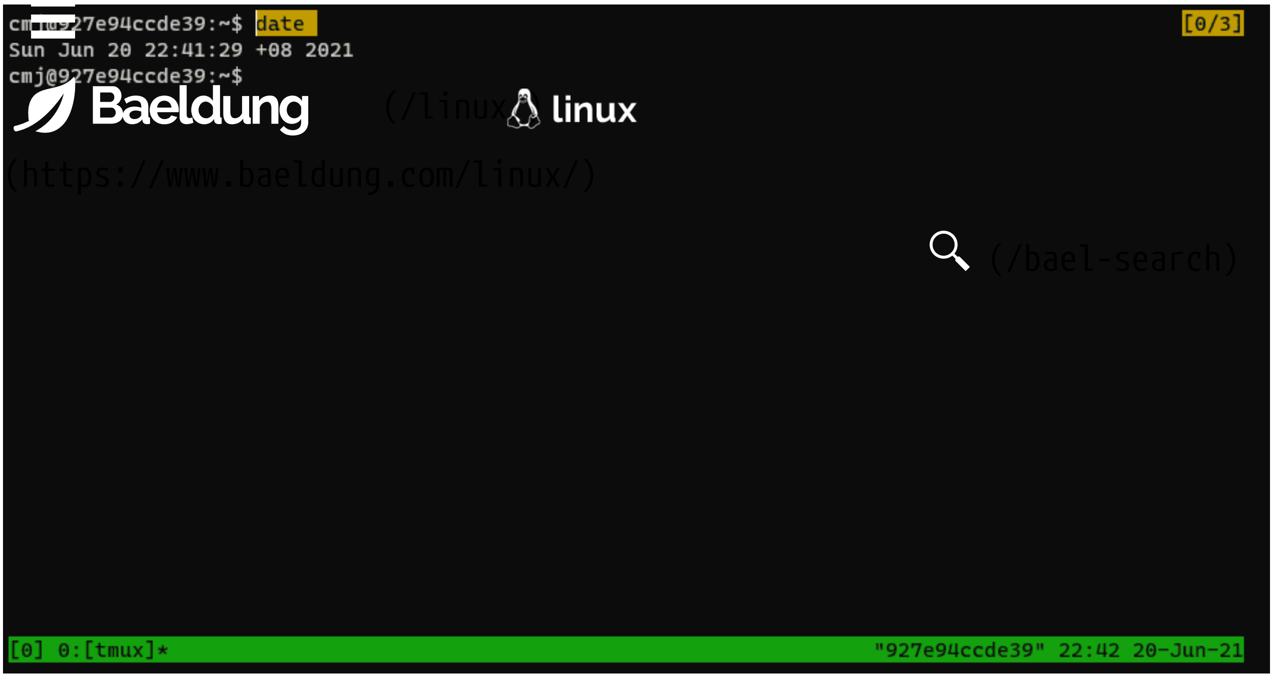
```
cmj@927e94ccde39:~$ date
Sun Jun 20 22:41:29 +08 2021
cmj@927e94ccde39:~$ 
```

The first number from the left represents the line number our cursor is on. Then, the number at the right represents the total number of lines we have in the standard output. Notably, **while in copy mode, we can also scroll via the arrow keys**

To copy the text, we move our cursor one line above using the *Up* arrow key. Once the cursor is in place, we input a shortcut to start a selection:

```
<prefix> + Space
```

When we begin the selection, we can see that the background color of our cursor turns yellow. This indicates that the cursor is now in selection mode. To select the line, we can move the cursor to the left using the *Left* arrow key:



