

Welcome!

APNIC Members Training Course

*Effective IP Address Management
Asia Pacific Policies and Procedures*

24 February 2003, Taipei, Taiwan
APNIC 15 Open Policy Meeting



Introduction

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Assumptions & Objectives

Assumptions

- Are current or prospective APNIC member
- Have not submitted many requests
- Are not familiar / up-to-date with policies
- Are not familiar with procedures

Objectives

- Teach members how to request resources from APNIC
- Keep membership up-to-date with latest policies
- Liaise with members
 - ☺ Faces behind the e-mails



Schedule

- Introduction (5)
- Policies (15)
- Whois Db Intro (38)

TEA BREAK
(10:30 – 11:00)

- Addressing Plan (65)
- ISP Request form (81)
- ISP Request evaluation (110)

LUNCH (12:30 – 13:30)

- IP Management (123)
- 2nd Opinion Request (137)
- DB protection & updates (158)
- Reverse DNS (177)

TEA BREAK
(15:30 – 16:00)

- DB admin & adv queries (201)
- ASN (218)
- IPv6 (238)
- Summary (263)



Introduction to APNIC

Asia Pacific Network Information Centre



What is APNIC?

- RIR for the Asia Pacific
 - Regional Internet Registry
 - Regional authority for Internet Resource distribution
 - IPv4 & IPv6 addresses, ASNs, reverse dns delegation
- Industry self-regulatory body
 - Non-profit, neutral and independent
- Open membership-based structure

APNIC Services & Activities

Resources Services

- IPv4, IPv6, ASN, reverse DNS
- Policy development
 - Approved and implemented by membership
- APNIC whois db
 - whois.apnic.net
 - Registration of resources

Information dissemination

- APNIC meetings
- Web and ftp site
- Mailing lists
 - Open for anyone!
- Training Courses
 - Subsidised for members
- Co-ordination & liaison
 - With membership, other RIRs & other Internet Orgs.



Questions ?

- Want to learn more about APNIC and the APNIC meetings?
 - *Come to the newcomers' orientation this evening at 18.00!*



Internet Registry Allocation and Assignment

Policies

Overview of APNIC policies

- Definitions
- Background
- Objectives
- Environment
- Allocation & Assignment Policies
- Summary



Allocation and Assignment

Allocation

“A block of address space held by an IR (or downstream ISP) for subsequent allocation or assignment”

- Not yet used to address any networks

Assignment

“A block of address space used to address an operational network”

- May be provided to LIR customers, or used for an LIR’s infrastructure ('self-assignment')

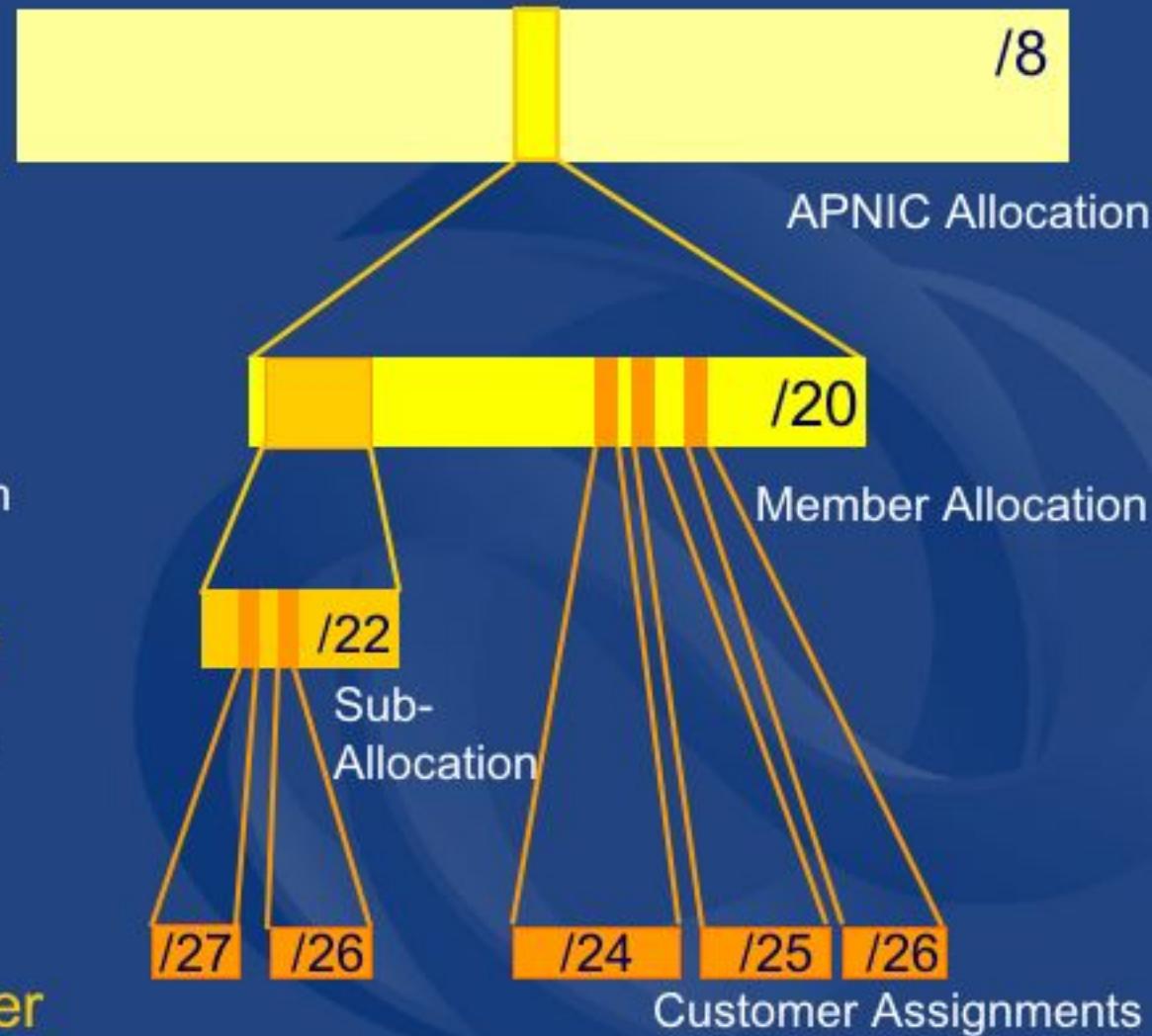
Allocation and Assignment

APNIC
Allocates
to APNIC Member

APNIC Member
Assigns Allocates
to end-user to downstream

Downstream
Assigns
to end-user

Customer / End User



Portable & non-portable

Portable Assignments

- Customer addresses independent from ISP
 - Keeps addresses when changing ISP
 - Bad for size of routing tables
 - Bad for QOS: routes may be filtered, flap-dampened
- (?)

