



Faculty of Computer Science
University of Applied Sciences Dresden

Internship Report
New Delhi - India

Writer: Jens Langner (10895)

Supervisor: Prof.Dr.-Ing. Koch

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1 Introduction

1.1 Where I did the internship

Within the studies at the University of Applied Sciences in Dresden every student has to attend a half years internship within a company of his choice.

Working for newtron AG Dresden since a year now, gave me the chance to strengthen my experiences in the fields of network administration and JaVA programming in a foreign country.

newtron AG, a one years old e-commerce company located at Dresden, was actually in the progress in founding a new branch in New Delhi, India when I asked if they are able to send students abroad. To strengthen my english and computer science skills in mind I was offered to help newtron AG building up their branch office in india in the fields of network planning and administration.

1.2 Why abroad ?

As I were always interested in foreign cultures and countries it was clear to me that as soon as I was reaching the term of my internship I wanted to apply for a job abroad. India was a very good chance for me to improve my english knowledge by working together with english speaking people.

As India has a famous culture and way of living I was also very interested in getting a deeper knowledge of this culture and how the people are living and working there. Also the fact that india is quite popular in the fields of computer science has strengthen my decision to make my internship abroad.

1.3 The company I worked for

newtron IT Labs Pvt. Ltd., located at the southern part of New Delhi (Gurgaon) was actually founded days before I arrived in india. It is a branch of newtron AG, Dresden for whom I am working since October 1999. newtron AG Dresden was founded in October 1999 as a B2B eCommerce company and is a maintainer of several internet portals for B2B auctions & trading.

2 Responsibilities

In this chapter I would like to give a short overview of the different responsibilities I had in india and in which field I have strengthen my knowledge.

2.1 network and system administrator

Working as an independent network administrator for several companies since 1993 I joined newtron AG in late 1999 as a consultant. As newtron AG was also founded in 1999 I was highly involved in the general network planning and setup in all other branches (Dresden, Frankfurt, Singapore, Vienna).

With this experiences in mind newtron AG was very pleased that I was interested in working in india. In coordination with germany, I was responsible for network planning and installation of the indian office. Also setting up the whole server park was one of my responsibilities there.

As the time went by in my half-year internship it was also my responsibility to hire and train a indian network administrator so that after my internship this administrator was able to takeover my work.

So working as the main network administrator for the indian office was the main part of my internship because I brought 8 years of experience in networks and communications into this responsibility.

2.2 JaVA developer

Beside the job as a network administrator I were also interested to strengthen my knowledge in the fields of object-oriented programming & design and finally I got the change to get involved in the new main project of newtron in india. As newtron is only developing JaVA-based technology it was my opportunity to learn JaVA in a real software project.

I got involved into a brand new project which newtron was starting in india. It is called “newtron Procurement Desk” and is a intranet based procurement solution for MRO goods based procurement.

MRO goods are all type of goods in a procurement process, where their price is lower tahn the costs of the process they are causing.

It was one of my responsibilities to design and program one module of this software project and also train a indian developer to take over this module after my travel back to germany.

3 Network administration

As pointed out in earlier chapters it was my main responsibility to plan and administrate the network in the new office in New Delhi. In this chapter I want to go into some details of my daily work in Delhi and which experiences I made there.

3.1 Network planning & installation

Starting from the first week of my arrival in india I was responsible for planning the internal network (LAN) in our office. I searched for several companies who were able to do the wiring of the office rooms as fast as possible with quality in mind.

It was a 100MBit based Twisted Pair (TP) network which I have choosen for connecting the computers together. Beside from acquiring different companies for the network installation it was my job to specify the server architecture that should be used in the office.

As in the office in india only software development take place it was only required to acquire a office solution server as a PDC and File shareing server. After some deeper market analysis I have choosen a NT 4 Server from Hewlett-Packard with a 30GB RAID-5 system and 512MB RAM.

This server had only the job to serve the developers as an Exchange, FileSharing and primary Domain Controller.

Also the internet connectivity required a separate server as a Internet-Gateway. As I had configured and designed the network of the other branches also it was clear that the network structure in india should match the same requirements. This leads to the decision to have a separate Linux server as the primary Internet gateway and also as a secondary firewall system beside the Hardwarefirewall which I brought from Germany.

Later on we also received a SUN Solaris server as the primary development database server for india. This decision was made because the software our indian collegues are developing will be sold to work on a Oracle database which normally runs on Solaris. So it was also my responsibility to configure & install this server in india.

