



Zephyr Workshop – Kconfig + DeviceTree

Understanding how Zephyr RTOS configures features and hardware

What is Kconfig?

Configuration system for:

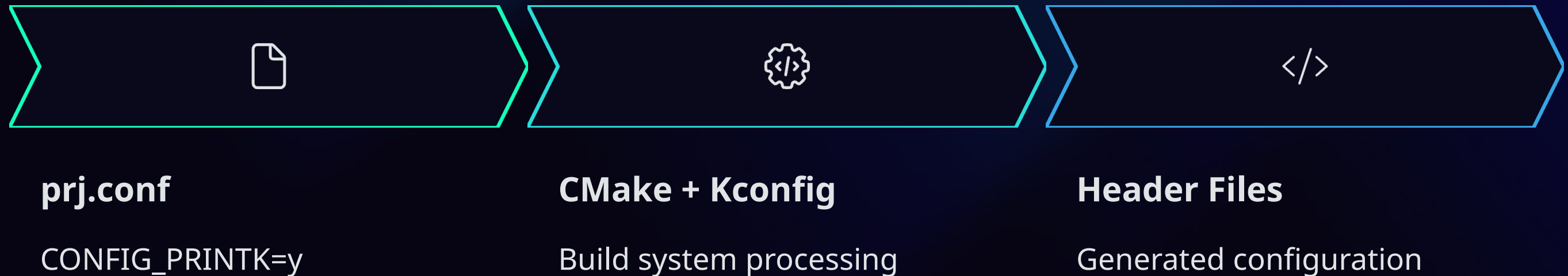
- System features
- Drivers
- RTOS options

Options start with 'CONFIG_'



```
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  <lstemable (rinection (boug)>
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  <letable/bywatln>
  <omifgle> |
```