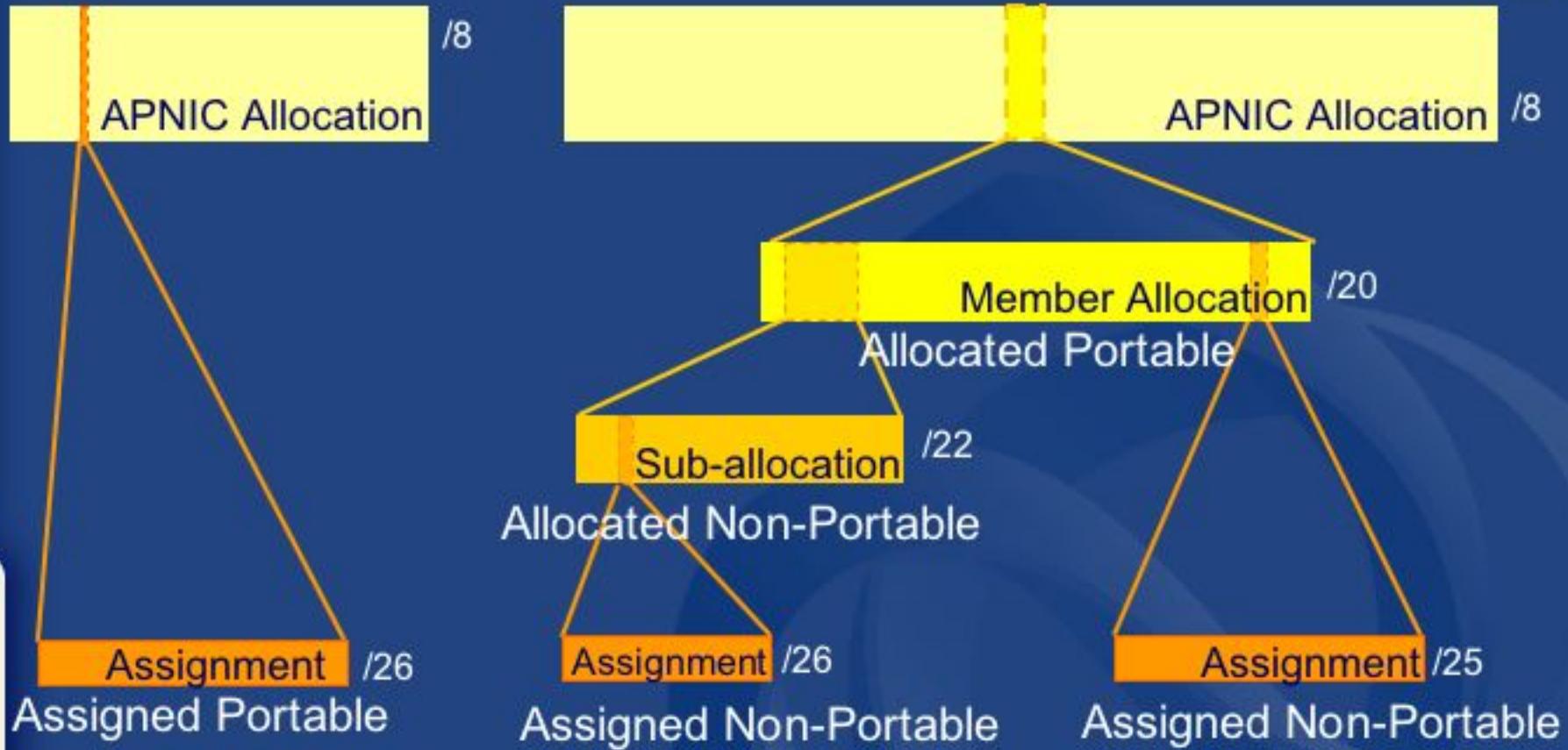


Non-portable Assignments

- Customer uses ISP's address space
 - Must renumber if changing ISP
 - Only way to effectively scale the Internet
- (smiley)



Allocation & assignment terms



- Terms used in 'status' field in the APNIC database
- Describes “portability” of the address space

Classful and Classless

- **Classful** (*Obsolete*)
 - Wasteful address architecture
 - network boundaries are fixed at 8, 16 or 24 bits (class A, B, and C)
- **Classless**
 - Efficient architecture
 - network boundaries may occur at any bit (e.g. /12, /16, /19, /24 etc)
- **CIDR**
 - Classless Inter Domain Routing architecture
 - Allows *aggregation* of routes within ISPs infrastructure

Best Current Practice



Aggregation and “portability”

Aggregation

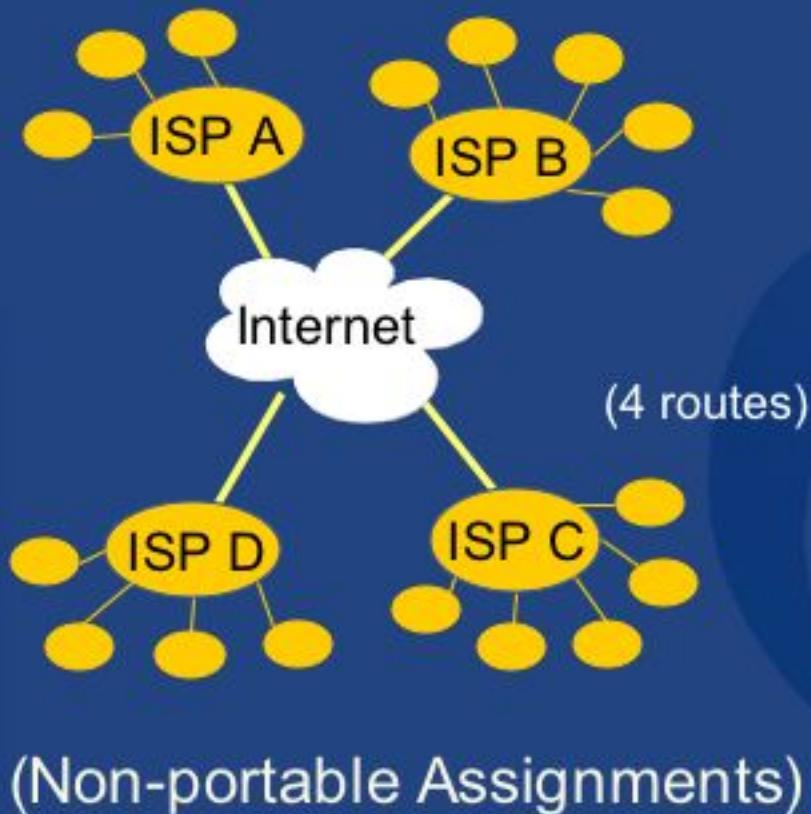


No Aggregation

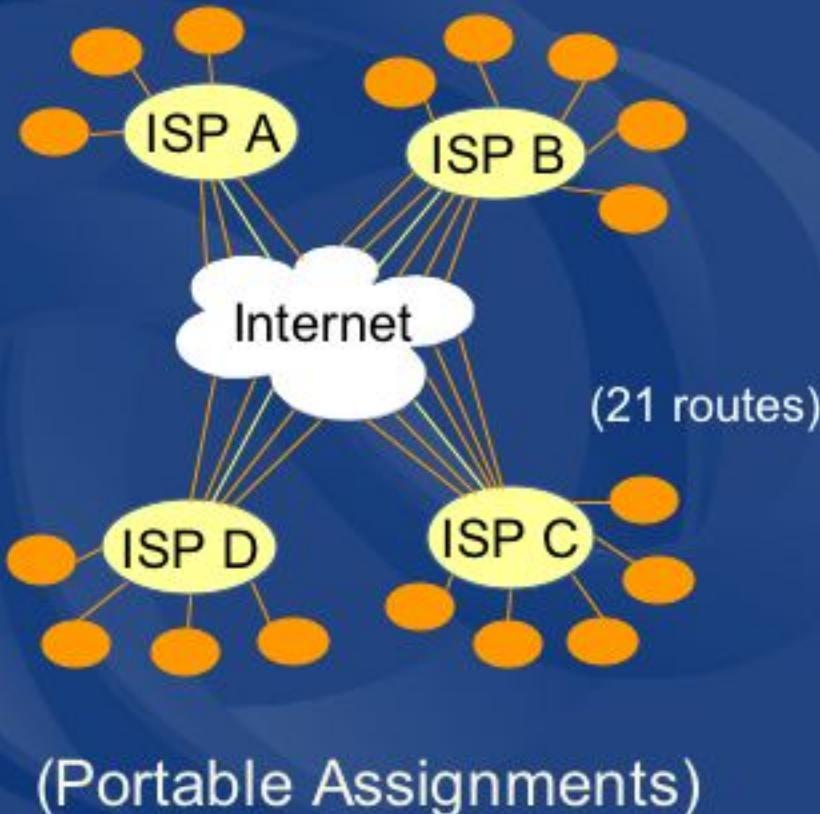


Aggregation and “portability”