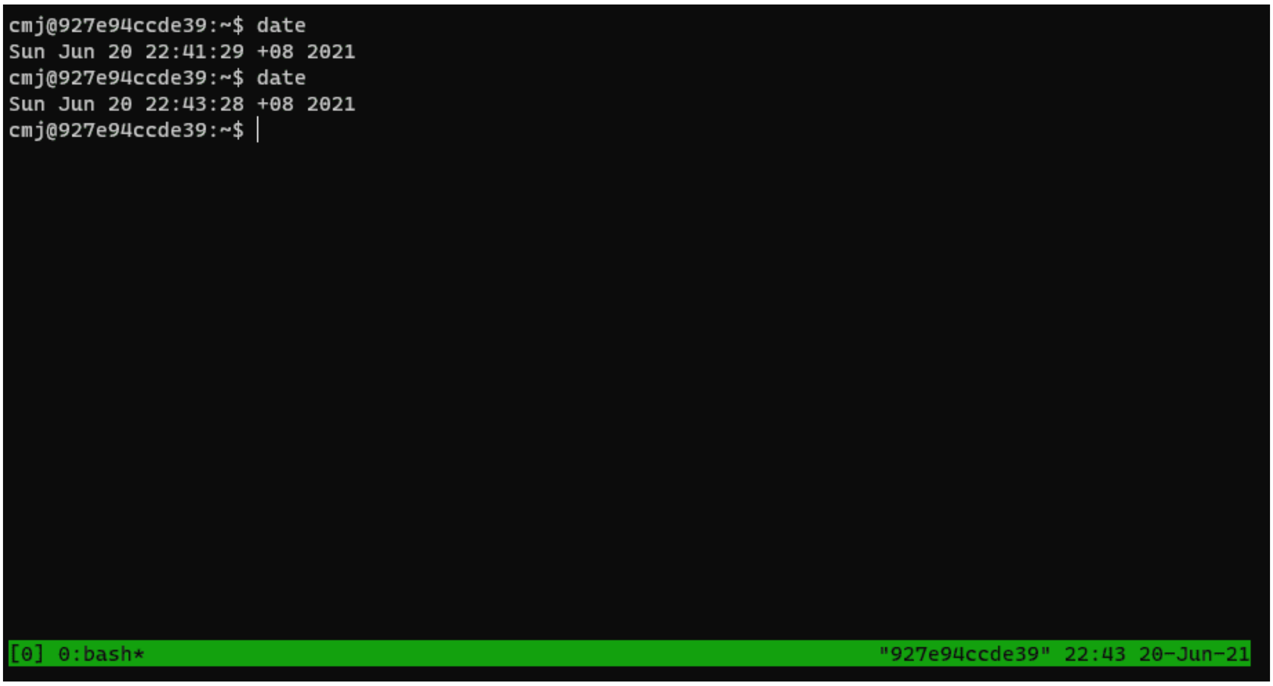
```
cmj@927e94ccde39:~$ date                                                    [0/3]
Sun Jun 20 22:41:29 +08 2021
cmj@927e94ccde39:~$

[0] 0:[tmux]*                                     "927e94ccde39" 22:42 20-Jun-21
```

Once we've confirmed the selection, we just hit *Return* to copy the text into the *tmux* clipboard.

Finally, we use another shortcut to paste the text from the *tmux* clipboard:

```
<prefix> + ]
```

At this point, we can see the text pasted back in the terminal:



```
cmj@927e94ccde39:~$ date
Sun Jun 20 22:41:29 +08 2021
cmj@927e94ccde39:~$ date
Sun Jun 20 22:43:28 +08 2021
cmj@927e94ccde39:~$ |

[0] 0:bash*                                       "927e94ccde39" 22:43 20-Jun-21
```

Notably, **the *tmux* clipboard is isolated from other applications and works only within *tmux* sessions.**

7.2. Scrolling Standard Output

To see the standard output that's beyond the display in *tmux*, we'll need to first go into copy mode.

Then, we can navigate the cursor using the arrow keys. Alternatively, we can press *Page Up* or *Page Down* to scroll by pages instead of lines.

7.3. Other Commands in Copy Mode

In copy mode, *tmux* supports a myriad of functions akin to the ones we usually find in text editors like *vi*.

For instance, **we can move to the next word by pressing the *w* key while in copy mode**. Similarly, we can move to the start of the line using the key *0*. Furthermore, we can **jump straight to a given line by pressing the colon key and then entering the line number**.

The commands we've mentioned thus far are just a small subset of what's possible while in copy mode. For a full list of supported commands and their shortcuts, we can refer to the *tmux* documentation (https://man7.org/linux/man-pages/man1/tmux.1.html#WINDOWS_AND_PANES).

