FAQ - Velox Rio

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Excepcionalmente esse FAQ está sendo contruído em português e inglês, para acelerar a produção do mesmo.

Índice

Parte I.   Introdução ao Velox/ADSL

I.1   O que é o Velox?

O Velox é o serviço de dados da Telemar. Velox l28 usa uma tecnologia ISDN (há controvérsias se Velox 128 é o DVI), funciona a 128 kbps. Velox 256 usa ADSL, funciona a 256 kbps para download. Velox mais velozes devem estar chegando. O Velox empresarial é 256.

I.2   O que é ADSL?

Asymmetric Digital Subscriber Line. ADSL is a modem technology that transforms ordinary phone lines (also known as "twisted copper pairs") into high-speed digital lines for ultra-fast Internet access. ADSL also enables access to corporate networks for telecommuters, as well as exciting new interactive multimedia applications such as multiplayer gaming, video on demand and video catalogs. ADSL, or Full Rate asymmetrical DSL, offers differing upload and download speeds and can be configured to deliver up to six megabits of data per second (6000K) from the network to the customer that is up to 120 times faster than dialup service and 100 times faster than ISDN.

ADSL enables voice and high-speed data to be sent simultaneously over the existing telephone line. This type of DSL is the most predominant in commercial use for business and residential customers around the world. Good for general Internet access and for applications where downstream speed is most important, such as video-on-demand. ITU-T Recommendation G.992.1 and ANSI Standard T1.413-1998 specify full rate ADSL. ADSL is asymmetric in that it transmits data faster downstream than it does upstream. This is appropriate for surfing the Internet, for example, where large amounts of data are transferred from the network to the user, and much less data is passed back to the network.
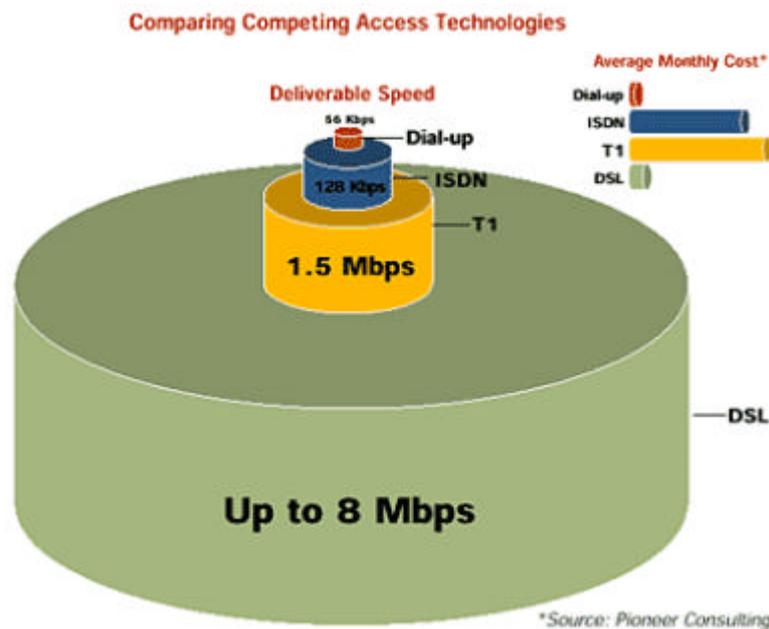
Traditional systems, like most modem connections, have been symmetric. ADSL usually has a downstream rate that is approximately 10 times faster than the upstream speed, but some ADSL offerings today deliver the same speed bidirectionally, e.g. 384kbps bidirectional. DSL: (digital subscriber line) a technology that exploits unused frequencies on copper telephone lines to transmit traffic typically at multi-megabit speeds. DSL can allow voice and high-speed data to be sent simultaneously over the same line. Because the service is 'always available,' end-users don't need to dial in or wait for call set-up. With DSL you are wired for speed.

I.3   How does ADSL work?

ADSL modems use digital coding techniques to squeeze up to 99% more capacity out of a phone line without interfering with your regular phone services. That means you could be simultaneously talking on the phone or sending a fax - while surfing the World Wide Web.

The A in ADSL means asymmetric DSL. This recognizes that for home use, since people tend to be more of a consumer of data than a producer, a slower *upstream* (upload) speed can traded off for a faster *downstream* (download) speed. In addition, the ADSL standard allows for regular phone service to be squeezed into the low end of the frequency spectrum. ADSL therefore needs a splitter to be placed during installation.
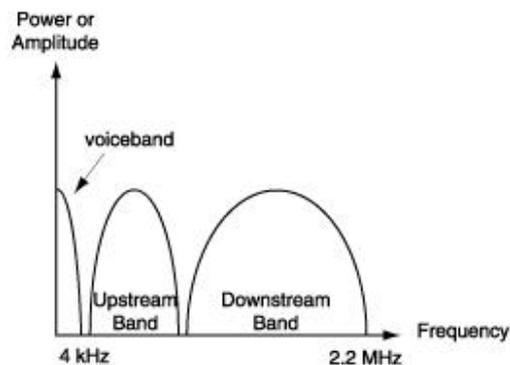
Um bom artigo, antigo, sobre o assunto pode ser encontrado em http://www.cs.tut.fi/tlt/stuff/adsl/pt_adsl.html.

ADSL Connection using Microfilters

The microfilter filters out the higher frequencies used for DSL.

Local Loop

SDSL Connection

A separate line is installed for the SDSL.

Local Loop
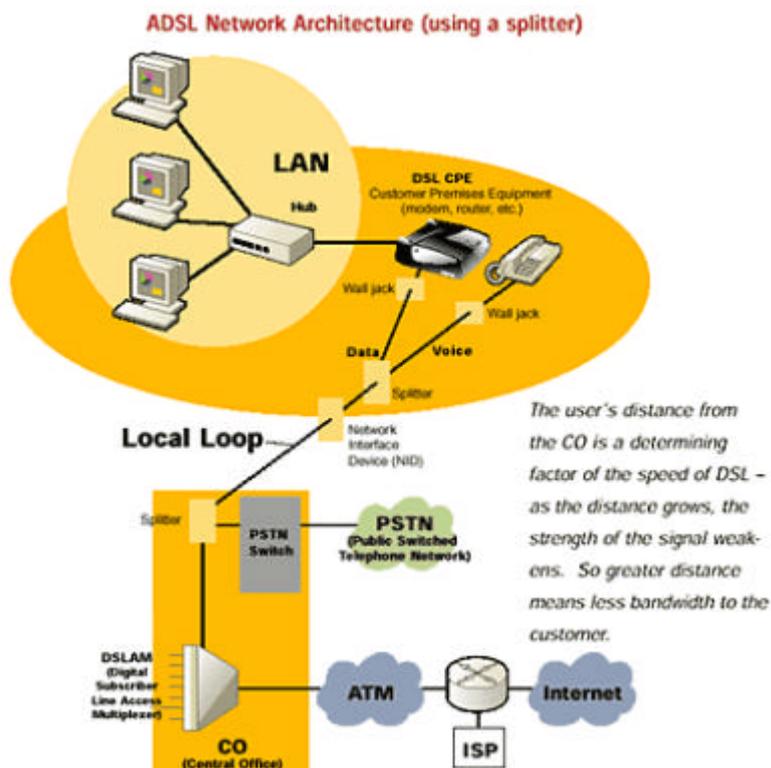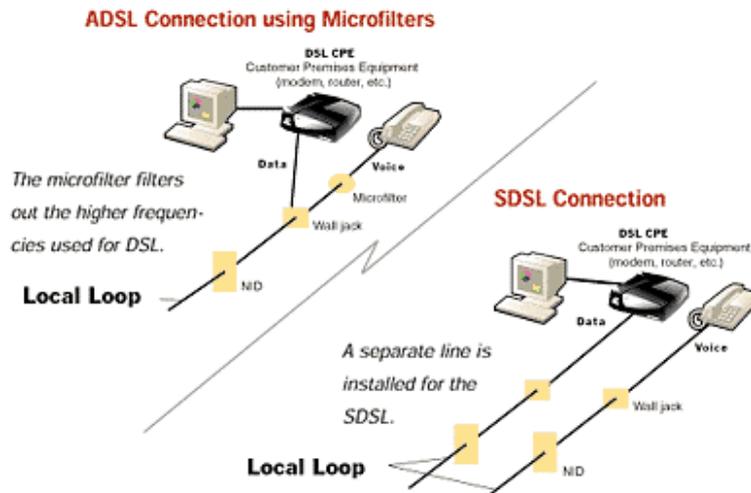
I.4 How fast is ADSL?

ADSL provides speeds up to 8 Mbps downstream (to the user) and up to 1 Mbps upstream, depending upon line length and loop and line conditions.

I.5 What are the main benefits of ADSL?

- Simultaneous Internet and voice/fax capabilities over a single telephone line

- Uninterrupted, high-speed Internet access that's always on-line
    - Bem, no Velox a gente tem que se autenticar em um provedor, o que é meio sacal

- Cost-effective solution for residential customers, telecommuters and small businesses
    - Apenas uma tarifa básica é paga
    - Não se paga por tráfego
    - Não se paga pela conexão

- Data Security that exceeds other technologies

I.6 If I am on the phone, will that decrease my bandwidth when downloading and by roughly how much?

Voice communications over POTS (plain old telephone service) operates at frequencies below 4KHz; all other services, such as ADSL, will use the frequencies above that. So no matter whether you are using the POTS frequencies or not, the bandwidth availabl e to ADSL is not affected.

I.7 ADSL boasts a great bandwidth. Can it be shared among two or more PCs,so that both can be connected to the internet at the same time?

Yes. If the modem has one, or multiple Ethernet 10baseT interfaced, it can connect an entire LAN. That way, all users on the LAN can share the higher connected bandwidth. If the modem has only one 10baseT interface, you can connect it to a mini-Ethernet hub that will distribute the bandwidth over a LAN.

Para fazer isso precisa de mais alguns equipamentos ou modificações. Uma solução fácil e barata é transformar o modem em router (ver FAQ de exploit) e usar um hub. Outra solução é usar o RASPPPoE ou outro driver de PPPoE que permita compartilhamento.

I.8 I understand that there is interference between two lines, but I don't understand how asymmetric data transfer can reduce this interference.

Crosstalk causes by far the largest contribution to capacity limiting noise for xDSL systems. There are two very different types of crosstalk in multi-pair access network cables, Near-End Crosstalk (NEXT) and Far-End Crosstalk (FEXT). NEXT is interference that appears on another pair at the same end of the cable as the source of the interference. Its level is substantially independent of the length of the cable. FEXT on the other hand is interference that appears on another pair at the opposite or far end of he cable to the source of the interference. Its level is attenuated at least as much as the signal itself if both have traveled the same distance. NEXT affects any systems that transmit in both directions at once (e.g. echo-cancelling systems), and where it occurs it invariably dominates over FEXT. It limits ISDN & HDSL range. NEXT can in principle be eliminated by not transmitting in both directions in the same band at the same time, separating the two directions of transmission either into non-overlapping intervals in time or into non-overlapping frequency bands. This converts duplex transmission into independent simplex transmissions, avoiding NEXT at the cost of a reduced bandwidth in each direction. FDM ADSL avoids NEXT in this way. At high enough frequencies the advantage of transmitting against FEXT noise rather than NEXT noise becomes so great that it can outweigh the disadvantage of reduced bandwidth.

I.9 Como funciona a autenticação?

O Muanis sabe...

Parte II. Que opções existem para sistemas ADSL?

Esse texto, obtido na Efficient Networks, explica mais um pouco como funciona o ADSL. Foram editadas as propagandas de produto.

O objetivo da presença desse texto é mostrar as várias opções que estariam disponíveis, não fosse o caso do Velox ter uma configuração padrão.

II.1 Overview

As Digital Subscriber Line (DSL) service becomes increasingly available, the consumers and small businesses who sign up for the service must choose from a growing variety of DSL access equipment. The variations are far from superficial, and reflect important differences among networks, users, and applications.

One residential user may want the lowest-cost, most basic PCI DSL card; another may value the easy installation of a USB DSL modem. A small, networked business may need a sophisticated DSL router, or might be as well served with a simple Ethernet DSL modem. Many applications are best served by equipment that supports more specific functionality.

Fortunately, there exists today an appropriate solution for each network, customer, and application. This paper examines the available options, and provides a guide to ensuring a correct match of DSL access equipment to use.

II.2   Assumptions

- *DSL service offerings as a group are evolving, and many different network architectures and protocol characteristics are touted as potential, future developments. To focus the discussion on solutions that address current and near term realities, this paper is framed by the following assumptions:*
- *Separate local exchange carrier and service provider networks. The end-to-end connection between a customer site and a service destination typically involves communications across two networks. The network of the carrier, typically an incumbent or competitive local exchange carrier, provides data transport between the customer premises and the service provider's point of presence. The service provider, typically an ISP or corporate network, receives the data and routes it to its destination in the service provider's network. Even when the carrier and the service provider are part of the same entity, the networks are generally separate.*
- *ATM data transport between the customer premises and the service provider's point of presence. Although a few frame-based carrier networks exist, almost all major U.S. local exchange carriers and international PTTs use ATM to transport data. The vast majority of DSL services employ ATM from the customer premises, across the carrier network, and up to the service provider's point of presence.*
- *Packet data transport within the service provider network. ISP and corporate networks are typically packet-based. These networks feature equipment at the ingress that receives cells from the carrier, reassembles the cells into packets, and routes the packets toward their destination.*
- *Standard methods for encapsulating data into ATM. This paper assumes that one of several existing standards is used to encapsulate data from the DSL access equipment through to the service provider. At present, any given service provider's equipment expects to receive data encapsulated with one of the existing standards, but the supported standard will vary from service provider to service provider.*

This paper describes DSL CPE selection in terms of DSL services as they are actually being deployed. It does not attempt to promote solutions based on unproven or incompletely defined technology, or anticipated future applications. The intention is to serve as a useful guide to service providers, manufacturers of equipment that will be bundled with DSL devices, and others who are currently responsible for selecting DSL equipment for their prospective customers.

II.3 Top-level DSL Modem Selection Criteria

In terms of general network and application compatibility issues, DSL access equipment placed at customer sites must meet four primary goals.

1. ***Complete network compatibility.*** *DSL CPE must be designed specifically to accommodate current networks, protocols, and desktop applications to provide customers with the highest degree of "plug and play" possible. In terms of accommodating the network, this means the device must be thoroughly compatible with both the carrier and the service provider - it must foster compatibility with the entire network, not just the central office equipment with which it immediately connects.*
2. ***Appropriateness to application.*** *Further consideration must be given to matching equipment to application. For residential use, an external device may be preferable when the customer will install the CPE; when a manufacturer or reseller will perform installation, an internal device is the better choice. Outfitting a small business requires choosing among options for PCI DSL modems, USB DSL modems, Ethernet DSL modems, and DSL routers, and the choice may be affected by both the application and the level of network expertise at the installation site.*
3. ***Cost value relative to use.*** *Any DSL CPE is essentially an enabling device, and the price a DSL customer pays should reflect only the cost of "enabling" that's actually needed. It would be inappropriate to charge a residential customer for a DSL router when an Ethernet DSL modem may supply all the needed functionality. On the other hand, it's inappropriate to sacrifice real value to lower the equipment cost.*
4. ***Thorough traffic management.*** *DSL applications will not always be based purely on data transmission; DSL is beginning to deliver video and voice traffic as well. Current DSL CPE lines and designs should include sufficient traffic management capabilities to support distinct service classes for diverse traffic types.*

Note: For a discussion of more generic issues that apply across CPE types, such as cost of deployment/support and user impact, please see the Efficient Networks white paper, "Remote Network Access Using Digital Subscriber Line Technology." http://www.efficient.com/solutions/

II.4 Network-related DSL Modem Selection Criteria

For complete network compatibility, the DSL access equipment must provide a data encapsulation mechanism that is compatible with the carrier network and with

equipment at the service provider. Data encapsulation spans the division of labor that exists between the cell world of the carrier and the packet world of the service provider.

In communicating with the carrier network, DSL CPE encapsulates IP-based data into ATM, and transmits the resulting cell flows as ATM over DSL to the carrier's central office[1]. At the central office, ATM traffic from multiple DSL links is aggregated and multiplexed onto a common upstream link, typically fiber optic. Each cell flow is directed toward its destination by one or more ATM switches. An underlying OC-3 SONET or DS-3 transport network carries data traffic over long distances and delivers it to the service provider's point of presence.

