



RIPE NCC

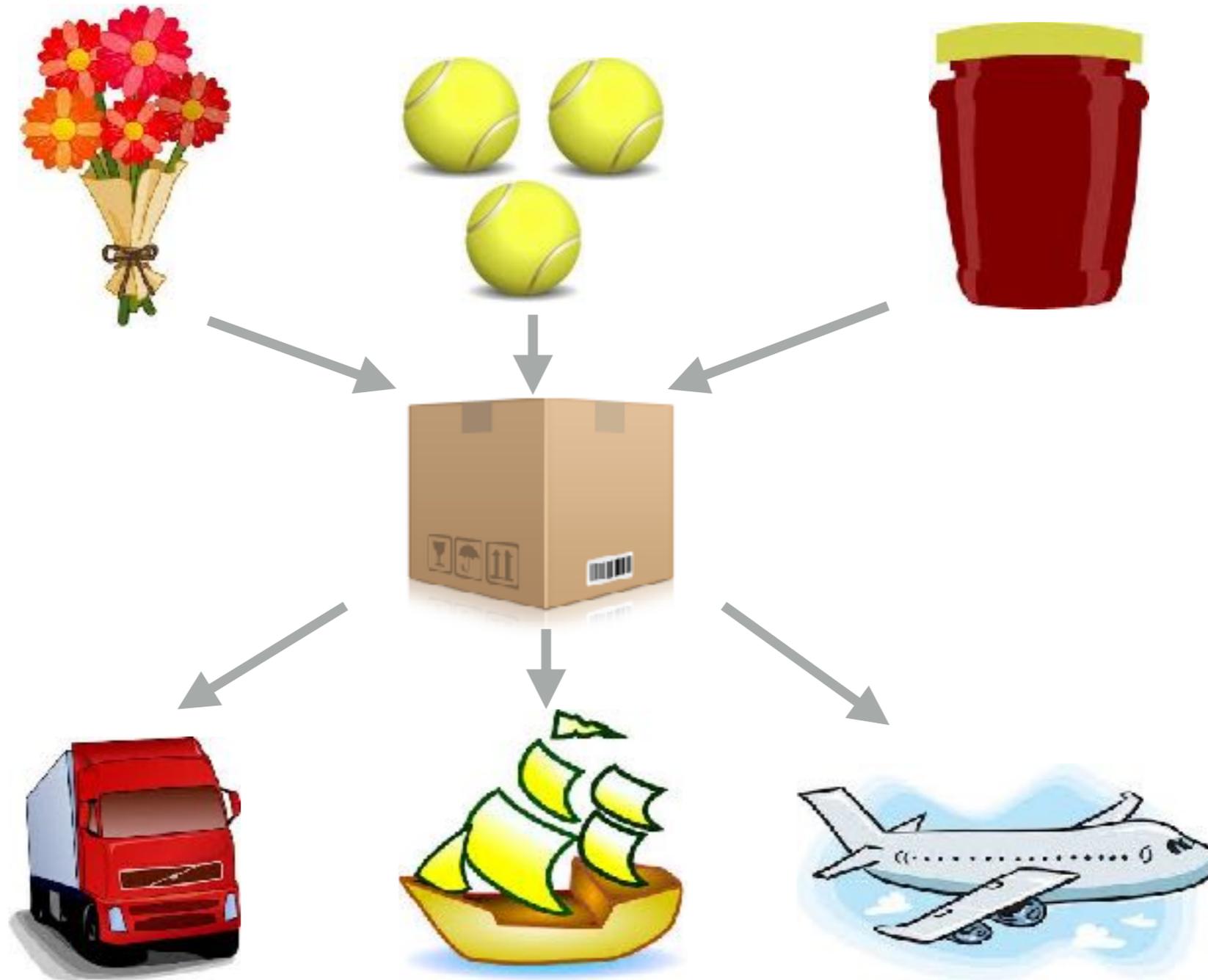
RIPE NETWORK COORDINATION CENTRE

