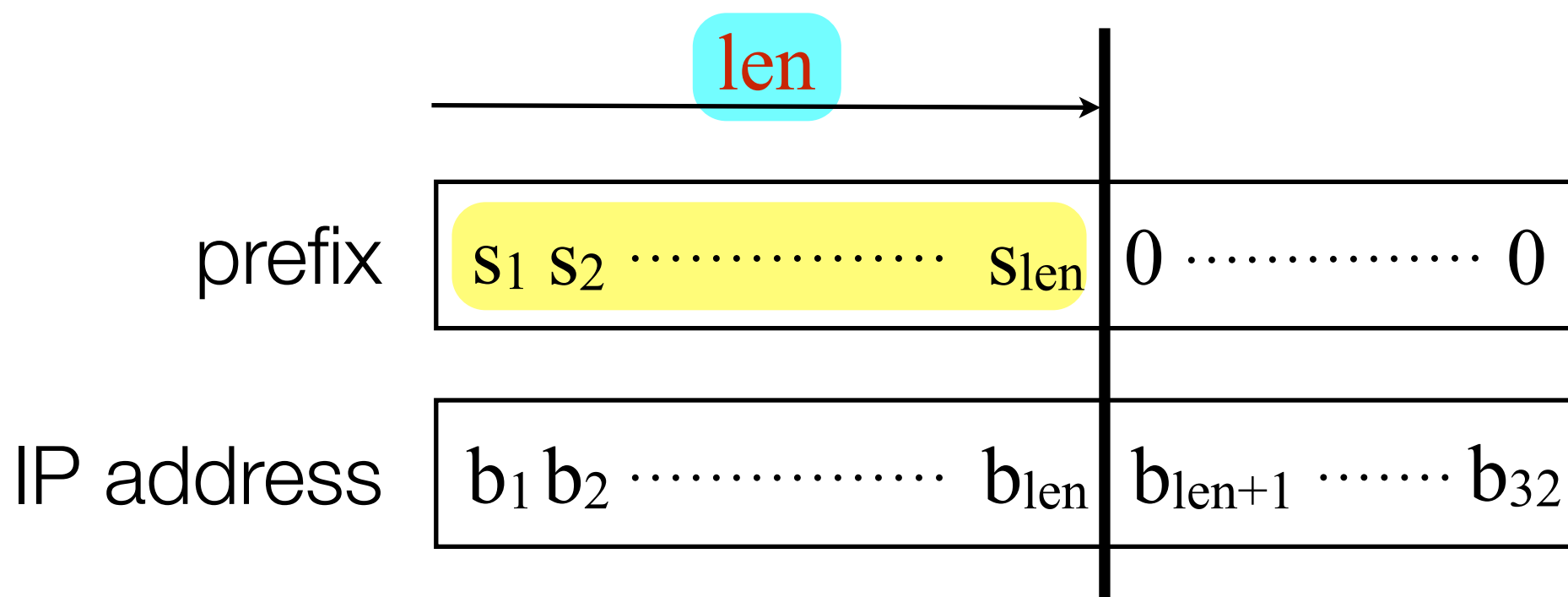


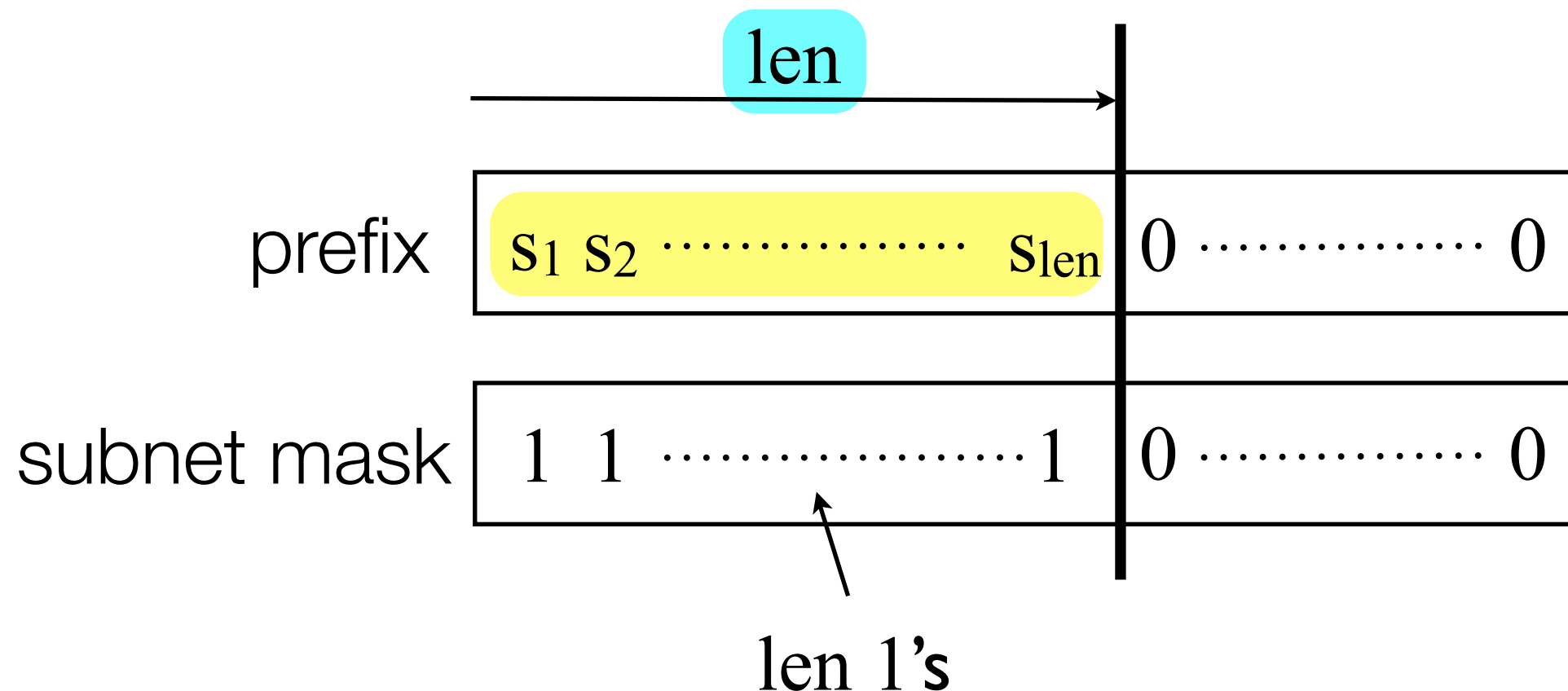
# IP Prefix

- ▶ specifies a range of consecutive IP addresses
- ▶ consists of a *subnet id* and a *length* (*len*)
- ▶ An IP address belongs to a range specified by a prefix if its first *len* bits are equal to those in the *subnet id* ( $s_i = b_i$  for all  $i \leq \text{len}$ ):