The service provider's backbone router or a Broadband Remote Access Server (B-RAS) receives cells from the carrier network, reassembles the cells into packets, terminates the encapsulation layer employed at the DSL CPE, and routes the packets toward their destination in the service provider network. (The router or B-RAS also performs such "upper layer" functions as user authentication, IP address assignment, and usage measurement.)
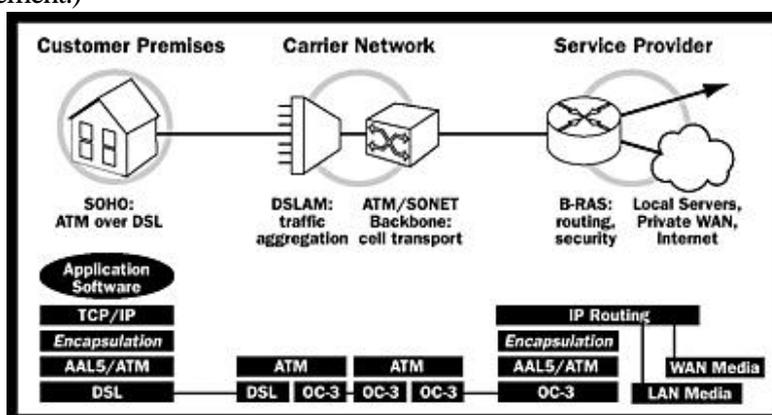
From the perspective of protocol encapsulation, an end-to-end network exists between the DSL CPE and the demarcation point at the service provider. It is not enough to ensure compatibility between the DSL CPE and the central office; the CPE and the routing equipment at the service provider must use a common encapsulation mechanism, and different equipment expects different encapsulation methods.

This fact can place tremendous emphasis on DSL CPE encapsulation flexibility. If the DSL user changes ISPs, or communicates with both an ISP and a corporate server, the equipment may need to accommodate more than one standard data encapsulation method.

II.5   Standard Data Encapsulation Methods

For any application, DSL access equipment will need to support one of the following five data encapsulation methods:

- ***Ethernet frames over ATM[2].*** *This method consists of a very simple encapsulation of Ethernet frames into AAL5 PDUs, which are then carried across ATM permanent virtual connections (PVCs). The greatest benefits of this method are simplicity and compatibility with the large installed base of Ethernet equipment.*

- ***IP packets over ATM[3].*** *This method moves beyond the above standard by adding the definition of address resolution functions in PVCs and switched virtual connections (SVCs). This method is beneficial for routing applications, though it poses complexities for configuration.*
- ***Point-to-Point Protocol (PPP) over ATM[4].*** *A number of prominent vendors have endorsed this method to promote thorough end-to-end compatibility between DSL CPE and service providers. As with the previous methods, AAL5 is employed. Because PPP is ubiquitous for dial-up remote access (analog modem or ISDN), its continued use enhances compatibility with existing applications, authentication procedures, and billing systems. Such PPP features as dynamic IP address assignments, default routers, and DNS servers also help simplify remote management.*
- ***Point-to-Point Protocol over Ethernet (PPPoE) over ATM[5].*** *This method combines Ethernet networking with PPP in an encapsulation method designed for multi-PC homes and businesses. PPPoE enables multiple users to connect to multiple destinations through a single, shared access device using only one PVC. It also provides for authentication, secure access, and accounting of each user at the customer premises, as if they were individual dial-up users.*
- ***Native ATM.*** *This data encapsulation method supports the newer class of DSL applications; ATM's benefits include the low latency and high throughput required to enable video and voice over DSL. Native ATM applications take advantage of these characteristics by sending and receiving data directly to and from the ATM network, with no intermediate TCP/IP protocol stack. This is most often accomplished with Microsoft's ATM Extensions to Winsock2[6].*

Because no single data encapsulation method addresses the requirements of all equipment at different ISPs and corporate networks, *it is very important* that the DSL access equipment supplied to most customers support all of the first four methods. Any DSL CPE manufacturer considered for a long-term partnership should also support Native ATM, to ensure readiness for the next generation of DSL video and voice applications.
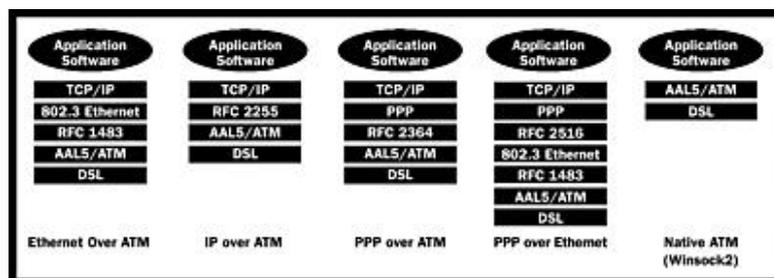
II.6 Application-related DSL Modem Selection Criteria

In addition to ensuring that the DSL access equipment being deployed supports the necessary protocol encapsulation for its overall network, it must be appropriate for its user environment and application. There are five basic DSL CPE types:

- ***ATM25 card to DSL modem.*** *This single-PC DSL solution consists of two components, a 25 Mbps ATM25 adapter card that installs inside a PC, and an external cell-forwarding modem that sits between the adapter and the DSL line.*
- ***USB DSL modem.*** *This single-PC device is the only DSL access equipment that does not require the installation of an internal card. The USB DSL modem plugs into the Universal Serial Bus (USB) port of a PC or notebook computer, and passes data directly between the computer and the DSL line.*
- ***PCI DSL modem.*** *This single-PC DSL card installs in a PC for direct connection to a DSL line, with no external component. Its function is essentially the same as the USB DSL modem, in an internal device. It is most often used to connect a standalone PC, but can also work with a remote access server PC functioning as a router.*
- ***Ethernet DSL modem.*** *This DSL solution, which is popular for both residential and business applications, provides single-PC connections via attachment to an internal Ethernet card, or multi-user connections via attachment to an Ethernet hub when full routing is not required. The Ethernet DSL modem encapsulates Ethernet frames into ATM for transmission on the DSL line.*
- ***DSL router.*** *DSL routers offer multi-user DSL access, typically for company-side Internet access or in applications that join a corporate network with a routed branch office network. IP address management is enabled for each user's desktop.*

Each of these DSL CPE types has strengths and limitations that ultimately make them suited to specific situations. The following pages explain the primary differences among them as relates to applications and user environments.

II.7   ATM to DSL Modem

This DSL equipment option joins an internal ATM25 adapter with an external DSL modem for use with a residential PC, or a PC in a small office where access is not shared over a LAN. ATM signaling and encapsulation occur within the PC; the ATM25 adapter connects to the DSL modem, which buffers cell traffic to and from the DSL line. This equipment combination provides end-to-end ATM, and is more common in Europe and Asia than in North America. It is used when ATM at the desktop is essential for quality of service and guaranteed bandwidth, as in video-on-demand applications.

Ease-of-use can be an issue with this equipment if installation is performed by a non-technical user. Initial setup requires the installation of an internal adapter. While native tools can be used for management and for adding features as driver updates to the adapter, the external modem requires separate configuration, management, and software upgrades.
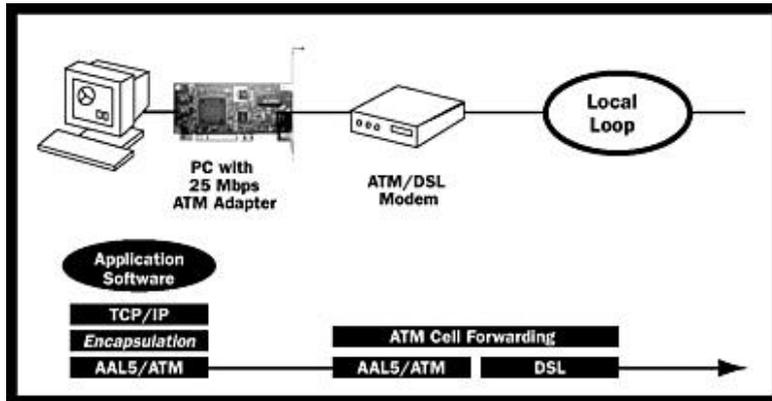
USB DSL Modem

A USB DSL modem is ideal for any residential/consumer DSL application where the end user is responsible for installing the device. It is also the most practical DSL CPE for notebook users who telecommute or finish work at home in the evening.
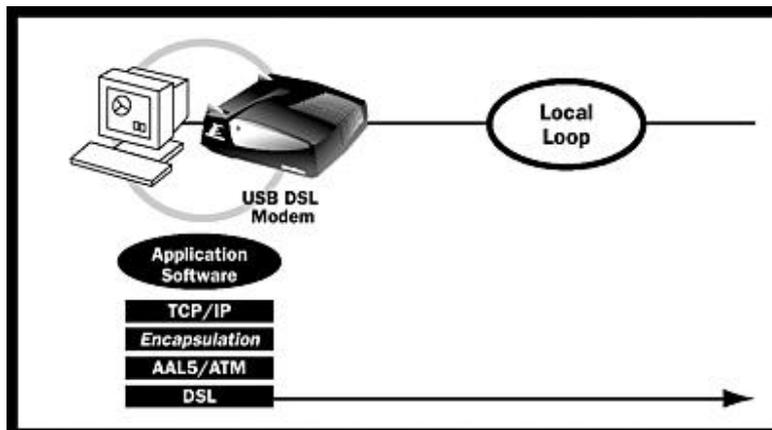
This solution is extremely easy to install, as it's the only DSL solution that does not require an internal card or NIC. ATM signaling and encapsulation are performed in the PC. These devices are slightly more expensive than internal solutions, but add value by minimizing customer support.

Note: A USB DSL modem can be connected to any PC or notebook with a USB port; a USB port is the only commonly available serial port capable of passing data at DSL speeds. Most PCs and notebooks manufactured since 1997 include USB ports.

II.8 PCI DSL Modem

PCI DSL modems offer the lowest equipment cost among DSL access solutions for home and very small office PCs; there are no costs associated with the package, power supply, and other components specific to external devices. ATM/DSL adapters are

especially well-suited to factory or reseller bundles, and to situations where the end user is comfortable installing an internal card.

While initial setup requires the installation of an internal card, management is simplified by the use of existing operating system tools and GUI, with no external equipment to configure or manage. All ATM and DSL functions are performed in the PC.
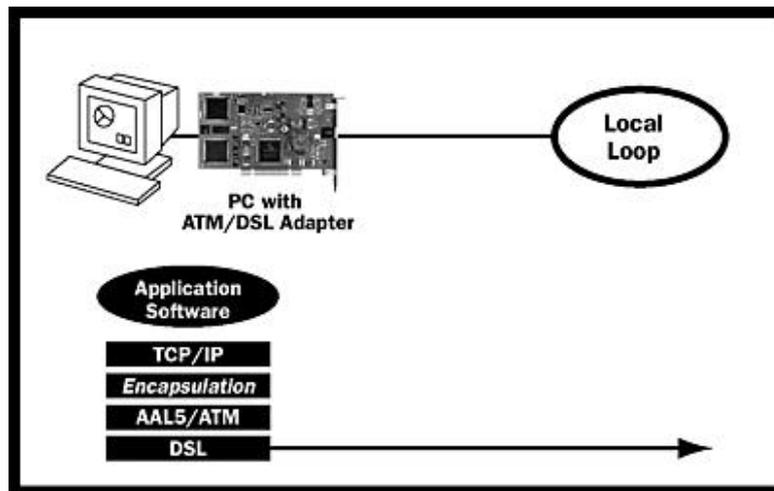
Note: A PCI DSL modem can also be installed in a remote access server PC, where it extends network access to an entire remote workgroup through a separate Ethernet adapter. This option is sometimes preferable over a DSL router when replacing an existing service, such as shared ISDN access through a dedicated server PC.

II.9 Ethernet DSL Modem

Ethernet DSL modems attach to internal Ethernet cards when connecting single PCs, and to Ethernet hubs in multi-user DSL applications that do not require full routing (such as the extension of central-site LAN services to a small remote office). Ethernet DSL modems encapsulate Ethernet frames into ATM for transmission, with no knowledge of a Layer 3 protocol such as IP.

This solution offers immediate compatibility with Ethernet-based networks, and for any non-IP traffic such as Novell's IPX. Installation is simple with little configuration required, though there is some complexity with external device management and software upgrades.

Concerns with service provider compatibility make this a very specific solution; encapsulation is limited to Ethernet over ATM and PPPoE over ATM. Ethernet DSL modems can support only permanent virtual circuits (PVCs), offering no support for SVCs as other DSL access devices do. Operation requires flooding of packets across the DSL link under some circumstances, using additional bandwidth.
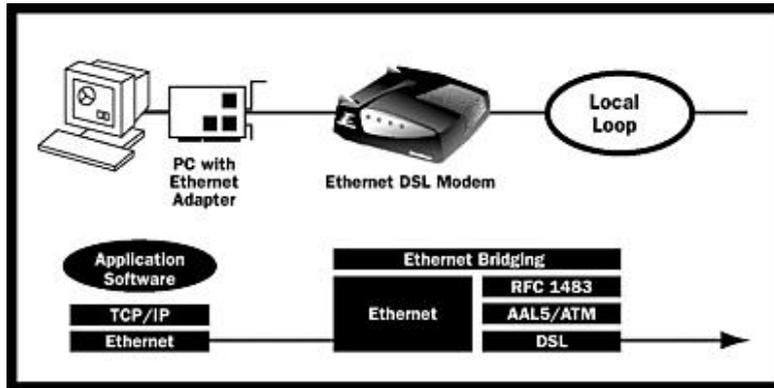
II.1O DSL Router

A DSL router is more fully featured than an Ethernet DSL modem, as it offers Layer 3 routing capabilities. DSL routers are the preferred solution for multi-user LANs in remote offices, as they enable IP address management for each user's desktop via DHCP. The router can act as a packet filter or a firewall for enhanced security.

This solution is highly compatible with Ethernet-based networks. Installation is simple, with router and desktop connections made via Ethernet. Management, however, requires a knowledgeable LAN administrator due to the inherent complexity of routed networks. As with Ethernet DSL modems, the DSL router offers some complexity in configuration, management, and software upgrades.

DSL routers offer more network compatibility than Ethernet DSL modems, but are inherently incapable of supporting Native ATM (in this situation, applications have no direct access to the ATM network). They can also support operation in SVC-based as well as PVC-based networks.
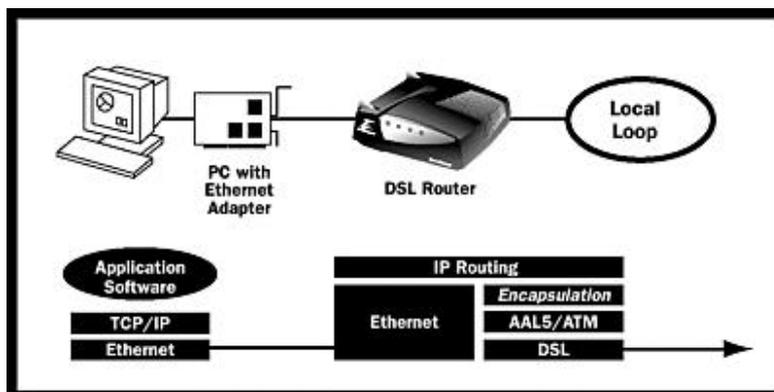
Parte III.   Telemar e provedores

III.1   Porque precisamos de um provedor?

Basicamente por que a ANATEL (ou uma lei?) manda. Tanto que o Velox empresarial, que segue outra legislação/portaria, não precisa de provedor.

III.2   Como evitar usar um provedor?

Usando Velox empresarial.

III.3   É possível usar um provedor comum?

Alguns usuários estão conseguindo autenticar o Velox em um provedor de acesso discado. Tecnicamente, é uma falha no provedor, que não está identificando a origem do pedido. Na prática, como o provedor não tem mais ou menos trabalho com uma conta comum ou uma conta velox, é a justiça sendo feita. Essa falha deve ser fechada em curto prazo.

III.4   Quais os serviços ADSL equivalentes no Brasil?

Na Telefônica, São Paulo, é o Speedy.

Parte IV.   Programas disponíveis

IV.1   O que é o Velox Connector? (Muanis?)

É um programa de autenticação que o Muanis fez.

IV.2   O que é o .... (outro programa que não me lembro).

IV.3   O que é o RASPPoE?

É uma implementação de PPPoE nativa de Windows (2000 transportada para outros) que permite o sharing da conexão com o Dual Link. Aparentemente suporta a placa USB, dessa forma você pode ligar a outra placa de rede na sua rede (usando um hub).

O RASPPoE tem a vantagem de "falar" o protocolo não padrão PPPoE:3com.

Essa solução deve ser mais lenta, do que converter o modem em router.

IV.4   O que é Dr. TCP?

É um programa que auxilia a trocar (tweak) valores importantes para TCP/IP, como MTU e RWIN.

Pode ser encontrado no site da dslreports.

IV.5 O que é Doctor Ping?

É um programa da DSLREPORTS que calcula sua latência, ajudando a calcular seu RWIN. Não funcionou comigo, pois usa servidores nos EUA.

IV.6 O que existe para Linux

Roaring Penguin has a free client for Linux that "speaks" PPPoE:3com, NetBSD and Solaris systems to connect to PPPoE service providers.

Parte V.   Hacks e exploits

V.1 Como acelerar minha conexão

Tem um FAQ inteiro sobre isso em http://www.dslreports.com/faq/tweaks. Basicamente você pode aumentar o seu RWIN até um ponto onde não faz mais diferença e colocar o MTU mais alto que funcione.

