

# Application of Appropriate Networking

## Technology at VINLEC

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In the beginning like many other organizations back in 1999 VINLEC found that its entire computer system, software and even more so in our case, hardware was Y2K non-compliant. To cut a long story short, new software was selected, which runs on the IBM iSeries .

The iSeries works most efficiently using TCP/IP protocol to communicate with client computers. We decided to use the preferred choice of client, i.e. personal computers running emulation software. As a result, we had to lay in an entirely new network, as our old network were based on CAT-3 cabling with a UNIX server.

Topography of VINLEC, for those of you who may not be familiar with VINLEC, we operate two main offices:

A main administrative office in Kingstown.

An Engineering Complex some distance out of Kingstown in Cane Hall

In addition, our main generation station is located near to, but not at the Engineering complex; there are also two remote hydro-electric plants on St. Vincent as well as facilities on Bequia, Canouan and Union Island.

Our new software suite requires that ALL locations have access to the on-line computer system.

We began by replacing the two pre-existing CAT3 10 Base T LANS (Kingstown and Cane Hall) with CAT – 5 100 MB LANS. I cannot over emphasize the importance of getting this basic, physical aspect of your network right. Mundane matters such as how the cables are handled, their correct termination, the selection and placement of switches and hubs are absolutely crucial to the proper functioning of any network. Done correctly, you need not revisit this aspect for years; done incorrectly, your life will be a living hell filled with strange, difficult to diagnose problems. Malfunctioning NIC's bruised, defective or improperly terminated cables, poor quality switches and hubs, any of these will result in poor communication within your network. We re-did our two main networks back in 1999 - 2000 and it is a reflection of the hour by hour involvement of our own staff that the "networking experts" contracted were able to do a decent job. If we were faced with the same task today (with the technological advances) I would most seriously consider using wireless networking.

By the end of 1999 we had our Kingstown LAN running and the iSeries installed. This was fine, since our first application was Customer Information System which was mostly confined to that office.

In early 2000 we began work on the Cane Hall LAN, still uncertain as to how we would link it to either Kingstown or to the Cane Hall Power Station.

In the previous system, there were separate servers at Kingstown and Cane Hall, each with the software to run the applications used at either location; the low level of integration required could be achieved on a low level data link and if it was down most of the time no one really suffered much.

Our new business process software is totally integrated and centralized, with the entire database and all processing in one server. Additionally there are more applications, many of which are in operational areas such as Work Orders.

So how do I link these two main offices?

One look at the topography ruled out any kind of radio link, as there are intervening hills. We seriously considered fiber, but we did not have the technology, nor the time to acquire it. So we paid a visit to our friends at Cable and Wireless. Thank god

for the threat of competition! We were still able to get an overpriced but reliable leased line link between the two main offices at Kingstown and Cane Hall.

To link the power plant at Cane Hall to the main complex there, we used a simple line of sight wireless link. This has proven to be 100% reliable and was much cheaper than the alternatives of leased lines on microwave.

Next we addressed what we referred to as “the Out Stations” i.e. the hydro facilities at Cumberland and South Rivers on St. Vincent and our facilities on the Grenadines Islands of Bequia, Canouan and Union Island. Here we anticipated that we would have a fairly low volume of traffic for at least a year or two, so we added dial up capabilities to the router at Kingstown and connected to Out Stations in this way. Of course the performance of these links is directly related to the quality of the telephone lines from time to time. Now we are finding some locations are proving to have very heavy traffic, with their connection being up 40+ hours per week. This has cost implications considering Cable and Wireless charges of \$0.19 per minute. We are therefore, actively focusing on the introduction of Virtual Private Network (VPN) over the Internet, which will give a faster (44K) connection at a cost of \$120 per month. VPN over Internet is also a more secure communication link than dial up.

We have had to add additional computers to some of these remote locations. This we have done by making use of the modem sharing (proxy server) capabilities of W2K Pro. This, then, was the basic physical network required to support the business

processes running on the iSeries. There was no network domain structure; client PCs had Windows NT Workstation, Office 97, and Client Access to connect to the iSeries . Clients had no security and all files were stored on individual PCs. Clearly this was an undesirable situation from every angle.

So we set about setting up a proper domain structure. We installed two identical servers (for redundancy) one each at Cane Hall and Kingstown. Each has a total of 18 GB hard drives with RAID protection and Pentium III processor as well as a tape drive for backups. These were set up as Domain Controllers with W2K Server, Active Directory. Domain security policies were defined. We then set about upgrading all our clients to W2K Pro and adding each PC and its users to the domain. In this way we were able to establish strict control over who uses the PCs and what software is installed on each.

