Open-source software should be a part of every CSP's IT vision and planning

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Communications service providers (CSPs) should take advantage of free and open-source software (FOSS) to introduce new solutions more rapidly. Using FOSS, rather than proprietary software, is one way in which CSPs can become more agile, benefit from the innovations of the Internet world and embrace the digital experience. CSPs should consider the following three points if they are to capitalise on the opportunities offered by FOSS.

- FOSS has proved useful in the broader IT community.
- Adoption of FOSS is already underway among CSPs and will be mainstream by 2020.
- CSPs need to decide who will provide support for any FOSS they deploy.

FOSS has already gradually taken over elements of many enterprises, and is now challenging the dominance of proprietary software in the telecoms industry. The source code of FOSS is freely available to view, modify and distribute, either on its own or as a component of a larger aggregate solution. This can be contrasted with "freeware", where the software is free-of-charge, but not necessarily open-source (for example, Skype). Most CSPs depend upon reference implementations and support from vendors in their use of FOSS. This comment provides an overview of FOSS developments in the IT and telecoms industries and how these are gradually transforming the IT operations of CSPs.

FOSS has proved useful in the broader IT community

FOSS is no longer synonymous with "cheap" or basic, functional software. It is now driving the innovation agenda and is seen as an enabler of the digital transformation in telecoms. FOSS is no longer optional, even for technology multinationals such as Apple and Microsoft. Microsoft announced its decision to make .NET open source in 2014. This was followed by Apple's programming language, Swift, being made open source in 2015.

FOSS infrastructure was the foundation that enabled OTT players (such as Instagram and Vine) to bring services to market quickly. CSPs wishing to keep pace with OTT competitors will need to adopt the same technology and approach to stay competitive as they sell more digital offerings.

Network function virtualisation (NFV) and software-defined networking (SDN) are closely associated with FOSS – OPNFV is a collaborative open-source platform for the former, while the goal of the OpenDaylight Project is to accelerate adoption of the latter. This makes adoption of FOSS even more imperative from the perspective of a CSP. Deploying FOSS enables CSPs to modify source code immediately, rather than being dependent on the release cycle of proprietary software or having to engage with proprietary vendors for custom development. By extension, FOSS code also offers enhanced interoperability, which reduces vendor lock-in. Deploying FOSS also enables CSPs to avoid capex investment in premium services from proprietary vendors, which would then aim to monetise integration work or upsell advanced services to their clients.

Adoption of FOSS is already underway among CSPs and will be mainstream by 2020

FOSS has reached almost every aspect of current software technology. For example, the Open Compute Project (OCP) and Telecom Infra Project (TIP) are both initiatives started by Facebook to share new designs for data centres and telecoms network infrastructure. The FOSS concept has the potential to be highly disruptive for vendors and CSPs. However, it will also enable greater collaboration and new partnerships to be formed.

FOSS has previously been closely associated with the IT industry, but it is now filtering into other industries that are increasingly reliant on software, such as healthcare and telecoms. Operators are no longer questioning the suitability of FOSS for their businesses, but are instead considering ways to include it in their IT solutions. OpenStack is a cloud OS that controls large pools of computing, storage and networking resources. It is a FOSS platform already widely deployed by Tier 1 operators, such as AT&T and Deutsche Telekom. Another example that indicates the expected importance of FOSS to CSPs is Hadoop, which is a widely-adopted, open-source, big-data platform. Cloudera is the most prolific contributor to the Hadoop ecosystem and the company reported revenue of USD100 million in 2015. Numerous leading CSPs, including BT, Telkomsel and Verizon, have gained business value from adopting Hadoop, as the software allows CSPs to better manage and utilise big data to make business gains.

FOSS has already been widely deployed at lower levels in the telco IT stack. These deployments include the Hadoop and Linux data platforms, and the Apache and OpenStack webserver technologies. There have also been deployments in many other application areas, some of which are outlined in Figure 1.

Figure 1: Examples of FOSS deployments at CSPs [Source: Analysys Mason, 2016]

Open-source software	Supplier	Example of deployment
CloudStack (cloud OS)	Apache Foundation	Alcatel-Lucent, Amdocs
Hadoop (big data platform)	Apache Foundation	China Mobile, Telefónica
jBilling (billing software)	AppDirect	Deutsche Telekom, Swisscom
OpenDaylight (SDN controller)	Linux Foundation	Chunghwa Telecom, Telstra
OpenBRM (billing software)	OpenBRM	FuzeNet, Globacom
Opencell (billing software)	Opencell	Bouygues Telecom, Orange
OpenStack (cloud OS)	OpenStack Foundation	AT&T, Ericsson
MySQL (database software)	Oracle	Telenor, Verizon
Analytics Pentaho (business intelligence software)	Pentaho Corporation	BT, Telefónica
Ejabberd (XMPP server)	ProcessOne	Orange, Swisscom
SugarCRM (customer relationship management software)	SugarCRM	Community Telco, Digi Telecommunications

The main challenge of FOSS is deciding who will support it

Increasing adoption of FOSS by CSPs presents numerous benefits, but it also presents operational challenges. CSPs require highly reliable products to deliver their services, so the cost of testing, supporting and updating the underlying code is significant. It is therefore essential that CSPs consider how FOSS will be supported before deploying it. This is particularly important because telecoms infrastructure, unlike that used in most other

industries, will need to be supported over a long period of time, potentially a number of decades. Open-source communities and telecoms enterprises will thus require a sustainable means of supporting FOSS over these timescales, regardless of who is going to provide the support.

The integration of open source into telecoms services will also challenge the direction of FOSS, which has always been closely associated with the development of new functionality. This contrasts sharply with development of telecoms infrastructure, in which emphasis has always been placed on performance, reliability and security. The new functionality that FOSS has often provided will drive innovation in telecoms software, but it is also imperative that support for FOSS is developed to provide the levels of reliability required in a CSP.