V.2 Como transformar o Dual Link em Router

Essas são as instruções do Acerola, copiadas como sempre...

Várias mensagens trataram desse assunto. O Muanis diz que é fácil seguir as instruções do acerola. Veja a mensagem 1213, passe o MTU do Windows para 1300,

Ultima atualizacao: 14/10/2001.

English Version - Italiano - Perguntas Frequentes (FAQ)

É simples. Você só precisa de um **cabo serial**.

OBS1: Esse procedimento desabilita a porta usb do modem. So eh possivel usar o modem conectando a placa de rede ou a um hub. Conectado a um hub, varios computadores podem usar o modem ao mesmo tempo (no maximo de 254 com a configuracao descrita aqui. eh possivel mais.).

OBS2: Esse processo eh reversivel. No entanto, nao conte com isso. Encare como um processo irreversivel. Mas eu tenho certeza que uma vez router, vc nao vai querer voltar a traz. Para reverter o processo, basta fazer o download da firmware do 3CP4130 (clique aqui para ver a pagina do 3cp4130 na 3com) e coloca-la de volta da mesma forma que voce fez com a firmware do 3CP4144. Eu nao fiz esse procedimento de volta, logo nao

posso garantir nada. Mas outros usuarios ja o fizeram e funcionou. Deu um pouco de trabalho, segundo eles.

OBS3: Se voce falou com algum babaca da telebrasilia, ele com certeza disse que o modem perde a garantia se vc fizer isso. Que garantia? Esse modem nao eh fabricado ja ha muito tempo pela 3com (clique aqui para ver). A 3com empurrou a ponta de estoque dela pros otarios brasileiros comprarmos.

OBS4: Esse procedimento ja foi feito em varios modems, inclusive o meu. Mas eu nem preciso dizer que eu nao posso dar nenhuma garantia que ele vai funcionar. Visto que isso eh uma especie de hack/exploit, o risco eh todo seu (*do at your own risk* em ingles).

OBS5: Se voce for leigo em computadores, ou seja, nao sabe o que eh uma porta serial ou uma janela de DOS, peca a um amigo que entenda de computadores para ajuda-lo. Tentei fazer esse texto o mais coloquial possivel, mas eh necessario um conhecimento minimo de computadores, alem de saber mexer no Word e navegar na Internet. Eh necessario saber tambem montar uma rede local TCP/IP em windows. Se voce usa algum tipo de unix, voce saca de computador suficiente para fazer esse procedimento em unix tambem. Soh o programa de download de firmware tem que ser rodado em emulador windows/dos.

OBS6: Se o seu problema eh somente windows 2000/xp ou vc realmente precisa da porta usb, voce pode continuar usando o seu dual link e baixar esses excelentes drivers de PPPoE para substituir aquela merda de Enthernet. O nome eh RASPPPoE: home page. Ele funciona em windows 95/98/me/nt/2000/xp Voce instala o driver como se fosse um protocolo (tcp/ip etc). Ai usa um programinha que vem nele e cria uma conexao do dial-up networking que funciona com seu modem dual link! Com conexao dialup vc pode usar internet conection sharing, winproxy, etc. Mas eu garanto que nada eh tao bom quanto ter um router.

Entre em contato comigo que ficarei feliz em ajuda-lo se vc tiver problemas:
acerola2000@ig.com.br

Agradecimentos especiais para Kueyke por compartilhar essas informacoes valiosas.

Veja as instruções passo a passo:

1. **Cabo Serial**. Olhe atrás do modem e veja a porta serial dele. É semelhate a saida serial do computador (mouse) e da saida do monitor (vga). O cabo que vc precisa conseguir é um cabo macho-femea do tipo EXTENSÃO MOUSE/VGA ou SERIAL MODEM. NÃO SERVE CABO DO TIPO LAP-LINK! Veja o tamanho da saida serial do seu computador. Verifique se ela eh do tamanho 9 como a do modem ou se eh maior (tamanho 25). As duas servem. Não confunda com a porta paralela da impressora. A porta serial eh do tipo macho

(pinos) e a porta paralela eh femea (buracos). No modem ela eh femea. Compre o cabo apropriado e compre um adaptador que transforma 9 em 25 se necessario.

2. **Firmware.** Firmware eh o sistema operacional do modem. Os modems homeconnect e officeconnect (router) tem o mesmo chipset mas tem firmwares diferentes. Vá na pagina da 3com (www.3com.com) e pegue o firmware do officeconnect.
   Va em:
   www.3com.com -> support for products -> Product Support -> By Product Number -> Enter Product Number: 3cp4144 <search> -> Get Support
   ou siga esse link direto.
   Essa eh a pagina do seu modem apos a transformacao. Seu modem vai virar um 3Com OfficeConnect Remote 812 ADSL Router (3CP4144).

   [bld_1_1_9_4.zip](bld_1_1_9_4.zip) esse eh firmware mais nova. infelizmente nao consegui faze-la funcionar. o modem conecta e fica se resetando toda a hora.

   [ocr812cd.exe](ocr812cd.exe) a firmware que vc precisa esta aqui, mas o arquivo tem 36 megas.

   Voce pode tambem baixar as documentacoes: http_filtering.pdf - [ig812.pdf](ig812.pdf) - [812_cli.pdf](812_cli.pdf) - releasenotes.pdf - 812_support_info.pdf

3. **Upgrade**. Descompacte o firmware.zip ou o ocr812cd.exe.
   Voce vai ver quatro arquivos: dl.bat - mr000100.sdl - mr010107.nac - pcsdl.exe
   (no caso do ocr812cd.exe vc vai no dir ocr812\Updates)
   Conecte o cabo serial na sua COM1 (primeira porta serial) e no modem. Execute numa janela de DOS:

   dl 115 mr

   ATENCAO! EH NORMAL ACONTECER ERROS DURANTE O DOWNLOAD DO FIRMWARE. Repita o processo ate que nao acontecam mais erros. Em geral da certo na primeira ou segunda tentativa.
   voce devera ver isso (se der certo):

```
        this batch file executes PCSDL with predetermined settings/args

procedure for SDL:
1. prepare all necessary files
2. turn OFF the card to be SDL'ed
3. execute this bat file
4. turn ON the card to be SDL'ed

download TARGET=mr
running pcsdl with port 1 at 115200

U.S. Robotics, Inc. (c) 1993-1995 Software Download Program Version 3.0.2
```

```
Verifying Initialization Program File: 100 %\
Verifying Operation Program File: 100 %-
Establishing Communication...
Establishing Communication...
Establishing Communication...
Establishing Communication...
```

4. Agora desligue o modem (da eletricidade), ligue de novo e aguarde. Voce vera:

```
        Establishing Communication...
Establishing Communication...
Establishing Communication...
Downloading Initialization Program: 100 %-
Initiating Software Download...
Downloading Operation Program: 100 %\
Erasing Flash ROM... •••••••••••••••••••••••••••••••••••••••••••••
•••••••••••••••••••••••••••••
Programming Flash ROM... ••••••••••••••••••••••••••••••••••••••••••
•••••••••••••••••••••••••••••••••••••••••••••••••••
•••••••••••••••••••••••
Checking Downloaded Program CRC... •••••••••••••••••••••••••
Software Download Successful!
```

5. Repita o processo se houver erros.
6. Pode ser necessario dar um reset (apagar) nas configuracoes do modem (so faca isso se for realmente necessario). Desligue o modem, segure o botao reset, ligue o modem com o botao apertado. A luz alert vai piscar rapido.

7. **Conexao via Terminal**. Execute o HyperTerminal do windows. Se vc nao o tiver, instale-o usando o cd de intalacao do windows:
   (painel de controle -> adicionar remover programas -> setup do windows -> comunicacoes -> hyperterminal)
   crie uma nova conexao com essa configuracao:
   Connect using: direct to com1
   configure
   bits per second 9600
   data bits: 8
   parity: none
   stop bits: 1
   flow control: hardware
   (veja a figura aqui)

   Conecte-se no modem com o hyperterminal (nao se esqueca de fechar a janela de dos que voce executou o dl.bat!). Voce devera ver algo do tipo:

```
        Serial Port Initialized
Initializing Timer...
Verifying Board Type...
Initializing LEDs...

3Com HomeConnect ADSL Modem Dual Link
-- Version V1.0.0

Executing Application Loader
-- Version V1.0.0

Maintenance?

Loading Application File...
File Name: mr010000.exe
File Size: 1358721 bytes

Copying Text Section...

100% Complete

Copying Data Section...

100% Complete

Clearing BSS Section...

Starting "mr010000.exe"...

TCP/IP networking software is Copyright 1988-1995,
Epilogue Corporation, Albuquerque NM, All rights reserved.
IP routing software is Copyright 1993-1995,
RainbowBridge Communication. Inc. Rockville MD, All rights reserved.
IPX networking software is Copyright 1994-1995,
RouterWare Inc. Newport Beach CA, Unpublished - rights reserved
under the Copyright Laws of the United States.
VJ TCP Header Compression software is Copyright (c) 1989, 1991, 1992, 1993,
Regents of the University of California. All rights reserved.


3Com OfficeConnect Remote 812, V1.1.7
3Com Corporation, Santa Clara, California
The software contained in this product is
Copyright 1997-99, 3Com Corporation, Santa Clara, California
All rights reserved.


Starting up the OfficeConnect system Executive...

Starting up OfficeConnect Configuration process...

OfficeConnect Configuration Process starting......

OfficeConnect starting required processes......
```

```
OfficeConnect configuring interfaces......
ADSL driver, dip switch set to: 0

OfficeConnect configuring networks......

OfficeConnect Adding networks to LAN interfaces....

OfficeConnect enabling networks on LAN interfaces....

Starting the CLI......
Command Line Interpreter Started - Please Wait...
3Com-DSL>
```

O importante eh o prompt no final 3Com-DSL>. Se ele apareceu esta tudo bem.
Espere as luzes do modem pararem de piscar.
A LUZ USB AGORA EH A LUZ ADSL. A LUZ ADSL NAO ACENDE MAIS.
As luzes PWR LAN e USB devem permanecer verdes.
Se o prompt nao apareceu ou se a luz usb (que agora eh adsl) nao ficou verde
desligue e ligue o modem.
Se ligar e desligar o modem nao resolver, tente fazer o download do firmware de
novo (feche o hyperterminal antes).

8. **Configuracoes de Rede** : Rode o Uninstall do software da 3com e remova tudo
que ele instalou nas configuracoes de rede. A sua configuracao de rede devera ter:

Client for Microsoft Networks
Placa de Rede
TCP/IP
File and print sharing for microsoft networks (opcional)

ATENCAO: soh remova os drivers/dispositivos da 3com. Se voce tem mais de
uma placa de rede ou tem um modem comum, nao remova os componentes dele
pois eles pararao de funcionar.

Configure o TCP/IP:
(se houver mais de um TCP/IP, configure o TCP/IP da placa de rede que esta
ligada ao modem/rede do modem)

Specific IP address: 192.168.157.x (onde x vai de 1 ate 255 exceto 100 que eh o
ip do modem).
Subnet Mask: 255.255.255.0 (essa eh a mascara default do modem, mas pode ser
mudada, veja o manual do modem)
Gateway: 192.168.157.100 (o seu modem agora vai ser um gateway)
DNS server: 192.168.157.100 e/ou outro(s) de sua preferencia.

Resete o computador.

9. **Configuracoes do Modem ADSL**: Entre no hyperterminal de novo e no prompt 3com-dsl> de o seguinte comando:

enable ip forwarding

E agora crie um usuario administrador para o seu modem. Escolha um login e uma senha que nao seje muito facil de adivinhar (ate 8 letras e numeros).

add user login password pass

onde login eh o nome do usuario (pode ser jose, maria, etc) e pass eh a senha dificil.

va numa janela de DOS e de ping 192.168.157.100. se houver resposta, eh pq o modem ja ta na rede. Se o modem estiver na rede, vc pode agora continuar a configuracao via web ou telnet, usando o login/senha que vc criou. Se vc for mais pedreira, ou se o ping nao funcionar, continue no terminal :).

10. **Configuracao via web (recomendada)**: acesse o site interno do seu modem: http://192.168.157.100 com o seu login e senha criados no passo anterior. voce vai ver uma paginazinha azul. se vc saca de computador, vai brincando ai e configurando o modem. veja o que vc tem que fazer:

OBS. ao mudar algumas configuracoes, o modem pode resetar. isso eh normal. espere ele terminar de resetar e continue.

configuration -> somente enable ip routing checkado -> modify globals

configuration -> ip address & dhcp -> add ("ip" se nao tiver nenhum) ou modify ("ip" que ja existe) ->
ip address: 192.168.157.100
ip mask: 255.255.255.0
rip: none
use this ip network as dhcp server (nao checkado)
so modifique isso ai em cima se vc souber o que ta fazendo.

configuration -> DNS -> Enable DNS (checkado) -> Pass DNS ... from this remote site ISP.
o modem funciona agora como um servidor de dns.

configuration -> remote sites profiles -> ISP - modify ->
Enable Remote Site (checked)
PPP over ATM (PPPoA) (selecionado)
user name e password da sua assinatura adsl.
voce agora nao precisa mais de dialer nenhum. o proprio modem ja autentica.
(se o vpi e o vci estiverem diferentes, anote os valores originais antes de mudar,
pois pode ser que a sua linha adsl tenha valores nao default. se nao funcionar,
volte aos valores originais. A telemar, por exemplo, usa vci 33)
VPI 0
VCI 35
Unspecified bit rate checkado.

Modify
Next>>

NAT checkado
Default workstation: 192.168.157.x (onde x eh o ip da maquina principal da rede)
isso faz com que todas as conexoes externas sejam redirecionados para a maquina
x. voce precisa disso para usar programas que precisam conectar na sua maquina,
tipo o DCC do irc, napster, morpheus, servidores de ftp, etc. voce pode ate
desabilitar o NAT, ou entao configurar as portas individualmente, se vc souber o
que ta fazendo.

use this connection as the default gateway (checkado)
RIP listen
RIP version RIPv1
pass DNS request ... (checkado)

os dois items dentro de security sao opcionais. o primeiro eu nao sei o que eh, mas
o segundo evita que alguem da internet use suas pastas e impressoras. nao sei se
eh muito util pois a telebrasilia desabilita as portas netbios, telnet e http. pode
checkar essa ultima se quiser.

Modify
next>>

IPX routing None

Modify

clique no Save Configuration que ta a esquerda em baixo. isso deve ser suficiente pra sua internet funcionar.

11. **Configuracao via terminal ou telnet (opcional para os punks pedreiras)**: A configuracao pode ser feita via telnet, com o login e senha criados no passo 6. Ou pode ser feita pelo terminal mesmo. Alem dos comandos ja dados no item 6, aqui vao os comandos:

    OBS1: a lista completa de comandos do terminal/telnet estao no 812_cli.pdf.