# Subnet Mask

- ▶ another way to specify **prefix length**
- ▶ a 32 bit, IP address-like, value whose binary representation has binary ones in bits corresponding to the subnet id bits.



# Subnet mask

---

- ▶ Typically represented using *decimal dotted notation*:

255.255.0.0

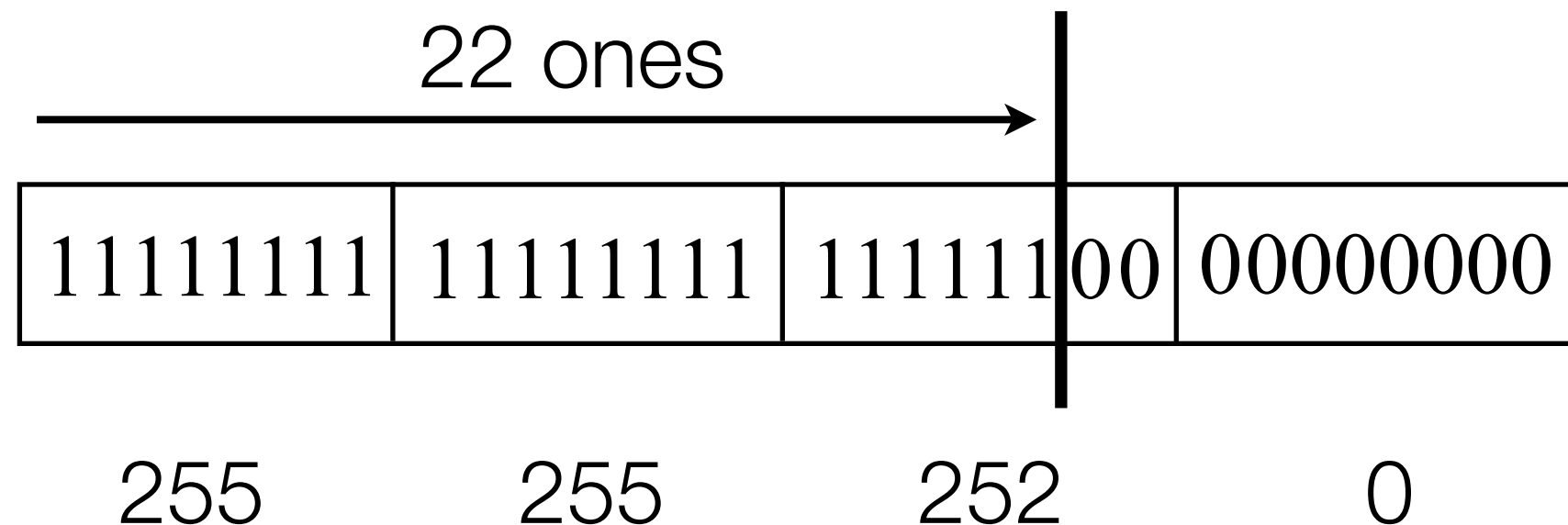
- ▶ Subnet length and subnet mask (netmask) are for all practical purposes equivalent:

132.177.4.0 with netmask 255.255.255.0

is equivalent to 132.177.4.0 /24

# Subnet mask calculation

- ▶ Subnet mask for prefix length 22:



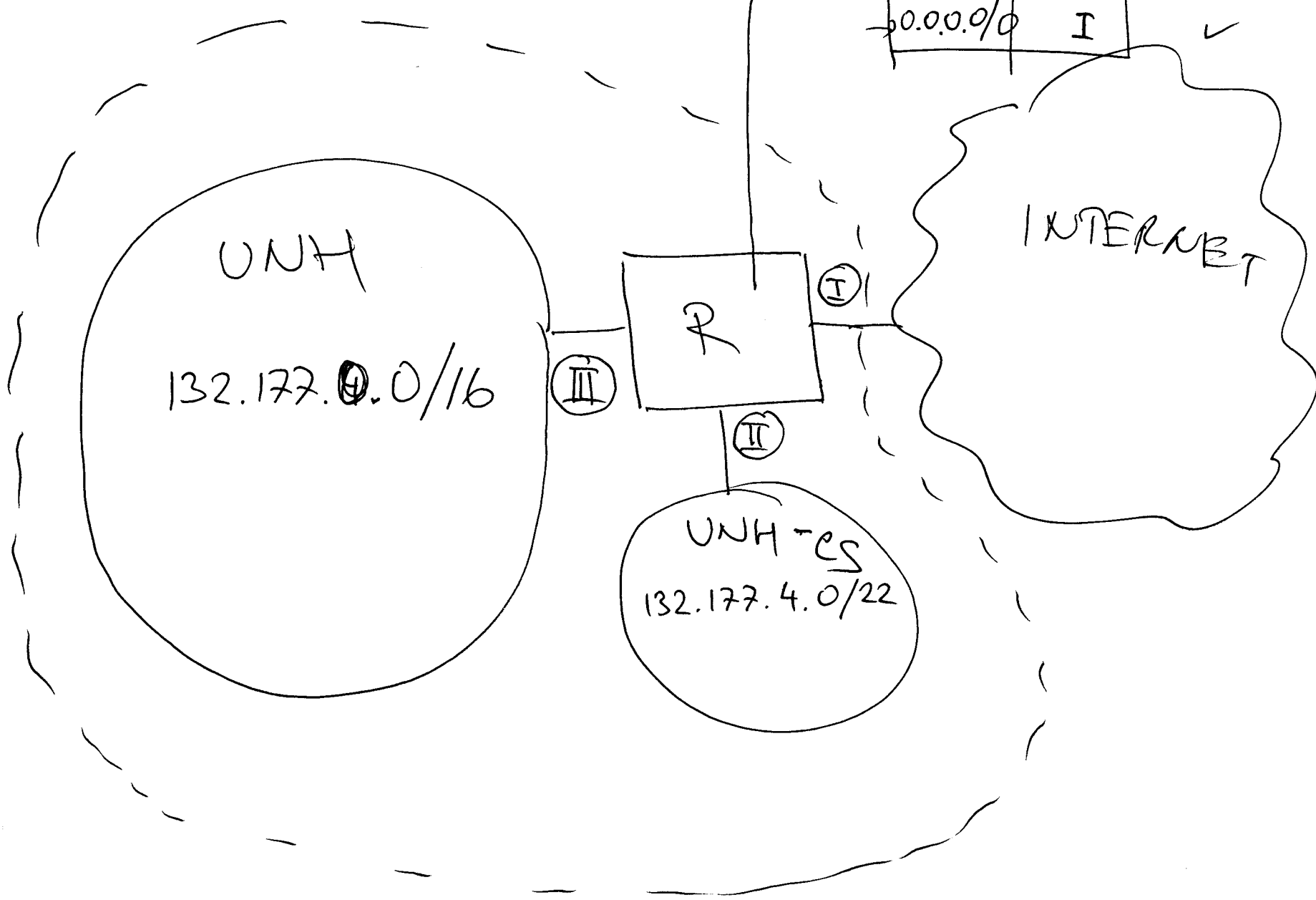
**/22** corresponds to **255.255.252.0**