3.2 Internet connectivity

As the main purpose of the indian office is software development and not internet based services I decided to also search for a internet provider in that region that could offer us a bandwith of a minimum of 512kbps leased line. In the first weeks I quickly came to the point were I recognized that there are only few internet providers (ISP) in india and especially in the region the office was operating.

The problem is that india is actually in progress of allowing private ISPs to operate there but still the government provides the largest ISP. This ISP is beside of the infrastructure not able to provide a fast connection to europe which was absolut necessary for newtron because of the VPN connections between the different offices.

Another problem is that whole india has only one deep-sea connection directly to the US and non to Europe. Direct Europe connection were only possible through satellite connections which results in a minimum response time of 500ms because of the long distances between the satellite and earth.

The first offer from a ISP took place at the start of August 2000 and after some first tests and discussions newtron and the new ISP (delDSL) negotiated a one years contract. delDSL was a new founded company from Delhi which focused especially on the region were we had our office (Gurgaon). The connectivity from their Gateway to our office were provided through a direct Microwave link. This was necessary because the infrastructure in Delhi suffers a lot and it was not possible for them to guarantee a stable connection on normal land lines.

After installing this microwave link we were able to access their microwave hub via a 512kbps SDSL connection. Over a period of half a year we discovered many problems with that provider because they weren't able to provide a 24/7 connectivity. So after receiving another offer from a ISP (spectranet) we decided to switch to this provider because they were also able to provide us a deep-sea connection to the US which gave us a response time of around 300ms which was necessary for our direct VPN connection to Germany which we are using for database connections.

In generally I have to say that all ISPs in Delhi suffer from the bad infrastructure there. The cause is not only the missing land line connections, it's also the unstructured work of different organisations there, where it is very easy possible that one company cuts another company's connection and sometimes not only by fault. Also the very bad power situation in Delhi was the cause of many internet cut offs during the first 3 months. Sometimes our office were completly closed because of a long time power breakdown. This power situation is also the cause why the whole office is connected via uninterruptable power supplies (UPS) where normally only servers are connected to such supplies.

3.3 Administration

3.3.1 Network administration

In the first 3 months of my internship I was very busy in setting up the whole network including the server connectivity. This includes the network and server planning along with acquiring all necessary network hardware. Also a daily job was to check the performance of the network and eventually fix some problems where users couldn't access different sources.

Because of the bad infrastructure in Delhi I was mainly busy in calling our local ISP (delDSL) because of some internet breakdowns and bad connections. Also the installation and configuration of the firewall systems in the office in india was part of my job there.

Another main responsibility was the configuration of our virtual private network (VPN) connection to Germany. As newtron is running different VPN connections to all other branches it was also required to setup a direct VPN connection to our german branch. With this VPN connection we were able to access the newtron wide intranet which includes newtron internal information and contacts.

As I have set up the VPN connections in all other branches also, my experiences in this field were quite helpfull. It took me only several hours to completely connect our indian branch to the newtron VPN¹.

3.3.2 Server administration

As described earlier I also aquired the server for the office in Delhi and so also administrating and installing this servers was my responsibility. This included the complete installation of Windows NT 4 Server as a PDC and MS Exchange 5.5 as well as configuring it as a normal File Sharing Server.

Beside this NT-based Office Solution Server I installed and administrated a Linux Server which had the main tasks to serve the users as a Internet Gateway. As I am administrating Linux since 1996, it took me only some few hours to get this Linux Server running with all needed network connections. This server is also responsible to act as an development version control server. As newtron is using CVS (Concurrent Versions System) as a revision control system for development and the fact that I am the main CVS Administrator of newtron it was also my responsibility to install and configure the Linux server in india as the second main CVS server. Newtron has 2 main CVS servers and it was also my job to create a possibility that this two servers synchronise their sourcecode once a day. I did this via several different shell scripts that will be run via a cronjob.

This server is also responsible to act as a second firewall system behind the main hardware firewall which is installed in every branch of newtron. The firewall on the Linux server is a ipchains based software firewall which has only restrictions to access from outside. The server has two network cards where one is directly connected to the internal network (LAN) and the other one directly to the hardware firewall. With that 2-firewall solution, which every newtron branch have, the office in india is also very secure from attacks. On the other hand the server is also configured to serve the workstations as a transparent web-proxy/cache so that every HTTP-Request is cached on the local drive which results in faster transfers from the internet. Also this Linux Server is configured to act as a samba file-sharing server.