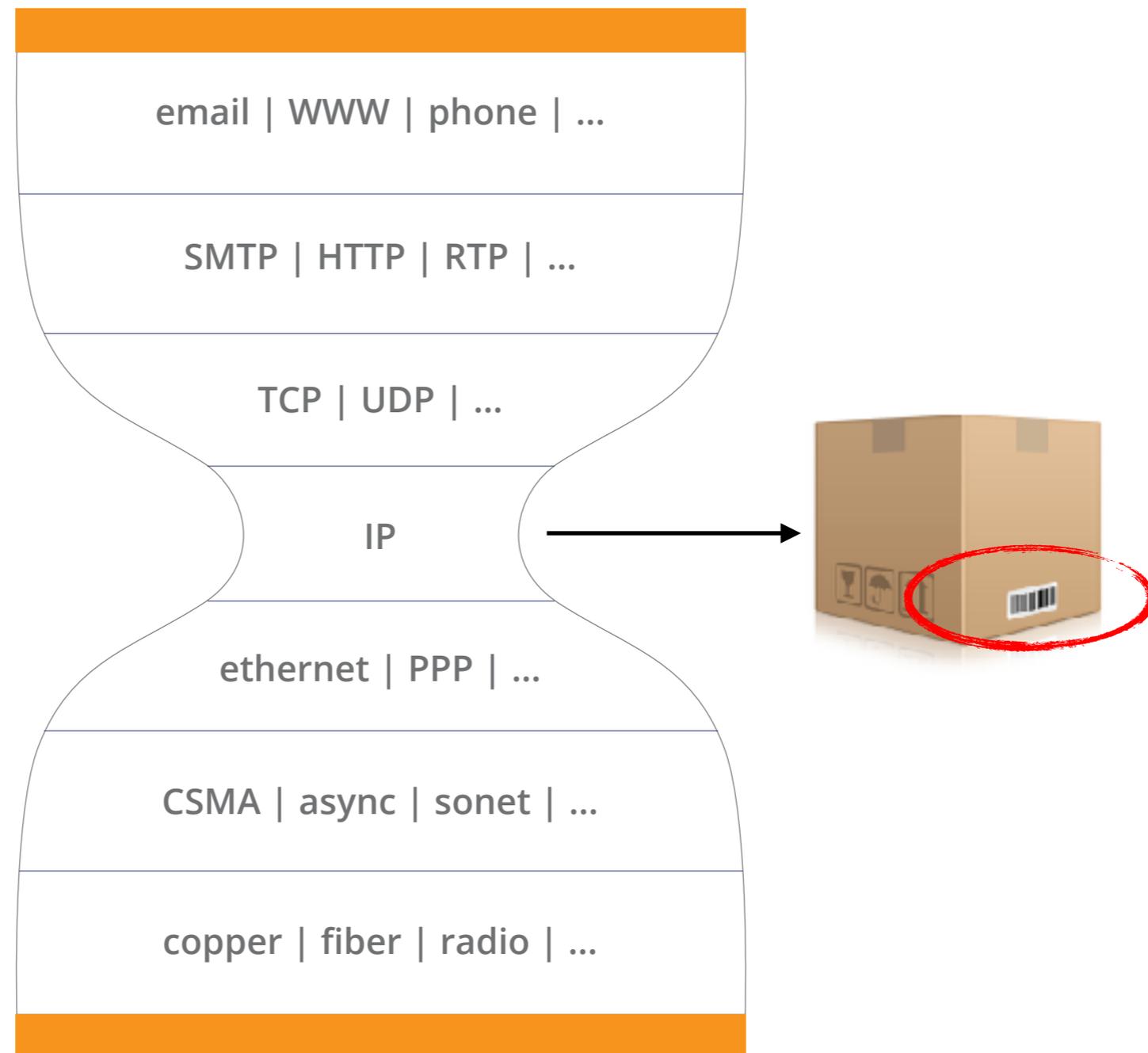
Internet Numbers

What are IP addresses
and where do they come
from?

