# WSL Linux on Windows

**START HERE**

`wsl --install`
Install WSL + Ubuntu

`wsl --shutdown`
Stop everything

`wsl -l -v`
Distros, state, version

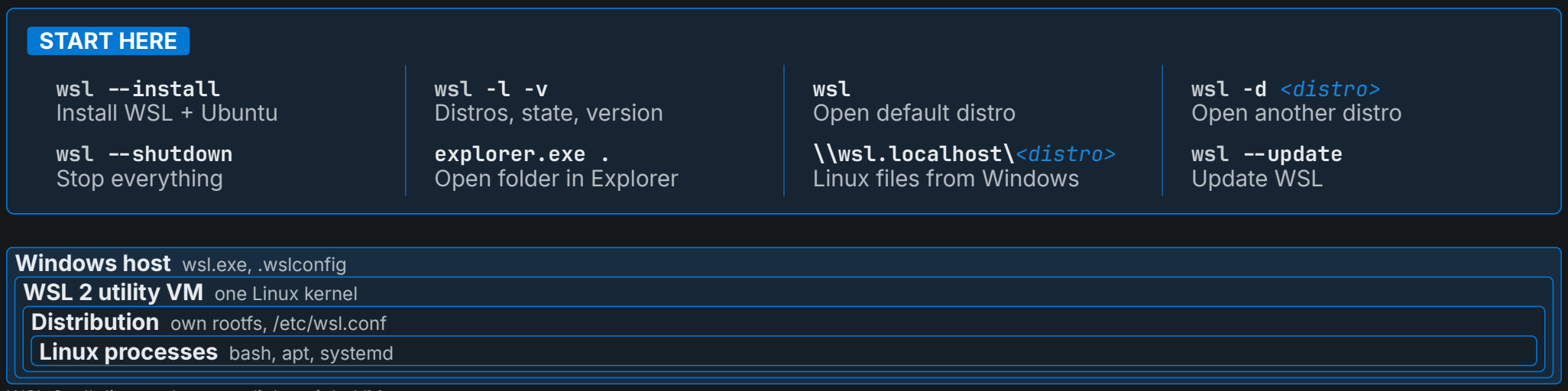
`explorer.exe .`
Open folder in Explorer

`wsl`
Open default distro

`\\wsl.localhost\<distro>`
Linux files from Windows

`wsl -d <distro>`
Open another distro

`wsl --update`
Update WSL




WSL 2: all distros share one lightweight VM

## CONCEPTS

Commands are shown for PowerShell or CMD. From inside Linux, call the same tool as wsl.exe.

**WSL 1 or WSL 2?**

| | WSL 1 | WSL 2 |
|---|---|---|
| Linux FS speed | slower | fast |
| /mnt/c speed | fast | slower |
| systemd, Docker | no | yes |
| LAN access | like Windows | NAT by default |

## INSTALL AND UPDATE

`wsl --install`
Install WSL and Ubuntu
*Needs an admin prompt and usually a reboot.*

`wsl --list --online`
Distros available to install
*Short form: wsl -l -o.*

`wsl --install -d <distro>`
Install a specific distro
*Add --name <name> or --location <dir> to choose name and folder.*

`wsl --update`
Update WSL to the latest release

`wsl --version`
Show WSL, kernel and WSLg versions

`wsl --status`
Show default distro and version

## DISTRIBUTIONS

`wsl --list --verbose`
List distros with state and version
*Short form: wsl -l -v. The * marks the default.*

`wsl --list --running`
List running distros only

`wsl --set-default <distro>`
Make a distro the default
*Short form: wsl -s <distro>.*

`wsl --terminate <distro>`
Stop one distro
*Short form: wsl -t <distro>.*

`wsl --shutdown`
Stop all distros and the VM
*Needed after editing .wslconfig or wsl.conf.*

## DISTRIBUTIONS (cont.)

`wsl --set-version <distro> 2`
Convert a distro to WSL 2
*Can take long and fail on big distros: export a backup first.*

