

The Third conference of Embedded Linux User Group (E-LUG)

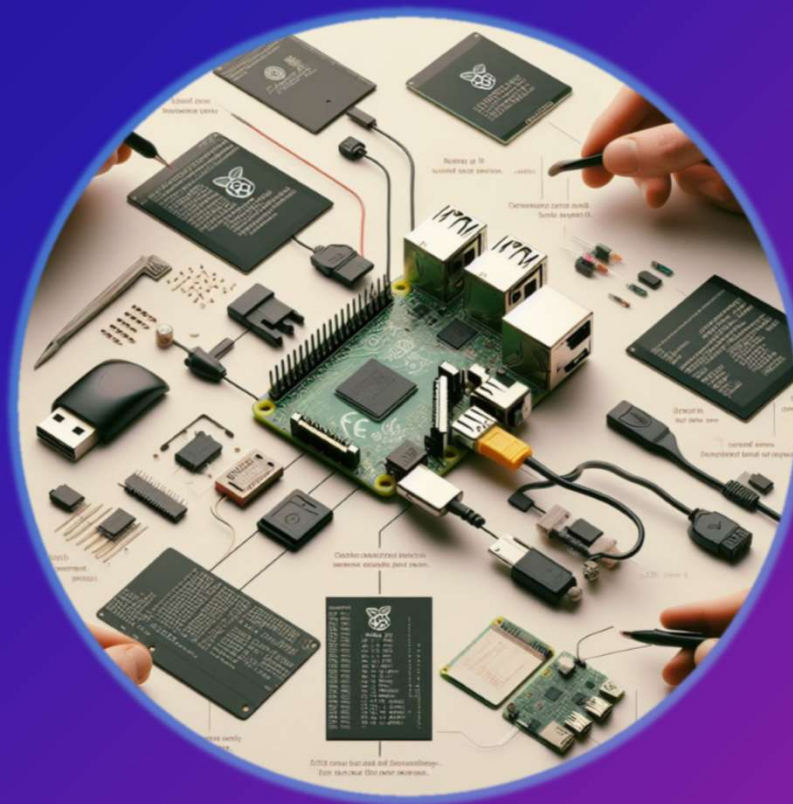


An Introduction to Yocto

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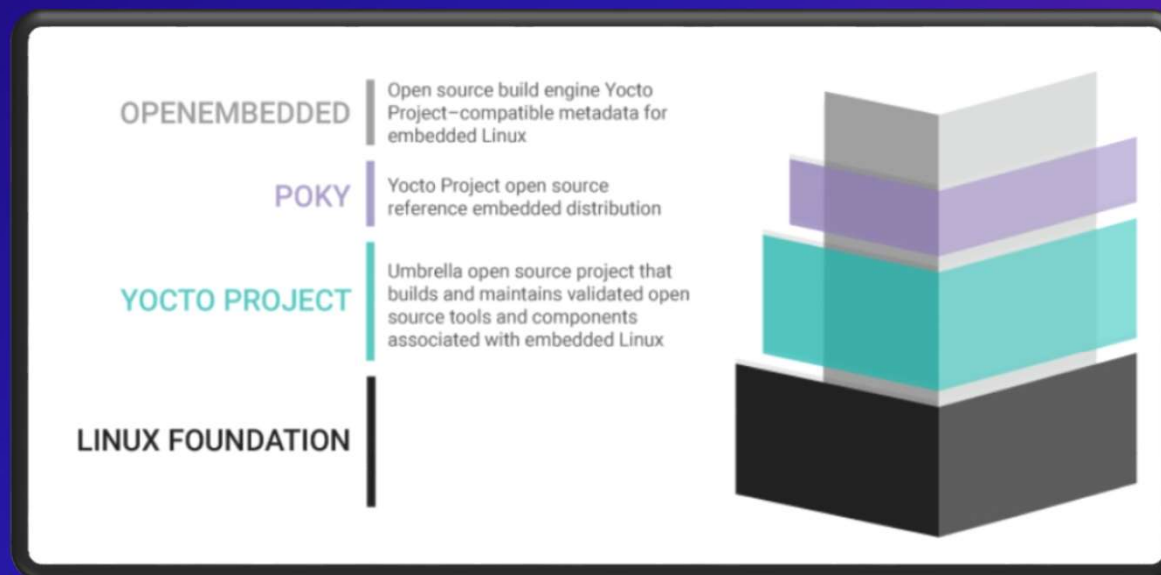
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Yocto Project Definition



