

RIPE Network Coordination Centre

**LIR Tutorial  
RIPE 58**

4 May 2009

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**The Internet Registry (IR) System**

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**The IR system**

Five RIRs worldwide

- Not for profit organisations
- Funded by membership fees
- Policies decided by regional communities

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**The five RIRs**

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Registration

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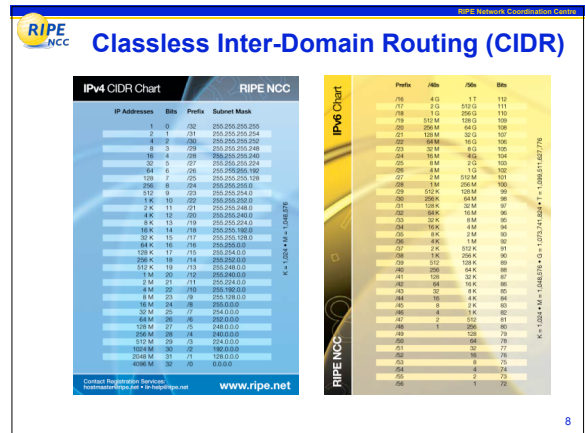
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Aggregation

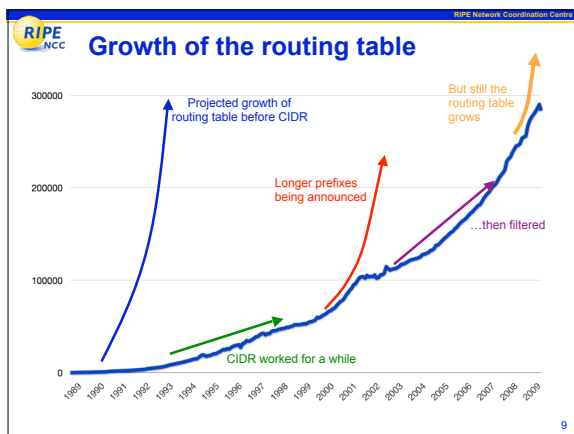
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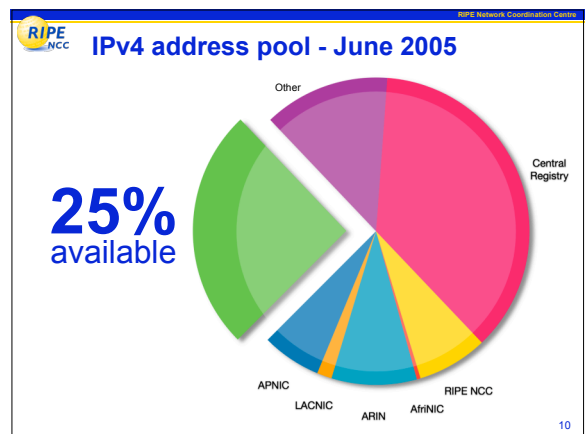
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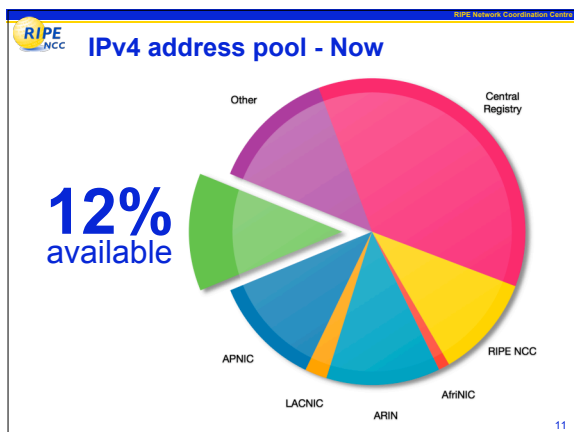
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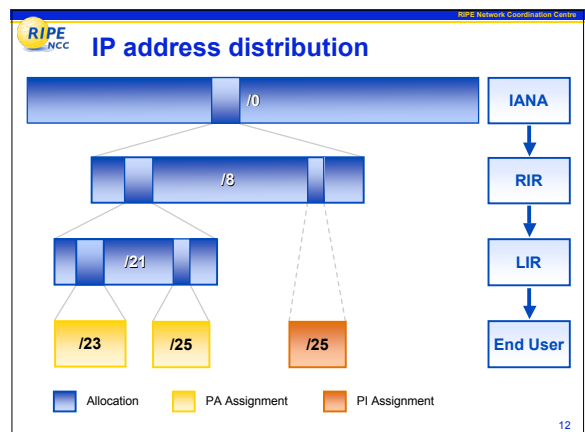
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## Types of address space

