

# waywall

chat 284 online

waywall is a Wayland compositor that provides various convenient features (key rebinding, Ninjabrain Bot support, etc) for Minecraft speedrunning. It is designed to be nested within an existing Wayland session and is intended as a successor to [resetti](#).

# Installation

waywall is available through some distribution-specific package repositories (presently the Arch User Repository and Nixpkgs.). Additionally, prebuilt binary packages are provided on the [Releases](#) page.

**The following sections contain the methods available for installing waywall on various distributions, listed roughly in order of preference.**

## Arch Linux

waywall is available on Arch-based distributions through the the Arch User Repository via the [waywall-working-git](#) package.

Prebuilt binary packages are additionally provided on the [Releases](#) page.

Lastly, waywall can be manually [built from source](#).

## Debian

Prebuilt binary packages for Debian 13 are provided on the [Releases](#) page.

### Caution

waywall is unable to run on many Debian derivatives, including Linux Mint and most versions of Ubuntu, as their package repositories are too outdated.

Additionally, waywall can be manually [built from source](#).

### Note

If you want to compile from source on Debian 13, you will need to use Clang, as the packaged version of GCC is not up-to-date enough.

## Fedora

Prebuilt binary packages for Fedora 42 are provided on the [Releases](#) page.

Additionally, waywall can be manually [built from source](#).

## Nix

waywall is available in Nixpkgs since 26.05.

If it is available, waywall should be installed on your NixOS or Home Manager profile.

### NixOS

```
# configuration.nix
{ pkgs, ... }:
{
  environment.systemPackages = [
    pkgs.prismlauncher
    pkgs.waywall
  ];
}
```

### Home Manager

```
# home.nix
{ pkgs, ... }:
{
  home.packages = [
    pkgs.prismlauncher
    pkgs.waywall
  ];
}
```

### Nix Profile

On other distributions with Nix installed, it can be installed with:

```
$ nix profile install nixpkgs#waywall
```

## Building from source

waywall is written in C and uses the Meson build system, so you will need to install a C toolchain and `meson` if they are not already on your system.

You will also need to install the following dependencies from your distribution's package repositories:

- `egl`
- `glesv2`
- `luajit`
- `spng`
- `wayland-client`
- `wayland-cursor`
- `wayland-egl`
- `wayland-protocols`
- `wayland-server`
- `xcb`
- `xcb-composite`
- `xcb-res`
- `xcb-xtest`
- `xwayland`
- `xkbcommon`

### Important

Many distributions, such as Fedora and Debian, split the “development files” (e.g. `pkg-config` data and C headers) into separate `-dev` or `-devel` packages. Make sure to find and install these in addition to the normal versions.

## Compiling

You can download and build a copy of waywall with the following commands:

```
git clone https://github.com/tesselslate/waywall  
cd waywall  
make
```

The compiled binary will be located at `build/waywall/waywall`. If you'd like, you can move it to somewhere on your `$PATH`.

## Building with the packaging script

The package building script is able to create binary packages for Arch Linux, Debian 13, and Fedora 42.

### Important

This script only builds packages for **Arch Linux**, **Debian**, and **Fedora**. If you use another distribution, you will have to [build waywall from source](#).

This script automatically builds both the main waywall binary and the mandatory patched version of GLFW, which is located at `/usr/local/lib64/waywall-glfw/libglfw.so`.

## Dependencies

- podman
- git
- pacur fedora-42, arch and debian-trixie containers (from <https://github.com/pacur/pacur>)
- docker

## Container setup

```
git clone https://github.com/pacur/pacur  
cd pacur/docker  
find . -maxdepth 1 -type d \(! -name "archlinux" ! -name "debian-trixie" ! -  
name "fedora-42" \) -exec rm -rf {} +  
for dir in */ ; do podman build --rm -t "pacur/${dir::1}" "$dir"; done
```

The containers should now be installed. If the build fails, try rebooting your machine.

## Setup

- Clone waywall repository `git clone https://github.com/tesselslate/waywall`
- Make the main script executable `chmod u+x build-packages.sh`
- [Install pacur containers](#) for `archlinux`, `fedora-42`, and `debian-trixie`
- Run `./build-packages.sh` inside the waywall directory and select which distributions to build for
  - Within the script: 1 for Arch, 2 for Fedora, 3 for Debian, 4 for done
  - Or, use the provided script flags for building (for example `./build-packages.sh --debian` or `./build-packages.sh --fedora --arch`)
- Enjoy

## Installation

The script will output where the build artifacts are located (for example `Build artifacts are located in: ~/waywall/waywall-build`). On some distributions, you can double-click the correct built package in your graphical file manager of choice. Otherwise, install it from the terminal with one of the following commands:

- ArchLinux: `sudo pacman -U ~/waywall/waywall-build/waywall-0.5-1-x86_64.pkg.tar.zst`
- Fedora: `sudo dnf localinstall ~/waywall/waywall-build/waywall-0.5-1.fc42.x86_64.rpm`
- Debian: `sudo dpkg -i ~/waywall/waywall-build/waywall_0.5-1_amd64.deb`

# Setup

After compiling waywall, you will need to configure your instance(s) to use it. It is *highly recommended* that you use [Prism Launcher](#). If you already have it, [MultiMC](#) can work, but it lacks some features.

## ❗ Caution

If your Minecraft launcher of choice is installed in some sort of container (e.g. [Flatpak](#)), then waywall will not work.

Consider installing [Prism Launcher](#) from your distribution's package manager (if available) or from the [Downloads page](#).

# GLFW

Minecraft uses a library known as [GLFW](#) in order to create a window and receive keyboard and mouse input. Unfortunately, the version shipped by default does not work with waywall, so you will need to compile a patched version of GLFW.

## 💡 Tip

If you used a [prebuilt package](#) or built your own with the package building script, then you already have the correct version of GLFW available! It can be found at `/usr/local/lib64/waywall-glfw/libglfw.so`.

## 💡 Tip

If you are using Prism Launcher installed from Nixpkgs, you can skip and continue to the next step as it already includes the patch.

If you have Nix but are using Prism Launcher from a *different* source, you can install the `glfw3-minecraft` package with `nix profile` and use the path `/home/USER/.nix-profile/lib/libglfw.so` in the upcoming steps.