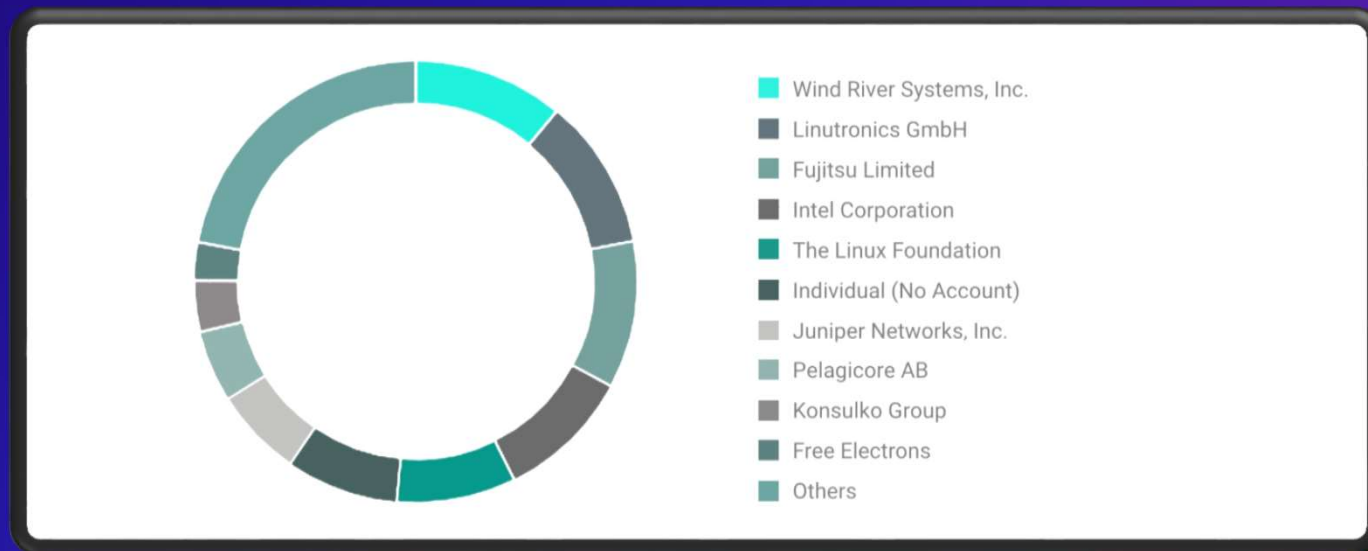
Yocto Project Definition

The Yocto Project is an Open Source collaboration project that provides Templates, Tools, and Methods to help create custom Linux-Based Systems for Embedded Products.



Yocto Project Definition

The primary purpose of the Yocto Project is to enable developers to create a complete Linux-Based Operating System tailored specifically for their Hardware & Application needs.



Yocto Components



Yocto Components

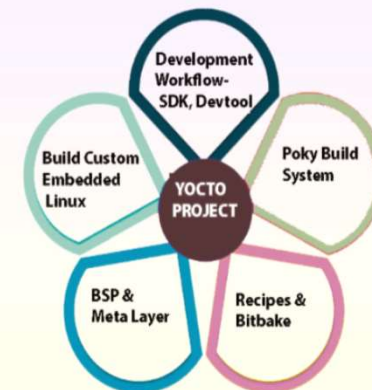
The Yocto Project is composed of several key components that work together to create a comprehensive system for building custom Linux distributions for Embedded Systems.