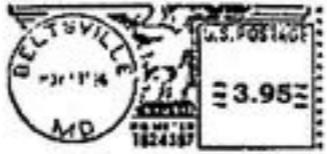


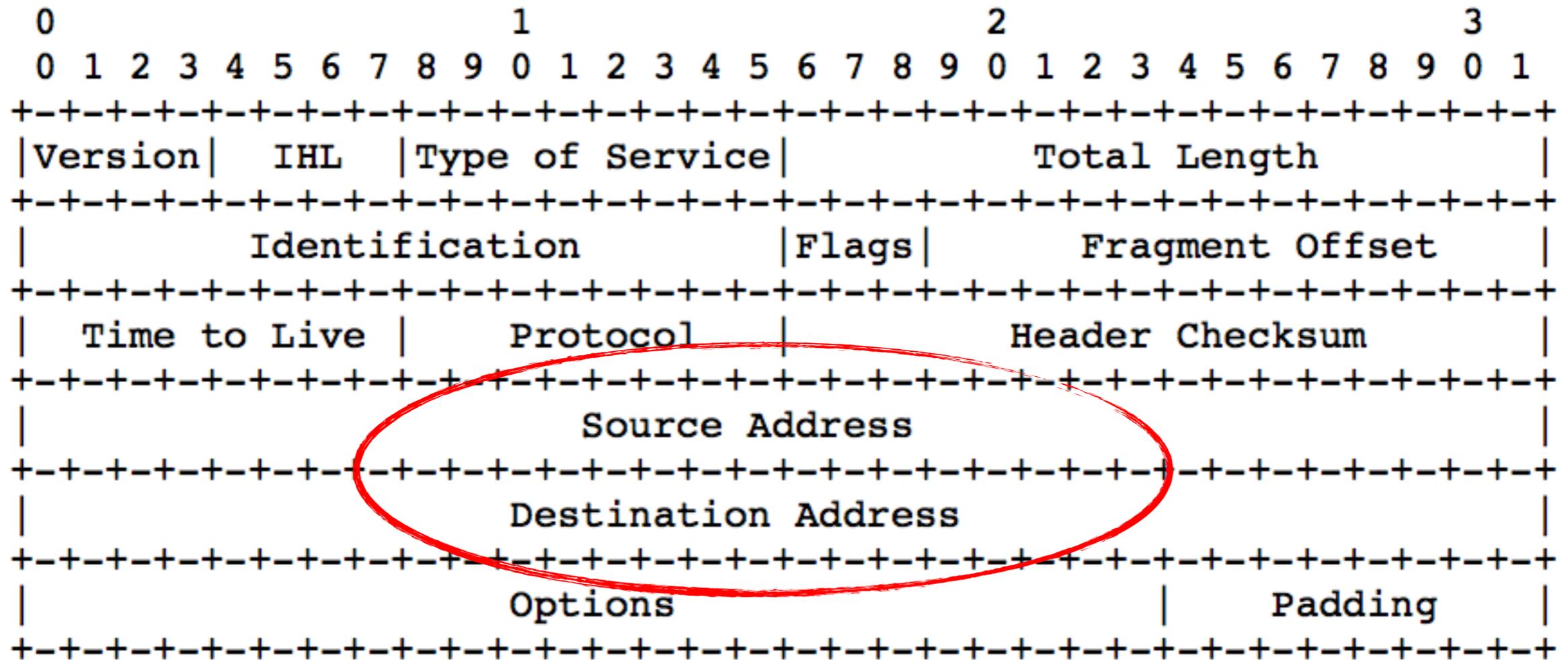
An Internet Protocol (IP) Packet?







P	
USPS PRIORITY MAIL	
<p>Sample Mailer 1123 Main St Test City DC 20260</p> <p>ADDRESS SERVICE REQUESTED</p> <p>SHIP WILLIAM SMITH TO: ONLINE SPECIALISTS 2345 GLENDALE DR RM 245 ATLANTA GA 30328-3474</p>	
<p>e/ USPS SIGNATURE CONFIRM</p>  <p>9121 0268 3733 1000 0010 10</p>	
<p>ELECTRONIC RATE APPROVED #026837331</p> <p><small>Priority Mail is a registered trademark of the U. S. Postal Service.</small></p>	



Example Internet Datagram Header



Just as your house,
your computer needs an address



Just as within the postal system, need to know where an address is to deliver a packet



11000001000000000000000011010111110
11000001000000000000000011010111111
11000001000000000000000011011000000
11000001000000000000000011011000001
11000001000000000000000011011000010
11000001000000000000000011011000011
11000001000000000000000011011000100