You can compile the patched version of GLFW with the following commands:

```
# clone GLFW
git clone https://github.com/glfw glfw
cd glfw
git checkout 3.4

# apply the patches
curl -o glfw.patch https://raw.githubusercontent.com/tesselslate/waywall/
be3e018bb5f7c25610da73cc320233a26dfce948/contrib glfw.patch
git apply glfw.patch

# compile GLFW
cmake -S . -B build -DBUILD_SHARED_LIBS=ON -DGLFW_BUILD_WAYLAND=ON
cd build
make
```

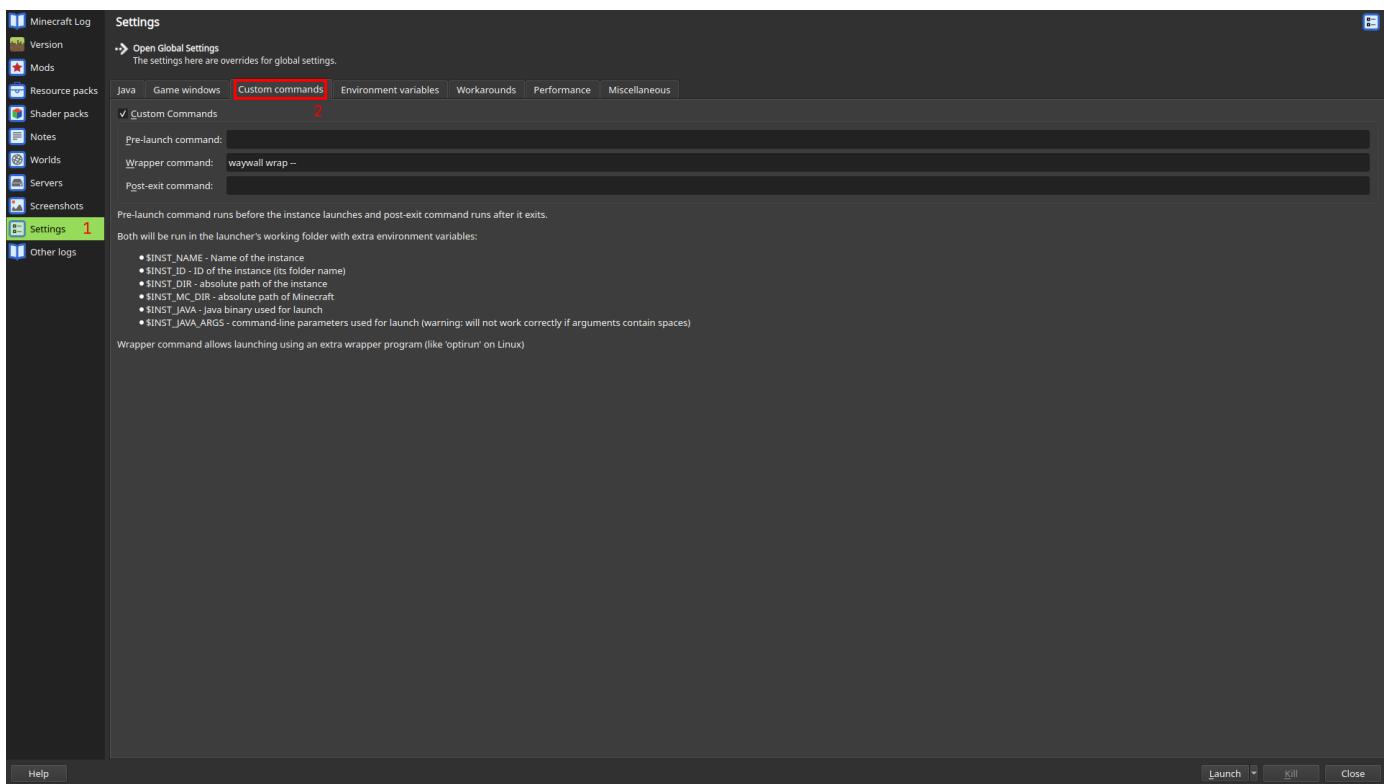
After running these commands, the new patched version of GLFW will be located at `glfw/build/src/libglfw.so` (or `src/libglfw.so` from the `build` directory.) You can copy it to a safer location like `~/.local/lib64`.

### Important

If you move the GLFW library to another location, make sure to copy the symlinks (`libglfw.so.3` and `libglfw.so.3.4`) as well.

## Instance setup

First, you need to configure your instance to use waywall. Navigate to the `Custom commands` submenu and enter `waywall wrap --` into the `Wrapper command` textbox. If needed, change `waywall` to point to the waywall executable you compiled earlier.



Secondly, you will need to use the patched version of GLFW. This differs based on whether you are on PrismLauncher or MultiMC.

## Prism Launcher

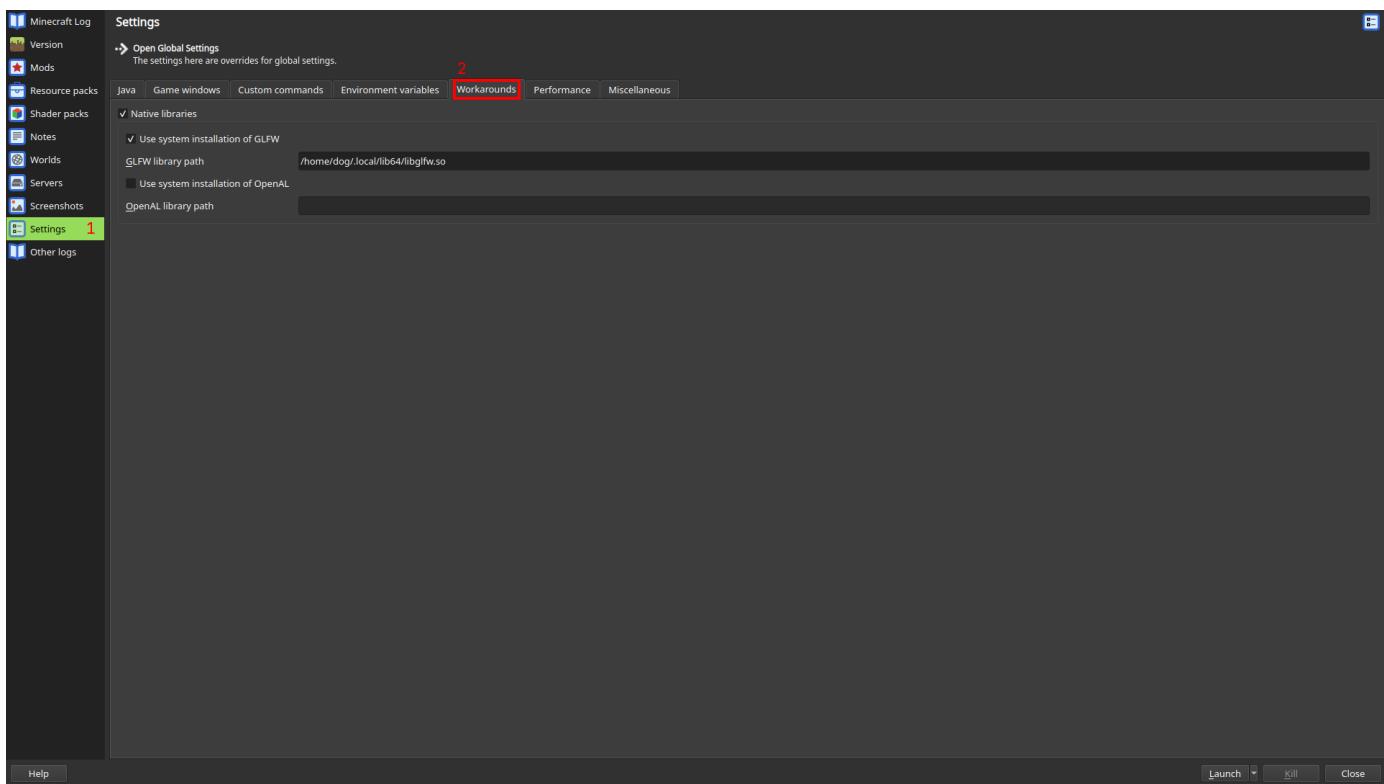
You can configure your instance to use the patched version of GLFW by opening its settings (with the `Edit` button on the right pane) and going to `Settings -> Workarounds`. Then, enable `Native libraries` and `Use system installation of GLFW`. Finally, enter the path to the patched `libglfw.so` you just compiled or installed.

