How the Yocto Project addressed Comcast RDK scalability issues

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Agenda

- What is the Yocto Project?
- What is the RDK?
- Scalability issues, Yocto Project to the rescue!
- Collaboration benefits

About us

- Yocto Project Community Manager
- @Linaro
- Designed/implemented Yocto Project based RDK

- RDK architect
- OpenEmbedded and Yocto Project maintainer
- Yocto Project TSC member

What is the Yocto Project?

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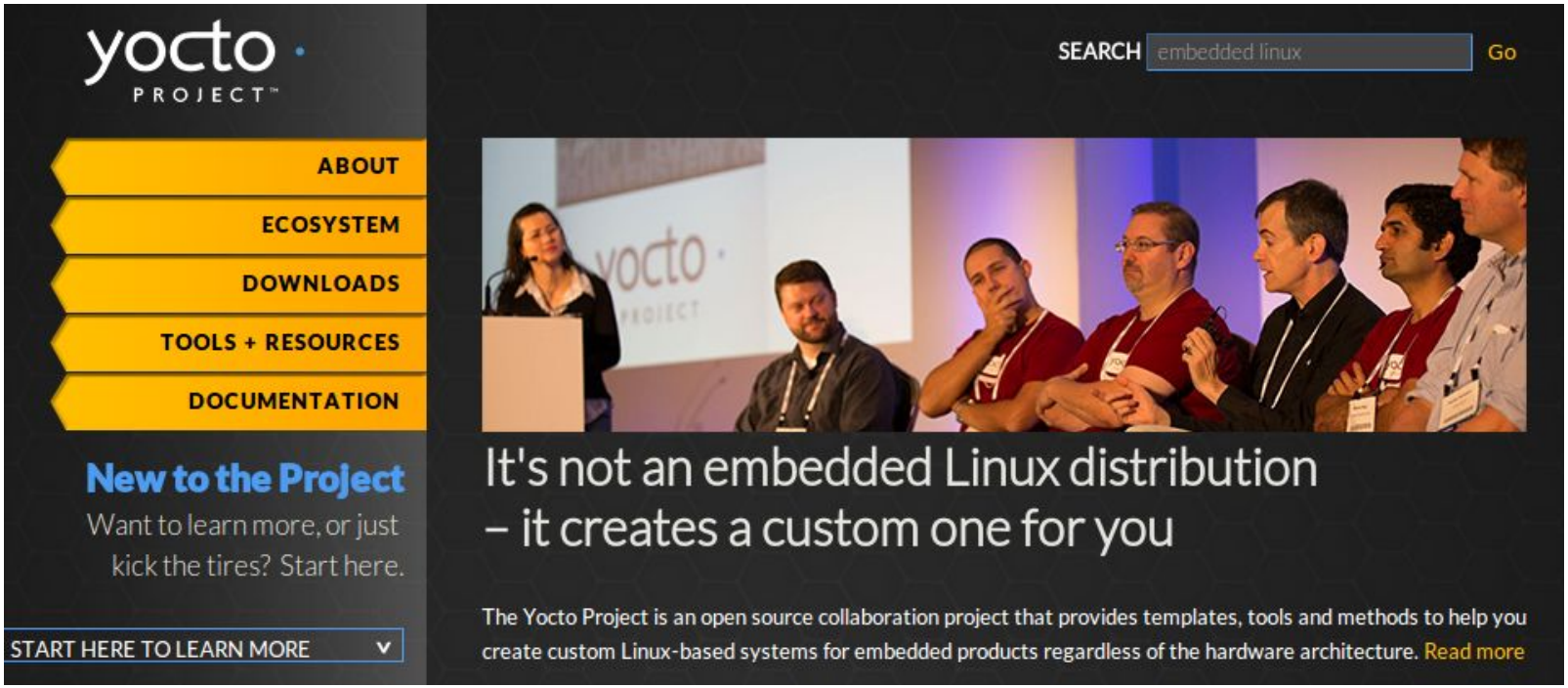


The Yocto Project is a set of templates, tools and methods that help you build custom Linux-based systems.