8. Unicode Handling

Although *tmux* is fairly versatile in terms of textual formatting and representation, it doesn't employ Unicode by default unless the proper locale (/linux/terminal-locales-check-character-encoding#linux-locale) has been set. Further, how UTF-8 characters appear within a *tmux* session depends on several factors.

(/linux/)

(https://www.baeldung.com/linux/)

8.1. Automatic Detection

(/bael-search)

To begin with, the terminal multiplexer attempts to detect UTF-8 support by checking several variables in order:

- *LC_ALL*
- *LC_CTYPE*
- *LANG*

Since these are standard locale variables, if the first of them that has a value also contains *UTF-8*, *tmux* assumes the terminal supports the encoding. If it doesn’t, the multiplexer sends _ to the terminal instead of the relevant Unicode.

However, this isn’t always a reliable way to confirm this support.

8.2. *tmux* Environment

If we want to ensure that we have the correct locale environment variables set, we can use the *setenv* subcommand:

```
$ tmux setenv 'LC_ALL' 'en_US.UTF-8'
$ tmux setenv 'LANG' 'en_US.UTF-8'
$ tmux show-environment
-DISPLAY
LANG=en_US.UTF-8
LC_ALL=en_US.UTF-8
-WINDOWID
-XAUTHORITY
```

(/linux/)
(https://www.baeldung.com/linux/)
(/bael-search)

This way, we have the proper values explicitly assigned for *tmux* sessions.

8.3. *-u* Flag

Finally, the *tmux* command also provides the *-u* flag. When we don't want to rely on automatic detection, we can use *-u* to indicate to *tmux* that we verify the terminal supports Unicode.

Even if none of the local environment variable values indicate Unicode support, *tmux* still accepts UTF-8 characters. Notably, *-u* is a shorthand for *-T UTF-8*.

9. Conclusion

In this article, we've taken a thorough look at the *tmux* command-line tool.

We started with some basic usage. Then, we looked at the different components of *tmux*. For each component, we also learned some of the shortcut keys we can use to configure it within a session.

Finally, we explored the copy mode in *tmux* and some of the commands we can issue in copy mode, as well as Unicode support.

Comments are closed on this article!

(/linux/)

(https://www.baeldung.com/linux/)

(/bael-search)

CATEGORIES

ADMINISTRATION (/LINUX/CATEGORY/ADMINISTRATION)
FILES (/LINUX/CATEGORY/FILES)
FILESYSTEMS (/LINUX/CATEGORY/FILESYSTEMS)
INSTALLATION (/LINUX/CATEGORY/INSTALLATION)
NETWORKING (/LINUX/CATEGORY/NETWORKING)
PROCESSES (/LINUX/CATEGORY/PROCESSES)
SCRIPTING (/LINUX/CATEGORY/SCRIPTING)
SEARCH (/LINUX/CATEGORY/SEARCH)
SECURITY (/LINUX/CATEGORY/SECURITY)
WEB (/LINUX/CATEGORY/WEB)

SERIES

LINUX ADMINISTRATION (/LINUX/LINUX-ADMINISTRATION-SERIES)
LINUX FILES (/LINUX/LINUX-FILES-SERIES)
LINUX PROCESSES (/LINUX/LINUX-PROCESSES-GUIDE)

ABOUT

ABOUT BAELDUNG (/ABOUT)
THE FULL ARCHIVE (HTTPS://WWW.BAELDUNG.COM/LINUX/FULL_ARCHIVE)

EDITORS (HTTPS://WWW.BAELDUNG.COM/EDITORS)

(/linux/)

TERMS OF SERVICE (HTTPS://WWW.BAELDUNG.COM/TERMS-OF-SERVICE)

(https://www.baeldung.com/linux/)

PRIVACY POLICY (HTTPS://WWW.BAELDUNG.COM/PRIVACY-POLICY)

COMPANY INFO (HTTPS://WWW.BAELDUNG.COM/BAELDUNG-COMPANY-INFO)

CONTACT (/CONTACT)

(/bael-search)