



Cable Access Q&A - Part One

Accessing the Internet using a Cable Network (and a cable modem) is becoming increasingly more popular due to the much greater speed than is available through telephone-modem access. Vicomssoft has gained valuable experience and knowledge about cable access and would like to make this information available to those interested in the subject.

We are presenting the information in a Q&A (Questions and Answers) format that we hope will be useful. Our current knowledge relates primarily to cable access in the USA and Canada although we understand that cable access to the Internet is growing in a number of countries world-wide. The explanations we provide should apply equally to cable access in most countries. We welcome feedback and comments from any readers on the usefulness or content.

All aspects of the Internet, and especially access via cable networks, are constantly changing. We are providing the best information available to us as at date of writing and intend to update it at frequent intervals as things change and/or more information becomes available. However, we intend this Q&A as a guide only and recommend that users obtain specific information from local cable companies to determine applicability to their specific requirements. (This is another way of saying that we cannot be held liable or responsible for the content).

The full Q&A is in two parts, each part divided into a number of sections. Part One is general in nature and less technical, while Part Two deals with more technical matters.

Vicomssoft does not sell cable modems or access to the Internet via cable systems. Furthermore, our products can be used with any type of Internet connection, be it modem dial-up, ISDN, T1, or cable modem. In other words, we are neutral on the subject of how people connect to the Internet (but will admit to being biased to encouraging people to connect).

From our tests, from feedback we have received from users, from the recent progress made by the cable companies and from what we have read, it would appear that accessing the Internet via cable systems using cable modems is an option that is definitely worth considering for users who have it available to them.

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Part 1: Answers

1. What is a Cable Network?

Cable Networks began in the USA over thirty years ago to provide TV access to locations that had difficulty in receiving TV signals transmitted by normal transmission towers. This included many inner city locations where TV reception was poor due to interference from buildings. In addition, geographical conditions around some towns, and cities (such as mountains) made it impractical for each building to have its own tall costly aerial. From a practical point of view, it was also more efficient to have a TV signal 'delivered' to a central location in a building or a community and then passed to individual TV sets than to have each TV set connected to its own external aerial.

Cable Companies were formed that normally obtained a license or franchise for a specific geographic location and sold access for a monthly subscription. Initially Cable Companies rebroadcast signals from the major TV networks and did not provide any of their own content.

The communications industry is an ever changing and fast moving industry so it was not long before Cable Companies began offering their own content and special content, often provided at a premium price (such as movie channels or sports channels).

At this juncture in our explanation, its worth emphasizing two points that will be elaborated on in more detail later.

Firstly, although Cable Companies had central distribution points, they also ran a unique connection directly into each house, apartment or office (as in the case of a telephone line). Secondly, the cable connection was intended to deliver TV signals which by their nature, require high bandwidth (more on this later).

2. What does a TV cable system have to do with the Internet?



As Cable Companies began to proliferate and expand, they began to recognize that they could provide services in addition to TV signals. Many began to offer telephone services which of course they were able to do relatively easily because they already had a connection running into premises. In this respect they were competing with traditional telephone companies who also had a connection into premises. The recent spectacular growth of the Internet offers Cable Companies a further opportunity, particularly since they can connect a user to the Internet at much faster speed. As anyone who has used the Internet knows, the faster the speed of access, the more useful and enjoyable the experience. Conversely, slow access can discourage frequent use and even deter it. Some Cable Companies spotted the (now) obvious opportunity if (1) they could provide Internet access and (2) if they could provide faster speed.

3. Why is access via a Cable Company faster?

Cable Companies by their very nature set up cabling and networks to provide TV signals which required far more signal throughput (bandwidth) to be communicated. Modern Cable Networks use fiber-optic cabling directly into the premises which cabling is theoretically capable of delivering vast amounts of data. On the other hand, most telephone subscribers have old 'copper cable' connecting them to their telephone company's high speed network.

(Note: Not all Cable Company connections use fiber-optic cabling. Some older ones use coaxial cabling which, although superior to 'copper wire' telephone cabling, does not provide the same throughput as fiber-optic.)

4. Why has it taken cable companies so long to provide Internet access?

Cable Companies can provide Internet access in two ways - either by a 'telephone dial-up type' of service or by a new high speed connection. Since they are able to provide telephone lines, their subscribers can usually use tradition connection devices such as modems or ISDN. This however is normally not much improvement over normal telephone dial-up access.

