IPv6 Address Management
The Internet Registry System

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Overview

- **Regional Internet Registries**

- **Policy Development**

- **IPv4 Policies**

- **IPv6 Policies (old and new)**

RIR Structure

- **Bottom up industry self-regulatory structure**
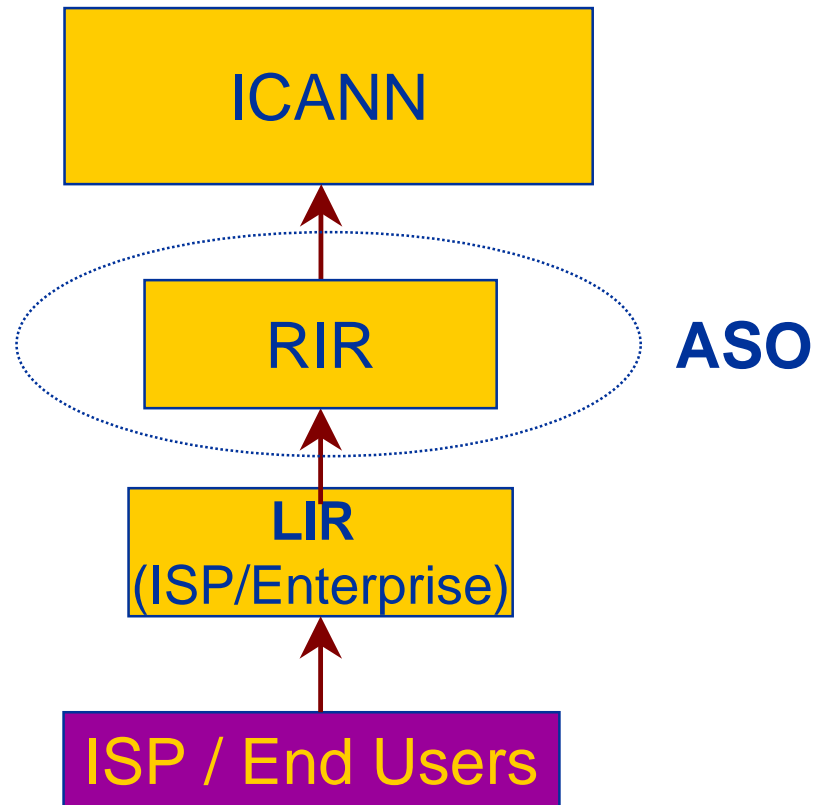 - Open and transparent
  - Neutral and impartial

- **Not for profit membership organisation**
  - Membership open to all interested parties
  - Membership elects Executive Board
  - Membership approves activities & budget

Global Policy Development

- **Developed in open policy forums**
  - within industry self-regulatory framework
  - with final approval by community

- **Implemented by RIRs**

- **Responsive policy development**
  - fair to all
  - changing requirements of industry
  - new technology (eg. GPRS, cable)
  - evolution of process