### ⚠ Important

Prism Launcher **will not expand** `~`. If your patched GLFW is within your home directory, you need to type out the absolute path.

### 💡 Tip

If you are using Prism Launcher installed from Nixpkgs, you must leave the path field empty to automatically use the patched GLFW.



## Multimc

You can configure your instance to use the patched version of GLFW by opening its settings (with the `Edit` button on the right pane) and going to `Settings`. Then, go to the `Workarounds` tab and confirm that `Use system installation of GLFW` is **disabled**. Finally, return to the `Java` tab and add `-Dorg.lwjgl.libname=PATH` to your Java arguments, replacing `PATH` with the path to the patched `libglfw.so` you just compiled.

### Important

MultiMC **will not expand** `~`. If your patched GLFW is within your home directory, you need to type out the absolute path.

## Configuration

waywall follows the [XDG Base Directory](#) specification and will search for a configuration file in `$XDG_CONFIG_HOME/waywall` (usually `~/.config/waywall`). If no configuration file exists, one will be automatically generated for you. You can use the following configuration as a starting point:

```
local waywall = require("waywall")
local helpers = require("waywall.helpers")

local config = {
    input = {
        layout = "us",
        repeat_rate = 40,
        repeat_delay = 300,

        sensitivity = 1.0,
        confine_pointer = false,
    },
    theme = {
        background = "#303030ff",
    },
}

config.actions = {}

return config
```

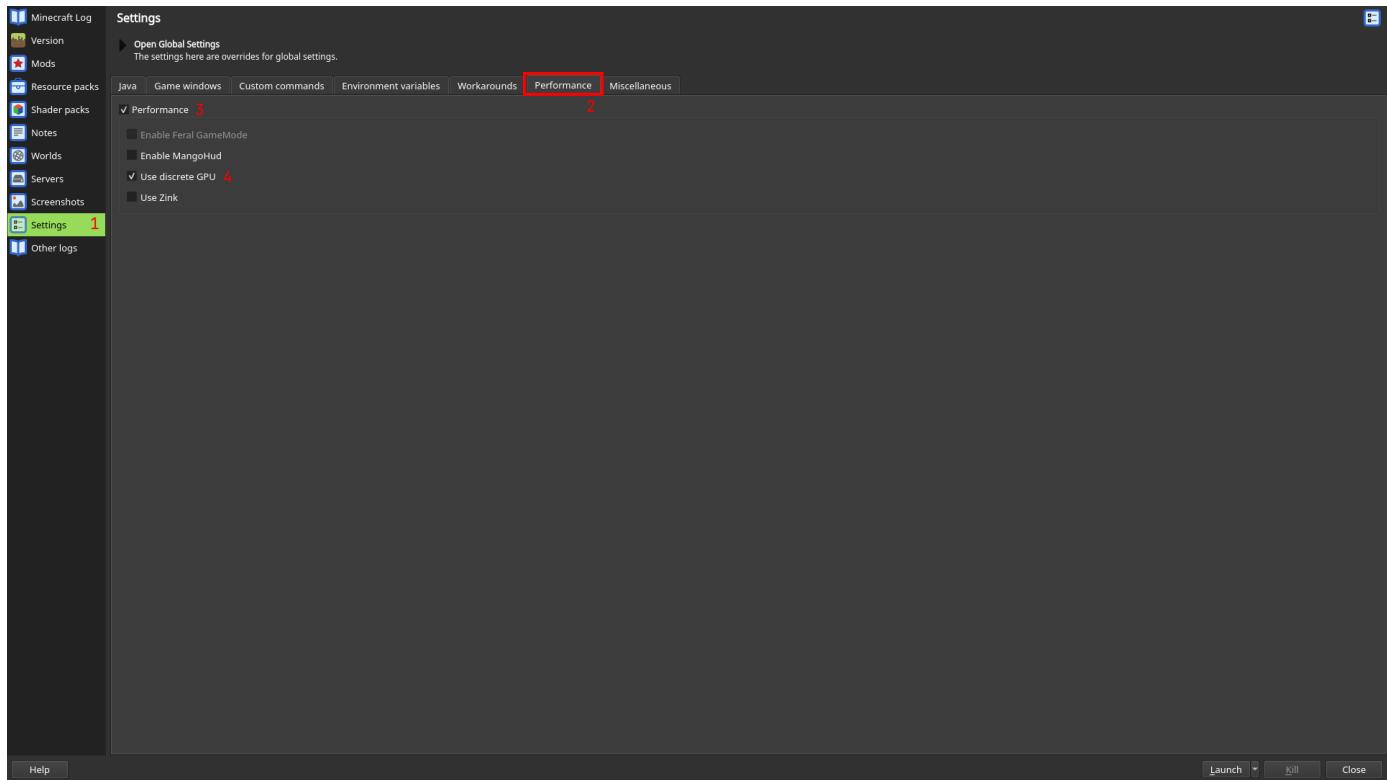
## NVIDIA

If you use an NVIDIA GPU, you will also need to set the environment variable `--GL_THREADED_OPTIMIZATIONS` to `0`. This can be done in the `Environment variables` submenu.

This environment variable fixes a startup crash (`GLFW error 65544`) and also ensures that preemptive navigation works correctly.

## Dual-GPU systems

If you have a system with an Nvidia GPU and an integrated GPU (quite common in laptops), go to the `Performance` tab and check `Use discrete GPU`.



# Known Issues

This page contains a list of known issues which you may encounter while using waywall.