The Yocto Project

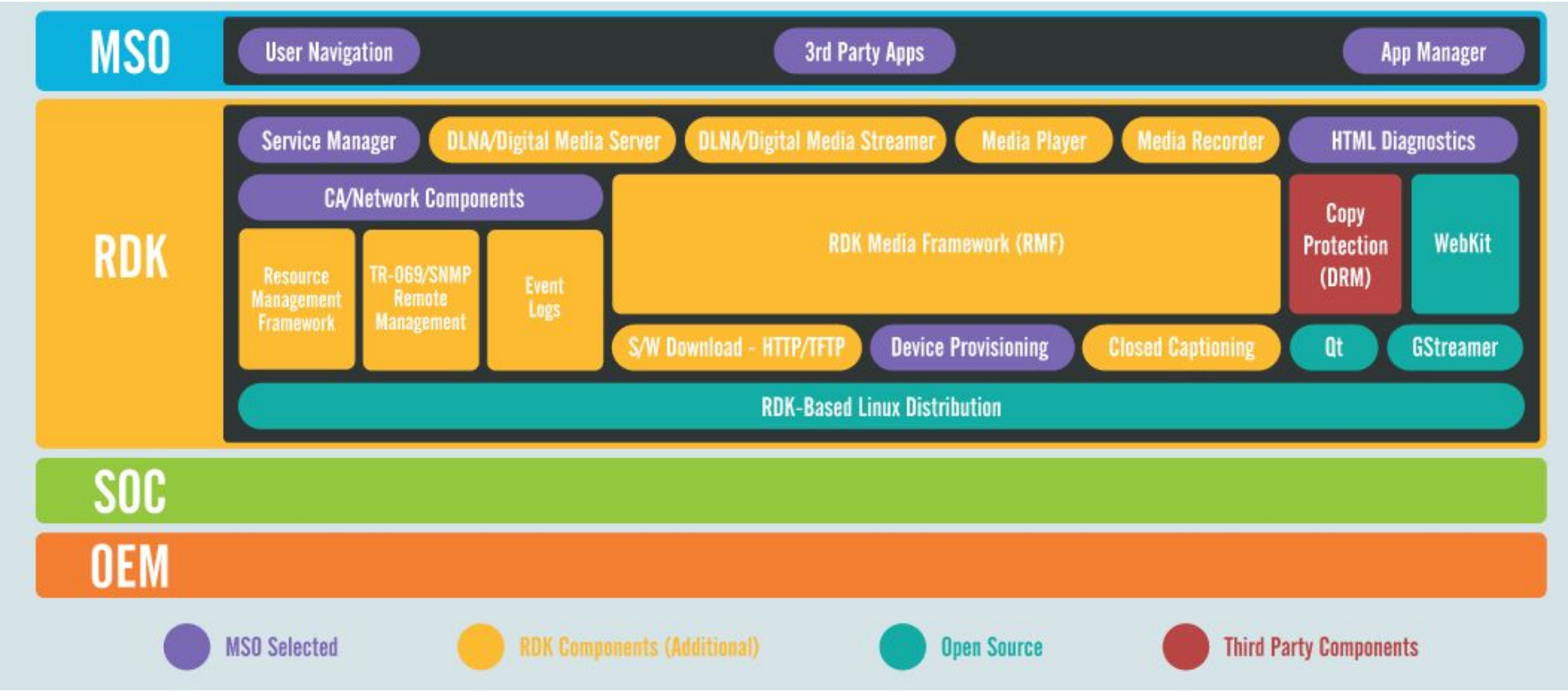
- **An open source, collaborative project**
  - hosted by the Linux Foundation in 2010
  - Project architect is Richard Purdie.
  - Based on OpenEmbedded which started in 2003.
- **Support all platforms:**
  - ARM, x86, PPC, MIPS
- **The de facto industry standard "tool kit" for building custom embedded Linux operating systems with**
  - over 50% market share by volume
  - over 80% market share by revenue
  - Released twice a year (April and October)

Why?