Policy Development

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          │                     │
          │       ICANN         │
          │                     │
          └─────────────────────┘
                    ▲
       ....................................
     .:     ┌──────────────┐          :.
    :       │     RIR      │            :    ASO
     :.     └──────────────┘          .:
       ....................................
                    ▲
          ┌──────────────────┐
          │       LIR        │
          │  (ISP/Enterprise)│
          └──────────────────┘
                    ▲
          ┌──────────────────┐
          │  ISP / End Users │
          └──────────────────┘
```

Policy Changes

- **Minimum Allocation: /19 $\rightarrow$ /20**
- **IPv6 policy development**
- **Policy Comparison Document**

- **Ongoing discussion**
  - criteria for initial allocation
  - wireless services - GPRS/UMTS
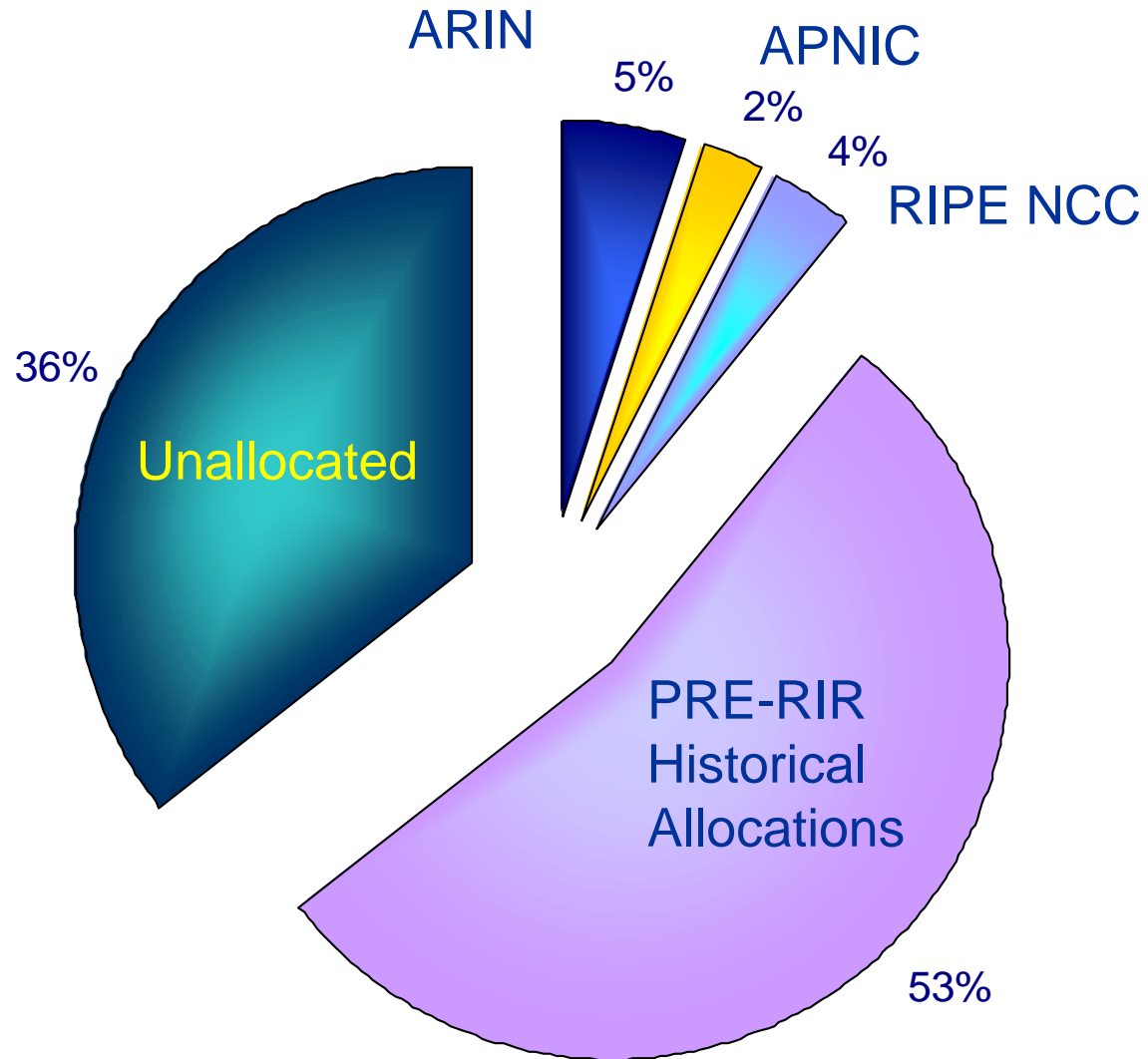 - broadband access - ADSL/cable

IPv4 Allocation Policies

- **RIPE NCC Member (Local IR)**

- **Slow Start:**
  - initial allocation: /20
  - subsequent allocation based on usage rate

- **Support and training to ensure fair distribution**
