'Raspberry PI' Future Outlook for Tamil

Saravanan Mariappan

Nexus NGN Sdn. Bhd., Malaysia. Email: nexusngn@gmail.com

Abstract. With the fast developing IT World and broadband penetration expanding rapidly from urban to rural, drastic economical, financial and educational improvement within the community were observed in developed nation. Hence many government institution have dedicated arm focusing mainly on the development of broadband facilities in rural area. With the made available broadband facilities, further challengers lays ahead on how to disseminate information and knowledge. Basic computing tools at low cost can be made available to the rural communities, with the introduction of mini computer "Raspberry PI" information and opportunity to be online can be made quick and cost effective. This paper addresses how Raspberry PI can contribute to the development of Tamil Community and Tamil Language. The mini computer can be used to develop teaching tools such as Mini USB Projector and simple Android Mobiles with internet access. It can also be used to be integrated with server as thin clients bringing the cost to implement ICT labs at remote rural sites cost effective. This paper will also discuss the current influence of the mini computer "Raspberry PI" in the Tamil community and how Tamil Language and the community can develop in the future.

Keywords : Raspberry PI, Thin Client, ICT Lab, Open Source

1.0 INTRODUCTION

Raspberry PI is a credit-card-sized single-board computer developed in United Kingdom by Raspberry PI foundation with the intention of promoting the teaching of basic computer. Since the development and touch of Raspberry Pi mini computer in 29th February 2012 the sales of Raspberry PI reached beyond 1million units. The used of this mini computer have gone into various industries, replacing expansive programmable controls. Creating new era of programmable device development. Some of the industries that uses Raspberry PI are:
- Nuclear industries
- Real-time monitoring devices with web interfaces
- Cloud storage and management
- Industries depend on Thin Client
- Home automation and monitoring
- Laptops
- File sharing portal
- Attach to camera and take picture on command.
- Digital signature
- Personal computers and many more
-

What interest us for the development of Tamil is the usage of Raspberry PI for teaching and the usage of broadband. For this purpose we can use Raspberry PI as personal computer and Thin client.

2.0 RASPBERRY PI REQUIREMENT FOR TEACHING

The basic requirement for affordable teaching devices are that the device should be able to operate using open source operating system and able to work on LAN.
Some of the criteria of open source operating system and software are:
- Licenses are not restricted to any party
- Licenses are allowed to be modified
- Modifications are allowed by adding on "patch files"
- No discrimination against person or groups
- Redistribution of program can be done without the requirement for additional licenses
- License must not be specific to a product
- License must not restrict other software- it's not required for other programs to be open source.

The type of open source programs that Raspberry PI should able to execute are:

1. Open office

Media Corder

2. Web browsing

 Miro

3. Instant messaging

Pidgin

4. Video playback

VLC

5. Video conversion

6. Video player

Miro

7. Graphics editing

GIMP   Paint.net   Inkscape

8. Email

Mozilla Thunderbird

9. Sound recording

Audacity

3.0 RASPBERRY PI AS THIN CLIENT

An ideal thin client is the computer hardware without hard drive and well equipped with dedicated mini motherboard which depends on the central server for processing data and connects to the server through network to run application, access files, print, and perform all services available in on ordinary computer. Plate 1 shows Raspberry PI working as thin client using edubuntu's LTSP.

Plate 1 : Raspberry PI as Thin Client.

A cost-effective similar solution can be provided by using Raspberry PI as thin client. It can be supported by open source

edubuntu server platform or LTSP server and run applications on central server.

The Raspberry PI that operates are thin clients are called Berry Terminals. The Berry Terminals linux base, designed to turn Raspberry PI mini computer into a low-cost thin clients. Figure 1 shows the working principal of Raspberry PI as thin client.

3.0 RASPBERRY PI AS THIN CLIENT

An ideal thin client is the computer hardware without hard drive and well equipped with dedicated mini motherboard which depends on the central server for processing data and connects to the server through network to run application, access files, print, and perform all services available in on ordinary computer. Plate 1 shows Raspberry PI working as thin client using edubuntu's LTSP.

