OPEN SOURCE SOFTWARE IN CHINA

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Executive Summary

The purpose of this report is to find the more suitable approaches to software development in China's future. This report introduced Chinese OS software including OS operating systems, the possibility of the use of OSS in education, Chinese government's plan about OSS, and the use of a OS platform called OpenStack in China. The advantages and disadvantages of open and closed source software was discussed in five aspects: cost, service, innovation, usability, and security. For better innovation, five keys were advised in the end of this report. To mobilize the enthusiasm of the Chinese to take part in OSS communities, organizations and communities in China and the government of China should put more effort to OSS.

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1. Introduction

1.1 Background

In 1999, the government of China developed China first OS operating system. OSS (Open Source Software) may solve piracy problems and save money. China does not have any OSS with an international reputation until now. OSS became more mature and adapt to business world better at present.

1.2 Objectives

This report will aim to address the following objectives:

- Development of open-source software in China in recent years
- Advantages and disadvantages of OSS and CSS
- Recommendations about China's future approaches to software development

1.3 Report Outline

This report is divided into 4 sections. The first section is about the development of open-source software in China in recent years, including open-source operating systems in China, OS education platform and cloud operating system such as OpenStack. The section two will outline the advantages and disadvantages of OSS and CSS in 4 parts. Then, this report will give recommendations about China's future approaches to software development. The last section is the conclusion, a summary of this report.

2. The development of open-source software in China

Chinese local software industry is young. Chinese company hardly develop upper-level software, such as operating systems. (Li, Lin, Xia, Wilson III, & Best, 2004) OSS can help software industry and the government may support OSS energetically. (Li, Lin, Xia, Wilson III, & Best, 2004)

2.1 OS Operating System

Chinese government released a Linux-based system in 2000 named Red Flag Linux (RFL). The final release of RFL is RSL 8.0 released in 23 April 2013. (Pan & Bonk, 2007)

In 2001, Kylin which is closed to the public was underwrote by National 863 High Technology Program in China. (Introduction of Kylin, 2004) The latest Kylin system is applied to the Tianhe-2. (Dongarra, 2013)

Support by the Chinese Academy of Sciences, the “China Operating System” had a bad reputation. (Lipsky, 2014)

Public OS operation system is unfulfilled, so that it can only help government and military departments. (Li, Lin, Xia, Wilson III, & Best, 2004)

2.2 OS Others

In 2017, there are over 40000 educational institutions and companies such as China Mobile used EduSoho to build online learning platform. (EduSoho, 2017)

In China, OSS and domestic software are considered to be closely related. (Guo, Huang, Zhang, & Chen, 2010) The "Internet Plus" plan is to help Internet companies increase their international presence. (Xinhua, China Focus: "Internet Plus" to fuel innovation, development, 2015) The support of the Chinese government is significant to OS (Guo, Huang, Zhang, & Chen, 2010) In this case, several government organizations work with third parties to build cloud computing platform based on the OpenStack. Chinese

companies are making great contributions to the OpenStack community. (Martinelli, 2016)

Tencent's Tstack won the OpenStack superuser award, which proved that Chinese companies are enthusiastic about using OSS. Tencent participates in community activities as a participant and sponsor. (Ferguson, 2017) But the contribution of China to the OSS community is relatively little. There are only 3 organizations is from China in the top 100. (diycode, 2017)

Commercial software with additional functions on the OS platform has received a favour from the government.

3. Advantages and disadvantages

There are various variables to consider, but the top 5 would be cost, service, innovation, usability, and security. (Amadeo, 2013) This report will discuss based on these factors.

3.1 Advantages of OSS

OSS is the cheapest option when it has maintaining and service support. It is a choice of low-level users. (Saltis, 2017)

OSS has good support. The community with the "image" authentication system, a system to show developers' credits or values, can make developers willing to develop into core developers (Figure 1). (Fitzgerald, 2009) Moore and Benbasat gave "image" a more important position. (Tornatzky & Klein, 1982). Image allows programmers to

SOCIALIZATION IN AN OPEN SOURCE SOFTWARE COMMUNITY

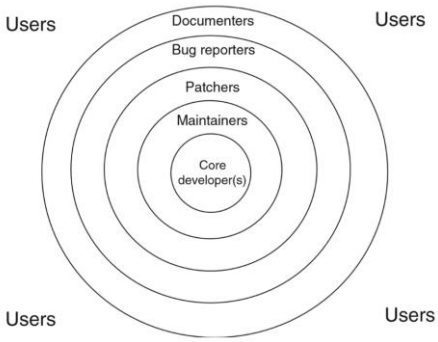

Figure 1. Current picture of OSS community organization.

gain public recognition of their skills and promote career opportunities and exposures. (Josh & Tirole, 2011)

Other external factors have more influence on the evolution of software than the software approaches itself. (Raghunathan, A Prasad, B. K. Mishra, & Hsihui Chang, 2005) So it is not necessary to be a CSS if you need success.

