Welcome to the

LIR Tutorial

RIPE NCC

Today…

- Being an LIR
- RIPE Database
- PI Address Space
- Assignment Window
- Making Assignments
- IPv6 Address Space
- Reverse DNS
- AS Numbers

Being an LIR

What is an LIR?

- **L**ocal **I**nternet **R**egistry
  - responsible for obtaining, distributing and registering IP resources, according to the RIPE policies
- Member of the RIPE NCC
  - receiving resources directly from the RIPE NCC
- Benefits
  - flexibility
  - independence (BGP multihoming)

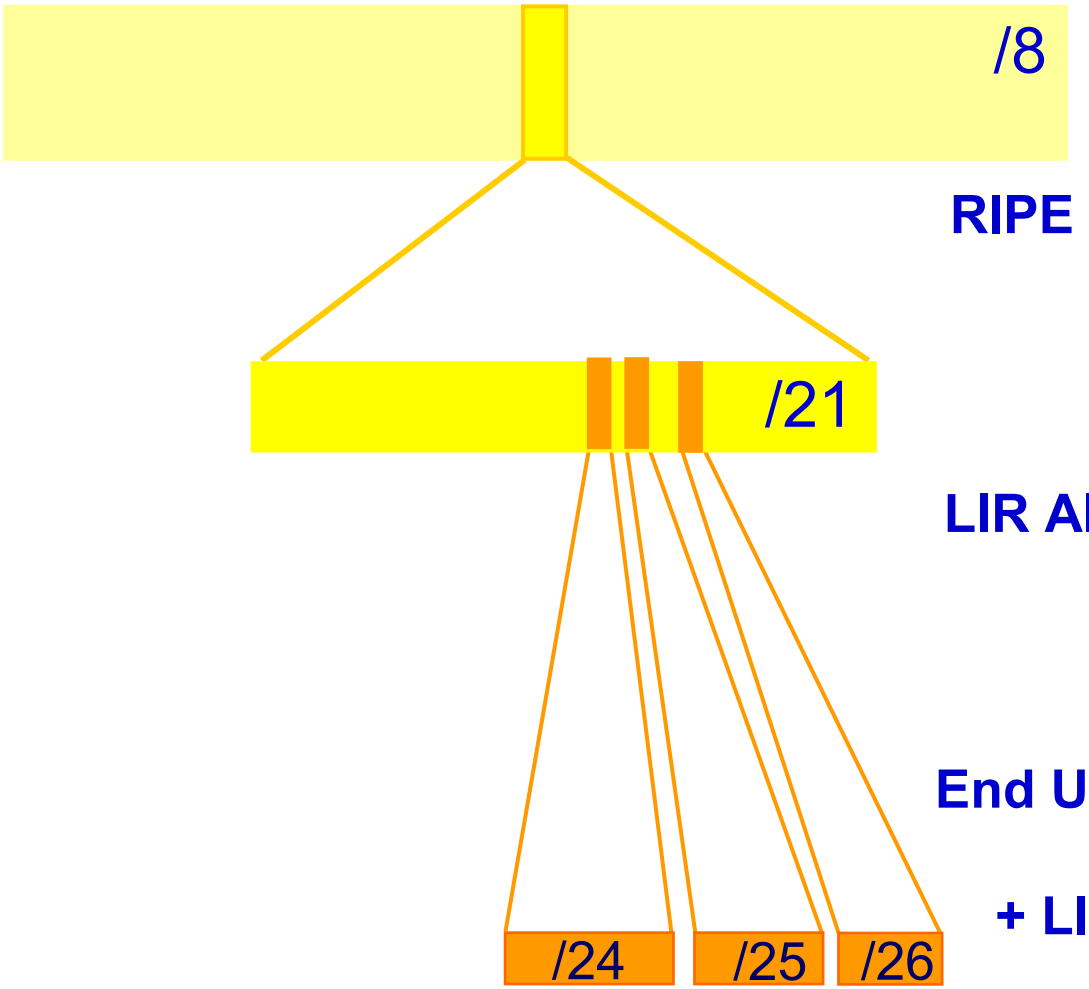
Internet Registry System Goals

Problem	Solution	Principle/**Goal**
Uniqueness and contact details	RIPE Database	**Registration**
Routing table growth	Scalable routing	**Aggregation**
Limited resource	Efficient use	**Conservation**

Classless Addressing

- Classful addressing (’80-’93) now obsolete
  - waste of addresses; routing table growth
- ’93: **C**lassless **I**nter **D**omain **R**outing (CIDR)
  - flexible allocation / assignment sizes
  - w.x.y.z/nn notation
- CIDR implemented in all modern routing protocols
- CIDR used for address space distribution