## Ninjabrain Bot calibration does not work

Ninjabrain Bot's calibration functionality has issues on Linux and does not work correctly within waywall. Using boat eye largely eliminates the need to calibrate. If boat eye is not an option, you may need to calibrate your standard deviation outside of waywall.

## waywall freezing in some Nvidia environments

Older versions of the Nvidia driver may cause waywall to freeze until waywall receives more events from your compositor (mouse movement, keyboard inputs, window resizing, etc).

If you have V-Sync enabled ingame, disabling it should fix the problem. If your framerate is uncapped and V-Sync is off, then try capping your framerate to less than 5x your monitor refresh rate.

If neither of these fix the problem, please let us know in [Discord](#) or on the [issue tracker](#).

## Display scaling not automatically accounted for

waywall does not currently support either of the Wayland protocols used for display scaling ([1](#), [2](#)). However, you can manually configure waywall to use a specific resolution while fullscreened with the `fullscreen_width` and `fullscreen_height` options.

# Lua

waywall is configured using the [Lua](#) programming language. If you have not used Lua before, you may find the documentation to be helpful:

- [Programming in Lua](#)
  - Do note that this book is slightly out of date, since it was written for Lua 5.0.  
waywall uses Lua 5.1, which has some additional features and changes.
- [Lua 5.1 Reference Manual](#)

If you *are* familiar with Lua, it is worth noting that waywall uses LuajIT and makes some small changes to the behavior and standard library of Lua. See [Lua changes](#) for more information.

## ⚠ Caution

Lua code executed by waywall is allowed to interact with the host operating system in various ways, such as spawning subprocesses and modifying files on disk. Read other people's code and do not blindly copy and paste it into your own configuration.

# Profiles

By default, waywall attempts to read and execute a configuration file from `$XDG_CONFIG_HOME/waywall/init.lua` (typically, this is equivalent to `~/.config/waywall/init.lua`).

If launched with a `--profile foo` argument, waywall will instead attempt to read and execute a configuration file from `$XDG_CONFIG_HOME/waywall/foo.lua`. Any number of profiles can exist within the waywall configuration directory.

# Hot reload

waywall attempts to watch for any and all changes to `.lua` files within the waywall configuration directory. When it detects a change, it will attempt to automatically reload your configuration. If successful, the Lua VM will be recreated and any changes to variables or other state within will not be transferred to the new configuration.

# Ninjabrain Bot

On most Wayland compositors, the contents of the clipboard are only offered to clients with input focus. This means that Ninjabrain Bot may only become aware of eye throws if you tab out of waywall and give it focus, which is not ideal.

To solve this, you can run Ninjabrain Bot inside of waywall so that it always receives clipboard updates from the game immediately. For example, the following action will start Ninjabrain Bot inside of waywall when run:

```
-- ... the rest of your configuration

config.actions = {
    -- ... the rest of your actions

    ["Ctrl-Shift-N"] = function()
        -- Change the path to your actual Ninjabrain Bot jar!
        waywall.exec("java -jar /path/to/ninjabrain-bot.jar")
    end
}

return config
```

Ninjabrain Bot is treated as a floating window, which are hidden by default. To make it visible, you can create another action which uses `waywall.show_floating` or `helpers.toggle_floating`.

## 💡 Tip

If Ninjabrain Bot displays a blank window after opening, try launching it with a version of Java newer than Java 8 (i.e. Java 17).

If you are using NixOS and Ninjabrain Bot fails to launch, try adding `-Dswing.defaultlaf=javax.swing.plaf.metal.MetalLookAndFeel` to your arguments when launching Ninjabrain Bot.

## Positioning floating windows

You can automatically “anchor” Ninjabrain Bot to a specific position in the waywall window by using the `theme.ninb_anchor` option.

Additionally, you can manually move all un-anchored floating windows by holding shift and dragging them with the left mouse button held down.

# Options

waywall has a number of built-in options for configuring its appearance and behavior. These options can be set by returning a table from your configuration file, e.g.:

```
local config = {
    input = {
        layout = "us",
        -- ... more options here
    },
    -- ... more options here
}

return config
```

The following sections will cover all of the available options which can be set using this configuration table.

# Actions

The `actions` section of the configuration table allows you to configure any number of “actions,” which are arbitrary Lua functions that get executed when a key or button combo is pressed.

## Default values

```
local config = {
    actions = {},
}

return config
```

## Configuration

The `actions` table should contain a list of key-value pairs where each key is a string describing the input (containing a key or button and any number of modifiers) and the value is a function to be executed when the input is received. For example:

```
local config = {
    actions = {
        -- This will run if you press T with no modifier keys held.
        ["T"] = function() end,

        -- This will run if you press T with only Shift held.
        ["Shift-T"] = function() end,

        -- This will run if you press Button 4 (side button) with only Control
        -- held.
        ["Ctrl-MB4"] = function() end,
    },
}

return config
```

The full lists of keysyms, mouse buttons, and modifiers can be found in the [Lookup Tables](#) section.

|  **Note**

An action will only trigger if your pressed modifiers exactly match those specified. For example, an action for "T" will only trigger if you press T while Shift, Control, etc. are not pressed. However, Caps Lock and Num Lock (mod2) will be ignored unless the action explicitly requires them.

### Important

The `*` modifier acts as a wildcard, allowing the action to run while other modifier keys are pressed. An action for "`*-T`" will trigger if you press T, regardless of what modifier keys (Shift, Control, etc.) are pressed.

This also works in combination with other modifiers: "`*-Shift-T`" will trigger as long as Shift is pressed, but other modifiers will not prevent the action from being run.

## Input consumption

By default, if waywall finds and runs an action, the input which triggered the action will be silently dropped and not passed on to the Minecraft instance.

However, in some cases (e.g. if an action fails to run), you may want the input to be passed along to the Minecraft instance as normal. You can make this happen by returning `false` from your action's function.

---

If your action pauses execution at any point (e.g. by calling `waywall.sleep()`) it will always consume the input, even if you return `false`.

---

# Input

The `input` section of the configuration table allows you to configure how keyboard and mouse input is processed by waywall in a number of ways.

## Default values

```
local config = {
    input = {
        -- XKB keymap options
        layout = "", 
        model = "", 
        rules = "", 
        variant = "", 
        options = "", 

        -- key/button remappings
        remaps = {}, 

        -- key repeat
        repeat_rate = -1,
        repeat_delay = -1, 

        -- mouse options
        sensitivity = 1.0,
        confine_pointer = false,
    },
}

return config
```

## Keymap configuration

waywall allows you to use a different keyboard layout from the rest of your Wayland session (e.g. for search crafting with [different languages](#)).