Kconfig – How it Works

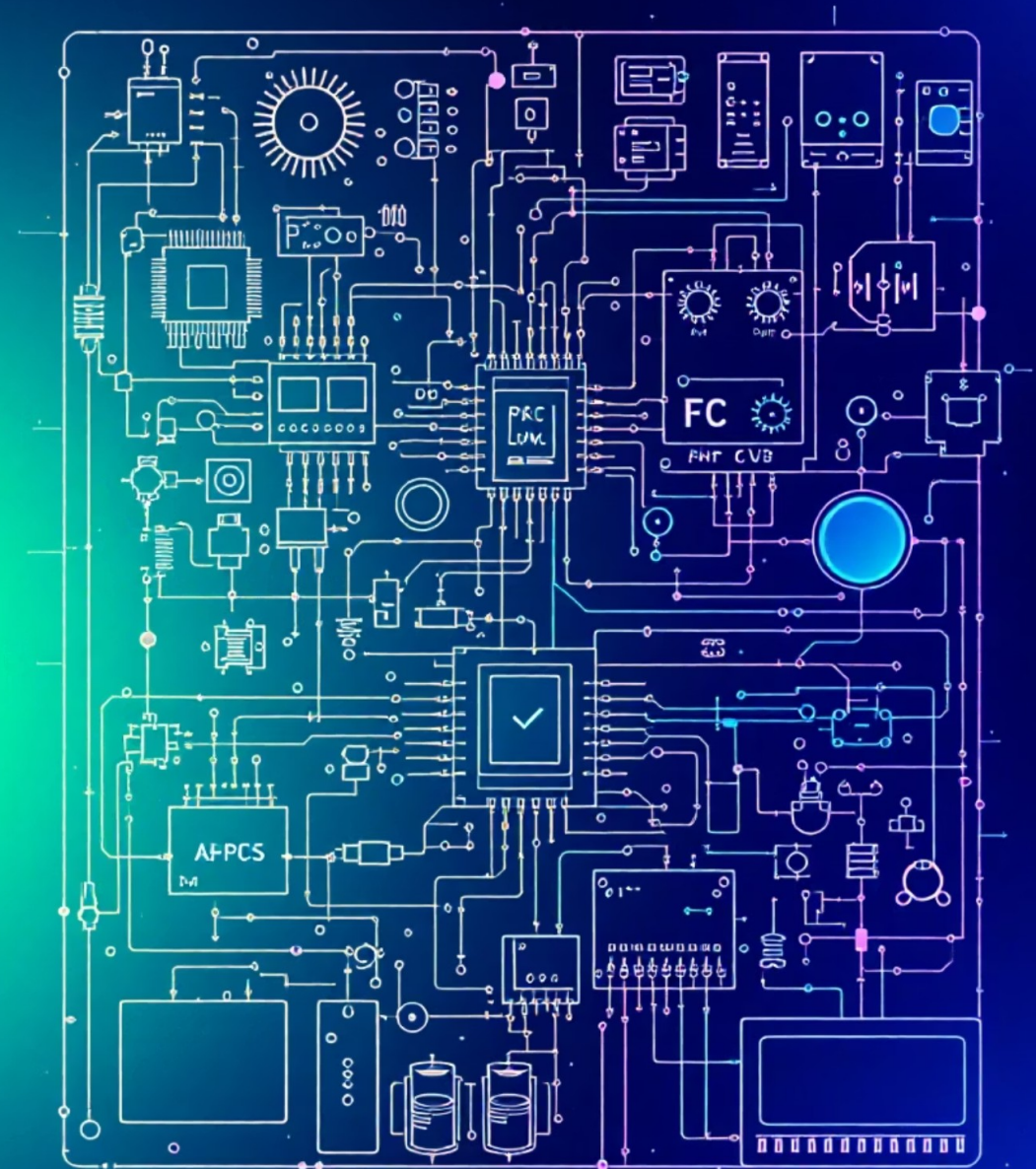


Use 'west build -t menuconfig' to explore

What is DeviceTree?

Hardware description language that:

- Describes hardware layout and connections
- Used by Zephyr at build time to generate hardware abstraction code.
- Files: *.dts (base), *.overlay (app-level override)



DeviceTree

Nodes

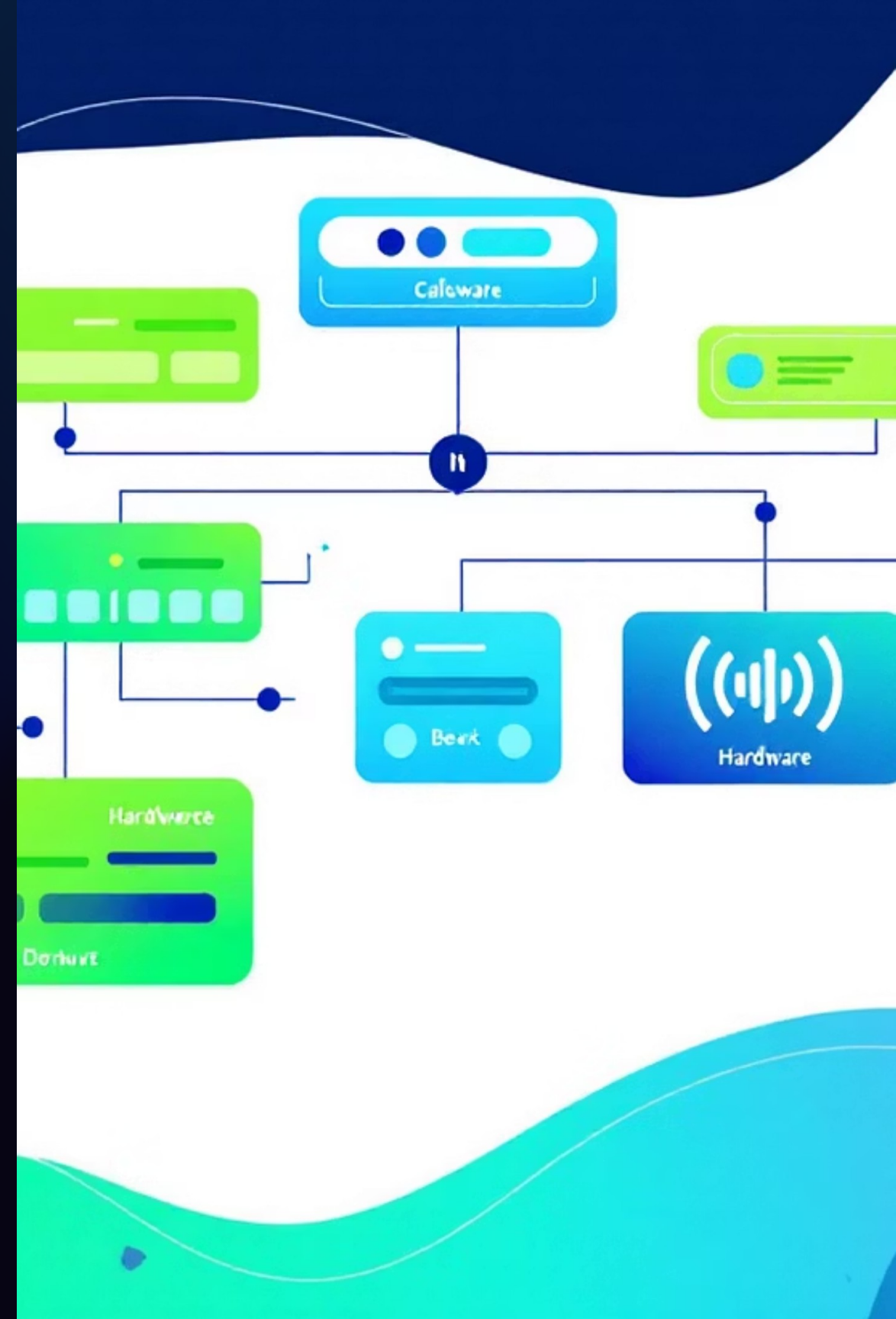
Hardware blocks (e.g.,
&gpio0)