`wsl --set-default-version 2`
Use WSL 2 for new installs

`wsl --unregister <distro>`
Remove a distro and ALL its data
*Deletes the root filesystem permanently; there is no undo.*

`wsl --manage <distro> --set-default-user <user>`
Change the login user
*The user must already exist in the distro.*

`wsl --manage <distro> --move <dir>`
Move the distro's disk

## RUN LINUX FROM WINDOWS

`wsl`
Shell in the default distro
*Starts in the current Windows directory.*

`wsl ~`
Shell in your Linux home

`wsl -d <distro>`
Shell in a specific distro

`wsl -u root`
Shell as root
*Forgot the sudo password? Reset it here with passwd <user>.*

`wsl <command>`
Run one Linux command
*Uses the current directory; paths must be Linux paths.*

`dir | wsl grep <text>`
Pipe Windows output into Linux tools

## RUN WINDOWS FROM LINUX

`explorer.exe .`
Open this folder in Explorer

`notepad.exe <file>`
Run any Windows program
*Keep the .exe and the exact case of the name.*

`cmd.exe /C <command>`
Run a CMD built-in like dir

## RUN WINDOWS FROM LINUX (cont.)

`powershell.exe -c <command>`
Run a PowerShell command

## FILES AND PATHS

`/mnt/c`
C: drive seen from Linux

`\\wsl.localhost\<distro>`
Distro's files seen from Windows
*Older builds use \\wsl$\<distro>; enter \\wsl$ to list all distros.*

`wslpath -w <path>`
Linux path to Windows path

`wslpath -u '<C:\path>'`
Windows path to Linux path
*Quote it so the shell keeps the backslashes.*

**Speed**
Keep projects in the Linux filesystem (~/project) when you work from Linux: /mnt/c is much slower under WSL 2.

## BACKUP AND DISKS

`wsl --export <distro> <file.tar>`
Back up a distro to a tar file
*Use - as the file name to write to stdout.*

`wsl --import <name> <dir> <file.tar>`
Restore or clone as a new distro
*No launcher for imports: set the user via [user] default.*

`wsl --manage <distro> --compact`
Compact the distro's VHDX

## CONFIGURATION

**Two config files**

| | .wslconfig | /etc/wsl.conf |
|---|---|---|
| Where | %UserProfile% | inside each distro |
| Scope | global, WSL 2 VM | one distro |
| Sets | memory, CPUs, network | systemd, mounts, user |

`[boot] systemd=true`
Run systemd in a distro (wsl.conf)

`[user] default=<user>`
Default login user (wsl.conf)

## CONFIGURATION (cont.)

`[wsl2] memory=<size>`
Cap VM memory (.wslconfig)
*Default is half of the Windows RAM. Sizes like 8GB or 512MB.*

`[wsl2] processors=<n>`
Cap VM CPUs (.wslconfig)

Changes apply only after the VM stops: run wsl --shutdown, or wait about 8 seconds after closing every shell.

## NETWORKING

`localhost:<port>`
Reach a Linux server from Windows
*Works by default (localhostForwarding).*

`wsl hostname -I`
IP address of the WSL 2 VM
*Capital -I; lower-case -i prints a placeholder address.*

`ip route show | grep -i default | awk '{print $3}'`
Windows host IP, seen from Linux
*Only needed in NAT mode.*

`[wsl2] networkingMode=mirrored`
Share Windows' network interfaces
*Windows 11 22H2+. Adds IPv6, LAN access and localhost both ways.*

## RECIPES

**Back up and restore a distro**

```
wsl --shutdown
wsl --export Ubuntu ubuntu.tar
# later, or on another PC:
wsl --import Ubuntu D:\wsl ubuntu.tar
```

**Enable systemd (/etc/wsl.conf)**

```
[boot]
systemd=true

[user]
default=<user>
# then run: wsl --shutdown
```

**Limit the VM (%UserProfile%\.wslconfig)**

```
[wsl2]
memory=8GB
processors=4
networkingMode=mirrored

[experimental]
sparseVhd=true
```