mbed HDK
from prototype to production

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mbed HDK – Origin and heritage

- The origins of mbed are in rapid prototyping and productivity
  - Creating abstractions
  - Choosing defaults that suit the common case
  - Pulling tricks/stunts to make things JustWork™
  - Pushing complexity away from the consumer to the creators (80/20 rule)

- The HDK was originally a set of schematics for the LPC11U35 DAPLink and the first supported MCU's. It was a recipe for dev boards… It worked!
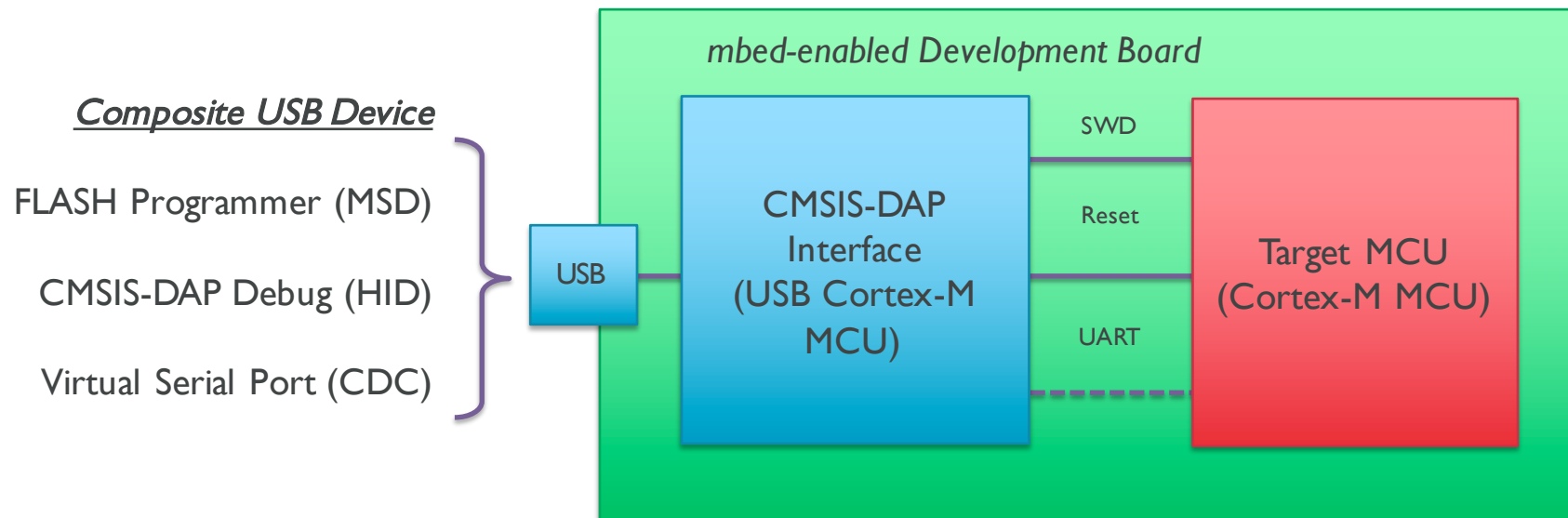
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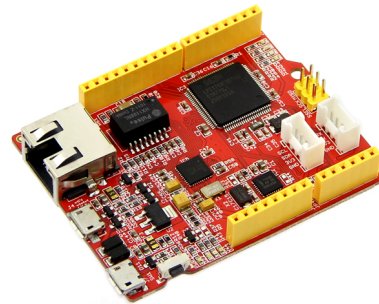
mbed HDK – Who and what it's for

- The first revision of the mbed HDK aimed to provide a solution to inter-linked problems
  - Recreating LPC1768 (and other) designs, that were compatible with the mbed SDK, and included debug interface (circuit and firmware)

- Released under permissive proprietary license, compatible with Apache 2.0

- No clear audience, other than those who wanted to reuse what we'd built.

- A zipfile included schematics, libraries, and some binaries for the DAPLink

- The philosophy remains the same, but the scope has widened
  - We learned from what we did right and wrong!