# Routing table

---

| Prefix   | Next hop     |
|----------|--------------|
| Prefix 1 | L2 interface |
| Prefix 2 | Next hop IP  |
| ...      | ...          |

Longest prefix match...



| PREFIX         | INTERF |
|----------------|--------|
| 132.177.4.0/22 | II     |
| 132.177.0.0/16 | III    |
| 0.0.0.0/0      | I      |

132.177.4.30  
 (✓)  
 ✓  
 ✓

132.177.2.17  
 X  
 (✓)  
 ✓

# Host routing table

```
[rbartos@lava ~]$ /sbin/route
Kernel IP routing table
Destination      Gateway          Genmask          Flags  Metric  Ref    Use  Iface
default          csunhrouter.cs. 0.0.0.0          UG     0        0      0   eth0
unh-cs           *               255.255.252.0    U      0        0      0   eth0
link-local       *               255.255.0.0      U     1002     0      0   eth0
```

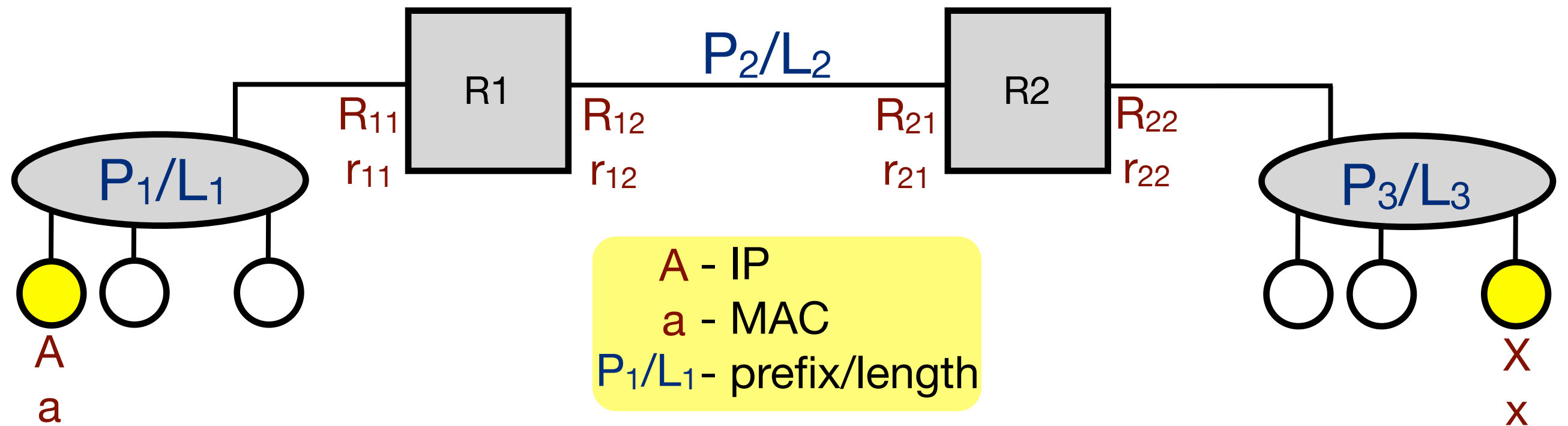
Do not resolve IP addresses

```
[rbartos@lava ~]$ /sbin/route -n
Kernel IP routing table
Destination      Gateway          Genmask          Flags  Metric  Ref    Use  Iface
0.0.0.0          132.177.4.4      0.0.0.0          UG     0        0      0   eth0
132.177.4.0      0.0.0.0          255.255.252.0    U      0        0      0   eth0
169.254.0.0      0.0.0.0          255.255.0.0      U     1002     0      0   eth0
```