Aggregation



No Aggregation



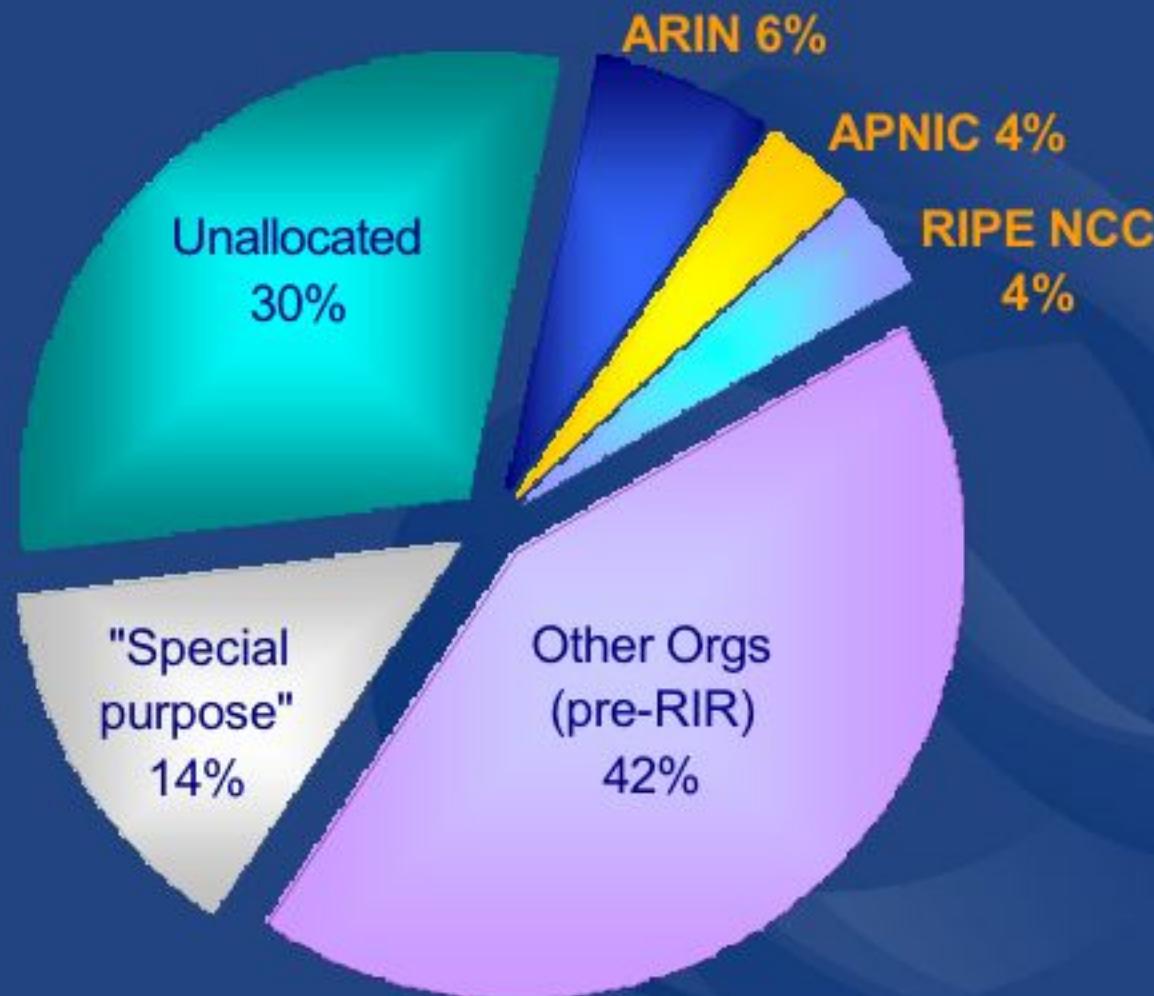
APNIC policies - objectives

- Conservation
 - *Ensuring efficient use and conservation of resources*
- Aggregation
 - *Limiting growth of routable prefixes*
- Registration
 - *Registering the Internet resources in a public db*
- Uniqueness
 - *Global visibility*
- Fairness and consistency
 - *Equal consideration irrespective of external factors*

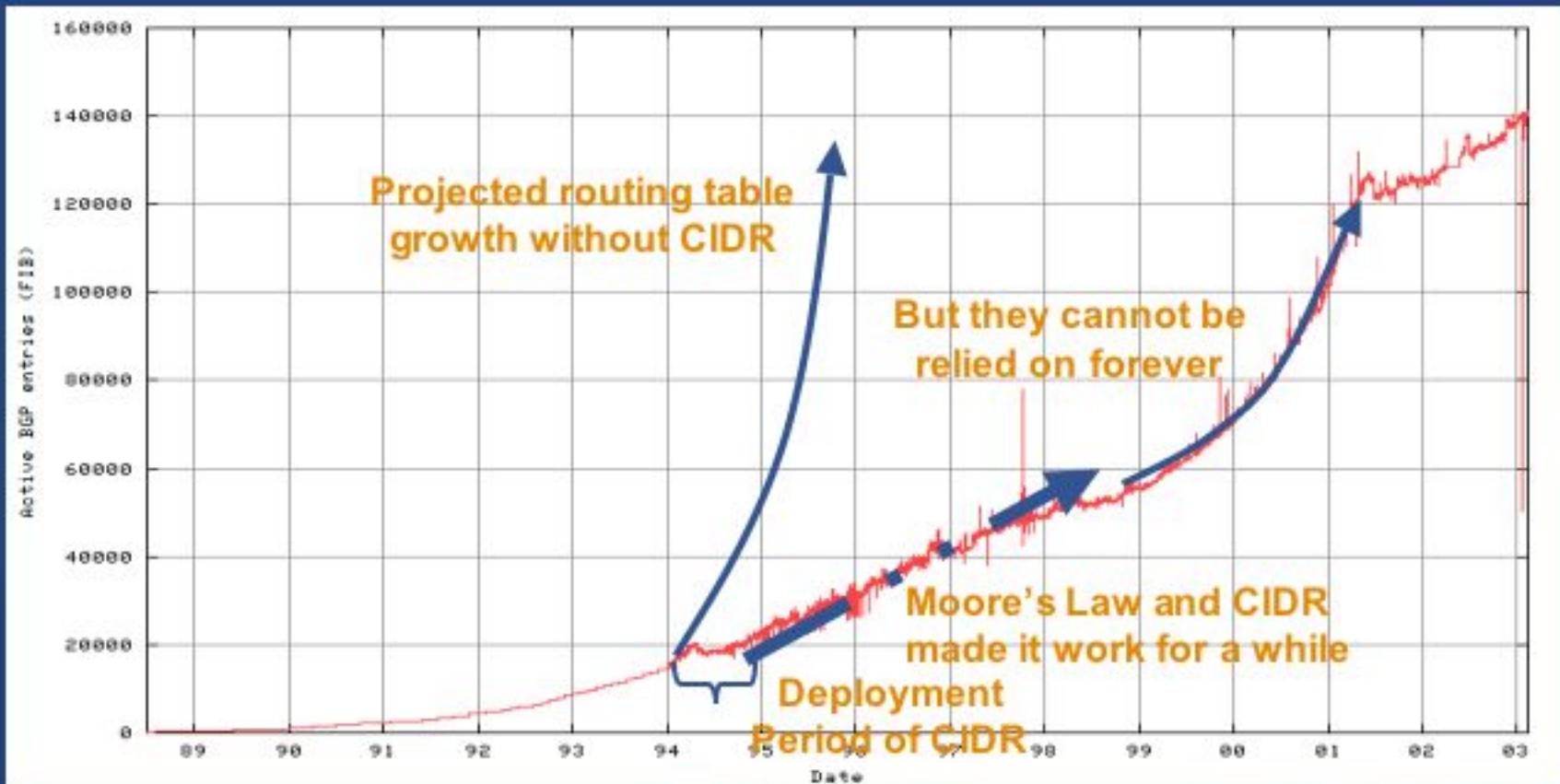
Why do we need policies ?