Properties

Configuration data (pins,
levels)

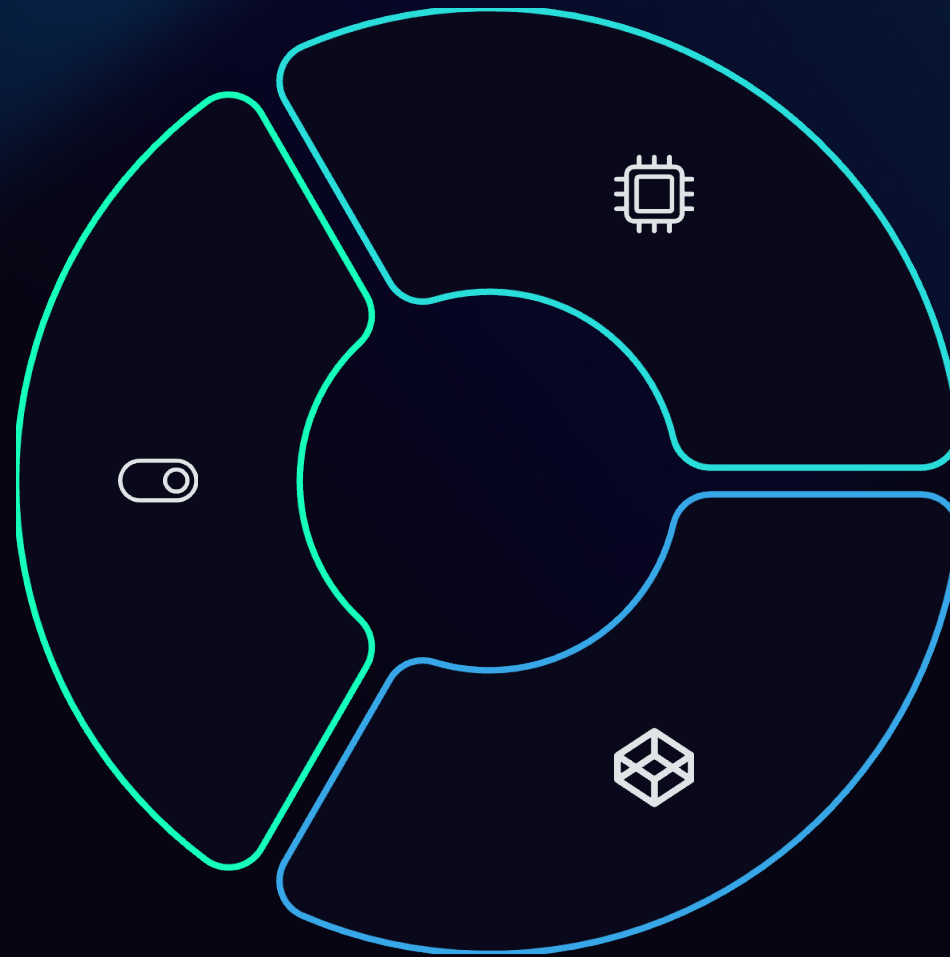
Labels & Aliases

Simplified code access



How Kconfig & DeviceTree Work Together

Kconfig
Enables drivers
(CONFIG_GPIO=y)



