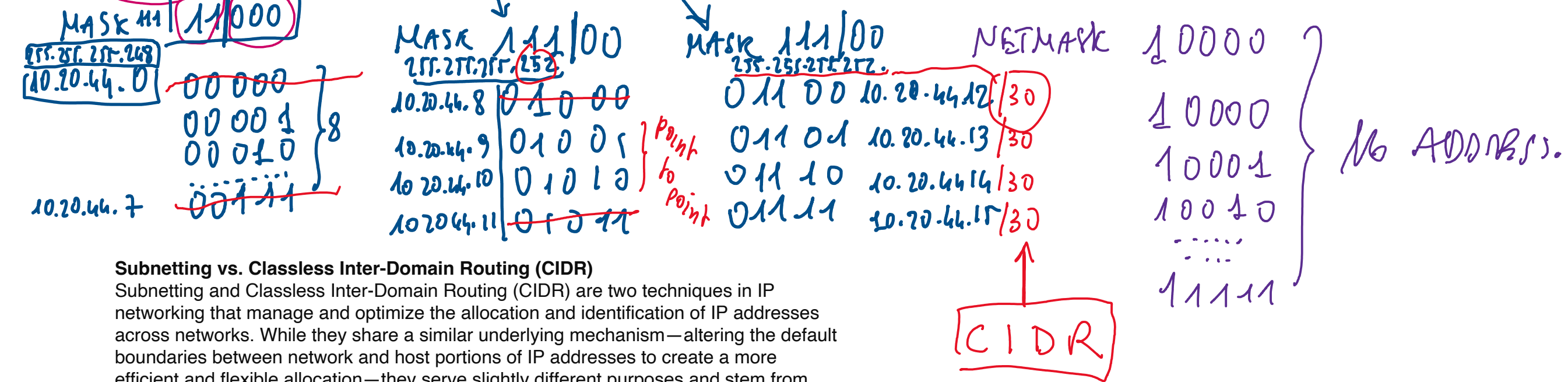


- The host part has two special addresses
- All bits set to 1 = all the nodes of the network (broadcast)
 - All bits set to 0 = no host (only network address)



Subnetting vs. Classless Inter-Domain Routing (CIDR)

Subnetting and Classless Inter-Domain Routing (CIDR) are two techniques in IP networking that manage and optimize the allocation and identification of IP addresses across networks. While they share a similar underlying mechanism—altering the default boundaries between network and host portions of IP addresses to create a more efficient and flexible allocation—they serve slightly different purposes and stem from different historical contexts.

Subnetting is a technique used within the framework of classful IP addressing. It involves dividing a single classful network into multiple smaller, sub-networks (subnets). This is achieved by extending the network portion of the address into what was originally part of the host portion, thereby reducing the number of addresses available for hosts but increasing the number of distinct networks within the original classful allocation. Subnetting was primarily introduced to overcome the limitations of the fixed class A, B, and C network sizes, allowing organizations to create networks that more closely matched their size requirements without wasting IP addresses.

For example, consider a Class B network, which by default supports 65,534 hosts. An organization with several departments might not need so many addresses but might require separate sub-networks for each department. By subnetting the Class B address, the organization could create multiple subnets, each supporting a smaller number of hosts, tailored to the size of each department.

CIDR, on the other hand, was introduced to replace the classful IP addressing system altogether. It allows for the aggregation of contiguous IP address blocks into a single routing table entry, known as a "supernet." This is achieved by specifying a network prefix, which can represent any arbitrary range of IP addresses, and is not restricted by the original classful boundaries. CIDR significantly improves the efficiency of routing by reducing the size of routing tables and enabling more precise allocation of IP addresses.

For instance, if an internet service provider (ISP) has several blocks of IP addresses that are adjacent in the address space, instead of advertising each block individually to the internet (which would increase the size of global routing tables), CIDR allows the ISP to aggregate these blocks into a single larger block. This is communicated with a shorter prefix length, effectively telling routers that a single routing path can be used to reach any IP address within this aggregated block.

CIDR