Cable companies had several problems to solve before being able to use their high bandwidth capability and offer high speed Internet access. The first issue to be dealt with was that cable networks were initially designed to deliver signals (i.e. TV) to subscribers and were usually not designed to receive data (as they would if they were providing Internet access). To solve this they would have to change equipment at both the subscriber end of the cable and at their own end of the cable. At the subscriber end they would have to provide a new device called a 'cable modem' while at their own end (called the 'head-end') they would have to change equipment to be able to receive data from the subscriber. They would also have to arrange for their head-end switch to be connected to the Internet backbone itself.

One problem was that many cable networks used differing technologies and there were no industry standards for either cable modems or head-end switches. Cable companies and their industry associations have been working together over the past several years and standards are now being established. As a result of the standards, cable modems will be able to be manufactured in significant quantities (since they will work with different cable companies' systems) and the cost will be reduced to that approximating a 'normal' telephone modem.



(Note: Some cable companies are working out interim systems that deliver Internet data to subscribers via the cable and receive the data from the subscriber via a telephone-modem. More on this later.)

There are also some commercial reasons for the delay in cable companies offering Internet access. Almost everybody, cable companies included, has been surprised by the rate of growth of the Internet and the demand for access. In addition to solving technical problems, cable companies had to determine if it was commercially viable to provide access. Since many telephone-modem Internet Service Providers (ISPs) charge flat rates of \$15.00 - \$25.00 per month for unlimited access, cable companies had to determine what they could charge for their higher bandwidth access, what number of subscribers would take up the option and if the revenue received would offset their costs.

A number of cable companies have been running limited trial systems providing Internet access during 1996 and 1997 and it appears that most trials have been successful from both the subscriber and the cable company point of view.

5. Can everyone have Internet access via Cable Services?

Unfortunately cable networks are not universally available. Due to the very nature of cable systems' requiring underground wiring they are very expensive to set up and are most appropriate to highly populated locations. Cable networks do however continue to grow and the new telephone and Internet access sources of revenue should encourage expansion.

In addition, not all cable companies are offering Internet access yet and many that do are continuing to do so on a limited or trial basis. It has been estimated that in the USA and Canada, cable modem service will be commercially available to 9 million homes by the end of 1997. This represents 9 percent of all homes with cable available to them. It is further estimated that there are currently 100,000 cable subscribers in the USA and Canada using cable networks for their Internet access and that this will grow to 200,000 by mid-1998 and to 1 million by mid-1999.

(Source: <http://news.com/News/Item/0,4,16944,00.html>)

6. How do I get connected to a Cable Network for Internet access?

You have already started researching the subject online by reading this Q&A and might like to continue your research online. To assist you we have provided a few URL references at the end of Part 1 of this Q&A.

If you are already connected to a cable system for television, you will only have to determine if your cable operator offers Internet access and what their rates are. If you are not yet connected to a cable system you will have to determine if cable connection is available to you and if you are able to purchase Internet access only, or if you are obliged to take TV subscriptions as well.

7. Do I need a separate cable for each service?



No, your Cable Company will put a junction box in your home or office. Your computer, telephone and Internet access will all be routed through this single connection.

8. How do I access the Internet using the Cable Network?

There are two options available for accessing the Internet through a cable network. The first is to use the dial-up telephone services provided by your Cable Company in conjunction with a modem or ISDN adapter. The second is to use a Cable modem. Each of these options is discussed in more detail below.

9. How do I use the telephone services for Internet access?

Using the standard dial-up services, the only involvement of your Cable Company is their provision of a telephone or ISDN line to you. You then choose your Internet Service Provider (ISP) as well as the connection equipment such as modem or ISDN terminal adapter. When you choose your ISP, they will require a service agreement, separate from your Cable contract. Using your cable provider to provide access this way will not however give you high speed access. For high speed access, you will need a Cable Modem.

10. What is a Cable Modem?

A Cable modem is a device at the subscriber end of a cable that allows a computer to be connected to the Internet through an existing Cable network connection. Unlike a dial-up connection, it does not require a phone line. Now that standards for Cable Modems have been agreed, their cost will decrease and they will be more readily available. (If you really want the nitty gritty details of cable modems please use the reference URL's we have provided at the end of Part 1 of this Q&A).

A cable modem works in a similar manner to a standard modem in that it takes a signal from the computer and converts it for transmission over the cable network. There are two major differences between a cable modem and other modem/ISDN devices. The first is that a cable modem attaches to your computer through an Ethernet Network Interface Card ('NIC'). The second and more significant difference is that the bandwidth available to cable modems is far in excess of that of a dial-up modem or ISDN.