- Global IPv4 Delegations

Policies

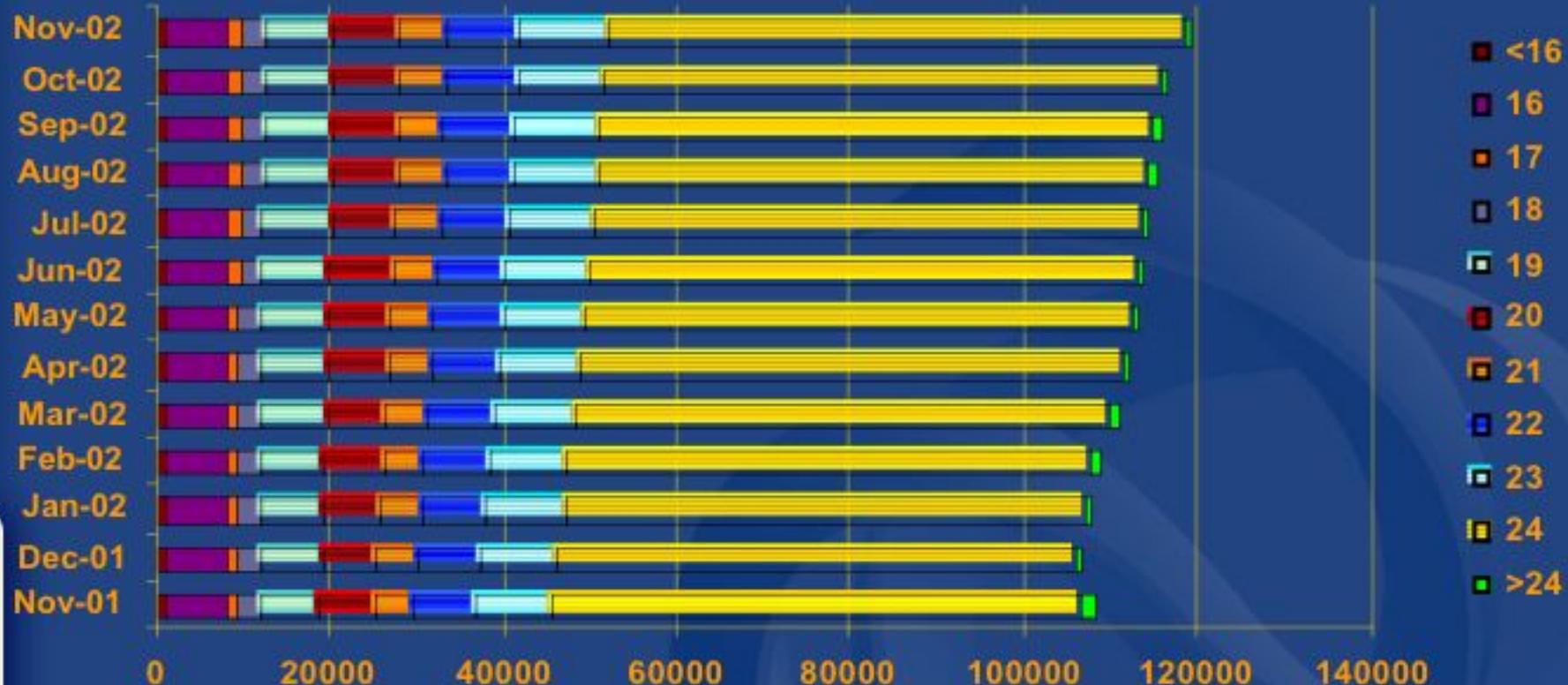


Growth of global routing table



<http://bgp.potaroo.net/as1221/bgp-active.html>

Routing table prefix distribution



APNIC policy environment

“IP addresses not freehold property”

- Assignments & allocations on license basis
 - Addresses *cannot* be bought or sold
 - Internet resources are public resources
 - ‘Ownership’ is contrary to management goals

“Confidentiality & security”

- APNIC to observe and protect trust relationship
 - Non-disclosure agreement signed by staff

APNIC allocation policies

- Aggregation of allocation
 - Provider responsible for aggregation
 - Customer assignments /sub-allocation must be non-portable
- Allocations based on demonstrated need
 - Detailed documentation required
 - All address space held to be declared
 - Address space to be obtained from one source
 - routing considerations may apply
 - Stockpiling not permitted

Initial IPv4 allocation criteria

1a. Have used a /22 from upstream provider

- Demonstrated efficient previous address usage
- OR

1b. Show immediate need for /22

- Can include customer projections & infrastructure equipment

2. Detailed plan for use of /21 within a year

3. Renumber to new space within 1 year

- Meet all policy requirements
 - Applicants may be required to show purchase receipts



APNIC allocation policies

- Transfer of address space
 - Not automatically recognised
 - Return unused address space to appropriate IR
- Effects of mergers, acquisitions & take-overs
 - Will require contact with IR (APNIC)
 - contact details may change
 - new agreement may be required
 - May require re-examination of allocations
 - requirement depends on new network structure

Address assignment policies

- Assignments based on requirements
 - Demonstrated through detailed documentation
 - Assignment should maximise utilisation
 - minimise wastage
- Classless assignments
 - showing use of VLSM
- Size of allocation
 - Sufficient for up to 12 months requirement



Small multihoming assignment policy

1a. Applicants currently multihomed

OR

1b. Demonstrate a plan to multihome within 1 month

2. Agree to renumber out of previously assigned space

- Demonstrate need to use 25% of requested space immediately and 50% within 1 year
- Meet all policy requirements or have the assignment revoked

IPv4 policy for IXPs

IXPs can apply for an assignment of /24 for Transit LAN

Criteria

- 3 or more peers
- Demonstrate “open peering policy”
- Not announce assignment to global routing table
 - APNIC has a reserved block of space from which to make IXP assignments

Portable assignments for critical infrastructure

- What is Critical Internet Infrastructure?

- Domain registry infrastructure

- Root DNS operators,
 - Generic Top Level Domain (gTLD) operators
 - Country Code Top Level Domain (ccTLD) operators

- Address Registry Infrastructure

- RIRs & NIRs
 - IANA

- Why a specific policy ?

- Protect stability of core Internet function

- Assignment sizes:

- IPv4: /24
 - IPv6: /32

New Policy
1 Dec 2002



Questions ?

The APNIC Database

Introduction and Usage

Overview

- What is the APNIC database?
- Why use it?
- Database query
- Database updating process

What is the APNIC database?

- Public network management database
 - Operated by IRs
- Tracks network resources
 - IP addresses, ASNs, Reverse Domains, Routing policies
- Records administrative information
 - Contact information (persons/roles)
 - Authorisation

Object types

<u>OBJECT</u>	<u>PURPOSE</u>
person	contact persons
role	contact groups/roles
inetnum	IPv4 addresses
inet6num	IPv6 addresses
aut-num	Autonomous System number
domain	reverse domains
route	prefixes being announced
mntner	(maintainer) data protection

<http://www.apnic.net/db/>

Object templates

To obtain template structure*, use :

whois -t <object type>

```
% whois -h whois.apnic.net -t person
```

person:	[mandatory]	[single]	[primary/look-up key]
address:	[mandatory]	[multiple]	[]
country:	[optional]	[single]	[]
phone:	[mandatory]	[multiple]	[]
fax-no:	[optional]	[multiple]	[]
e-mail:	[mandatory]	[multiple]	[look-up key]
nic-hdl:	[mandatory]	[single]	[primary/look-up key]
remarks:	[optional]	[multiple]	[]
notify:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]

*Recognised by the RIPE whois client/server

Person object example

- Person objects contain contact information

Attributes**Values**

person:	Ky Xander
address:	ExampleNet Service Provider
address:	2 Pandora St Boxville
address:	Wallis and Futuna Islands
country:	WF
phone:	+680-368-0844
fax-no:	+680-367-1797
e-mail:	kxander@example.com
nic-hdl:	KX17-AP
mnt-by:	MAINT-WF-EX
changed:	kxander@example.com 20020731
source:	APNIC

What is a nic-hdl?

- Unique identifier for a person
- Represents a person object
 - Referenced in objects for contact details
 - (inetnum, aut-num, domain...)
 - format: <XXXX-AP>
 - Eg: KX17-AP



person:	Ky Xander
address:	ExampleNet Service Provider
address:	2 Pandora St Boxville
address:	Wallis and Futuna Islands
country:	WF
phone:	+680-368-0844
fax-no:	+680-367-1797
e-mail:	kxander@example.com
nic-hdl: KX17-AP	
mnt-by:	MAINT-WF-EX
changed:	kxander@example.com 20020731
source:	APNIC



Inetnum object example

- Contain IP address allocations / assignments

Attributes	Values
inetnum:	202.51.64.0 - 202.51.95.255
netname:	CCNEP-NP-AP
descr:	Communication & Communicate Nepal Ltd
descr:	VSAT Service Provider, Kathmandu
country:	NP
admin-c:	AS75-AP
tech-c:	AS75-AP
mnt-by:	APNIC-HM
mnt-lower:	MAINT-NP-ARUN
changed:	hostmaster@apnic.net 20010205
source:	APNIC

Inter-related objects

mntner:
MAINT-WF-EX

...
...



inetnum:
202.64.10.0 – 202.64.10.255
...
admin-c: **KX17-AP**
tech-c: **ZU3-AP**
...
mnt-by: **MAINT-WF-EX**
...

