OpenEmbedded and the Yocto Project: Working together on a common Core

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how we work together
Let's start with a little history...


openembedded

OpenEmbedded:

Embedded Linux build system
Uses "bitbake" and recipes to build packages and images
Founded in 2005
Grown since then to
  > 7,500 recipes, 300 machines, 20 distros

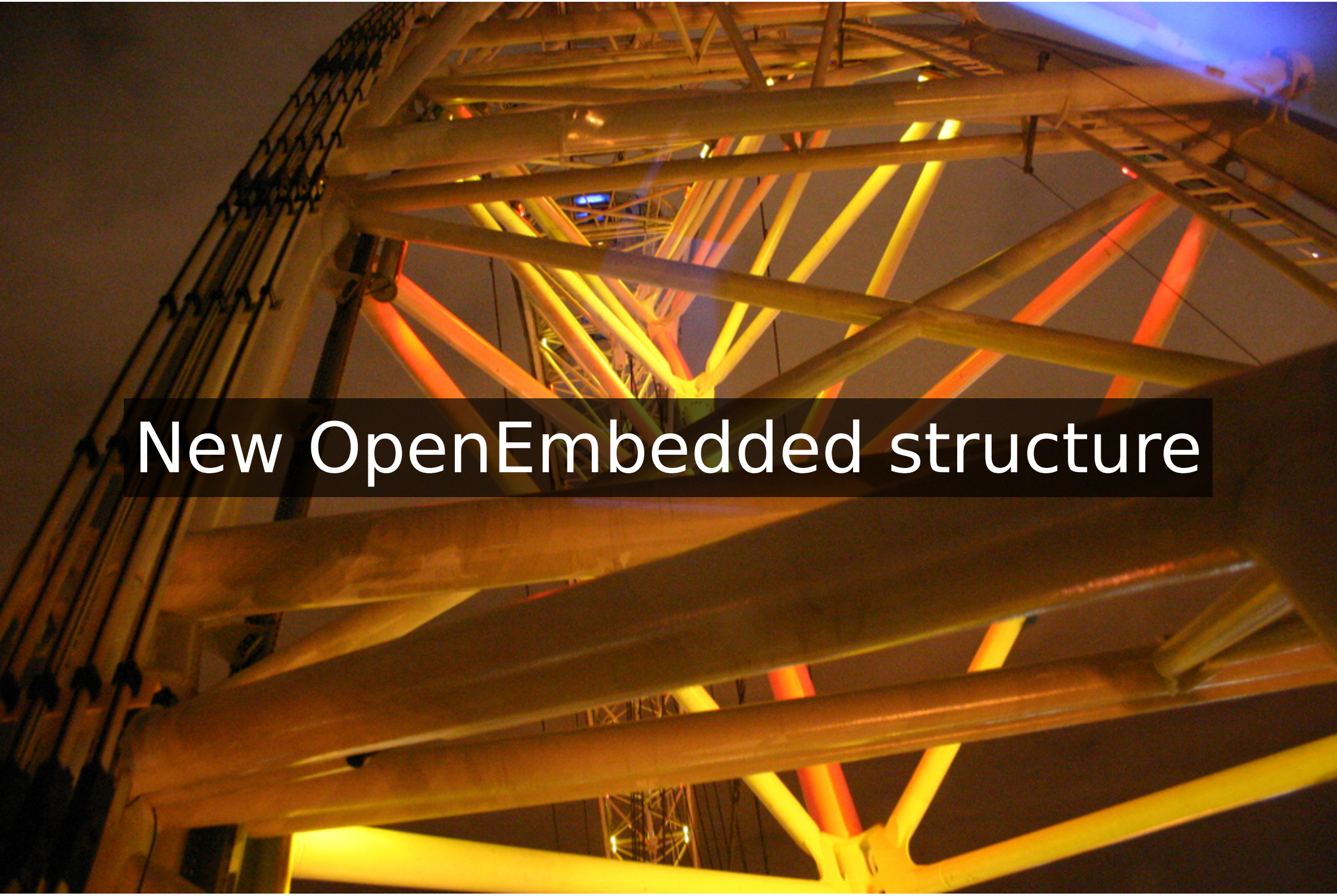
A number of forks
  Produced by small consulting firms and larger OSVs
  Molding OE into something commercially supportable
  Included Poky developed by OpenedHand
 OpenedHand was acquired by Intel and then in Oct 2010...