Yocto Components

The Yocto Project's components are listed below:

- 1) BitBake
- 2) OpenEmbedded-Core (OE-Core)
- 3) Poky
- 4) Layers
- 5) Software Development Kit (SDK)
- 6) Yocto Project Tools
- 7) Toaster
- 8) Metadata and Recipes



Yocto Components: BitBake

BitBake is the core build engine used by the Yocto Project. It processes recipes (metadata) to perform tasks such as fetching source code, configuring builds, compiling software, and creating packages.

Key Features:

- 1) *Task execution*: Defines and executes tasks required to build software.
- 2) *Dependency management*: Manages dependencies between tasks and recipes.
- 3) *Parallel execution*: Supports parallel task execution to speed up the build process.



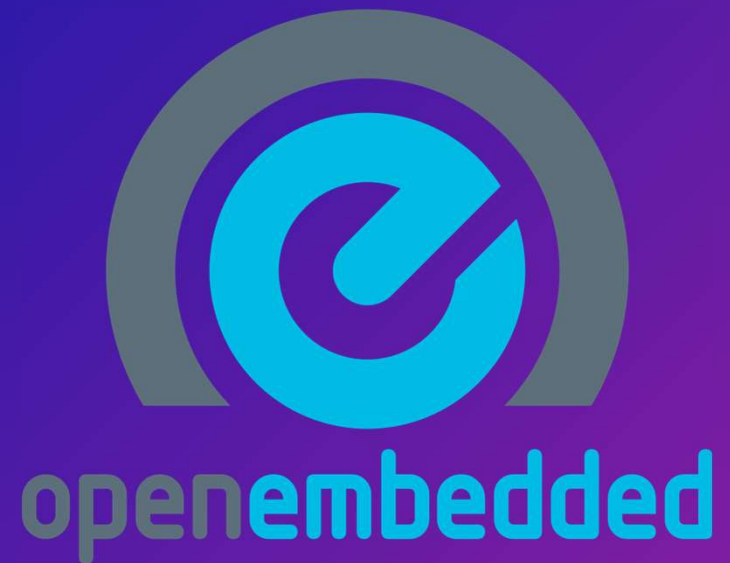
Yocto Components: OpenEmbedded-Core (OE-Core)



OE-Core is the core set of metadata, classes, and recipes used by the Yocto Project. It serves as the foundation for building custom Linux distributions.

Key Features:

- 1) *Recipes*: Define how to build software packages.
- 2) *Classes*: Provide reusable build logic.
- 3) *Configuration files*: Define settings for the build environment.

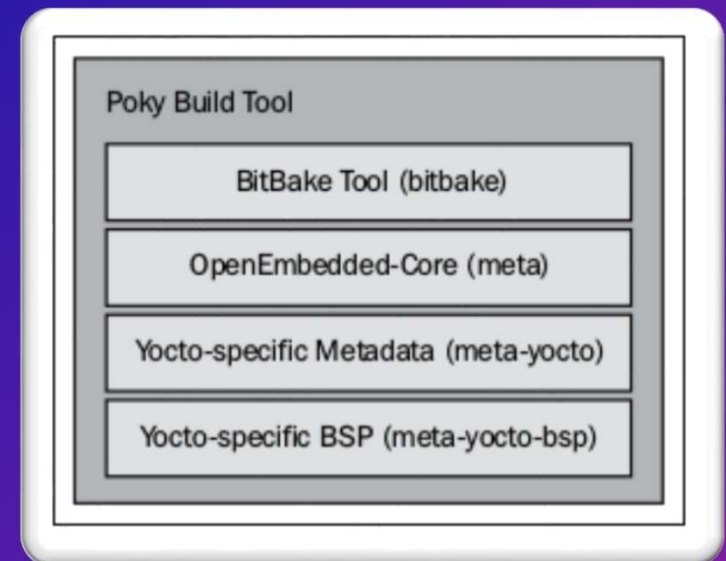


Yocto Components: Poky

Poky is the reference distribution provided by the Yocto Project. It includes BitBake, OE-Core, and example recipes and configurations.

Key Features:

- 1) *Reference implementation*: Serves as a starting point for building custom Linux distributions.
- 2) *Build environment*: Provides a ready-to-use build environment for developers.



