

Using FreeBSD to Promote Open Source Development Methods

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Abstract

In this paper we present AeroSource, an initiative to bring Open Source Software development methods to internal software developers at The Aerospace Corporation. Within AeroSource, FreeBSD is used in several key roles. First, we run most of our tools on top of FreeBSD. Second, the ports collection (both official ports and custom internal ones) eases our administrative burden. Third, and most importantly the FreeBSD project serves as an example and role model for the results that can be achieved by an Open Source Software projects. We discuss the development infrastructure we have built for AeroSource based largely on BSD licensed software including FreeBSD, PostgreSQL, Apache, and Trac. We will also discuss our custom management tools including our system for managing our custom internal ports. Finally, we will cover our development successes and how we use projects like FreeBSD as exemplars of OSS development.

1 Extended Abstract

The Aerospace Corporation operates a Federally Funded Research and Development Center for National Security Space. From the corporate web site[Aerospace]:

Since 1960 The Aerospace Corporation has operated a federally funded research and development center in support of national-security, civil and commercial space programs. We're applying the leading technologies and the brightest minds in the industry to meet the challenges of space.

The company employs approximately 2400 engineers on a wide range of disciplines. In today's engineering

climate, a large portion of these engineers write software, up to thousands of programs by some counts.

Due in part to the fact that these engineers are not trained software developers, the quality of software and software development methods varies widely. Since Aerospace helps oversee the development of massive software projects, we have a significant number of people who are trained to develop these types of software. They represent one of two historical groups of developers at Aerospace. They use big, heavy development processes which produce reliable software suitable for all sorts of applications, but require significant numbers of full-time developers and large paper trails.

The other camp takes a laissez-faire approach to software development. They tend to use little or no processes to the point that one of the more advanced groups was using a shared file system for development with a white board to lock files before the AeroSource team started working with them. As would be expected, this approach to development yields highly variable results. A number of pieces of software are quite useful and are even used outside the company, but even with those we've heard reports of problems like features disappearing between releases.

Past attempts to encourage developers of the more important pieces of software to adopt more rigorous development practices have met with limited success. One problem is that these developers quite reasonably fear the more heavy weight processes they see employed to build big systems. In addition to the process overhead of these methods developers worry about the cost of tools and the need to learn new tools.

AeroSource is our current attempt to bring modern software development methods to the more ad-hoc development projects within Aerospace. We are promoting the idea that using tools and methods from Open Source software (OSS) development provides a useful midpoint between big, expensive software methods and current practices. In addition to promoting Open Source software and development methods, we are also promoting the Open Source development philosophy

within the company. We call this internal OSS, Enterprise Source Software (ESS). ESS enshrines principles of OSS, but restricted to the enterprise. Users of ESS are free to read the source code, build and run it, make changes to it, and redistribute modified versions of it as long as they do so within the bounds of the company. External software distribution remains governed by existing processes.¹

In the full paper we discuss our experiences designing, developing and promoting AeroSource and the Enterprise Source Software concept. We discuss our use of FreeBSD throughout, both as critical infrastructure and as an example of both what can be achieved with OSS methods and one set of highly effective methods. In the Enterprise Source Software section we discuss ESS and the reactions of users to it. Coming from the OSS world, it's often hard to grasp the issues people raise, but we've found it's critical to do so if we're going to convince people to support ESS so we discuss those issues here. We also discuss the ways in which we use FreeBSD as an example of the value of OSS development methods. In the AeroSource section we discuss our implementation of AeroSource using FreeBSD and other open source technologies. We also talk about our successes and failures in recruiting projects to use it. Finally we conclude with a discussion of future directions for AeroSource.

References

[Aerospace] The Aerospace corporate web site.
October 11, 2007. <http://www.aero.org/>

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¹We have ambitions to encourage the release of more Aerospace code as OSS. ESS is the first of several steps in that direction.