yocto

PROJECT

Yocto Project

Linux Foundation project w/ support from chip vendors and OSVs
Main project is the Poky build system
Other projects under the Yocto umbrella e.g.
  pseudo
  swabber
Trying to make it easier to build embedded Linux
Late 2010 - looking for a way to work more closely with OE

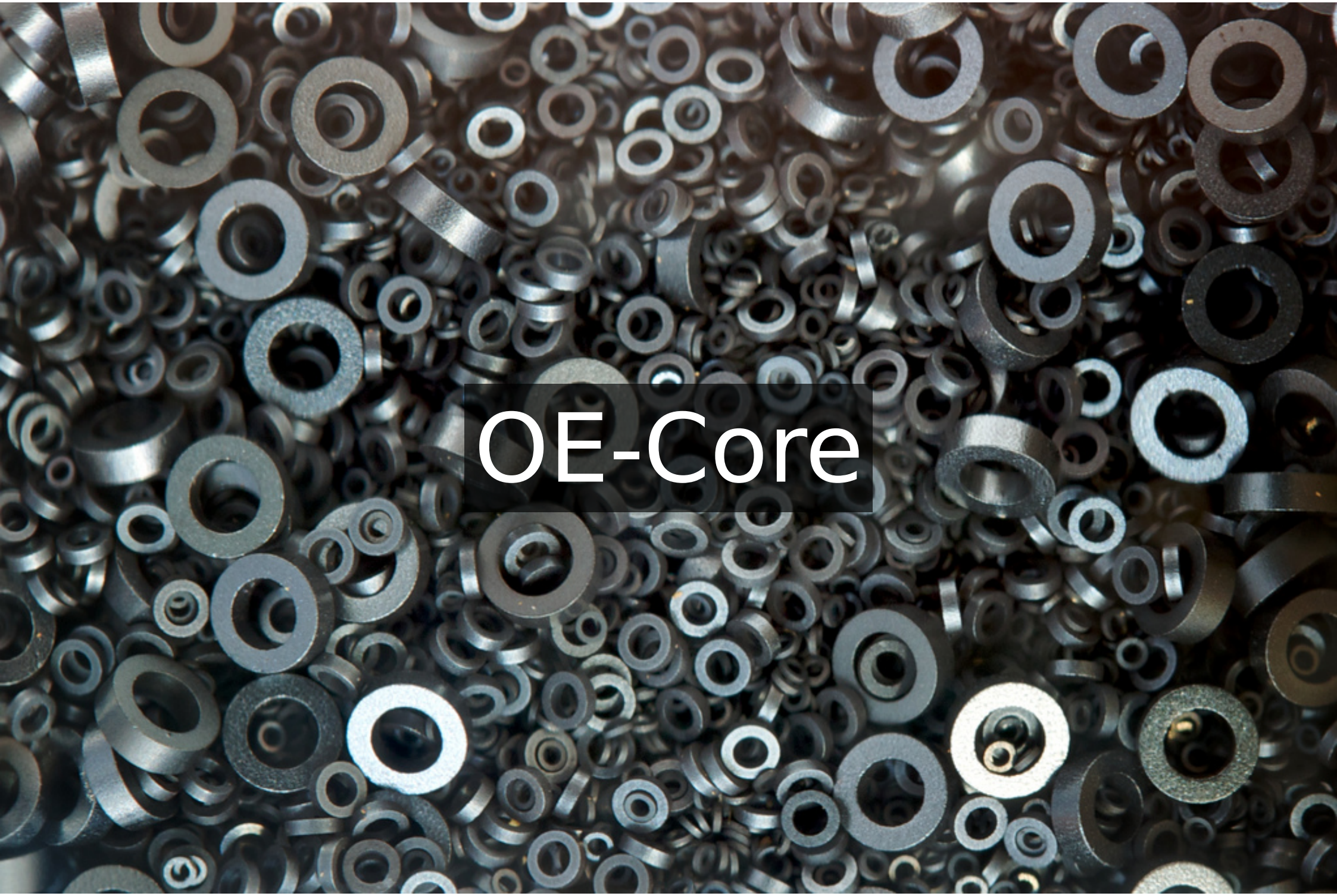


New OpenEmbedded structure

Split up into layers
A machine/distro neutral base to build on - OE-Core
Various other layers to enable machines, software and policies

Why split the metadata?

Just the recipes you need for your project
Customisations more visible & easier to manage
Each layer can be focused
  Smaller, reusable units
  Less stale metadata cruft mixed in
  Easy to see how well maintained it is
  Avoid mixing in machine-specific overrides



OE-Core

OE-Core created from Poky with machines removed, rename poky->core
  Archs: ARM, x86, x86-64, MIPS and PowerPC (+ PowerPC64)
  Only QEMU emulated machines
  Distro-less (some default policy)
  One X-based UI (Sato) for testing
  Mostly one version of each recipe (some exceptions, e.g. for GPLv2/v3)
Can build working system using just OE-Core (and bitbake) and nothing else
Pull model vs. push model of classic OE
  Patches sent to the mailing list, reviewed and merged from there
Yocto Project contributes directly to this core
  and then pulls changes into Poky from there
  same for bitbake
The basis of the collaboration between OE and Yocto


Layers

Types of layers - machine layer (BSP), software layer, distro layer
Overlaying recipes
  Can be done, but leads to maintenance problems
bbappends
  Add/change just the variables you need to

Some examples of common tasks via bbappend:

```
DESCRIPTION = "My package with special option enabled"

EXTRA_OECONF += "--enable-option"
```

Custom /etc/network/interfaces:

1) Add recipes-core/netbase_4.47.bbappend:

```
---- snip ----
FILESEXTRAPATHS_prepend := "${THISDIR}/${PN}:"
---- snip ----
```

2) Add recipes-core/netbase/netbase/interfaces

```
FILESEXTRAPATHS_prepend := "${THISDIR}/${PN}:"

SRC_URI += "custom-changes.patch"
```


Getting started - what should you do?
TTBZ8.COM

Create a customisation layer
Look for existing layers / recipes before starting your own

Creating a new layer

Structure:

- conf/layer.conf
- recipes-*/*/*
- README

patches etc.