**132.177.4.0/22** → local delivery via interface eth0  
(do ARP for the destination IP)

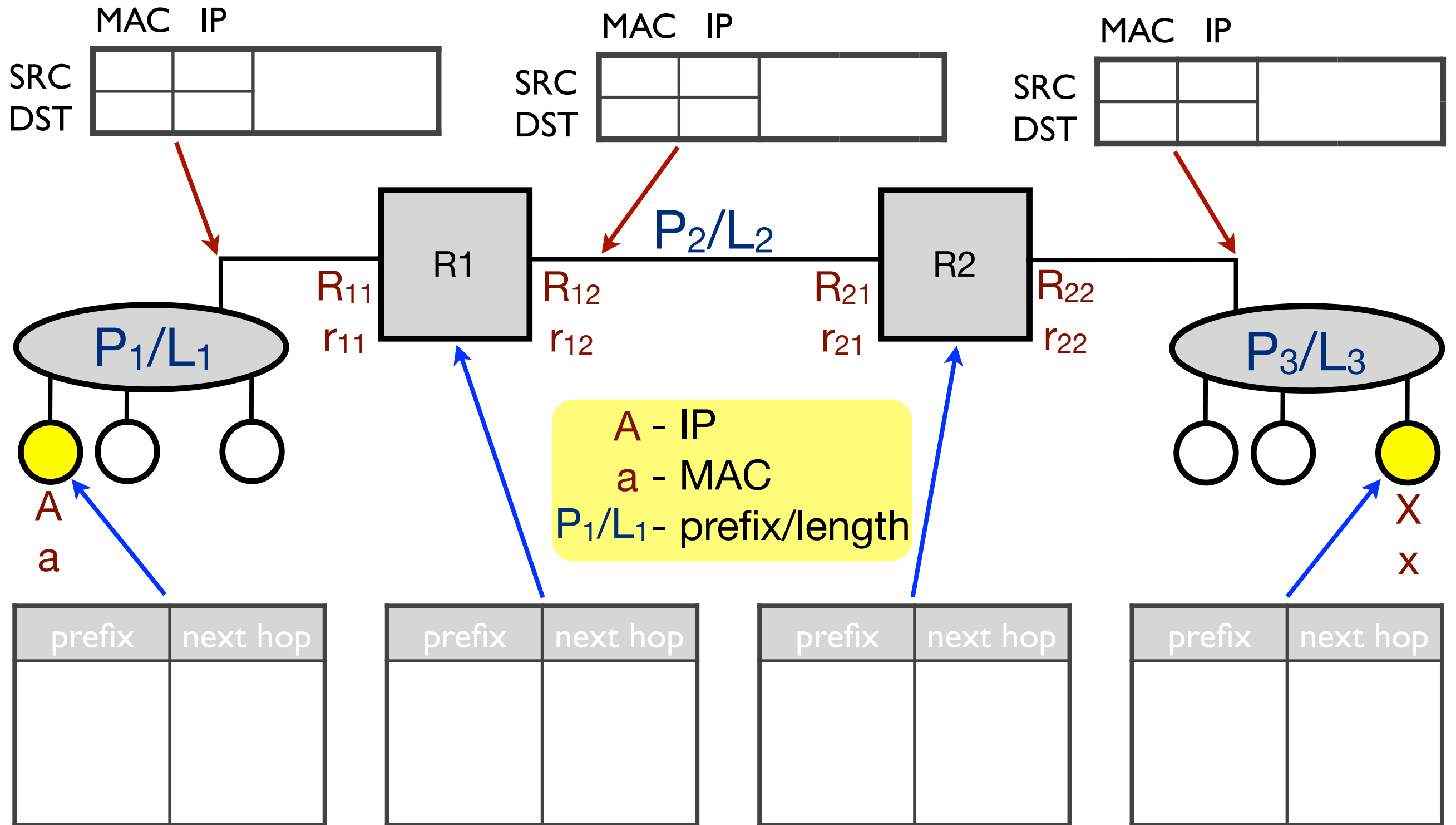
**0.0.0.0/0** (everything else) → send to 132.177.4.4  
(csunhrouter.cs.unh.edu) via eth0  
(do ARP for 132.177.4.4)

