# FOSS – Powering IT Infrastructure

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**The economic meltdown has severely affected all segments of the economy across the world. There is all round cost cutting and a scramble for lower cost alternatives. Open Source comes as blessing in these recessionary times.**

**The computing environment of every educational institution is becoming more demanding with the passage of time. Consequently, the complexity of its IT infrastructure is also increasing. Educational institutes do not have financial resources that corporates command and hence delivering the required computing capability at a reasonable cost becomes a challenging task. The traditional approach was to use proprietary software as it was proven and well supported. The biggest hurdle was its cost. It is this hurdle that Free & Open Source Software (FOSS) helps to overcome. Not only is the software available at zero cost, it is robust, reliable and widely used.**

The open source community is a paradigm by itself. It has changed the way to harness the potential of Information Technology. Free and Open Source Software is important to end-users since it is a critical enabler. Such software is developed, tested improved and updated for use, by a diverse community of programmers and users, on a regular basis. It has proved to be a great boon for the educational institutions as it can meet a variety of computing needs at a very low cost.

While paid software has its own advantages few educational institutions can afford to buy and use paid software to meet all its needs. This need is best met by open source software which has its own merit. Being free is not its only attraction, inherent in the open source philosophy is the freedom of a distributed community of programmers to modify and improve the code. This model exemplifies the best of humanitarian effort for a social cause.

Due to this reason alone, educational institutions must give it a chance and in the process reap the dual benefit of getting robust and proven software free of cost, at the same time promoting the Open Source movement.

**Software typically required by educational institutes.**

A typical institution needs software to run its network, access the internet, send and receive emails, share printing resources, maintain databases and for word processing, spreadsheets and presentations. In more advanced setups there is a need for DTP and audio visual software besides managing an intranet and local messaging.

The open source domain has applications that easily meet all these needs and more. Those who need, can even get ERP, CRM and other Groupware, developed by the Open Source community and available freely to any type of organization.

All that is needed are a couple of motivated Linux professionals capable of self learning and supported by well trained technicians to setup and maintain a large network of computers with all critical software obtained at zero cost. It is amazing but easily made possible by FOSS.

**The ITM experience**

At our institute, the exercise began in the middle of 2004 with initial support from The Argon Company, a Mumbai based IT consultancy, who introduced us to Richard Stallman, the founder of the Open Source movement.

The journey, over the years, has been as exciting as it was challenging. We discovered new tools available in the Open Source domain and we had to spend sometime understanding and configuring it. Once this stage was crossed the implementation was relatively easy.

Switching to open source isn't like waving a magic wand. The most difficult task that we faced in the transition to Open Source applications, was weaning users from the traditional tools they were accustomed to. Unflinching support from the top management helped us to overcome these hurdles and today, ITM Navi Mumbai, maintains a network that supports over 150 desktops and a floating population of over 500 laptops. Over 90 of these desktops are thin clients supported by LTSP software.

The network layout at ITM Navi Mumbai is as shown in the attached file.

We maintain:

4 LTSP servers
4 firewall cum proxy servers
2 data exchange servers
2 NAS boxes
1 DHCP server
1 LDAP server
1 Radius Authentication Server
5 distributed print servers
30 Wi-Fi access points

We currently use 24 Layer 2 unmanaged switches with over 500 ports to interconnect the above hardware to over 200 desktops and a floating population of over 500 laptops.

Bandwidth is made available by four leased circuits, each of 2mbps rating from four independent sources. Students have access to multiple online resources such as EBSCO, HBR Online and Prowess. Most of the assignments are submitted in soft copy format.

The lifeblood of this network is a host of applications from the Open Source domain. The list comprises of:

- Fedora as the operating system, be it desktops or servers.
- LTSP software is used to support over 90 thin clients. Three LTSP servers centrally manage about 30 users each. This could have been accomplished using a single server but the cost of hardware was found to be more than that of three ordinary servers with 4MB RAM on each.
- IP Chains is used to setup the firewall, SQUID for distribution of bandwidth and SARG to monitor its consumption.
- System administrators use Webmin and NTOP to manage and monitor the entire network.
- Data repositories and backups reside on two NAS boxes. One of them runs on FreeNAS and the other uses OpenFiler.RAID5 which is inbuilt in both of these software, is in the process of being deployed.
- Desktops use Firefox for browsing and Open Office for word processing, spreadsheets and presentations. Thunderbird is the default mail client.
- We even manage a mail server based on Q-Mail with over a hundred users and as many mailing lists.
- We have small applications and an Intranet created in-house using the Linux-Apache-MySQL-Php (LAMP) platform.
- For audio-video manipulations we use Gimp for photographs, Audacity for audio editing, Kino for video editing and Blender for 3-D animation.
- Our latest venture is implementing Moodle, which an Open Source teacher-student interaction platform, which supports e-learning, online tests and academic data management.
- Gaim & Skype are used for voice and instant messaging.
- Backup is done using RSync with the help of prescheduled CRON jobs
- Our ERP runs on Tomcat with PostgreSQL providing the database support.

- We maintain our own webserver with multiple virtual domains and a mail server using QMail.

**Future Plans**

In the coming months we plan to use the following open source software.

VPN
VoIP (Asterisk)
Virtualization
Clustering

Using FOSS has become even more attractive today, due to the fact that skilled manpower is more easily available and most open source applications have the support of a commercial outfit behind it, should the need arise.

As a tribute to the efforts of the Open Source community, we are now exploring avenues to propagate the use of FOSS and train system administrators of institutions who wish to adopt this model.