

# The Embedded Linux Quick Start Guide

Are you thinking of using Linux on your next embedded project but not sure where to begin? This one day workshop shows you how it is done. Beginning with a blank development board, you will learn how to bring up Linux and access hardware using GPIO and i2c.

The workshop covers the four elements of embedded Linux: toolchain, bootloader, kernel and root filesystem. The theory is backed up with hands-on sessions using a common development board: a BeagleBone Black. All the software needed for the practicals will be supplied on a bootable USB flash drive, which you can keep for future reference.

## Duration

1 day

## Audience

This course is ideal for software engineers who are familiar with embedded devices but need to apply that knowledge to Linux development, and to those who are familiar with Linux, but want to apply that knowledge to embedded systems

## Prerequisites

**Essential:** good knowledge of the C programming language, since this is used in the programming portions of the course

**Desirable:** *either* a good background in embedded devices, *or* a reasonable proficiency in Linux command-line tools. Delegates with neither will find the learning curve rather steep

## Course materials

All students will receive:

- A printed copy of the presentations and lab notes
- Worked solutions to the lab sessions

## About the trainer



Chris Simmonds has been using Linux in embedded systems for almost 20 years. He has been running training courses and workshops in embedded Linux since 2002 and has delivered hundreds of sessions to many well-known companies in the UK, Europe, USA, South America and SE Asia. He is the author of the book "Mastering Embedded Linux Programming", and is a frequent presenter at open source and embedded conferences, including Embedded Linux Conference and Embedded World. You can see some of his work on the "Inner Penguin" blog at [www.2net.co.uk](http://www.2net.co.uk)

## Enquiries and bookings

Please email [training@2net.co.uk](mailto:training@2net.co.uk) or call +44 (0)1962 869003

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## Course outline

### Introduction to Embedded Linux

- Linux as an embedded operating system
- Working with open source licenses
- The four elements of embedded Linux: toolchain; bootloader; kernel and root filesystem

### Building Linux for BeagleBone Black

- Introduction to Buildroot
- Configuring and building a Linux system
- Booting the BeagleBone Black
- Getting basic system information from the command line

### Buildroot

- Using Buildroot for small projects
- Selecting a suitable board configuration
- Customizing the board configuration
- Selecting an appropriate root filesystem format

### Understanding Toolchains

- The anatomy of a toolchain
- Choosing an appropriate C library
- Using Buildroot to create a toolchain
- The art of cross compiling
- Building and testing the “helloworld” program

### Device trees

- What does the kernel need to know about the hardware?
- The role of the device tree
- Overview of device tree syntax
- Compiling and testing device trees

### Writing applications that interact with hardware

- In Linux, everything is a file, including devices
- Writing programs that interact with devices
- Accessing General Purpose Input/Output (GPIO) pins
- An overview of i2c
- Accessing i2c devices
- An example application that reads sensor data from i2c