Another server which I was responsible for is the SUN Solaris based Ultra 10L server which serves the development team as the main ORACLE database server. After a complete installation and configuration of Solaris 7 & Oracle 8 this server acts as a development platform for testing the database connectivity of the software newtron is developing in india.

¹VPN: Virtual Private Network, a full encrypted transparent layer for private communication over the internet.

To achieve all the above solutions it was also needed to create some enhancements and scripts for the server for which I mainly used Perl and bash.

3.3.3 System administration

Beside from the servers I had to administrate, to acquire and to configure all workstations in the office in Delhi. As we had good contacts to Hewlett-Packard India we also ordered an overall of 30 workstations with P-III 700MHz, 17" inch monitors and 128MB RAM as development stations.

This workstations were preinstalled with Windows 98 but we needed Windows 2000 for all clients, so I created an image with Norton Ghost and installed it on every client. I also had to install several different software packages (i.e. Borland JBuilder 3) to give the developers the ability to work properly with their computers.

Also helping the developers with daily related problems of their workstations was my responsibility. In fact I were the representative for all technical related question concerning newtron IT Labs, india.

4 JaVA development

In the second part of my internship I was also involved in a new software project newtron IT Labs has started in india. As newtron AG, the founder of newtron IT Labs, is working on eBusiness based webapplications for companies the new project was a intranet-based webapplication to give companies the ability to automate their procurement processes via a intranet software solution.

4.1 The project

“newtron Procurement Desk” is a web application which is based on the internal web-framework of newtron AG. This procurement solution should provide companies with a cheap and easy way to handle all different types of transactions in a procurement process via a web-based software solution that should be located in the intranet of the company, so that every employee can access this solution directly from his desk without having to install a special software excluding a web-browser.

There exists many other procurement solution on the market but the newtron procurement desk is focusing on the low cost market where it is specialised on the MRO market.

4.2 The procurement process

To give you a deeper view into the newtron procurement desk project you should have a good overview of the traditional procurement process and how it still happens in many companies.

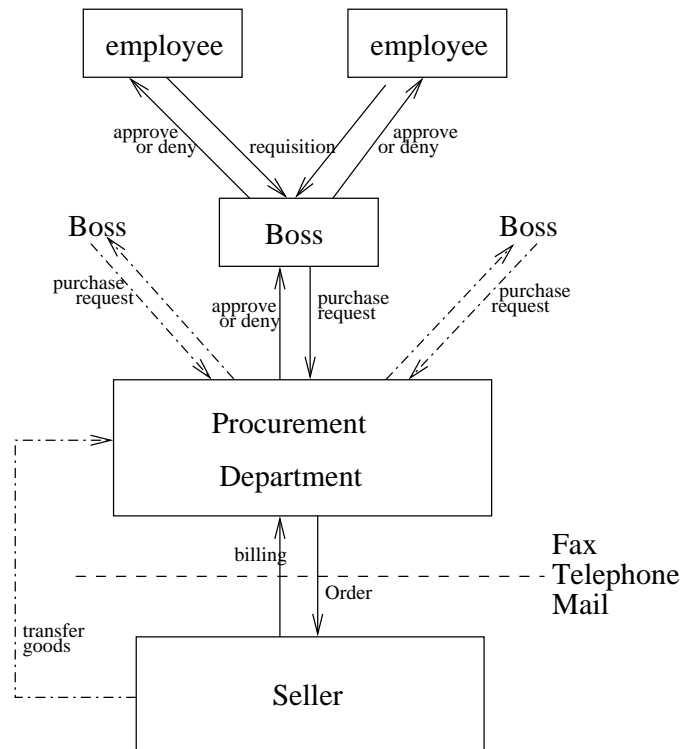


Fig 1.1 - Traditional procurement process

In former days companies had one central procurement department where all requisition came in and this was also the central point where information got stuck. Normally every employee had to go to his boss if he needs to get some material for his job and his boss could either accept or reject his requisition. Also if his boss was approving his requisition the requisition were transferred to the purchase department. All this was mainly based on manual interaction and communication.

This is the point where such a procurement solution takes place. As the former explained traditional procurement process was mainly a manual process, it should also be clear that such a process costs lots of administrative money. The idea of eProcurement solutions is based on that fact, because with such an electronical equivalent solution the company has the ability to automate this process and reduce his costs.