- **Spend less time on things that bring no value to your business:**
  - up-to-date recipes for thousands of packages
  - Quickly build an entire Linux system from source, using a validated set of packages (toolchain, busybox, libc, init system...)
  - Built in support for package management
  - Predictable and reproducible builds
- **Provides set of standard tools and build guidelines.**
  - reuse across projects or organizations
  - autobuilders/bots
  - Helps manage adherence to Open Source Licensing
  - Minimal dependencies on host and users
- **Flexibility and customization:**
  - Configure the system at will.

What is the RDK?

RDK Video software stack

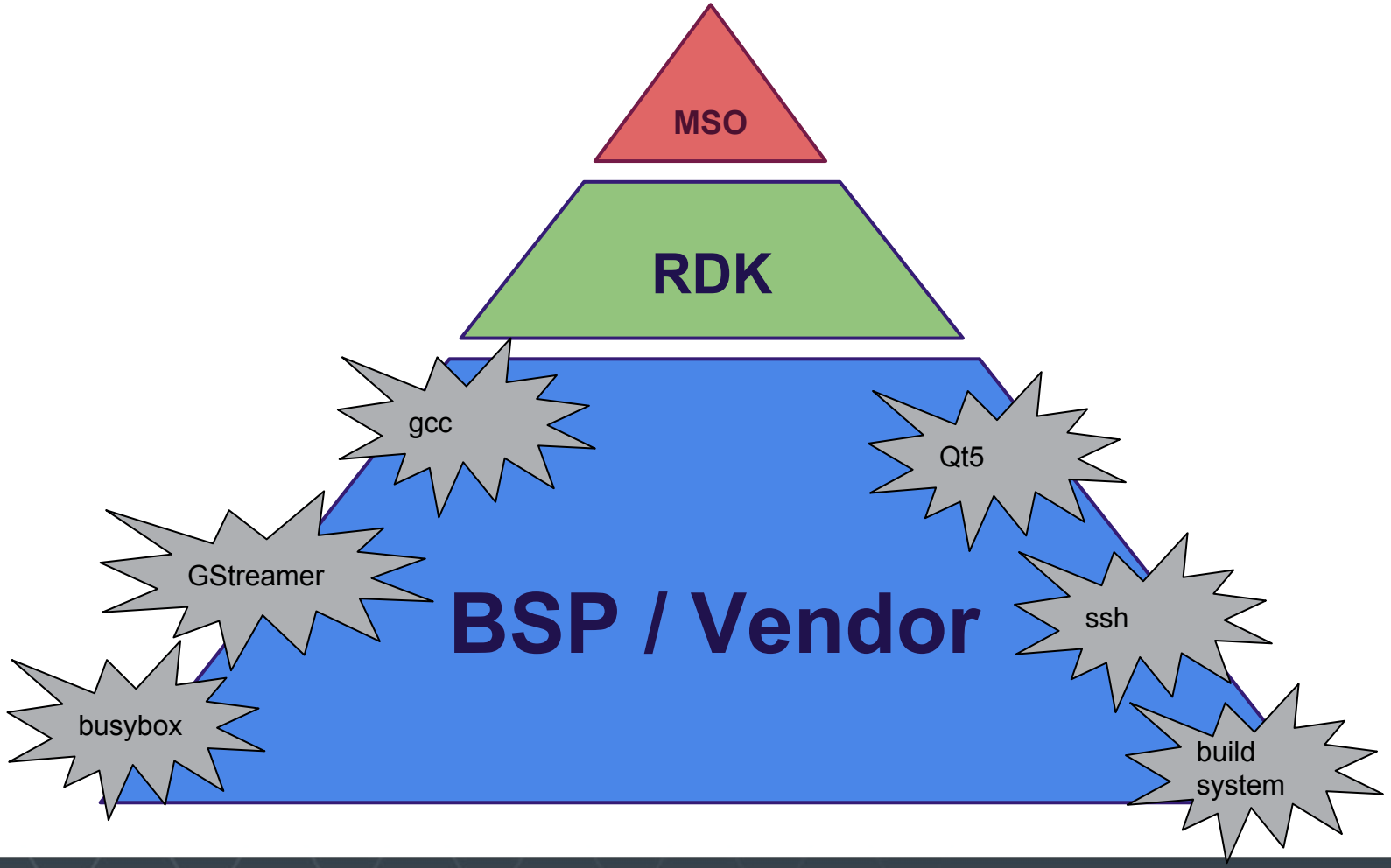


Scalability issues, and Yocto Project to the rescue

RDK 1.x : why the need for change?

