OPEN
SOURCE

## The Future of
Tech and Telecom

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The open source philosophy and methodology has made a considerable impact on the history of computing. It has steadily entered and gained traction in almost every area and industry. For reasons of protecting intellectual property and keeping development focused, proprietary software was, for decades, the only way for organizations to achieve specific goals within budget. Because proprietary software or hardware is developed by businesses whose sole aim is to achieve or maintain profitability, these products could more effectively be designed 'in-house', often in a shorter span of time.

But the draw and appeal of computers and programming has always attracted countless hobbyists and amateurs. And this community of talent has been hard at work since the first computer, building and modifying software, to provide useful new features or just to have some fun.

What was seen as hobbyist fun for decades is now a mature community of developers that industry takes very seriously. Major businesses and organizations are now utilizing the open source method of development to build software that is more responsive to user needs and often less expensive. The telecommunications industry is certainly no stranger to open source. This whitepaper explores the open source philosophy and its impact on the telecom sector.
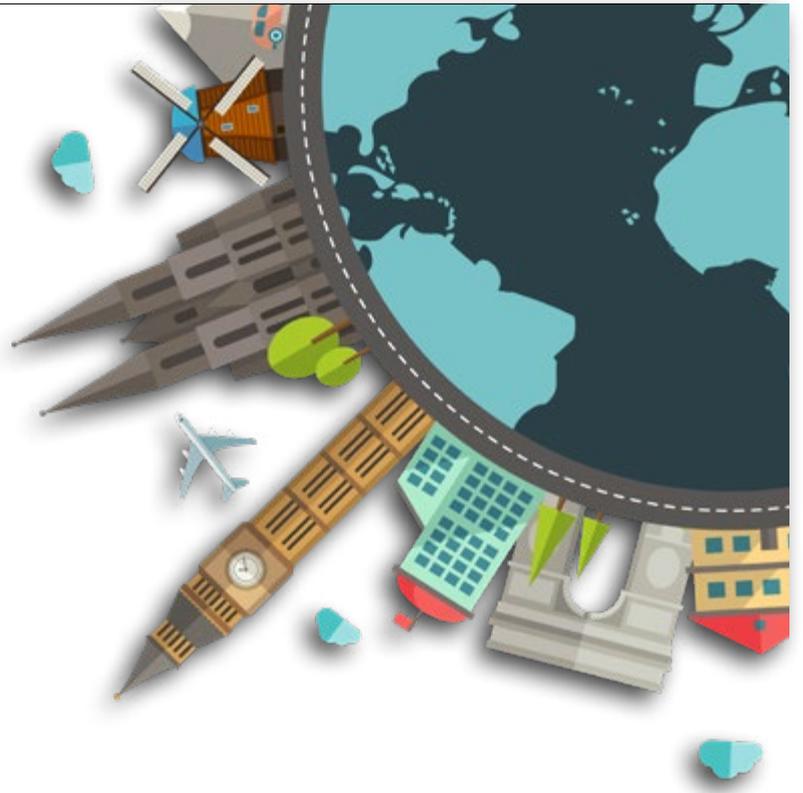
WHAT IS OPEN SOURCE?

The open source method leverages the power of the Internet to develop software. It does this by organizing a project around building a specific tool or program, then making the source code, design documents, and content publicly available under various open source licenses. This allows any seasoned or aspiring developer to try their hand at building or improving the source code without needing to consult the original publisher or producer for permission. The key word in open source development is passion.

Developers in the open source community devote immense time and effort into designing and programming software, while simultaneously making it free and public. While there are certainly ways for them to capitalize on their work, the most significant reward for an open source project is to see the rate of collective learning increase to the point that development and adoption of their product is exponentially sped up. In fact, this is the primary reason open source projects were first organized and the community created.[1]

Open Source Licenses

Copyright laws and protection of intellectual property is a serious matter. That's why to maintain the integrity of open source projects and protect its community's peace of mind, open source licenses are used. These "allow software to be freely used, modified, and shared." [2]

There are many widely recognized and respected licenses in current use, including the MIT License and the Apache License. One of the most popular (only recently eclipsed by the MIT license[3]) is the GNU General Public License (GPL).