Allocation and Assignment



RIPE NCC Allocation

LIR Allocation

End User Assignments

+ LIR's Infrastructure

Terminology

- Allocation:
  - address space set apart, by the RIPE NCC for LIR's and its customers' future use
- Assignment:
  - address space **in use** in networks (End User, downstream ISP or LIR's own infrastructure)
  - made from allocation or sub-allocation
- Assignment Window:
  - maximum nr of addresses an LIR can assign without RIPE NCC's approval. New LIR: AW=0

LIR Set-up Process

- Steps
  - read policy documents
  - apply for membership
    - RegID, contacts
  - pay the fees
  - sign the contract
- Next steps
  - LIR: register RIPE Database contact data
  - RIPE NCC: “Reg” file, “organisation” object
  - LIR: activate LIR Portal account

RIPE NCC E-Learning Centre - Mozilla Firefox

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https://e-learning.ripe.net/

RIPE NCC E-Learning Centre

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- Link to RIPE NCC website
- RIPE Database
- E-Learning news

Course categories

- RIPE Database
- Internet Administration
- How to...
- FAQs

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E-Learning news

Welcome to the RIPE NCC E-Learning Centre!
by Rumy Kanis - Wednesday, 24 May 2006, 07:29 PM

This service is available to both members and non-members of the RIPE NCC and enables users to learn in their own space at their own pace.

Modules available currently are

- RIPE Database
  - an introduction to creating and updating basic Database objects
- Internet Administration
  - a short history of Regional Internet Registries (RIRs) and of the Number Resource Organization

Throughout 2006, the RIPE NCC will be adding several modules such as the RIPE Policy Development Process (PDP), DNS for LIRs, Advanced Database Objects and the billing/charging scheme.

To take any of the courses on the E-Learning Centre, you will first need to register an account.

- To register a new account - click here
- For help with registering your account (including audio) - click here
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If you have any questions or feedback about the RIPE NCC E-Learning Centre, please e-mail: e-learning@ripe.net

Older discussions ...

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Calendar

<< November 2006 >>

Mon	Tue	Wed	Thu	Fri	Sat	Sun
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Upcoming Events

LIR Course - Verona, IT
Friday, 24 November (12:00 AM)

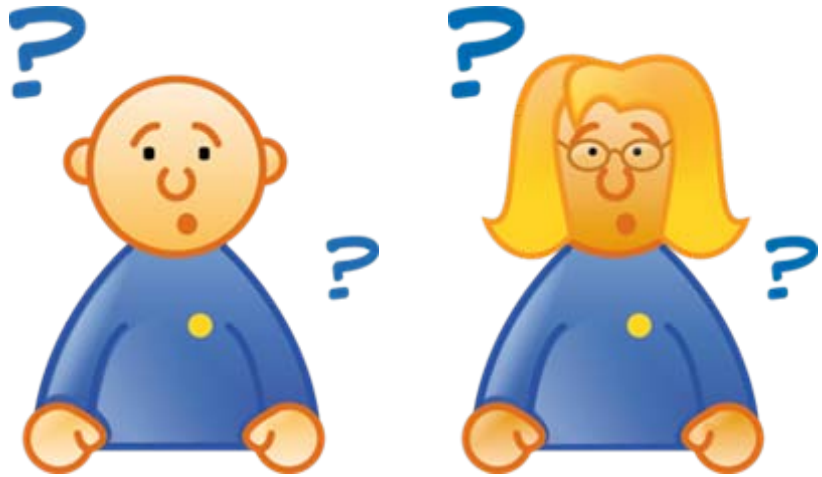
Routing Registry Course - Rome, IT
Monday, 27 November (12:00 AM)

Done

e-learning.ripe.net

Summary

- You are part of the global Registry System
- LIR Portal: main interface
- E-Learning



Questions?