Plate 2: Centralized Raid Server

4.0 ADVANTAGES OF OPEN SOURCE COMPUTING SYSTEM

The thin client system in school computer labs are capable of providing affordable server-based open source computing solution. The main advantages of using this system in schools are to increase reliability and consistency of technology over time. Through a password-accessible accounts, students, teachers, and administrators can store and can access saved documents and personal settings. Since all files and programs are stored centrally, users can access their work from any computers within the network.

Eg. when a teacher or student "logs in", the server provides them with their "desktop configuration". Users can even access their "desktop" from home or other remote location.

The other advantages of open source computing with thin client system are as below:
- less administration – central management of users, patches, software, data and backups.
- Higher security – elimination of viruses, Trojans or other vulnerabilities on the user desktops.
- Hardware independence – support of virtually all client devices and computer hardware and very low system requirement.
- Easy access – teacher and students can access their documents and applications from any PCs in the local area network.
- Reduction in TCO – Total Cost of Ownership reduction by up to 50%.

Benefits for school in using open source computing thin client system:
- Lowers cost of technology over time
- Secure data and equipment
- Less downtime and greater efficiency
- Reduces administrator staffing costs
- Lessen the risk of data theft
- Disaster recovery: Data is more secure
- Reduced time for technical support

- Lower power consumption: save electricity
- Zero licensing management
- Minimum maintenance
- Highly trained individuals are not required

At present we have successfully done about 70 ICT labs in Tamil schools in Malaysia using thin client and server base computing.
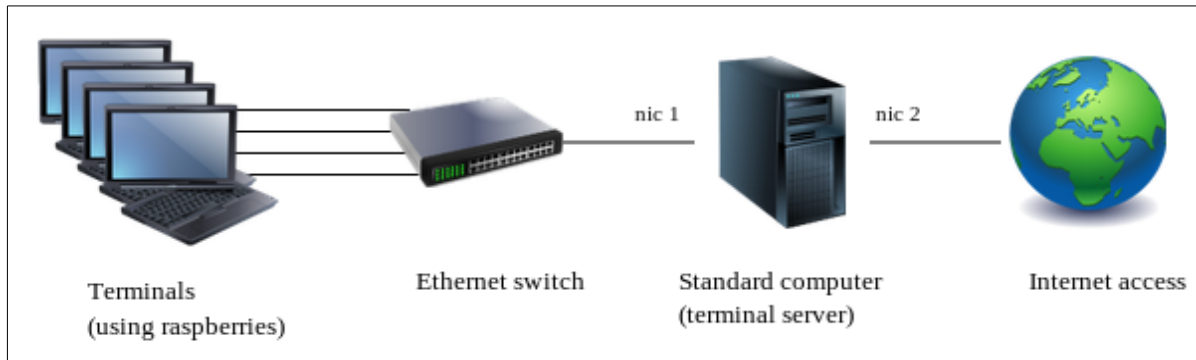

Figure 1.0 shows the working principal of Raspberry PI as thin client.

The labs at present uses refurbish computers of Pentium 3 and 4 or above. These systems are venerable to breakdown without any signs of defects due to aged motherboard, cooling fan, power supply, and other moving parts. Hence with the introduction of Raspberry PI the longevity and warranty period of the thin client can be extended beyond two to three years as Raspberry PI do not have any moving parts.

5.0 CONCLUSION

The open source thin client computing environment currently implemented in Malaysian Tamil schools have been well received with 70 over schools been teaching ICT and Tamil since 2009. With the use of Raspberry PI as thin client, the performance of the lab can be enhanced further. The cost to implement the lab can also be reduced substantially. The server based open source technology making it easier for students and teachers to organize and access education materials and multimedia content. At the same time the thin client network enables the schools to use this technology more effectively to monitor students work. With open source applications and thin client technology it was possible to decrease the cost of installation and the cost of maintaining the computer lab. With servers installed at each and every schools, the setting up of centralized school management system is now possible. With centralized school management system in place, teaching and training materials can be deployed to every schools at realtime. This will enhance greater sharing of knowledge between schools, universities, individuals and even between countries, pushing the envelop to further height for the growth of Tamil language and Tamil community.