  - Assignment Window
  - LIR Training Courses

Global Address Allocation

ARIN
5%

APNIC
2%

4%

RIPE NCC

36%

Unallocated

PRE-RIR
Historical
Allocations

53%

IPv6 Allocation Policies

Peering with 3 $\geq$ subTLAs

AND either

Plan to provide IPv6 services within 12 months

OR

$\geq$ **40 SLA customers**

Note: this is under discussion and will change!

IPv6 Allocation Policies (Bootstrap Phase)

Peering with 3 $\geq$ ASes
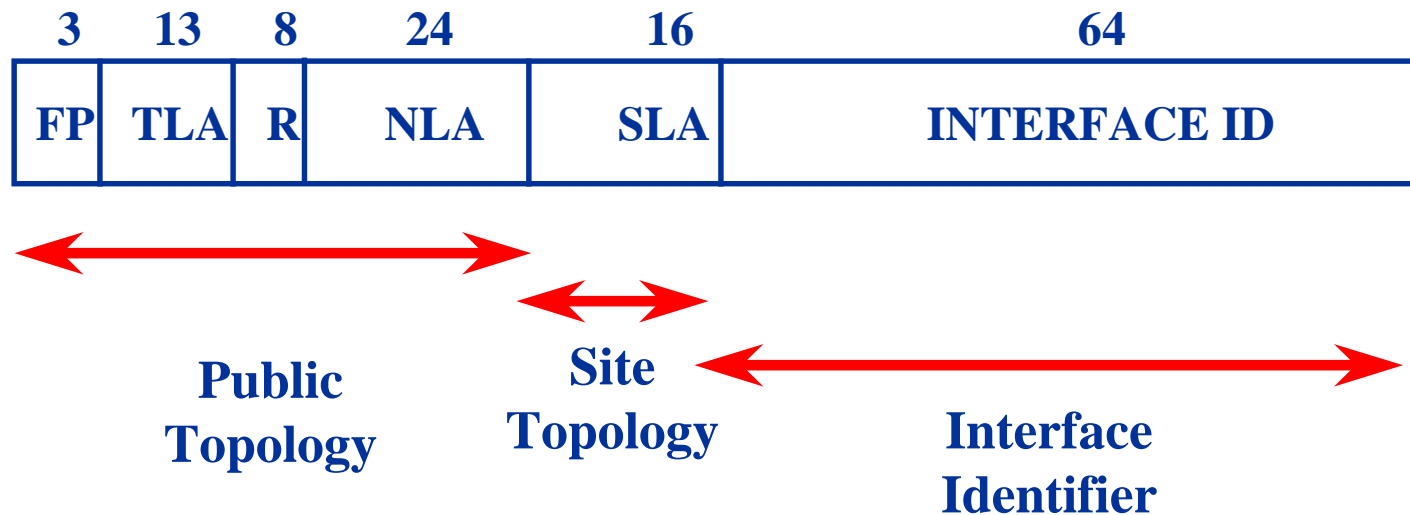
AND

Plan to provide IPv6 services within 12 months
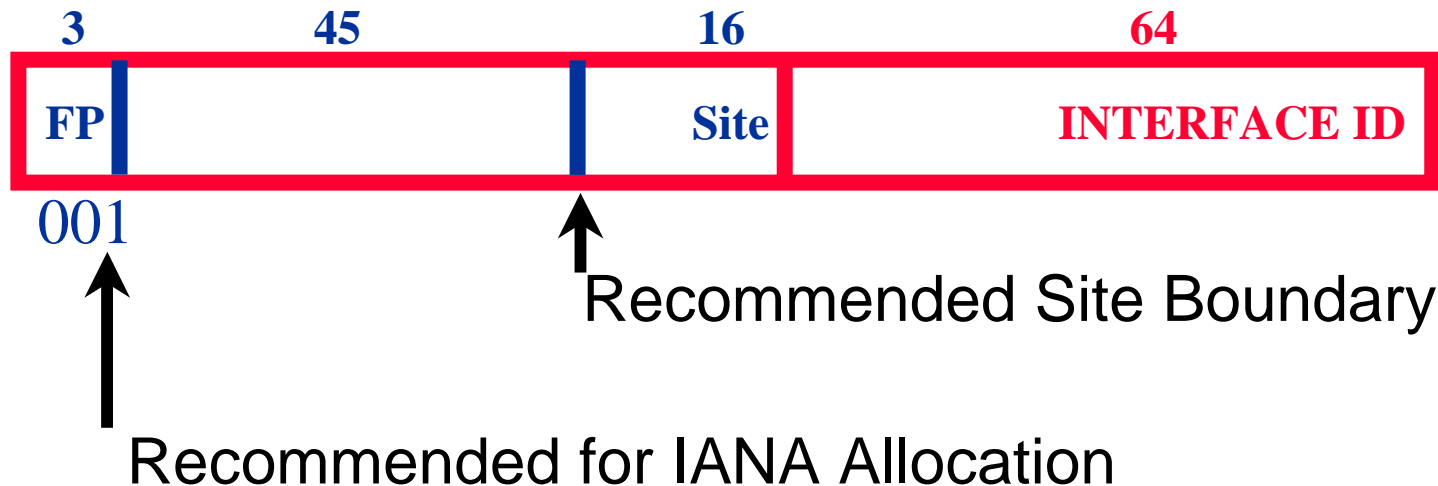
AND either

$\geq$ 40 IPv4 customers

OR

6bone experience