    OBS2: essa configuracao soh deve ser feita se a configuracao via web nao funcionou, ou se vc souber o que ta fazendo.

    enable security_option remote_user administration

    esse comando habilita a configuracao via web e via telnet, que ja deveria estar habilitada.

    add user nome **password** senha

    adiciona usuario administrador. isso ja foi feito no passo 6.

    add ip network ip address 192.168.157.100/C **frame** ethernet_ii **enable** yes
    add tftp client 0.0.0.0
    enable ip forwarding

    so faca isso se o ping 192.168.157.100 nao respondeu. o ip ja deveria estar configurado e funcionando, so faltando dar o enable, como no passo 6.

    set dhcp mode server
    set dhcp server start 192.168.157.1 **end** 192.168.157.255 **mask** 255.255.255.0
    set dhcp server router 192.168.157.100
    set dhcp server dns1 192.168.157.100 **dns2** 0.0.0.0
    set dhcp server wins1 0.0.0.0 **wins2** 0.0.0.0
    add dns server * **vc** ISP
    enable dns

    se as maquinas na sua rede local nao tiverem ip fixo, elas podem usar o modem como dhcp server.

    atencao para os parametros vpi e vci. alguns provedores usam valores nao default. (telemar eh vci 33)

add vc ISP (adiciona a conexao isp se ela ja nao exitir)
set vc ISP **ip** enable **ipx** disable **bridging** disable
set vc ISP **network_service** ppp
set vc ISP **send_name** internet-user **send_password** 1a2b3c (aqui voce
poe o login senha do seu provedor)
set vc ISP **atm vpi** 0 **vci** 35 **category_of_service** unspecified **pcr** 0
set vc ISP **address_selection** negotiate
set vc ISP **local_ip_address** 255.255.255.255
set vc ISP **nat** enable
set vc ISP **ip_routing** listen
set vc ISP **default_route_option** enable
enable vc ISP

o comando list vc mostra as conexoes existentes. deveria ser algo
do tipo:

```
     Com-DSL>list vc

VIRTUAL CHANNELS

Name           Encapsulation Type VPI VCI Status
ISP       PPP       PVC  0  35 ENABLED
default       RFC_1483    PVC  0  0  INACTIVE
3Com DL Manager  PPP       PVC  0  32  INACTIVE
3Com-DSL>
```

o comando show vc ISP mostra as configuracoes. deve ser algo do tipo:

```
     3Com-DSL>show vc ISP

INFORMATION FOR USER: ISP
Status: ENABLED
Destination Address:
Input Filter: INRSISP.FLT
Output Filter:
Session Timeout: 0
Idle Timeout: 300 (D)

NETWORK PARAMETERS:
Encapsulation: PPP
MTU: 1500
MAC Encapsulated Routing: DISABLED
Bridging: DISABLED
IP Usage: ENABLED
Address Selection: NEGOTIATE
Remote IP Address: 255.255.255.255/C
IP Routing: LISTEN
IP RIP Routing Protocol: RIPV1
IPX Usage: DISABLED
IPX Address: ffffffff
```

```
IPX Routing: NONE
IPX WAN Usage: DISABLED (D)
---Press <return> or type More for more; typ
Default Route Option: ENABLED
IP Source Address Validation: DISABLED
Network Address Translation Option: Enabled
NAT Default Address: 192.168.157.x (onde x eh a maquina default)
Intelligent NAT Option: ENABLED
Learn Address Dynamically using: Disabled
IP RIP Routing Policies:
SPLIT_HORIZON
POISON_REVERSE
FLASH_UPDATE
RIPV1_RECEIVE
RIPV2_RECEIVE
IP RIP Authentication Key:
Local IP Address: 255.255.255.255
Management IP Address: 0.0.0.0/H (D)
Compression: TCPIP (D)
Connection Type: CONTINUOUS
Send Name: <seu login do provedor>
Send Password: <sua senha do provedor>

ATM PARAMETERS:
Circuit Type: PVC
Virtual Path Identifier: 0
---Press <return> or type More for mo re; type Quit to stop output:
Virtual Channel Identifier: 35
Bit Rate: UNSPECIFIED
Peak Cell Rate: 0
3Com-DSL>
```

para mudar essas configuracoes, use o comando set vc ISP <opcao> <valor>. consulte o manual.

o comando list ip networks mostras as redes configuradas. deve ser algo assim:

```
     3Com-DSL>list ip networks

CONFIGURED NETWORKS
Name     Prot Int  State   Type    Network Address
ip       IP   eth:1 ENABLED STATIC  192.168.157.100/C
ISP-ip-I3 IP  atm:1 ENABLED DYNAMIC 200.181.88.0/C
3Com-DSL>
```

ip eh a sua rede interna (configurada acima) e IPS-ip eh a conexao internet.

o comando show ip network ip settings mostra as configuracoes da rede interna.
deve ser algo do tipo:

```
      3Com-DSL>show ip network ip settings

SHOW IP NETWORK ip SETTINGS:
Interface: eth:        1
Network Address:       192.168.157.100/C
Frame Type:            ETHERNET_II
Status:            ENABLED
Reconfigure Needed:    FALSE
Mask:              255.255.255.000
Station:           192.168.157.100
Broadcast Algorithm:    1
Max Reassembly Size:    3468
IP Routing Protocol:    NONE
IP RIP Routing Policies:
IP RIP Authentication Key:
3Com-DSL>
```

Esses sao os comando basicos de configuracao do modem. Leia a documentacao da 3com para maiores detalhes. Ha tambem um site interessante (em espanhol) some o 812 office connect: http://kickme.to/adsl

Entre em contato comigo que ficarei feliz em ajuda-lo se vc tiver problemas: acerola2000@ig.com.br

V.3   Posso utilizar vários usuários (PC) ligados ao meu modem.

3Com documentation and tech support will tell you that "PPP over ATM allows only one user at a time per virtual circuit." While true, the statement is misleading.

Using a gateway before the modem will consolidate all Internet traffic to the modem, and you will still only be using 1 ATM virtual circuit.

So the real answer is ... Yes, you can share your Internet connection with the 3Com Dual Link when operating in PPPoA mode

Veja como transformar seu modem em roteador (mensagem 1213).

V.4   Como é a linguagem do Modem?

Veja o manual eth_cli.pdf, supostamente é a mesma linguagem.

V.5   Como aumentar a segurança do modem Dual Link

V.5.1

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OK, now that legal info is out of the way... This page describes how I disabled features on the modem. This may cause problems for your connection, or may violate your ISP's contract. My intent is to help you understand my thinking process, you'll need to decide for yourself about the security of the modem.

The Dual Link is actually an interesting modem. It supports all three major ADSL transport protocols (PPPoA, PPPoE and Bridged), so if I move or switch ADSL providers it should work. It provides a command line interface with outstanding visibility and flexibility. It provides a simple web interface (but you can't use this while connected to the Internet in PPPoA mode). And it provides a number of built-in services that you would expect to only find on routers.

BUT, it ruins compatibility on the LAN side for PPPoA users by introducing PPPoE:3com.

V.5.2 Motivation

This page has information on how I increased the security of my 3Com ADSL Modem Dual Link ("Dual Link"). Because the Dual Link has a number of internal servers, it could be compromised by hackers (very unlikely given the 'easy target' of an unsecured PC).

This issue became important to me after reading a CERT advisory http://www.cert.org/advisories/CA-2001-08.html and associated details. Well, that and my desire to tweak equipment for better performance and security.

There is no documentation for the Dual Link, but in November 2000 someone from 3Com tech support suggested I read the documentation for a related product (3Com ADSL Modem Ethernet).

V.5.3 Approach

First step is to understand the default configuration of my Dual Link. Following that, I'll selectively disable capabilities and add security settings. I used the Dual Link's serial port and HyperTerminal on my Win2k PC. That is the only way to access the powerful command line interface, plus I could interrogate and configure the modem without interrupting my Internet connection. And with a little 'cut & paste' action you get to see my actual dialog with the modem.

After reading the documentation for a related product, I now assume that the Dual Link ships with most remote access capabilities disabled. This is based on my

understanding of the "3Com HomeConnect ADSL Modem Ethernet CLI User's Guide." I have not tested all the claims made in that Users Guide.

The remote access capabilities and internal servers for http, telnet, and TFTP are my immediate security concerns. After closing any obvious open holes I may test with a port scanner to verify my actions and understanding of the Dual Link.

I'm running firmware version 1.0.14 at the time this web page was written:

root> show system

SYSTEM DESCRIPTION
System Descriptor:
3Com HomeConnect ADSL Modem Dual Link V1.0.14,
Built on Apr 17 2000 at 11:41:11.

V.5.4 Default Configuration Settings that Impact Security

I was pleased to find that by default, the Dual Link is fairly secure. Telnet and TFTP must be enabled through access lists, but SNMP was wide open.

The default settings for Command Line Interface (CLI) services are very secure for a home user:

- CLI password protection is *disabled* (for serial port connections)

- no default users (for TELNET access from LAN/WAN)

The default settings for Bridging services can be increased either through filters or specifying authorized LAN MAC addresses:

- bridge will pass any LAN MAC address

- 2 bridge WAN ports configured (only 1 used for Internet connection)

- No packet filtering on bridge ports

The default settings for Ethernet services are:

- ARP cache empty

- No packet filtering on Ethernet interface

To allow remote SNMP and Telnet management of the Dual Link you must configure the unit's TCP/IP stack. The stack can receive packets from any bridge port. The Dual Link will also send syslog information to a pre-defined host.

The Dual Link also includes a standard set of IP utility programs including Ping, Telnet, TFTP, FTP, and Rlogin. The internal servers for telnet and TFTP are enabled but inaccessible by default. The internal web server for administration of Dual Link via a web browser is enabled by default.

The default settings for TCP/IP services are:

- has a single IP address on private class C subnet

- no default route (0.0.0.0)

- no static routes

- routes for private class C subnet

- DNS server table empty

- DHCP server for LAN *enabled*

- Web server (http) is *enabled*

- TFTP server *enabled*, with no clients defined (TFTP inaccessible)

- TELNET server *enabled*, with no login users defined (TELNET inaccessible)

- SNMP access is *enabled*, and SNMP generates authentication traps and Ethernet linkup/linkdown traps

- Syslog has no IP hosts defined (will not send syslog entries)

V.5.5 Closing Potential Security Holes

Now that default configuration settings are understood, here's my approach to closing potential security holes:

- Disable IP network and IP address

- Disable DHCP server (Netgear router provides IP addresses for LAN)

- Disable HTTP web server

- Disable TFTP server (overkill because no clients defined)

- Disable TELNET server (overkill because no login users defined)

- Disable SNMP

- Disable SNMP authentication traps

- Disable SNMP linkup/linkdown traps

Here is what I left open:

- No CLI password protection, because CLI requires physical access to serial port on modem.

- No special packet filtering because this is handled by my gateway router. I could have put a spoof filter to reject WAN inbound packets with source address on my home LAN subnet, but I'd rather maintain only one set of filters on the router.

V.6 Secure the Dual Link

The changes made with "disable" command can be reversed with corresponding "enable" command (and vice versa). The DHCP server can be enabled with "set dhcp mode server" command.

Disable IP Network
root> disable ip network ip

Disable DHCP Server
root> set dhcp mode disabled

Disable Internal HTTP, TFTP and TELNET Servers
root> disable network service httpd
root> disable network service tftpd
root> disable network service telnetd

Disable TELNET access to CLI
root> disable security_option remote_user administration

Disable SNMP access and traps
root> disable security_option snmp user_access
root> disable snmp authentication traps
root> disable link_traps interface eth:1

Restrict LAN access by Ethernet MAC address
(replace xx:xx:xx:xx:xx:xx with PC or router MAC address)
root> add bridge access_mac_address xx:xx:xx:xx:xx:xx
root> enable bridge access_mac_address

Remember Changes after Modem Loses Power or Reboots
root> save all

V.7   How to Identify Default Configuration Settings

In this section I will show the commands used to determine the default configuration settings. Some of these examples were done after disabling services, so don't assume I captured these before securing the Dual Link.

I've highlighted the command with **BOLD** font, and items of interest in blue font.

V.7.1   CLI: Disable CLI password protection and verify no Telnet users
```
root> disable command password
root>
root> list users

USERS
        Login
```

```
Name      Service     Status
root>
```

V.7.2   BRIDGE: Check "Access MAC" mode and addresses

root> show bridge

```
BRIDGE SETTINGS
Status: ENABLED
Number of Active Ports: 2
Base MAC Address: yy:yy:yy:yy:yy:yy
Base Aging Time: 300
Wan to Wan Forwarding: DISABLED
Access MACs Only: ENABLED
Spanning Tree Mode: DISABLED
SpanningTree Forward Delay: 5
SpanningTree Priority: 32768
root>
```
root> list bridge access_mac_addresses

```
BRIDGE ACCESS MAC ADDRESSES
MAC Address
xx:xx:xx:xx:xx:xx
root>
```

V.7.3   FILTERS: Check for input and output filters

root> list ports

```
BRIDGE WAN PORTS

Port      Description     Type     VPI     VCI     Status
ISP                       PVC      0       35      ENABLED
root>
```
root> show port ISP

```
INFORMATION FOR BRIDGE WAN PORT: ISP
Status: ENABLED
Description:
Input Filter:
Output Filter:

NETWORK PARAMETERS:
Encapsulation: PPP

ATM PARAMETERS:
Circuit Type: PVC (D)
Virtual Path Identifier: 0
Virtual Channel Identifier: 35
```

```
Bit Rate: UNSPECIFIED (D)
Peak Cell Rate: 0 (D)
root>
```
root> show ethernet settings

```
INTERFACE eth:1 SETTINGS
Description: ETHERNET-T Ethernet Driver
Type: ETHERNET-CSMACD
Speed: 10000000
High Speed: 0
Administrative Status: Up
Operational Status: Up
Link Up/Down Traps: ENABLED
Promiscuous Mode: FALSE
Connector Present: TRUE
Filter Access: ON
Last Change: 0d 00:00:01
Input Filter:
Output Filter:
Physical Address: 00:c0:49:24:0e:60
root>
```

V.7.4 TCP/IP: Identify basic networking services

root> list ip arp

```
IP ARP
IP Address     Phys Address     Type      IfName
```

root> list ip addresses

```
IP ADDRESSES
                   Bcast      Reassembly
Address            Algo       Max Size      Interface
192.168.100.100/C  1          3468          NONE
```

root> list ip routes

```
IP ROUTES
Destination       Prot  NextHop         Metric Interface
192.168.100.000/C Local 192.168.100.100 1      NONE
192.168.100.100/H Local 192.168.100.100 1      NONE
192.168.100.255/H Local 192.168.100.255 1      NONE
255.255.255.255/H Local 255.255.255.255 1      NONE
```

root> list ip networks

```
CONFIGURED NETWORKS
```

```
Name      Prot Int     State     Type    Network Address
ip        IP   bridge ENABLED   STATIC  192.168.100.100/C
```

root> list dns servers

```
DNS NAME SERVERS
Domain Name     Server Address
```

root> show dhcp server settings

```
DHCP Server Settings

Status: DISABLED
Start IP Address: 192.168.100.001
End IP Address: 192.168.100.040
IP Mask: 255.255.255.000
IP Router: 000.000.000.000
Lease (seconds): 4800
Host Name: unit
Domain Name: dummy.net
DNS #1: 000.000.000.000
DNS #2: 000.000.000.000
WINS #1: 000.000.000.000
WINS #2: 000.000.000.000
root>
```

V.7.5 SERVERS: Identify internal servers and status

root> list services

```
CONFIGURED NETWORK SERVICES
          Server                       Admin
Name      Type      Socket    Close    Status
httpd     HTTPD     80        FALSE    ENABLED
    DATA:

tftpd     TFTPD     69        FALSE    ENABLED
    DATA:

telnetd   TELNETD   23        FALSE    ENABLED
    DATA:

root>
```

V.7.6 SNMP and SYSLOG: Status

root> show security_option settings

```
SECURITY OPTION SETTINGS
```

```
SNMP User Access: DISABLED
Administration by Remote User: OFF
root> show snmp settings

SNMP SETTINGS
Authentication Traps: DISABLED
root>
root> list syslog

SYSLOG SINKS
SysLog      Log Level       Msg Count
root>
```

V.8   Quais os números mágicos para MTU e MSS do TCP/IP

(TCP, IP, MTU and MSS magic numbers)

1500	The biggest sized IP packet that can normally traverse the internet without getting fragmented. Typical MTU for non PPPoE, non VPN connections.
1492	The maximum MTU recommended for internet PPPoE implementations
1472	The maximum ping data payload before fragmentation errors are received on non-PPPoE non VPN connections
1460	TCP Data size (MSS) when MTU is 1500 and not using PPPoE
1464	The maximum ping data payload before fragmentation errors are received when using a PPPoE connected machine
1452	TCP Data size (MSS) when MTU is 1492 and using PPPoE
576	Typically recommended as the MTU for dialup type applications .. leaving 536 bytes of TCP data
48	The sum of IP, TCP, and PPPoE headers
40	The sum of IP, and TCP headers
28	The sum of IP, ICMP headers

Parte VI.   Questões Técnicas avançadas

VI.1 Como funciona o Model Dual Link

When operating in PPPoA mode, the 3Com Dual Link ADSL Modem does not terminate the PPP session with your ISP. It extends the PPP session to your PC and/or router, using a non-compliant (RFC 2516) dialect of PPPoE ("PPPoE:3com"). The 3Com bundled EnterNet300 PPPoE client software terminates the PPP session and provides an Internet connection.

It's important to understand that the PPPoE session is only between PC/router and the Dual Link modem. The Dual Link modem negotiates the PPPoE Discovery Phase without ISP involvement. The link between modem and ISP is pure PPPoA. After that, the PPPoE Session Phase takes over and that is when the ISP negotiates PPP parameters with the PC (or router).

VI.2 Qual o problema do PPPoE da 3COM?

Here is short description of the problem that you can send to your equipment vendor when requesting a firmware upgrade.

So that is why asking a router vendor to "support PPPoA" is asking the wrong question. What you need to ask is "do you support PPPoE:3com?"

The router will do the job of the EnterNet300 software, if only it could talk to the 3Com modem. So the good news is that once the router is talking with the 3Com Dual Link, you won't need any special software to connect to the Internet.

The 3Com modem talks to your ISP using PPPoA and then converts protocols to PPPoE:3com (3Com's non-standard dialect of PPPoE) in order to continue packet transmission over your local Ethernet network. This is necessary because PPPoA won't work over Ethernet.

