

# Abstract

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We'll (1) install a lightweight desktop and xrdp on Ubuntu, (2) enable audio/clipboard channels (PipeWire), (3) lock xrdp to localhost, (4) use **Termius** to open an SSH tunnel (local port → server 3389), and (5) RDP to `127.0.0.1:<local-port>` from your client with audio + clipboard enabled. This gives you a secure, SSH-tunneled RDP workflow.

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## Secure RDP to Ubuntu via Termius (SSH Tunnel + xrdp)

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### Checklist (high-level flow)

- Pick a desktop (XFCE) and install **xrdp** on the server.
  - Enable audio + clipboard redirection (PipeWire module and xrdp channels).
  - Bind xrdp to `127.0.0.1` and restart the service.
  - In **Termius**, create a host and a **Local** port-forward (e.g., `13389 → 127.0.0.1:3389`).
  - From your local PC/phone, RDP to `127.0.0.1:13389` with audio & clipboard turned on.
  - Verify session, then maintain & troubleshoot with logs if needed.
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### Prerequisites

#### Server (Ubuntu 25.x)

- A sudo user and SSH access (public IP or via jump host).
- Network egress to fetch packages.

- Enough RAM/disk for a lightweight desktop (XFCE recommended). DigitalOcean's reference walkthrough also uses XFCE and xrdp together. ([DigitalOcean 1](#))

## Local

- **Termius** installed (desktop or mobile). Termius supports an easy Port Forwarding wizard. ([termius.com 2](#))
  - An RDP client:
    - **Windows 11**: built-in *Remote Desktop Connection* (`mstsc`). Audio/clipboard redirection is supported in RDP clients. ([Microsoft Learn 3](#))
    - **Linux desktop: Remmina or FreeRDP (xfreerdp)**. FreeRDP's current man page documents `+clipboard`, `/sound`, `/microphone`, and dynamic resolution. ([openSUSE Manpages 4](#))
    - **Pixel phones (Linux Terminal / Android)**: You can run a normal RDP client app on Android, or use the new Linux Terminal (Debian VM) on Pixel for Linux tooling; Google's own guidance notes it's not intended as a full desktop by itself. ([How-To Geek 5](#))
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## Step-by-step Instructions

### Step 1: Install a desktop and xrdp on Ubuntu

#### Beginner view

1. SSH to the server.
2. Install a light desktop and xrdp in one go:

```
sudo apt update
sudo apt install -y xfce4 xfce4-goodies xrdp
```

3. Set your xrdp session to start XFCE:

```
echo "xfce4-session" | tee ~/.xsession
```

4. Restart xrdp:

```
sudo systemctl restart xrdp
```

You now have a GUI + RDP server ready. A widely used guide uses the same approach (`xfce4-session` in `~/.xsession`). ([DigitalOcean 1](#))

#### Pro breakdown

- Modern Ubuntu xrdp integrates with **Xorg** via the `xorgxrdp` modules (usually pulled in automatically when you install `xrdp`). If needed, ensure `xorgxrdp` is present (Ubuntu 25.04 shows it in universe).

([GitHub 6](#), [Ubuntu Updates 7](#))

- The `~/.xsession` forces a consistent session manager for xrdp; without it, you can hit black/blank screens. This pattern is consistent across quality references. ([DigitalOcean 1](#))

## Validation

- `systemctl status xrdp` should be **active (running)**. If not, fix service errors before moving on. ([DigitalOcean 1](#))
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## Step 2: Enable audio & clipboard redirection

### Beginner view

1. Install the PipeWire audio module for xrdp (if available on Ubuntu 25.x):

```
sudo apt install -y libpipewire-0.3-modules-xrdp
```

2. Make sure xrdp's clipboard and audio features are on (we'll confirm in Step 3). PipeWire's xrdp module allows audio in RDP sessions on PipeWire systems. ([Launchpad 8](#))

### Pro breakdown

- The **PipeWire xrdp module** is the upstream way to get audio from xrdp with PipeWire (superseding the old PulseAudio module). If your distro doesn't package it, the official project documents building the module. ([GitHub 9](#))
- On the **client** side, make sure your RDP client is set to *play audio on this computer* and (optionally) *record from this computer* for mic input. Microsoft's RDP docs & admin guides detail audio capture/playback redirection. ([Microsoft Learn 3](#))

## Validation

- After connecting later, you should see a sound device in the remote session; if not, revisit this step.
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## Step 3: Lock xrdp to localhost and restart

**Beginner view** Edit `/etc/xrdp/xrdp.ini` and in the `[Globals]` section **bind to loopback**:

```
[Globals]
; ...other settings...
address=127.0.0.1
; port defaults to 3389, leave it
```