**Provider Aggregatable (PA)**

- Allocated to LIR/ Assigned by LIR
- Address space remains with LIR

**Provider Independent (PI)**

- Assigned to End User
- Address space remains directly with End User

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## Questions?

## RIPE and RIPE NCC and the Policy Development Process

## RIPE and RIPE NCC

- Réseaux IP Européens (1989)
  - Collaborative, open community for Internet operators, administration and development
- RIPE Network Coordination Centre (1992)
  - Independent not-for-profit membership organisation
  - One of 5 Regional Internet Registries
  - Member services
  - Public services

## Who makes policies?

```

graph BT
    GPP[Global Policy Proposal] --> R1[Afrinic community]
    GPP --> R2[RIPE community]
    GPP --> R3[ARIN community]
    GPP --> R4[APNIC community]
    GPP --> R5[LACNIC community]
    R1 --> RAC[Reach consensus across communities]
    R2 --> RAC
    R3 --> RAC
    R4 --> RAC
    R5 --> RAC
    RAC --> ASO[ASO]
    ASO --> ICANN[ICANN / IANA]
    
```

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## Policy development process

```

graph LR
    subgraph Create [Create Policy Proposal]
        direction TB
        C1[Initial discussion of proposal]
        C2[Proceed to documentation?]
        C3[Document is drafted]
        C4[Suggested timeline: up to 9 weeks]
    end

    subgraph Discussion [Discussion Phase]
        direction TB
        D1[Initial discussion of proposal]
        D2[Proceed to documentation?]
        D3[Document is drafted]
        D4[Suggested timeline: up to 9 weeks]
    end

    subgraph Review [Review Phase]
        direction TB
        R1[Comment and review]
        R2[Is there consensus?]
        R3[Suggested timeline: up to 5 weeks]
    end

    subgraph Concluding [Concluding Phase]
        direction TB
        Cn1[Last call]
        Cn2[Is there consensus?]
        Cn3[Announce decision]
        Cn4[Suggested timeline: up to 5 weeks]
    end

    C1 --> D1
    D2 --> R1
    R2 --> Cn1
    
```

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## Who does what? (1)

The community - that's you!

- Creates proposals
- Discusses proposals

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## Who does what? (2)

Working Group (WG) chairs

- Accept proposals
- Chair the discussions
- Decide if consensus has been reached

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## Who does what? (3)

The RIPE NCC

- Acts as the secretariat to support the process
- Publishes the documents
- Implements the proposals

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## Why would you want to participate?

- Policy determines how you run your business
- Over 6000 LIRs, however;
- only a fraction are active participants in the PDP

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## Participating

- Sign up for the Policy Announce mailing list
- Join in discussions about policy proposals
- Stay up to date with new policies
- Propose a new policy

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Questions?



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## The RIPE Database

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## RIPE Database

Public Internet resource and routing registry database

Querying the RIPE Database

- Command-line client
- Web interface
- Free text search (Glimpse)

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## Protection

```
mntner: LIR-MNT
auth: MD5-PW $1$0930uR
```

→

```
person: John Smith
nic-hdl: JS1-RIPE
mnt-by: LIR-MNT
```

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## Authentication

Password (MD5-PW)

Private key/public key


- PGPKEY-<id> and key-cert object



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## Questions?



