Advanced Client Management Tool For Diskless Workstations Using LTSP

Akshay Chavan
Pimpri Chinchwad College of Engineering, Nigdi

Swapnil Gujar
Pimpri Chinchwad College of Engineering, Nigdi

Ansh Bahri
Pimpri Chinchwad College of Engineering, Nigdi

Jayesh Chaudhari
Pimpri Chinchwad College of Engineering, Nigdi

Abstract

Normally, developing countries suffer from shortage of infrastructure needed to fulfil requirements. Most of the institutes, school and colleges do not have efficient financial conditions and according to buy costly licensed software and with strict IT laws it becomes very difficult to meet both ends for the authorities. The much needed solution for this problem is "Free Open Source Software (FOSS)". There are many solutions for this open source movement. One such solution is Diskless Workstation on Virtualized Linux Platform (DWVLP). This paper works on DWVLP only which is based on LTSP. The official website for LTSP is www.ltsp.org. The aim of this project is to provide the diskless workstations on Linux platform that boot from network server. The diskless workstations can be any W86/low end Pentium or even any 386 system.

The appeal of this project is that it provides an easy way to set up low-cost, diskless workstations that boot from a network server running Linux. Today, many public and private institutions can hardly afford new computers or expensive software license fees. By using diskless workstations and Linux, they can save large amounts of money and become much more productive. This technology may also be used to teach children and workers the technical skills they require for the future.

Keywords: *Web KeywordsLTSP-Linux Terminal Server Project; DNS-Domain Name Server; DHCP-Dynamic Host Configuration Protocol; DISKLESS-CPU's without hard disk and without any flash memory; ACM tool -Advanced Client Management tool for Diskless workstations repository.*

1. Introduction

i. Introduction

This paper broader the way of client management tool in distributed environment. The tool applies these techniques with the perspective of Java language, Servlets. The popularity of server side programming tool has been increased to a greater extent. According to the online research services, Java, Servlets and other scripting languages has empowered millions of domain including the well-known websites such as Wikipedia, Word press. We are providing a basic tool for server/network administrators. Although we do some minimal analysis of client to verify how it calls upon additional server code through these interface mechanism.

ii. Problem Definition

To present an assistive toolkit for administrator to monitor the diskless client using the Linux Terminal Server Project

This paper will tell us about the ways of programming a monitoring tool i.e. a tool which will help Server administrator to monitor the clients and communicate with them.

2. Proposed System

The current paper extends by providing more focus on deploying the software in distributed environment where the clients are not having their hard disks. The proposed system gives the power to administrators to communicate with clients.

The tools previously built to keep a watch on clients using the workstation in laboratory or any

working environment. A trial installation was conducted on Dual-Core system as a client and Dual-Core system with Edubuntu 12.0.4 as a server. Final installation will be done later. The Ethernet card used will be PCI Realtek rtl8139 make running at 100 Mbps. Existing well-structured networks will be used. The requirements as mentioned above will be followed for the implementation of the diskless workstations.

All the necessary software and the documentation needed to implement the LTSP network can be obtained from download section of official website of LTSP (www.ltsp.org) The precompiled packages comes in RPM format from the LTSP website. It is necessary to read the documentation before doing the actual installation..

Earlier many tools were built, one of them was "Epoptes" which could see only what clients are doing and there was no such support like having a shell script database .Here we are providing comfort to admin to fire the queries from the database which are already loaded into the shell script database provided in the system .
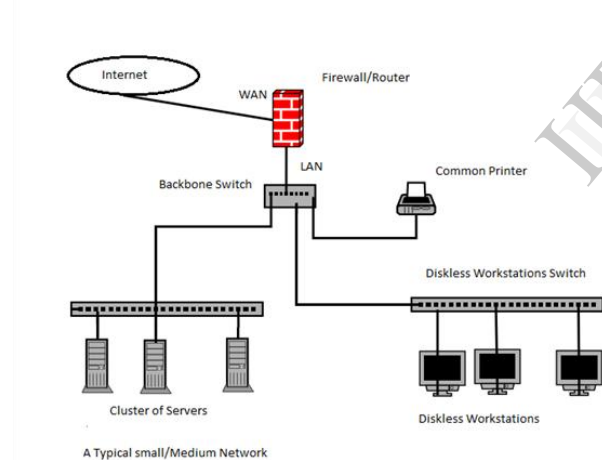
3. System Architecture

Figure 1. System Architecture

3.1 Java I/O file and Serialization:

In computer science, in the context of data storage and transmission, serialization is the process of converting a data structure or object state into a format that can be stored (for example, in a file or memory buffer, or transmitted across a network connection link) and "resurrected" later in the same or another computer environment.

In Our project we are using client-server architecture. One can load previously used commands and fire it on selected multiple clients.