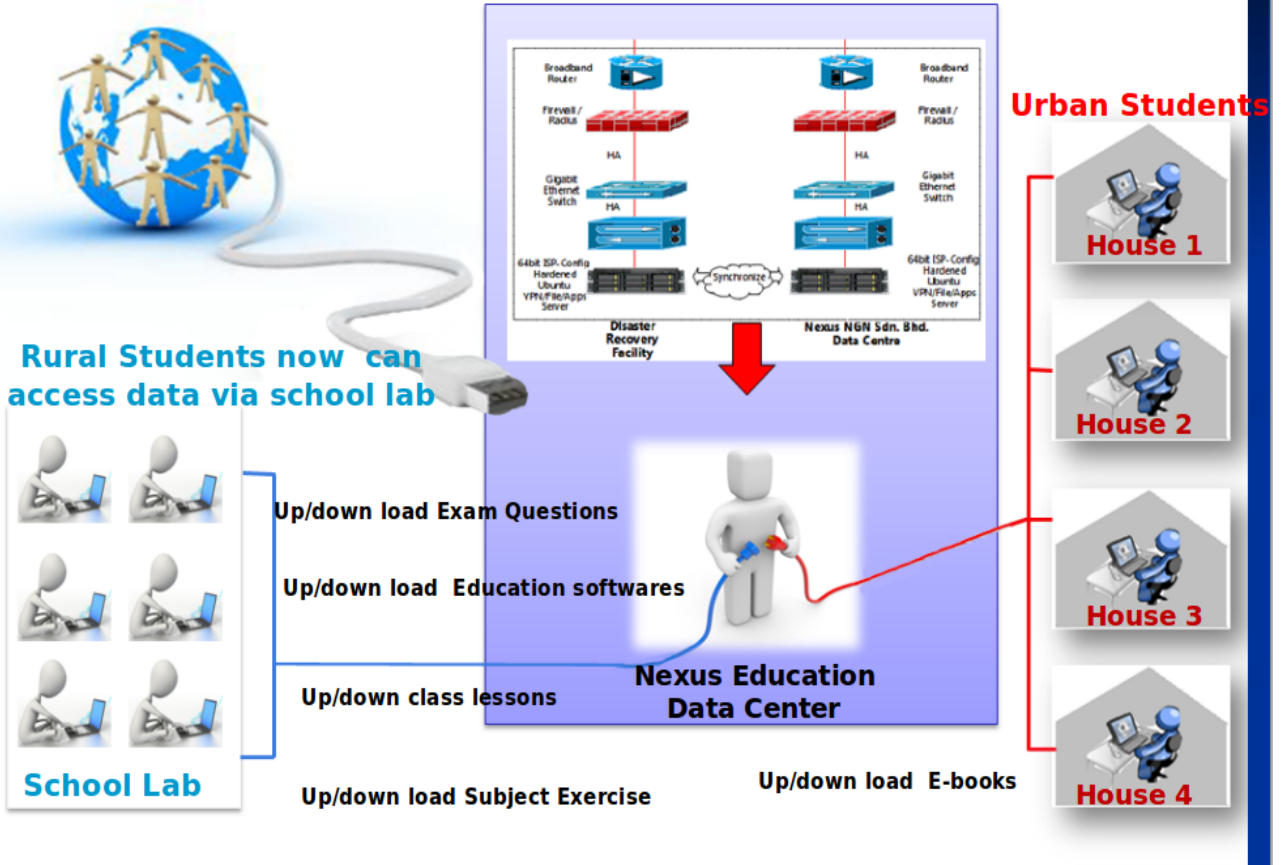Plate 3 : Tamil school students using open source Thin Client in an ICT lab.

Figure 2 : Shows the future of Thin Client and centralized management allowing students and schools to have full access to centralized server from anywhere at anytime.