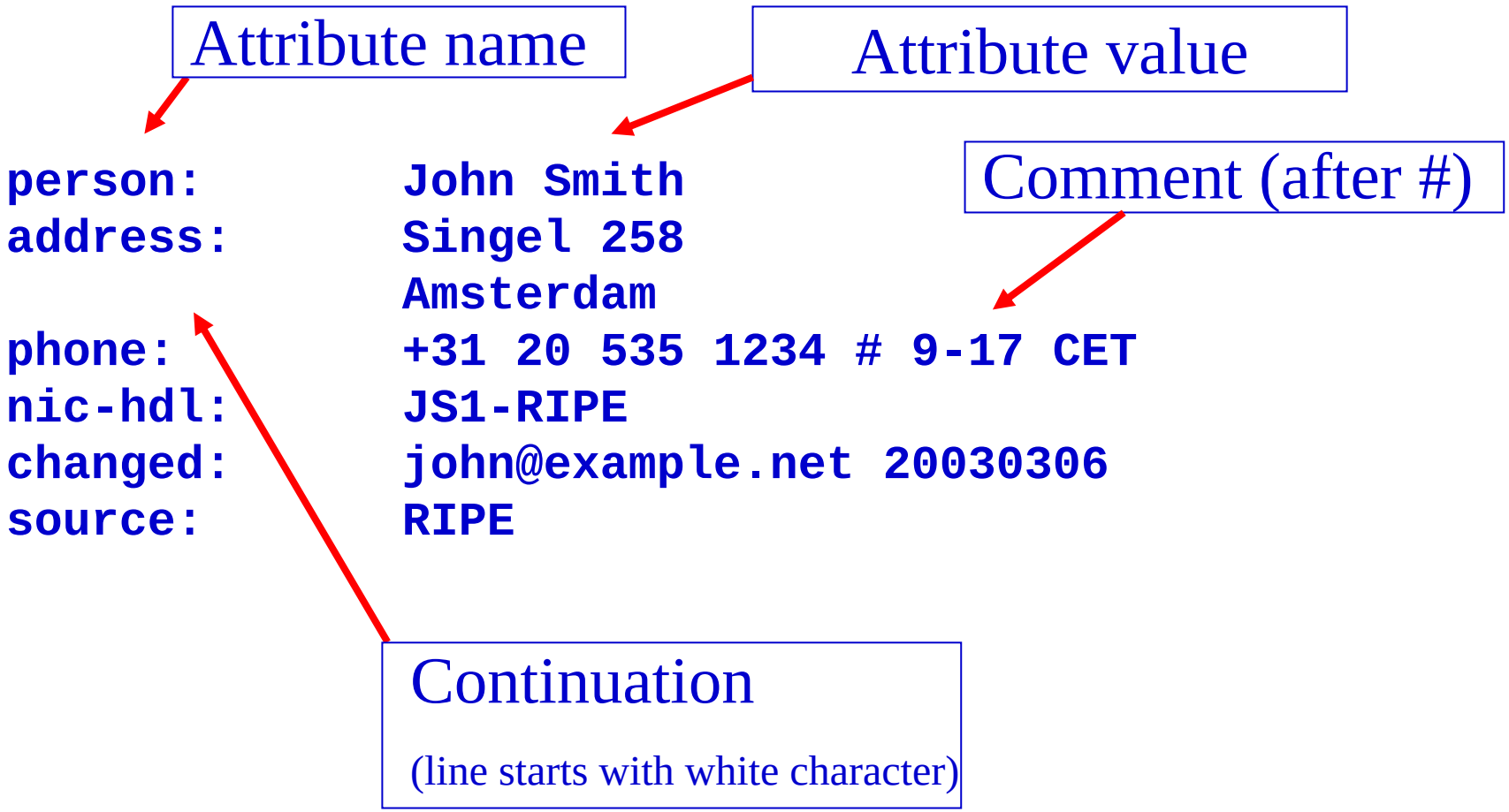
RIPE Database

RIPE Database

- Public Network Management Database
- All LIRs must have
  - **`person`** object
  - **`maintainer`** (**`mntner`**) object
  - **`organisation`** object

  - **`role`** object is convenient

DB Object Syntax



Protection of DB Objects

- "**mnt-by**": attribute refers to **mntner** object
  - Checked at every update

- **Password:**
  - **CRYPT-PW** **about to be deprecated!**
  - **MD5-PW**
    - https://www.ripe.net/cgi-bin/crypt.cgi
- **Private key/Public key**
  - **PGPKEY-<id> & key-cert** object
  - **X.509-<id> & key-cert** object

- Multiple auth / mnt-by / mntner-s are OR-ed

Hierarchical Authorisation

```
inetnum: 10.0.0.0 - 10.255.255.255
mnt-lower: MNT1
mnt-by: MNT2
```

WHAT	WHO
Create Sub Groups ‘under’ this Object	MNT1
Change this Object	MNT2

```
inetnum: 10.10.0.0 - 10.10.255.255
mnt-by: MNT3
```

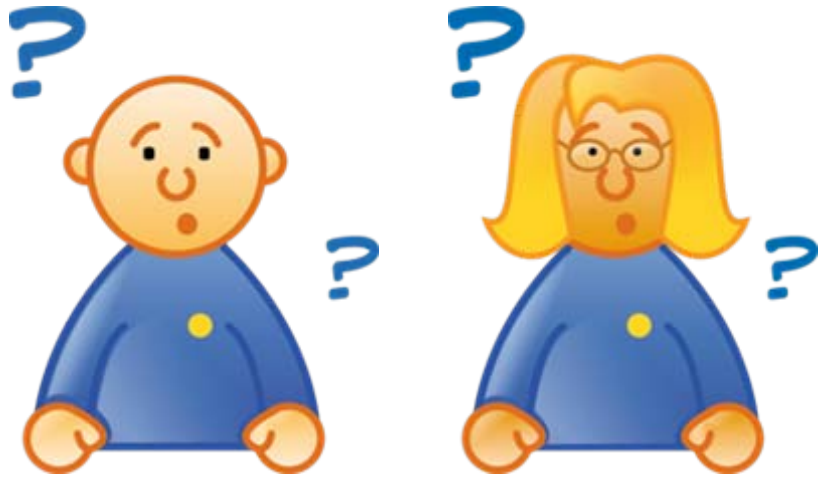
WHAT	WHO
Create Sub Groups ‘under’ this Object	MNT3
Change this Object	MNT3

```
inetnum: 10.0.0.0 – 10.255.255.255
mnt-by: MNT1
mnt-by: MNT4
mnt-domains: MNT3
```

