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# The Build System

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## Architectures, Platforms, Targets, and Projects

The LK build system thinks of the world in four layers.

Projects are what you ask make to build. They are a set of modules (typically apps and libraries) built for a Target. They are defined in `project/<name>.mk`. The Target is selected via `TARGET := <name>` in this makefile or an included makefile (in the case where multiple projects share a common configuration). You choose your project by either passing it to make on the commandline (`make <name>`) or putting a `PROJECT := <name>` directive in `local.mk`.

Targets are typically a specific PCB (or family of extremely closely related PCBs, maybe differing just a little, detectable by some revision resistors or the like). They belong to a Platform and are defined in `target/<name>/rules.mk`. The Platform is selected via `PLATFORM := <name>` in this makefile.

Platforms typically are Systems-on-Chip (either individual or related families). They belong to an Architecture and are defined in `platform/<name>/rules.mk`. The Architecture is selected via

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`ARCH := <name>` in this makefile.

Architectures are a specific CPU or CPU family (ARM Cortex M3, Intel IA32, etc).

## Example Project

An example project is `stm32f4-discovery-test`. The Target there is `stm32f4-discovery` (the ST development board of the same name). Its Platform is `stm32f4xx`, a family of ST microcontrollers. `STM32_CHIP` is set to `stm32f407` for things that may be specific to that chip. Some `GLOBAL_DEFINES` are configured here as well, like `HSE_VALUE` which is the frequency of the crystal — a platform-specific definition. The Platform `stm32f4xx` sets `ARCH` as `arm` and `ARM_CPU` (specific to arm architecture) to `cortex-m4`, as well as configuring other platform-specific values.

The above configuration information lives in the following files in the lk source tree:

```
project/stm32f4-discovery-test.mk
target/stm32f4-discovery/rules.mk
platform/stm32f4xx/rules.mk
arch/arm/rules.mk
```