- **Legacy RDK build system**
  - started with a trivial script
  - grew into a very complex “program”
- **Difficult to use,**
  - lack of documentation
- **Difficult to maintain and satisfy the scalability of RDK community**
- **Very slow upgrade of standard open source core components**
  - security
  - bugs
  - improvements

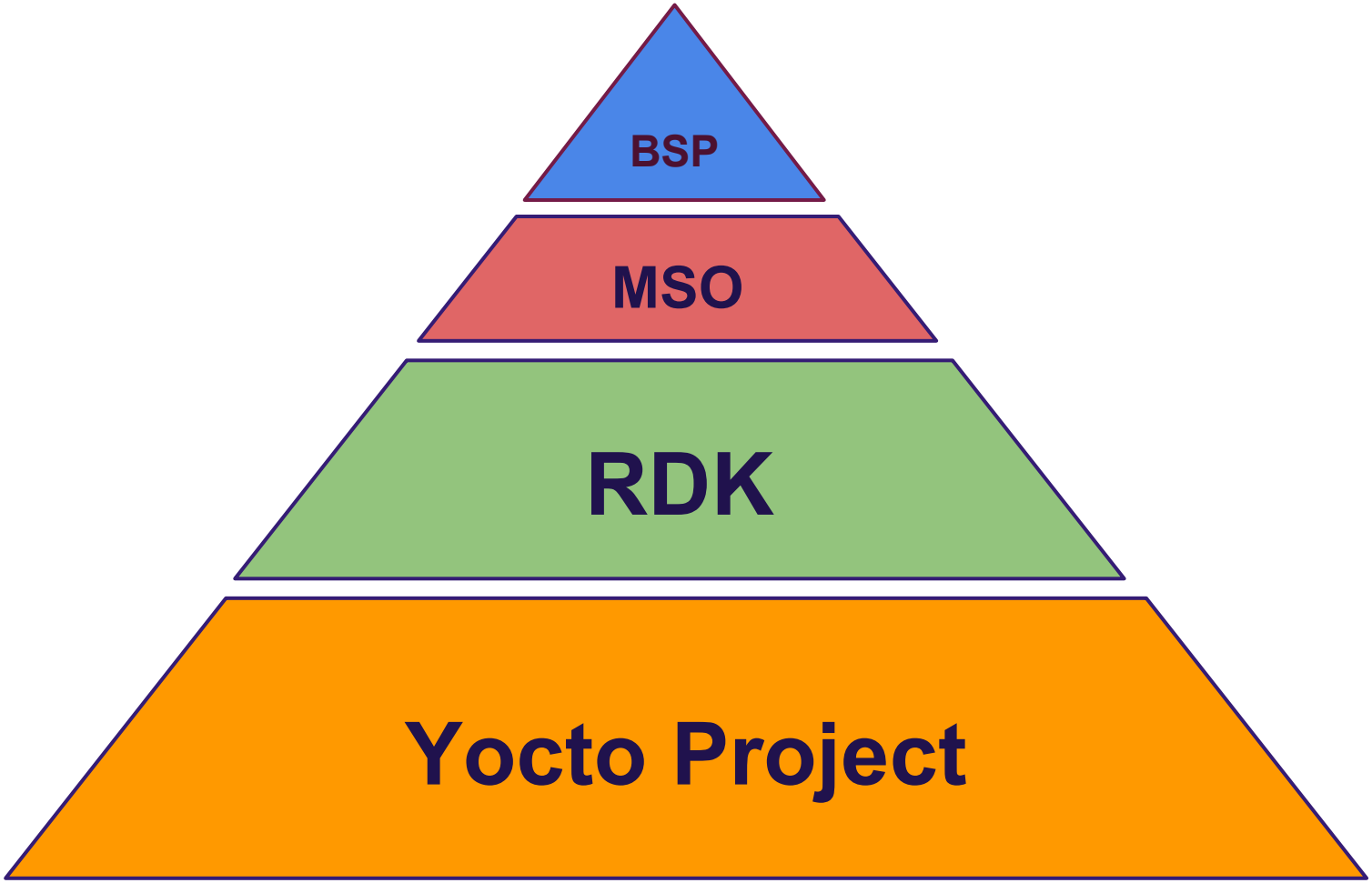
RDK1.x : the BSP problem