WHAT	WHO
Create Domain Objects for 10.0.0.0/8	MNT3
Change this Object	MNT1 **or** MNT4

Summary

- RIPE Database
- Maintainers
- Hierarchical authorisation



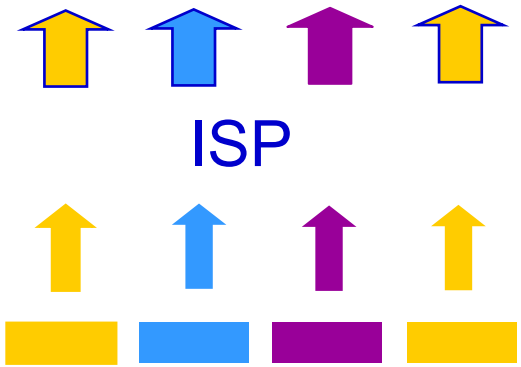
Questions?

PI Address Space

PI versus PA Assignments

No Aggregation

BGP Announcements (4)



ISP

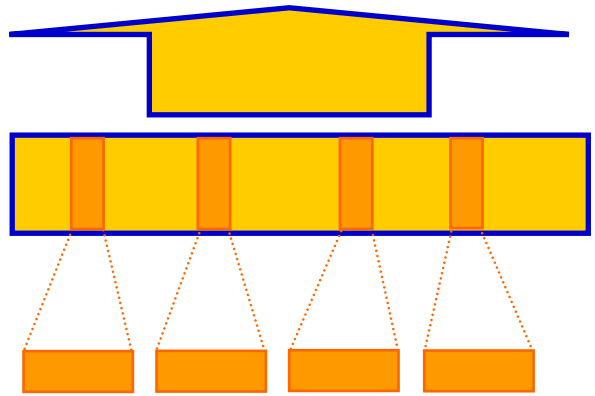
Customer Assignments

Provider **I**ndependent

(Portable Assignments)

Aggregation

BGP Announcement (1)



LIR

Allocation

Customer Assignments

Provider **A**ggregatable

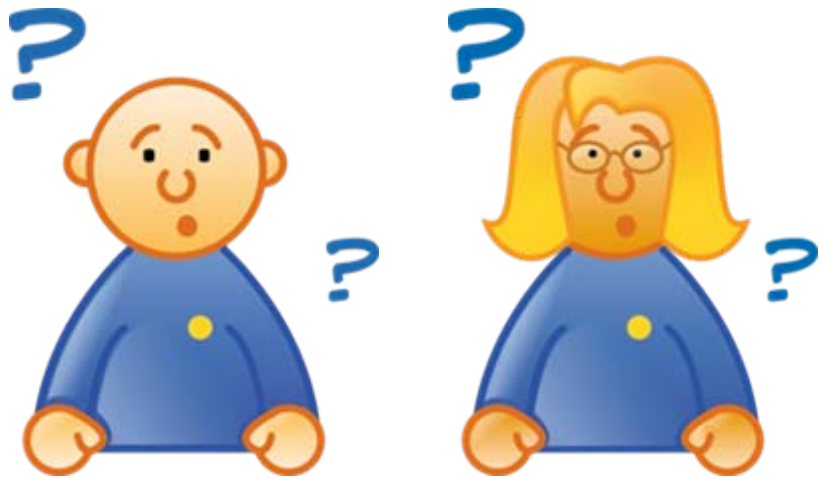
(Non-portable Assignments)

Evaluation of PI requests

- Additional questions
  - Why does End User want PI (and not PA)?
  - Requesting extra address space for routing?
  - Aware of consequences?
- Same criteria as for PA assignments
  - Conservative estimates
  - Classless
- Assignment is only valid as long as original criteria remain valid

Summary

- PA recommended
- LIR requests PI space for End User
- Shared responsibilities



Questions?