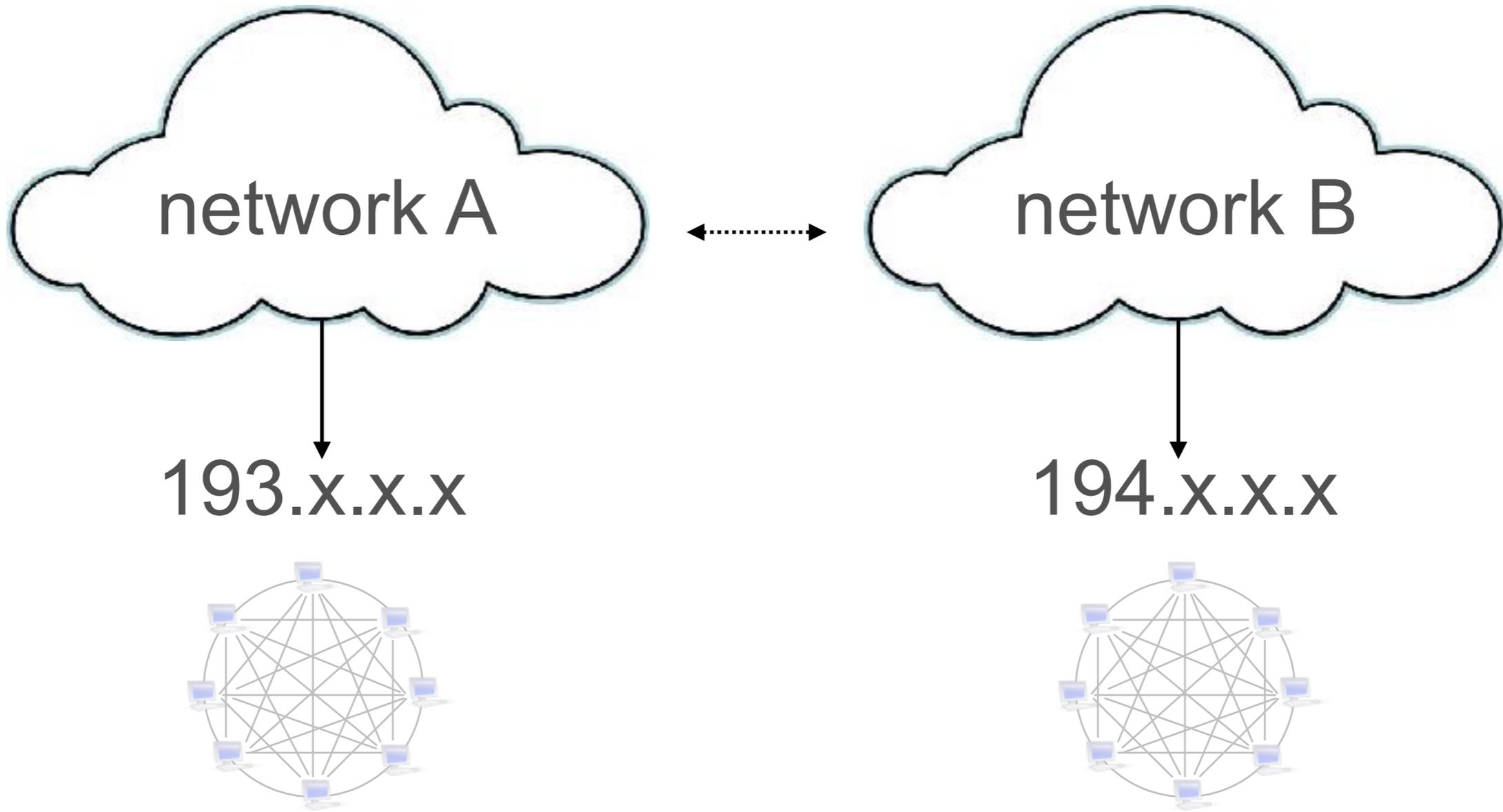


193.0.6.190
193.0.6.191
193.0.6.192
193.0.6.193
193.0.6.194
193.0.6.195
193.0.6.196

network : computer
← →



“Internet zipcode”?



IANA
registry



RFC 762
IEN 127
Network Numbers

January 1980
Assigned Numbers

ASSIGNED NETWORK NUMBERS

This list of network numbers is used in the internetwork, the field is 8 bits in size.