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DAPLink – mbed interface firmware

- An open source project that implements the embedded firmware required for a Cortex-M debug probe
- *https://github.com/mbedmicro/daplink*

mbed-enabled Development Board

Composite USB Device

FLASH Programmer (MSD)

CMSIS-DAP Debug (HID)

Virtual Serial Port (CDC)

USB

CMSIS-DAP Interface (USB Cortex-M MCU)

SWD

Reset

UART

Target MCU (Cortex-M MCU)

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What's new! (and still in progress)

- *Reference Libraries – Convenient resources for the Pros*

  - Eagle Component Libraries; The components our "reference designs" are built from
  - Eagle Schematic libraries; Schematic chunks that can be re-used
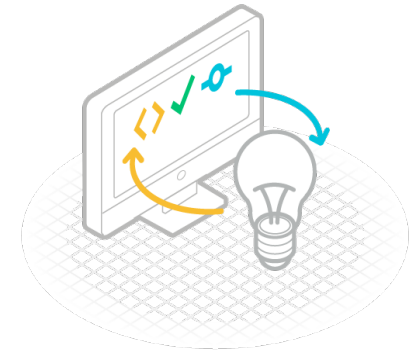
- *Reference designs – Complete designs, laid out, ready to fabricate*

  - Built from the Reference Component and Schematic Libraries,
  - Can be manufactured, most likely to be tweaked and extended
  - Bits of kit that we built for our own needs, but others might need them too!
  - Linked to and supported by software projects

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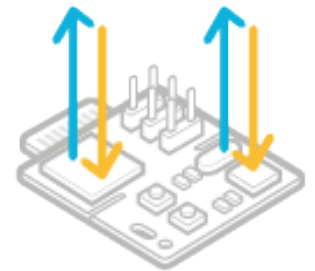
What's new! (and still in progress)

- **Version control!**

  - *https://github.com/ARMmbed/mbed-HDK*

  - The hardware guys finally listened to the software guys!

  - Hosted in GitHub, complete with releases to avoid Zip Archive Hell!

  - We accept Pull Requests!

    Look out for Acceptance Criteria, Coming Soon!

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What's new!

- **OSH Park PCB, eBOM**
  - PCBs available in OSH Park, ready to be ordered
  - Eagle component libraries being linked against Octopart eBOM feature
  - Generates purchasable BOMs across major the distributors (Farnell, Mouser, Digikey)

Production Design Projects in mbed-HDK

- mbed Application Shield
- CI Test Shield
- DAPLink
  - DIPDAP
  - SWDAP
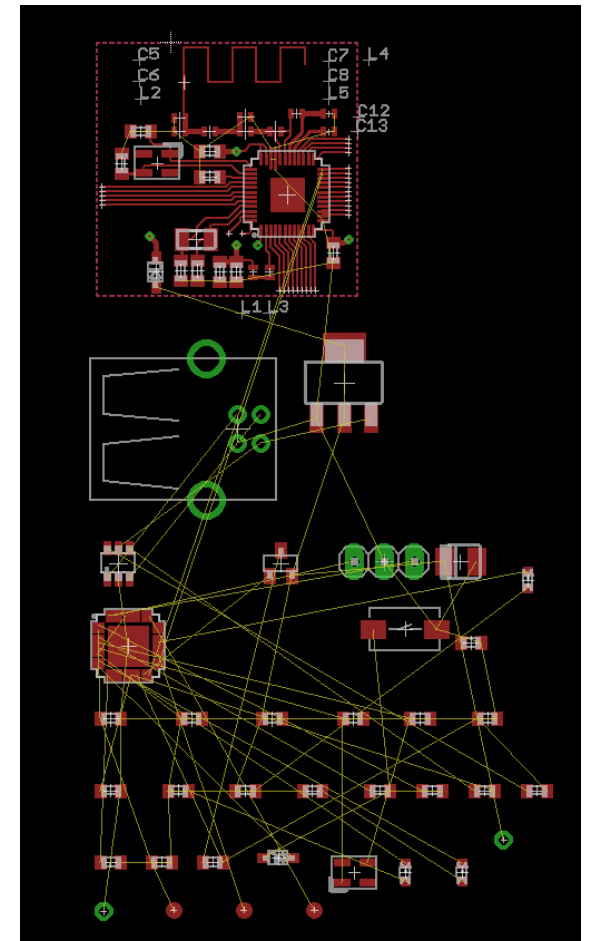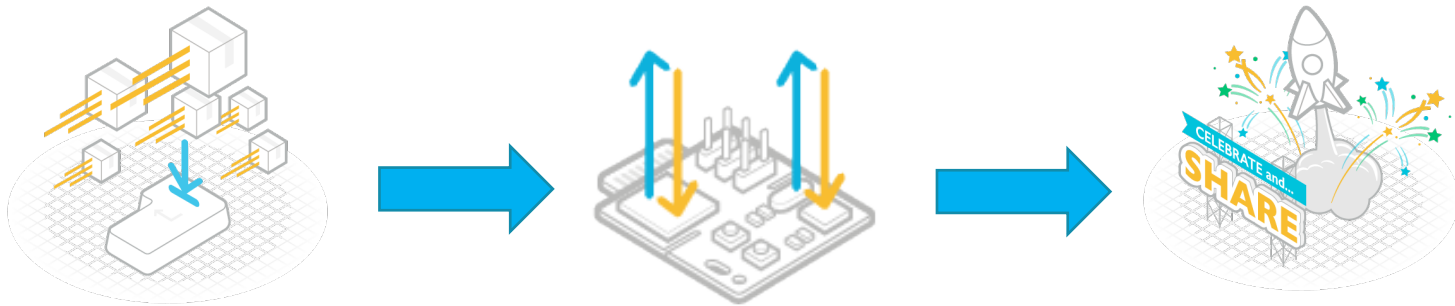- mbed 6LoWPAN Border Router HAT