Assignment Window

Assignment Window Concept

- Maximum number of IP addresses the LIR can assign without approval from the RIPE NCC
  - For each End User, within any 12 months
- Every LIR will have an AW of a /21
  - six months after receiving first allocation
  - Policy will take effect 7 June 2007
- New LIR, AW = zero

Infrastructure versus End User

- LIR / ISP infrastructure
  - **blocks** for co-location: server housing, web hosting
  - **blocks** for connection to End Users (dial-up, P2P)

- End User network
  - their equipment, their location
  - separate subnet(s)

Assignments for LIRs' Infrastructure

- LIR can make multiple assignments to own infrastructure. Each assignment = or < AW
- In **`inetnum`** object: ***separate*** attribute:

  `remarks: INFRA-AW`

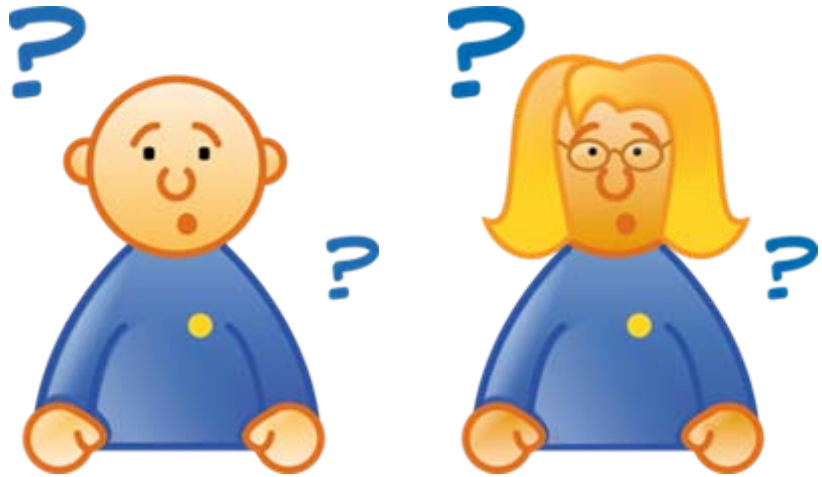
  - Only if assignment hasn't been requested!
  - Cannot be merged
- Keep documentation to justify assignments
- **Assignments > AW : send request to the RIPE NCC !**

Ask for Approval if…

- Request is above AW:
  - This request and all previous assignments you made without the RIPE NCC to the same End User in the last 12 months
  - New LIR's AW=0 – need approval for **every** assignment!

Summary

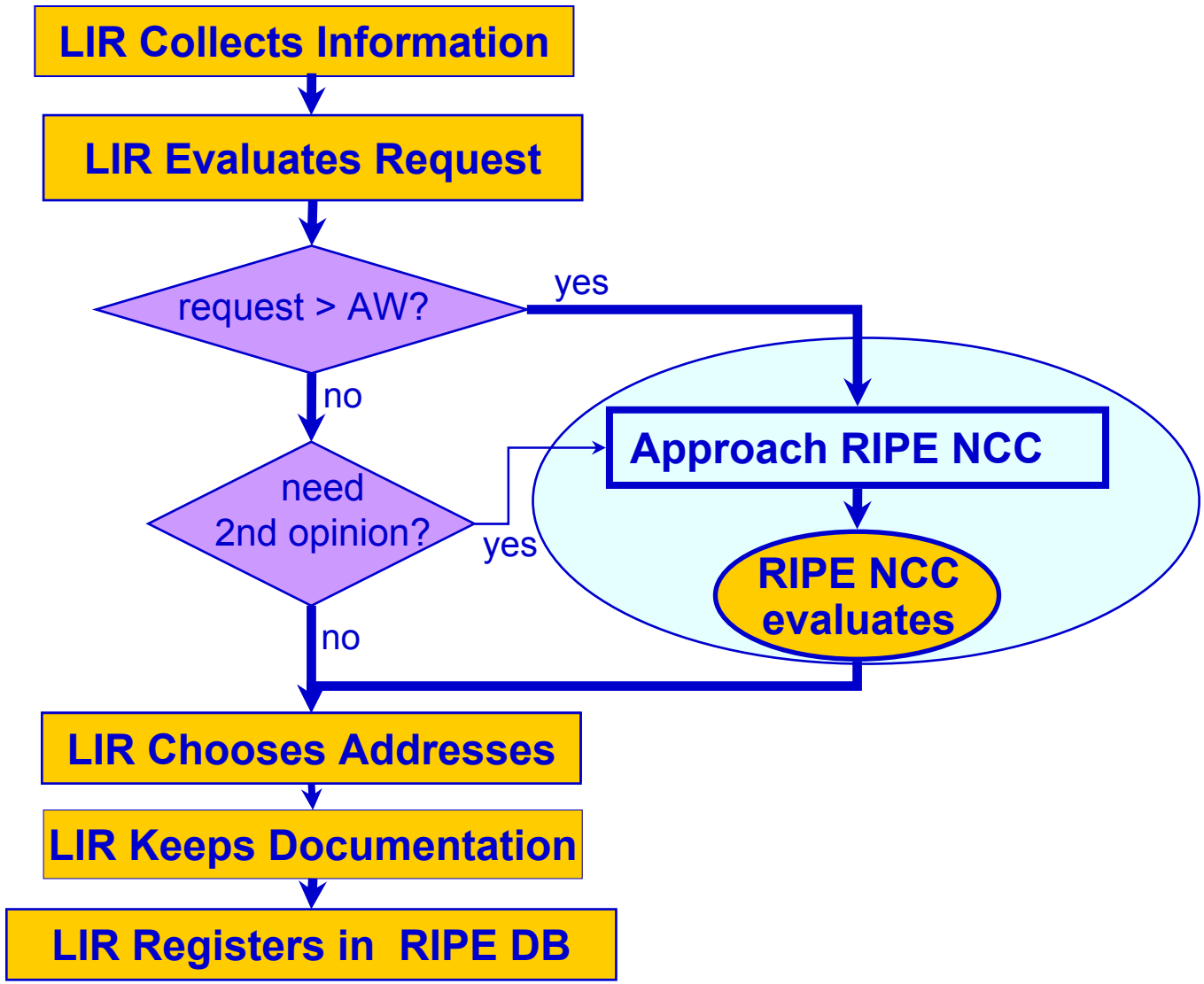
- New LIR: AW=0
- Assignment > AW: send request for approval
- Assignment < AW: evaluate & assign yourself