We also relocated all data from the individual PCs to one of the two domain Controllers. This allowed us to establish object level security and file sharing similar to that on the iSeries. We also commenced automatic daily backup of all our users' files. Finally we used simple print servers to remove many printers from the control of individual users allowing the rationalization of printer resources.

But what about the Internet, Intranet, etc.?

Previously there were about ten individual users each of whom had internet access using individual modems. As you will realize not only is this inefficient and costly, but it creates major security risks.

So, while we were setting up our domain, we installed a full time direct connection to the Internet through a firewall. Then we went around removing or disabling the various modems throughout the network. (A task easier said than done). We also registered our own Internet Domain and installed our own mail server. To those of you who may not have your own mail server, you would be surprised how simple and inexpensive an exercise this can be. Indeed VINLEC is now in a position to extend mail server services to other organization who may only have dial up Internet access, anywhere in the world.

In the meantime we have introduced two other Internet applications.

The first is the use of VPN over Internet to link our iSeries to that of our software provider, HTE Inc. in Florida. This used to be done via long-distance dial up at standard international telephone rates.

The other is the use of Web Conferencing for training. By doing this, we save the cost of airfare from Florida and accommodation expenses for software trainers. We are also able to schedule one and two hour training sessions, rather than 3 – 5 day ones. This

also allows the sharing of an instructor's time across an unlimited geographic area, further reducing costs.

Just recently we have launched an Intranet Web Site . This features items of general information and interest to VINLEC staff and is accessible to all computer users within VINLEC.

In the near future, we want to establish VINLEC's presence on the Internet by launching a corporate Webpage. This will be used to improve and expand two way communications with our customers. At a later date this will be expanded to include e-commerce, i.e. on-line bill payment among other things. This is expected to be a great convenience to customers in areas remote to our Customer Service office in Kingstown as well as to allow (say) a son living in the US to pay his parent's bill back home without the hassle and expense of money transfer, etc.

### CONCLUSION

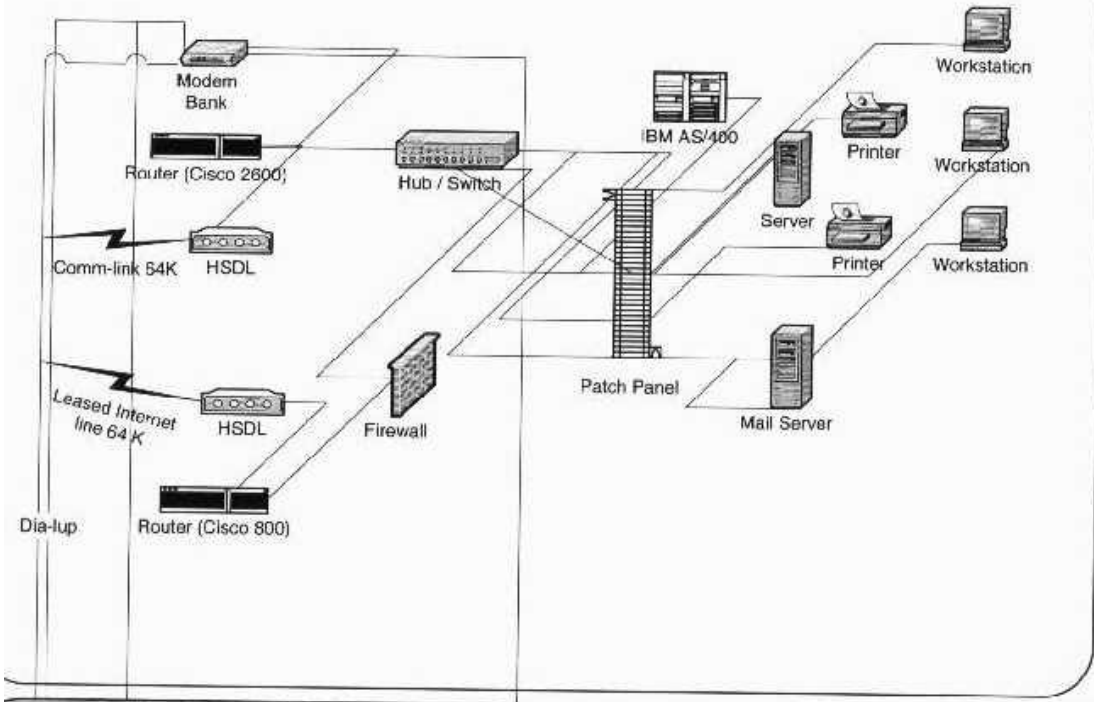
As you can see, we have managed to put together quite a patchwork quilt of networking technologies that (somehow) seems to work well for us.