So the goal is for your router to support the following Internet connection:
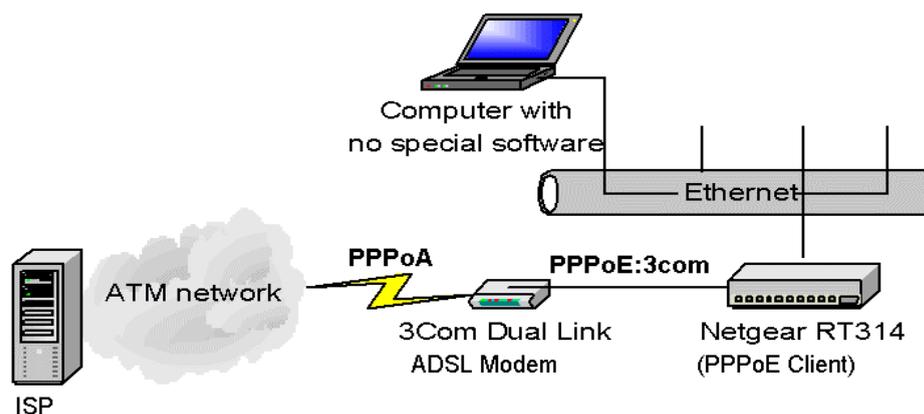
The 3Com Dual Link uses a NON-COMPLIANT version of PPPoE (per RFC 2516). The PPPoE protocol specifies 2 new values for the EtherType field in the Ethernet MAC frame.

RFC 2516 specifies that the EtherType for "PPPoE discovery" is 0x8863, and "PPPoE session" is 0x8864.

BUT... 3Com changed these values to 0x3c12 and 0x3c13 (shame on them).

Here is a summary:

	ETHER_TYPE value for PPPoE Discovery phase	ETHER_TYPE value for PPPoE Session phase
PPPoE RFC2516	0x8863	0x8864
PPPoE:3com	0x3c12	0x3c13

3Com bundles EnterNet300 to be used as your connection client on the PC (but private labels it as 3Com software). If you locate the enternet.ini file, you'll see these NON-COMPLIANT values being set.

Excerpt from file c:\3Com\DLCC\bin\EnterNet.ini
...
ETYPEDISCOVERY=0x3c12
ETYPEPAYLOAD=0x3c13
...

I'm using a Netgear 314, and observed the exact same issue when attempting to get a Linux computer to talk directly to the 3Com Dual Link.

The 3Com simply won't respond to any RFC 2516 PPPoE packets. That means your router will simply timeout when attempting to establish a PPPoE connection with your 3Com modem.

You can test this yourself by removing the router, connecting the PC directly to the Dual Link, and then find enternet.ini and change the two lines from above to look like:
ETYPEDISCOVERY=0x8863
ETYPEPAYLOAD=0x8864

Next, run the 3Com/EnterNet300 dialer application. I've watched the network traffic with a packet sniffer and can verify that the 3Com modem won't reply at all. After a short time the dialer application will report a problem.

VI.3 PPPoA: The "Problem Protocol" for LANs

PPPoA is a "problem protocol" for your LAN because it can't be used over standard Ethernet connections. To enable Ethernet-based LAN connections, the Dual Link converts PPPoA on the ISP side of modem into **"PPPoE:3com"** on the LAN side of modem. Why? Without converting the packets, your computer would need an ATM network interface card instead of an Ethernet interface. *However, PPPoE:3com is a non-standard implementation of PPPoE (per IETF RFC2516), and that raises interoperability issues with routers and PPPoE client software (if you don't have a router).*

Other ADSL modem vendors chose different approaches to converting the "problem protocol" into an Ethernet compatible protocol. These other approaches have few or no interoperability issues. For example, Alcatel STH converts PPPoA into PPTP (and most consumer routers support this standard), Cisco consumer modems terminate the PPPoA session and act as a gateway/router, and PairGain Megabit modems also use the gateway/router approach.

VI.4 PPPoE Client Software on Computer

So your ISP requires PPPoA, but your PC's Dialer software is running PPPoE:3com to talk with the 3Com Dual Link. How does that work?

At first glance this is all very confusing. The 3Com ADSL modem is operating as a bridge, and it takes care of converting protocols from PPPoA to PPPoE:3com. This is necessary because PPPoA will not run over Ethernet. In fact, PPPoE was invented to handle this very problem. However, 3Com uses a **non-standard** dialect of PPPoE (PPPoE:3com).

Your "Dialer" (EnterNet300) software on the PC speaks both PPPoE and PPPoE:3com. The Dialer application manages the DSL connection with your ISP, and configures your PC's networking. This software is actually from a company named NTS (recently acquired by Efficient Networks). The Dialer application is part of the EnterNet300 software package. As far as I know, the only other PPPoE client software that can speak PPPoE:3com dialect is [RASPPPOE](#) (Windows 98/98SE/ME/2000) and [Roaring Penguin's](#) rp-pppoe (Linux users only).

PPPoE and PPPoE:3com always require special software to be installed on your computer, **except** if your DSL connection is managed by a router. So after the router is installed and working, don't use the PPPoE software on the PC!

VI.5 Qual é o script de configuração do Modem Dual Link no Velox

add ip network ip address 192.168.157.100/C frame ETHERNET_II

set port ISP vpi 00 vci 33 pcr 0

enable port ISP

set port 3Com DL Manager vpi 00 vci 32 pcr 32

enable port 3Com DL Manager

VI.6 Depois de transformar meu modem em router, não consigo acessar alguns sites.

Baixe seu MTU para um número menor que 1492. 1300 tem dado certo. Leia as repostas sobre MTU.

VI.7 O que é MTU?

The MTU setting controls the maximum ethernet packet size your PC will send (you did know the internet works in packets, didn't you?). Why a limit? because although larger packets can be constructed and sent, Your ISP and Internet backbone routers and equipment will chop up (fragment) any larger than their limit, then these parts are re-assembled by the target equipment before reading. This fragmentation, and re-assembly is not optimal.

VI.8 Que valor usar para MTU?

Unless otherwise set, windows defaults MTU to 1500, or a lower value of 576 for external networks. 1500 is ok unless you are running PPPoE, or want to use IPSec (Secure VPNs), or both, (it is then too big). 576 is not efficient for the broadband/internet, (it is too small).

If your MTU is too low already, (maybe 576), the following method will not be able to detect whether you can switch to an optimal size..... So first follow "CHANGING MTU for PPPoE" to reset MTU to 1500, reboot, then come back to this! The best value for MTU is that value just before your packets get fragmented. How do you find out that? By using Ping at an MSDOS command prompt. Go to Start/ Programs/ MSDOS-PROMPT, and type....

ping -f -l 1472 www.dslreports.com

(That is a dash-ell not a dash-one. Also note the spaces in-between the sections)

Press Enter.

Then reduce 1472 by 10 until you no longer get the "packet needs to be fragmented" error message. Then increase by 1 until you are 1 less from getting "packet need to be fragmented" message again. Add 28 more to this (since you specified ping packet size, not including IP/ICMP header of 28 bytes) And this is your MaxMTU. Note:If you can ping through with the number at 1472, you are done! Stop right there. Add 28 and your MaxMTU is 1500.

For PPPoE, your MaxMTU should be no more than 1492, to allow space for the 8 byte PPPoE "wrapper", but again, experiment to find the optimal value.. For PPPoE, the stakes are high: if you get MTU wrong, you may not just be sub-optimal, things like UPLOADING, or web pages, may stall, or not work at all!

VI.9 O que é RWIN?

RWIN (TCP Receive Window) is the amount of data that your computer can accept without acknowledging the sender. If sender has not received acknowledgement for the first packet it sent, it will stop and wait and if this wait exceeds a certain limit, it may even retransmit. This is how TCP achieves reliable data transfer.

Anyway, this start-stop action slows down the throughput considerably in some cases. Hence, RWIN should be large enough to sustain continuous data transfer. By *default*, this window is too small (8192 for Windows 95/98/98SE/NT and 16384 for Windows ME/2000) for many types of DSL and Cable (Broadband).

Raising RWIN creates a *larger* window, which allows more information to come through non stop, *up to a point*. After this point, no difference will be noticed for the particular connection. For each user, this point can/will vary and is determined by (bandwidth * delay) product.

Please note that there is no single value for all hosts on the Internet. You have to allocate some *reasonable* extra RWIN (say 20-25%)for variance from average latency

RWIN (Receive Window) is the single most important tweak. Raising Rwin from default (8760 for Win95/98/98SE/NT and 17520 for WinME/2K/XP), *may* greatly improve download speeds, depending on your line. Why? Here is my kindergarten analogy:
Default RWIN for broadband, is like having a tiny straw in a thick milk shake, only so much can get through the straw (line), so fast. By putting a larger straw (higher RWIN) in that same thick shake, you allow more shake (data) to come through sooner (thus improving speeds), *to a point that is*. After which, there is *no more* improvement, and shake (data) can start spilling all over (packet loss). So the key is, to find an RWIN that fits *your* line just right.

The formula for finding your "ideal" RWIN, is to take your latency (average ping time in ms x 1.5), multiply it by your advertised speed, and divide that by 8. Or use our RWIN calculator **here** Note: If setting RWIN below 8192, try using even multiples of MSS (see "MSS requested" on Tweaks Test).

Note: If you have low advertised speeds, then raising RWIN may be uncalled for, and have no affect.

Parte VII.   Tecnologias Componentes e Similares

VII.1 O que é PPPoE?

PPPoE (Point-to-Point Protocol over Ethernet) is a specification for connecting multiple computer users on an Ethernet local area network to a remote site through common customer premises equipment, which is the telephone company's term for a modem and similar devices. PPPoE can be used to have an office or building-full of users share a common Digital Subscriber Line (DSL), cable modem, or wireless connection to the Internet. PPPoE combines the Point-to-Point Protocol (PPP), commonly used in dialup connections, with the Ethernet protocol, which supports multiple users in a local area network. The PPP protocol information is encapsulated within an Ethernet frame. PPPoE has the advantage that neither the telephone company nor the Internet service provider (ISP) needs to provide any special support. Unlike dialup connections, DSL and cable modem connections are "always on." Since a number of different users are sharing the same physical connection to the remote service provider, a way is needed to keep track of which user traffic should go to and which user should be billed. PPPoE provides for each user-remote site session to learn each other's network addresses (during an initial exchange called "discovery"). Once a session is established between an individual user and the remote site (for example, an Internet service provider), the session can be monitored for billing purposes. Many apartment houses, hotels, and corporations are now providing shared Internet access over DSL lines using Ethernet and PPPoE.

Originally designed for dialup lines, it is being used by DSL providers to solve the problems they get managing an open DSL network, viz: IP address shortages, broadcasts not meant for you appearing on your local IP address (because you are on a giant ISP centered virtual net), and other (mainly ISP-end) difficulties inherent in large bridged networks.

Some heavy duty DSL back-end suppliers are promoting PPPoE as a way of helping ISPs cope with these difficulties. Redback, for example, is promoting PPPoE (PPP over ethernet), with a lot of success.

With a PPPoE setup, your computer (or in some cases, DSL hardware) needs to run a PPPoE protocol stack (software). This will be recommended by your DSL supplier. One of the more common PPPoE stacks is WinPOET. There may be difficulties combining NAT and PPP or PPPoE implementations.. it generally makes things more complex. Check the FAQ for common problems with PPPoE, DHCP and other issues. If you have a choice, try to get a bridged static IP.

An argument from a large DSL ISP, in favor of PPPoE follows:

"One of the biggest complaints with dial-up, is that unless my company runs L2TP tunnels or some kind of IPSec, there's no way to access my work files from home. BSG's, with or without PPPoE allow the service provider to manage many seperate networks. For instance, ibm.com, bigDSLisp.net, ba.com could all be accessed from your desktop provided your service provider had agreements with these companies. This is only the first step. In 5 years you could see a consolidation, whereby there are only 2-3 facilities providers in New York, with many service companies providing value adds. Can you imagine FOX being a reseller with all of their programming offered at 500kb/s streaming! Sure there are bumps in the road. The whole PPPoE issue is only an issue because the software is still in it's infancy.

Why don't I like the static/DHCP model? Well mainly because it is so inflexible. Your router becomes the termination point, and running any advanced services reduces its ability to forward packets. The irony is that the SMS-1000 (Redback) BSG which Bell Canada and Bell Atlantic have deployed was designed by former Cisco developers. Essentially the redback emulates a bank of routers, and the customer is connected to one of those routers based on their domain name.

What will happen 3-5 years? Only backbone routers will remain packet workhorses, the access routers will be replaced by BSG's capable of "seeing" every single customer. Access providers will realize that their value is in the proximity to users, which equates to large amounts of revenue from new broadcasters. By users, I mean consumers, because the power workers will be starting to convert to mass wireless services, as yet too expensive for consumer."

VII.2 O que é PPPoA?

PPPoA is PPP over ATM.. from a software point of view, this is very similar to PPPoE. in this case though, a DSL modem pumping ATM is internal to the computer, rather than being a short ethernet cable away.

VII.3 What will ADSL do to ISDN?

That all depends upon the telephone companies offering both services. The two services are not the same -- ISDN provides two voice channels or a 128 Kbps data channel while ADSL is predominantly a data pipe providing an asymmetrical bandwidth of up to 8 Mbps downstream and 1 Mbps upstream under good conditions. However, an ADSL access network will be an overlay network and therefore will not require the expensive and time-consuming switch upgrades that held ISDN back for so long. If ADSL service prices resemble ISDN service prices, then one would expect ADSL to be favored for Internet and video applications.

VII.4 How does ADSL compare to cable modems?

ADSL provides a dedicated service over a single telephone line; cable modems offer a dedicated service over a shared media. While cable modems have greater downstream bandwidth capabilities (up to 30 Mbps), that bandwidth is shared among all users on a line, and will therefore vary, perhaps dramatically, as more users in a neighborhood get online at the same time. Cable modem upstream traffic will in many cases be slower than ADSL, either because the particular cable modem is inherently slower, or becasue of rate reductions caused by contention for upstream bandwidth slots. The big difference between ADSL and cable modems, however, is the number of lines available to each. There are no more than 12 million homes passed today that can support two-way cable modem transmissions, and while the figure also grows steadily, it will not catch up with telephone lines for many years. Additionally, many of the older cable networks are not capable of offering a return channel; consequently, such networks will need significant upgrading before they can offer high bandwidth services.

Parte VIII. FAQ do Acerola

Esse FAQ é relativo a modificação Modem->Router.

Ultima atualizacao: 14/10/2001.

VIII.1 P - Eu tenho 3 PCs aqui em casa, Atualmente eu uso o PC(base) conectado ao meu modem via USB daí sai o cabo para o HUB para os outros dois PCs com isso eu uso um software de Proxy para eles se conectarem. A minha duvida é se eu transformar ele vou precisar de uma segunda placa de rede? Tenho um HUB encore de 10mbs 16portas, Vou poder botar um cabo do modem direto no HUB daí mais três cabos um para cada PC? É ISSO MESMO?

R - Nao, soh vai precisar de uma placa de rede para cada micro. Sim, eh isso mesmo. Voce conenta os tres micros no hub e conecta o modem no hub tambem, como se fosse outro micro. Voce nao vai usar mais nenhum programa de proxy, nem internet

connection sharing, nem nenhum dialer, nem nada. Vc vai configurar uma rede local, da qual o modem faz parte, e o modem vai ser o gateway da rede local.

VIII.2 P - Vai funcionar mesmo no XP?

R - Sim, vai funcionar em qualquer sistema operacional, inclusive unix, machintosh, etc. Voce nao vai precisar instalar absolutamente nada no computador. Soh precisa configurar uma rede local com o modem como gateway.

VIII.3 P - Se não der certo tens a documentação para reverter?

R - Nao. A pagina eh como transformar o dual link em router, e nao o contrario. Mas, para reverter, basta fazer o mesmo procedimento de upload da firmware com a firmware antiga do modem (3CP4130). Voce pode pegar ela na pagina da 3com ou no cd de instalacao. O nome dos arquivos sao: MU010104.NAC - Mu010101.sdl. Os numeros podem mudar dependendo da versao do firmware. Eu nao fiz esse procedimento, logo nao posso garantir nada.

VIII.4 P - se funcionar a conversão, aquele software não será mais preciso, terei que usar o adaptador de rede do WInXP (conexão via broadband)

R - Nao. O windows xp, ou qualquer outro sistema operacional, nem vai tomar conhecimento de que tem um modem ligado na rede. O modem passa a se comportar como se fosse uma outra maquina com conexao direta a internet. Voce soh vai precisar montar uma rede local, e na configuracao do tcp/ip da sua placa de rede voce poe o ip do modem como gateway.

VIII.5 P - Quem faz a validacao de senhas? Onde eu coloco meu login/senha?

R - O proprio router faz a autenticacao. Ele guarda o login/senha. Voce deve indicar na configuracao seu login/senha do servico ADSL. Em alguns casos, trata-se do login/senha do seu provedor, em outros (telemar/velox) eh o numero do seu telefone.

VIII.6 P - Nao consigo acessar alguns sites (e.g. www.globo.com, www.ig.com.br, www.oglobo.com.br, www.cade.com.br, www.lancenet.com.br, www.globonews.com.br). O que faco?

R - Use outro browser (netscape, opera, etc). Ou entao consulte
www.speedguide.com e procure patches apropriados para a sua versao do windows.
Agradecimentos a Marcio Josbete Prado pela dica desse site.