IPv6 Unicast Address

3	13	8	24	16	64
FP	TLA	R	NLA	SLA	INTERFACE ID

Public Topology

Site Topology

Interface Identifier

Mixes Technology and Policy

IPv6 Unicast Address: the **Technology** and **Recommendations**

3	45	16	64
FP		Site	INTERFACE ID

001 ← Recommended for IANA Allocation

↑ Recommended Site Boundary

Technology is what can be Hard-Coded in Routers

IPv6 Unicast Address: the **Policy** Space

3	??	??	??	16	64
FP	IANA	RIR	ISP	Site	INTERFACE ID

001

Recommended Site Boundary

RIR Allocates to LIRs/ISPs

IANA Allocates to RIRs
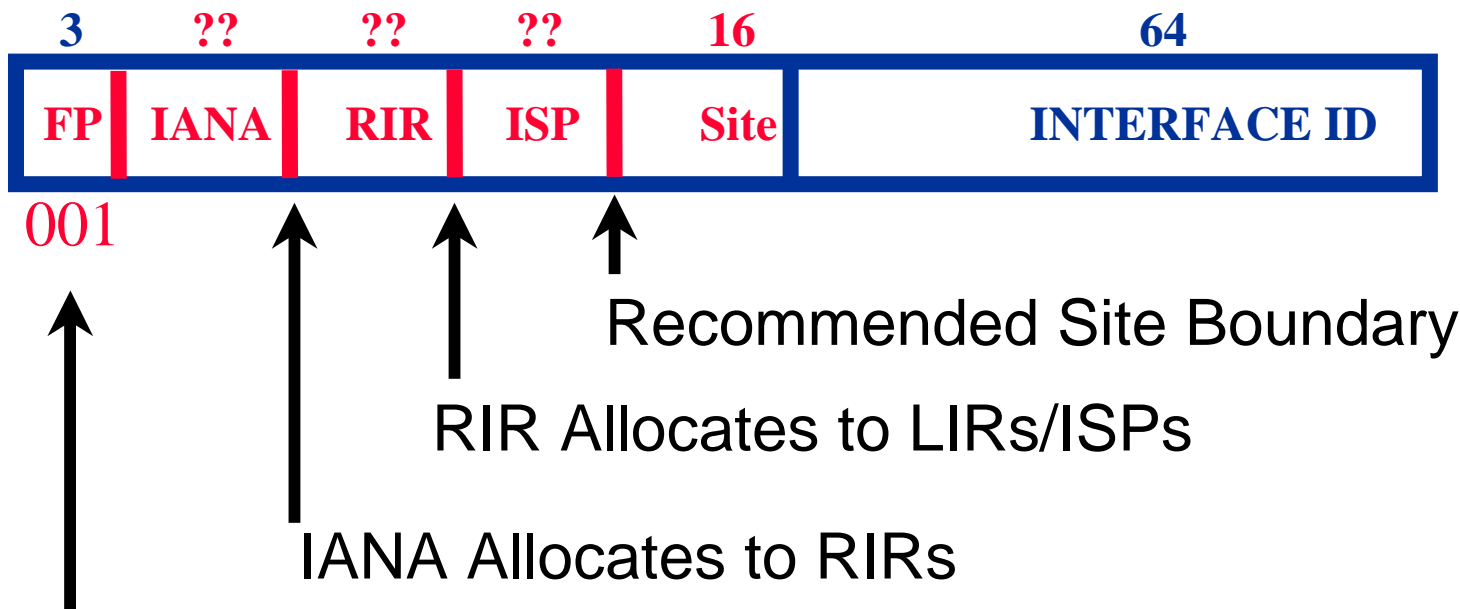