11. How do I get a Cable Modem?

When you obtain Internet access from your Cable Company, they will normally provide you with a Cable Modem that has been tested to work with their network. They will also normally provide you with any other hardware and software to get you connected to the Internet. Some Cable Companies include the cost of the Cable Modem in the monthly subscription charge and some will have a one-time charge. In any event, their cost is now about the same as for a high speed modem.

12. How does a Cable Modem's speed compare with other connection methods?

As with many communication systems, there are both theoretical and 'Real World' performance statistics. Comparisons are further confused by the fact that not all Cable Companies provide



the same Internet access speeds. At the end of this Part we have provided a chart that provides detail of speeds for modems, ISDN and Cable Modems. For the purposes of this general discussion however, we'll mention a few round numbers here.

The real-world speed of Cable Modem access is probably more than 60 times that of a 33.6 k modem, probably more than 30 times that of a one of the new X2/56k modems and probably more than 15 times that of a two channel 128k ISDN connection.

Put another way, Cable Modem access can be as fast or faster than having a leased line T1 connection or put still another way - its fast! Most people that have used it are very enthusiastic and would do almost anything rather than revert to dial-up connection.

13. **What is the theoretical performance of a Cable Modem?**

A cable modem is theoretically capable of receiving data at 30Mbps which, if it were achieved in the real world, would be 892 times the throughput of a standard 33.6k modem. It is unlikely that Cable Companies would either want to provide this throughput or be technically able to do so in a real world situation.

14. **What is the real-world performance?**

The theoretical performance of a Cable Modem is based upon all other devices being able to work at the same speed and performance as the Cable Modem. However, in a similar way that a standard 10Mbps Ethernet connection reduces to a 4Mbps, so too will the performance of a Cable Modem connection.

In addition, the Cable network itself will suffer the same problems of Internet performance as any other Internet Service Provider (ISP). Although performance to services on the cable network itself can be amazingly fast, access to 'the outside world' will be slowed down by the performance of other connections on the way.

If you connect to a remote Internet site that itself has a connection speed equivalent to a T1 connection (1.5Mbps), then that is as fast as the data can be served to you, no matter how fast your receiving equipment is.

15. **What is the point of having all this bandwidth available?**

The bottom line is that having high speed cable modem access to the Internet will ensure that any data coming down to your computer will be by the fastest possible means. Your connection will not become the bottleneck. This really comes into its own where multiple sites and multiple sessions are being used, in other words, when you want to do more than one thing at a time on the Internet.

For example, a file transfer (FTP) will use as much of the connection speed (bandwidth) as is possible. With a modem or even an ISDN connection this means that using other services such as web browsing can become extremely slow. A Cable Modem is able to cope with the file transfer and the browsing and still have plenty of bandwidth available. The cable modem will



also make connecting more than one computer (a LAN) to the Internet even more practical (more on this later).

Using Cable Access also means that in your community, serviced by the same Cable Company, you could use the cable network to share files with neighbors and have local information services at your fingertips.

16. How should I choose between what type of connection to use?

The decision to use either a Cable Modem or a dial up service depends upon the facilities offered by your Cable Company when compared against another ISP. For many people, the Cable Company as an ISP or a third party ISP is able to offer a similar level of service.

The following are a few considerations when deciding, who to use to provide your Internet access:

- What Internet services do you want to use, such as email, web browsing, file transfers, etc.?
- How much does the Internet account cost per month?
- Are there costs for making a phone call to your ISP?
- Does your ISP have any additional charges?
- Does each service offer you sufficient email addresses?
- Are you able to get personal web space?
- Do you require additional phone lines to be installed?
- Can the ISP be accessed through a local call?

Considerations might be the number of mailboxes that you are allowed, the amount of personal web space, is your Internet Service a flat fee or is it a scalable charge depending upon the amount of data you transfer and the services you require.

Firstly, it is a good idea to decide what is important to you, then which of the available providers is best suited to deliver those services.

17. How much does it cost?

The cost of the Cable Modem for Internet Access is very reasonable, especially with the greater bandwidth available. The service costs tend to be only slightly more than the monthly charge for a dial-up 33.6 modem connection to an Internet Service Provider (ISP).

The table below shows the typical first year costs when comparing a Cable Modem, 33.6 modem and ISDN for Internet access.

