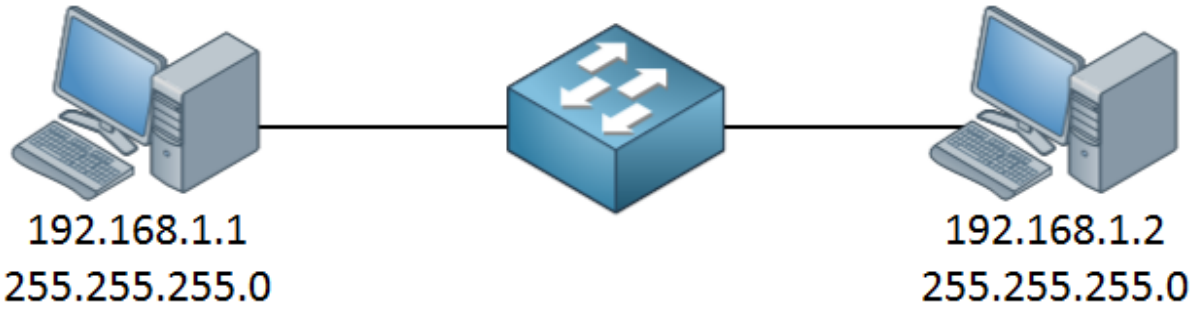
What is a default gateway

When a host wants to reach a destination that is **outside of its own network**, it has to use a default gateway. We use a router or multilayer switch (that's a switch that can do routing) as a default gateway.

In this lesson I'll explain how a host knows when to use the default gateway or not and how it works behind the scenes. Let's start with a simple example:



Above we have two hosts connected to a switch. We only have network 192.168.1.0 with subnet mask 255.255.255.0.

When one host wants to send something to another host then it will check if the destination is inside or outside its own network. When the destination is in the same network then it will use ARP to find the MAC address of the destination and it can send the IP packet. How does the host check if the destination is in the same network? This is done by checking the subnet mask. For example, let's say that 192.168.1.1 wants to send an IP packet to 192.168.1.2:

Source	192.168.1.1	11000000 10101000 00000001 00000001
Destination	192.168.1.2	11000000 10101000 00000001 00000010
Subnet mask	255.255.255.0	11111111 11111111 11111111 00000000

The subnet mask tells us which part of the IP address is the network and host part, the host that uses 192.168.1.1 sees that 192.168.1.2 is using the exact same network address and will know that it can use ARP to find the MAC address, create an Ethernet frame, encapsulate the IP packet and send it towards the switch.