Sunshine

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ABOUT

CHAPTER

ONE

OVERVIEW

LizardByte has the full documentation hosted on Read the Docs.

1.1 About

Sunshine is a self-hosted game stream host for Moonlight. Offering low latency, cloud gaming server capabilities with support for AMD, Intel, and Nvidia GPUs for hardware encoding. Software encoding is also available. You can connect to Sunshine from any Moonlight client on a variety of devices. A web UI is provided to allow configuration, and client pairing, from your favorite web browser. Pair from the local server or any mobile device.

1.2 System Requirements

> **Warning:** This table is a work in progress. Do not purchase hardware based on this.

Minimum Requirements

GPU	AMD: VCE 1.0 or higher, see obs-amd hardware support
	Intel: VAAPI-compatible, see: VAAPI hardware support
	Nvidia: NVENC enabled cards, see nvenc support matrix
CPU	AMD: Ryzen 3 or higher
	Intel: Core i3 or higher
RAM	4GB or more
OS	Windows: 10+ (Windows Server not supported)
	macOS: 11.7+
	Linux/Debian: 11 (bullseye)
	Linux/Fedora: 36+
	Linux/Ubuntu: 20.04+ (focal)
Network	Host: 5GHz, 802.11ac
	Client: 5GHz, 802.11ac

4k Suggestions

GPU	AMD: Video Coding Engine 3.1 or higher
	Intel: HD Graphics 510 or higher
	Nvidia: GeForce GTX 1080 or higher
CPU	AMD: Ryzen 5 or higher
	Intel: Core i5 or higher
Network	Host: CAT5e ethernet or better
	Client: CAT5e ethernet or better

HDR Suggestions

GPU	AMD: Video Coding Engine 3.4 or higher
	Intel: UHD Graphics 730 or higher
	Nvidia: Pascal-based GPU (GTX 10-series) or higher
CPU	AMD: todo
	Intel: todo
Network	Host: CAT5e ethernet or better
	Client: CAT5e ethernet or better

1.3 Integrations

1.4 Support

Our support methods are listed in our LizardByte Docs.

1.5 Downloads

1.6 Stats

CHAPTER

TWO

INSTALLATION

The recommended method for running Sunshine is to use the *binaries* bundled with the latest release.

Attention: Additional setup is required after installation. See *Setup*.

2.1 Binaries

Binaries of Sunshine are created for each release. They are available for Linux, macOS, and Windows. Binaries can be found in the latest release.

Tip: Some third party packages also exist. See *Third Party Packages*.

2.2 Docker

Docker images are available on Dockerhub.io and ghcr.io.

See *Docker* for additional information.

2.3 Linux

Follow the instructions for your preferred package type below.

CUDA Compatibility

CUDA is used for NVFBC capture.

Tip: See CUDA GPUS to cross reference Compute Capability to your GPU.

Package	CUDA Version	Min Driver	CUDA Compute Capabilities
PKGBUILD	User dependent	User dependent	User dependent
sunshine.AppImage	11.8.0	450.80.02	50;52;60;61;62;70;75;80;86;90;35
sunshine.pkg.tar.zst	11.8.0	450.80.02	50;52;60;61;62;70;75;80;86;90;35
sunshine_{arch}.flatpak	12.0.0	525.60.13	50;52;60;61;62;70;75;80;86;90
sunshine-debian-bullseye-{arch}.deb	11.8.0	450.80.02	50;52;60;61;62;70;75;80;86;90;35
sunshine-fedora-36-{arch}.rpm	12.0.0	525.60.13	50;52;60;61;62;70;75;80;86;90
sunshine-fedora-37-{arch}.rpm	12.0.0	525.60.13	50;52;60;61;62;70;75;80;86;90
sunshine-ubuntu-20.04-{arch}.deb	11.8.0	450.80.02	50;52;60;61;62;70;75;80;86;90;35
sunshine-ubuntu-22.04-{arch}.deb	11.8.0	450.80.02	50;52;60;61;62;70;75;80;86;90;35

2.3.1 AppImage

According to AppImageLint the supported distro matrix of the AppImage is below.

- [×] Debian oldstable (buster)
- [✓] Debian stable (bullseye)
- [✓] Debian testing (bookworm)
- [✓] Debian unstable (sid)
- [✓] Ubuntu kinetic
- [✓] Ubuntu jammy
- [✓] Ubuntu focal
- [×] Ubuntu bionic
- [×] Ubuntu xenial
- [×] Ubuntu trusty
- [×] CentOS 7

1. Download `sunshine.AppImage` to your home directory.
2. Open terminal and run the following code.

```
./sunshine.AppImage --install
```

Start:

```
./sunshine.AppImage --install && ./sunshine.AppImage
```

Uninstall:

```
./sunshine.AppImage --remove
```

2.3.2 Archlinux PKGBUILD

1. Open terminal and run the following code.

```
wget https://github.com/LizardByte/Sunshine/releases/latest/download/PKGBUILD
makepkg -fi
```

Uninstall:

```
pacman -R sunshine
```

2.3.3 Archlinux pkg

1. Open terminal and run the following code.

```
wget https://github.com/LizardByte/Sunshine/releases/latest/download/sunshine.pkg.
↪tar.zst
pacman -U --noconfirm sunshine.pkg.tar.zst
```

Uninstall:

```
pacman -R sunshine
```

2.3.4 Debian Package

1. Download `sunshine-{ubuntu-version}.deb` and run the following code.

```
sudo apt install -f ./sunshine-{ubuntu-version}.deb
```

Note: The `{ubuntu-version}` is the version of ubuntu we built the package on. If you are not using Ubuntu and have an issue with one package, you can try another.

Tip: You can double click the deb file to see details about the package and begin installation.

Uninstall:

```
sudo apt remove sunshine
```

2.3.5 Flatpak Package

1. Install Flatpak as required.
2. Download `sunshine_{arch}.flatpak` and run the following code.

   Note: Be sure to replace `{arch}` with the architecture for your operating system.

   System level (recommended)

```
flatpak install --system ./sunshine_{arch}.flatpak
```

User level

```
flatpak install --user ./sunshine_{arch}.flatpak
```

Additional installation (required)

```
flatpak run --command=additional-install.sh dev.lizardbyte.sunshine
```

Start:

X11 and NVFBC capture (X11 Only)

```
flatpak run dev.lizardbyte.sunshine
```

KMS capture (Wayland & X11)

```
sudo -i PULSE_SERVER=unix:$(pactl info | awk '/Server String/{print$3}')␣
↪flatpak run dev.lizardbyte.sunshine
```

Uninstall:

```
flatpak run --command=remove-additional-install.sh dev.lizardbyte.sunshine
flatpak uninstall --delete-data dev.lizardbyte.sunshine
```

2.3.6 RPM Package

1. Add *rpmfusion* repositories by running the following code.

```
sudo dnf install https://mirrors.rpmfusion.org/free/fedora/rpmfusion-free-release-
↪$(rpm -E %fedora).noarch.rpm \
https://mirrors.rpmfusion.org/nonfree/fedora/rpmfusion-nonfree-release-$(rpm -E
↪%fedora).noarch.rpm
```

2. Download `sunshine.rpm` and run the following code.

```
sudo dnf install ./sunshine.rpm
```

Tip: You can double click the rpm file to see details about the package and begin installation.

Uninstall:

```
sudo dnf remove sunshine
```

2.4 macOS

Sunshine on macOS is experimental. Gamepads do not work. Other features may not work as expected.

2.4.1 pkg

Warning: The *pkg* does not include runtime dependencies.

1. Download the `sunshine.pkg` file and install it as normal.

Uninstall:

```
cd /etc/sunshine/assets
uninstall_pkg.sh
```

2.4.2 Portfile

1. Install MacPorts
2. Update the Macports sources.

   ```
   sudo nano /opt/local/etc/macports/sources.conf
   ```

   Add this line, replacing your username, below the line that starts with `rsync`.
   `file:///Users/<username>/ports`

   `Ctrl+x`, then `Y` to exit and save changes.
3. Download the `Portfile` to `~/Downloads` and run the following code.

   ```
   mkdir -p ~/ports/multimedia/sunshine
   mv ~/Downloads/Portfile ~/ports/multimedia/sunshine/
   cd ~/ports
   portindex
   sudo port install sunshine
   ```
4. The first time you start Sunshine, you will be asked to grant access to screen recording and your microphone.

Uninstall:

```
sudo port uninstall sunshine
```

2.5 Windows

2.5.1 Installer

1. Download and install `sunshine-windows-installer.exe`

> **Attention:** You should carefully select or unselect the options you want to install. Do not blindly install or enable features.

To uninstall, find Sunshine in the list here and select "Uninstall" from the overflow menu. Different versions of Windows may provide slightly different steps for uninstall.

2.5.2 Standalone

1. Download and extract `sunshine-windows-portable.zip`

To uninstall, delete the extracted directory which contains the `sunshine.exe` file.

CHAPTER

THREE

DOCKER

3.1 Important note

Starting with v0.18.0, tag names have changed. You may no longer use `latest`, `master`, `vX.X.X`.

3.2 Build your own containers

This image provides a method for you to easily use the latest Sunshine release in your own docker projects. It is not intended to use as a standalone container at this point, and should be considered experimental.

```
ARG SUNSHINE_VERSION=latest
ARG SUNSHINE_OS=ubuntu-22.04
FROM lizardbyte/sunshine:${SUNSHINE_VERSION}-${SUNSHINE_OS}

# install Steam, Wayland, etc.

ENTRYPOINT steam && sunshine
```

3.2.1 SUNSHINE_VERSION

- `latest`, `master`, `vX.X.X`
- `nightly`
- commit hash

3.2.2 SUNSHINE_OS

Sunshine images are available with the following tag suffixes, based on their respective base images.

- `archlinux`
- `debian-bullseye`
- `fedora-36`
- `fedora-37`
- `ubuntu-20.04`
- `ubuntu-22.04`

3.2.3 Tags

You must combine the `SUNSHINE_VERSION` and `SUNSHINE_OS` to determine the tag to pull. The format should be `<SUNSHINE_VERSION>-<SUNSHINE_OS>`. For example, `latest-ubuntu-22.04`.

See all our available tags on docker hub or ghcr for more info.

3.3 Where used

This is a list of docker projects using Sunshine. Something missing? Let us know about it!

- Games on Whales

3.4 Port and Volume mappings

Examples are below of the required mappings. The configuration file will be saved to `/config` in the container.

3.4.1 Using docker run

Create and run the container (substitute your `<values>`):

```
docker run -d \
  --name=<image_name> \
  --restart=unless-stopped
  -e PUID=<uid> \
  -e PGID=<gid> \
  -e TZ=<timezone> \
  -v <path to data>:/config \
  -p 47984-47990:47984-47990/tcp \
  -p 48010:48010 \
  -p 47998-48000:47998-48000/udp \
  <image>
```

3.4.2 Using docker-compose

Create a `docker-compose.yml` file with the following contents (substitute your `<values>`):

```
version: '3'
services:
  <image_name>:
    image: <image>
    container_name: sunshine
    restart: unless-stopped
    volumes:
      - <path to data>:/config
    environment:
      - PUID=<uid>
      - PGID=<gid>
      - TZ=<timezone>
```

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```
    ports:
      - "47984-47990:47984-47990/tcp"
      - "48010:48010"
      - "47998-48000:47998-48000/udp"
```

3.4.3 Parameters

You must substitute the <values> with your own settings.

Parameters are split into two halves separated by a colon. The left side represents the host and the right side the container.

Example: `-p external:internal` - This shows the port mapping from internal to external of the container. Therefore `-p 47990:47990` would expose port `47990` from inside the container to be accessible from the host's IP on port `47990` (e.g. `http://<host_ip>:47990`). The internal port must be `47990`, but the external port may be changed (e.g. `-p 8080:47990`). All the ports listed in the `docker run` and `docker-compose` examples are required.

Parameter	Function	Example Value	Required
`-p <port>:47990`	Web UI Port	`47990`	True
`-v <path to data>:/config`	Volume mapping	`/home/sunshine`	True
`-e PUID=<uid>`	User ID	`1001`	False
`-e PGID=<gid>`	Group ID	`1001`	False
`-e TZ=<timezone>`	Lookup TZ value	`America/New_York`	False

User / Group Identifiers:

When using data volumes (-v flags) permissions issues can arise between the host OS and the container. To avoid this issue you can specify the user PUID and group PGID. Ensure the data volume directory on the host is owned by the same user you specify.

In this instance `PUID=1001` and `PGID=1001`. To find yours use id user as below:

```
$ id dockeruser
uid=1001(dockeruser) gid=1001(dockergroup) groups=1001(dockergroup)
```

If you want to change the PUID or PGID after the image has been built, it will require rebuilding the image.

3.5 Supported Architectures

Specifying `lizardbyte/sunshine:latest-<SUNSHINE_OS>` or `ghcr.io/lizardbyte/sunshine:latest-<SUNSHINE_OS>` should retrieve the correct image for your architecture.

The architectures supported by these images are shown in the table below.

tag suffix	amd64/x86_64	arm64/aarch64
archlinux		
debian-bullseye		
fedora-36		
fedora-37		
ubuntu-20.04		
ubuntu-22.04		

CHAPTER

FOUR

THIRD PARTY PACKAGES

Danger: These packages are not maintained by LizardByte. Use at your own risk.

4.1 AUR

4.2 Chocolatey

4.3 nixpkgs

4.4 Scoop

4.5 Solus

4.6 Winget

4.7 Legacy GitHub Repo

Attention: This repo is not maintained. Thank you to Loki for bringing this amazing project to life!

CHAPTER

FIVE

USAGE

1. See the *setup* section for your specific OS.
2. If you did not install the service, then start sunshine with the following command, unless a start command is listed in the specified package *installation* instructions.

   Note: A service is a process that runs in the background. Running multiple instances of Sunshine is not advised.

   Basic usage

   ```
   sunshine
   ```

   Specify config file

   ```
   sunshine <directory of conf file>/sunshine.conf
   ```

   Note: You do not need to specify a config file. If no config file is entered the default location will be used.

   Attention: The configuration file specified will be created if it doesn't exist.

3. Configure Sunshine in the web ui

   The web ui is available on https://localhost:47990 by default. You may replace *localhost* with your internal ip address.

   Attention: Ignore any warning given by your browser about "insecure website". This is due to the SSL certificate being self signed.

   Caution: If running for the first time, make sure to note the username and password that you created.

   Add games and applications.
   This can be configured in the web ui.

   Note: Additionally, apps can be configured manually. *src_assets/<os>/config/apps.json* is an example of a list of applications that are started just before running a stream. This is the directory within the GitHub

repo.

4. In Moonlight, you may need to add the PC manually.
5. When Moonlight request you insert the correct pin on sunshine:
   - Login to the web ui
   - Go to "PIN" in the Navbar
   - Type in your PIN and press Enter, you should get a Success Message
   - In Moonlight, select one of the Applications listed

5.1 Network

The Sunshine user interface will be available on port 47990 by default.

Warning: Exposing ports to the internet can be dangerous. Do this at your own risk.

5.2 Arguments

To get a list of available arguments run the following:

```
sunshine --help
```

5.3 Setup

5.3.1 Linux

The *deb*, *rpm*, *Flatpak* and *AppImage* packages handle these steps automatically. Third party packages may not.

Sunshine needs access to *uinput* to create mouse and gamepad events.

1. **Add user to group *input*, if this is the first time installing.**

   ```
   sudo usermod -a -G input $USER
   ```

2. **Create *udev* rules.**

   ```
   echo 'KERNEL=="uinput", GROUP="input", MODE="0660", OPTIONS+="static_node=uinput
   ↪"' | \
   sudo tee /etc/udev/rules.d/85-sunshine-input.rules
   ```

3. Optionally, configure autostart service
   - filename: `~/.config/systemd/user/sunshine.service`
   - **contents:**

```
[Unit]
Description=Sunshine self-hosted game stream host for Moonlight.
StartLimitIntervalSec=500
StartLimitBurst=5

[Service]
ExecStart=<see table>
Restart=on-failure
RestartSec=5s
#Flatpak Only
#ExecStop=flatpak kill dev.lizardbyte.sunshine

[Install]
WantedBy=graphical-session.target
```

package	ExecStart	Auto Configured
aur	/usr/bin/sunshine	✓
deb	/usr/bin/sunshine	✓
rpm	/usr/bin/sunshine	✓
AppImage	~/sunshine.AppImage	✓
Flatpak	flatpak run dev.lizardbyte.sunshine	✓

Start once

```
systemctl --user start sunshine
```

Start on boot

```
systemctl --user enable sunshine
```

4. **Additional Setup for KMS**

Note: `cap_sys_admin` may as well be root, except you don't need to be root to run it. It is necessary to allow Sunshine to use KMS.

Enable

```
sudo setcap cap_sys_admin+p $(readlink -f $(which sunshine))
```

Disable (for Xorg/X11)

```
sudo setcap -r $(readlink -f $(which sunshine))
```

5. **Reboot**

```
sudo reboot now
```

5.3.2 macOS

Sunshine can only access microphones on macOS due to system limitations. To stream system audio use Soundflower or BlackHole.

Note: Command Keys are not forwarded by Moonlight. Right Option-Key is mapped to CMD-Key.

Caution: Gamepads are not currently supported.

Configure autostart service

MacPorts

```
sudo port load Sunshine
```

5.3.3 Windows

For gamepad support, install ViGEmBus

Sunshine firewall

Add rule

```
cd /d "C:\Program Files\Sunshine\scripts"
add-firewall-rule.bat
```

Remove rule

```
cd /d "C:\Program Files\Sunshine\scripts"
remove-firewall-rule.bat
```

Sunshine service

Enable

```
cd /d "C:\Program Files\Sunshine\scripts"
install-service.bat
```

Disable

```
cd /d "C:\Program Files\Sunshine\scripts"
uninstall-service.bat
```

5.4 Shortcuts

All shortcuts start with `CTRL + ALT + SHIFT`, just like Moonlight

- `CTRL + ALT + SHIFT + N` - Hide/Unhide the cursor (This may be useful for Remote Desktop Mode for Moonlight)
- `CTRL + ALT + SHIFT + F1/F12` - Switch to different monitor for Streaming

5.5 Application List

- Applications should be configured via the web UI.
- A basic understanding of working directories and commands is required.
- You can use Environment variables in place of values
- `$(HOME)` will be replaced by the value of `$HOME`
- `$$` will be replaced by `$`, e.g. `$$(HOME)` will be become `$(HOME)`
- `env` - Adds or overwrites Environment variables for the commands/applications run by Sunshine
- `"Variable name":"Variable value"`
- `apps` - The list of applications
- Advanced users may want to edit the application list manually. The format is `json`.
- **Example `json` application:**

```
{
    "cmd": "command to open app",
    "detached": [
        "some-command",
        "another-command"
    ],
    "image-path": "/full-path/to/png-image",
    "name": "An App",
    "output": "/full-path/to/command-log-file",
    "prep-cmd": [
        {
            "do": "some-command",
            "undo": "undo-that-command"
        }
    ],
    "working-dir": "/full-path/to/working-directory"
}
```

  - `cmd` - The main application
  - `detached` - A list of commands to be run and forgotten about
    - If not specified, a process is started that sleeps indefinitely
  - `image-path` - The full path to the cover art image to use.
  - `name` - The name of the application/game
  - `output` - The file where the output of the command is stored

  - `prep-cmd` - A list of commands to be run before/after the application
    * If any of the prep-commands fail, starting the application is aborted
    * `do` - Run before the application
      · If it fails, all `undo` commands of the previously succeeded `do` commands are run
    * `undo` - Run after the application has terminated
      · Failures of `undo` commands are ignored
  - `working-dir` - The working directory to use. If not specified, Sunshine will use the application directory.
- For more examples see *app examples*.

5.6 Considerations

- When an application is started, if there is an application already running, it will be terminated.
- When the application has been shutdown, the stream shuts down as well.
  - For example, if you attempt to run `steam` as a `cmd` instead of `detached` the stream will immediately fail. This is due to the method in which the steam process is executed. Other applications may behave similarly.
- The "Desktop" app works the same as any other application except it has no commands. It does not start an application, instead it simply starts a stream. If you removed it and would like to get it back, just add a new application with the name "Desktop" and "desktop.png" as the image path.
- For the Linux flatpak you must prepend commands with `flatpak-spawn --host`.

5.7 HDR Support

Streaming HDR content is supported for Windows hosts with NVIDIA, AMD, or Intel GPUs that support encoding HEVC Main 10. You must have an HDR-capable display or EDID emulator dongle connected to your host PC to activate HDR in Windows.

- Ensure you enable the HDR option in your Moonlight client settings, otherwise the stream will be SDR.
- A good HDR experience relies on proper HDR display calibration both in Windows and in game. HDR calibration can differ significantly between client and host displays.
- We recommend calibrating the display by streaming the Windows HDR Calibration app to your client device and saving an HDR calibration profile to use while streaming.
- You may also need to tune the brightness slider or HDR calibration options in game to the different HDR brightness capabilities of your client's display.
- Older games that use NVIDIA-specific NVAPI HDR rather than native Windows 10 OS HDR support may not display in HDR.
- Some GPUs can produce lower image quality or encoding performance when streaming in HDR compared to SDR.

5.8 Tutorials

Tutorial videos are available here.

Community!

Tutorials are community generated. Want to contribute? Reach out to us on our discord server.

CHAPTER

SIX

APP EXAMPLES

Since not all applications behave the same, we decided to create some examples to help you get started adding games and applications to Sunshine.

Attention: Throughout these examples, any fields not shown are left blank. You can enhance your experience by adding an image or a log file (via the `Output` field).

6.1 Common Examples

6.1.1 Desktop

Field	Value
Application Name	`Desktop`
Image	`desktop.png`

6.1.2 Steam Big Picture

Note: Steam is launched as a detached command because Steam starts with a process that self updates itself and the original process is killed. Since the original process ends it will not work as a regular command.

Field	Linux	macOS	Windows
Application Name	`Steam Big Picture`		
Detached Commands	`setsid steam steam://open/bigpicture`	`open steam://open/bigpicture`	`steam steam://open/bigpicture`
Image	`steam.png`		

6.1.3 Epic Game Store game

Note: Using URI method will be the most consistent between various games, but does not allow a game to be launched using the "Command" and therefore the stream will not end when the game ends.

URI (Epic)

Field	Windows
Application Name	`Surviving Mars`
Detached Commands	`cmd /C "start com.epicgames.launcher://apps/d759128018124dcabb1fbee9bb28e178%3A20729b9176c24 action=launch&silent=true"`

Binary (Epic w/ working directory)

Field	Windows
Application Name	`Surviving Mars`
Command	`cmd /c "MarsEpic.exe"`
Working Directory	`C:\Program Files\Epic Games\SurvivingMars`

Binary (Epic w/o working directory)

Field	Windows
Application Name	`Surviving Mars`
Command	`"C:\Program Files\Epic Games\SurvivingMars\MarsEpic.exe"`

6.1.4 Steam game

Note: Using URI method will be the most consistent between various games, but does not allow a game to be launched using the "Command" and therefore the stream will not end when the game ends.

URI (Steam)

Field	Linux	macOS	Windows
Application Name	`Surviving Mars`		
Detached Commands	`setsid steam steam://rungameid/464920`	`open steam://rungameid/464920`	`cmd /C "start steam://rungameid/464920"`

Binary (Steam w/ working directory)

Field	Linux	macOS	Windows
Application Name	`Surviving Mars`		
Command	`MarsSteam`		`cmd /c "MarsSteam.exe"`
Working Directory	`~/.steam/steam/SteamApps/common/Survivng Mars`		`C:\Program Files (x86)\Steam\steamapps\common\Surviving Mars`

Binary (Steam w/o working directory)

Field	Linux	macOS	Windows
Application Name	`Surviving Mars`		
Command	`~/.steam/steam/SteamApps/common/Survivng Mars/MarsSteam`		`"C:\Program Files (x86)\Steam\steamapps\common\Surviving Mars\MarsSteam.exe"`

6.2 Linux

6.2.1 Changing Resolution and Refresh Rate (Linux - X11)

Field	Value
Command Preparations	Do: `xrandr --output HDMI-1 --mode 1920x1080 --rate 60`
	Undo: `xrandr --output HDMI-1 --mode 3840×2160 --rate 120`

6.2.2 Changing Resolution and Refresh Rate (Linux - Wayland)

Field	Value
Command Preparations	Do: `wlr-xrandr --output HDMI-1 --mode 1920x1080@60Hz`
	Undo: `wlr-xrandr --output HDMI-1 --mode 3840×2160@120Hz`

6.2.3 Flatpak

Attention: Because Flatpak packages run in a sandboxed environment and do not normally have access to the host, the Flatpak of Sunshine requires commands to be prefixed with `flatpak-spawn --host`.

6.3 macOS

6.3.1 Changing Resolution and Refresh Rate (macOS)

Note: This example uses the *displayplacer* tool to change the resolution. This tool can be installed following instructions in their GitHub repository.

Field	Value
Command Preparations	Do: `displayplacer "id:<screenId> res:1920x1080 hz:60 scaling:on origin:(0,0) degree:0"`
	Undo: `displayplacer "id:<screenId> res:3840x2160 hz:120 scaling:on origin:(0,0) degree:0"`

6.4 Windows

6.4.1 Changing Resolution and Refresh Rate (Windows)

Note: This example uses the *QRes* tool to change the resolution and refresh rate. This tool can be downloaded from their SourceForge repository.

Field	Value
Command Preparations	Do: `FullPath\qres.exe /x:1920 /y:1080 /r:60`
	Undo: `FullPath\qres.exe /x:3840 /y:2160 /r:120`

Tip: You can change your host resolution to match the client resolution automatically using the Nonary/ResolutionAutomation project.

CHAPTER

SEVEN

ADVANCED USAGE

Sunshine will work with the default settings for most users. In some cases you may want to configure Sunshine further.

7.1 Performance Tips

7.1.1 AMD

In Windows, enabling *Enhanced Sync* in AMD's settings may help reduce the latency by an additional frame. This applies to *amfenc* and *libx264*.

7.1.2 Nvidia

Enabling *Fast Sync* in Nvidia settings may help reduce latency.

7.2 Configuration

The default location for the configuration file is listed below. You can use another location if you choose, by passing in the full configuration file path as the first argument when you start Sunshine.

The default location of the `apps.json` is the same as the configuration file. You can use a custom location by modifying the configuration file.

Default File Location

Value	Description
Docker	/config/
Linux	~/.config/sunshine/
macOS	~/.config/sunshine/
Windows	%ProgramFiles%\Sunshine\config

Example

```
sunshine ~/sunshine_config.conf
```

To manually configure sunshine you may edit the *conf* file in a text editor. Use the examples as reference.

Hint: Some settings are not available within the web ui.

7.3 General

7.3.1 sunshine_name

Description
The name displayed by Moonlight

Default
PC hostname

Example

```
sunshine_name = Sunshine
```

7.3.2 min_log_level

Description
The minimum log level printed to standard out.

Choices

Value	Description
verbose	verbose logging
debug	debug logging
info	info logging
warning	warning logging
error	error logging
fatal	fatal logging
none	no logging

Default
`info`

Example

```
min_log_level = info
```

7.3.3 log_path

Description
The path where the sunshine log is stored.

Default
`sunshine.log`

Example

```
log_path = sunshine.log
```

7.3.4 global_prep_cmd

Description
A list of commands to be run before/after all applications. If any of the prep-commands fail, starting the application is aborted.

Default
`[]`

Example