OSS encourages innovation. (Saltis, 2017) OSS has better performance in personalized problems. (Webb, 2001)The administrator can in control of the level of risk. (Ross, 1999)

OS can hit Chinese piracy industry. If companies turn the business mode into selling

affiliate components and service support, they will get more economic income. (Nilay, 2005) (Pykäläinen, Yang , & Fang; , 2009)

3.2 Advantages of CSS

CSS has better service, CSS providers will ensure their product is working and take more responsibility for the safety of their users, they have the strength to protect privacies. CSS has detailed help documents which is friendly to novices. (Amadeo, 2013) The CS projects are less complex than OS projects for the beginners. (Paulson, Succi, & Eberlein, 2004)

CSS can also provide sufficient test experience and have support from the online community. (Saltis, 2017)

3.3 Disadvantages of OSS

OSS needs long-term maintenance, and could increase the cost of uncontrolled. (Amadeo, 2013) (Saltis, 2017)

Sam Saltis (2017) state that OS is a philosophical imagination which can leave users weak to rascal developers and selfish hackers.

The OSS community cannot provides efficient help, and the ability and security of online community solutions are suspected. In the long run, the motivation of community resolution has also been questioned. (Amadeo, 2013) (Saltis, 2017)

OSS is unstable. The source code can be too vast to be test. (Amadeo, 2013)

Some comments suggest that OSS has a high quality because of the number of developers. (Raymond, 1999) But research has showed that the rate at which extra bugs are uncovered does not gage linearly with the number of reviewers. (Glass, 2003) The depth of the review is more concerned than the number of reviewers. (Howard & LeBlanc, 2002)

OSS is unacceptable to low-level users and has many different OS license terms that make it difficult for business applications. (OSI, 2017) (Amadeo, 2013)

3.4 Disadvantages of CSS

The cost of proprietary software depends on the complexity of the software, hardware costs a lot of money. (Amadeo, 2013) The provider of closed source software carefully listens to the user's needs, but the individualization of closed source software always requires expensive costs. Closed source software also has little space for the user to make many changes or additions. (Amadeo, 2013)

CSS fosters less creativity than OSS, closed source software method will provide less features over time than by using the closed-source method. (Paulson, Succi, & Eberlein, 2004)

4. Recommendations

- Following the five key factors of Rogers (2003) (Fitzgerald, 2009) (Relative advantage, Compatibility, Complexity, Trialability, Observability) in the process of innovation.
- The OS community should achieve better systematization and unity, and establish good community service suggestions for developers of different levels, to minimize the risk of innovation.
- Chinese organizations should encourage its employees to participate in the OSS community and respect their independence, so that Chinese developers can do more contributions.
- Chinese government should pay more attention to the OSS based on 2016 XI'S statement. (Xinhua, Xi stresses Internet innovation, security, 2016)
- Attach importance to basic education for software development
- Although OSS has a few different license terms, GPL takes up 50%. (Kirk St.Amant & Brian Still, 2017) So it is necessary to read them carefully.

5. Conclusion

In 1999, developers cannot develop such advanced OSS at the initial stage of the industry. Today, the number of advanced developers is not enough to support OS advanced operating systems and applications. Foreign OS platforms provide opportunities for developers to work with the government and develop some software. Some Chinese companies start making contributions to the OSS community.

For the long-term, OSS is the most economical way to develop software. OSS can stimulate the creativity of the developer in a good OSS community. Developers speak of their values and enjoy the recognized social status. This is the motivation of the OSS community to flourish. The quality of the software does not change because of OS or CS. OSS can meet more personalized needs and suppress the piracy industry.

China need to popularize the basic education related to the development of computer software. A standardized OS community. Image system may promote the development of OSS. (Glass, 2003)

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