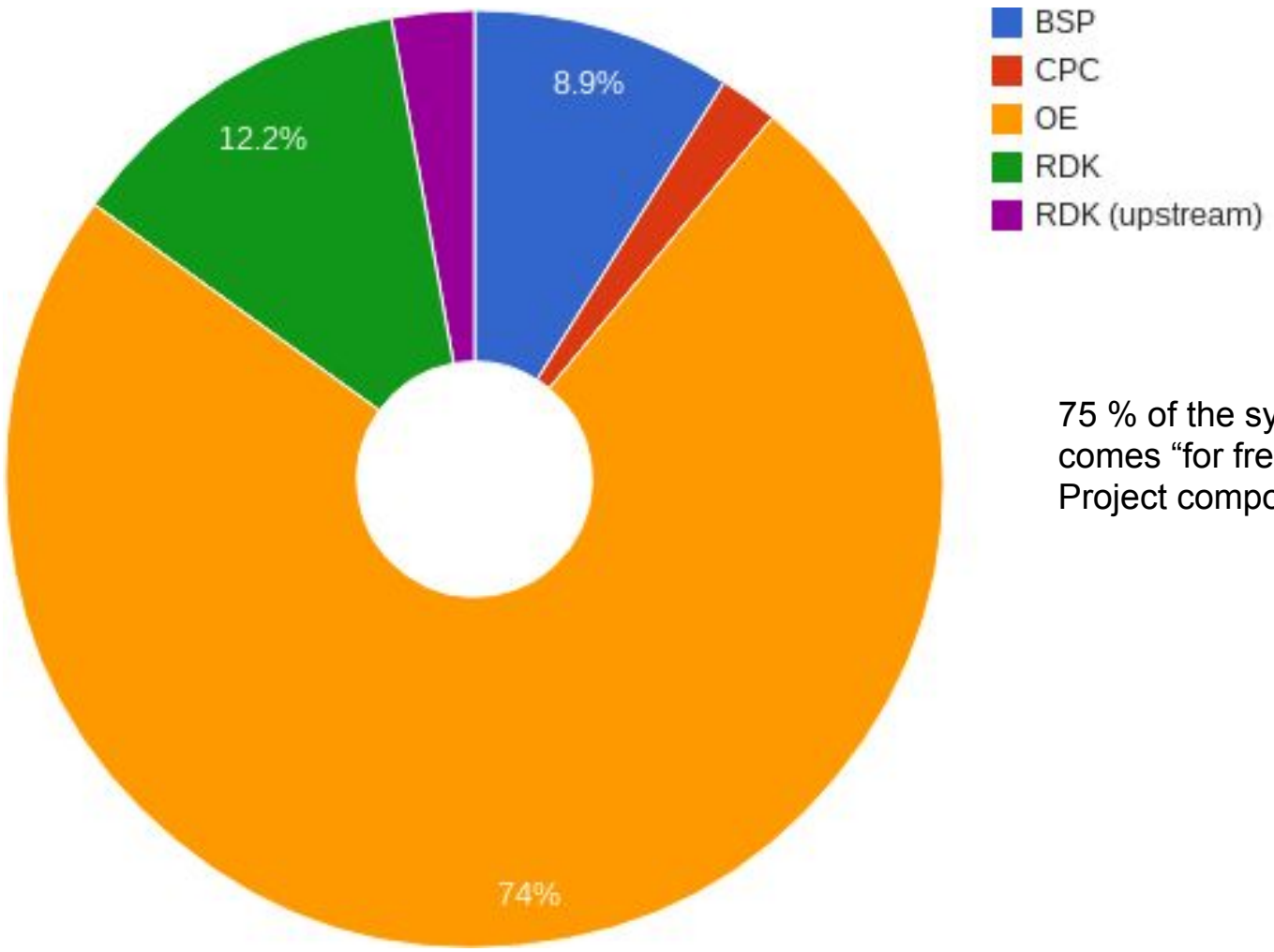
Migration to Yocto Project: goals

- **RDK unification**
- **Clear separation of ownership and responsibilities**
- **Yocto Project as a foundation for RDK**
  - rely on well supported (and existing!) recipes
  - maintenance and security updates
- **Simplified and consistent build infrastructure**
- **Upgradability**
- **Reduce cost of entry for new vendor**