```
global_prep_cmd = [{"do":"nircmd.exe setdisplay 1280 720 32 144","undo":"nircmd.exe␣
↪setdisplay 2560 1440 32 144"}]
```

7.4 Controls

7.4.1 gamepad

Description
The type of gamepad to emulate on the host.

> **Caution:** Applies to Windows only.

Choices

Value	Description
x360	xbox 360 controller
ds4	dualshock controller (PS4)

Default
`x360`

Example

```
gamepad = x360
```

7.4.2 back_button_timeout

Description
If, after the timeout, the back/select button is still pressed down, Home/Guide button press is emulated.

On Nvidia Shield, the home and power button are not passed to Moonlight.

> **Tip:** If back_button_timeout < 0, then the Home/Guide button will not be emulated.

Default
`2000`

Example

```
back_button_timeout = 2000
```

7.4.3 key_repeat_delay

Description
The initial delay, in milliseconds, before repeating keys. Controls how fast keys will repeat themselves.

Default
`500`

Example

```
key_repeat_delay = 500
```

7.4.4 key_repeat_frequency

Description
How often keys repeat every second.

Tip: This configurable option supports decimals.

Default
`24.9`

Example

```
key_repeat_frequency = 24.9
```

7.4.5 keybindings

Description
Sometimes it may be useful to map keybindings. Wayland won't allow clients to capture the Win Key for example.

Tip: See virtual key codes

Hint: keybindings needs to have a multiple of two elements.

Default

```
0x10, 0xA0,
0x11, 0xA2,
0x12, 0xA4
```

Example

```
keybindings = [
  0x10, 0xA0,
  0x11, 0xA2,
  0x12, 0xA4,
  0x4A, 0x4B
]
```

7.4.6 key_rightalt_to_key_win

Description

It may be possible that you cannot send the Windows Key from Moonlight directly. In those cases it may be useful to make Sunshine think the Right Alt key is the Windows key.

Default

`disabled`

Example

```
key_rightalt_to_key_win = enabled
```

7.5 Display

7.5.1 adapter_name

Description

Select the video card you want to stream.

Tip: To find the name of the appropriate values follow these instructions.

Linux + VA-API

Unlike with *amdvce* and *nvenc*, it doesn't matter if video encoding is done on a different GPU.

```
ls /dev/dri/renderD*  # to find all devices capable of VAAPI

# replace ``renderD129`` with the device from above to lists the name and␣
↪capabilities of the device
vainfo --display drm --device /dev/dri/renderD129 | \
  grep -E "((VAProfileH264High|VAProfileHEVCMain|VAProfileHEVCMain10).
↪*VAEntrypointEncSlice)|Driver version"
```

To be supported by Sunshine, it needs to have at the very minimum: `VAProfileH264High` : `VAEntrypointEncSlice`

Todo: macOS

Windows

```
tools\dxgi-info.exe
```

Default
Sunshine will select the default video card.

Examples

Linux

```
adapter_name = /dev/dri/renderD128
```

Todo: macOS

Windows

```
adapter_name = Radeon RX 580 Series
```

7.5.2 output_name

Description
Select the display number you want to stream.

Tip: To find the name of the appropriate values follow these instructions.

Linux
During Sunshine startup, you should see the list of detected monitors:

```
Info: Detecting connected monitors
Info: Detected monitor 0: DVI-D-0, connected: false
Info: Detected monitor 1: HDMI-0, connected: true
Info: Detected monitor 2: DP-0, connected: true
Info: Detected monitor 3: DP-1, connected: false
Info: Detected monitor 4: DVI-D-1, connected: false
```

You need to use the value before the colon in the output, e.g. 1.

Todo: macOS

Windows

```
tools\dxgi-info.exe
```

Default
Sunshine will select the default display.

Examples

Linux

```
output_name = 0
```

Todo: macOS

Windows

```
output_name  = \\.\DISPLAY1
```

7.5.3 fps

Description
The fps modes advertised by Sunshine.

Note: Some versions of Moonlight, such as Moonlight-nx (Switch), rely on this list to ensure that the requested fps is supported.

Default
`[10, 30, 60, 90, 120]`

Example

```
fps = [10, 30, 60, 90, 120]
```

7.5.4 resolutions

Description
The resolutions advertised by Sunshine.

Note: Some versions of Moonlight, such as Moonlight-nx (Switch), rely on this list to ensure that the requested resolution is supported.

Default

```
[
  352x240,
  480x360,
  858x480,
  1280x720,
  1920x1080,
  2560x1080,
  3440x1440,
  1920x1200,
  3860x2160,
  3840x1600,
]
```

Example

```
resolutions = [
  352x240,
  480x360,
  858x480,
  1280x720,
```

(continues on next page)

(continued from previous page)

```
  1920x1080,
  2560x1080,
  3440x1440,
  1920x1200,
  3860x2160,
  3840x1600,
]
```

7.5.5 dwmflush

Description

Invoke DwmFlush() to sync screen capture to the Windows presentation interval.

> **Caution:** Applies to Windows only. Alleviates visual stuttering during mouse movement. If enabled, this feature will automatically deactivate if the client framerate exceeds the host monitor's current refresh rate.

> **Note:** If you disable this option, you may see video stuttering during mouse movement in certain scenarios. It is recommended to leave enabled when possible.

Default

`enabled`

Example

```
dwmflush = enabled
```

7.6 Audio

7.6.1 audio_sink

Description

The name of the audio sink used for audio loopback.

> **Tip:** To find the name of the audio sink follow these instructions.
>
> **Linux + pulseaudio**
>
> ```
> pacmd list-sinks | grep "name:"
> ```
>
> **Linux + pipewire**
>
> ```
> pactl info | grep Source
> # in some causes you'd need to use the `Sink` device, if `Source` doesn't work, so␣
> ↪try:
> pactl info | grep Sink
> ```

macOS

Sunshine can only access microphones on macOS due to system limitations. To stream system audio use Soundflower or BlackHole.

Windows

```
tools\audio-info.exe
```

Tip: If you want to mute the host speakers, use *virtual_sink* instead.

Default

Sunshine will select the default audio device.

Examples

Linux

```
audio_sink = alsa_output.pci-0000_09_00.3.analog-stereo
```

macOS

```
audio_sink = BlackHole 2ch
```

Windows

```
audio_sink = {0.0.0.00000000}.{FD47D9CC-4218-4135-9CE2-0C195C87405B}
```

7.6.2 virtual_sink

Description

The audio device that's virtual, like Steam Streaming Speakers. This allows Sunshine to stream audio, while muting the speakers.

Tip: See *audio_sink*!

Tip: These are some options for virtual sound devices.

- Stream Streaming Speakers (Linux, macOS, Windows)
  - To use this option, you must have Steam installed and have used Stream remote play at least once.
- Virtual Audio Cable (macOS, Windows)

Example

```
virtual_sink = {0.0.0.00000000}.{8edba70c-1125-467c-b89c-15da389bc1d4}
```

7.7 Network

7.7.1 external_ip

Description
If no external IP address is given, Sunshine will attempt to automatically detect external ip-address.

Default
Automatic

Example

```
external_ip = 123.456.789.12
```

7.7.2 port

Description
Set the family of ports used by Sunshine. Changing this value will offset other ports per the table below.

Port Description	Default Port	Difference from config port
HTTPS	47984 TCP	-5
HTTP	47989 TCP	0
Web	47990 TCP	+1
RTSP	48010 TCP	+21
Video	47998 UDP	+9
Control	47999 UDP	+10
Audio	48000 UDP	+11
Mic (unused)	48002 UDP	+13

Attention: Custom ports may not be supported by all Moonlight clients.

Default
`47989`

Example

```
port = 47989
```

7.7.3 pkey

Description
The private key. This must be 2048 bits.

Default
`credentials/cakey.pem`

Example

```
pkey = /dir/pkey.pem
```

7.7.4 cert

Description
The certificate. Must be signed with a 2048 bit key.

Default
`credentials/cacert.pem`

Example

```
cert = /dir/cert.pem
```

7.7.5 origin_pin_allowed

Description
The origin of the remote endpoint address that is not denied for HTTP method /pin.

Choices

Value	Description
pc	Only localhost may access /pin
lan	Only LAN devices may access /pin
wan	Anyone may access /pin

Default
`pc`

Example

```
origin_pin_allowed = pc
```

7.7.6 origin_web_ui_allowed

Description
The origin of the remote endpoint address that is not denied for HTTPS Web UI.

Choices

Value	Description
pc	Only localhost may access the web ui
lan	Only LAN devices may access the web ui
wan	Anyone may access the web ui

Default
`lan`

Example

```
origin_web_ui_allowed = lan
```

7.7.7 upnp

Description
Sunshine will attempt to open ports for streaming over the internet.

Choices

Value	Description
on	enable UPnP
off	disable UPnP

Default
`disabled`

Example

```
upnp = on
```

7.7.8 ping_timeout

Description
How long to wait, in milliseconds, for data from Moonlight before shutting down the stream.

Default
`10000`

Example

```
ping_timeout = 10000
```

7.8 Encoding

7.8.1 channels

Description
This will generate distinct video streams, unlike simply broadcasting to multiple Clients.

When multicasting, it could be useful to have different configurations for each connected Client.

For instance:

- Clients connected through WAN and LAN have different bitrate constraints.
- Decoders may require different settings for color.

> **Warning:** CPU usage increases for each distinct video stream generated.

Default
1

Example

```
channels = 1
```

7.8.2 fec_percentage

Description
Percentage of error correcting packets per data packet in each video frame.

> **Warning:** Higher values can correct for more network packet loss, but at the cost of increasing bandwidth usage.

Default
`20`

Range
`1-255`

Example

```
fec_percentage = 20
```

7.8.3 qp

Description
Quantization Parameter. Some devices don't support Constant Bit Rate. For those devices, QP is used instead.

> **Warning:** Higher value means more compression, but less quality.

Default
`28`

Example

```
qp = 28
```

7.8.4 min_threads

Description
Minimum number of threads used for software encoding.

Note: Increasing the value slightly reduces encoding efficiency, but the tradeoff is usually worth it to gain the use of more CPU cores for encoding. The ideal value is the lowest value that can reliably encode at your desired streaming settings on your hardware.

Default
`1`

Example

```
min_threads = 1
```

7.8.5 hevc_mode

Description

Allows the client to request HEVC Main or HEVC Main10 video streams.

> **Warning:** HEVC is more CPU-intensive to encode, so enabling this may reduce performance when using software encoding.

Choices

Value	Description
0	advertise support for HEVC based on encoder
1	do not advertise support for HEVC
2	advertise support for HEVC Main profile
3	advertise support for HEVC Main and Main10 (HDR) profiles

Default

`0`

Example

```
hevc_mode = 2
```

7.8.6 capture

Description

Force specific screen capture method.

> **Caution:** Applies to Linux only.

Choices

Valu	Description
nvfbc	Use NVIDIA Frame Buffer Capture to capture direct to GPU memory. This is usually the fastest method for NVIDIA cards. For GeForce cards it will only work with drivers patched with nvidia-patch or nvlax.
wlr	Capture for wlroots based Wayland compositors via DMA-BUF.
kms	DRM/KMS screen capture from the kernel. This requires that sunshine has cap_sys_admin capability. See *Linux Setup*.
x11	Uses XCB. This is the slowest and most CPU intensive so should be avoided if possible.

Default

Automatic. Sunshine will use the first capture method available in the order of the table above.

Example

```
capture = kms
```

7.8.7 encoder

Description

Force a specific encoder.

Choices

Value	Description
nvenc	For NVIDIA graphics cards
quicksync	For Intel graphics cards
amdvce	For AMD graphics cards
software	Encoding occurs on the CPU

Default

Sunshine will use the first encoder that is available.

Example

```
encoder = nvenc
```

7.8.8 sw_preset

Description

The encoder preset to use.

Note: This option only applies when using software *encoder*.

Note: From FFmpeg.

A preset is a collection of options that will provide a certain encoding speed to compression ratio. A slower preset will provide better compression (compression is quality per filesize). This means that, for example, if you target a certain file size or constant bit rate, you will achieve better quality with a slower preset. Similarly, for constant quality encoding, you will simply save bitrate by choosing a slower preset.

Use the slowest preset that you have patience for.

Choices

Value	Description
ultrafast	fastest
superfast	
veryfast	
faster	
fast	
medium	
slow	
slower	
veryslow	slowest

Default

`superfast`

Example

```
sw_preset  = superfast
```

7.8.9 sw_tune

Description

The tuning preset to use.

Note: This option only applies when using software *encoder*.

Note: From FFmpeg.

You can optionally use -tune to change settings based upon the specifics of your input.

Choices

Value	Description
film	use for high quality movie content; lowers deblocking
animation	good for cartoons; uses higher deblocking and more reference frames
grain	preserves the grain structure in old, grainy film material
stillimage	good for slideshow-like content
fastdecode	allows faster decoding by disabling certain filters
zerolatency	good for fast encoding and low-latency streaming

Default

`zerolatency`

Example

```
sw_tune    = zerolatency
```

7.8.10 nv_preset

Description
The encoder preset to use.

Note: This option only applies when using nvenc *encoder*. For more information on the presets, see nvenc preset migration guide.

Choices

Value	Description
p1	fastest (lowest quality)
p2	faster (lower quality)
p3	fast (low quality)
p4	medium (default)
p5	slow (good quality)
p6	slower (better quality)
p7	slowest (best quality)

Default
`p4`

Example

```
nv_preset = p4
```

7.8.11 nv_tune

Description
The encoder tuning profile.

Note: This option only applies when using nvenc *encoder*.

Choices

Value	Description
hq	high quality
ll	low latency
ull	ultra low latency
lossless	lossless

Default
`ull`

Example

```
nv_tune = ull
```

7.8.12 nv_rc

Description
The encoder rate control.

Note: This option only applies when using nvenc *encoder*.

Choices

Value	Description
constqp	constant QP mode
vbr	variable bitrate
cbr	constant bitrate

Default
`cbr`

Example