IETF asks IANA to only allocate from FP=001 for now

RIR to LIR

3	??	??	??	16	64
FP	IANA	RIR	LIR	Site	INTERFACE ID

001

↑
RIR->LIR Boundary
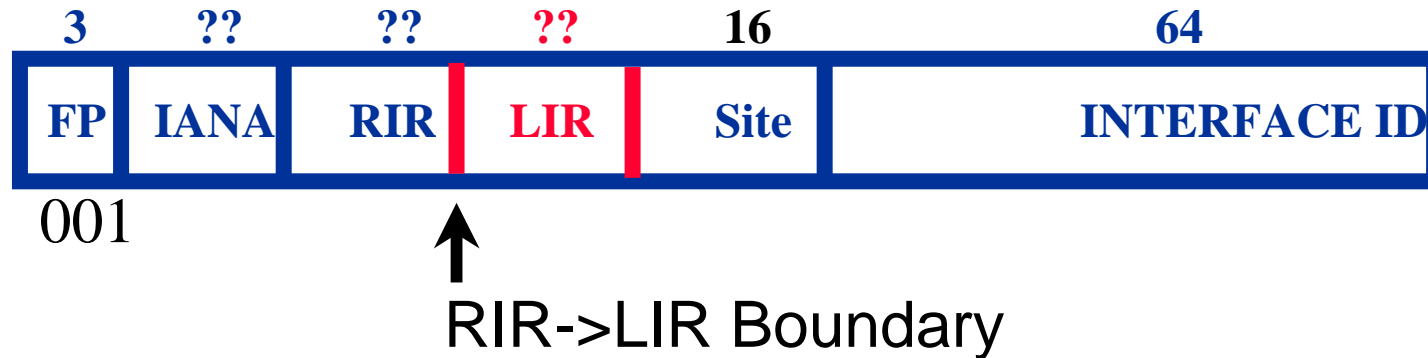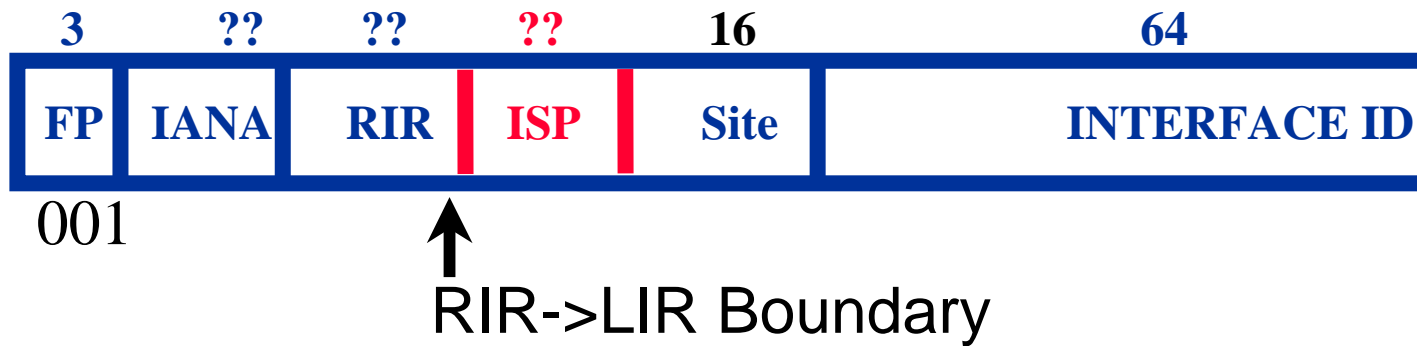
- **Slow Start**
  - minimum initial allocation (size TBD)
  - subsequent allocation based on usage rate

- **Based on current practice**
  - works well
  - LIRs & RIRs familiar with process
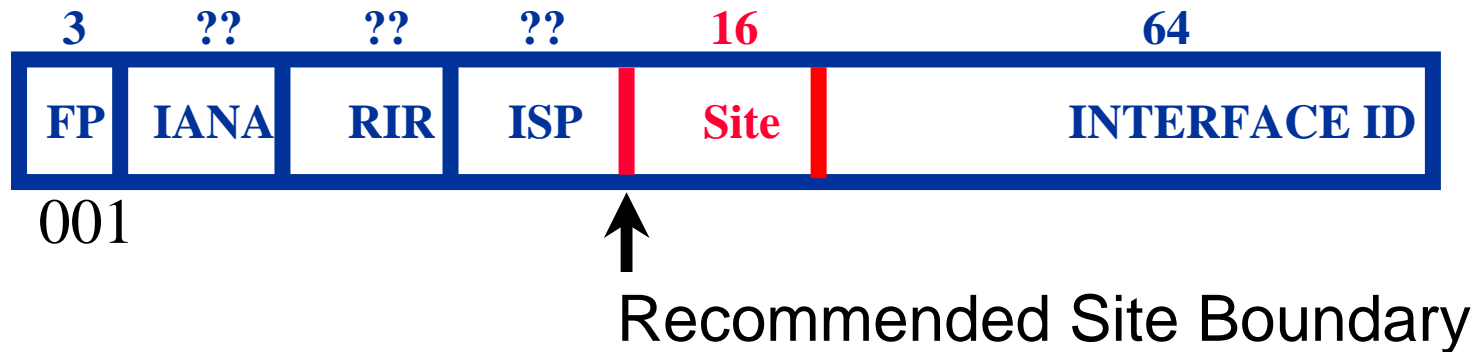 - never been able to develop a clear definition of *ISP*

ISP to ISP

3	??	??	??	16	64
FP	IANA	RIR	ISP	Site	INTERFACE ID

001

↑ RIR->LIR Boundary

- **Based on need**

