Converting to Base 256 from Decimal

To Convert a Decimal Number to a Base-256 dotted-decimal

Step	
1	**Evaluate the number to be converted:** • If the decimal number is less than 256, then use that decimal number for the 4th octet, and pad the rest with zeros so that the result is in dotted-decimal form, with four octets. • If the number is >= 256, then continue to step 2.
2	Divide the decimal number by 256
3	Multiply the decimal portion of the result from step 2 by 256
4	Subtract the result of step 3 from the original decimal number to yield the Base-256 octet
5	Examine the decimal portion of the result from step 2 a. If that decimal portion of the number is less than 256, then use that number for the next octet. • Use zeroes for any remaining octets, so that the number is in dotted-decimal form. b. If that number is larger than, or equal to 256, then continue from step 2, using that number.

Example 1

Find the last address in an IPv4 subnet with a network address of 16.0.0.0, with 32,768 addresses per subnet.

First, convert the number of addresses - 1 to Base 256 (dotted-decimal). 32,768 - 1 = 32,767
Once the conversion is complete, add that Base 256 dotted-decimal value to the 1st address to determine the last address in the subnet.

First address in subnet 1:	16	.	0	.	0	.	0
Number of addresses (32,768 per subnet) -1 :	0	.	0	.	127	.	255
Last address in subnet 1:	16	.	0	.	127	.	255

Convert 32,767 to an IPv4 address.

1. 32,767 / 256 = 127.996
2. 127 x 256 = 32,512
3. 32,767 – 32,512 = 255 (this is the 4th octet of the dotted-decimal)
4. Since 127 is smaller than 256 you're done dividing and the value for the 3rd octet is 127

Using zeroes for any remaining octets yields a dotted-decimal value of: 0.0.127.255
The 255 is from step 3, and the 127 is what was left over.

Example 2

Convert 2,215,708,686 to a Base-256 dotted-decimal IPv4 address.

The 4th Octet is:

1. 2,215,708,686 / 256 = 8,655,112.055
2. 8,655,112 x 256 = 2,215,708,672
3. 2,215,708,686 - 2,215,708,672 = 14 (So, 14 is the 4th octet)

The 3rd Octet is:

1. 8,655,112 / 256 = 33,809.031
2. 33,809 x 256 = 8,655,104
3. 8,655,112 - 8,655,104 = 8 (So, the 3rd octet is 8)

The 2nd Octet is:

1. 33,809 / 256 = 132.066
2. 132 x256 = 33,792
3. 33,809 - 33,792 = 17 (So, the 2nd octet is 17)

The 1st Octet is:

1. 132 is left over. Since 132 is too small to divide by 256, 132 is the 1st octet

The result is: 2,215,708,686 = 132.17.8.14

Check

$132 \times 256^3 =$	2,214,592,512
$17 \times 256^2 =$	1,114,112
$8 \times 256^1 =$	2,048
$14 \times 256^0 =$	14
	2,215,708,686

Example 3

Convert 1,024 to Base-256

The 4th Octet is:

1. 1,024 / 256 = 4
2. 4 x 256 = 1,024
3. 1,024 - 1,024 = 0 (So, 0 is the 4th octet)

The 3rd Octet is:

- Since we're left with "4," and "4" is less than 256, we use "4" for the 3rd octet

The result: **1,024** decimal is equal to **0.0.4.0** in Base-256