BSD: Small But Smart?

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What is BSD?

- **Berkeley Software Distribution** (**BSD**, sometimes called **Berkeley Unix**) – a university Unix – shared the initial codebase and design with the original *AT&T UNIX*, widely adopted by vendors, e.g. *DEC*, *Sun Microsystems*.

- BSD releases provided a **basis for** several open-source development projects, e.g. **FreeBSD**, **NetBSD**, **OpenBSD** or **DragonFly**.

- **Incorporated in** whole or in part in modern proprietary operating systems, e.g. the TCP/IP (IPv4-only) networking code in **Microsoft Windows** and portions of FreeBSD used in Apple's **Mac OS X** or Juniper's **Junos**.

Nowadays BSD...

- Still continues to serve as a **technological testbed** for academic organizations, e.g. *Cambridge University Computer Laboratory (Capsicum, CHERI, TESLA, Mirage), Università di Pisa (dummynet, netmap), Swinburne University of Technology's Centre for Advanced Internet Architectures.*

- Still used in numerous **commercial and free products**, and, increasingly, in embedded devices, at different companies, e.g. *FreeNAS, pfSense, NetApp, EMC/Isilon, Yahoo!, New York Internet, Panasas, genua mbh, Hudson River Trading, Netflix, Netasq, Datapipe.*

- Still there in the list of *Netcraft's* **most reliable hosting** company sites – *3 out of 10, and 1st is FreeBSD in March 2013.*

Is BSD About Licensing?

Indeed **friendly** license:

- **Allows** companies to distribute derived products as **proprietary** software.

- **Compatible** with many other open-source licenses.

Is BSD About Licensing (Only)?

But the following is usually considered as well:

- General **quality** of its source code, architecture.

- **Centralized** development of components.

- **Extensive** and excellent documentation (manual pages).

- **Conformance** to standards (IEEE, ISO, ANSI, POSIX), optionally conservative extensions, retaining traditions.

- Emphasis on **compatibility**, **stability** and **reliability** (binary compatibility layer, KPI, API, ABI).

- **Mature** development model.

Is BSD About RElicensing?

Take a brief look at some recent changes:

- clang/LLVM: library-based approach, more flexible architecture

- BSD-licensed `grep(1)`: library-based approach

Desire for **simplicity**, **usability**, **minimalism**, **quality**, **avoiding gruesome hacks** – *random* open-source code found somehere *may not* provide this.

Things have to be **rethought** sometimes! There is no silver bullet but room for improvements, the World keeps changing...

Taking the **challenge**.

BSD is Experimenting

Apparently BSDs like to come up with their own solutions to problems. But is this itself a problem?

- Virtualization: **bhyve**
- Security: **jails**, **MAC**, **OpenPAM**, **Capsicum**, **auditdistd**
- Firewalls: **PF**, **NPF**, **IPFW**, **IPF**
- File systems: **UFS**, **GEOM**, **ZFS**, **HAMMER**, **HAST**
- Networking: **IPv6/IPSec (KAME)**, **netmap**, **CARP**
- Management of applications: **Ports**, **pkgsrc**, **poudriere**
- Userland: **OpenSSH**, **OpenSMTPD**, **tmux**

The BSD community usually is very open and encourages new and fresh approaches, everybody is free to **experiment**.

Is BSD Lagging Behind?

Compare the numbers of developers (in 2013):

- **Linux** kernel developers: **1300+**

- **Debian** developers: **1000+**

- **FreeBSD** developers: $\sim$ **360**

- **NetBSD** developers: $\sim$ **240**

- **OpenBSD** developers: $\sim$ **120**

BSD Has Scarce Resources

However, the smaller number of developers comes with some advantages:

- **Dedicated**, experienced, skilled, mature, convergent community of developers and users.

- **Careful** investments for projects, careful allocation of resources.

- **Less** teams of less members, less overhead in management and communication.

- **Focused**, polite, constructive technical discussions and arguments, avoiding "bikesheds".

- **Peer-to-peer** reviews.

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What do you think?

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