IPv4 addresses

Data protection

person:
...
nic-hdl: **KX17-AP**
...

Contact info

person:
...
nic-hdl: **ZU3-AP**
...

Contact info

Admin-c and tech-c

- Responsibility – ‘admin’ contacts
 - Legal authority
 - Technical management
 - Network planning, backbone design
 - Deployment, capacity, and upgrade planning
- Expertise - ‘tech’ contacts
 - Routing, aggregation, BGP, etc
 - Addressing, subnetting, CIDR, etc

Database query - architecture

Server

whois.apnic.net

whois.ripe.net

whois.arin.net

WHOIS

Queries & responses

Client

Unix Client

'X' Client

Windows Client

HTTP/CGI

Command Prompt / Web Interface

Database query - clients

- Standard whois client
 - Included with many Unix distributions
 - RIPE extended whois client
 - <http://ftp.apnic.net/apnic/dbase/tools/ripe-dbase-client.tar.gz>
- Query via the APNIC website
 - <http://www.apnic.net/apnic-bin/whois2.pl>
- Query clients - MS-Windows etc
 - Many available



Why use the database?

- Register use of Internet Resources
 - IP assignments, reverse DNS, etc
 - Ascertain custodianship of a resource
 - Fulfill responsibilities as resource holder
- Obtain details of technical contacts for a network
 - Investigate security incidents
 - Track source of network abuse or “spam” email



Basic database queries

- Unix
 - whois –h whois.apnic.net <lookup key>
- Web interface
 - <http://www.apnic.net/apnic-bin/whois2.pl>
- Look-up keys
 - usually the object name
 - Check template for look-up keys



Database query – look-up keys

OBJECT TYPE

person
role
mntner
inetnum
domain
aut-num
as-macro
route
inet6num

ATTRIBUTES – LOOK-UP KEYS

name, nic-hdl, e-mail
name, nic-hdl, e-mail
maintainer name
network number, name
domain name
as number
as-macro name
route value
network number, name

whois supports queries on any of these objects/keys



Database query - UNIX

```
% whois zulrich@example.com
% whois zu3-ap
% whois "zane ulrich"
```

person:	Zane Ulrich
address:	ExampleNet Service Provider
address:	2 Pandora St Boxville
address:	Wallis and Futuna Islands
country:	WF
phone:	+680-368-0844
fax-no:	+680-367-1797
e-mail:	zulrich@example.com
nic-hdl:	ZU3-AP
mnt-by:	MAINT-WF-EX
changed:	zulrich@example.com 20020731
source:	APNIC

Database query - web

Whois Advanced Query - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History

Address: http://www.apnic.net/apnic-bin/whois2.pl

http://www.apnic.net/apnic-bin/whois2.pl

APNIC Asia Pacific Network Information Centre

Services | Membership | Information | Documents | Training | Contact | Search

1. Type in search key

Search for: OA3-AP

Search Whois

2. Search options (flags)

3. 'Search Whois'

Advanced Whois search options

Type of object: all types

Source database: all sources

Inverse lookup: none

Brief descriptions below

Fast raw output

No recursive lookup

No 'syntactic sugar'

APNIC objects only

Level of specificity:

Less specific

1st level more specific

All more specific

About the database Reset

Common whois options

Option	Brief description
-F	Gives a faster result, but with attributes in short form.
-i	Provides reverse/inverse lookups of objects associated with the specified attribute.
-L	Finds all less specific matches.
-m	Finds first level more specific matches.

Database query - inetnum

```
% whois 203.127.128.0 - 203.127.159.255
% whois 203.127.128.0/19
% whois SINGNET-SG
```

```
inetnum:      203.127.128.0 - 203.127.159.255
netname:      SINGNET-SG
descr:        Singapore Telecommunications Ltd
descr:        31, Exeter Road, #02-00, Podium Block
descr:        Comcentre, 0923
country:      SG
admin-c:      CWL3-AP
tech-c:       CWL3-AP
mnt-by:       APNIC-HM
changed:      hostmaster@apnic.net 19990803
source:       APNIC
```

Notes

- Incomplete addresses padded with ".0"
- Address without prefix interpreted as "/32"



Creating a person object

Whois Database Guide:

http://www.apnic.net/services/whois_guide.html

1. Fill out person object form on web

- Name, e-mail, phone, address etc
- Tick 'MNT-NEW' for temporary protection

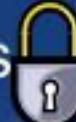


2. Completed template is sent to you

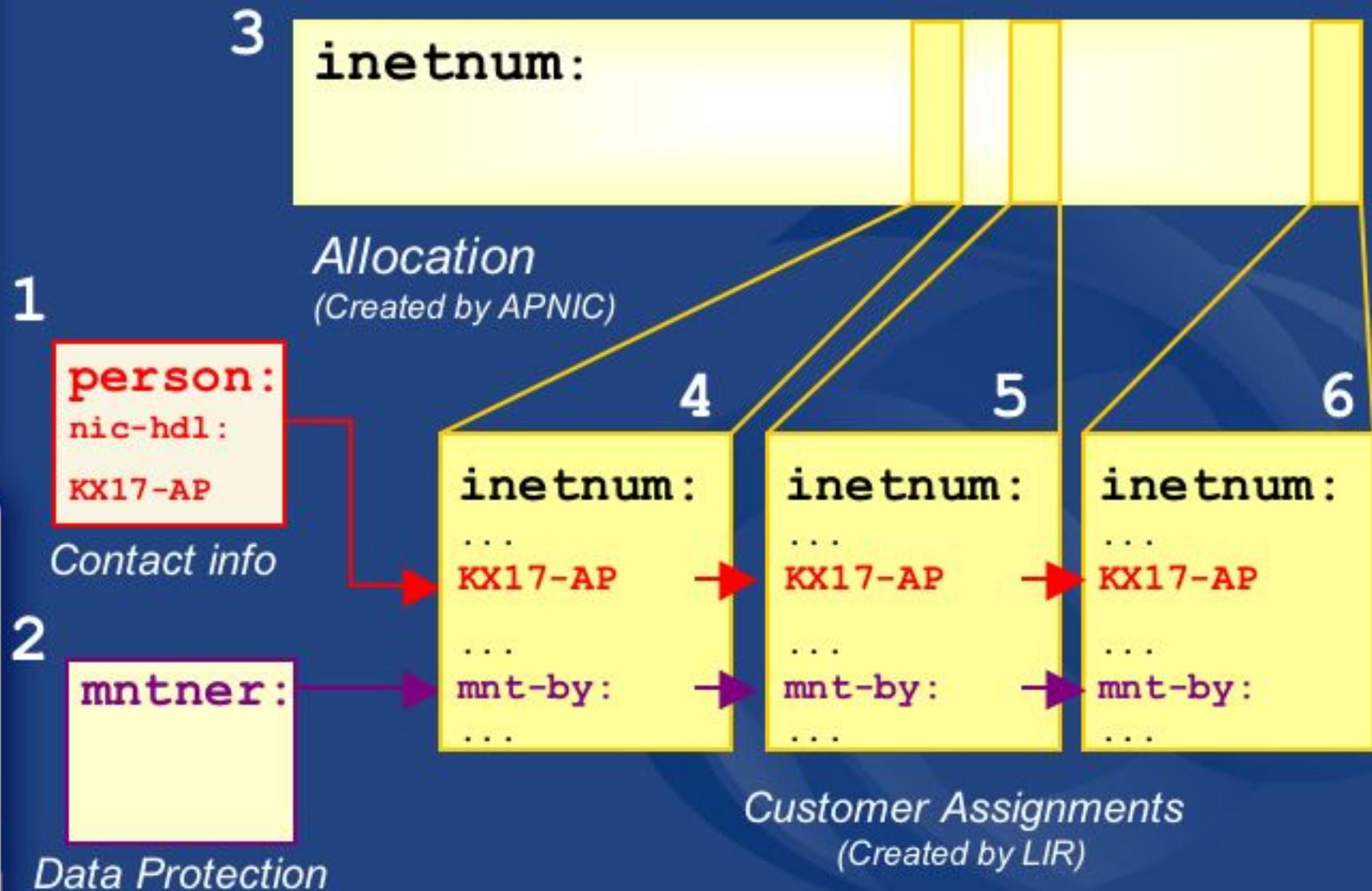
3. Forward template to <auto-dbm@apnic.net>

4. Person object created and nic-hdl is generated

LIR registration – reminder!