Questions?

Making Assignments

Assignment Process



LIR Evaluation

- Collect information from customer
  - Confidential, local language
- Planning of growth two years ahead
  - Utilisation: 25% now, 50% in one year
- Assignment address range
  - Your choice
  - Any range from your allocation
  - All subnets classless

RIPE NCC Evaluation

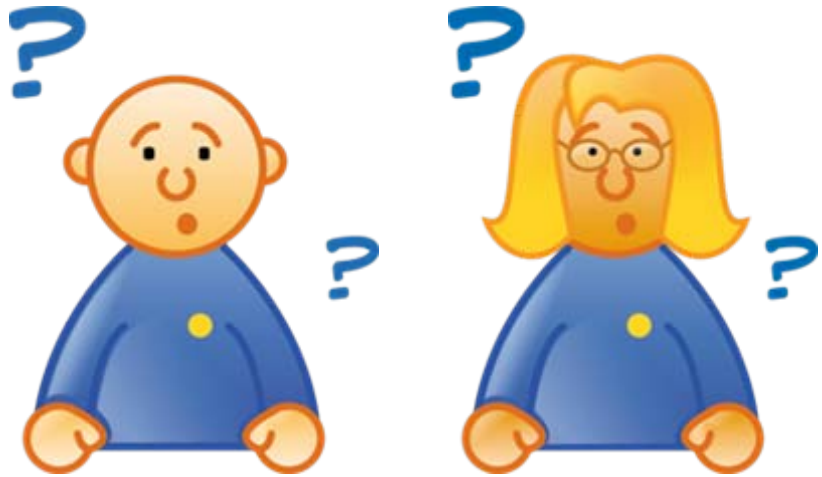
- Based on “IPv4 Address Policies” document
  - Dynamic assigning encouraged
    - not static
  - More than /20: usage statistics verification
    - Always-on technologies: xDSL, cable, GPRS…
  - Name-based virtual web hosting encouraged
    - not IP-based
    - exceptions: SSL, ftp & mail servers...

Approval

- RIPE NCC sends approval message to LIR
  - Size
  - **“netname:”**
  - Date
    - ticket closed
- LIR keeps approval message
    - keep all original documents too
- Next steps
  - LIR chooses addresses
  - LIR creates **inetnum** object

Summary

- Evaluate End User needs
- Always register End Users separately



Questions?

IPv6 Address Space

First IPv6 Allocation

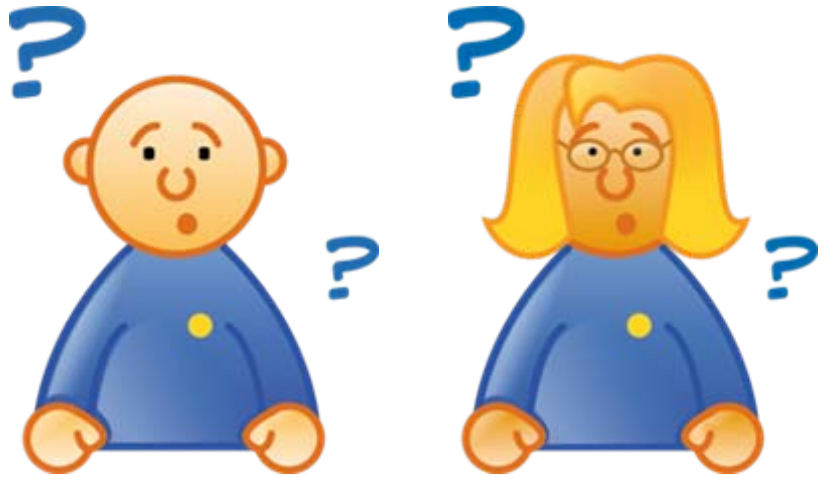
- If you
  - a) are an LIR
  - b) not an End Site
  - c) plan to provide IPv6 connectivity to aggregated ‘customers’, who are assigned /48s
  - d) plan to assign 200 /48s within two years
- Send us “IPv6 first allocation request form”
- Minimum initial allocation size /32
  - Assignment policy being discussed

IPv6 Assignments

- Usual assignment size - /48 for each “site”
  - End User network
  - LIR infrastructure (per PoP)
  - No approval needed
- Smaller size
  - /64 just one subnet
  - /128 just one device
- Multiple /48 for very large End Users
  - Approval needed

Summary

- IPv6 allocation requirements
- Check the Address-Policy WG!