RDK2.x layer architecture

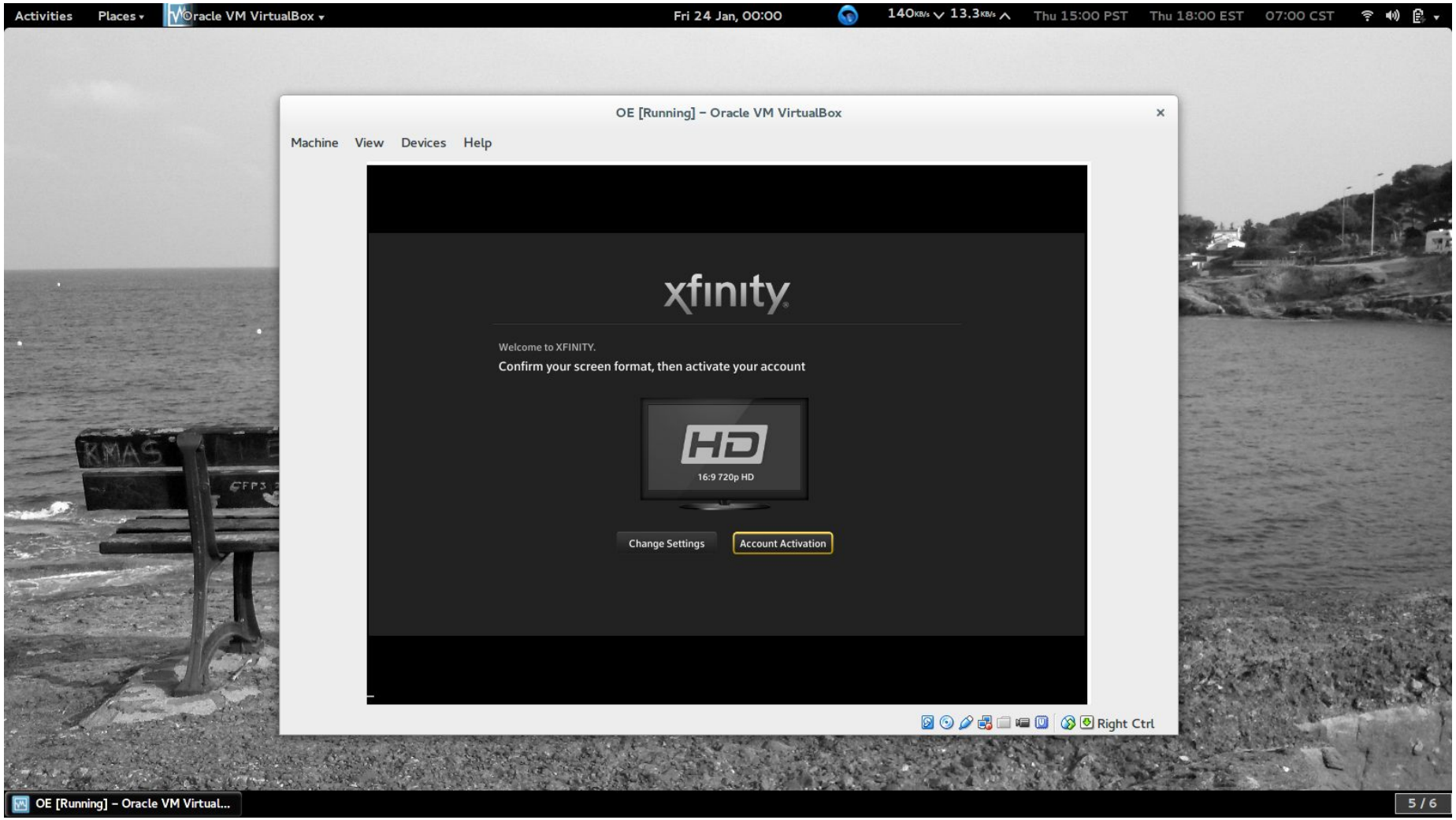


RDK2.x: origin of software components



75 % of the system image comes “for free” from Yocto Project compone

Bonus track: the RDK Emulator



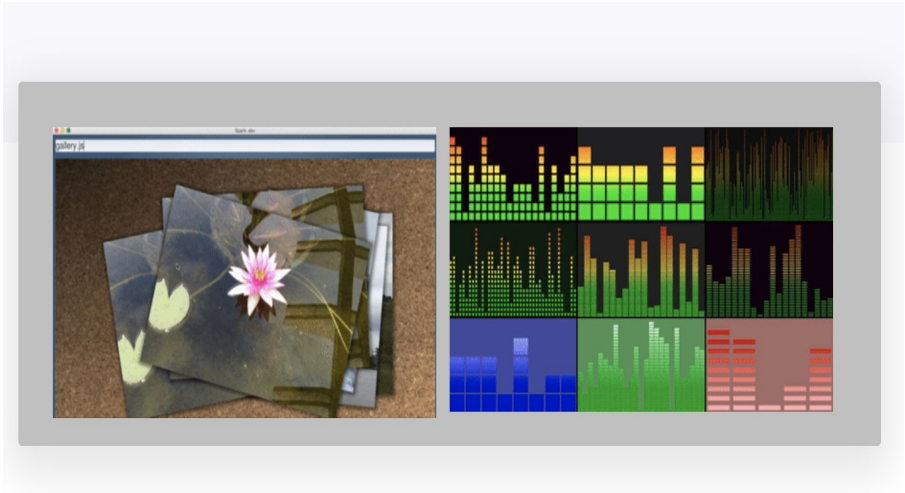
Collaboration Benefits

Yocto Project RDK benefits

- Build “on the shoulders of giants”
- Standard distribution and build tools
  - Reduce fragmentation and differentiation across SoCs in areas that don't matter
  - Reduce entry barrier for newcomers in the RDK community
  - Benefits from development, innovation and support from the entire Yocto Project ecosystem
  - Thousands of components already pre-integrated
- Standard BSP deliveries
  - Homogeneous across all RDK SoC vendors
  - BSP layer can be made independent of RDK, and can be reused for any OpenEmbedded based project

Benefits … RDK 3.0

- RDK has gained sharper Innovation focus
  - Westeros - Embedded Wayland Compositor
  - Spark UI
    - http://www.sparkui.org//index.html
  - Firebolt SDK
    - Application Development Kit for RDK
  - Optimized Embedded Browser Framework (WPE)
  - Secure Video playback
  - OpenCDM



Benefits...

- **RDKs Horizontal Scale** (https://rdkcentral.com/projects/)
  - Some of known Profiles
  - RDK-V - Video Clients and gateways
  - RDK-B - Broadband, edge gateways
    - DOCSIS, EPON, GPON
  - RDK-C - Smart Security Cameras
  - …
  - Add yours

Daily Driver Benefits...

- **Reduced build times (~3x)**
  - trusted incremental builds
- **Lot of Documentation**
  - Eases Developer Onboarding
- **Open Source Community**
  - Better Chances of finding developers
- **Licensing tools**
  - Help in compliance
- **Testing Infrastructure**
  - Indirect benefits
- **Security patches**
  - Backports

Questions and Answers

Thank you for your attention