1. Create person objects for contacts
 - To provide contact info in other objects
2. Create mntner object
 - To provide protection of objects
– (To be discussed later)
3. *Create inetnum objects for all customer address assignments and sub-allocations*
 - (Allocation object created by APNIC)

Using the db – step by step



Database auto-responses

- Successful update
 - Objects accepted
- Warnings
 - Objects accepted but ambiguous
 - Objects corrected and accepted
- Errors
 - Objects NOT accepted

Don't understand the error message?

- Contact the APNIC helpdesk!
 - Include the error message



Database mailboxes

- Automatic request processing



<auto-dbm@apnic.net>

- Automatic “robot” for all db updates
- Email template for create/update/delete

- Database service support



<helpdesk@apnic.net>

- E-mails answered by APNIC staff
- 1 day response time

Summary

- Use the APNIC whois database
 - To register information
 - To search information
- Create a person object
- Register all your assignments!
 - Fulfill your responsibility as a resource holder

<auto-dbm@apnic.net>

- for all updates!

Questions ?

- Want to learn more about advanced queries?
 - *Come to the IRR tutorial tomorrow!*



Internet Registry Procedures

Addressing Plan



Addressing plan

- To complete documentation
 - First need a technical PLAN
 - Documenting the architecture of the present and eventual goal
 - IP addressing is fundamental part of network design
 - IP addressing ‘planning’ example to follow..

Some icons



Router
(layer 3, IP datagram forwarding)



Network Access Server
(layer 3, IP datagram forwarding)



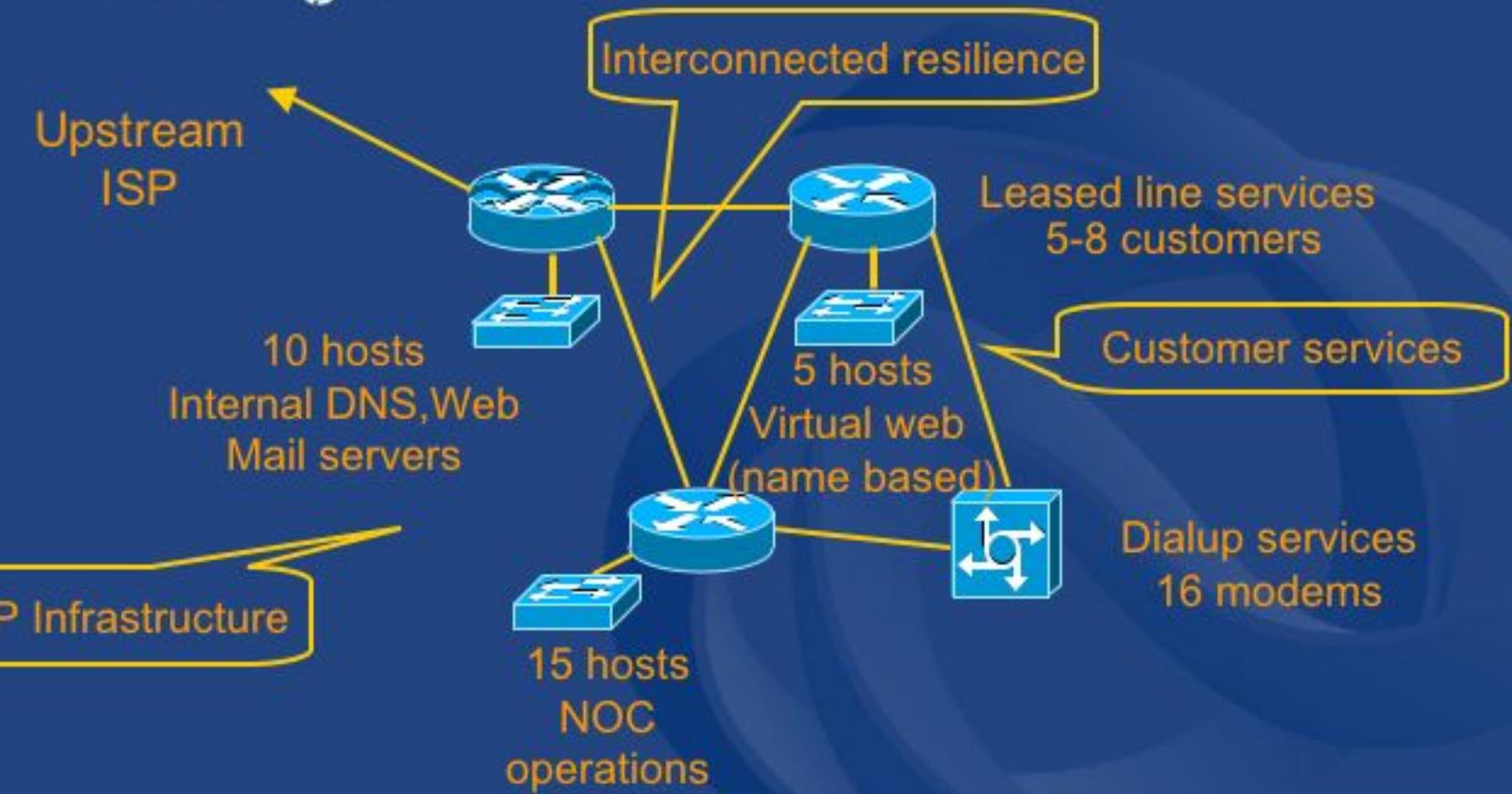
Ethernet switch
(layer 2, packet forwarding)