One reason why this license is so popular may be on account of its robust legal definitions that protect users, developers, and the software. Both Asterisk® and FreePBX® are licensed under a version two GNU license.[4] In fact, the "free" in FreePBX is actually not referring to price; it is short for "freedom," which speaks richly of its open source pedigree.[5]

Open Source Schools of Thought

Within open source communities, opinions on the overarching goals of the public development model vary significantly. Among developers, opinions can range from, on the one hand, a radical focus on user rights and decry any corporate sponsorship or oversight[6] to, on the other hand, a disinterested anti-philosophical view that open source is just a development model that gets tarnished by politics.

Corporations whose business model rely on open source softwares typically take a mediating view. They value the inherent respect for user rights built into the development model, but they recognize that, for many, they can offer invaluable value-added services. This can be as minimal as offering training and hardware or as comprehensive as offering no-worry, no-effort turnkey versions of open source tools.

Within the crowd of businesses who are adopting the open source model or technology derived from it, their reasons typically fall into two camps. For larger enterprises, open source development is a tried and true way to more efficiently utilize their internal infrastructure to speed development and gain publicity. Companies like Microsoft and Google are majorly involved in this model. Smaller businesses rely on open source to complete projects that have proven useful to users but which would be cost-prohibitive to develop from scratch.

Even within the development model, you can split hairs. Open source projects can follow either a monolithic or a modular approach. With a monolithic development model, software utilities are all released at one time, meaning fewer, slower releases but a much less disjointed product. Projects like Wordpress, Linux, and Lodash prefer this approach. Other open source projects prefer to operate with the modular approach wherein various open source softwares are seen as cogs made to work together. A great example of this are the numerous plugins for Wordpress developed with the open source approach. None of them are made to be an end in themselves, but to perform particular functions. This promotes more rapid releases of single utilities made to solve specific problems rather than be general solutions.[7]

Why Open Source Matters

Open source now plays a central role in technological development. Leading technology corporations, once known chiefly for their proprietary products, now sponsor and contribute majorly to the open source movement, as indicated by the recent acquisition of GitHub by Microsoft.[8]

Rather than keeping their software packages in private servers, companies have taken to using open source repositories as a means of increasing adoption of their software technologies by developers across the world. One of the most significant advantages of open source over proprietary technology is its ability to respond to market needs with more agility and speed. Since developments can be modified under the community's moderation without the bureaucratic, legal, or cost limitations of the proprietary development model, open source is equipped to meet the needs of end users better and more quickly.[9]

When compared to open source software, the value proposition of an exclusively proprietary development model falls apart. Open source software is more cost-effective, more agile and transparent, and support for releases is typically more robust and lasts much longer. These characteristics make open source content widely applicable to nearly every industry, giving it the potential to drive many industries forward. For instance, open source encourages new business ventures because developers can use existing technologies to create new solutions to existing problems with minimal investment. Rather than starting from square one, open technologies afford new and existing developers the opportunity to take advantage of research that has already been done by others in developing new products or contributing improvements to others.

Impact of Open Source on R&D and Culture

Organizations that host open source projects, like GitHub, play an essential role in the research and development of software and other technologies. With the reduced (often free to use) costs of hosting software packages, developers can focus on the projects without worrying about hosting costs. And if it becomes apparent that other developers solved a problem better, a developer is always able to abandon their design and instead adopt and work on the new one.[10][11] For instance, recently, in addition to its usual contribution of web browser technology (like Web Audio, Angle, Brotli), Microsoft has embraced the use of technology produced through the Google-led open source Chromium project.[12] This recent change by Microsoft shows that open source is responsive to market needs like better browser speed, which is what prompted them to use the more up-to-date technology for its Microsoft Edge browser. In addition to keeping technology up-to-date and increasing program efficiency, another characteristic of open source development is the prompt response of the community in addressing emerging security issues.

Open source also has a positive impact on culture, especially in encouraging a culture of cooperation in which developers share their work without licensing fees for the benefit of all. Through the culture of sharing, the focus of development is providing better solutions rather than increasing financial margins. This is an excellent strategy for creating technology able to respond to modern user needs. Since the source code for open source products can be downloaded and used by anyone, it is possible for developers to tailor software for the specific needs of niche groups, regardless of size. And free from the typical financial restraints of software programming, technological development is promoted at a global level, as well as encouraging solidarity by providing a platform for people to contribute what they can in skills and through voluntary donations.