There are five options in the `input` table which can be used to configure which keymap is loaded by XKB:

---

```
layout, model, rules, variant, options
```

---

Unfortunately, detailed information on XKB configuration is outside the scope of this document. You can refer to the [libxkbcommon documentation](#) for more information. If installed, you can also refer to the standard database of XKB configuration rules, which is typically located at `/usr/share/X11/xkb`.

## Input remapping

waywall allows you to remap keys and mouse buttons to one another in any fashion via the `remaps` table within the `input` table. Here are a few examples:

```
{
    ["MB4"] = "Home",      -- remap side button to Home
    ["X"] = "F3",          -- remap X to F3
}
```

Each key-value pair specifies a single remapping, where the key is the source input (button or key) and the value is the resulting output which gets sent to the game.

The list of all available keycodes and mouse buttons can be found in the [Lookup Tables](#) section.

## Key repeat

waywall allows you to configure how key repeat works with the `repeat_rate` and `repeat_delay` options.

The `repeat_rate` option specifies how many times per second a keypress should be repeated while it is held down. This option is mostly useful for increasing the speed at which the F3+F key combination changes your render distance.

The `repeat_delay` option determines how long (in milliseconds) a key must be held down before it will start repeating.

By default, both options are set to a value of `-1`, which means they will use the same values as your main Wayland session.

### ⚠️ Warning

If you use a short `repeat_delay` and set `repeat_rate` to more than 20 Hz, you may experience issues with switching hotbar slots. This is due to a bug in how the game handles certain keybinds and can be avoided by either using a longer `repeat_delay` or using a `repeat_rate` no greater than 20 Hz.

## Mouse sensitivity

The `sensitivity` option applies a constant multiplier to your mouse motion while aiming with the camera ingame. The default value of `1.0` results in no change, while `2.0` would make it twice as fast and `0.5` would make it half as fast.

### ❗ Important

This option only affects your camera movement, *not* your mouse movement in menus. Additionally, it only takes effect **when Raw Input is disabled ingame**.

## Pointer confinement

The `confine_pointer` option allows you to lock your mouse pointer to the waywall window. This can be useful if you have two monitors and accidentally flick your mouse to the side while in your inventory, which might otherwise cause you to focus a different window and lose time.

# Theme

The `theme` section of the configuration table allows you to configure the appearance of waywall.

## Default values

```
local config = {
    theme = {
        background = "#000000ff",
        background_png = "",

        cursor_theme = "",
        cursor_icon = "",
        cursor_size = 0,

        ninb_anchor = "",
        ninb_opacity = 1.0,
    },
}

return config
```

## Background

The `background` or `background_png` option determines the background of the waywall window. `background_png` specifies the path to a PNG file, otherwise `background` determines the solid color background. The background is only visible while the Minecraft window does not occupy the entire waywall window (e.g. while using Thin BT or boat eye.)

For `background`, you may specify either an RGB or RGBA hex color. Different compositors may handle non-opaque background colors differently, and non-opaque colors may not appear correctly if waywall is fullscreened.

## Cursor theme

waywall provides three options for configuring the appearance of the cursor:

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### `cursor_theme`, `cursor_icon`, `cursor_size`

---

By default, these options are left unset, and waywall will attempt to automatically detect and use the cursor settings of your main Wayland session.

The `cursor_theme` option should contain the name of an installed icon theme (typically in `/usr/share/icons` or `~/.local/share/icons`). The `cursor_icon` option should point to a valid Xcursor file within the specified theme.

---

On some compositors, such as mutter (GNOME), waywall's automatic cursor theme detection will fail. waywall attempts to use the `XCURSOR_*` environment variables and `cursor_shape_v1` protocol for picking a cursor theme, but GNOME does not support either of these mechanisms and instead only exposes a GNOME-specific DBus interface.

---

## Ninjabrain Bot

There are two options for changing the appearance of Ninjabrain Bot:

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### `ninb_anchor`, `ninb_opacity`

---

If set, the `ninb_anchor` option will cause the Ninjabrain Bot window to be locked to a specific side or corner of the waywall window. The following are valid values for `ninb_anchor`:

- `topleft`
- `top`
- `topright`
- `left`
- `right`
- `bottomleft`
- `bottomright`

If you would like to further customize the position of Ninjabrain Bot, you can instead provide a table to `ninb_anchor` like the following:

```
{  
    position = "right",  
    x = -10,  
    y = 10,  
}
```

This will position Ninjabrain Bot 10 pixels to the left of and below the center of the `right` anchor position. You can omit one or both of `x` and `y`.

The `ninb_opacity` option allows you to make the Ninjabrain Bot window translucent. The default value of `1.0` results in a fully opaque window, while values between `0.0` and `1.0` will result in varying degrees of translucency.

---

The `ninb_opacity` option requires that your compositor supports the [alpha\\_modifier\\_v1](#) protocol. If it is not supported, the option will have no effect.

---

# Shaders

The `shaders` section of the configuration table allows you to load custom OpenGL shaders to further customize the appearance of various scene objects (mirrors, images, text).

## ⚠ Warning

This option is intended for more advanced users who are able to write shaders to do what they want. A tutorial on how to write OpenGL shaders is outside of the scope of this documentation (and I am not particularly qualified to write one anyway.)

## Default values

```
local config = {
    shaders = {},
}

return config
```

## Configuration

The `shaders` table should contain a list of key-value pairs where each key is a string containing the name of the shader and the value is a table describing the shader's sources (fragment and/or vertex). For example:

```
local read_file = function(name)
    local home = os.getenv("HOME")

    local file = io.open(home .. "./config/waywall/" .. name, "r")
    local data = file:read("*a")
    file:close()

    return data
end

local config = {
    shaders = {
        ["pie_chart"] = {
            vertex = read_file("pie_chart.vert"),
            fragment = read_file("pie_chart.frag"),
        }
    }
}

return config
```

If either `vertex` or `fragment` is unspecified, they will default to the implementations provided by waywall's built-in "texcopy" shader. You can view the sources for the texcopy shader [here](#).

## Vertex format

The following attributes are provided to the vertex shader. You can use as many as you like, and leaving attributes unused is fine.

### v\_src\_pos (vec2)

`v_src_pos` contains the pixel coordinate which should be sampled from the source texture.

### v\_dst\_pos (vec2)

`v_dst_pos` contains the pixel coordinate at which the vertex is located.

### v\_src\_rgba (vec4)

`v_src_rgba` contains the source color for the color-keying operation (if any). An alpha value of 0 signals that no color keying should happen.

### **v\_dst\_rgba (vec4)**

`v_dst_rgba` contains the output color for the color-keying operation (if any).

## **Uniforms**

The following uniforms are provided to the vertex shader:

### **u\_src\_size (vec2)**

`u_src_size` contains the size of the source texture in pixels.