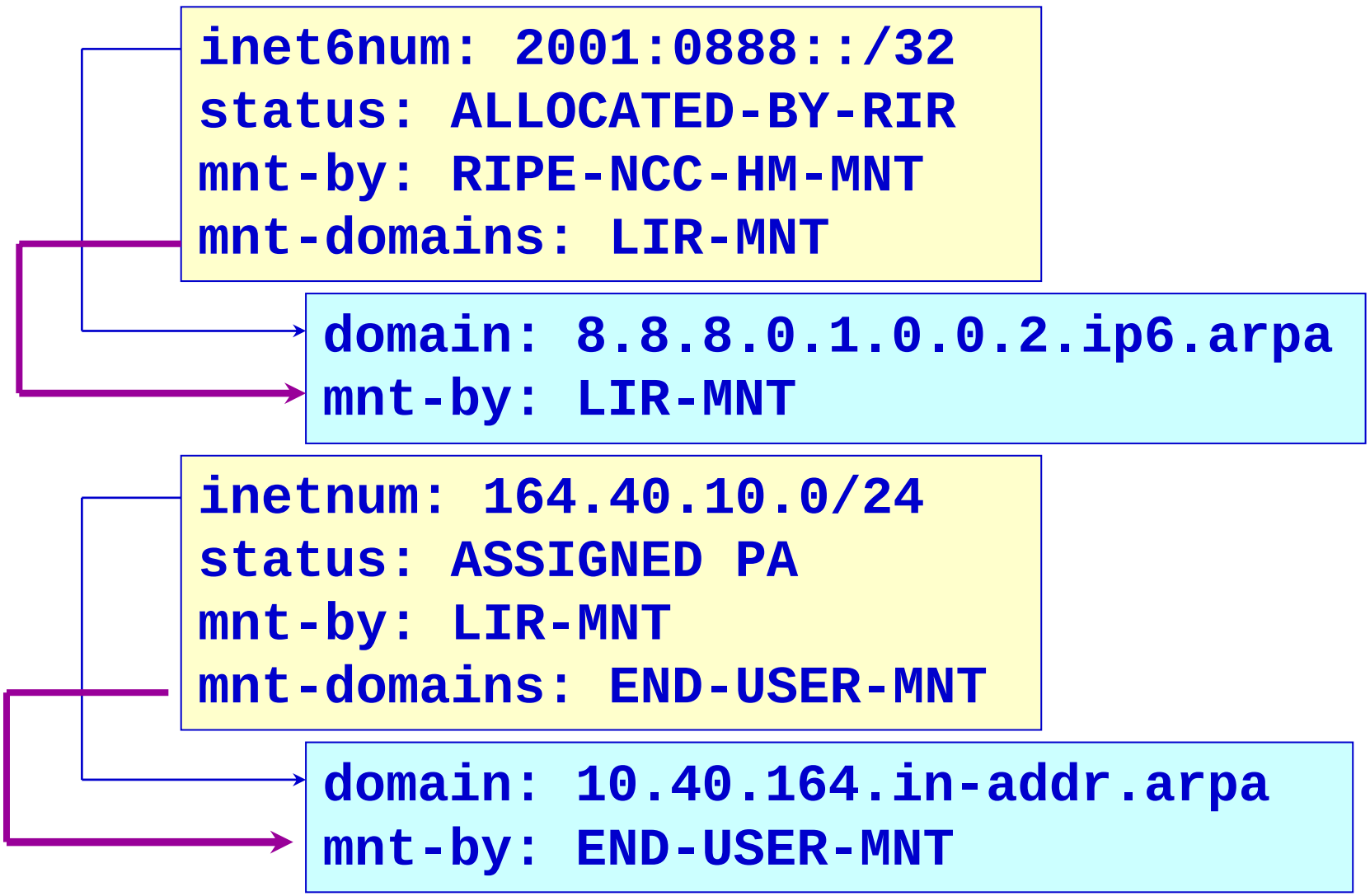
Questions?

Reverse DNS

Why Reverse DNS?