THE PLACE OF OPEN SOURCE IN THE TELECOMMUNICATIONS INDUSTRY

As indicated earlier, open source has had far-reaching implications for telecommunications. The industry has seen widespread adoption of open source technologies in areas which were once dominated by proprietary technology.

Some of the open source technologies that have been widely adopted in telecommunications include compression technologies, transmission technologies, software technologies, and operating systems.[14] (All four of these areas directly shape or impact Voice over IP technology.) By cutting development costs with the open source model, service providers have been able to reduce their operating costs, allowing savings to be passed on to end users in the form of overall lower prices for telecommunication services.[15] In addition, businesses further maximize their budgets by using a higher percentage of open source softwares in their tool kits and networks, reducing or eliminating licensing fees. AT&T, for example, is a major contributor to the Linux Foundation. They have even set the goal of reducing their network costs by virtualizing seventy-five percent or more of their network with open source virtualization software by the year 2020. [16] [17]

One of the main benefits of using open source and open standards for the telecommunications industry is the robust interoperability that results. Open source software is typically designed with the end user in mind with the goal of improving different technologies without experiencing any incompatibilities.

The creation of Asterisk, the world's most widely used open source communications platform, is a famous example. Mark Spencer, the founder of Digium®, developed the software to be a PBX for his business while still in college, but its widespread interoperability and powerful utility paved the way for people to use Asterisk to develop numerous communications applications and disrupt the entire telecom industry.

Another important example that has improved the level of compatibility is the cooperation between Nokia and Red Hat in building a cloud-native design for telecom technologies.[18] By using a cloud-based approach, service providers and end users no longer need to worry about technological compatibility because all variables are addressed on the server end.[19] Cloud computing would enable the adoption of technologies like software-defined networks (SDN) and network function virtualization (NFV) through the combination of hardware and software products to result in software-only solutions that encourage innovation in telecommunications.[20] Through these solutions, telecommunications take advantage of the benefits of open source, such as responsiveness to market needs, improved security, and more rapid updates among others.

Open source technologies have made such far-reaching improvements that even big box service providers have had no option other than adopting them to benefit from the improvements they have to offer and remain competitive.

For example, the Asterisk open source communications engine made huge advancements in IP-based video and voice communications, fueling both better corporate and homebrew communications solutions across the globe. Because Asterisk and associated project FreePBX are free under the GNU GPL license, any developer, service provider, or business can adopt the technology and build either a fairly stock phone system or extensively modify it to fit almost any voice or video communications need.

Another key advantage of technologies like Asterisk and FreePBX is that they are designed with compatibility in mind. This means that service providers and end users stuck with legacy communications equipment can still take advantage of modern developments like VoIP and Unified Communications. No one gets locked out of global communications anymore like they would have when proprietary software and hardware were dominant.

Asterisk and others also empower developers and information technology employees because it makes it possible to craft robust telecommunications solutions for their end users with significantly less cost and effort. Instead of requiring developers to devote all of their resources to software development, Asterisk handles all "the low-level details of real-time communications" so that developers can focus on the business aspects of their operations.[21]

By making it possible for service providers to use open source frameworks for their telecommunications technology, the potential of open source to streamline the future of the industry, in terms of technological compatibility and standardization, are already beginning to be realized. Also, the open source method ensures that all the technology used in telecommunications remains up-to-date for security and quality reasons.

IMPORTANCE OF OPEN SOURCE TECHNOLOGY FOR COMMUNICATIONS

As indicated above, open source technology is vital to the current and future development of telecommunications products and services. Advancements have been made exponentially more quickly by adopting the open source method and ethos, especially when compared to exclusively proprietary technology.

For instance, due to the lack of any compatibility issues in open source products, all telecommunications solutions based on open source technologies will be of better quality and more interconnected. Also, due to the greatly reduced costs of R&D and software-only implementation, open source continues to make telecommunications services more affordable to all people as service providers reduce their operating costs.[22] Open source technologies can be modified and optimized at little to no cost, which means that end users experience limitless possibilities and powerful flexibility in the products available for them to use.

The future of communications technology is in open source. This is seen every day as more and more products are based on open source technologies, especially as the industry has begun to favor open source over proprietary alternatives.

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