Addressing plan

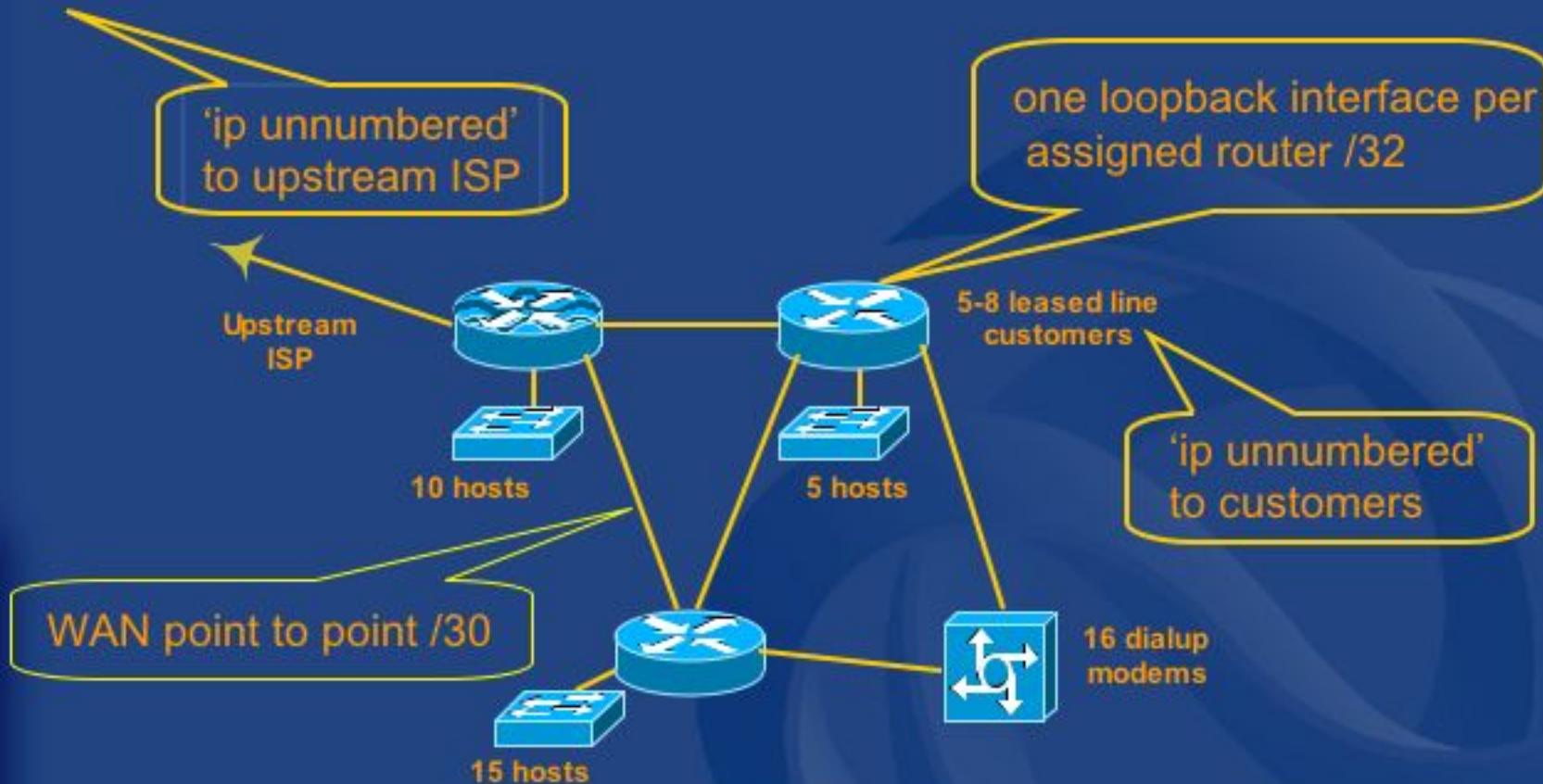
- Identify components of network
 - Customer services
 - ISP internal infrastructure
- Identify phases of deployment
 - Starting off, 6 months, 12 months
- Identify equipment and topology changes
 - Need for redundancy
 - Need for increased scale

Network plan

- Starting off



Network plan



Addressing plan

Addressing
Plan

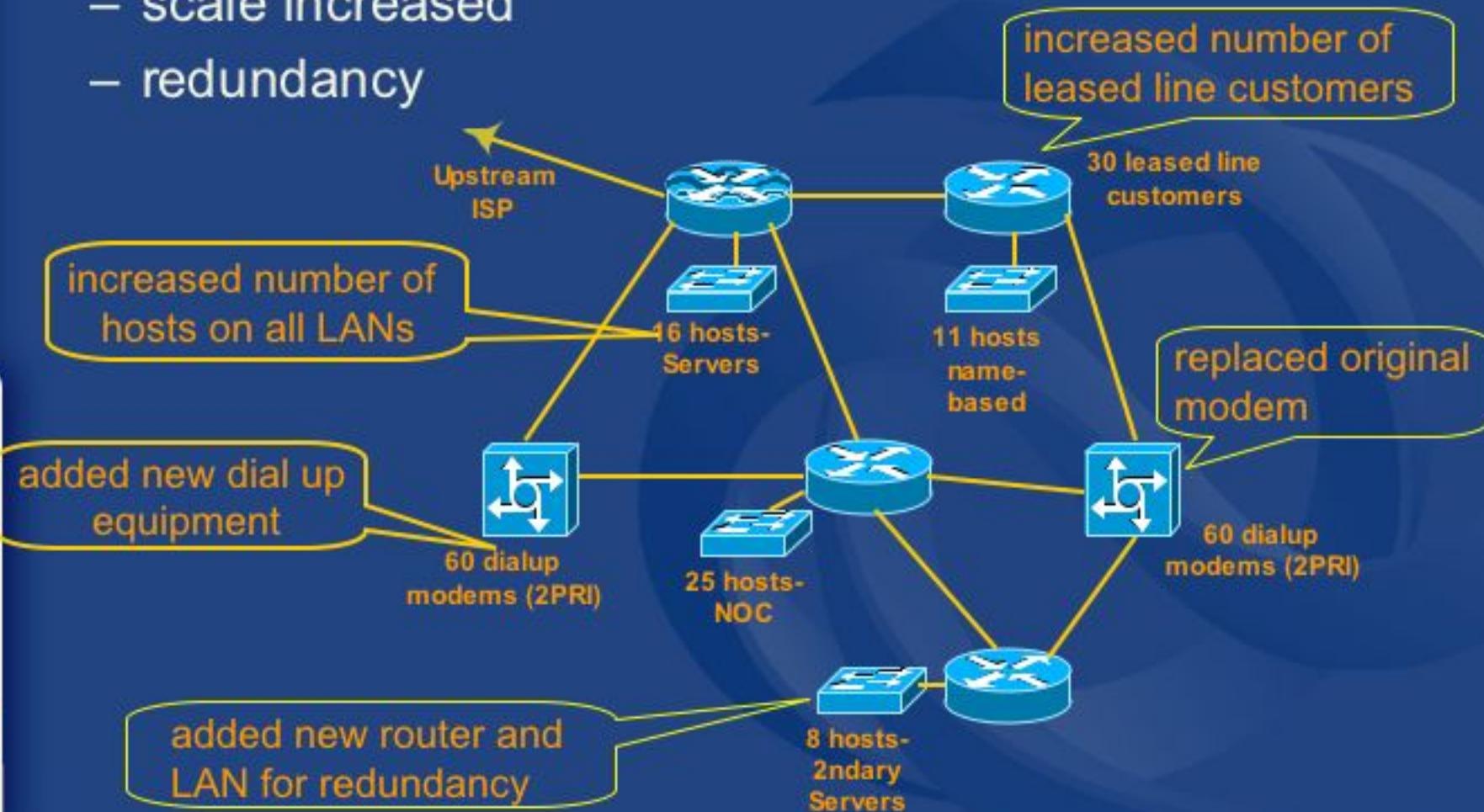
- Initial addressing plan
 - numbers of host addresses (interfaces)



network-plan:	16	analogue dialup modems, vendor 'x'
network-plan:	5	LAN -web hosting (Name-based hosting)
network-plan:	128	5-8 leased line customers (/28)
network-plan:	15	LAN -NOC and Ops management
network-plan:	10	LAN -mail,DNS, web servers internal
network-plan:	4	loopback router interfaces
network-plan:	2	router WAN ports (x 5 lines)

Network plan – 6 months

- 6 months later
 - scale increased
 - redundancy



Addressing Plan – 6 months

- Network plan at 6 months
 - increases in hosts (interfaces)