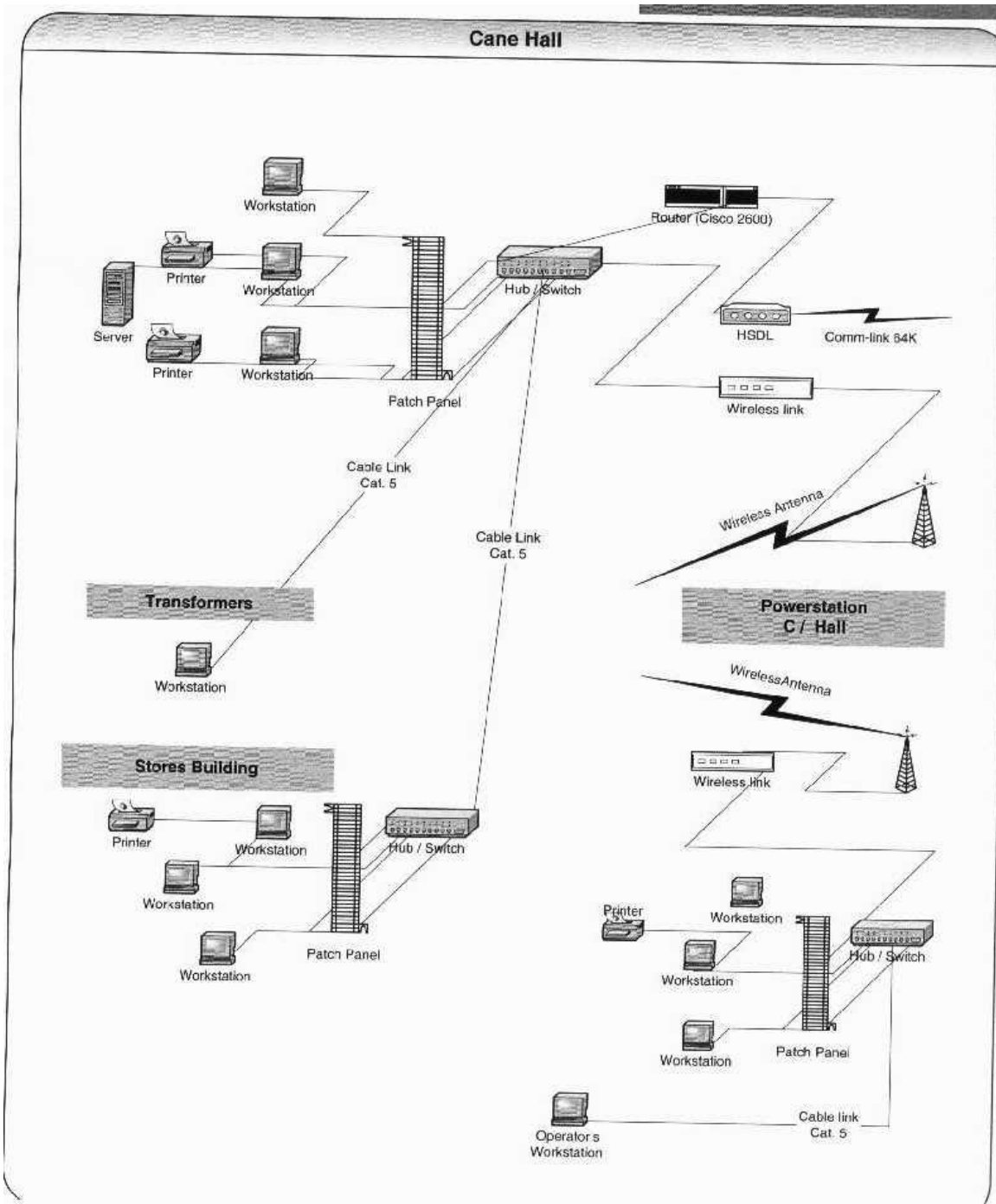
Each technology is measured in its turn against our two main criteria:

- 1) Will it produce savings or increase efficiency ?
- 2) Will it improve customer satisfaction?

The fact is that there is no easy, one stop shop for networking solutions. We have to select and integrate the "best fit" solution for each situation.

# Kingstown





## Out Stations



Canouan  
(Dial-Up)



Union Island  
(Dial-Up)



Bequia  
(Dial-Up)



South Rivers  
(Dial-Up)



Cumberland  
(Dial-Up)