Ensure clipboard/audio channels are enabled in `[Channels]`:

```
[Channels]
; ...other channels...
```

```
rdpsnd=true  
cliprdr=true  
drdynvc=true
```

Then:

```
sudo systemctl restart xrdp
```

### Pro breakdown

- `address=127.0.0.1` is documented in **xrdp.ini(5)** and forces xrdp to listen only on loopback, so it's **not exposed** to the internet. We'll reach it through SSH tunneling only. The same man page documents channel toggles (`cliprdr`, `rdpsnd`, `drdynvc`). ([Ubuntu Manpages 10](#))

### Validation

- `sudo ss -ltnp | grep 3389` should show `127.0.0.1:3389` listening. If you see `0.0.0.0:3389`, recheck the `address=` line and restart xrdp.

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## Step 4: Create an SSH tunnel in Termius

### Beginner view (Termius UI)

- Open **Termius** → *Port Forwarding* → **New Port Forwarding** → choose **Local**.
  - **Local port:** `13389` (or any free port)
  - **Destination:** `127.0.0.1`
  - **Destination port:** `3389`
  - **Host:** select the SSH Host you use for the server
- Save, then **Connect** the port forward. Termius' docs show the Port Forwarding wizard flow. ([termius.com 2](#))

### Pro breakdown

- Local forwards invert exposure: RDP client connects to **localhost:13389**, which SSH encrypts to the server, then hands off to **127.0.0.1:3389** there. This neatly bypasses WAN blocks on 3389 and avoids opening that port publicly. (General notes on local port-forwarding.) ([Wikipedia 11](#))

### Validation

- In Termius, you should see the forward in *Connected* state. If a port-in-use error appears, pick a different local port (e.g., `14389`). ([Super User 12](#))

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## Step 5: RDP to the tunneled port from your client

### Beginner view

- **Windows 11:** Press **Win** → type **mstsc**, run:
  - In the *Computer* box, enter **127.0.0.1:13389**.
  - Click **Show Options** → **Local Resources** → **Remote audio** → **Settings...** → set *Play on this computer* and enable mic if needed.
  - Ensure **Clipboard** is ticked (Local Resources → *Clipboard*). Then **Connect**. (Microsoft docs cover audio/AV redirection basics used across RDP.) ([Microsoft Learn 3](#))
- **Linux desktop:**
  - **Remmina:** Protocol **RDP**, Server **127.0.0.1:13389**. In profile, enable **Clipboard** and **Audio** (output + mic if needed).
  - **FreeRDP** example:

```
xfreerdp /v:127.0.0.1:13389 +clipboard /sound /microphone
```

**+clipboard, /sound, /microphone** are documented. ([openSUSE Manpages 4](#))

- **Pixel (Android / Linux Terminal):**
  - Easiest: install **Microsoft Remote Desktop** (Android) and connect to **127.0.0.1:13389**, enabling audio & clipboard in the app.
  - Pixel's Linux Terminal (Debian VM) is great for SSH/CLI, but Google clarifies it's **not** intended to provide a full desktop experience on its own—use an Android RDP app for GUI RDP. ([How-To Geek 13](#))

### Pro breakdown

- FreeRDP supports dynamic resolution (**+dynamic-resolution**) and granular clipboard directions; see the current man page for advanced flags. ([openSUSE Manpages 4](#))

### Validation

- You should reach the **xrdp** login and land in **XFCE**. If the screen is blank or session drops, see **Troubleshooting**.

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## Step 6: Verify features and optimize

### Beginner view

- Test **clipboard** both ways (copy local → remote and remote → local).
- Play test audio in the remote session (e.g., a short video).
- If performance is choppy, reduce color depth or resolution in your RDP client. A popular guide notes reducing resolution/bit-depth improves xrdp performance. ([DigitalOcean 1](#))

### Pro breakdown

- For FreeRDP, try `/gfx:AVC420:on` and `/network:auto` on high-latency links; enable `+dynamic-resolution` for resizes. (Options are documented in the man page; many admins share performance presets publicly.) ([openSUSE Manpages 4](#), [Wapnet Blog 14](#))

## Validation

- Clipboard and audio should work; otherwise, verify Step 2 and Step 3 settings.
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## Step 7: Maintain & update safely