### **u\_dst\_size (vec2)**

`u_dst_size` contains the size of the destination texture (waywall window) in pixels.

## **Example**

The following shaders perform color-keying to only accept the three main colors of the `gameRenderer` pie chart (orange for block entities, pink for entities, and green for unspecified):

### **pie\_chart.vert**

```
attribute vec2 v_src_pos;
attribute vec2 v_dst_pos;

uniform vec2 u_src_size;
uniform vec2 u_dst_size;

varying vec2 f_src_pos;

void main() {
    gl_Position.x = 2.0 * (v_dst_pos.x / u_dst_size.x) - 1.0;
    gl_Position.y = 1.0 - 2.0 * (v_dst_pos.y / u_dst_size.y);
    gl_Position.zw = vec2(1.0);

    f_src_pos = v_src_pos / u_src_size;
}
```

## pie\_chart.frag

```
precision highp float;

varying vec2 f_src_pos;

uniform sampler2D u_texture;

const float threshold = 0.01;
const vec3 pink = vec3(0.882, 0.271, 0.761); // #e145c2
const vec3 orange = vec3(0.914, 0.427, 0.302); // #e96d4d
const vec3 green = vec3(0.271, 0.796, 0.396); // #45cb65

void main() {
    vec4 color = texture2D(u_texture, f_src_pos);

    bool is_pink = all(lessThan(abs(color.rgb - pink), vec3(threshold)));
    bool is_orange = all(lessThan(abs(color.rgb - orange), vec3(threshold)));
    bool is_green = all(lessThan(abs(color.rgb - green), vec3(threshold)));

    if (is_pink || is_orange || is_green) {
        gl_FragColor = color;
    } else {
        gl_FragColor = vec4(0.0, 0.0, 0.0, 0.0);
    }
}
```

# Window

The `window` section of the configuration table allows you to configure aspects of the window that waywall opens.

## Default values

```
local config = {
    window = {
        fullscreen_width = 0,
        fullscreen_height = 0,
    },
}

return config
```

## Fullscreen resolution

The `fullscreen_width` and `fullscreen_height` options allow you to specify a width and height which waywall should force the game to render at while the game is fullscreened.

This option is especially useful if you have display scaling enabled (i.e. 110% at 1440p) but would still like Minecraft to render at a normal resolution.

If either value is 0, then waywall will use whichever resolution the compositor tells it to use.

# Experimental

The `experimental` section of the configuration table contains miscellaneous and developer-focused settings.

## Default values

```
local config = {
    experimental = {
        debug = false,
        jit = false,
        tearing = false,
    },
}

return config
```

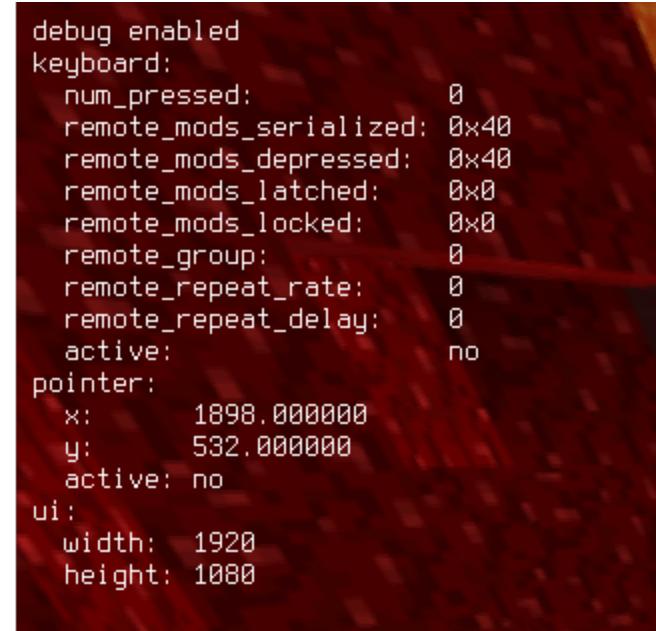
## Debug

When enabled, the `debug` option will draw text about the state of waywall in the upper left corner of the window.

This information is usually only needed for development purposes.

## JIT

waywall uses [LuaJIT](#) as its Lua implementation. By default, the JIT is disabled due to limitations with the Lua `debug` package. If your configuration contains a lot of compute-heavy Lua code, you may experience better performance by setting the `jit` option to `true`.



A screenshot of a terminal window displaying Wayland debug output. The output shows various system states such as keyboard, pointer, and UI dimensions. The text is white on a dark background.

```
debug_enabled
keyboard:
  num_pressed: 0
  remote_mods_serialized: 0x40
  remote_mods_depressed: 0x40
  remote_mods_latched: 0x0
  remote_mods_locked: 0x0
  remote_group: 0
  remote_repeat_rate: 0
  remote_repeat_delay: 0
  active: no
pointer:
  x: 1898.000000
  y: 532.000000
  active: no
ui:
  width: 1920
  height: 1080
```

Enabling the JIT may cause the [instruction limit](#) to behave inconsistently. If your configuration has infinite loops, waywall may freeze permanently.

## Tearing

The `tearing` option allows you to enable screen tearing (it is disabled by default.) This option requires your compositor to support the [tearing\\_control\\_v1](#) protocol, or else it will have no effect.

# waywall

The `waywall` module contains various functions for interacting with waywall.

# active\_res

This function returns the current size of the Minecraft window (in pixels). If no resolution has been set with `waywall.set_resolution()`, the returned width and height values will equal zero.

## Arguments

None

## Return values

- `width : number`
- `height : number`

---

This function cannot be called during startup.

---

# current\_time

This function returns the number of milliseconds which have elapsed since an arbitrary epoch. The time is gathered using `CLOCK_MONOTONIC`.

## Arguments

None

## Return values

- `ms` : number

# exec

This function asynchronously executes the given command as a subprocess. Arguments are split by spaces and no further processing is performed; quoting arguments or performing shell substitutions will require you to run a shell script.

If the spawned subprocess does not exit before waywall, it will be killed with `SIGKILL` when waywall closes.

## Arguments

- `command` : string

## Return values

None

---

This function cannot be called during startup.

---

# floating\_shown

This function returns whether or not floating windows (i.e. Ninjabrain Bot) are currently visible.

## Arguments

None

## Return values

- `shown` : boolean
- 

This function cannot be called during startup.

---

# get\_key

This function returns a boolean whether a key is currently pressed on the keyboard. See [Lookup Tables](#) for a list of valid keycodes.

## Arguments

- `key` : string

## Return values

- `pressed` : boolean

---

This function cannot be called during startup.

---

# image

This function loads a PNG image from the file system and displays it over top of the waywall window. You may want to use it for e.g. your boat eye overlay.