```
nv_rc = cbr
```

7.8.13 nv_coder

Description
The entropy encoding to use.

Note: This option only applies when using H264 with nvenc *encoder*.

Choices

Value	Description
auto	let ffmpeg decide
cabac	context adaptive binary arithmetic coding - higher quality
cavlc	context adaptive variable-length coding - faster decode

Default
`auto`

Example

```
nv_coder = auto
```

7.8.14 qsv_preset

Description
The encoder preset to use.

Note: This option only applies when using quicksync *encoder*.

Choices

Value	Description
veryfast	fastest (lowest quality)
faster	faster (lower quality)
fast	fast (low quality)
medium	medium (default)
slow	slow (good quality)
slower	slower (better quality)
veryslow	slowest (best quality)

Default
`medium`

Example

```
qsv_preset = medium
```

7.8.15 qsv_coder

Description
The entropy encoding to use.

Note: This option only applies when using H264 with quicksync *encoder*.

Choices

Value	Description
auto	let ffmpeg decide
cabac	context adaptive binary arithmetic coding - higher quality
cavlc	context adaptive variable-length coding - faster decode

Default
`auto`

Example

```
qsv_coder = auto
```

7.8.16 amd_quality

Description
The encoder preset to use.

Note: This option only applies when using amdvce *encoder*.

Choices

Value	Description
speed	prefer speed
balanced	balanced
quality	prefer quality

Default
`balanced`

Example

```
amd_quality = balanced
```

7.8.17 amd_rc

Description
The encoder rate control.

Note: This option only applies when using amdvce *encoder*.

Choices

Value	Description
cqp	constant qp mode
cbr	constant bitrate
vbr_latency	variable bitrate, latency constrained
vbr_peak	variable bitrate, peak constrained

Default
`vbr_latency`

Example

```
amd_rc = vbr_latency
```

7.8.18 amd_usage

Description
The encoder usage profile, used to balance latency with encoding quality.

Note: This option only applies when using amdvce *encoder*.

Choices

Value	Description
transcoding	transcoding (slowest)
webcam	webcam (slow)
lowlatency	low latency (fast)
ultralowlatency	ultra low latency (fastest)

Default
`ultralowlatency`

Example

```
amd_usage = ultralowlatency
```

7.8.19 amd_preanalysis

Description
Preanalysis can increase encoding quality at the cost of latency.

Note: This option only applies when using amdvce *encoder*.

Default
`disabled`

Example

```
amd_preanalysis = disabled
```

7.8.20 amd_vbaq

Description
Variance Based Adaptive Quantization (VBAQ) can increase subjective visual quality.

Note: This option only applies when using amdvce *encoder*.

Default
`enabled`

Example

```
amd_vbaq = enabled
```

7.8.21 amd_coder

Description

The entropy encoding to use.

Note: This option only applies when using H264 with amdvce *encoder*.

Choices

Value	Description
auto	let ffmpeg decide
cabac	context adaptive variable-length coding - higher quality
cavlc	context adaptive binary arithmetic coding - faster decode

Default

`auto`

Example

```
amd_coder = auto
```

7.8.22 vt_software

Description

Force Video Toolbox to use software encoding.

Note: This option only applies when using macOS.

Choices

Value	Description
auto	let ffmpeg decide
disabled	disable software encoding
allowed	allow software encoding
forced	force software encoding

Default

`auto`

Example

```
vt_software = auto
```

7.8.23 vt_realtime

Description
Realtime encoding.

Note: This option only applies when using macOS.

Warning: Disabling realtime encoding might result in a delayed frame encoding or frame drop.

Default
`enabled`

Example

```
vt_realtime = enabled
```

7.8.24 vt_coder

Description
The entropy encoding to use.

Note: This option only applies when using macOS.

Choices

Value	Description
auto	let ffmpeg decide
cabac	
cavlc	

Default
`auto`

Example

```
vt_coder = auto
```

7.9 Advanced

7.9.1 file_apps

Description
The application configuration file path. The file contains a json formatted list of applications that can be started by Moonlight.

Default
OS and package dependent

Example

```
file_apps = apps.json
```

7.9.2 file_state

Description
The file where current state of Sunshine is stored.

Default
`sunshine_state.json`

Example

```
file_state = sunshine_state.json
```

7.9.3 credentials_file

Description
The file where user credentials for the UI are stored.

Default
`sunshine_state.json`

Example

```
credentials_file = sunshine_state.json
```

CHAPTER

EIGHT

CHANGELOG

8.1 0.19.1 - 2023-03-30

Fixed

- (Audio) Fixed no audio issue introduced in v0.19.0

8.2 0.19.0 - 2023-03-29

Breaking

- (Linux/Flatpak) Moved Flatpak to org.freedesktop.Platform 22.08 and Cuda 12.0.0 This will drop support for Nvidia GPUs with compute capability 3.5

Added

- (Input) Added option to suppress input from gamepads, keyboards, or mice
- (Input/Linux) Added unicode support for remote pasting (may not work on all DEs)
- (Input/Linux) Added XTest input fallback
- (UI) Added version notifications to web UI
- (Linux/Windows) Add system tray icon
- (Windows) Added ability to safely elevate commands that fail due to insufficient permissions when running as a service
- (Config) Added global prep commands, and ability to exclude an app from using global prep commands
- (Installer/Windows) Automatically install ViGEmBus if selected

Changed

- (Logging) Changed client verified messages to debug to prevent spamming the log
- (Config) Only save non default config values
- (Service/Linux) Use xdg-desktop-autostart for systemd service
- (Linux) Added config option to force capture method
- (Windows) Execute prep command in context of current user
- (Linux) Allow disconnected X11 outputs

Fixed

- (Input/Windows) Fix issue where internation keys were not translated correct, and modifier keys appeared stuck
- (Linux) Fixed startup when /dev/dri didn't exist
- (UI) Changes software encoding settings to select menu instead of text input
- (Initialization) Do not terminate upon failure, allowing access to the web UI

Dependencies

- Bump third-party/moonlight-common-c from 07beb0f to c9426a6
- Bump babel from 2.11.0 to 2.12.1
- Bump @fortawesome/fontawesome-free from 6.2.1 to 6.4.0
- Bump third-party/ViGEmClient from 9e842ba to 726404e
- Bump ffmpeg
- Bump third-party/miniupnp from 014c9df to e439318
- Bump furo from 2022.12.7 to 2023.3.27
- Bump third-party/nanors from 395e5ad to e9e242e

Misc

- (GitHub) Shared feature request board with Moonlight
- (Docs) Improved application examples
- (Docs) Added WIP documentation for source code using Doxygen and Breathe
- (Build) Fix linux clang build errors
- (Build/Archlinux) Skip irrelevant submodules
- (Build/Archlinux) Disable download timeout
- (Build/macOS) Support compiling for earlier releases of macOS
- (Docs) Add favicon
- (Docs) Add missing config default values
- (Build) Fix compiler warnings due to depreciated elements in C++17
- (Build) Fix libcurl link errors
- (Clang) Adjusted formatting rules

8.3 0.18.4 - 2023-02-20

Fixed

- (Linux/AUR) Drop support of AUR package
- (Docker) General enhancements to docker images

8.4 0.18.3 - 2023-02-13

Added

- (Linux) Added PKGBUILD for Archlinux based distros to releases
- (Linux) Added precompiled package for Archlinux based distros to releases
- (Docker) Added archlinux docker image (x86_64 only)

8.5 0.18.2 - 2023-02-13

Fixed

- (Video/KMV/Linux) Fixed wayland capture on Nvidia for KMS
- (Video/Linux) Implement vaSyncBuffer stuf for libva <2.9.0
- (UI) Fix issue where mime type was not being set for node_modules when using a reverse proxy
- (UI/macOS) Added missing audio sink config options
- (Linux) Specify correct Boost dependency versions
- (Video/AMF) Add missing encoder tunables

8.6 0.18.1 - 2023-01-31

Fixed

- (Linux) Fixed missing dependencies for deb and rpm packages
- (Linux) Use dynamic boost

8.7 0.18.0 - 2023-01-29

Attention, this release contains critical security fixes. Please update as soon as possible. Additionally, we are encouraging users to change your Sunshine password, especially if you expose the web UI (i.e. port 47790 by default) to the internet, or have ever uploaded your logs with verbose output to a public resource.

Added

- (Windows) Add support for Intel QuickSync
- (Linux) Added aarch64 deb and rpm packages
- (Windows) Add support for hybrid graphics systems, such as laptops with both integrated and discrete GPUs
- (Linux) Add support for streaming from Steam Deck Gaming Mode
- (Windows) Add HDR support, see https://docs.lizardbyte.dev/projects/sunshine/en/latest/about/usage.html#hdr-support

Fixed

- (Network) Refactor code for UPnP port forwarding
- (Video) Enforce 10 FPS encoding frame rate minimum to improve static image quality

- (Linux) deb and rpm packages are now specific to destination distro and version
- (Docs) Add nvidia/nvenc preset migration guide
- (Network) Performance optimizations
- (Video/Windows) Fix streaming to multiple clients from hardware encoder
- (Linux) Fix child process spawning
- (Security) Fix security vulnerability in implementation of SimpleWebServer
- (Misc) Rename "Steam BigPicture" to "Steam Big Picture" in default apps.json
- (Security) Scrub basic authorization header from logs
- (Linux) The systemd service will now restart in the event of a crash
- (Video/KMS/Linux) Fixed error: `couldn't import RGB Image:  00003002 and 00003004`
- (Video/Windows) Fix stream freezing triggered by the resolution changed
- (Installer/Windows) Fixes silent installation and other miscellaneous improvements
- (CPU) Significantly improved CPU usage

8.8 0.17.0 - 2023-01-08

If you are running Sunshine as a service on Windows, we are strongly urging you to update to v0.17.0 as soon as possible. Older Windows versions of Sunshine had a security flaw in which the binary was located in a user-writable location which is problematic when running as a service or on a multi-user system. Additionally, when running Sunshine as a service, games and applications were launched as SYSTEM. This could lead to issues with save files and other game settings. In v0.17.0, games now run under your user account without elevated privileges.

Breaking

- (Apps) Removed automatic desktop entry (Re-add by adding an empty application named "Desktop" with no commands, "desktop.png" can be added as the image.)
- (Windows) Improved user upgrade experience (Suggest to manually uninstall existing Sunshine version before this upgrade. Do NOT select to remove everything, if prompted. Make a backup of config files before uninstall.)
- (Windows) Move config files to specific directory (files will be migrated automatically if using Windows installer)
- (Dependencies) Fix npm path (breaking change for package maintainers)

Added

- (macOS) Added initial support for arm64 on macOS through Macports portfile
- (Input) Added support for foreign keyboard input
- (Misc) Logs inside the WebUI and log to file
- (UI/Windows) Added an Apply button to configuration page when running as a service
- (Input/Windows) Enable Mouse Keys while streaming for systems with no physical mouse

Fixed

- (Video) Improved capture performance
- (Audio) Improved audio bitrate and quality handling
- (Apps/Windows) Fixed PATH environment variable handling

- (Apps/Windows) Use the proper environment variable for the Program Files (x86) folder
- (Service/Windows) Fix SunshineSvc hanging if an error occurs during startup
- (Service/Windows) Spawn Sunshine.exe in a job object, so it is terminated if SunshineSvc.exe dies
- (Video) windows/vram: fix fringing in NV12 colour conversion
- (Apps/Windows) Launch games under the correct user account
- (Video) nvenc, amdvce: rework all user presets/options
- (Network) Generate certificates with unique serial numbers
- (Service/Windows) Graceful termination on shutdown, logoff, and service stop
- (Apps/Windows) Fix launching apps when Sunshine is running as admin
- (Misc) Remove/fix calls to std::abort()
- (Misc) Remove prompt to press enter after Sunshine exits
- (Misc) Make log priority consistent for execution messages
- (Apps) Applications in Moonlight clients are now updated automatically after editing
- (Video/Linux) Fix wayland capture on nvidia
- (Audio) Fix 7.1 surround channel mapping
- (Video) Fix NVENC profile values not applying
- (Network) Fix origin_web_ui_allowed binding
- (Service/Windows) Self terminate/restart service if process hangs for 10 seconds
- (Input/Windows) Fix Windows masked cursor blending with GPU encoders
- (Video) Color conversion fixes and BT.2020 support

Dependencies

- Bump ffmpeg from 4.4 to 5.1
- ffmpeg_patches: add amfenc delay/buffering fix
- CBS moved to ffmpeg submodules
- Migrate to upstream Simple-Web-Server submodule
- Bump third-party/TPCircularBuffer from `bce9170` to `8833b3a`
- Bump third-party/moonlight-common-c from `8169a31` to `ef9ad52`
- Bump third-party/miniupnp from `6f848ae` to `207cf44`
- Bump third-party/ViGEmClient from `f719a1d` to `9e842ba`
- Bump bootstrap from 5.0.0 to 5.2.3
- Bump @fortawesome/fontawesome-free from 6.2.0 to 6.2.1

8.9 0.16.0 - 2022-12-13

Added

- Add cover finder
- (Docker) Add arm64 docker image
- (Flatpak) Add installation helper scripts
- (Windows) Add support for Unicode input messages

Fixed

- (Linux) Reintroduce Ubuntu 20.04 and 22.04 specific deb packages
- (Linux) Fixed udev and systemd file locations

Dependencies

- Bump babel from 2.10.3 to 2.11.0
- Bump sphinx-copybutton from 0.5.0 to 0.5.1
- Bump KSXGitHub/github-actions-deploy-aur from 2.5.0 to 2.6.0
- Use npm for web dependencies (breaking change for third-party package maintainers)
- Update moonlight-common-c
- Use pre-built ffmpeg from LizardByte/build-deps for all sunshine builds (breaking change for third-party package maintainers)
- Bump furo from 2022.9.29 to 2022.12.7

Misc

- Misc org level workflow updates
- Fix misc typos in docs
- Fix winget release

8.10 0.15.0 - 2022-10-30

Added

- (Windows) Add firewall rules scripts
- (Windows) Automatically add and remove firewall rules at install/uninstall
- (Windows) Automatically add and remove service at install/uninstall
- (Docker) Official image added
- (Linux) Add aarch64 flatpak package

Changed

- (Windows/Linux/MacOS) - Move default config and apps file to assets directory
- (MacOS) Bump boost to 1.80 for macport builds
- (Linux) Remove backup and restore of config files

Fixed

- (Linux) - Create sunshine config directory if it doesn't exist
- (Linux) Remove portable home and config directories for AppImage
- (Windows) Include service install and uninstall scripts again
- (Windows) Automatically delete start menu entry upon uninstall
- (Windows) Automatically delete program install directory upon uninstall, with user prompt
- (Linux) Handle the case of no default audio sink
- (Windows/Linux/MacOS) Fix default image paths
- (Linux) Fix CUDA RGBA to NV12 conversion

8.11 0.14.1 - 2022-08-09

Added

- (Linux) Flatpak package added
- (Linux) AUR package automated updates
- (Windows) Winget package automated updates

Changed

- (General) Moved repo to @LizardByte GitHub org
- (WebUI) Fixed button spacing on home page
- (WebUI) Added Discord WidgetBot Crate

Fixed

- (Linux/Mac) Default config and app files now copied to user home directory
- (Windows) Default config and app files now copied to working directory

8.12 0.14.0 - 2022-06-15

Added

- (Documentation) Added Sphinx documentation available at https://sunshinestream.readthedocs.io/en/latest/
- (Development) Initial support for Localization
- (Linux) Add rpm package as release asset
- (macOS) Add Portfile as release asset
- (Windows) Add DwmFlush() call to improve capture
- (Windows) Add Windows installer

Fixed

- (AMD) Fixed hwdevice being destroyed before context
- (Linux) Added missing dependencies to AppImage
- (Linux) Fixed rumble events causing game to freeze
- (Linux) Improved Pulse/Pipewire compatibility

- (Linux) Moved to single deb package
- (macOS) Fixed missing TPCircularBuffer submodule
- (Stream) Properly catch exceptions in stream broadcast handlers
- (Stream/Video) AVPacket fix

8.13 0.13.0 - 2022-02-27

Added

- (macOS) Initial support for macOS (#40)

8.14 0.12.0 - 2022-02-13

Added

- New command line argument `--version`
- Custom png poster support

Changed

- Correct software bitrate calculation
- Increase vbv-bufsize to 1/10 of requested bitrate
- Improvements to Web UI

8.15 0.11.1 - 2021-10-04

Changed

- (Linux) Fix search path for config file and assets

8.16 0.11.0 - 2021-10-04

Added

- (Linux) Added support for wlroots based compositors on Wayland.
- (Windows) Added an icon for the executable

Changed

- Fixed a bug causing segfault when connecting multiple controllers.
- (Linux) Improved NVENC, it now offloads converting images from RGB to NV12
- (Linux) Fixed a bug causes stuttering

8.17 0.10.1 - 2021-08-21

Changed

- (Linux) Re-enabled KMS

8.18 0.10.0 - 2021-08-20

Added

- Added support for Rumble with gamepads.
- Added support for keyboard shortcuts <— See the README for details.
- (Windows) A very basic script has been added in Sunshine-Windowstools <– This will start Sunshine at boot with the highest privileges which is needed to display the login prompt.

Changed

- Some cosmetic changes to the WebUI.
- The first time the WebUI is opened, it will request the creation of a username/password pair from the user.
- Fixed audio crackling introduced in version 0.8.0
- (Linux) VAAPI hardware encoding now works on Intel i7-6700 at least. <– For the best experience, using ffmpeg version 4.3 or higher is recommended.
- (Windows) Installing from debian package shouldn't overwrite your configuration files anymore. <– It's recommended that you back up `/etc/sunshine/` before testing this.

8.19 0.9.0 - 2021-07-11

Added

- Added audio encryption
- (Linux) Added basic NVENC support on Linux
- (Windows) The Windows version can now capture the lock screen and the UAC prompt as long as it's run through `PsExec.exe` https://docs.microsoft.com/en-us/sysinternals/downloads/psexec

Changed

- Sunshine will now accept expired or not-yet-valid certificates, as long as they are signed properly.
- Fixed compatibility with iOS version of Moonlight
- Drastically reduced chance of being forced to skip error correction due to video frame size
- (Linux) sunshine.service will be installed automatically.

8.20 0.8.0 - 2021-06-30

Added

- Added mDNS support: Moonlight will automatically find Sunshine.
- Added UPnP support. It's off by default.

8.21 0.7.7 - 2021-06-24

Added

- (Linux) Added installation package for Debian

Changed

- Fixed incorrect scaling for absolute mouse coordinates when using multiple monitors.
- Fixed incorrect colors when scaling for software encoder

8.22 0.7.1 - 2021-06-18

Changed

- (Linux) Fixed an issue where it was impossible to start sunshine on ubuntu 20.04

8.23 0.7.0 - 2021-06-16

Added

- Added a Web Manager. Accessible through: https://localhost:47990 or https://:47990
- (Linux) Added hardware encoding support for AMD on Linux

Changed

- (Linux) Moved certificates and saved pairings generated during runtime to .config/sunshine on Linux

8.24 0.6.0 - 2021-05-26

Added

- Added support for surround audio

Changed

- Maintain aspect ratio when scaling video
- Fix issue where Sunshine is forced to drop frames when they are too large

8.25 0.5.0 - 2021-05-13

Added

- Added support for absolute mouse coordinates
- (Linux) Added support for streaming specific monitor on Linux
- (Windows) Added support for AMF on Windows

8.26 0.4.0 - 2020-05-03

Changed

- prep-cmd is now optional in apps.json
- Fixed bug causing video artifacts
- Fixed bug preventing Moonlight from closing app on exit
- Fixed bug causing preventing keyboard keys from repeating on latest version of Moonlight
- Fixed bug causing segfault when another session of sunshine was already running
- Fixed bug causing crash when monitor has resolution 1366x768

8.27 0.3.1 - 2020-04-24

Changed

- Fix a memory leak.

8.28 0.3.0 - 2020-04-23

Changed

- Hardware acceleration on NVidia GPU's for Video encoding on Windows

8.29 0.2.0 - 2020-03-21

Changed

- Multicasting is now supported: You can set the maximum simultaneous connections with the configurable option: channels
- Configuration variables can be overwritten on the command line: "name=value" –> it can be useful to set min_log_level=debug without modifying the configuration file
- Switches to make testing the pairing mechanism more convenient has been added, see "sunshine –help" for details

8.30 0.1.1 - 2020-01-30

Added

- (Linux) Added deb package and service for Linux

8.31 0.1.0 - 2020-01-27

Added

- The first official release for Sunshine!

CHAPTER

NINE

GAMESTREAM

Nvidia announced that their GameStream service for Nvidia Games clients will be discontinued in February 2023. Luckily, Sunshine performance is now on par with Nvidia GameStream. Many users have even reported that Sunshine outperforms GameStream, so rest assured that Sunshine will be equally performant moving forward.

9.1 Migration

We have developed a simple migration tool to help you migrate your GameStream games and apps to Sunshine automatically. Please check out our GSMS project if you're interested in an automated migration option. At the time of writing this GSMS offers the ability to migrate your custom games and apps. The working directory, command, and image are all set in Sunshine's `apps.json` file. The box-art image is also copied to a specified directory.

9.2 Limitations

Sunshine does have some limitations, as compared to Nvidia GameStream.

- Automatic game/application list.
- Changing game settings automatically, to optimize streaming.

CHAPTER

TEN

GENERAL

10.1 Forgotten Credentials

If you forgot your credentials to the web UI, try this.