VIII.7 P - Eu uso velox/telemar. Ha diferencas?

R - Sim. Primeiro, seu login e senha nao sao o login e senha do provedor. Sao o seu
numero do telefone. Segundo, o parametro vci eh 33 e nao 35.

VIII.8 P - Achei outra versao do firmware. Eh seguro instala-la?

R - Nao. Instalar a versao 1.1.7 ja eh um procedimento arriscado, mas funciona. A
1.1.9 nao eh estavel. O modem reseta apos algum tempo. A versao 2.0, segundo um
usuario que nao conheco pessoalmente, danificou seu modem.

VIII.9 P - E quanto ao DHCP?

R - Eu nao uso DHCP. Uso ips fixos. O modem suporta no maximo 40 maquinas
em DHCP. A configuracao DHCP que esta na pagina talvez nao funcione devido a esse
limite. Consulte o manual do router.

VIII.10 P - Voce pode me mandar por email ou disponibilizar na pagina determinado software?

R - Nao. Redistribuicao de software, mesmo que ele esteje disponivel de graca em
alguma pagina, eh ilegal. E eu nao tenho nem tempo nem largura de banda pra fazer isso.
Soh posso mesmo indicar onde consegui-lo.

VIII.11 P - Como configuro o modem para unix?

R - Unix nao eh sistema operacional para leigos. Se voce nao sabe configurar uma
rede local em unix, nao deveria estar usando windows.

VIII.12 P - Estou tendo problemas com FTP.

R - Normal. Voce agora nao tem mais uma conexao direta com a internet, e sim
atraves de um router. Voce pode mapear as portas do modem para a sua maquina e usar
ftp normalmente ou pode usar ftp em passive mode. Quaisquer programas que abram

portas servidores na sua maquina vao parar de funcionar a nao ser que voce mapeie as portas no modem.

VIII.13   P - Eu tenho um modem de outra marca/modelo. Como faco ele funcionar?

R - Infelizmente nao posso ajudar. Eu soh tenho o dual link. E nem de dual link eu entendo muito.

VIII.14   P - A luz do adsl (antiga usb) nao para de piscar.

R - O modem nao esta conseguindo se conectar. Pode ser um problema de configuracao dos parametros vpi e vci. Consulte a assistencia tecnica do seu provedor adsl. Ou entao leve o modem na casa de um amigo que tenha adsl e veja se funciona lah. Por incrivel que pareca, isso ja funcionou com umas 3 pessoas.

P - Como eu faco pra saber meu ip na internet? O winipcfg (ou outro programa) soh mostra o meu ip local.
R - Voce pode abrir uma pagina que detecte o seu ip ou pode entrar no terminal do modem e dar o comando list ip addresses.

P - Afinal, quem eh meu provedor?
R - A telemar/brasiltelecom eh o seu verdadeiro provedor. Mas por questoes burocraticas da anatel, voce tem que assinar um provedor (terra, uol, etc) para que nao caracterize que a empresa de telefonia esta provendo acesso a internet.

VIII.15   P - O router eh mais seguro?

R - Sim, muito mais. Todos os ataques externos sao feitos ao modem, e nao a sua maquina. Se algum trojan abrir uma porta servidor no seu computador, ninguem de fora vai poder se conectar a ela. Isso tudo muda, no entanto, se voce configurou alguma maquina como default workstation. Essa ultima opcao, apesar de ser a mais funcional, apresenta todas as vulnerabilidades de uma conexao internet comum. Nada que um firewallzinho nao resova.

VIII.16   P - Eu quero te processar. Como te encontro? OU Eu quero te pegar na porrada. Como te encontro? OU Eu te acho o maximo! Como te encontro?

R - No way.

Perguntas sao sempre bem-vindas
acerola2000@ig.com.br

Parte IX.   Outras perguntas.

IX.1   Qual o consumo elétrico médio do modem 3Com Dual Link?

Da página da Telemar: O consumo é de 13 kwh/mês, considerando o Modem 3Com Dual link ligado 24h/dia por 30 dias. Este consumo é menos que 1/3 consumido de uma lâmpada de 60W (José Muanis)

IX.2   O modem pode ser desligado da energia (quando desligar o computador)?

Parte X.   Glossário desse FAQ

ADSL	Asymmetric Digital Subscriber Line
ANATEL	Agência Nacional de Telecomunicações
CPE	Customer Premises Equipment
DVI	ISDN da Telemar
FEXT	Far End Cross Talk
ISDN	RDSI em inglês
Microfilter	Used in ADSL installations, the microfilter is placed on phone lines to filter out interference between the high and low frequencies.
NEXT	Near End Cross Talk
POTS	Plain Old Telephone Service
PPP	Poit to Point Protocol
PPPoA	PPP over ATM
PPPoE	PPP over Ethernet
RDSI	ISDN em português
Speedy	Serviço de dados da Telefônica
Splitter	Used in ADSL installation, a splitter is a filter placed at both ends of the local loop. It splits the line, separating the high-fre-quency data communications from the low-frequency voice communications.
Velox	Serviços de dados da Telemar.
Virtua	Serviço de internet via cabo da Net, Organizações Globo.

Parte XI.   Glossário Técnico

- **100Base-T** - A 100 Mbps LAN that maintains backward compatibility with 10 Base-T networks running at 10 Mbps. Competitor to 100VG AnyLAN.
- **10Base-T** - A 10 Mbps Ethernet LAN that runs over twisted-pair wiring. This network interface was originally designed to run over ordinary twisted-pair (phone wiring) but is predominantly used with Category 3 or Category 5 cabling.
- **2B1Q** - Two Binary, One Quaternary is a line modulation coding technique where 2 bits are mapped to 1 quaternary symbol; it is used in IDSL, SDSL, HDSL, and ISDN.

(i) A

- **Access Line** - The physical telecommunications circuit connecting an end user location with the serving Central Office (CO) in a local network environment. See also Local Loop.
- **Access Network** - That portion of a public-switched network that connects access nodes to individual subscribers. The access network today is predominantly passive twisted-pair copper wiring.
- **Access Nodes** - Points on the edge of the access network that concentrate individual access lines into a smaller number of feeder lines.
- **Access Rate** - The transmission speed of the physical access circuit between the end user location and the local network. This is generally measured in bits per second; also called Access Speed.
- **Adapter Card** - Circuit board or other hardware that provides the physical interface to a communications network; an electronics board installed in a computer which provides network communication capabilities to and from that computer; a card that connects the DTE to the network. Also called a Network Interface Card (NIC).
- **ADSL (Asymmetric Digital Subscriber Line)** - A technology that delivers data faster downstream than upstream. The fastest downstream rate is 8 Mbps, while the fastest upstream rate is 640 Kbps. ADSL connections work at distances up to 18,000 feet (5,488 meters) from a CO over a single copper twisted-pair in a telephone line (the other twisted pair can still be used for POTS voice service). It is widely deployed by ILECs. ADSL is the most popular form of DSL for residential users. See Reverse ADSL
- **ADSL Transmission Unit - Central Office** - The ADSL modem or line card that physically terminates an ADSL connection at the telephone service provider's serving Central Office (CO).
- **ADSL Transmission Unit - Remote** - The ADSL modem or PC card that physically terminates an ADSL connection at the end user's location.
- **Always-on** - Current dial-up services require the user to call the ISP. The connection is only active during the duration of the call. Most DSL implementations (including ADSL, UADSL, and SDSL) enable the connection to be always on in a fashion similar to a LAN.
- **Analog** - An electrical signal or wave form in which the amplitude and/or frequency vary continuously, such as a voice signal over a Plain Old Telephone System (POTS) line.
- **ASIC (Application Specific Integrated Circuit)** - A chip designed for a specific application. Examples of an ASIC application can be SDSL or other broadband solutions.
- **ATM (Asynchronous Transfer Mode)** - A high-bandwidth, low-delay, connection-oriented, packet-like switching and multiplexing technique. Usable capacity is segmented into 53-byte fixed-size cells; each cell is presented to the network on a start-stop basis, thus asynchronous. The key difference between ATM, X.25 packet switching, and Frame-Relay is that the packets of the earlier technologies varied in size. The consistent size of ATM allows video, voice, and data to be carried at a manageable rate.
- **ATM25** - ATM Forum-defined 25.6 Mbps cell-based user interface based on an IBM token ring network.

- **Available Bit Rate** - Provides a guaranteed minimum capacity but allows data to be sent at higher capacities when the network is free.

(ii) B

- **B Channel** - The bearer channel in ISDN. With both basic rate and primary rate ISDN, this is a full-duplex 64 Kbps channel for sending and receiving data. See also Basic Rate Interface, Integrated Services Digital Network, and Primary Rate Interface.
- **Backbone** - That part of a network which is used as the main path for carrying traffic between network endpoints.
- **Backbone LAN** - A transmission facility designed to interconnect two or more LAN segments.
- **Bandwidth** - The width of a communications channel measured in bits per second (digital bps) or cycles per second (analog Hertz). It represents the capacity to handle simultaneous data transmissions; the greater the bandwidth, the more information that can be sent in a given amount of time.
- **Baseband** - Technology using the entire bandwidth of a transmission medium, such as copper cable, to carry a single digital data signal. Note that this limits such transmission to a single form of data transmission (e.g., voice or data), since digital signals are not modulated. See also Broadband.
- **Basic Encoding Rate** - Bit error rate, or the ratio of received bits that are in error; also, a rule for encoding data units described in ANSI. See Bit Error Rate Test.
- **Basic Rate Access** - See Basic Rate Interface.
- **Basic Rate Interface** - This is an ISDN interface typically used by smaller sites and customers. This interface consists of a single 16 Kbps data (or D) channel plus two bearer (or B) channels for voice and/or data. Also known as Basic Rate Access, or BRA.
- **Bit** - A contraction of binary digit. A bit is the smallest element of information in the digital system.
- **Bit Error Rate Test** - A test that reflects the ratio of erroneous bits to the total number transmitted. Usually shown in exponential form (10^6) to indicate that one out of a certain number of bits are in error.
- **Bits Per Second** - The raw data rate of a system.
- **BOOTP (Bootstrap Protocol)** - A technology used by a network node to determine the IP address of its Ethernet interf ace.
- **Bridge** - A bridge passes data packets between two or more LANs that use the same communications protocol. It forwards or keeps an incoming packet based on its hardware (MAC) address. It does not offer the privacy of a router connection since it allows each LAN to see all devices on the opposite side of the bridge. Note: MAC (all caps) is not short for Macintosh; it stands for Media Access Control.
- **Bridge Tap** - A sometimes-accidental connection of another local loop to the primary local loop. It is generally harmful to DSL connections and should be removed. For example, extra phone wiring within a residence is a combination of short bridge taps. A POTS splitter isolates the house wiring and provides a direct path for the DSL signal to pass unimpaired to the ATU-R modem.
- **Broadband** - Refers to signal transmission in which a single medium, such as copper or fiber optic cable, carries multiple channels, typically using some form of frequency or wave division multiplexing. This bandwidth sharing allows the integration of voice, video, and data over a single transmission medium. DSL is a broadband transmission scheme.
- **Broadband ISDN (Broadband Integrated Services Digital Network)** - A technology suite designed for high-bandwidth multimedia applications and the integration of voice, data, and video. The two transmission types are ATM and STM.

(iii) C

- **Carrier Service Area** - Area served by a LEC, RBOC, or telco, often using DLC technology.
- **Cell** - A 53-byte unit of transmission in Asynchronous Transfer Mode (ATM). See also ATM Cell.
- **Central Office** - A circuit switch that terminates all the local access lines in a particular geographic serving area; a physical building where the local switching equipment is found. DSL lines running from a subscriber's home connect at their serving Central Office (CO).
- **Channel** - A generic term for a communications path on a given medium; multiplexing techniques allow providers to put multiple channels over a single medium. See also Multiplexer.
- **Circuit Switched Network** - A network that establishes a physical circuit temporarily on demand (typically when a telephone or other connected device goes off hook) and keeps that circuit reserved for the user until it receives a disconnect signal.
- **Circuit Switching** - A switching system that establishes a dedicated physical communications connection between endpoints, through the network, for the duration of the communications session; this is most often contrasted with packet switching in data communications transmissions. See also Packet Switching.
- **CLEC (Competitive Local Exchange Carrier)** - A Local Exchange Carrier which is not the Incumbent (LEC) or market-leading LEC. CLECs compete on a selective basis for local exchange service, and long distance, Internet access, and cable TV/video on demand. They build or rebuild their own loops (wired or wireless), and lease local loops from ILECs at wholesale rates for resale to end users. CLECs include cellular/PCS providers, ISPs, IXCs, CATV providers, CAPs, LMDS operators, and power utilities.
- **CLI (Command Line Interface)** - A technology that gives the user the option of configuring a router by entering special commands in a terminal emulator connected to the PC's serial port. There are hundreds of commands available and they are detailed in the CLI reference manual.
- **CO (Central Office)** - See Central Office.
- **Coaxial Cable** - This cable consists of a single insulated copper wire surrounded by a braided copper shield. Two types of coaxial cable are currently used in LANs: 50-ohm cable is used for digital signaling, and 75-ohm cable is used for analog and high-speed digital signaling.
- **Compression** - The act of sampling and reducing a signal for the purposes of saving storage or transmission capacity; MPEG1 and MPEG2 are two key encoding and compression algorithms that enable full-motion video.
- **Console** - This refers to a device, such as a PC, that can be used to configure a router via a serial port (RS232) connection. The Configuration Manager and Command Line Interface are both used on the console.
- **Constant Bit Rate** - Specifies a fixed bit rate so that data is sent in a steady stream. This is the same thing as a leased line.
- **Core Network** - Combination of switching offices and transmission plants connecting switching offices together. In the US, local exchange Core Networks are linked by several competing Interexchange networks; in the rest of the world, the Core Network extends to national boundaries.
- **CPE (Customer Premises Equipment)** - Networking devices such as workstations, routers, POTS splitters, etc. installed at a customer site and connected to the telephone company network, such as the SpeedStream® family of DSL CPE.

- **Crosstalk** - Interference on an analog line of an adjacent signal with the intended receive signal. Crosstalk makes it hard to hear just the intended signal, as there are multiple conversations on the line at once.
- **CSU/DSU (Channel Service Unit/Data Service Unit)** - A digital interface device that connects end user data communications equipment to the digital local access lines.

(iv) D

- **D Channel** - The data signaling channel, in the ISDN scheme; this is the channel that carries signaling and limited packet communications. In basic rate ISDN, this is a full-duplex 16 Kbps channel; in primary rate ISDN, this is a full-duplex 64 Kbps channel. See Basic Rate Interface, Integrated Services Digital Network, and Primary Rate Interface.
- **Data Circuit Terminating Equipment** - Any device that is connected to the subscriber end of a transmission circuit and provides the appropriate termination functions for that connection. A modem or DSU/CSU are considered DCE. Also called Data Communications Equipment.
- **Dedicated Line** - A transmission circuit that is reserved by the provider for the full-time use of the subscriber. Also called a Private Line.
- **Demodulation** - Conversion of a carrier signal or wave form (analog) into an electrical signal (digital).
- **DHCP (Dynamic Host Configuration Protocol)** - A TCP/IP protocol that allocates IP addresses automatically to any DHCP client (any device attached to your network such as your PC) so that addresses can be reused when the client no longer needs them.
- **DHCP Relay** - This allows devices on a LAN to get addressing information from a DHCP server that is located at another site (across a WAN). It centralizes network addressing at a corporate site and simplifies workstation configuration.
- **DHCP Server** - This automatically assigns addresses to all workstations on the LAN.
- **Dial Up** - The process of initiating a switched connection through the network; when used as an adjective, this is a type of communication that is established by a switched-circuit connection.
- **Digital Data Service** - Private line digital service with data rates of 56/64 Kbps.
- **Digital Hierarchy** - The progression of digital transmission standards typically starting with DS-0 (64 Kbps) and going up through at least DS-3. Twenty-four DS-0s make up a DS-1; 28 DS-1s make up a DS-3. There are other links (including a DS-2), but these are less common.
- **Digital Loop Carrier** - Equipment used to concentrate many local loop pairs onto a few high-speed digital pairs or one fiber optic pair for transport back to the Central Office (CO).
- **Digital Signal 0** - In the digital hierarchy, this signaling standard defines a transmission speed of 64 Kbps.
- **Digital Signal 1** - In the digital hierarchy, this signaling standard defines a transmission speed of 1.544 Mbps; a DS-1 is composed of 24 DS-0 signals; this term is often used interchangeably with T-1.
- **Digital Signal 3** - In the digital hierarchy, this signaling standard defines a transmission speed of 44.736 Mbps; a DS-3 is composed of 28 DS-1 signals; this term is often used interchangeably with T-3.
- **Digital Signal Processor** - A specialized computer chip designed to perform speedy, complex operations on digitized wave forms.
- **Distribution** - Portion of the telephone cabling plant that connects subscribers to feeder cables from the Central Office.
- **DNS** - A Domain Name System looks up and converts host domain names into their assigned IP addresses. A domain name is a meaningful and easy-to-remember "handle" for the numerical address required by a computer. A DNS relay connects the client to the ISP server that performs the domain name lookup.