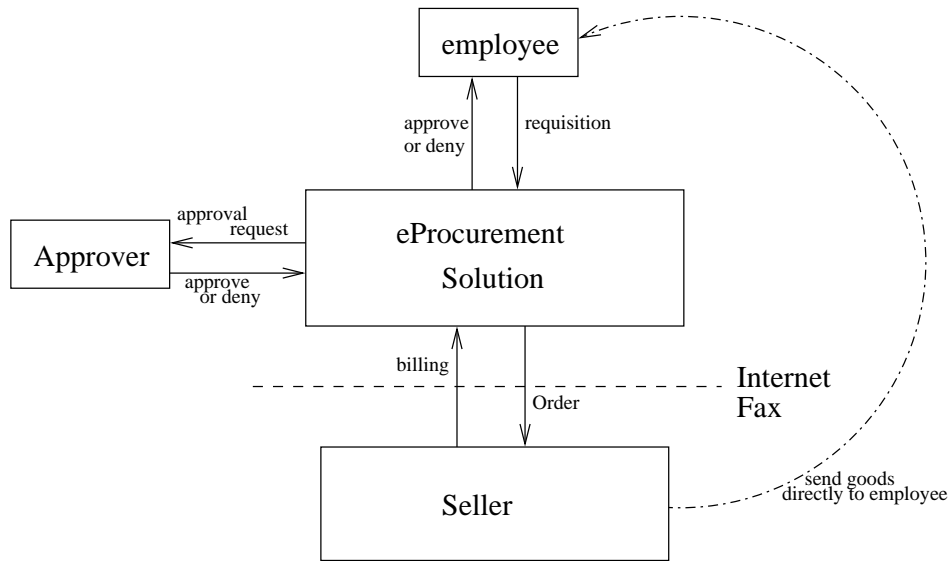


Figure 1.2 - eProcurement process

Starting from the requisition of products, the approval process is one of the most important ones in such a eProcurement solution, because it has to completely rebuilt the whole company based approval processes like in the traditional one.

To design and implement such a approval process (engine) was the part in the software solution I was responsible for.

4.3 Approval process

In a procurement process the approval is one of the most important modules because it is very important that requisitions got approved correctly and that the processes are exactly built upon the hierarchical structure of the company.

In my internship it was my responsibility to design this part of the “newtron Procurement desk” and to make sure that it will be well developed until I left india.

The development of this approval module had several different steps and especially because newtron is using object oriented software engineering tools like ObjectiF.

In the first step I had to analyse the requirements and needed features for such an approval engine. This phase took me about two weeks, where I created a separate document that I am going to attach to this report. After this first analysis I had to design the workflows with help of ObjectiF and UML¹. This workflows are also described in a non-UML manner in the attached document.

As in every other software engineering process, I had also to design the classes in UML. Normally also ObjectiF could be used to automatically create the needed source code out of the class design, but as ObjectiF and every other software engineering tool suffers here I had to manually create the classes and it’s corresponding methods, but I

¹UML: Unified Modelling Language

was also very happy in doing this, because in that way I had no problems in strengthen my Java knowledge.

As the framework of newtron also supplies a separate database part, I was also responsible for the database design which the approval module is using. This database design will also be further described in detail in the attached document.

Not only the database framework of newtron is a powerful tool, moreover this framework also includes a own webserver that also supports services lke load-balancing and caching of often used parts.

One can compare the newtron framework against other public ones like JSP/ASP². But learning more about such a web/database framework, gave me the oppurtunity to compare this framework technologies myself.

As I am working for newtron under a non-disclosual aggreement I am sorry to explain, that it is not possible to show any part of the source code nor give any detailed information about the source-part of the approval module I was responsible for. But to give you a better overview of the approval module itself I hope that the attached specification which I have written in November 2000 will be enough for you to understand what this is all about.

²JSP/ASP: Java Server Pages / Active Server Pages

5 Summary

As a summary about the internship in india I have to say that the experiences I mad there were very interesting, but sometimes also very shocking.

Beside the experiences as a software engineer and network administrator, I had the chance to live in a complete different culture for 6 months which were totally different from the thoughts I had before I arrived in india.

Not only the experience in working together with indian software developer were different from my thoughts, also the whole living as an european there with all the very poor people around me, was very different and hard.

Also often I worked around 12-14 hours a day including the weekends, because there are only very few places where you can go as an european to spend your spare time.

But still overall I would say that it was very interesting to make this experience and to work together with indian software developers, even if they are not as good as I have heard and thought before.