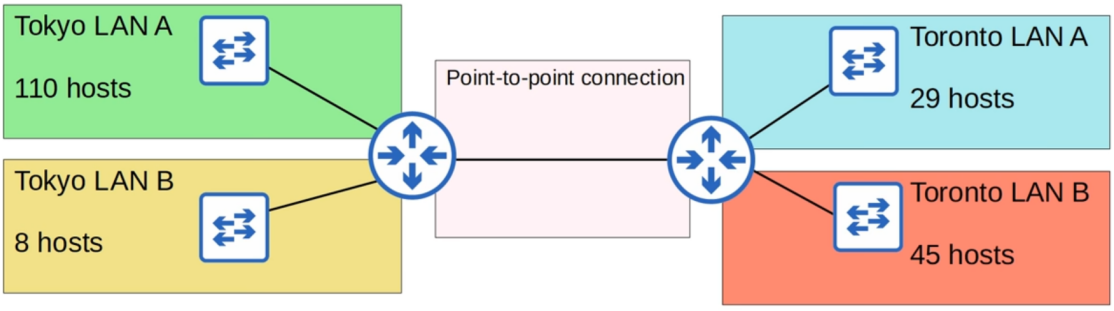
DAY 15 - VLSM

Purinat33

Variable-Length Subnet Mask

- Up to this point, we've been using **FLSM** (**Fixed-Length Subnet Mask**) for subnetting.
- This means that all of the subnets use the same prefix length & share the same number of hosts. (e.g. Subnetting a Class C network into four subnets *of equal size* using /26)
- **VLSM (Variable-Length Subnet Masks)** is the process of creating subnets of *different sizes*, to make your use of network addresses more efficient.
- **VLSM** is more complicated than FLSM, but doable.

Example:



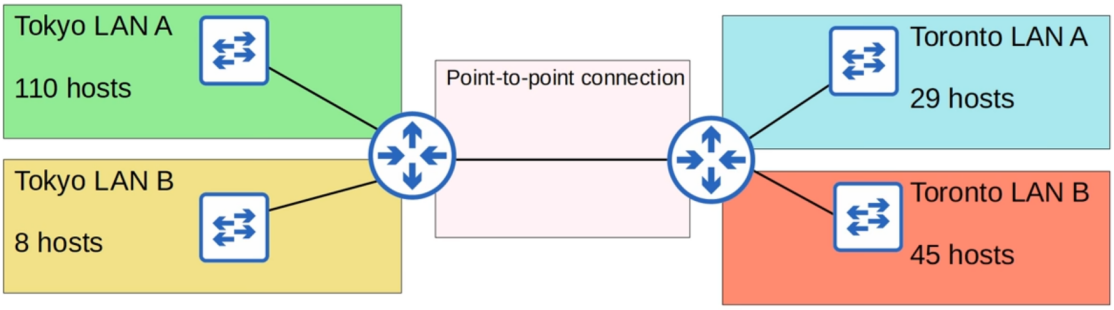
192.168.1.0/24

Using **FLSM**, we need to borrow 3 bits to get 8 subnets, which leave each subnet with only 32 IPs (30 Hosts), which is not enough.

Steps:

1. Assign the **Largest Subnet** at the **Start** of the address space.
2. Assign the second-largest subnet after it.
3. Repeat the process until all subnets have been assigned.

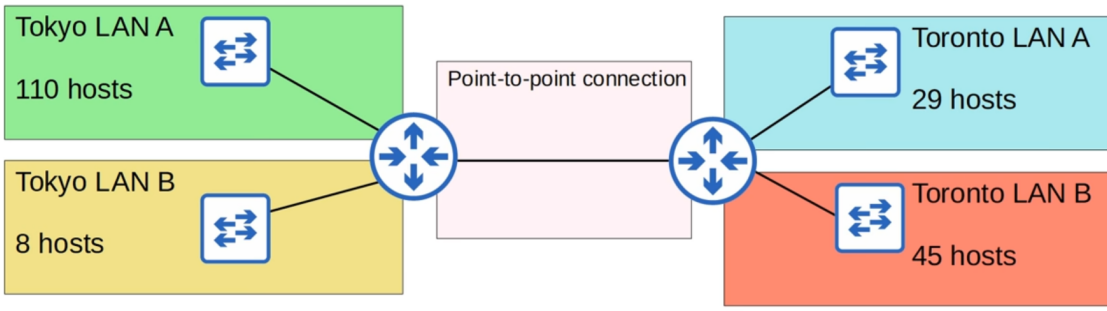
From the Example:



192.168.1.0/24

Order:

1. Tokyo LAN A (110)
2. Toronto LAN B (45)
3. Toronto LAN A (29)
4. Tokyo LAN B (8)
5. **Point-to-Point** Connection (2)



192.168.1.0/24

Tokyo LAN A

- **Network Address**: `192.168.1.0/25`
- **Broadcast Address**: `192.168.1.127/25`
- **First Host**: `192.168.1.1/25`
- **Last Host**: `192.168.1.126/25`
- **No. of Hosts**: 126

Toronto LAN B

- **Network Address**: `192.168.1.128/26`
- **Broadcast Address**: `192.168.1.191/26`
- **First Host**: `192.168.1.129/26`
- **Last Host**: `192.168.1.190/26`

- **No. of Hosts**: 62

Toronto LAN A

- **Network Address**: `192.168.1.192/27`
- **Broadcast Address**: `192.168.1.223/27`
- **First Host**: `192.168.1.193/27`
- **Last Host**: `192.168.1.222/27`
- **No. of Hosts**: 30

Tokyo LAN B

- **Network Address**: `192.168.1.224/28`
- **Broadcast Address**: `192.168.1.239/28`
- **First Host**: `192.168.1.225/28`
- **Last Host**: `192.168.1.238/28`
- **No. of Hosts**: 14
  - Using `/29` gives 8 addresses but **6** usable addresses.

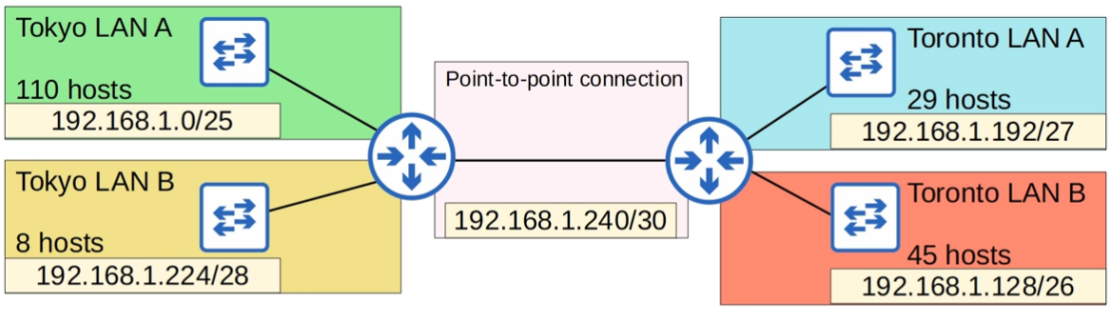
Point-to-Point Connection:

- **Network Address**: `192.168.1.240/31`
- **Broadcast Address**: `192.168.1.241/31`
- **First Host**: `192.168.1.240/31` (**R1**)
- **Last Host**: `192.168.1.241/31` (**R2**)
- **No. of Hosts**: 0
  - But this is for **Point-to-Point** connection, where exactly **Two IPs** are valid.

BUT... `/31` is generally *discouraged* for CCNA.

Point-to-Point Connection (CCNA):

- **Network Address**: `192.168.1.240/30`
- **Broadcast Address**: `192.168.1.243/30`
- **First Host**: `192.168.1.241/30`
- **Last Host**: `192.168.1.242/30`
- **No. of Hosts**: 2



192.168.1.0/24

Additional Practice:

- http://www.subnettingquestions.com
- http://subnetting.org
- https://subnettingpractice.com