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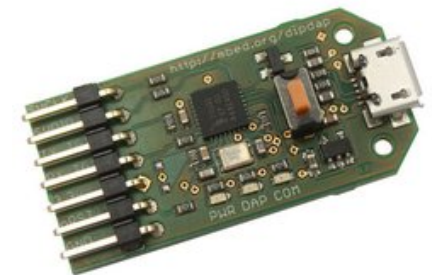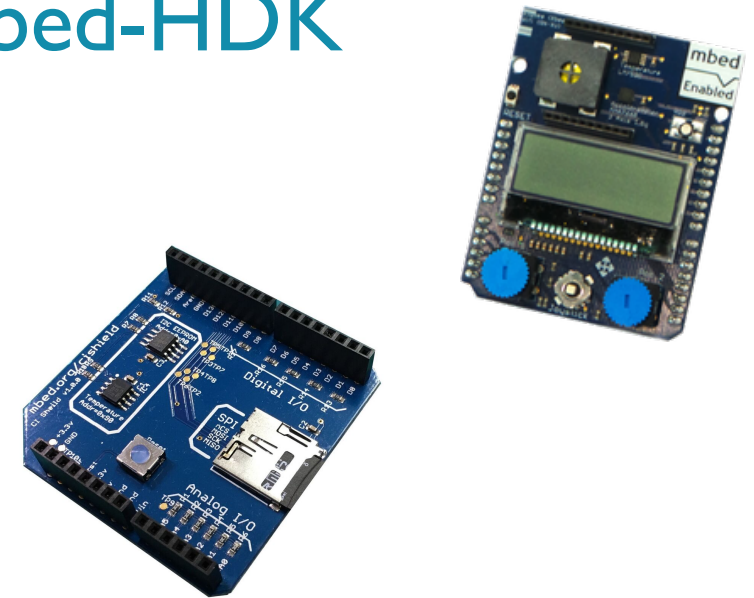
Example – Composability

Let's make a nRF51822 dev board, with an LPC11U35 Interface

1. Import MCU subsystem
2. Import DAPLink subsystem from the reference library
3. Add special sauce as required
4. Manufacture -> Ship -> Profit!

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Get involved!

- We're happy to take contributions..
  - **Libraries**

    MCU, Radio, Modules, components
  - **Subsystem**

    Prebuilt schematic blocks that are logically correct
  - **Full examples**

    RF examples in particular add a lot of value

- Help us build the go-to place for developers who want full stack solutions
  - Hardware, device software (OS, Stack, Client), cloud connectivity

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