# WSL Linux on Windows

## CONCEPTS

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

**Windows host** wsl.exe, .wslconfig
- **WSL 2 utility VM** one Linux kernel
  - **Distribution** own rootfs, /etc/wsl.conf
    - **Linux processes** bash, apt, systemd

WSL 2: all distros share one lightweight VM

### 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

**`wsl --list --online`**
Distros available to install

**`wsl --install -d <distro>`**
Install a specific distro

**`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

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

**`wsl --set-default <distro>`**
Make a distro the default

**`wsl --terminate <distro>`**
Stop one distro

**`wsl --shutdown`**
Stop all distros and the VM

## DISTRIBUTIONS (cont.)

**`wsl --set-version <distro> 2`**
Convert a distro to WSL 2

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

**`wsl --unregister <distro>`**
Remove a distro and ALL its data

**`wsl --manage <distro> --set-default-user <user>`**
Change the login user

## RUN LINUX FROM WINDOWS

**`wsl`**
Shell in the default distro

**`wsl ~`**
Shell in your Linux home

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

**`wsl -u root`**
Shell as root

**`wsl <command>`**
Run one Linux command

## RUN WINDOWS FROM LINUX

**`explorer.exe .`**
Open this folder in Explorer

**`notepad.exe <file>`**
Run any Windows program

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

## FILES AND PATHS

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

**`\\wsl.localhost\<distro>`**
Distro's files seen from Windows

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

**`wslpath -u '<C:\path>'`**
Windows path to Linux path

> **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

**`wsl --import <name> <dir> <file.tar>`**
Restore or clone as a new distro

## 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)

**`[wsl2] memory=<size>`**
Cap VM memory (.wslconfig)

**`[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

**`wsl hostname -I`**
IP address of the WSL 2 VM

## 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
```