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## IPv4 Resources

**RIPE NCC** **How to Set-up an LIR**

- Complete application form
- Sign contract - "Service agreement"
- Pay the sign-up & yearly fee

New LIRs get 2 free vouchers for RIPE Meetings

**RIPE NCC** **Terminology**

**Allocation**

- Block of IP addresses reserved for future use

**Assignment**

- A chunk of addresses out of an Allocation that is in use:
  - in your own infrastructure
  - in an End User network

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**RIPE NCC** **First IPv4 allocation**

- Create `mntner`, `person`, and `role` objects
- Submit the IPv4 First Allocation Request form
- Submit the IPv4 PA Assignment Request form

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**RIPE NCC** **Assignment Window (AW)**

- The maximum number of addresses that can be assigned without prior approval from the RIPE NCC
  - To any End User within 12 months
  - New LIR: AW = 0

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**RIPE NCC** **The assignment process**

```

graph TD
    A[Collect information and evaluate request] --> B{Request > AW?}
    B -- yes --> D[RIPE NCC evaluates request]
    B -- no --> C{Need 2nd opinion?}
    C -- yes --> D
    C -- no --> E[Choose addresses]
    D --> E
    E --> F[Keep documentation and register in RIPE Database]
  
```

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**RIPE NCC** **Additional IPv4 allocation**

- Tidy up your records in the RIPE Database
- Request a list of invalid assignments
- Send an IPv4 Additional Allocation request
- We will audit you

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## Reverse delegation

inetnum: 172.25.64.0/19

status: ALLOCATED PA

mnt-by: RIPE-NCC-HM-MNT

mnt-domains: LIR-MNT

domain: 64-95.25.172.in-addr.arpa

mnt-by: END-USER-MNT

mnt-by: LIR-MNT


nserver: ns.bluelight.nl

nserver: ns2.pinklight.de

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## Questions?



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## Independent Resources

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## Independent Resources

- What ?
  - PI (IPv4 and IPv6)
  - ASN
  - IXP IPv6
  - Anycast
- Contract with End User required
  - Example contract on RIPE NCC website
- Yearly charges for Independent Resources
  - RIPE NCC Charging Scheme 2009

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## Autonomous System Numbers

Assignment requirements

- Address space
- Multihoming
- One AS Number per network

For LIR itself

For End User

- Sponsoring LIR requests it for End User
- Direct Assignment User requests it for themselves

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## 32-bit AS Numbers

32-bit ASN deployment schedule:

1 Jan 2008: 16-bit default, 32-bit on request

1 Jan 2009: 32-bit default, 16-bit on request

1 Jan 2010: Only 32-bit AS Numbers

Note: 16-bit AS Numbers will not be deprecated.  
This schedule applies to newly assigned ASNs

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**RIPE NCC 32-bit AS Numbers and you**

Can you handle the new format, e.g.  
 - “AS4192351863” ?  
 If not, please act now!


Prepare for 32-bit AS numbers in your organisation:

- Check whether your hardware is compatible; if not, ask your hardware vendor for support
- Check whether your upstream provider is running compatible hardware; if not, encourage them to upgrade!