```
sunshine --creds <new username> <new password>
```

10.2 Web UI Access

Can't access the web UI?

1. Check firewall rules.

10.3 Nvidia issues

NvFBC, NvENC, or general issues with Nvidia graphics card.

- Consumer grade Nvidia cards are software limited to a specific number of encodes. See Video Encode and Decode GPU Support Matrix for more info.
- You can usually bypass the restriction with a driver patch. See Keylase's Linux or Windows patches for more guidance.

CHAPTER

ELEVEN

LINUX

11.1 KMS Streaming fails

If screencasting fails with KMS, you may need to run the following to force unprivileged screencasting.

```
sudo setcap -r $(readlink -f $(which sunshine))
```

CHAPTER

TWELVE

MACOS

12.1 Dynamic session lookup failed

If you get this error:

> *Dynamic session lookup supported but failed: launchd did not provide a socket path, verify that org.freedesktop.dbus-session.plist is loaded!*

Try this.

```
launchctl load -w /Library/LaunchAgents/org.freedesktop.dbus-session.plist
```

CHAPTER

THIRTEEN

WINDOWS

13.1 No gamepad detected

1. Verify that you've installed ViGEmBus.

CHAPTER

FOURTEEN

BUILD

Sunshine binaries are built using CMake. Cross compilation is not supported. That means the binaries must be built on the target operating system and architecture.

14.1 Building Locally

14.1.1 Clone

Ensure git is installed and run the following:

```
git clone https://github.com/lizardbyte/sunshine.git --recurse-submodules
cd sunshine && mkdir build && cd build
```

14.1.2 Compile

See the section specific to your OS.

- *Linux*
- *macOS*
- *Windows*

14.2 Remote Build

It may be beneficial to build remotely in some cases. This will enable easier building on different operating systems.

1. Fork the project
2. Activate workflows
3. Trigger the *CI* workflow manually
4. Download the artifacts/binaries from the workflow run summary

CHAPTER

FIFTEEN

LINUX

15.1 Requirements

15.1.1 Debian Bullseye

End of Life: TBD

Install Requirements

```
sudo apt update && sudo apt install \
    build-essential \
    cmake \
    libavdevice-dev \
    libboost-filesystem-dev \
    libboost-locale-dev \
    libboost-log-dev \
    libboost-program-options-dev \
    libboost-thread-dev \
    libcap-dev \  # KMS
    libcurl4-openssl-dev \
    libdrm-dev \  # KMS
    libevdev-dev \
    libmfx-dev \  # x86_64 only
    libnuma-dev \
    libopus-dev \
    libpulse-dev \
    libssl-dev \
    libva-dev \
    libvdpau-dev \
    libwayland-dev \  # Wayland
    libx11-dev \  # X11
    libxcb-shm0-dev \  # X11
    libxcb-xfixes0-dev \  # X11
    libxcb1-dev \  # X11
    libxfixes-dev \  # X11
    libxrandr-dev \  # X11
    libxtst-dev \  # X11
    nodejs \
    npm \
    nvidia-cuda-dev \  # Cuda, NvFBC
    nvidia-cuda-toolkit  # Cuda, NvFBC
```

15.1.2 Fedora 36, 37

End of Life: TBD

Install Requirements

```
sudo dnf update && \
sudo dnf group install "Development Tools" && \
sudo dnf install \
    boost-devel \
    cmake \
    gcc \
    gcc-c++ \
    intel-mediasdk-devel \ # x86_64 only
    libappindicator-gtk3-devel \
    libcap-devel \
    libcurl-devel \
    libdrm-devel \
    libevdev-devel \
    libva-devel \
    libvdpau-devel \
    libX11-devel \  # X11
    libxcb-devel \  # X11
    libXcursor-devel \  # X11
    libXfixes-devel \  # X11
    libXi-devel \  # X11
    libXinerama-devel \  # X11
    libXrandr-devel \  # X11
    libXtst-devel \  # X11
    mesa-libGL-devel \
    npm \
    numactl-devel \
    openssl-devel \
    opus-devel \
    pulseaudio-libs-devel \
    rpm-build \  # if you want to build an RPM binary package
    wget \  # necessary for cuda install with `run` file
    which   # necessary for cuda install with `run` file
```

15.1.3 Ubuntu 20.04

End of Life: April 2030

Install Requirements

```
sudo apt update && sudo apt install \
    build-essential \
    cmake \
    g++-10 \
    libappindicator3-dev \
    libavdevice-dev \
    libboost-filesystem-dev \
    libboost-locale-dev \
```

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```
    libboost-log-dev \
    libboost-thread-dev \
    libboost-program-options-dev \
    libcap-dev \  # KMS
    libdrm-dev \  # KMS
    libevdev-dev \
    libmfx-dev \  # x86_64 only
    libnuma-dev \
    libopus-dev \
    libpulse-dev \
    libssl-dev \
    libva-dev \
    libvdpau-dev \
    libwayland-dev \  # Wayland
    libx11-dev \  # X11
    libxcb-shm0-dev \  # X11
    libxcb-xfixes0-dev \  # X11
    libxcb1-dev \  # X11
    libxfixes-dev \  # X11
    libxrandr-dev \  # X11
    libxtst-dev \  # X11
    nodejs \
    npm \
    wget  # necessary for cuda install with `run` file
```

Update gcc alias

```
update-alternatives --install \
  /usr/bin/gcc gcc /usr/bin/gcc-10 100 \
  --slave /usr/bin/g++ g++ /usr/bin/g++-10 \
  --slave /usr/bin/gcov gcov /usr/bin/gcov-10 \
  --slave /usr/bin/gcc-ar gcc-ar /usr/bin/gcc-ar-10 \
  --slave /usr/bin/gcc-ranlib gcc-ranlib /usr/bin/gcc-ranlib-10
```

15.1.4 Ubuntu 22.04

End of Life: April 2027

Install Requirements

```
sudo apt update && sudo apt install \
    build-essential \
    cmake \
    libappindicator3-dev \
    libavdevice-dev \
    libboost-filesystem-dev \
    libboost-locale-dev \
    libboost-log-dev \
    libboost-thread-dev \
    libboost-program-options-dev \
    libcap-dev \  # KMS
```

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```
    libdrm-dev \  # KMS
    libevdev-dev \
    libmfx-dev \  # x86_64 only
    libnuma-dev \
    libopus-dev \
    libpulse-dev \
    libssl-dev \
    libwayland-dev \  # Wayland
    libx11-dev \  # X11
    libxcb-shm0-dev \  # X11
    libxcb-xfixes0-dev \  # X11
    libxcb1-dev \  # X11
    libxfixes-dev \  # X11
    libxrandr-dev \  # X11
    libxtst-dev \  # X11
    nodejs \
    npm \
    nvidia-cuda-dev \  # CUDA, NvFBC
    nvidia-cuda-toolkit  # CUDA, NvFBC
```

15.2 CUDA

If the version of CUDA available from your distro is not adequate, manually install CUDA.

Tip: The version of CUDA you use will determine compatibility with various GPU generations. See CUDA compatibility for more info.

Select the appropriate run file based on your desired CUDA version and architecture according to CUDA Toolkit Archive.

