

## Video - Classful IPv4 Addressing (14 min)

First of all, when we're talking about Classful IP addressing and networks, we're talking about Class C, Class B, and Class A addresses. Now, what makes a Class C, Class B, and Class A address and network? Two things, the IP address and the subnet mask. In order to have a Class C IP address or Class C network, you need the IP address first octet to be a number between 192 and 223. You also need the subnet mask to be 255.255.255.0. As long as you have these two requirements, you would have a Class C IP address and Class C network. To have a Class B IP address and network, you'd need the IP address, the number in the first octet, to be a number between 128 and 191, and the subnet mask would need to be 255.255.0.0. For a Class A IP address and network, the first octet address number would need to be a number between zero and 127, and the subnet mask 255.0.0.0. Now, you might ask yourself, why these specific numbers? Zero to 127 for Class A, 128 to 191 for Class B, and 192 to 223 for Class C. It all has to do with the fact that the router and the computers see the IP addresses and the subnet masks in binary, not in dotted decimal notation. This is just the decimal representation of what the computer sees in binary. So, if we look at it in binary, and we take a look, and convert the first octet in the IP address to binary, we see that in order to have a number between 192 and 223, the first three digits in binary, counting from left to right, need to be one, one, and zero. If the first three digits are one, one, zero, the number has to be between 192 and 223. And for Class B, if the number starts with a one and zero, then the resulting number will be constrained to 128 to 191. And in Class A, as long as, in binary, the number begins with a zero, the number in decimal representation can only be zero to 127. So, the restrictions on the numbers, zero to 127, 128 to 191, and 192 to 223, are due to how the address functions in binary.