- **LIRs need enough space for**
  —internal POPs and smaller ISPs

- **Need for sub-allocations from the ISP's allocation**
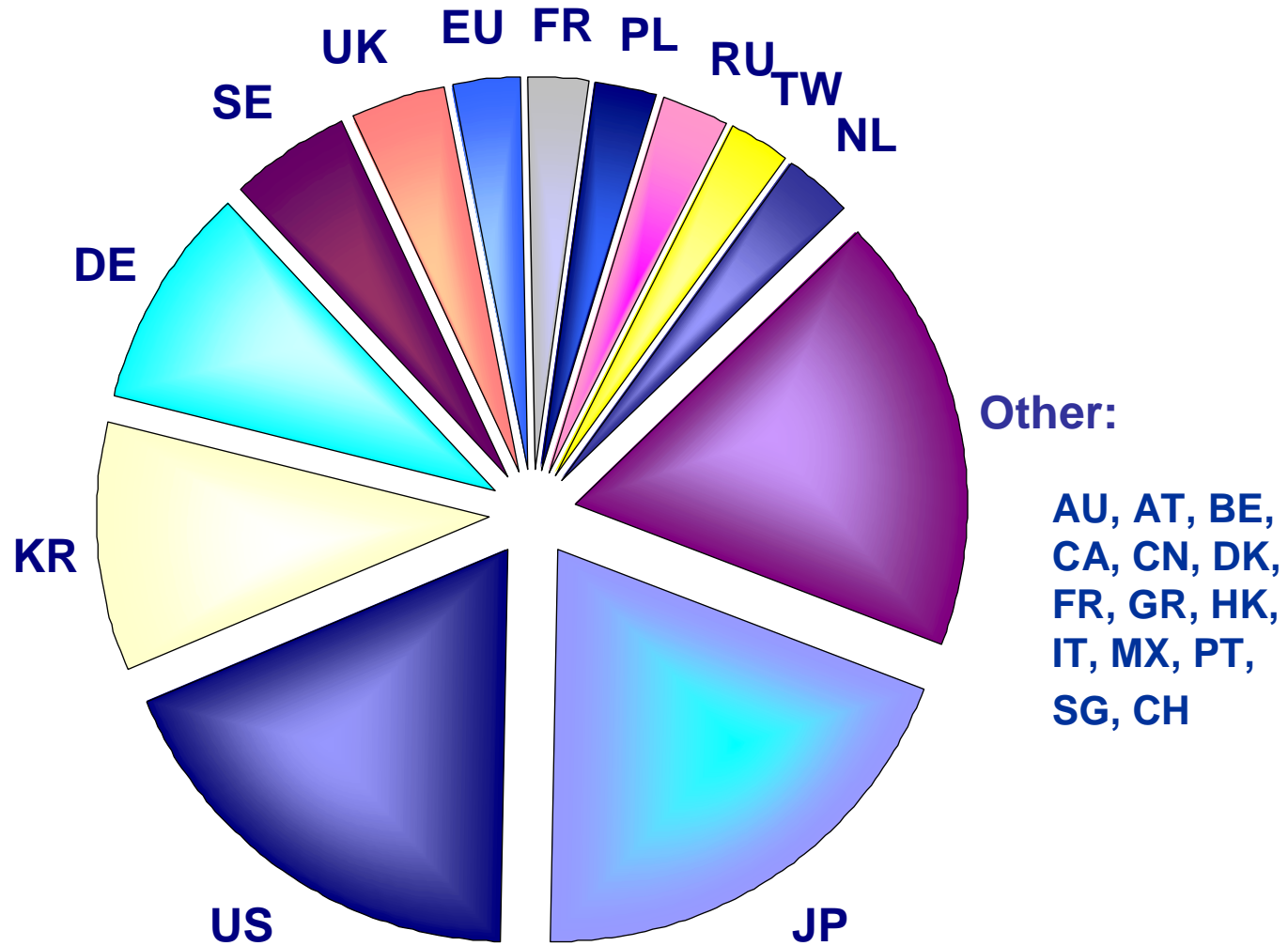 —larger than assignment to a site

ISP to Customer

3	??	??	??	16	64
FP	IANA	RIR	ISP	Site	INTERFACE ID

001

↑ Recommended Site Boundary

- **IAB/IESG recommends /48**

- **Use a /128 where known that only one device is required**
  - —e.g dial-up

- **Use a /64 when network will not be subnetted**
  - —e.g. a mobile phone given 802.11, bluetooth, etc.

Global IPv6 Distribution

Other:

AU, AT, BE, CA, CN, DK, FR, GR, HK, IT, MX, PT, SG, CH

Questions