```
wget https://developer.download.nvidia.com/compute/cuda/11.4.2/local_installers/cuda_11.
↪4.2_470.57.02_linux.run \
  --progress=bar:force:noscroll -q --show-progress -O ./cuda.run
chmod a+x ./cuda.run
./cuda.run --silent --toolkit --toolkitpath=/usr --no-opengl-libs --no-man-page --no-drm
rm ./cuda.run
```

15.3 npm dependencies

Install npm dependencies.

```
npm install
```

15.4 Build

Attention: Ensure you are in the build directory created during the clone step earlier before continuing.

```
cmake ..
make -j ${nproc}

cpack -G DEB  # optionally, create a deb package
cpack -G RPM  # optionally, create a rpm package
```

CHAPTER

SIXTEEN

MACOS

16.1 Requirements

macOS Big Sur and Xcode 12.5+

Use either MacPorts or Homebrew

16.1.1 MacPorts

Install Requirements

```
sudo port install avahi boost180 cmake curl libopus npm9 pkgconfig
```

16.1.2 Homebrew

Install Requirements

```
brew install boost cmake node opus
# if there are issues with an SSL header that is not found:
cd /usr/local/include
ln -s ../opt/openssl/include/openssl .
```

16.2 npm dependencies

Install npm dependencies.

```
npm install
```

16.3 Build

Attention: Ensure you are in the build directory created during the clone step earlier before continuing.

```
cmake ..
make -j ${nproc}

cpack -G DragNDrop  # optionally, create a macOS dmg package
```

If cmake fails complaining to find Boost, try to set the path explicitly.

`cmake -DBOOST_ROOT=[boost path] ..`, e.g., `cmake -DBOOST_ROOT=/opt/local/libexec/boost/1.80 ..`

CHAPTER

SEVENTEEN

WINDOWS

17.1 Requirements

First you need to install MSYS2, then startup "MSYS2 MinGW 64-bit" and execute the following codes.

Update all packages:

```
pacman -Suy
```

Install dependencies:

```
pacman -S base-devel cmake diffutils gcc git make mingw-w64-x86_64-binutils \
mingw-w64-x86_64-boost mingw-w64-x86_64-cmake mingw-w64-x86_64-curl \
mingw-w64-x86_64-libmfx mingw-w64-x86_64-openssl mingw-w64-x86_64-opus \
mingw-w64-x86_64-toolchain
```

17.2 npm dependencies

Install nodejs and npm. Downloads available here.

Install npm dependencies.

```
npm install
```

17.3 Build

Attention: Ensure you are in the build directory created during the clone step earlier before continuing.

```
cmake -G "MinGW Makefiles" ..
mingw32-make -j$(nproc)

cpack -G NSIS  # optionally, create a windows installer
cpack -G ZIP  # optionally, create a windows standalone package
```

CHAPTER

EIGHTEEN

CONTRIBUTING

Read our contribution guide in our organization level docs.

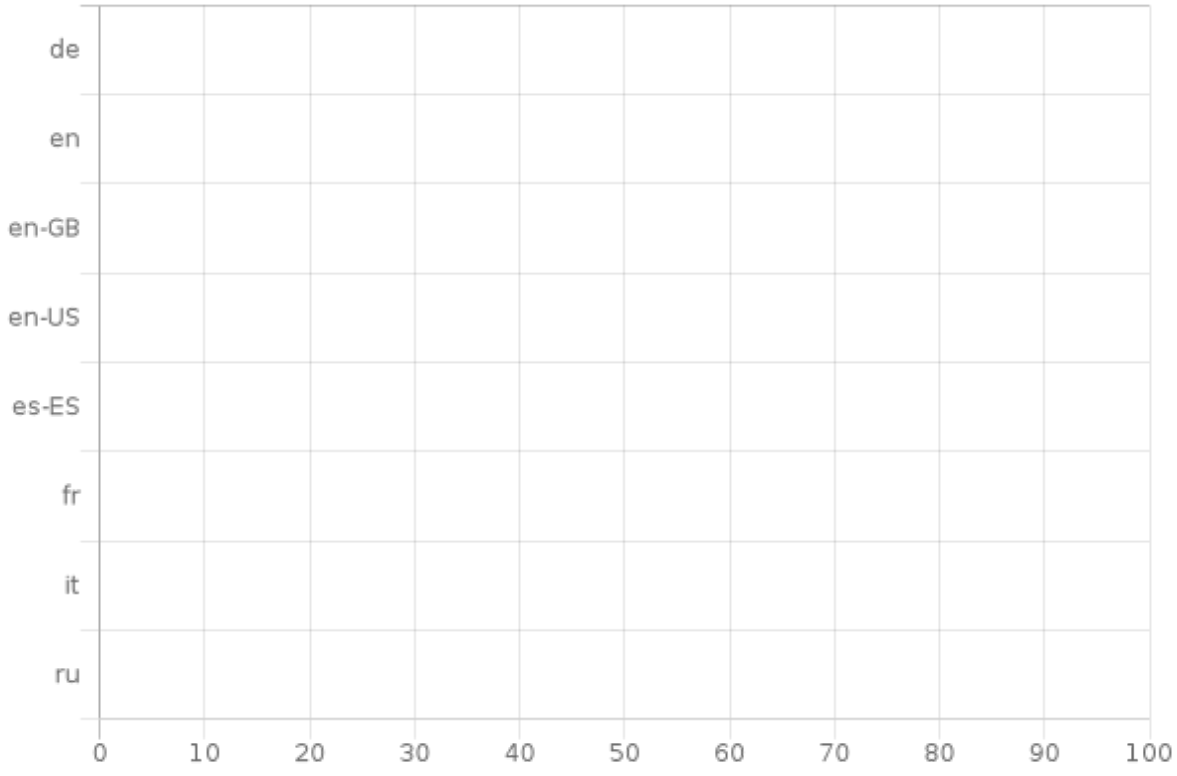
CHAPTER

NINETEEN

LOCALIZATION

Sunshine is being localized into various languages. The default language is *en* (English) and is highlighted green.

Graph



19.1 CrowdIn

The translations occur on CrowdIn. Feel free to contribute to localization there. Only elements of the API are planned to be translated.

> **Attention:** The rest API has not yet been implemented.

Translations Basics

- The brand names *LizardByte* and *Sunshine* should never be translated.
- Other brand names should never be translated. Examples:
  - AMD
  - Nvidia

CrowdIn Integration

How does it work?

When a change is made to sunshine source code, a workflow generates new translation templates that get pushed to CrowdIn automatically.

When translations are updated on CrowdIn, a push gets made to the *l10n_nightly* branch and a PR is made against the *nightly* branch. Once PR is merged, all updated translations are part of the project and will be included in the next release.

19.2 Extraction

There should be minimal cases where strings need to be extracted from source code; however it may be necessary in some situations. For example if a system tray icon is added it should be localized as it is user interfacing.

- **Wrap the string to be extracted in a function as shown.**

```
#include <boost/locale.hpp>
boost::locale::translate("Hello world!")
```

> **Tip:** More examples can be found in the documentation for boost locale.

> **Warning:** This is for information only. Contributors should never include manually updated template files, or manually compiled language files in Pull Requests.

Strings are automatically extracted from the code to the *locale/sunshine.po* template file. The generated file is used by CrowdIn to generate language specific template files. The file is generated using the *.github/workflows/localize.yml* workflow and is run on any push event into the *nightly* branch. Jobs are only run if any of the following paths are modified.

```
- 'src/**'
```

When testing locally it may be desirable to manually extract, initialize, update, and compile strings. Python is required for this, along with the python dependencies in the *./scripts/requirements.txt* file. Additionally, xgettext must be installed.

Extract, initialize, and update

```
python ./scripts/_locale.py --extract --init --update
```

Compile

```
python ./scripts/_locale.py --compile
```

CHAPTER

TWENTY

TESTING

20.1 Clang Format

Source code is tested against the *.clang-format* file for linting errors. The workflow file responsible for clang format testing is *.github/workflows/cpp-clang-format-lint.yml*.

Test clang-format locally.

```
find ./ -iname *.cpp -o -iname *.h -iname *.m -iname *.mm | xargs clang-format -i
```

20.2 Sphinx

Sunshine uses Sphinx for documentation building. Sphinx, along with other required python dependencies are included in the *./docs/requirements.txt* file. Python is required to build sphinx docs. Installation and setup of python will not be covered here.

Doxygen is used to generate the XML files required by Sphinx. Doxygen can be obtained from Doxygen downloads. Ensure that the *doxygen* executable is in your path.

The config file for Sphinx is *docs/source/conf.py*. This is already included in the repo and should not be modified.

The config file for Doxygen is *docs/Doxyfile*. This is already included in the repo and should not be modified.

Test with Sphinx

```
cd docs
make html
```

Alternatively

```
cd docs
sphinx-build -b html source build
```

20.3 Unit Testing

Todo: Sunshine does not currently have any unit tests. If you would like to help us improve please get in contact with us, or make a PR with suggested changes.

CHAPTER

TWENTYONE

LEGAL

Attention: This documentation is for informational purposes only and is not intended as legal advice. If you have any legal questions or concerns about using Sunshine, we recommend consulting with a lawyer.

Sunshine is licensed under the GPL-3.0 license, which allows for free use and modification of the software. The full text of the license can be reviewed here.

21.1 Commercial Use

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CHAPTER

TWENTYTWO

SRC

We are in process of improving the source code documentation. Code should be documented using Doxygen syntax. Some examples exist in *main.h* and *main.cpp*. In order for documentation within the code to appear in the rendered docs, the definition of the object must be in a header file, although the documentation itself can (and should) be in the source file.

22.1 Example Documentation Blocks

file.h

```
// functions
int main(int argc, char *argv[]);
```

file.cpp (with markdown)

```
/**
 * @brief Main application entry point.
 * @param argc The number of arguments.
 * @param argv The arguments.
 *
 * EXAMPLES:
 * ```cpp
 * main(1, const char* args[] = {"hello", "markdown", nullptr});
 * ```
 */
int main(int argc, char *argv[]) {
  // do stuff
}
```

file.cpp (with ReStructuredText)

```
/**
 * @brief Main application entry point.
 * @param argc The number of arguments.
 * @param argv The arguments.
 * @rst
 * EXAMPLES:
 *
 * .. code-block:: cpp
 *    main(1, const char* args[] = {"hello", "rst", nullptr});
```

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```
 * @endrst
 */
int main(int argc, char *argv[]) {
  // do stuff
}
```

22.2 Code

22.2.1 main

Defines

MAIL(x)

Functions

void **log_flush**()

Flush the log.

EXAMPLES:

```
log_flush();
```

int **main**(int argc, char *argv[])

Main application entry point.

EXAMPLES:

```
main(1, const char* args[] = {"sunshine", nullptr});
```

Parameters

- **argc** – The number of arguments.
- **argv** – The arguments.

std::uint16_t **map_port**(int port)

Map a specified port based on the base port.

EXAMPLES:

```
std::uint16_t mapped_port = map_port(1);
```

Parameters

port – The port to map as a difference from the base port.

Returns

std:uint16_t : The mapped port number.

void **open_url**(const std::string &url)

void **print_help**(const char *name)

Print help to stdout.

EXAMPLES:

```
print_help("sunshine");
```

Parameters

name – The name of the program.

std::string **read_file**(const char *path)

Read a file to string.

EXAMPLES:

```
std::string contents = read_file("path/to/file");
```

Parameters

path – The path of the file.

Returns

`std::string` : The contents of the file.

void **tray_donate_github_cb**(struct tray_menu *item)

void **tray_donate_mee6_cb**(struct tray_menu *item)

void **tray_donate_patreon_cb**(struct tray_menu *item)

void **tray_donate_paypal_cb**(struct tray_menu *item)

void **tray_open_ui_cb**(struct tray_menu *item)

void **tray_quit_cb**(struct tray_menu *item)

int **write_file**(const char *path, const std::string_view &contents)

Writes a file.

EXAMPLES:

```
int write_status = write_file("path/to/file", "file contents");
```

Parameters

- **path** – The path of the file.
- **contents** – The contents to write.

Returns

`int` : `0` on success, `-1` on failure.