# Static IP Routing

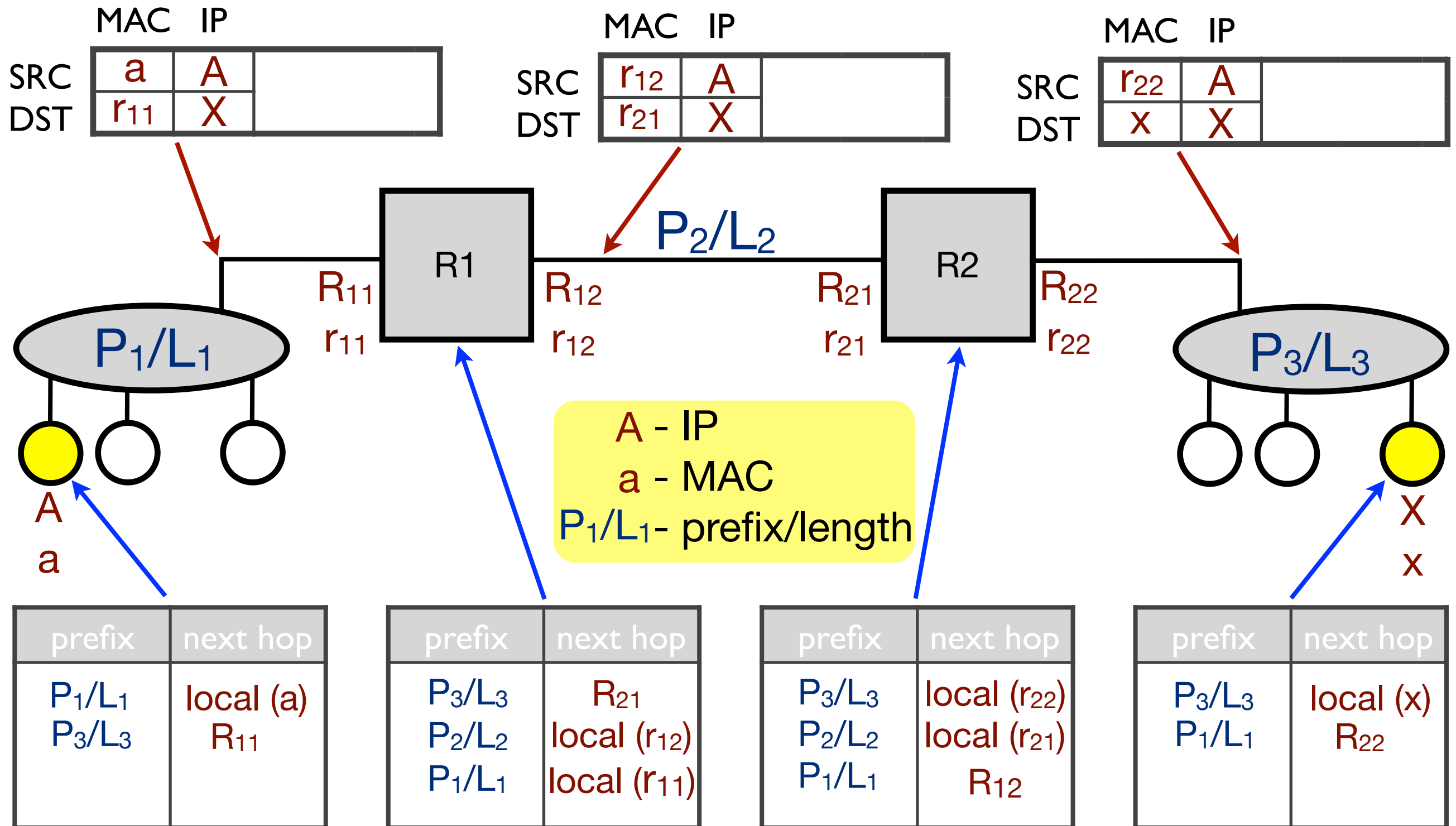




# Static IP Routing



# Static IP Routing



# Static IP Routing