DeviceTree

Defines hardware (LED on
GPIO0, pin 13)

Application

Uses enabled, defined hardware



Live Example – LED

Blink

Start with Hello

World

Base project structure

Edit Files

prj.conf and main.c

Add app.overlay

Define LED alias

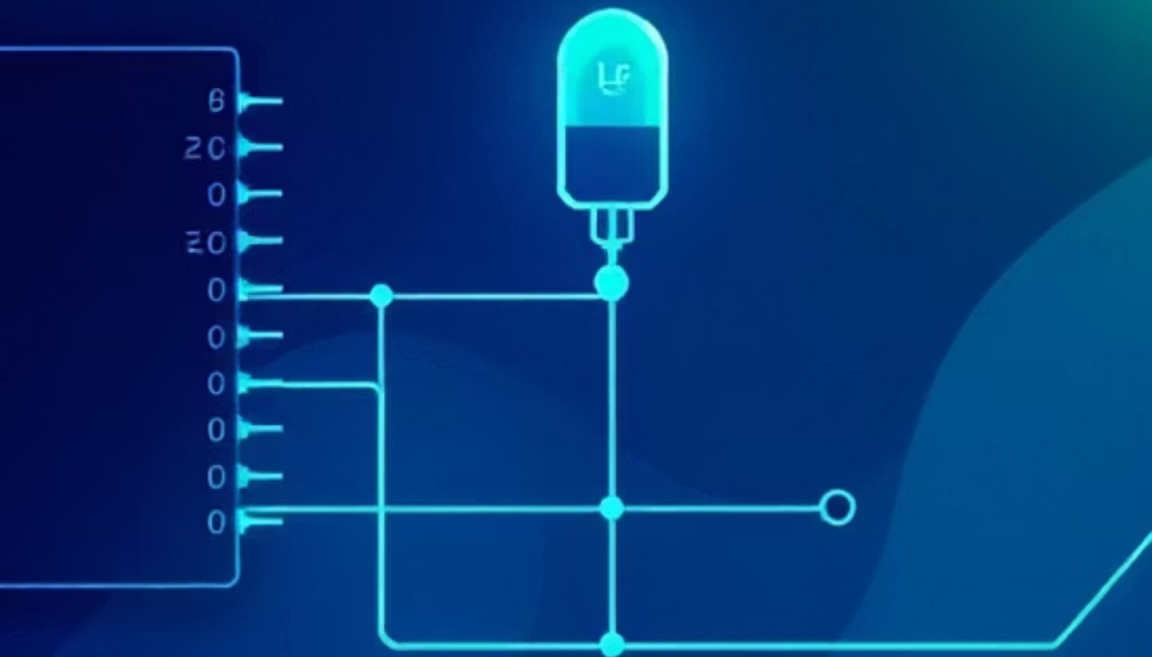
prj.conf – Example

```
CONFIG_GPIO=y
```

Enables the GPIO driver subsystem

A screenshot of a code editor window with a dark theme. The window has a title bar with three colored circles (red, yellow, green) and a close button. The editor shows a file named 'prj.conf' with the following content:

```
1 Embedded systems
2
3 configuration file (
4   configuration for system );
5 control settings
6 configured setting;
7
8 / embedded system configuration );
9 embedded system:
10 create {
11   connection - connection 'rulers' ();
12
13   onctrl: sol ({}
14     line 'fastu, -data: can #11/);
15   embedded set: file;
16   coradner file roller;
17
18   controller, celltion system;
19   file: tiao ({}
20     gre: tatin; );
21   conctos: is: file;
22   collected: s: contrigut on );
23   coteradom: ic: ed: ling);
24   rec: anee (re: en);
25 }
26
27 from file: codaer (all embedded systems: setting ); {
28 };
```