- **DoS (Denial-of-Service Attack)** - A coordinated attack which overloads a website's abilities, forcing a shut-down, All FlowPoint routers installed in the field and all new Efficient SpeedStream outers shipped since (x date) have a built-in anti-spoofing filter to help defend the network against Distributed Denial-of-Service attacks (incoming and outgoing).
- **Downstream** - Refers to data sent from the headend or CO to a subscriber site. In DSL, the communications from the network towards the customer premises.
- **DSL (Digital Subscriber Line)** - The fastest way to bring the Internet to your business, home office, or home through a normal phone line. DSL comes in several flavors; see ADSL, G.Lite, HDSL, IDSL, SDSL, VDSL, UDSL.
- **DSL Forum** - The organization developing and defining DSL standards, including those affecting ADSL, SDSL, HDSL, and VDSL.
- **DSLAM (Digital Subscriber Line Access Multiplexer)** - network device, usually at a telephone company CO, that receives signals from multiple customer DSL connections and puts the signals on a high-speed backbone line. Typically you have to be within 18,000 feet of a DSLAM to have DSL service. Depending on the product, DSLAM multiplexers connect DSL lines with some combination of ATM, frame relay, or IP networks. DSLAM enables a phone company to offer business or home users the fastest phone line technology (DSL) with the fastest backbone network technology (ATM).

(v) E

- **E-1** - The European equivalent of a T1 circuit. It is a term for a digital facility used for transmitting data over a telephone network at 2.048 Mbps.
- **E-3** - The European equivalent of a T3 circuit. It is a term for a digital facility used for transmitting data over a telephone network at 34 Mbps.
- **Echo Suppressor/Echo Canceller** - These are active devices used by the phone company to suppress positive feedback (singing) on the phone network.
- **EIA/TIA (Electronic Industries Association/Telecommunications Industry Association)** - This organization provides standards for the data communications industry to ensure uniformity of the interface between DTEs and DCEs.
- **ELEC (Enterprise Local Exchange Carrier)** - Generally, a large corporation operating as their own LEC as a means of obtaining better carrier rates for themselves, including perhaps selling services to others from a separate profit center.
- **Encapsulation** - This involves wrapping data within a particular protocol header. Sometimes the entire frame from one network is simply placed in the header used by the data link layer protocol of another network.
- **Encryption** - For security purposes, a specific algorithm may be used to alter the appearance of data, making it incomprehensible to those who are not authorized to see the information.
- **Enterprise Network** - A widely dispersed, multifaceted telecommunications network for a particular purpose or organization; a term for all of an organization's telecommunications networking services and equipment.
- **Ethernet** - A LAN used to connect devices within a single building or campus at speeds up to 10 Mbps. Within the OSI model, Ethernet is defined at layer one (physical) and layer two (data link). Based on Carrier Sense Multiple Access/Collision Detection (CSMA/CD), Ethernet works by simply checking the wire before sending data. See also 10Base-T.

(vi) F

- **Far End Cross Talk** - Leakage of one or more foreign sources into the receiver of a system at the distant end of a transmission system.
- **Fast Ethernet** - A LAN used to connect devices within a single building or campus at speeds up to 100 Mbps.
- **Feeder** - That portion of the telephone cable plant that extends from the Central Office (CO) to distribution frames where distribution cables deliver traffic to subscribers.
- **Feeder Distribution Interfaces** - Points where cable bundles from the telephone switch use drop lines extended out to service users.
- **Fiber Distributed Data Interface** - A LAN token ring standard using fiber optic cable.
- **Fiber Optic Cable** - A transmission medium composed of glass or plastic fibers; pulses of light are emitted from a laser-type source.
- **File Transfer Protocol** - Internet tool for accessing files linked to the Internet.
- **Filter** - Generally this is a process or device that screens network traffic for characteristics such as source address, destination address, or protocol, and determines whether to forward or block data based on the programmed criteria.
- **Firewall** - This is a combination of software and hardware that filters or blocks traffic from a public network. A firewall renders parts of the private network inaccessible and invisible to the public network. It prevents unauthorized and/or unrecognized access.
- **Frame** - This usually refers to headers and trailers used for synchronization and error control. The terms cell, datagram, message, packet, and segment are also used to describe logical information groupings at various layers of the OSI reference model.
- **Frame Relay** - A high-speed, packet-switched data communications service, similar to X.25. Frame relay is a leading contender for LAN-to-LAN interconnect services, and is well suited to the demands of LAN environments. See also Permanent Virtual Circuit and Switched Virtual Circuit.
- **Frequency Division Multiplexing** - A multiplexing technique that uses different frequencies to combine multiple streams of data for transmission over a communications medium.
- **FTP (File Transfer Protocol)** - Part of the TCP/IP protocol stack used for transferring files between network nodes.
- **Full Duplex** - Transmission of data in two directions simultaneously.

(vii) G

- **G.Lite ("gee'-dot-light")** - Also known as DSL Lite and Universal ADSL, G.Lite is expected to become the most widely installed form of DSL. It is essentially a smaller bandwidth flavor of G.Lite provides a data rate from 128 Kbps to 1.544 Mbps downstream and from 128 Kbps to 384 Kbps upstream.

(viii) H

- **HDSL (High-bit-rate Digital Subscriber Line)** - Delivers up to 1.544 Mbps of data symmetrically (upstream and downstream) over two copper twisted-pairs. Because HDSL provides T1-level speed, telephone companies have been using HDSL for local access to T1 services whenever possible. The operating range of HDSL is limited to 12,000 feet (3658.5 meters), so signal repeaters are installed to extend the service farther away from the CO.

- **HDSL Transmission Unit - Central Office** - The HDSL modem or line card that physically terminates an HDSL connection at the telephone service provider's serving Central Office (CO).
- **HDSL Transmission Unit - Remote** - The HDSL modem or PC card that physically terminates an HDSL connection at the end user's location.
- **High Pass Filter** - A signal filter which would be installed in a customer premises ADSL modem (ATU-R), which only allows higher frequency data to be delivered to the modem. See Low Pass Filter.
- **Hop count** - This represents the number of routers through which a packet must pass before reaching its final destination.
- **Hub** - A hub is hardware that contains independent but connected network devices. Hubs can repeat signals or merely split signals sent through them.

(ix) I

- **IAD (Integrated Access Device)** - Refers to point-to-point CPE and CO devices that terminate customers' data, voice, and video traffic and trunk it upstream to a network backbone.
- **IDSL (ISDN Digital Subscriber Line)** - This form of DSL works over copper wire that has been provisioned for ISDN. Since this is a repeater technology (repeaters can be installed in the line to boost the signal), it can deliver service up to 35,000 feet from the telephone company Central Office (CO). If your business or home is too far from the Central Office (CO) to work with other flavors of DSL, IDSL could be the perfect solution. IDSL provides symmetrical speeds of 144 Kbps.
- **IEEE (Institute of Electrical and Electronic Engineers)** - A professional group that designs and defines network standards, LAN standards in particular.
- **IGP (Interior Gateway Protocol)** - Interior Gateway Protocol is used to exchange routing information within an autonomous system. Examples of common Internet IGPs include IGRP, OSPF, and RIP.
- **ILEC (Incumbent Local Exchange Carrier)** - Not to be confused with Independent Telco, which were never part of the Bell system. An ILEC is a Local Exchange Carrier which, when competition begins (per the 1996 Telecommunications Act), has the dominant position in the market-in summary, the original carrier in the market prior to the entry of competition.
- **In-band management** - This means within a frequency range used for data transmission.
- **Interface** - A point of connection between two systems, networks, or devices.
- **InterLATA** - Telecommunications services that originate in one and terminate in another LATA.
- **Internet Access Node** - The Internet access provider's facility for receiving communications from subscribers and prepping it for transmission into the Internet. An ISP access node typically consists of analog modem, ISDN, and DSL access multiplexers to accept the public network subscriber connections; routers to packetize the communications into TCP/IP; and frame relay switches to serve as the fast-packet connection into the Internet. See Transmission Control Protocol/Internet Protocol.
- **Internet Engineering Task Force (IETF)** - The primary working body developing new TCP/IP standards for the Internet.
- **Internet Protocol** - A standard describing software that keeps track of the Internetwork addresses for different nodes, routes outgoing messages, and recognizes incoming messages.
- **Internetwork Packet Exchange** - LAN communications protocol used to move data between server and workstation programs running on different network nodes.

- **Interoperability** - The ability of equipment from multiple vendors to communicate using standardized protocols.
- **IntraLATA** - Telecommunications services that originate and terminate in the same LATA.
- **IP** - Internet Protocol, a network layer protocol in the TCP/IP stack, provides features for addressing, type-of-service specification, fragmentation and reassembly, and security.
- **IP address** - Any computing device that uses the Internet must be assigned an Internet or IP address. This 32-bit number is written in 4 decimal fields or "octets" separated by periods, e.g., 192.9.200.1. All workstations on a given IP network use the same IP network number, and each workstation has a unique IP host address and an optional subnetwork number. The network and subnetwork numbers together are used for routing, while the host number is used to address an individual host within the network or subnetwork. A subnet mask may be used to extract network and subnetwork information from the IP address.
- **IPX** - Internetwork Packet Exchange is a NetWare (Layer 3) protocol used for transferring data from servers to workstations. IPX is similar to IP.
- **ISA (Industry Standard Architecture)** - A personal computer bus architecture.
- **ISDN (Integrated Services Digital Network)** - A communication protocol offered by telephone companies that permits telephone networks to carry data, voice, and other traffic. DSL is replacing ISDN because it can typically provide a faster connection (see IDSL). ISDN continues to be a popular technology in Europe and parts of the Pacific Rim.
- **ISO (International Standards Organization)** - International organization for standardization which is based in Geneva. Publishes national and international standards for data communications. US representative to ISO is ANSI.
- **ISP (Internet Service Provider)** - The telecommunications company providing subscriber access into the Internet.
- **ITUTSS (International Telecommunications Union Telecommunications Standards Sector)** - Formerly the CCITT, the major international standards body governing telecommunications; it is a committee of the ITU, a United Nations treaty organization.
- **IXC (Interexchange Carrier)** - A long distance telecommunications provider that offers a range of circuit-switched, packet-switched, leased line, and enhanced communications services; or any company that provides communications services between exchanges on a long haul basis. See Telco.

(x) K

- **Kbps (Kilobits per second)** - One thousand bits per second.
- **KHz (Kilohertz)** - One thousand hertz.

(xi) L

- **L2FP** - Layer 2 Forwarding Protocol supports the creation of secure virtual private dial-up networks (VPN) over the Internet.
- **LAN (Local Area Network)** - A data communications network covering a small area, usually within the confines of a building or floors within a building; a relatively high-speed computer communications network for in-building data transfer and applications. LANs connect workstations, peripherals, servers, and other devices.
- **Last Mile** - Refers to the local loop and is the difference between a local telephone company office and the service user; a distance of about two to three miles (18,000 feet).
- **LATA (Local Access Transport Area)** - The US term LATA arose out of the post-divestiture fight between the local telephone companies and AT&T over who could carry

which traffic as AT&T split itself up. Roughly, a LATA maybe geographically defined as larger than a local calling area and smaller than a whole state. However, this is not a hard and fast rule-the state of Connecticut has one LATA, for instance.

- **Layer** - Once upon a time the International Standards Organization designed an Open Systems Interconnection (OSI) Reference Model for all network developers on our planet. The 7 "layers" of the OSI model are:
  1. physical - electrical and mechanical functions
  2. data link - detecting and correcting errors
  3. network - routing processes
  4. transport - initiating and releasing connections
  5. session - handling transmission errors
  6. presentation - formatting data
  7. application - interface with network services.
- **Layer 3 Switching** - Layer 3 switching technology integrates routing with switching to yield high-speed routing in the millions-of-packets-per-second range.
- **Layer Two Tunneling Protocol** - An extension to the PPP protocol that enables ISPs to operate VPNs. L2TP merges the best features of two other tunneling protocols: PPTP and L2F.
- **Leased Line** - A telecommunications transmission circuit that is reserved by a communications provider for the private use of a customer. Also called a private line.
- **LEC (Local Exchange Carrier)** - A telephone access and service providers that resulted from the US deregulation of telecommunications in 1996.
- **Line conditioning** - This can improve the analog characteristics of leased voice-grade channels, thereby allowing higher transmission rates.
- **Loaded Pair** - A twisted-pair phone line with inductors, or loading coils, inserted periodically to flatten the frequency response in the 4 KHz voiceband.
- **Loading Coil** - A device used to extend the range of a local loop for voice grade communications. They are inductors added in series with the phoneline which compensate for the parallel capacitance of the line. They benefit the frequencies in the high end of the voice spectrum at the expense of the frequencies above 3.6 KHz. Thus, loading coils prevent DSL connections.
- **Local Loop** - A generic term for the connection between the customer premises (home or office) and the provider's serving Central Office.
- **Local Multipoint Distributed Service** - A terrestrial wireless broadcasting service, principally intended for video distribution, that has been proposed by the FCC for operation in the band which operates in the same band as FSS uplink and feeder link transmissions (28 GHz). This band can supply two-way communications, meaning it could be used for interactive TV, data, and telephone services.
- **Long Distance** - Representing the communications of information over a distance other than the local calling area. Also called long haul traffic.
- **Low Pass Filter** - A signal filter installed in a customer premises ADSL modem (ATUR), which would not modify the low frequencies present in its input signal (the POTS transmission is sent unmodified to a phone), but would prevent the high-frequency components (data) from reaching a customer's telephone. See High Pass Filter.

(xii) M

- **MAC address (Media Access Control)** - A Media Access Control (Layer 2) address is required for every port or device that connects to a LAN. MAC addresses allow framing and error detection. They are 6 bytes long and are also known as hardware addresses and physical addresses.
- **Main Distribution Frame** - Central point where all local loops terminate in the Central Office (CO).
- **Mbps (Megabits Per Second)** - One million bits per second.

- **Media Access Control** - A method of controlling access to a transmission medium (e.g., Ethernet, Token Ring, and FDDI).
- **MER (MAC Encapsulated Routing)** - Creates a virtual Ethernet-to-Ethernet environment by encapsulating IP routed packets into RFC 1483 bridged frames.
- **Metric** - In telecom/IT, a metric is an algorithm used by routers to determine the best path for sending packets to a remote destination.
- **Minimum Point Of Entry** - The closest practical point to where the carrier facilities cross the property line or the closest practical point to where the carrier cabling enters a multiunit building or buildings.
- **Mobile Telephone Switching Office** - A generic name for the main cellular switching center which supports multiple base stations.
- **Modem** - A term which is actually based on the function of the device itself-a MOdulator/DEModulator. A modem converts analog waveforms into digital data and vice versa. In DSL, the device that is at each end of the DSL circuit is being generically referred to as a modem. See also Demodulation and Modulation.
- **Modulation** - The process whereby an electrical carrier wave is altered to facilitate the transmission of a signal.
- **MPEG (Motion Picture Experts Group)** - This is an industry organization whose goal is to develop standards and specifications for the encoding, transmission, and decoding of video information over various media and network technologies. See also MPEG1 and MPEG2.
- **MPEG1** - Compression scheme for full motion video. Compression algorithm introduced by MPEG in 1991, the common goal of MPEG is to compress 7.7 Meg down to about 150 Kbytes. MPEG1 is designed to provide a resolution of 352 by 240 pixels at 30 frames per second.
- **MPEG2** - Video compression standard selected by MPEG. Designed to provide a resolution of 720 by 480 pixels at 30 frames per second. Likely to be the leading compression algorithm for a range of video applications including video on demand.
- **Multichannel Multipoint Distributed Service** - Also known as wireless cable. MMDS is a pay television delivery system that delivers up to 33 channels of video programming via microwave transmission.
- **Multiple System Operator** - A company that operates more than one cable TV system.
- **MUX (Multiplexer)** - A MUX is a device that allows the transmission of multiple data streams over a common medium. Several communications paths or channels may be either permanently or dynamically established over the medium to accomplish this. See Channel.

(xiii) N

- **NAP (Network Access Point)** - A NAP is a public network exchange facility where ISPs can connect with one another in peering arrangements. The NAPs are a key component of the Internet backbone because the connections within them determine how traffic is routed. They are also the points of most Internet congestion.
- **Narrowband** - A term used to describe services with up to and including T1 or 1.544 Mbps.
- **Narrowband ISDN** - Same as ISDN.
- **NAT (Network Address Translation)** - The translation of an Internet Protocol address (IP address) used within one network to a different IP address known within another network. Reduces the need for globally unique IP addresses. NAT allows a business to use a single IP address in its communication with the outside world.
- **Near End Cross Talk** - Leakage of undesired local signals into the local retriever; could be from the companion transmitter or other nearby sources.