Assigned Network Numbers

Decimal	Octal	Name	Network	References
0	0		Reserved	
1	1	BBN-FR	BBN Packet Radio Network	
2	2	SF-PR-1	SF Bay Area Packet Radio Network (1)	
3	3	BBN-RCC	BBN RCC Network	
4	4	SATNET	Atlantic Satellite Network	
5	5	FTL-PR	Ft. Hill Packet Radio Network	
6	6	SF-PR-2	SF Bay Area Packet Radio Network (2)	
7	7	CHAOS	MIT CHAOS Network	
8	10	CLARKNET	SATNET subnet for Clarkburg	
9	11	BRAGG-FR	Ft. Bragg Packet Radio Network	
10	12	ARPANET	ARPANET	[1,2]
11	13	UCLNET	University College London Network	
12	14	CYCLADES	CYCLADES	
13	15	NPLNET	National Physical Laboratory	
14	16	TELENET	TELENET	
15	17	EPSS	British Post Office EPSS	
16	20	DATAPAC	DATAPAC	
17	21	TRANSPAC	TRANSPAC	
18	22	LCSNET	MIT LCS Network	[37,38]
19	23	TYMNET	TYMNET	
20	24	DC-PR	Washington D.C. Packet Radio Network	
21	25	EDN	DCEC EDN	
22	26	DTAINET	DTAINET	[47,48]
23	27	MITRE	MITRE Cablenet	[23]
24	30	BBN-LOCAL	BBN Local Network	
25	31	RHRR-PPSN	RHRR / PPSN	
26	32	AUTODIN-II	AUTODIN II	
27	33	NOSEC-LCCN	NOSEC / LCCN	
28	34	WIDEBAND	Wide Band Satellite Network	
29	35	DCN-COMSAT	COMSAT Distributed Computing Network	
30	36	DCN-UCL	UCL Distributed Computing Network	
31	37	BBN-SAT-TEST	BBN SATNET Test Network	
32	40	UCL-CR1	UCL Cambridge Ring 1	
33	41	UCL-CR2	UCL Cambridge Ring 2	
34-254	42-376		Unassigned	
255	377		Reserved	



It works, but doesn't scale



The IP Registry

Birth of the RIRs

IETF: Taking a Regional Approach



- Started in August 1990 (RFC 1174)
 - Need a more scalable system
 - Delegate responsibility to regional entities?
- Defined those entities in RFC 1466 (May 1993)
 - Legitimised by networks in the area (users of addresses)
 - Well established organisation (not only be a registry)
 - Stable, reliable and provide timely service
 - Implement the rules set by the community
 - Coordinate with the IANA in distributing resources



**“The Regional Internet Registries (RIRs) were
invented by the IETF”**

RIPE and the RIPE NCC



- RIPE was established in April 1989
 - Coordinate amongst the European networks
 - Exchange experiences and seek efficiencies
- In 1992 established the RIPE NCC
 - RIPE Network Coordination Centre
 - Part of TERENA (association of research networks)
 - Secretariat to the RIPE community
 - Organise their meetings, run the mailing lists
 - Well suited to become one of those new registries

RIPE NCC: Regional Internet Registry

- RIPE NCC is an association in Amsterdam
 - RIPE is not a legal entity!
 - Is the secretariat for the RIPE community
- Receives large address blocks from IANA
 - Distribute those in smaller blocks to its members
 - Publish and maintain a list of who has which block
 - Implement the rules (policies) set by the RIPE community
- Allocate resources to networks in the region
 - Your network equipment or servers have to be there

National Internet Registries (NIR)?



- For a brief period an intermediate solution was used to delegate responsibility (RFC 1174):
 - *“In addition, however, the IR would also allocate to organizations approved by the Coordinating Committee for Intercontinental Research Networking (CCIRN) blocks of network and autonomous system numbers, as needed, and delegate to them further assignment authority.”*
- These allocations formed the basis for some of the national registries that exist in Asia and South America