- Mapping IP numbers to domain names
- Needed for applications (mail, IRC, ftp)
  - Troubleshooting (traceroute)
- LIR's responsibility

inet(6)num and domain Objects



Set-up & Request

- Configure DNS server for chosen zones
  - RFC 1912, RFC 2182
- Find the secondary server
  - ns.ripe.net mandatory for IPv4 /16
- Request = submit **domain** object to RIPE DB

```
nserver: ns.bluelight.nl
nserver: ns2.pinklight.de
```

What Will Be Checked

1. RIPE Database syntax
2. Authentication
   - "**`mnt-domains:`**" in corresponding **`inetnum`**

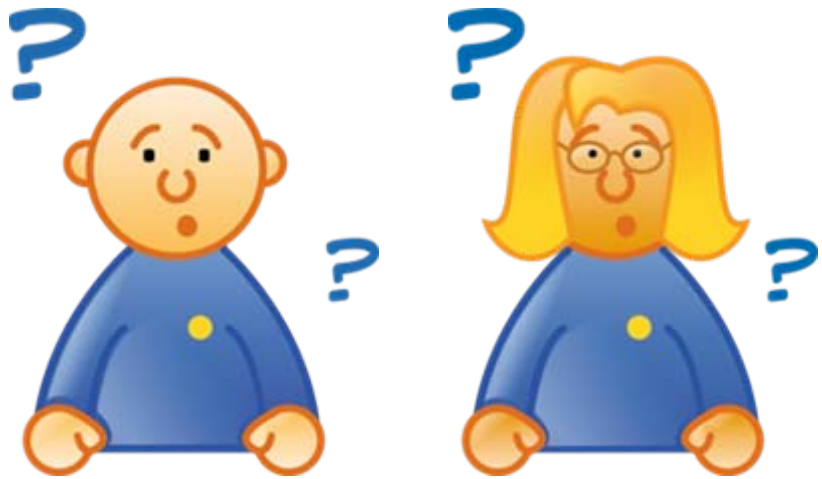
   and
   - "**`mnt-by:`**" in **`domain`**
3. Name servers setup

- Errors / warnings: ask <*ripe-dbm@ripe.net*>

- Success: RIPE NCC updates parent zone

Summary

- RDNS important service to customers
- Come to a DNS for LIRs course!



Questions?

AS Numbers

Autonomous System

- RFC 1930:
  - "An AS is a connected group of … IP prefixes … which has a **single** and **clearly defined** routing policy."
- LIR can request an ASN
  - For own network, or for another organisation
- Assignment criteria: multihomed
  - Unique routing policy
  - E-mail addresses of peers

aut-num Object

- RIPE NCC creates **aut-num** object
  - **-mnt-by: LIR-MNT**
  - **-mnt-routes: End-User-MNT (or LIR)**
  - **-org: "of whoever uses the ASN"**
- When the peering is established, LIR should update routing policy
- AS Number assignment is only valid as long as the original criteria remain valid

32 Bit AS Numbers

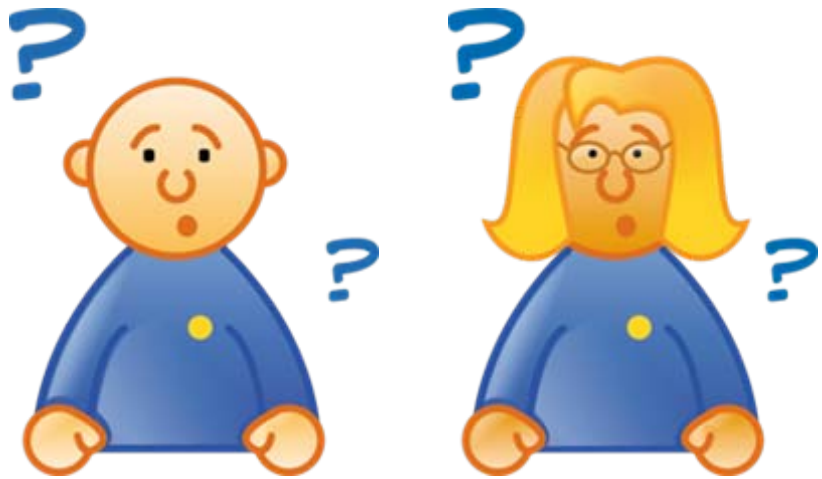
- Problem: AS numbers running out
  - Solution: 32 bit AS numbers

- 2007-2008: 16 bit AS default, 32 bit AS on request
- in 2009: 32 bit AS default, 16 bit AS on request
- as of 2010: Only 32 bit AS numbers

- Don’t wait until 2009!
  - Can you handle your new AS 1.5432 ?

Summary

- AS32
- Come to the Routing Registry course!



Questions?

Summary

- To get the resources you need, use LIR Portal
- To keep your LIR Portal up to date, use LIR Portal
- To register for RIPE NCC courses, use LIR Portal
- E-Learning
- 32 Bit AS Numbers
- New RIPE Policies

The End!

Край

Y Diwedd

Fí

Finis

النهاية

Соңы

վերջ

Liðugt

Ende

Кінець

Konec

Fund

Kraj

پایان

Son

Kpaj

Lõpp

Vége

An Críoch

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Endir

Fine

Sfârşit

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