The `options` table can have the following options, although only `dst` is required:

```
{  
    -- absolute location/size of image in waywall window  
    dst = {  
        x = 100,  
        y = 100,  
        w = 200,  
        h = 200,  
    },  
  
    -- optional  
    depth = 0,  
  
    -- optional  
    shader = "shader_name"  
}
```

For more information on custom shaders, see [Shaders](#).

## Arguments

- `path` : string
- `options` : table

## Return values

- `image` : [image object](#)

---

This function cannot be called during startup.

---

# listen

This function registers the given event listener to be called whenever the given event occurs. The returned cancellation function can be called to unregister the event listener so that it is not triggered anymore.

The list of valid event names is:

- `load`
  - For when configuration loading is finished and functions such as `waywall.text()` are now legal to call
- `resolution`
  - For resolution changes with `waywall.set_resolution()`
- `state`
  - For updates to the instance's state-output file

## Arguments

- `event : String`
- `listener : function`

## Return values

- `cancel : function`

# mirror

This function creates a “mirror” which displays a specific area of the Minecraft window on top of the waywall window. You may want to use it for e.g. boat eye measurement.

The `options` table can have the following options, although only `src` and `dst` are required:

```
{  
    -- area to copy from minecraft window  
    src = {  
        x = 160,  
        y = 900,  
        w = 100,  
        h = 100,  
    },  
  
    -- absolute location/size of mirror in waywall window  
    dst = {  
        x = 0,  
        y = 300,  
        w = 100,  
        h = 100,  
    },  
  
    -- optional  
    color_key = {  
        input = "#dddddd",  
        output = "#ee1111",  
    },  
  
    -- optional  
    depth = 0,  
  
    -- optional  
    shader = "shader_name",  
}
```

The `color_key` option allows you to perform color keying on the mirrored area, which will only preserve pixels of the given `input` color and change them to the `output` color.

For more information on custom shaders, see [Shaders](#).

## Arguments

- `options` : table

## Return values

- `mirror`: `mirror` object
- 

This function cannot be called during startup.

---

# press\_key

This function sends a fake key press (keydown event followed by a keyup event) to Minecraft using the given keycode. See [Lookup Tables](#) for a list of valid keycodes.

## Arguments

- key : string

## Return values

None

---

This function cannot be called during startup.

---

# profile

This function returns the name of the profile if one was provided at startup with `--profile`. Otherwise, it returns nil.

## Arguments

None

## Return values

- `profile` : string or nil

# set\_keymap

This function attempts to change the current XKB layout in use by Minecraft. The following keys will be read from the options table if they are set:

- `layout`
- `model`
- `rules`
- `variant`
- `options`

These keys behave the same as those in the [input configuration table](#).

## Arguments

- `options : table`

## Return values

None

---

This function cannot be called during startup.

---

# set\_remaps

This function changes the set of active [input remaps](#) and follows the same format as the table from the [initial input configuration](#).

## Arguments

- `remaps` : table

## Return values

None

---

This function cannot be called during startup.

---

# set\_resolution

This function sets the resolution of the Minecraft window. If both `width` and `height` are 0, the Minecraft window will instead stretch to fit the bounds of the waywall window (and will continue to do so as the window is resized).

## ⚠ Warning

Make sure your resolutions follow the [leaderboard rules](#)! You may only use a single resolution which extends past the bounds of your monitor, and it is **not allowed** to use a resolution greater than 16384 pixels in width or height.

## Arguments

- `width` : number
- `height` : number

## Return values

None

---

This function cannot be called during startup.

---

# set\_sensitivity

This function changes the mouse sensitivity multiplier which is used for camera movement. If the provided sensitivity is 0, the sensitivity will instead be reset to whatever value you have specified in the [input configuration table](#).

## Arguments

- `sensitivity` : number

## Return values

None

---

This function cannot be called during startup.

---

# show\_floating

This function sets whether or not floating windows (i.e. Ninjabrain Bot) should be visible.

## Arguments

- show : boolean

## Return values

None

---

This function cannot be called during startup.

---

# sleep

This function causes the current Lua execution context to pause for the given number of milliseconds. Other Lua code, such as other keybind or event handlers, can be executed while the current execution context is paused.

Calling this function forbids keybind handlers from marking an input as non-consumed. See [Input consumption](#) for more details.

## Arguments

- `ms` : number

## Return values

None

---

This function cannot be called during startup.

---

# state

This function returns a table describing the current state of the Minecraft instance according to the State Output mod. If the instance does not have State Output installed and enabled, this function will throw an error when called.

The returned table may have one of several structures depending on the state of the instance. The `screen` field will always be present, allowing you to determine which form it has:

## title, waiting, and wall

```
{  
    screen = "title" or "waiting" or "wall",  
}
```

## generating and previewing

```
{  
    screen = "generating" or "previewing",  
    percent = 0,  
}
```

## inworld

```
{  
    screen = "inworld",  
    inworld = "unpaused" or "paused" or "menu",  
}
```

## Arguments

None

## Return values

- `state : table`
- 

This function cannot be called during startup.

---

# text

This function creates and displays text over top of the waywall window.

The `options` table can have the following options, of which `x` and `y` are non-optional:

```
{  
    -- absolute location of text in waywall window  
    x = 100,  
    y = 100,  
  
    -- color of text (optional)  
    color = "#abcdef",  
  
    -- size of text (optional)  
    size = 1,  
  
    -- optional  
    depth = 0,  
  
    -- optional  
    shader = "shader_name"  
}
```

## Arguments

- `text` : string
- `options` : table

## Return values

- `text` : text object

---

This function cannot be called during startup.

---

# toggleFullscreen

This function toggles whether or not the waywall window is fullscreen. This is intended for users of compositors which do not provide an option to set windows to fullscreen without decorations.

## Arguments

None

## Return values

None

---

This function cannot be called during startup.

---

# waywall.helpers

The `waywall.helpers` module contains various “helper” functions which provide common functionality.

# ingame\_only

This function wraps the given function so that it only runs if the user is in a world and not in any menu. If these conditions are not met, the given function will not be called and `false` will be returned.

If State Output is not enabled, calling the returned function will throw an error.

## Arguments

- `func` : function

## Return values

- `ingame_func` : function

---

The returned function cannot be called during startup.

---

# res\_image

This function creates an image which only appears when a specific resolution is active, and is not present otherwise. It is effectively equivalent to:

```
waywall.listen("resolution", function()
    local width, height = waywall.active_res()

    if width == DESIRED_WIDTH and height == DESIRED_HEIGHT then
        -- make image...
    else
        -- destroy image...
    end
end)
```

The image will be created with the given `path` and `options` and will only appear on screen while the active resolution is equal to `width x height`.