3. Communication Servlets

Here we are using servlets as a communicator, where client can send request in simple objects. The data travels between client and server is in XML form so that it will not consume much bandwidth of LAN and hence reducing the traffic on the network

4. Implementation

Example:

Let us now consider, we having 5 clients which are booting from a central server say server 1,so after booting from server 1 each one will have its own running copy of Operating system. We will deploy our tool on server so that each client will get its own copy. Now clients are having their own Interface to communicate with server they can ask for specific service to the server and vice-versa.

When client start anything on its own desktop server will get notification that say client 1 has started Firefox so that you can block the services to client. And hence the purpose of the project is served.

The current system is capable of handling 20 diskless workstations. For the same we will be needing a powerful server in terms of processing speed, memory and sufficient disk space to store individual client's data. Moreover the tool we are developing is totally built in Java language and has portability. It can be run on cross platforms also suppose we need a Windows platform machine for some operations then we can add the machine into our network and by installing our tool we can monitor the client whose running its windows operating system and hence the tool provides great flexibility. At the same time administrator can monitor both clients windows platform clients and Linux platform clients.

4. Steps to setup Diskless Workstations and deployment of ACM tool

1. First install Edubuntu 12.04 operating system on server. For that the server configuration we acquired is RAM: 8GB,Processor: Core i5, Memory:750GB,NIC: PXE Enabled Realtek NIC.

2. After installing operating system check for the package LTSP i.e. Linux Server Terminal Project. If it is not found then download it via Synaptic package manager.

3. Now we have to configure some files in LTSP. Say dhcpd.conf,.

```
# dhcpd.conf
ddns-update-style      Ad-hoc;
option      subnet-      255.255.255.0;
mask
option   broadcast-   192.168.0.255;
address
option routers        192.168.0.200;
option    domain-   192.168.0.200;
name-servers
option    domain-   "your_domain.org";
name
# You really should fix this
option option-128 code 128 = string;
option option-129 code 129 = text;
get-lease-             true;
hostnames
next-server             192.168.0.200;
option root-path       "192.168.0.200:/opt/ltsp-
                        4.2/i386";
```

```
subnet 192.168.0.0 netmask 255.255.255.0 {
   range   192.168.0.100  192.168.0.199;
   if substring (option vendor-class-identifier,
0, 9) = "PXEClient" {
      filename              "/lts/2.6.16.1-ltsp-
1/pxelinux.0";
   }
   else{
      filename "/lts/vmlinuz-2.6.16.1-ltsp-2";
   }
}
#
# If you need to pass parameters on the kernel
command line, you can
# do it with option-129.  In order for
Etherboot to look at option-129,
# you MUST have option-128 set to a specific
value.  The value is a
# special   Etherboot   signature   of
'e4:45:74:68:00:00'.
#
# Add these two lines to the host entry that
needs kernel parameters
#
#                  option   option-128
e4:45:74:68:00:00;        # NOT a mac
address
#          option option-129        "NIC=ne
IO=0x300";
#
```

Figure 2: dhcpd.conf file snippet

4. After that reboot the server machine to apply the changes and then start the LTSP service on server side.

5. After rebooting install ACM tool on server side and for client side install the tool on server side itself.

6. Now start the diskless clients and enter into boot menu and select the option boot from network.

7. After doing that the client machine will start fetching its operating system from server.

8. Now starting the ACM tool part from client side will send request to server and server will accept that request and list the client in its service pane.

9. And hence the diskless clients are up and working with Advanced client monitoring tool.

Results:

Once all connections are done and tool is deployed for each and every client then we can monitor our clients from a single place only.

According to the results we came to know that the system is more helpful in educational institutes where education level is poor because of lack of infrastructure. And with the help of this system we can provide a better cost reduced solution for educational institutes and offices or small scale businesses .

5. Conclusion

We have presented a technique for reusing the older machines in educational institutes and spread more educational awareness in society.

Our project is one of the projects of open source movement and is very well suited for the Big Institutes with more rewards, with less investment and minimum efforts. The excellent feature of the open source is that it gives up-to-date documentation, which guides the user through all installation, configuration and troubleshooting process. The rate of **obsolescence** in the computer industry is very high; hence it is very difficult to convince the decision-making authorities (Management) about discarding the old computers. These old computer can be used as terminals in the project to connect to the Linux Terminal Server. In conditions where the cost is most important criterion, This project can be used in big way in schools and colleges which will also indirectly promote the students to use free and open source software in a big wayreturns the addition. For this we provided all probable combination of inputs in numerous test cases.

6. References

[1] Jim McQuillan, "The Linux Terminal Server Project: Thin clients and Linux", *Proceedings of the 4th Annual Linux Showcase & Conference,Atlanta*, October 2000.

[2] Brian Zammit, "Linux Terminal Server Project: Server Configuration Guidelines,"

[3] W. Richard Stevens, Addison-Wesley, A. Chander, D. Dhurjati, H. Inamura, and Z. Su, "TCP/IP Illustrated," Volume 1, 1994.

[4] James S. Plank, Youngbae Kim, Jack J. Dongarra,"Fault Tolerant Matrix for Networks of Workstations using Diskless Check pointing," , Vol 6.2006.

[5] http://www.ltsp.org