

# UNDERSTANDING NETWORK BLOCKS

## *ISP Network Block*

### *Introduction*

I am writing this article partly because of the frustration experienced setting up a new network block of IP addresses assigned by the ISP (Internet Service Provider) and partly as a reminder. The operation itself is not difficult it is just not common knowledge or it is difficult to obtain, the process involves the configuration of an existing router in this case "**Zyxel P660-R D1**" but it could be any suitable router. Generally, the larger ISP (Internet Service Provider) BT, Virgin, Talk Talk and so do not as far as I know do not provide Block IP (Internet Protocol) addresses or the support thereof.

I contacted my ISP( Internet Service Provider) and thought I knew what I was doing and ended up practically accusing an engineer that he didn't know what he was talking about (I thought I was speaking to a junior) and to put me on to someone who did, well it turns out he was absolutely correct in his assessment of the situation and it was me that was wrong, I can only express my apologise in hindsight.

### *Router Configuration*

The router itself is assigned a single IP address this will not change 81.3.117.72 for example this has a subnet mask of 255.255.255.255 this means it is an IP address block of one IP only. Now the clever bit your ISP will also assign a block of IP's that are routed to that one IP address, these IP addresses can be completely different but must be in sequence within the block range and will have a subnet mask which limits the range of the block of IP addresses that can be assigned. This in actual fact is a common technique and many network engineers would use this to limit and or control

the number of PC's, servers and or routers that could exist on that one network. This, then provides an additional level of security, if you exhaust the number of machines that can be attached to that network no other devices can be fitted unless an IP address within the range is available or vacant.

In my case the router WAN (Wide Area Network) configuration had a single IP address which is assigned automatically when the router logs on via the username and password credentials are entered, this does not need to be changed or altered in any way. The next part of the setup is to identify the parameters for the LAN (Local Area Network) on the the same WAN (Wide Area Network) router you are working on. The WAN is configured as I have said already, but the LAN side also needed to be configured with the address block provided by your ISP this is the bit that expands the number of devices that can exist within the block provided.

Lets say you have 16 address supplied by your ISP the first and last IP addresses cannot be used as these are already taken these being the network and broadcast address so.

81.185.120.64 would be the first IP address and woul exists for the network (already assigned cannot use)

81.185.120.65 would be the first usable address that a network device could use PC, Server or Router

.....

81.185.120.78 would be the last available usable address

81.185.120.79 would be the broadcast address (already assigned cannot use)

Please Note with this configuration does not use NAT (Network Address Translation) which must be turned off, it is not needed in any case.

It is also required you enter the subnet mask this is sometimes not identified fully by your ISP I guess you are expected to know, in my defence I did know. What I was given was the following:-

81.18\*.\*\*\*.\*/28 The actual network I would rather keep to myself so lets use the example above

81.185.120.64/28 this is common notation to someone who uses network all the time less so for the inexperienced.

The slash 28 denotes in this case a subnet mask of:-

255.255.255.240

It may not seem it but this gives 14 usable IP addresses from a 16 IP address block.

This next part is optional and if you are running servers generally you would want to specify the IP address to use so you wouldn't use DHCP server, however and again this is optional DHCP does not care if devices are pre assigned it will use a vacant IP address that is not used.

DHCP requires the start of the available IP address in block the finish usable address in block and the number of addresses to allocate in this case 14 you do not include the addresses you can not use.

Review your configuration making sure to identify the changes you have made are permanent in some rare cases you may need to reboot the router but in the case of the Zyxel this was not needed.

***Further Note***

I wanted to separate the servers on our system from that of our LAN users, why you may ask! Well if all the machines used were allocated an IP address within an assigned block of IP's I would need a much larger block range than the one requested also the LAN user would be on the same network as the servers and router/routers. So to avoid the acquisition of an unreasonably large block of IP addresses and to add a layer of separation between servers and LAN users, I used one of the allocated IP addresses to route LAN traffic via a wireless router that used a network connection rather than ADSL (Asynchronous Digital Subscriber Line) to the network and provide within it a DHCP server of class 'C' addresses to serve the LAN users and prevent the unnecessary use of valuable block IP addresses.

Source : [http://www.soslug.org/wiki/undertanding\\_network\\_blocks](http://www.soslug.org/wiki/undertanding_network_blocks)