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**RIPE NCC**

**Questions?**

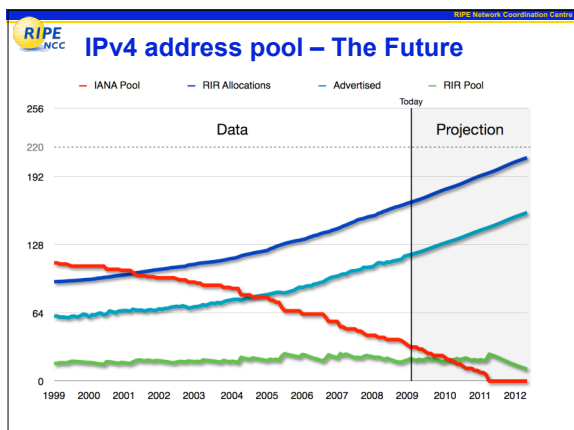
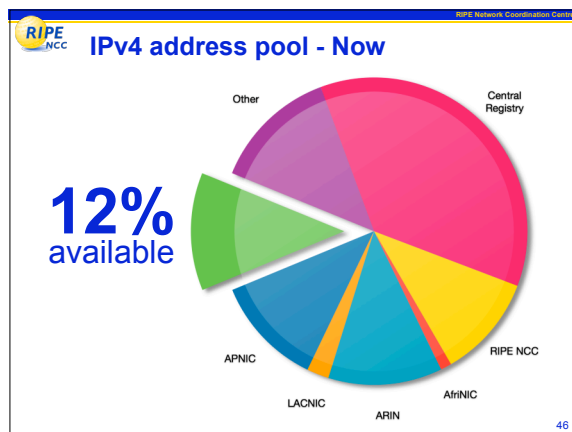


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**RIPE NCC**

**IPv6**

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**RIPE NCC IPv6 basics**

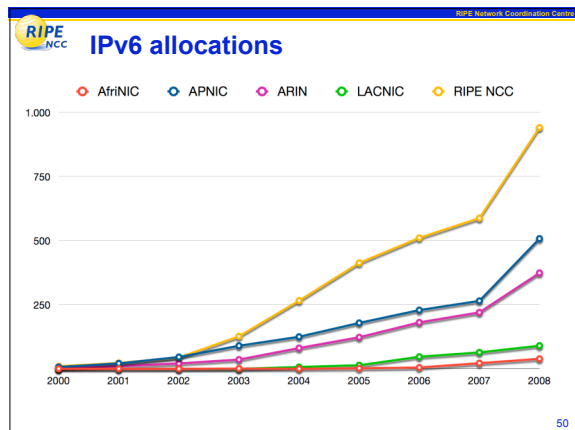
- IPv6 address: 128 bits
  - 32 bits in IPv4
- Every subnet should be a /64
- Customer assignments (sites) between:
  - /64 (1 subnet)
  - /48 (65536 subnets)
- Minimum allocation size /32
  - 65536 /48's

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**IPv6 and IPv4 compatibility?**

- IPv6 is a different protocol from IPv4
- IPv6 hosts cannot talk to IPv4 hosts directly
- Tools like 6to4 and other tunneling options let IPv6 hosts talk to each other

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**Getting an IPv6 allocation**

To qualify, an organisation must:

- Be an LIR
- Advertise the allocation as a single prefix
- Have a plan for making assignments within two years

Minimum allocation size /32

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**Getting IPv6 if you are not LIR**

- Get a sub-allocation from an LIR
- Get an assignment from an LIR
  - /48 or /56 for the End User sites
- Provider Independent (PI) IPv6 assignments

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**Questions?**

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**The End!**

Край Y Diwedd  
 Соңы Fí Finis  
 النهاية Liðugt Kінець  
 Ende Finvezh Konec  
 Kraj Ěnn Fund پايان Kraj  
 Löpp Beigas Vége Son An Críoch  
 Fine ებოძა Endir Sfârșit Fin Τέλος  
 Einde Конец Slut Slutt  
 დასასრული Pabaiga  
 Fim Amaia Loppu Tmiem Koniec

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## LIR course slogans... about IPv4

- Will work for /24
- RIPE NCC - absolutely classless
- You're too late - we have a /8
- Soon it will be all too late, no space to allocate
- You have reached the end of the Internet



IPv4 - eats, shoots and leaves!

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## LIR course slogans... about IPv6

- I will miss IPv4
- 2011: make a date with a /48
- Get your IPv6, because the clock ticks
- IPv6 is the fix
- Ignoring IPv6 since 1996

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