RIR Service Regions



Five RIRs

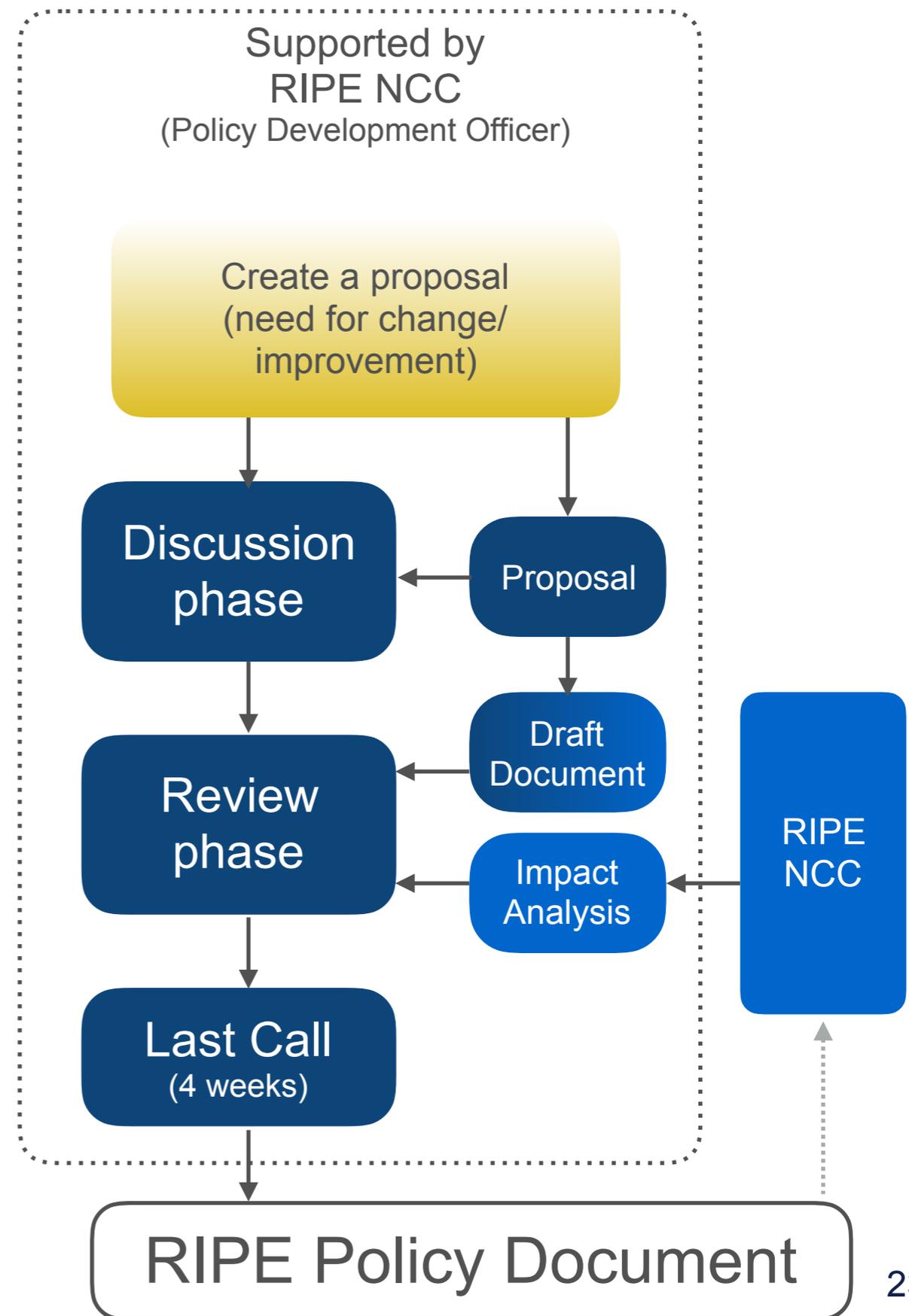


- All membership based not-for-profit
 - Funded by membership fees
 - Distribute IPv4, IPv6 and Autonomous System Numbers
- Policies set by regional community
 - Open, inclusive and consensus based
 - Implemented by the Regional Internet Registry
- Global coordination via the NRO
 - Number Resource Organisation
 - NRO Number Council forms the ASO in ICANN