## Arguments

- `path`: string
- `options`: table
- `width`: number
- `height`: number

## Return values

- `cancel`: function

# res\_mirror

This function creates a mirror which only appears when a specific resolution is active, and is not present otherwise. It is effectively equivalent to:

```
waywall.listen("resolution", function()
    local width, height = waywall.active_res()

    if width == DESIRED_WIDTH and height == DESIRED_HEIGHT then
        -- make mirror...
    else
        -- destroy mirror...
    end
end)
```

The mirror will be created with the given `options` and will only appear on screen while the active resolution is equal to `width x height`.

## Arguments

- `options` : table
- `width` : number
- `height` : number

## Return values

- `cancel` : function

# toggle\_floating

This function toggles whether or not floating windows are visible.

## Arguments

None

## Return values

None

---

This function cannot be called during startup.

---

# toggle\_res

This function returns another function which, when called, toggles between the provided resolution and no resolution (stretching Minecraft back to the bounds of the waywall window).

If a value is provided for the `sens` parameter, toggling to the given resolution will set the mouse sensitivity to that value. Toggling away from the resolution will set the sensitivity back to the default value specified in the [input configuration table](#).

## Arguments

- `width` : number
- `height` : number
- `sens` : number (optional)

## Return values

- `toggle` : function

---

The returned function cannot be called during startup.

---

# Object types

Some functions of the waywall API return objects of custom types. This section documents those types and the functionality that they provide.

# Scene objects

Scene objects represent various kinds of graphics which are drawn on the waywall window. There are currently three kinds of scene objects:

- [Images](#)
- [Mirrors](#)
- [Text](#)

All scene objects share a common set of methods, although some may have extra methods of their own.

Scene objects will disappear either when they are explicitly [closed](#) or when they are garbage collected by the Lua virtual machine.

## 💡 Tip

Because scene objects disappear when garbage collected, you should make sure to store a reachable reference to any objects you create, such as in a local variable at the top level of your configuration.

Additionally, reloading your configuration will cause all live scene objects to be destroyed (since they are garbage collected when the Lua virtual machine is destroyed and recreated for your new configuration.)

# Depth

All scene objects have a depth value, which can be set at the time of creation or with the [set\\_depth](#) method. Scene objects with a greater depth will appear in front of objects with a lesser depth. Scene objects with a negative depth will appear beneath the Minecraft instance.

Scene objects without an explicitly specified depth, or objects whose depth has been set to 0, follow different ordering rules. The complete order in which scene objects appear is as follows (starting from the furthest forward to the furthest back):

- All objects with positive depth
- Images with unspecified depth
- Mirrors with unspecified depth
- Text with unspecified depth

- The Minecraft instance
- All objects with negative depth

## Methods

### **close**

This method closes the scene object, causing it to disappear from the scene. It is invalid to call any methods on a scene object after it has been closed.

#### **Arguments**

- None

#### **Return values**

- None

### **get\_depth**

This method returns the current depth of the scene object, or 0 if no depth has been set.

#### **Arguments**

- None

#### **Return values**

- `depth : number`

### **set\_depth**

This method sets the depth of the scene object. After the depth is set, it will be arranged according to the [ordering rules](#).

## Arguments

- depth : number

## Return values

- None

# image

The image type represents a [scene object](#) displaying an image. It is returned by [waywall.image\(\)](#).

## Methods

Image objects have all of the [methods](#) which are available to [scene objects](#).

# mirror

The mirror type represents a [scene object](#) displaying a mirror. It is returned by `waywall.mirror()`.

## Methods

Mirror objects have all of the [methods](#) which are available to [scene objects](#).

# text

The text type represents a [scene object](#) displaying text. It is returned by by `waywall.text()`.

## Methods

Text objects have all of the [methods](#) which are available to [scene objects](#).

# Lookup Tables

waywall has pre-defined sets of names which correspond to keys, mouse buttons, and modifiers. These are used when loading your configuration. All names are case insensitive.

## Keycodes

### Important

Keycodes are used for [remapping keys and buttons](#) in your configuration and for [pressing keys in actions](#).

The list of valid keycodes can be found in waywall's source code [here](#).

Virtually all normal keyboard keys are present, although some may not be named as you expect. waywall follows the names defined by the `input-event-codes.h` header from Linux.

## Keysyms

### Important

Keysyms are used for adding [actions](#) to your configuration.

The list of valid keysyms comes from libxkbcommon. The `xkbcommon-keysyms.h` header contains all of the valid keysym names. Each keysym's name is prefixed with `XKB_KEY_`.

## Modifiers

The following table lists all valid names for modifiers:

Modifier	Names		
Shift	shift		
Control	ctrl	control	
Caps Lock	caps	lock	capslock

Modifier	Names		
<b>Alt</b>	mod1	alt	
<b>Num Lock</b>	mod2	num	numlock
<b>Mod3</b>	mod3		
<b>Super</b>	mod4	super	win
<b>Mod5</b>	mod5		

## Mouse buttons

The following table lists all valid names for mouse buttons:

Button	Names			
<b>Left Button</b>	lmb	m1	mouse1	leftmouse
<b>Middle Button</b>	mbb	m3	mouse3	middlemouse
<b>Right Button</b>	rmb	m2	mouse2	rightmouse
<b>Side button (M4)</b>	mb4	m4	mouse4	
<b>Side button (M5)</b>	mb5	m5	mouse5	

# Lua changes

waywall makes use of [LuaJIT](#), an alternative implementation of Lua 5.1 which provides better performance and additional functionality. A list of LuaJIT's additions is available [here](#).

---

Note: The `jit` package from LuaJIT is not available in waywall.

---

## Instruction count limit

waywall will allow a maximum of 50 million Lua instructions to be executed when it calls into user code (e.g. actions). This limit is in place to prevent buggy configurations from hard-locking waywall.

If this limit is exceeded, an error will be thrown, causing Lua execution to stop. This error cannot be caught with `pcall` or `xpcall`.

 **Warning**

[Enabling the JIT](#) may cause the instruction limit to behave inconsistently. If your configuration has infinite loops, waywall may freeze permanently.

## Standard library changes

waywall makes a few changes and additions to the Lua standard library:

- `package.path` is automatically updated to include the waywall configuration directory, so you can `require()` other files contained within it.
- `pcall` and `xpcall` have been modified to prevent user code from disabling the instruction count limit by accident.
- `print` has been modified so that its output appears in a similar format to other waywall log messages.
- `os.setenv` is a **new** function added by waywall which behaves much like C's `setenv()` and allows for changing and deleting environment variables.
  - Calling `os.setenv` with two strings (a name and value) will behave like C's `setenv()`.

- Calling `os.setenv` with a string and nil will unset the given environment variable.

You can refer to the [startup code](#) to see all of the changes waywall makes in more detail.