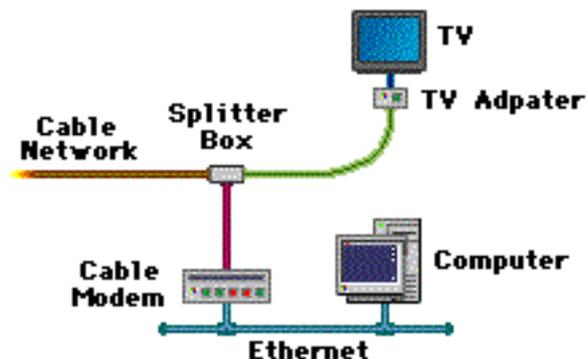
Connection Type	Cable Modem 4Mbps	Dial-up Modem 33.6Kbps	ISDN 128Kbps
Set-up Costs			

Access charge	\$0.00	Unlimited	\$?	Plan dependant	\$?	Plan dependant
Modem cost	\$0.00	Rental included	\$200.00		\$500.00	
Extra phone line	\$0.00		\$80.00		\$80.00	
Set-up fee	\$150.00	Not required	\$30.00		\$150.00	
Total set-up costs	\$150.00		\$310.00		\$730.00	
Monthly Costs						
ISP fee	\$45.00		\$25.00		\$50.00	
Call charges	\$0.00	Not required	\$15.00		\$15.00	
Total per month	\$45.00		\$40.00		\$65.00	
1st Year Costs	\$690.00		\$790.00		\$1510.00	
Monthly Equivalent	\$57.50		\$65.83		\$125.83	

Prices shown are averages drawn from various services and may vary in your area. Plan Dependant is where ISP's may have their own scale of charges for access time.

18. How does a Cable Modem actually work?

Your Cable Company supplies you with a connection to your home which in turn is connected to a splitter box. One spur from the splitter box is connected to your TV, through a TV Adapter, the other being connected to your Cable Modem, which in turn is connected to your computer through an Ethernet connection. The diagram below illustrates a typical installation.



19. How does the Cable Modem physically attach to my computer?

The most common method for Cable Modems to be attached to your computer is by using an Ethernet connection utilizing 10baseT cables. (10baseT is also referred to as Twisted Pair or UTP.) This uses a cable that is similar to a telephone cable with a small plastic connector at either end. One end connects to the Cable Modem, the other connects to your computer's Ethernet card.

20. What is a Telco Return Cable Modem service?

Telco Return (sometimes also referred to as TR or Telephone Return) is a system used by some cable company ISP's to provide Internet access. This system uses separate send and receive paths.

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21. What if I have more than one computer?

If you wanted to connect several computers at a location to the Internet using traditional one-by-one methods, your costs would increase exponentially. For each computer, you would require an individual modem / ISDN, separate telephone lines, separate ISP accounts, etc. Clearly this is inefficient and impractical. Alternately you could use a dedicated hardware router obtain a business account from your ISP. This alternative requires technical skills (hardware routers are not for the faint hearted) and the business ISP account may be costly.

Fortunately there is a an easy-to-use cost-effective alternative using the Vicomssoft InterGate. With its Network Address Translation feature, multiple users can simultaneously share one ordinary ISP account and one connection to the Internet.

The combination of the Vicomssoft InterGate and a cable modem is ideal in a number of scenarios where Internet access is required by more than one computer, whether at school, at home or in businesses.

22. What's the downside of using Cable access?

The popular expression *"if something looks too good to be true, it probably is !"* is a warning to us all to exercise caution before enthusiastically embracing new technologies. On the surface, access to the Internet via cable networks appears to be the solution for all those who have suffered from slow access via dial-up modems. If, as is often the case, it is your method of accessing the Internet that is the bottleneck, then access via a cable modem will remove that bottleneck. It is worth remembering however that some popular sites and the wider Internet connections are often the bottlenecks, and in those cases, delays will still occur. The analogy of cars on a Freeway is appropriate. If you have a high performance car and there is not much traffic on the Freeway, you will be able to have unimpeded high speed travel (not that any of our readers would speed of course). If however the highway is clogged with other cars, it really doesn't matter what the performance or speed of your car is. You will only be able to go as fast as the slowest cars.

Another issue worth raising is somewhat of a technical one and it involves security. Cable modems connected to the head-end equipment at the cable company approximate the situation of your computer being connected to a LAN hub. When using a single Ethernet card, this results in other people on your branch of the network (perhaps as many as 500) being able to 'see' data passing to your computer (Part Two explains this in more detail). Unless you have some type of sharing or server active on your computer this will not normally represent any risk or danger. For total peace of mind you can use a Firewall product such as the Vicomssoft InterGate which can be configured to insure that your computer or other computers on your LAN are not at risk.

23. What's the bottom line? What does Vicomssoft recommend?

Vicomssoft does not sell cable modems or access to the Internet via cable systems. Furthermore, our products can be used with any type of Internet connection, be it modem dial-up, ISDN, T1, or cable modem. In other words, we are neutral on the subject of how people



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