Variables

boost::log::sources::severity_logger<int> **debug**

bool **display_cursor**

boost::log::sources::severity_logger<int> **error**

boost::log::sources::severity_logger<int> **fatal**

boost::log::sources::severity_logger<int> **info**

thread_pool_util::*ThreadPool* **task_pool**

boost::log::sources::severity_logger<int> **verbose**

boost::log::sources::severity_logger<int> **warning**

namespace **mail**

Functions

MAIL(audio_packets)

MAIL(broadcast_shutdown)

MAIL(hdr)

MAIL(idr)

MAIL(rumble)

MAIL(shutdown)

MAIL(switch_display)

MAIL(touch_port)

MAIL(video_packets)

Variables

safe::*mail_t* **man**

22.2.2 audio

namespace **audio**

Typedefs

using **buffer_t** = util::buffer_t<std::uint8_t>

using **packet_t** = std::pair<void*, *buffer_t*>

Enums

enum **stream_config_e**

Values:

enumerator **STEREO**

enumerator **HIGH_STEREO**

enumerator **SURROUND51**

enumerator **HIGH_SURROUND51**

enumerator **SURROUND71**

enumerator **HIGH_SURROUND71**

enumerator **MAX_STREAM_CONFIG**

struct **config_t**

Public Types

enum **flags_e**

Values:

enumerator **HIGH_QUALITY**

enumerator **HOST_AUDIO**

enumerator **MAX_FLAGS**

Public Members

int **channels**

std::bitset<*MAX_FLAGS*> **flags**

int **mask**

int **packetDuration**

struct **opus_stream_config_t**

Public Members

int **bitrate**

int **channelCount**

int **coupledStreams**

const std::uint8_t ***mapping**

std::int32_t **sampleRate**

int **streams**

22.2.3 cbs

namespace **cbs**

struct **h264_t**

Public Members

nal_t **sps**

struct **hevc_t**

Public Members

nal_t **sps**

nal_t **vps**

struct **nal_t**

Public Members

util::buffer_t<std::uint8_t> **_new**

util::buffer_t<std::uint8_t> **old**

22.2.4 config

namespace **config**

struct **audio_t**

Public Members

std::string **sink**

std::string **virtual_sink**

struct **input_t**

Public Members

std::chrono::milliseconds **back_button_timeout**

bool **controller**

std::string **gamepad**

std::chrono::milliseconds **key_repeat_delay**

std::chrono::duration<double> **key_repeat_period**

std::unordered_map<int, int> **keybindings**

bool **keyboard**

bool **mouse**

struct **nvhttp_t**

Public Members

std::string **cert**

std::string **external_ip**

std::string **file_state**

std::vector<int> **fps**

std::string **origin_pin_allowed**

std::string **origin_web_ui_allowed**

std::string **pkey**

std::vector<std::string> **resolutions**

std::string **sunshine_name**

struct **prep_cmd_t**

Public Functions

inline explicit **prep_cmd_t**(std::string &&do_cmd)

inline **prep_cmd_t**(std::string &&do_cmd, std::string &&undo_cmd)

Public Members

std::string **do_cmd**

std::string **undo_cmd**

struct **stream_t**

Public Members

int **channels**

int **fec_percentage**

std::string **file_apps**

std::chrono::milliseconds **ping_timeout**

struct **sunshine_t**

Public Members

struct *config*::*sunshine_t*::*cmd_t* **cmd**

std::string **config_file**

std::string **credentials_file**

std::bitset<*flag*::*FLAG_SIZE*> **flags**

std::string **log_file**

int **min_log_level**

std::string **password**

std::uint16_t **port**

std::vector<*prep_cmd_t*> **prep_cmds**

std::string **salt**

std::string **username**

struct **cmd_t**

Public Members

int **argc**

char ****argv**

std::string **name**

struct **video_t**

Public Members

std::string **adapter_name**

struct *config*::*video_t*::[anonymous] **amd**

int **amd_coder**

std::optional<int> **amd_preanalysis**

std::optional<int> **amd_quality_h264**

std::optional<int> **amd_quality_hevc**

std::optional<int> **amd_rc_h264**

std::optional<int> **amd_rc_hevc**

std::optional<int> **amd_usage_h264**

std::optional<int> **amd_usage_hevc**

std::optional<int> **amd_vbaq**

std::string **capture**

bool **dwmflush**

std::string **encoder**

int **hevc_mode**

int **min_threads**

struct *config*::*video_t*::[anonymous] **nv**

int **nv_coder**

std::optional<int> **nv_preset**

std::optional<int> **nv_rc**

std::optional<int> **nv_tune**

std::string **output_name**

int **qp**

struct *config*::*video_t*::[anonymous] **qsv**

std::optional<int> **qsv_cavlc**

std::optional<int> **qsv_preset**

struct *config*::*video_t*::[anonymous] **sw**

std::string **sw_preset**

std::string **sw_tune**

struct *config*::*video_t*::[anonymous] **vt**

int **vt_allow_sw**

int **vt_coder**

int **vt_realtime**

int **vt_require_sw**

namespace **flag**

Enums

enum **flag_e**

Values:

enumerator **PIN_STDIN**

enumerator **FRESH_STATE**

enumerator **FORCE_VIDEO_HEADER_REPLACE**

enumerator **UPNP**

enumerator **CONST_PIN**

enumerator **FLAG_SIZE**

22.2.5 confighttp

Defines

WEB_DIR

Variables

const std::map<std::string, std::string> **mime_types** = {{"css", "text/css"}, {"gif", "image/gif"}, {"htm", "text/html"}, {"html", "text/html"}, {"ico", "image/x-icon"}, {"jpeg", "image/jpeg"}, {"jpg", "image/jpeg"}, {"js", "application/javascript"}, {"json", "application/json"}, {"png", "image/png"}, {"svg", "image/svg+xml"}, {"ttf", "font/ttf"}, {"txt", "text/plain"}, {"woff2", "font/woff2"}, {"xml", "text/xml"},}

namespace **confighttp**

Variables

constexpr auto **PORT_HTTPS** = 1

22.2.6 crypto

namespace **crypto**

Typedefs

using **aes_t** = std::array<std::uint8_t, 16>

using **bignum_t** = util::safe_ptr<BIGNUM, BN_free>

using **bio_t** = util::safe_ptr<BIO, BIO_free_all>

using **cipher_ctx_t** = util::safe_ptr<EVP_CIPHER_CTX, EVP_CIPHER_CTX_free>

using **md_ctx_t** = util::safe_ptr<EVP_MD_CTX, md_ctx_destroy>

using **pkey_ctx_t** = util::safe_ptr<EVP_PKEY_CTX, EVP_PKEY_CTX_free>

using **pkey_t** = util::safe_ptr<EVP_PKEY, EVP_PKEY_free>

using **sha256_t** = std::array<std::uint8_t, SHA256_DIGEST_LENGTH>

using **x509_store_ctx_t** = util::safe_ptr<X509_STORE_CTX, X509_STORE_CTX_free>

using **x509_store_t** = util::safe_ptr<X509_STORE, X509_STORE_free>

using **x509_t** = util::safe_ptr<X509, X509_free>

Variables

constexpr std::size_t **digest_size** = 256

class **cert_chain_t**

Public Functions

void **add**(*x509_t* &&cert)

const char ***verify**(*x509_t*::element_type *cert)

Private Members

x509_store_ctx_t **_cert_ctx**

std::vector<std::pair<*x509_t*, *x509_store_t*>> **_certs**

struct **creds_t**

Public Members

std::string **pkey**

std::string **x509**

namespace **cipher**

Functions

constexpr std::size_t **round_to_pkcs7_padded**(std::size_t size)

Variables

constexpr std::size_t **tag_size** = 16

class **cbc_t** : public *crypto*::*cipher*::*cipher_t*

Public Functions

cbc_t() = default

cbc_t(*cbc_t*&&) noexcept = default

cbc_t(const *crypto*::*aes_t* &key, bool padding = true)

int **encrypt**(const std::string_view &plaintext, std::uint8_t *cipher, *aes_t* *iv)

length of cipher must be at least: round_to_pkcs7_padded(plaintext.size())

return -1 on error return bytes written on success

cbc_t &**operator=**(*cbc_t*&&) noexcept = default

class **cipher_t**

Subclassed by *crypto::cipher::cbc_t*, *crypto::cipher::ecb_t*, *crypto::cipher::gcm_t*

Public Members

cipher_ctx_t **decrypt_ctx**

cipher_ctx_t **encrypt_ctx**

aes_t **key**

bool **padding**

class **ecb_t** : public *crypto*::*cipher*::*cipher_t*

Public Functions

int **decrypt**(const std::string_view &cipher, std::vector<std::uint8_t> &plaintext)

ecb_t() = default

ecb_t(const *aes_t* &key, bool padding = true)

ecb_t(*ecb_t*&&) noexcept = default

int **encrypt**(const std::string_view &plaintext, std::vector<std::uint8_t> &cipher)

ecb_t &**operator=**(*ecb_t*&&) noexcept = default

class **gcm_t** : public *crypto*::*cipher*::*cipher_t*

Public Functions

int **decrypt**(const std::string_view &cipher, std::vector<std::uint8_t> &plaintext, *aes_t* *iv)

int **encrypt**(const std::string_view &plaintext, std::uint8_t *tagged_cipher, *aes_t* *iv)

length of cipher must be at least: round_to_pkcs7_padded(plaintext.size()) + crypto::cipher::tag_size

return -1 on error return bytes written on success

gcm_t() = default

gcm_t(const *crypto*::*aes_t* &key, bool padding = true)

gcm_t(*gcm_t*&&) noexcept = default

gcm_t &**operator=**(*gcm_t*&&) noexcept = default

22.2.7 httpcommon

namespace **http**

22.2.8 input

namespace **input**

Functions

std::shared_ptr<input_t> **alloc**(*safe*::*mail_t* mail)

inline std::unique_ptr<*platf*::deinit_t> **init**()

void **passthrough**(std::shared_ptr<input_t> &input, std::vector<std::uint8_t> &&input_data)

void **print**(void *input)

void **reset**(std::shared_ptr<input_t> &input)

struct **touch_port_t** : public *platf*::touch_port_t

Public Members

float **client_offsetX**

float **client_offsetY**

int **env_height**

int **env_width**

float **scalar_inv**

22.2.9 move_by_copy

namespace **move_by_copy_util**

Functions

template<class **T**>
MoveByCopy<*T*> **cmove**(*T* &movable)

template<class **T**>
MoveByCopy<*T*> **const_cmove**(const *T* &movable)

template<class **T**>

class **MoveByCopy**

Public Types

typedef *T* **move_type**

Public Functions

inline **MoveByCopy**(const *MoveByCopy* &other)

inline explicit **MoveByCopy**(*move_type* &&to_move)

MoveByCopy(*MoveByCopy* &&other) = default

inline **operator** ***move_type***()

inline *MoveByCopy* &**operator=**(const *MoveByCopy* &other)

MoveByCopy &**operator=**(*MoveByCopy* &&other) = default

Private Members

move_type **_to_move**

22.2.10 network

namespace **net**

Typedefs

using **host_t** = util::safe_ptr<ENetHost, free_host>

using **packet_t** = util::safe_ptr<ENetPacket, enet_packet_destroy>

using **peer_t** = ENetPeer*

Enums

enum **net_e**

Values:

enumerator **PC**

enumerator **LAN**

enumerator **WAN**

22.2.11 nvhttp

namespace **nvhttp**

This namespace contains all the functions and variables related to the nvhttp (GameStream) server.

Variables

constexpr auto **GFE_VERSION** = "3.23.0.74"

The GFE version we are replicating.

constexpr auto **PORT_HTTP** = 0

The HTTP port, as a difference from the config port.

constexpr auto **PORT_HTTPS** = -5

The HTTPS port, as a difference from the config port.

constexpr auto **VERSION** = "7.1.431.-1"

The protocol version.

22.2.12 process

Defines

__kernel_entry

namespace **proc**

Typedefs

typedef *config*::*prep_cmd_t* **cmd_t**

using **file_t** = util::safe_ptr_v2<FILE, int, fclose>

struct **ctx_t**

Public Members

std::string **cmd**

std::vector<std::string> **detached**

Some applications, such as Steam, either exit quickly, or keep running indefinitely. Steam.exe is one such application. That is why some applications need be run and forgotten about

std::string **id**

std::string **image_path**

std::string **name**

std::string **output**

std::vector<*cmd_t*> **prep_cmds**

std::string **working_dir**

class **proc_t**

Public Functions

int **execute**(int app_id)

std::string **get_app_image**(int app_id)

std::vector<*ctx_t*> &**get_apps**()

const std::vector<*ctx_t*> &**get_apps**() const

inline **proc_t**(boost::process::environment &&env, std::vector<*ctx_t*> &&apps)

int **running**()

Returns

_app_id if a process is running, otherwise returns 0

void **terminate**()

~proc_t()

Private Members

ctx_t **_app**

int **_app_id**

std::vector<*cmd_t*>::const_iterator **_app_prep_begin**

std::vector<*cmd_t*>::const_iterator **_app_prep_it**

std::vector<*ctx_t*> **_apps**

boost::process::environment **_env**

file_t **_pipe**

boost::process::child **_process**

boost::process::group **_process_handle**

bool **placebo** = {}

22.2.13 round_robin

namespace **round_robin_util**

Functions

template<class **V**, class **It**>
round_robin_t<*V*, *It*> **make_round_robin**(*It* begin, *It* end)

template<class **V**, class **T**>

class **it_wrap_t**

Public Types

typedef std::ptrdiff_t **diff_t**

using **difference_type** = *V*

typedef *T* **iterator**

using **iterator_category** = std::random_access_iterator_tag

using **pointer** = *V**

using **reference** = *V*&

using **value_type** = *V*

Public Functions

inline bool **operator!=**(const *iterator* &other) const

inline *reference* **operator***()

inline const *reference* **operator***() const

inline *iterator* **operator+**(*diff_t* step)

inline *iterator* **operator++**()

inline *iterator* **operator++**(int)

inline *iterator* **operator+=**(*diff_t* step)

inline *iterator* **operator-**(*diff_t* step)

inline *diff_t* **operator-**(*iterator* first)

inline *iterator* **operator--**()

inline *iterator* **operator--**(int)

inline *iterator* **operator-=**(*diff_t* step)

inline *pointer* **operator->**()

inline const *pointer* **operator->**() const

inline bool **operator<**(const *iterator* &other) const

inline bool **operator<=**(const *iterator* &other) const

inline bool **operator==**(const *iterator* &other) const

inline bool **operator>**(const *iterator* &other) const

inline bool **operator>=**(const *iterator* &other) const

Private Functions

inline *iterator* &**_this**()

inline const *iterator* &**_this**() const

template<class **V**, class **It**>

class **round_robin_t** : public *round_robin_util*::*it_wrap_t*<*V*, *round_robin_t*<*V*, *It*>>