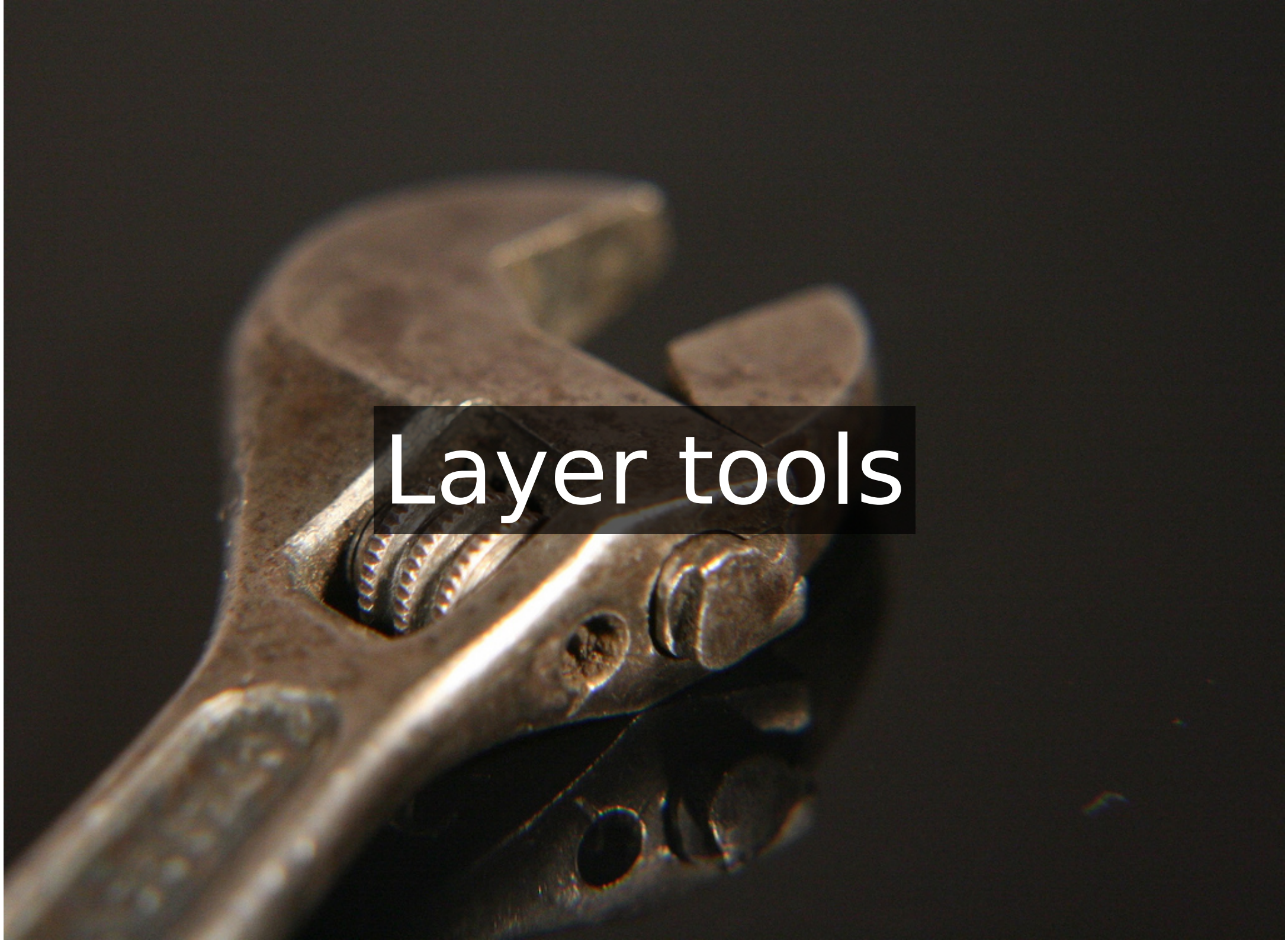
```
# We have a conf and classes directory
BBPATH := "${BBPATH}:${LAYERDIR}"

# We have recipes-* directories, add to BBFILES
BBFILES := "${BBFILES}
            ${LAYERDIR}/recipes-*/*/*.bb
            ${LAYERDIR}/recipes-*/*/*.bbappend"

BBFILE_COLLECTIONS += "layername"
BBFILE_PATTERN_layername := "^${LAYERDIR}/"

BBFILE_PRIORITY_layername = "5"
```

conf/layer.conf
See Yocto Project developer's guide



Layer tools

Managing metadata across multiple layers can be tricky
Yocto Project is working on tools to do this

bitbake-layers


combo-layer

Current status

OE Layer index:
16 BSP layers
12 software layers (e.g. EFL, XFCE)
5 distro layers
meta-openembedded
New layers popping up all the time

What's next?

Yocto: Enhance layer tools further

- Start looking at what each layer does down at the variable level in bitbake-layers
- Web-based layer index (searchable)
- Recipe maintenance tools

OE:

- Improve OE documentation
- Bring more metadata over from OE-Classic (need maintainers!)

References

http://www.yoctoproject.org
http://www.openembedded.org
http://www.openembedded.org/wiki/LayerIndex

IRC (freenode): #yocto, #oe


A successful tool is one that was used to do something undreamed of by its author.

Questions?

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