Yocto Components: Layers

Layers are modular components that provide additional metadata, recipes, and configurations. They can be added to the build environment to extend its functionality.

Key Features:

- 1) *Modularity*: Allows for separation of different functionalities and customizations.
- 2) *Layer stacking*: Supports stacking multiple layers to create complex systems.
- 3) *Layer management tools*: Tools like BitBake-Layers help manage and organize layers.



Yocto Components: Software Development Kit (SDK)

The SDK provides tools for cross-development, allowing developers to write and test code for their embedded systems on a host machine.

Key Features:

- 1) *Cross-compilation tools*: Includes compilers, debuggers, and other tools for cross-compiling software.
- 2) *Development libraries*: Provides libraries and headers needed for development.
- 3) *Application development*: Supports building and testing applications on the host machine.



Yocto Components: Yocto Project Tools

Key Tools:

devtool: A command-line tool that simplifies common development tasks, such as adding new recipes or modifying existing ones.

wic: A tool for creating and manipulating disk images.

pseudo: A tool that provides fakeroot functionality, allowing builds to perform operations that require root privileges without needing actual root access.



Yocto Components: Toaster

The Toaster is a web-based interface for BitBake. It provides a graphical interface to manage, configure, and monitor builds.

Key Features:

- 1) *Build management*: Allows users to start, stop, and monitor builds.
- 2) *Configuration management*: Provides tools to configure build settings.
- 3) *Visualization*: Offers visual representations of build dependencies and progress.



Yocto Components: Metadata and Recipes

Metadata and recipes define how to fetch, configure, compile, and package software.

Key Features:

- 1) *Recipes*: Files with the `.bb` extension that contain instructions for building software.
- 2) *Recipe Append Files*: Files with the `.bbappend` extension that modify or extend existing recipes.
- 3) *Configuration Files*: Files that define build settings and environment variables.



Benefits of the Yocto Project



Benefits of the Yocto Project



There are some main benefits that listed below:

1) Customizability: Developers can create a Linux distribution tailored to their specific hardware and application requirements.

2) Scalability: Supports a wide range of architectures and platforms, making it suitable for diverse embedded applications.

3) Community and Support: The Yocto Project has a robust community and extensive documentation, providing support and resources for developers.

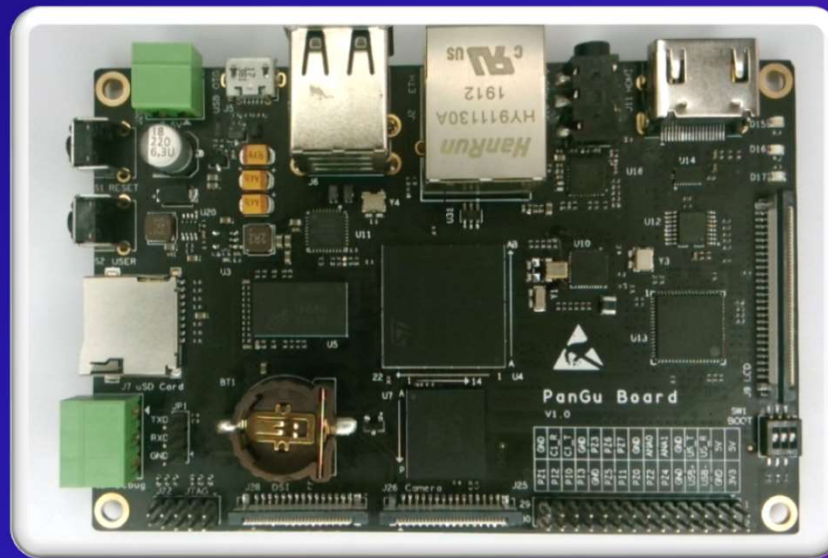
4) Reproducibility: Ensures that builds are reproducible, which is critical for development and deployment consistency.

How to begin?



How to begin?

<https://docs.yoctoproject.org/>



References

- ✓ https://en.wikipedia.org/wiki/Yocto_Project
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- ✓ https://www.openembedded.org/wiki/OpenEmbedded_and_The_Yocto_Project
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