Public Types

using **iterator** = *It*

using **pointer** = *V**

Public Functions

inline void **dec**()

inline bool **eq**(const *round_robin_t* &other) const

inline *pointer* **get**() const

inline void **inc**()

inline **round_robin_t**(*iterator* begin, *iterator* end)

Private Members

It **_begin**

It **_end**

It **_pos**

22.2.14 rtsp

namespace **rtsp_stream**

Variables

constexpr auto **RTSP_SETUP_PORT** = 21

struct **launch_session_t**

Public Members

crypto::*aes_t* **gcm_key**

bool **host_audio**

crypto::*aes_t* **iv**

22.2.15 stream

namespace **stream**

Variables

constexpr auto **AUDIO_STREAM_PORT** = 11

constexpr auto **CONTROL_PORT** = 10

constexpr auto **VIDEO_STREAM_PORT** = 9

struct **config_t**

Public Members

audio::config_t **audio**

int **audioQosType**

int **controlProtocolType**

int **featureFlags**

std::optional<int> **gcmap**

int **minRequiredFecPackets**

video::*config_t* **monitor**

int **packetsize**

int **videoQosType**

namespace **session**

Enums

enum class **state_e** : int

Values:

enumerator **STOPPED**

enumerator **STOPPING**

enumerator **STARTING**

enumerator **RUNNING**

22.2.16 sync

namespace **sync_util**

template<class **T**, class **M** = std::mutex>

class **sync_t**

Public Types

using **mutex_t** = *M*

using **value_t** = *T*

Public Functions

inline std::lock_guard<*mutex_t*> **lock**()

inline *value_t* &**operator***()

inline const *value_t* &**operator***() const

inline *value_t* ***operator->**()

inline *sync_t* &**operator=**(const *value_t* &val) noexcept

inline *sync_t* &**operator=**(*sync_t* &&other) noexcept

inline *sync_t* &**operator=**(*sync_t* &other) noexcept

template<class **V**>
inline *sync_t* &**operator=**(*V* &&val)

inline *sync_t* &**operator=**(*value_t* &&val) noexcept

template<class ...**Args**>
inline **sync_t**(*Args*&&... args)

Public Members

value_t **raw**

Private Members

mutex_t **_lock**

22.2.17 system_tray

22.2.18 tasl_pool

namespace **task_pool_util**

template<class **Function**>

class **_Impl** : public *task_pool_util*::*_ImplBase*

Public Functions

inline **_Impl**(*Function* &&f)

inline virtual void **run**() override

Private Members

Function **_func**

class **_ImplBase**

Subclassed by *task_pool_util::_Impl< Function >*

Public Functions

virtual void **run**() = 0

inline virtual **~_ImplBase**() = default

class **TaskPool**

Subclassed by *thread_pool_util::ThreadPool*

Public Types

typedef std::unique_ptr<*_ImplBase*> **__task**

typedef std::chrono::steady_clock::time_point **__time_point**

typedef *_ImplBase* ***task_id_t**

Public Functions

inline bool **cancel**(*task_id_t* task_id)

template<class **X**, class **Y**>
inline void **delay**(*task_id_t* task_id, std::chrono::duration<*X*, *Y*> duration)

Parameters
duration – The delay before executing the task

inline std::optional<*__time_point*> **next**()

inline *TaskPool* &**operator=**(*TaskPool* &&other) noexcept

inline std::optional<*__task*> **pop**()

inline std::optional<std::pair<*__time_point*, *__task*>> **pop**(*task_id_t* task_id)

template<class **Function**, class ...**Args**>

inline auto **push**(*Function* &&newTask, *Args*&&... args)

template<class **Function**, class **X**, class **Y**, class ...**Args**>
inline auto **pushDelayed**(*Function* &&newTask, std::chrono::duration<*X*, *Y*> duration, *Args*&&... args)

Returns
an id to potentially delay the task

inline void **pushDelayed**(std::pair<*__time_point*, *__task*> &&task)

inline bool **ready**()

TaskPool() = default

inline **TaskPool**(*TaskPool* &&other) noexcept

Protected Attributes

std::mutex **_task_mutex**

std::deque<*__task*> **_tasks**

std::vector<std::pair<*__time_point*, *__task*>> **_timer_tasks**

Private Functions

template<class **Function**>
inline std::unique_ptr<*_ImplBase*> **toRunnable**(*Function* &&f)

template<class **R**>

class **timer_task_t**

Public Functions

inline **timer_task_t**(*task_id_t* task_id, std::future<*R*> &future)

Public Members

std::future<*R*> **future**

task_id_t **task_id**

22.2.19 thread_pool

namespace **thread_pool_util**

class **ThreadPool** : public *task_pool_util*::*TaskPool*

Public Types

typedef TaskPool::__task **__task**

Public Functions

inline void **_main**()

inline void **join**()

template<class **Function**, class ...**Args**>
inline auto **push**(*Function* &&newTask, *Args*&&... args)

template<class **Function**, class **X**, class **Y**, class ...**Args**>
inline auto **pushDelayed**(*Function* &&newTask, std::chrono::duration<*X*, *Y*> duration, *Args*&&... args)

inline void **pushDelayed**(std::pair<__time_point, *__task*> &&task)

inline void **start**(int threads)

inline void **stop**()

inline **ThreadPool**()

inline explicit **ThreadPool**(int threads)

inline **~ThreadPool**() noexcept

Private Members

bool **_continue**

std::condition_variable **_cv**

std::mutex **_lock**

std::vector<std::thread> **_thread**

22.2.20 thread_safe

namespace **safe**

Typedefs

template<class **T**>

using **alarm_t** = std::shared_ptr<*alarm_raw_t*<*T*>>

using **mail_t** = std::shared_ptr<*mail_raw_t*>

using **signal_t** = *event_t*<bool>

Functions

inline void **cleanup**(*mail_raw_t**)

template<class **T**>
inline auto **lock**(const std::weak_ptr<void> &wp)

template<class **T**>
alarm_t<*T*> **make_alarm**()

template<class **T**, class **F_Construct**, class **F_Destruct**>
auto **make_shared**(*F_Construct* &&fc, *F_Destruct* &&fd)

template<class **T**>

class **alarm_raw_t**

Public Types

using **status_t** = util::optional_t<*T*>

Public Functions

inline **alarm_raw_t**()

inline void **reset**()

inline void **ring**(const *status_t* &status)

inline void **ring**(*status_t* &&status)

inline *status_t* &**status**()

inline const *status_t* &**status**() const

inline auto **wait**()

template<class **Pred**>
inline auto **wait**(*Pred* &&pred)

template<class **Rep**, class **Period**>
inline auto **wait_for**(const std::chrono::duration<*Rep*, *Period*> &rel_time)

template<class **Rep**, class **Period**, class **Pred**>
inline auto **wait_for**(const std::chrono::duration<*Rep*, *Period*> &rel_time, *Pred* &&pred)

template<class **Rep**, class **Period**>
inline auto **wait_until**(const std::chrono::duration<*Rep*, *Period*> &rel_time)

template<class **Rep**, class **Period**, class **Pred**>
inline auto **wait_until**(const std::chrono::duration<*Rep*, *Period*> &rel_time, *Pred* &&pred)

Private Members

std::condition_variable **_cv**

std::mutex **_lock**

status_t **_status**

template<class **T**>

class **event_t**

Public Types

using **status_t** = util::optional_t<*T*>

Public Functions

inline bool **peek**()

inline *status_t* **pop**()

template<class **Rep**, class **Period**>
inline *status_t* **pop**(std::chrono::duration<*Rep*, *Period*> delay)

template<class ...**Args**>
inline void **raise**(*Args*&&... args)

inline void **reset**()

inline bool **running**() const

inline void **stop**()

inline const *status_t* &**view**()

Private Members

bool **_continue** = {true}

std::condition_variable **_cv**

std::mutex **_lock**

status_t **_status** = {util::false_v<*status_t*>}

class **mail_raw_t** : public std::enable_shared_from_this<*mail_raw_t*>

Public Types

template<class **T**>

using **event_t** = std::shared_ptr<*post_t*<*event_t*<*T*>>>

template<class **T**>

using **queue_t** = std::shared_ptr<*post_t*<*queue_t*<*T*>>>

Public Functions

inline void **cleanup**()

template<class **T**>
inline *event_t*<*T*> **event**(const std::string_view &id)

template<class **T**>
inline *queue_t*<*T*> **queue**(const std::string_view &id)

Public Members

std::map<std::string, std::weak_ptr<void>, std::less<>> **id_to_post**

std::mutex **mutex**

template<class **T**>

class **post_t** : public *T*

Public Functions

template<class ...**Args**>
inline **post_t**(*mail_t* mail, *Args*&&... args)

inline **~post_t**()

Public Members

mail_t **mail**

template<class **T**>

class **queue_t**

Public Types

using **status_t** = util::optional_t<*T*>

Public Functions

inline bool **peek**()

inline *status_t* **pop**()

template<class **Rep**, class **Period**>
inline *status_t* **pop**(std::chrono::duration<*Rep*, *Period*> delay)

inline **queue_t**(std::uint32_t max_elements = 32)

template<class ...**Args**>
inline void **raise**(*Args*&&... args)

inline bool **running**() const

inline void **stop**()

inline std::vector<*T*> &**unsafe**()

Private Members

bool **_continue** = {true}

std::condition_variable **_cv**

std::mutex **_lock**

std::uint32_t **_max_elements**

std::vector<*T*> **_queue**

template<class **T**>

class **shared_t**

Public Types

using **construct_f** = std::function<int(*element_type*&)>

using **destruct_f** = std::function<void(*element_type*&)>

using **element_type** = *T*

Public Functions

inline *ptr_t* **ref**()

template<class **FC**, class **FD**>
inline **shared_t**(*FC* &&fc, *FD* &&fd)

Private Members

construct_f **_construct**

std::uint32_t **_count**

destruct_f **_destruct**

std::mutex **_lock**

std::array<std::uint8_t, sizeof(*element_type*)> **_object_buf**

struct **ptr_t**

Public Functions

inline *element_type* ***get**() const

inline **operator bool**() const

inline *element_type* ***operator->**()

inline *ptr_t* &**operator=**(const *ptr_t* &ptr) noexcept

inline *ptr_t* &**operator=**(*ptr_t* &&ptr) noexcept

inline **ptr_t**()

inline **ptr_t**(const *ptr_t* &ptr) noexcept

inline **ptr_t**(*ptr_t* &&ptr) noexcept

inline explicit **ptr_t**(*shared_t* *owner)

inline void **release**()

inline **~ptr_t**()

Public Members

shared_t ***owner**

22.2.21 upnp

namespace **upnp**

22.2.22 utility

Todo: Add utility.h

22.2.23 uuid

namespace **uuid_util**

union **uuid_t**

Public Functions

inline constexpr bool **operator<**(const *uuid_t* &other) const

inline constexpr bool **operator==**(const *uuid_t* &other) const

inline constexpr bool **operator>**(const *uuid_t* &other) const

inline std::string **string**() const

Public Members

std::uint16_t **b16**[8]

std::uint32_t **b32**[4]

std::uint64_t **b64**[2]

std::uint8_t **b8**[16]

Public Static Functions

static inline *uuid_t* **generate**()

static inline *uuid_t* **generate**(std::default_random_engine &engine)

22.2.24 video

namespace **video**

Typedefs

using **float2** = float[2]

using **float3** = float[3]

using **float4** = float[4]

using **hdr_info_t** = std::unique_ptr<*hdr_info_raw_t*>

using **packet_t** = std::unique_ptr<*packet_raw_t*>

struct **color_t**

Public Members

float4 **color_vec_u**

float4 **color_vec_v**

float4 **color_vec_y**

float2 **range_uv**

float2 **range_y**

struct **config_t**

Public Members

int **bitrate**

int **dynamicRange**

int **encoderCscMode**

int **framerate**

int **height**

int **numRefFrames**

int **slicesPerFrame**

int **videoFormat**

int **width**

struct **hdr_info_raw_t**

Public Functions

inline explicit **hdr_info_raw_t**(bool enabled)

inline explicit **hdr_info_raw_t**(bool enabled, const SS_HDR_METADATA &metadata)

Public Members

bool **enabled**

SS_HDR_METADATA **metadata**

struct **packet_raw_t**

Public Functions

inline void **init_packet**()

template<class **P**>
inline explicit **packet_raw_t**(*P* *user_data)

inline explicit **packet_raw_t**(std::nullptr_t)

inline **~packet_raw_t**()

Public Members

AVPacket ***av_packet**

void ***channel_data**

std::vector<*replace_t*> ***replacements**

struct **replace_t**

Public Functions

inline **replace_t**(std::string_view old, std::string_view _new) noexcept

Public Members

std::string_view **_new**

std::string_view **old**

22.2.25 platform

common

Todo: Add common.h

linux

cuda

graphics

Todo: Add graphics.h

misc

Todo: Add misc.h

vaapi

namespace **egl**

namespace **va**

wayland

namespace **wl**

class **monitor_t**

Public Functions

void **listen**(zxdg_output_manager_v1 *output_manager)

monitor_t(const *monitor_t*&) = delete

monitor_t(*monitor_t*&&) = delete

inline **monitor_t**(wl_output *output)

monitor_t &**operator=**(const *monitor_t*&) = delete

monitor_t &**operator=**(*monitor_t*&&) = delete

Public Members

std::string **description**

std::string **name**

wl_output ***output**

platf::touch_port_t **viewport**

x11grab

Todo: Add x11grab.h

macos

av_audio

Todo: Add av_audio.h

av_img_t

Todo: Add av_img_t.h

av_video

Todo: Add av_video.h

misc

namespace **dyn**

nv12_zero_device

Todo: Add nv12_zero_device.h

windows

display

Todo: Add display.h

misc

namespace **platf**

PolicyConfig

Todo: Add PolicyConfig.h

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