### Beginner view

- Keep packages updated:

```
sudo apt update && sudo apt upgrade
```

- Restart xrdp after config changes:

```
sudo systemctl restart xrdp
```

### Pro breakdown

- Logs to check when things misbehave:
  - `/var/log/xrdp.log` and `/var/log/xrdp-sesman.log` (service/session)
  - `~/.local/share/xrdp/xrdp-chansrv.$DISPLAY.log` (channels like clipboard/audio), as per chansrv docs. ([Super User 15](#), [Debian Manpages 16](#))
- Wayland vs Xorg: xrdp works with Xorg virtual sessions. If you ever switch desktops and hit black screens, ensure Xorg is used for xrdp sessions (a common pitfall documented in community guides). ([DigitalOcean 1](#))

## Validation

- After updates, reconfirm you can RDP via the tunnel and that audio/clipboard still work.
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## Troubleshooting

- **Black/blank screen after login**
  - Ensure `~/.xsession` contains `xfce4-session`. Restart `xrdp`. Confirm you're not trying to remote the active physical Wayland session. ([DigitalOcean 1](#))
- **Clipboard doesn't work**
  - Confirm `[Channels]` has `clipdr=true`. Check the per-display `chansrv` log for errors (see paths above). Reconnect to spawn a fresh chansrv. ([Ubuntu Manpages 10](#), [Debian Manpages 16](#))

- **No sound devices**
    - Verify `libpipewire-0.3-modules-xrdp` is installed, and the client has audio redirection enabled (Windows: Local Resources → Remote audio). Some distros require logging out and back in to load modules. ([Launchpad 8](#), [Microsoft Learn 17](#))
  - **Tunnel connects but RDP fails**
    - Confirm xrdp is bound to `127.0.0.1:3389` and running. Double-check the Termius forward is **Local 13389 → 127.0.0.1:3389** and connected. Termius' wizard simplifies this flow. ([termius.com 2](#))
  - **Local port already in use**
    - Choose another local port (e.g., `14389`). This is a typical fix if something is already listening on 3389 locally. ([Super User 12](#))
  - **Session ends immediately**
    - Check `/var/log/xrdp-sesman.log` for session startup errors. Make sure the user's home dir perms aren't too restrictive (e.g., `chmod 755 ~` can help in some cases) and that `xfce4-session` is installed. (See DO guide's notes.) ([DigitalOcean 1](#))
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## Additional Resources

- **xrdp manual (xrdp.ini)** – binding to `address=`, channels (`cliprdr`, `rdpsnd`, `drdynvc`). ([Ubuntu Manpages 10](#))
- **FreeRDP (xfreerdp) man page** – `+clipboard`, `/sound`, `/microphone`, dynamic resolution. ([openSUSE Manpages 4](#))
- **DigitalOcean: Enable RDP (xrdp) on Ubuntu** – practical walkthrough using XFCE and `.xsession`. ([DigitalOcean 1](#))
- **Termius: Port Forwarding** – wizarded setup of local forwards. ([termius.com 2](#))
- **PipeWire module for xrdp** – Ubuntu package & upstream project. ([Launchpad 8](#), [GitHub 9](#))
- **Pixel Linux Terminal (How-To Geek)** – how to enable it & its intended scope (not a full desktop). ([How-To Geek 5](#))

## Further read

1. [Debian Manpages — xrdp-chansrv\(8\) — xrdp — Debian unstable](#)
2. [DigitalOcean — Enable Remote Desktop Protocol Using xrdp on Ubuntu 22.04](#)
3. [GitHub — neutrinolabs/pipewire-module-xrdp](#)
4. [GitHub — neutrinolabs/xrdp: xrdp: an open source RDP server](#)
5. [How-To Geek — Google Explains Why It Added a Linux VM to Pixel Phones](#)
6. [How-To Geek — How to Use Your Pixel's Hidden Linux Terminal \(and Should You?\)](#)
7. [Launchpad — libpipewire-0.3-modules-xrdp \(amd64, Ubuntu\)](#)
8. [Microsoft Learn — Configure audio and video redirection over the Remote ...](#)
9. [Microsoft Q&A — Remote Desktop Connection Stops Audio on ...](#)
10. [openSUSE Manpages — xfreerdp\(1\) — freerdp](#)
11. [Super User — Windows 10 SSH "Cannot listen to port 3389"](#)

12. [Super User — XRDP rejecting login - remote desktop](#)
13. [Termius Docs — Port Forwarding](#)
14. [Ubuntu Manpages — xrdp.ini - Configuration file for xrdp\(8\) \(focal\)](#)
15. [Ubuntu Manpages — xrdp.ini - Configuration file for xrdp\(8\) \(noble\)](#)
16. [Ubuntu Packages — xorgxrdp package](#)
17. [UbuntuUpdates — Package "xorgxrdp" \(plucky 25.04\)](#)
18. [Wapnet Blog — Optimizing RDP Performance on Linux: My Best Settings with xfreerdp](#)
19. [Wikipedia — Port forwarding](#)