RIPE Policy Development

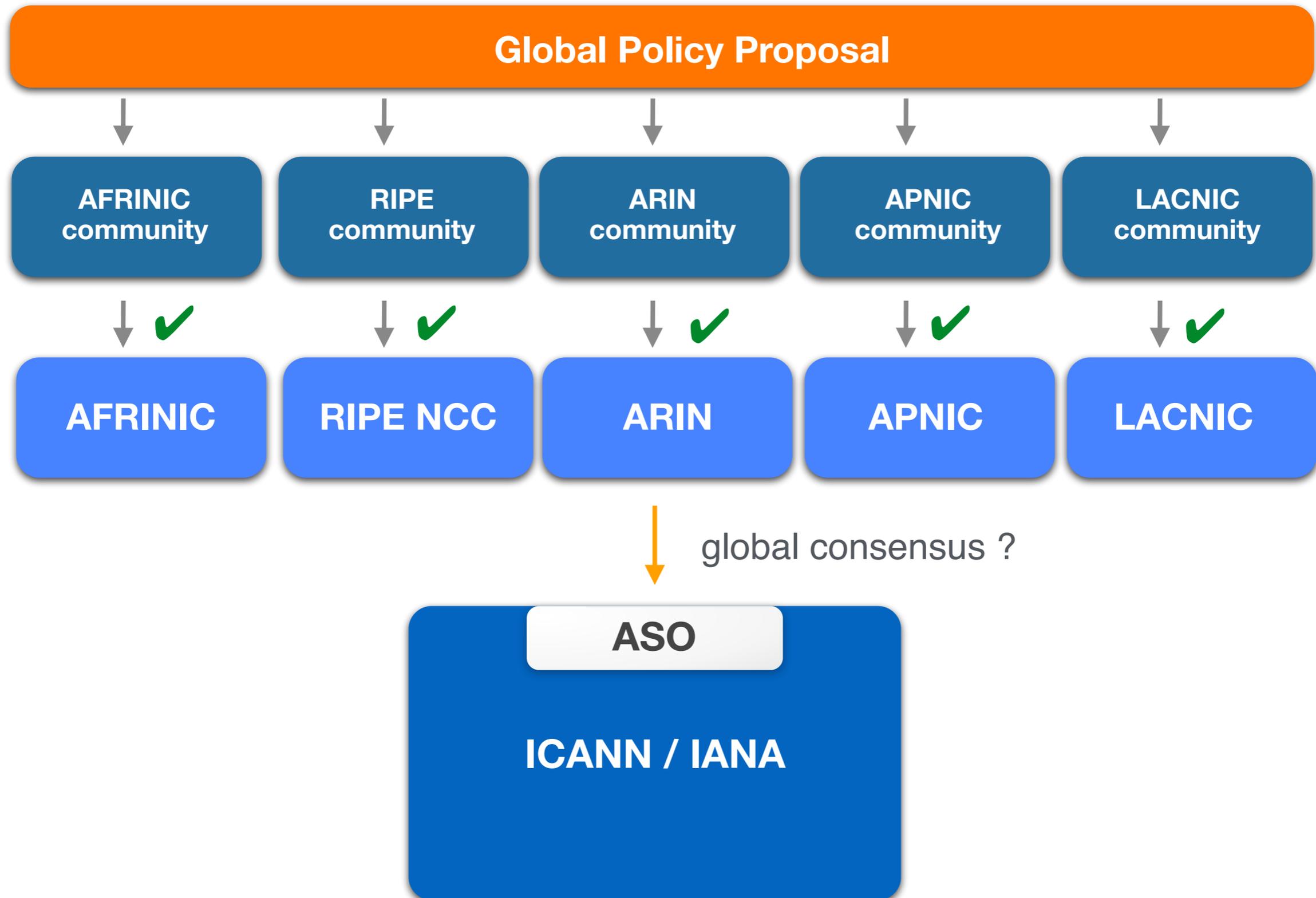


- Process described in document ripe-642
- Decisions based on mailing list discussion
 - Face to face meetings help
- Rough Consensus
 - Properly address all concerns and objections
 - Work out differences
 - No voting or counting





What about IANA?



Benefits of a Regional Approach



- We are very close to our users (stakeholders)
 - Easier communications
 - Easier to maintain accurate registry
- Policies can adapt to regional differences
 - Different stages of Internet development
 - Different priorities amongst stakeholders
- Overlap exists between community members
 - All policy development is open to everyone
 - No requirement to be from inside the region