app.overlay -

```
/ {  
    aliases {  
        led0 = &led0;  
    };  
};
```

Defines hardware reference for LED

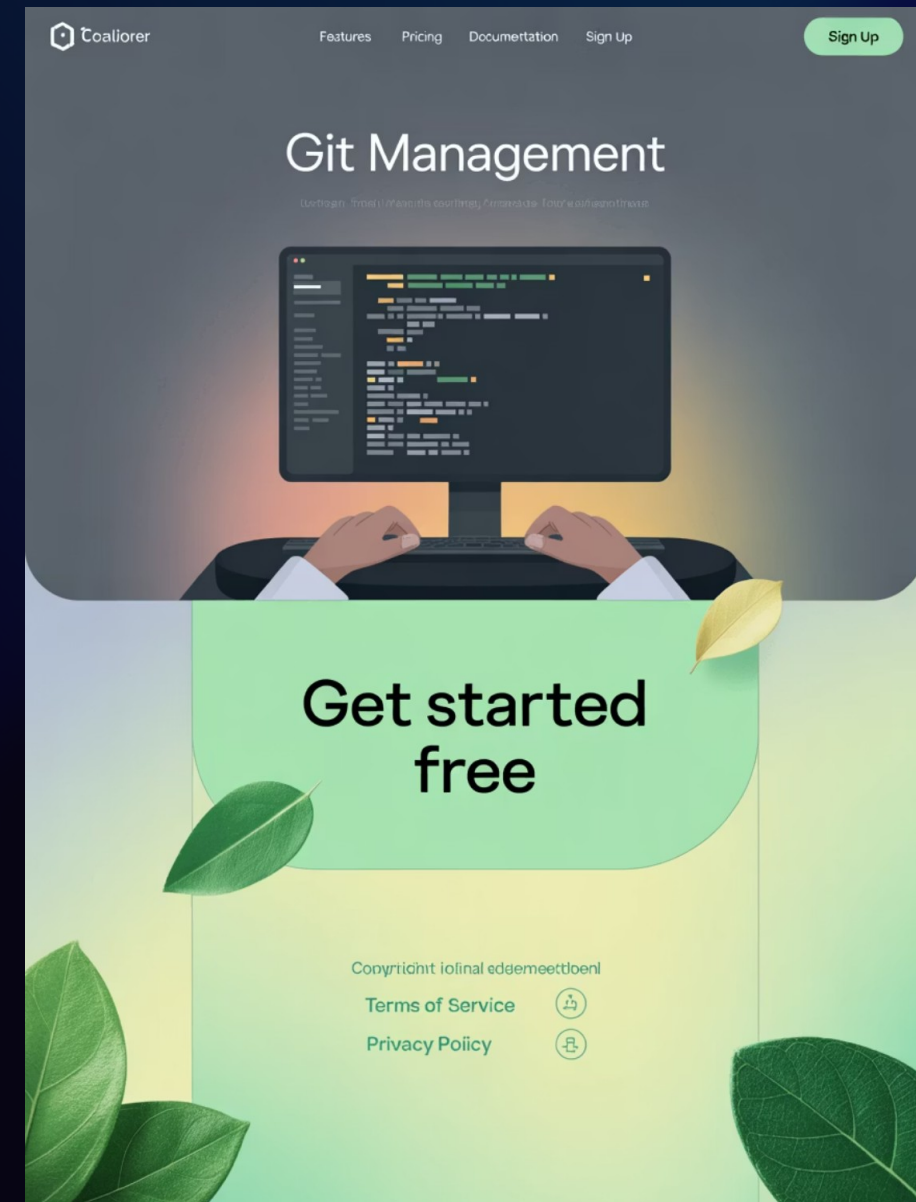
main.c – DeviceTree Usage

Add the code from blinky led sample to main.c



Run the sample

- build and flash on nrf52dk
files .dts and _defconfig from the folder
boards/nrf52dk generates the configuration
- Check the file build/zephyr/.config
- Check the file build/zephyr/zephyr.dts



Explore menuconfig

Run: `west build -t menuconfig`

Enable or disable options

Compare output with `build/zephyr/.config` now