- **NetBIOS** - Network Basic Input/Output System is used by applications on an IBM LAN to request services from lower-level network processes. These services might include session establishment and termination or information transfer. It requires bridging.
- **NetWare** - This popular distributed NOS was developed by Novell. It provides transparent remote file access and numerous other distributed network services.
- **Network Access Provider** - Another name for the provider of networked telephone and associated services.
- **Network Address** - A network layer address refers to a logical, rather than a physical network device. Also called a protocol address.
- **Network Design Interface Specification** - Used for all communication with network adapters. Works primarily with LAN manager and allows multiple protocol stacks to share a single NIC.
- **Network Interface Device** - A device that terminates copper pair from the serving Central Office (CO) at the user's destination and which is typically located outside that location.
- **Network Management System** - That system which allows a provider or enduser to manage portions or all of a telecommunications network; in DSL, network management systems allow providers to control and monitor those services based on the ADSL streams, at both the physical and logical layers of the services.
- **Network Service Provider** - The term for an organization offering and providing value-added network services on a telecommunications network.
- **Network Termination Equipment** - The equipment at the end of the line.
- **Network Termination Unit** - Equipment at the customer premises which terminates a network access interface.
- **NIC (Network Interface Card)** - The circuit board or other form of computer hardware which serves as the interface between a computer, or other form of communicating DTE, and the communications network; in ADSL, a common NIC card is an Ethernet NIC card which serves as the interface to the ADSL modem from the computer. See also Adapter.
- **NOC (Network Operations Center)** - The organization responsible for maintaining a network.
- **Node** - This refers to an endpoint of a network connection, or a junction common to two or more lines in a network. Nodes can be processors, controllers, or workstations.
- **NOS (Network Operating System)** - Software that directs traffic throughout the network. NOS examples include LAN Manager, NetWare, NFS, and VINES.
- **Nx64** - Describes a contiguous bit stream at the Nx64 Kbps rate to an application. Examples are LAN interconnect and point-to-point videoconferencing.

(xiv) O

- **OC-3 (Optical Carrier Level 3)** - A protocol for a 155.5 Mbps backbone (2016 channels).
- **Out-of-band management** - This means using frequencies or channels outside the frequencies or channels normally used for data transfer. Out-of-band signaling can be used for error reporting in situations in which in-band signaling is compromised by network problems

(xv) P

- **Packet** - A sub-unit of a data stream; a grouping of information that includes a header (containing information like address destination) and, in most cases, user data.

- **PBX (Private Branch Exchange)** - Refers to the digital or analog telephone switchboard located on the subscriber premises and used to connect private and public telephone networks.
- **PBX (Public Branch Exchange)** - A private telephone network used within an enterprise. Users of the PBX share a certain number of outside lines for making telephone calls external to the PBX. Most medium-sized and larger companies use a PBX because it's much less expensive than connecting an external telephone line to every telephone in the organization. In addition, it's easier to call someone within a PBX because the number you need to dial is typically just three or four digits.
- **Permanent Virtual Circuit** - A term found in frame relay and ATM networking in which a virtual connection between two fixed endpoints is established through the network. See also Switched Virtual Circuit.
- **Ping (Packet INternet Grouper)** - An Internet program used to determine whether a specific IP address is accessible. It works by sending a packet to the specified address and waiting for a reply. To ping an address from Windows, select Start/Programs/MS-DOS Prompt, then after C:\ Windows> type "ping" followed by the IP address. If you get a successful ping reply from your target machine, this means the computers are getting addresses from the router and that they are correctly running TCP/IP.
- **POP (Point Of Presence)** - refers to a physical location where an interexchange carrier has installed equipment to connect with a local exchange carrier.
- **POP (Post Office Protocol)** - refers to client e-mail applications use to retrieve mail from a mail server.
- **POP (Point of Purchase)** - as in the ordering page at an e-commerce site.
- **POTS (Plain Old Telephone Service)** - This term commonly refers to standard telephony, as in placing and receiving telephone calls. This is more or less interchangeable with PSTN (Public Switched Telephone Network). A POTS splitter enables both DSL digital data and standard telephone analog transmissions to share a single connection.
- **POTS Splitter** - A device that separates an DSL communications stream into its POTS and data components, offering a standard POTS connection such as an RJ-11 jack in the US, and an Ethernet or ATM connection, such as an RJ-45 jack. See also Low Pass Filter, High Pass Filter.
- **PPP (Point-to-Point Protocol)** - A common, layer two protocol used with Internet protocols and services. This provides router-to-router and host-to-network connections over synchronous and asynchronous circuits.
- **PPTP** - PPTP is simply when traditional PPP dial up frames are encapsulated in IP, enabling use of the Internet as a demand dial WAN.
- **Primary Rate Interface** - This is an ISDN interface typically used by larger customers. This interface consists of a single 64 Kbps data (or D) channel plus 23 or 30 bearer (or B) channels for voice and/or data. Also known as Primary Rate Access, or PRA.
- **Protocol** - This is a set of rules and conventions that govern how devices on a network exchange information. A router recognizes many different protocols, facilitating communications between networks that speak different languages.
- **Protocol Data Unit** - A segment of data generated by a specific layer in a protocol stack; usually consists of a block of data from a higher layer (the Service Data Unit or SDU) encapsulated by the next lower layer with a header and trailer.
- **PUC (Public Utilities Commission)** - Each U.S. regulatory agency (per state) responsible for regulating intrastate communications.
- **PVC (Permanent Virtual Circuit)** - Consists of originating and terminating frame relay addresses and data link control identifiers.
- **PVP (Permanent Virtual Path)** - A Permanent Virtual Path consists of PVCs.
- **PVP tunneling** - This is a method of linking two private ATM networks across a public network using a virtual path. The public network transparently trunks the entire collection of virtual channels in the virtual path between the two private networks.

(xvi) Q

- **QoS (Quality of Service)** - Typically an ISP will offer a Service Level Agreement, which means "we'll do the best we can but no guarantees," but not a QoS agreement, which means "we guarantee you x bandwidth."
- **QAM (Quadrature Amplitude Modulation)** - A modulation technique used by modems and DSL equipment in which a carrier's amplitude and phase are simultaneously modulated by the digital traffic.

(xvii) R

- **Radio Frequency Interference** - Radio frequency is the electromagnetic spectrum from 3 KHz to 300 GHz.
- **RBOC (Regional Bell Operating Company)** - An all-inclusive term for each of the seven telephone companies which were created after AT&Ts divestiture.
- **Relay** - This refers to a device that connects two or more networks or network systems. A data link (Layer 2) relay is a bridge; a network (Layer 3) relay is a router.
- **Remote Terminal** - Local loop terminates at remote terminal intermediate points closer to the service user to improve service reliability.
- **Remote Termination Unit** - A device installed at the service user site that connects to the local loop to provide high-speed connectivity. Also referred to as the ATU-R.
- **Reverse ADSL** - A term for a DSL stream that is asymmetrical in the upstream direction; that is, a reverse ADSL link has a small downstream and large upstream communications path.
- **RFC 1483 (SNAP)** - Subnetwork Access Protocol is a standard method for encapsulating multi-protocol data Into frames for ATM (Layer 5) networks. It is one of many RFC "link protocols" that define how different devices communicate with each other across networks and assure "interoperability"
- **RIP** - Routing Information Protocol is the most common IGP in the Internet and helps keep routing tables current.
- **RJ-11** - Six-conductor modular jack used with four-wire cabling. Most common phone jack in the world and is used commonly on phones, modems, and fax machines.
- **RJ-45** - Eight-pin connector used to attach data transmission devices to standard telephone wiring. Commonly used in 10Base-T connections.
- **Router** - A router is a network layer device that uses one or more algorithms to determine the optimal path along which data should be forwarded. Routers forward packets from one network to another based on network layer information. Routers are occasionally called gateways, but traditional gateways do not translate data.
- **Routing table** - This is a table stored in a router or some other internetworking device that keeps track of routes to particular destinations and, in some cases, metrics associated with those routes.

(xviii) S

- **SAP (Service Advertising Protocol)** - Provides a means of informing network clients, via routers and servers, of available network resources and services such as files servers, CD- ROM drives, and modem pools.

- **SDSL (Symmetric Digital Subscriber Line)** - A technology which can transfer data at up to 2.3 Mbps both downstream and upstream over a single copper twisted-pair line. This technology has typically been deployed to small and medium size businesses. Any business that generates as much information as it consumes over the Internet should consider an SDSL solution.
- **SLA (Service Level Agreement)** - Outlines minimum acceptable performance parameters (such as delay, throughput, percent availability, etc.) for public data services such as frame relay, VPNs, DSL access, and Internet access.
- **SLIP (Serial Line Internet Protocol)** - A predecessor of PPP, is for point-to-point serial connections using a variation of TCP/IP.
- **SMDS (Switched Multimegabit Data Service)** - A connectionless data service based on global addressing that enables communications between sites typically at speeds between 1.5 Mbps and 34 Mbps.
- **SMDS Interface Protocol** - Formal name given to each layer of the SMDS network interface.
- **SNMP (Simple Network Management Protocol)** - The network management protocol used with TCP/IP-based Internets. SNMP is used for communication between management consoles and network devices. It provides a means to manage configurations, statistics collection, performance, and security. SNMP2 supports centralized as well as distributed network management strategies.
- **SONET (Synchronous Optical NETwork)** - A family of fiber optic transmission technologies with rates from 51 Mbps to 13 Gbps (gigabytes per second).
- **Spoofing** - This technique polls and updates service frames from WAN links to optimize network connection times. It also refers to when a packet claims to be from an address from which it was not actually sent. An illegal hacker act of spoofing is designed to foil network security mechanisms such as filters and access lists.
- **Stack** - A stack is a set of related communications protocols that operate together to facilitate communication at some or all of the 7 layers of a standard network. TCP/IP is one example of a protocol stack.
- **STS-1** - An ATM physical layer implementation supporting 51 Mbps.
- **STS-3** - An ATM physical layer implementation supporting 155 Mbps.
- **Subnet Mask** - This is a 32-bit address mask used in IP to indicate the bits of an IP address that are being used for the subnet address. It is sometimes referred to simply as mask.
- **Subnetwork** - In IP networks, this is a network sharing a particular subnet address. Subnetworks are networks arbitrarily segmented by a network administrator in order to provide a multilevel, hierarchical routing structure while shielding the subnetwork from the addressing complexity of attached networks. It is sometimes called a subnet.
- **Subscriber Network Interface** - SMDS term describing generic access to a SMDS network over a dedicated circuit which can be DS-0, DS-1, or DS-3.
- **SVC (Switched Virtual Circuit)** - A Switched Virtual Circuit is established on demand and is torn down when transmission is complete. SVCs are used in situations where data transmission is sporadic. SVC is a term found in frame relay and ATM networking in which a virtual connection, with variable endpoints, is established through an ATM network at the time the call is begun; the SVC is de-established at the conclusion of the call. See also Permanent Virtual Circuit.
- **Synchronous Digital Hierarchy** - The international standard for transmitting digital information over optical networks. Term used by ITU to refer to SONET.
- **Synchronous Transmission** - Data transmission using synchronization bytes, instead of star/stop bits, to control the transmission. In DSL, videostreams are considered to be synchronous in nature. See Asynchronous Transmission.
- **Synchronous Transport Module-1** - SDH standard for transmission over OC-3 optical fiber at 155.52 Mbps.
- **Synchronous Transport Signal-1** - SONET standard for transmission over OC-1 optical fiber at 51.84 Mbps.

(xix) T

- **T-1** - A Bell system term for a digital carrier facility used for transmission of data through the telephone hierarchy at a transmission rate of 1.544 Mbps.
- **T-3** - A Bell system term for a digital carrier facility used for transmission of data through the telephone hierarchy at a transmission rate of 45 Mbps.
- **Telco** - A generic term for the local telephone company operator in a given area. In the US, the major telcos are the seven regional Bell operating companies and the leading independent telcos, GTE, SNET, and MCI/Sprint; in Europe, Asia, and elsewhere, the term telco generally refers to the incumbent monopoly, but increasingly refers to competing local providers as well.
- **Telnet** - Telnet is the standard terminal emulation protocol in the TCP/IP protocol stack. Telnet is used for remote terminal connection, enabling users to log on to remote systems and use resources as if they were connected to a local system.
- **TFTP (Trivial File Transfer Protocol)** - Trivial File Transfer Protocol allows for file transfer between computers over a network.
- **Time Division Multiplexing** - Technique where data from multiple channels may be allocated bandwidth on a single wire pair based on time slot assignment.
- **Transparent bridging** - This allows transfer of frames across intermediate nodes without the bridges being seen by end nodes.
- **Tunneling Protocol** - A technology that enables one network to send its data via another network's connections. Tunneling works by encapsulating a network protocol within packets carried by the second network.
- **Twisted-pair** - A common form of copper cabling used for telephony and data communications. It consists of two copper lines twisted around each other; the twisting protects the communications from electromagnetic frequency and radio frequency interference.

(xx) U

- **UNIX** - An operating system developed in 1969 at Bell Laboratories.
- **UTP (Unshielded Twisted-Pair)** - Unshielded Twisted-Pair cabling is used in a variety of networks and does not require the fixed spacing between connections that is necessary with coaxial cable.
- **UDP (User Datagram Protocol)** - User Datagram Protocol transmits packets without requiring a handshake between source and destination.

(xxi) V

- **Variable Bit Rate** - Provides a specified throughput capacity but data is not sent evenly. This is a popular choice for voice and videoconferencing data.
- **VDSL (Very High Data Rate Digital Subscriber Line)** - A technology that delivers 13 to 52 Mbps downstream and 1.5 to 2.3 Mbps upstream over a single copper twisted-pair. The operating range of VDSL is limited to 1,000 to 4,500 feet (304.8 to 1,372 meters) from the CO. As of May 2000, this technology is still in development. VDSL may coexist with ADSL once the latter is more widely deployed.
- **Video on Demand** - The ability to activate a stored or live motion picture stream; in DSL the application that allows subscribers to view movies or other video programming on request, similar to cable television's Pay-Per-View.

- **Video Telephony** - The ability to view real-time video communications on a two-way or multipoint basis. Also called videoconferencing.
- **Virtual circuits** - Also called channels or paths. They are logical circuits created to ensure reliable communication between two network devices. A virtual circuit is defined by a VPI/VCI pair, and can be either permanent (PVC) or switched (SVC). Virtual circuits are used in Frame Relay. In ATM, a virtual circuit is called a virtual channel and may be identified by a number (VCI). A bundle of virtual channels is called a virtual path and may be identified by a number (VPI).
- **Virtual LAN** - Workstations connected to an intelligent device which provides capabilities to define LAN membership.
- **VoATM (Voice over ATM)** - Enables a router to carry voice traffic (for example, telephone calls and faxes) over an ATM network through a special encapsulation for multiplexed voice.
- **VoDSL (Voice over DSL)** - Enables a router to carry voice traffic (for example, telephone calls and faxes) over a DSL network through a special encapsulation for multiplexed voice.
- **VoFR (Voice Over Frame Relay)** - Enables a router to carry voice traffic (for example, telephone calls and faxes) over a Frame Relay network after segmenting and encapsulating it.
- **Voice Frequency** - In telephony, typically the range is up to 4 KHz.
- **VoIP (Voice Over IP)** - Voice Over IP enables a router to carry normal telephony-style voice over an IP-based network with POTS-like functionality, reliability, and voice quality. It segments the voice signal into frames, which are then coupled and stored in voice packets.
- **VPI (Virtual Path Identifier)** - As an ATM term, it is an eight-bit field in the ATM cell header which indicates the virtual path over which the cell should be routed.
- **VPI/VCI (Virtual Path Identifier/Virtual Channel Identifier)** - The VPI (Virtual Path Identifier, an 8-bit field in an ATM header), combined with the VCI (Virtual Channel Identifier, a 16-bit field in an ATM header), is used to identify the next destination of a cell as it passes through a series of ATM switches.
- **VPN (Virtual Private Network)** - A network that is constructed by using public wires to connect nodes. For example, a number of systems enable creation of networks using the Internet as the medium for transporting data. These systems use encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted.

(xxii) W

- **WAN (Wide Area Network)** - Private network facilities, usually offered by public telephone companies but increasingly available from alternative access providers (sometimes called Competitive Access Providers, or CAPs), that link business networks.
- **WinSock** - Windows Socket Interface software allows a wide variety of applications to share an Internet connection such as the Windows "Dial-Up Networking" program that initiates a connection.

Parte XII.   Colaboradores:

Muitos colaboradores involuntários, já que esse FAQ é a maior colagem...

Várias mensagens que estão na lista velox-rio (veja em yahoogroups)

Informações selecionadas retiradas de

- http://www.fotonica.fis.unb.br/adsl/

- http://www.adsl.com/about_dsl.htm

- http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci214430,00.html

- http://www.dslreports.com/

- http://www.efficient.com

- http://www.bbarrera.com/pppoe3com.htm