These are complex subjects, but I've listed enough "buzzwords" for you to find more detailed info via a search engine:

Regarding your previous posts:

Telco carrier service:

US:
DDS Service = 56 Kb/s
T1/DS1 (T1 is the carrier technology, DS1 is the service) = 1.544 Mb/s of which, 8 Kb/s is used for framing. The remaining DS1 Service:
1.536 Mb/s is divided into 24 timeslots (time division multiplexing) of 64 Kb/s each.
- If the service running on the T1 is "channelized", different applications can be assigned different channels. For example, 18 channels could be reserved for voice traffic, and the remaining six channels reserved for data. The remaining six channels would leave 384 Kb/s for data. Depending on the encoding scheme, a portion of this bandwidth would be required for framing.
 - Data within the channels would be either 56 Kb/s per channel or 64 Kb/s per channel.
- Early encoding schemes (AMI, or Alternate Mark Inversion) utilized 8 Kb/s per channel for framing, and later schemes (such as b8zs, or "Bi-polar with 8th zero substitution) allowed the full 64 Kb/s per channel to be used for data. (b8zs is actually a type of AMI, but that's another story - if you care enough to argue this sort of thing, you have a few too many pens in your pocket protector)

In Europe, Africa, South and Central America, the E1 (also known as CEPT-1) standard is used, rather than the North American DS1 standard. The actual standard is CCITT G.700 series. CCITT is now called ITU, mostly to confuse people who were crashing their parties.

E1 utilizes blocks of 32 pulse code modulated (PCM) blocks, aggregated to form a 2.048 Mb/s channel. E1 uses High Density Three Zeroes Suppression (HDB3) to ensure ones density. Ones density is a dull subject, but if you can explain the concept during a job interview, telephone companies will beg you to work for them and throw lots of money at you.

Both DS1 and E1 service can be delivered as "fractional" service, whereby only a subset of the total timeslots/blocks are available for customer use. This reduces the bandwidth available to the customer, but also reduces the cost.

ISDN (Integrated Services Digital Network) is an all-digital service. Two types of end-user (narrow band) services are available; BRI and PRI.

BRI, or Basic Rate Interface, is carried on a standard two-wire circuit (as typically used for analog voice service, often called POTS - "plain ol' telephone service") in North America (ANSI T1.601). I have not worked with BRI outside North America, but the CCITT I.430 standard specifies a four-wire service. Perhaps someone on the other side of the pond can add to this.

BRI is divided into "B" and "D" channels. "B" channels are used for data transmission, and the "D" channel is used for signaling. Two 56 Kb/s "B"

channels and one 16 Kb/s "D" channel make up a BRI. Most equipment is capable of using both "B" channels as a single data path, and can use the "D" channel bandwidth when available as well, yielding 128 Kb/s. Alternatively, one "B" channel can be used for data, while the second "B" channel carries voice.

PRI, or Primary Rate Interface, provides more "B" channels. In North America, PRI is delivered on a T1 carrier, and contains 23 "B" channels and one "D" channel of 64 Kb/s each. In most of the rest of the world, PRI is delivered on E1, and consists of 30 "B" channels plus one "D" channel.

On Fri, 1 May 1998, JonnyBoy85 wrote:

> Hello all, and thank you soo much for your amazing response to my last post
> about Leased Lines, ISDN.
>
> Can somebody explain about IP numbering please? With a 40 workstation LAN,
> will there all ready be IP numbers allocated? I've heard about dynamically
> assigned addresses, but how/why is this done?.. What software/hardware does
> this?

If you are using "public" IP addresses, valid for Internet addressing, you will need to obtain assigned addresses. The Internic used to assign all addresses, but now most addresses are assigned to customers by service providors from pre-allocated blocks of addresses.

When a block of addresses has been assigned for your use, you can either statically configure an IP address for each interface that needs one, or you can dynamically assign IP addresses to systems on an as needed basis. Originally, BOOTP was frequently used to provide address assignment (BOOTP was actually developed as a way to boot a diskless station from a remote server). DHCP has generally replaced BOOTP as a dynamic address allocation system. DHCP does not "create" addresses, it is simply a method for "loaning" them out to systems that need an address. The addresses must still come from a block of available addresses.

> And why does purchasing a firewall to hide my internal network not require
> enough IP addresses for all of the computers on the LAN?
>

You can use a smaller subset of assigned addresses for "outside" access, and translate to "inside" addresses which are not visible to the outside. This topic is a paper all by itself. If you are interested, look up "Network Address Translation (NAT) and RFC 1918 with a search engine and start reading.

> Also, does anyone in the UK know where I should be able to get an E1
> connection from?.. Would it be an ISP, or someone like British Telecom?
>

Typically, an E1 would come from a carrier, such as British Telecom. An E1 service simply connects two points, however. You could use an E1 to connect an office in London with an office in Manchester. You could also use an E1 circuit to connect your London office to the Internet, via an Internet Service Providor. The ISP may be able to arrange the circuit and the ISP's port access for you.