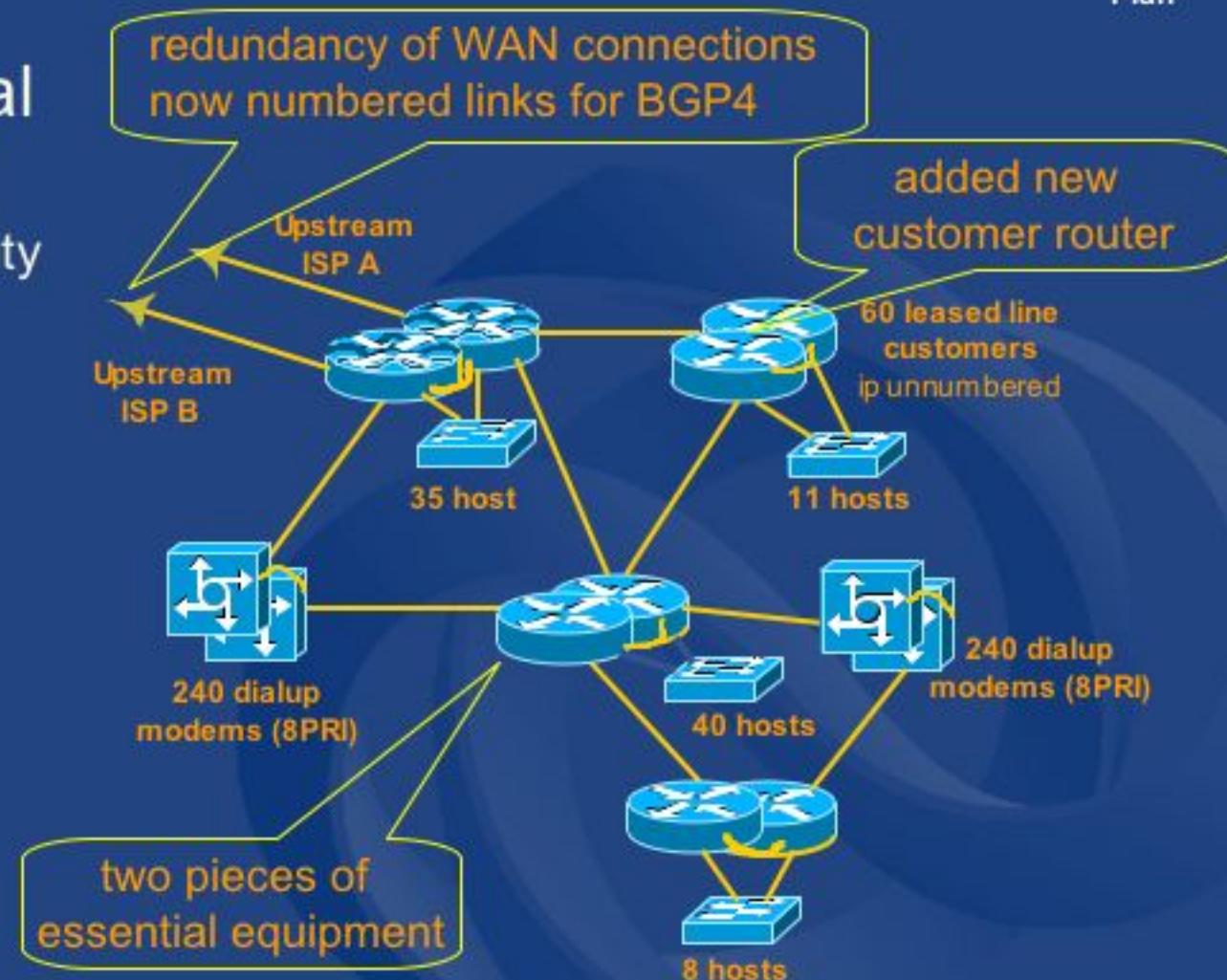
network-plan:	16/ 60	2 PRI dialup modems, vendor 'y'
network-plan:	5/ 11	LAN -web hosting (Name-based hosting)
network-plan:	128/ 512	30 leased line customers (pool)
network-plan:	15/ 25	LAN -NOC and Ops management
network-plan:	10/ 16	LAN -mail,DNS, web servers internal
network-plan:	4/ 6	loopback router interfaces
network-plan:	2/ 2	router WAN ports (x 8 lines)
network-plan:	0/ 60	2 PRI dialup modems
network-plan:	0/ 8	LAN-secondary servers

Changed description

New hardware

Network Plan – 12 months

- 12 months total
 - site redundancy
 - greater complexity
 - *efficiency*



Addressing Plan – 12 months

- Network plan at 12 months

- increases in hosts (interfaces)
- one year total



network-plan:	16/60/	240	8 PRI dialup modems, vendor x
network-plan:	0/60/	240	8 PRI dialup modems, vendor y
network-plan:	5/11/	11	LAN -web hosting (Name-based hosting)
network-plan:	128/512/	1020	60 leased line customers (pool)
network-plan:	15/25/	40	LAN -NOC and Ops management
network-plan:	10/16/	35	LAN -mail,DNS, web servers internal
network-plan:	0/8/	8	LAN-secondary servers
network-plan:	2/2/	2	router WAN ports (x 8 lines)
network-plan:	4/6	12	loopback router interfaces



Addressing Plan

- Can now determine subnet sizes

network-plan:	256	16/60/ 240	8 PRI dialup modems, vendor x
network-plan:	256	0/60/ 240	8 PRI dialup modems, vendor y
network-plan:	16	5/11/ 11	LAN -web hosting (Name-based hosting)
network-plan:	1024	128/512/ 1020	60 leased line customers (pool)
network-plan:	64	15/25/ 40	LAN -NOC and Ops management
network-plan:	64	10/16/ 35	LAN -mail,DNS, web servers internal
network-plan:	8	0/8/ 8	LAN-secondary servers
network-plan:	4	2/2/ 2	router WAN ports (x 8 lines)
network-plan:	16	4/6/ 12	loopback router interfaces

Addressing Plan

Addressing
Plan

- Addressing plan for network-plan
 - re-ordered **large to small** according to relative subnet size
 - determination of relative subnet addresses

network-plan:	0.0.0.0	1024	128/512/1020	60 leased line customers (pool)
network-plan:	0.0.4.0	256	16/60/240	8 PRI dial up modems, vendor x
network-plan:	0.0.5.0	256	0/60/240	8 PRI dial up modems, vendor y
network-plan:	0.0.6.0	64	10/16/35	LAN -mail,DNS, web internal
network-plan:	0.0.6.64	64	15/25/40	LAN -NOC and Ops management
network-plan:	0.0.6.128	16	5/11/11	LAN -web hosting (Name-based hosting)
network-plan:	0.0.6.144	16	0/8/8	LAN -secondary servers
network-plan:	0.0.6.160	16	4/6/12	loopback router interfaces
network-plan:	0.0.6.176	4	2/2/2	router WAN ports (x8)

– cumulative total 0.0.6.208

Addressing Plan

Addressing
Plan

- Addressing plan for network-plan
 - connect to the Internet (full-time, part-time)?



network-plan:	0.0.0.0	255.255.252.0	YES	1024	128/512/1020	60 leased customers
network-plan:	0.0.4.0	255.255.255.0	PART	256	16/60/240	8 PRI dial up modems..
network-plan:	0.0.5.0	255.255.255.0	PART	256	0/60/240	8 PRI dial up modems..
network-plan:	0.0.6.0	255.255.255.192	YES	64	10/16/35	LAN -mail,DNS, web internal
network-plan:	0.0.6.64	255.255.255.192	YES	64	15/25/40	LAN -NOC & Ops mgmt
network-plan:	0.0.6.128	255.255.255.240	YES	16	5/11/11	LAN -web hosting (Name-based)
network-plan:	0.0.6.144	255.255.255.240	YES	16	0/8/8	LAN -secondary servers
network-plan:	0.0.6.160	255.255.255.240	YES	16	4/6/12	loopback router interfaces
network-plan:	0.0.6.176	255.255.255.252	YES	4	2/2/2	router WAN ports (x 8)

Addressing Plan

- Addressing plan complete
 - total planned for customer assignments /22
 - total planned for ISP infrastructure /24 + /23

network-plan:	0.0.0.0	255.255.252.0	YES	1024	128/512/1020	60 leased line customers
network-plan:	0.0.4.0	255.255.255.0	PART	256	16/60/240	8 PRI dial up modems..
network-plan:	0.0.5.0	255.255.255.0	PART	256	0/60/240	8 PRI dial up modems..
network-plan:	0.0.6.0	255.255.255.192	YES	64	10/16/35	LAN -mail,DNS, web internal
network-plan:	0.0.6.64	255.255.255.192	YES	64	15/25/40	LAN -NOC & Ops mgmnt
network-plan:	0.0.6.128	255.255.255.240	YES	16	5/11/11	LAN -web hosting (Name-based)
network-plan:	0.0.6.144	255.255.255.240	YES	16	0/8/8	LAN -secondary servers
network-plan:	0.0.6.160	255.255.255.240	YES	16	4/6/12	loopback router interfaces
network-plan:	0.0.6.176	255.255.255.252	YES	4	2/2/2	router WAN ports (x 8 lines)

- detailed, efficient and accurate



Questions ?

Internet Registry Procedures

ISP Request

ISP address request

- Hostmaster Administrivia
 - <hostmaster@apnic.net> mailbox filtered
 - Requires member account name
 - Subject: IP Address Request [CONNECT-AU]
- Ticketing system
 - Every request is assigned a ticket
 - Please keep # in subject line of email eg.
 - [APNIC #14122] [CHINANET-CN]
- New staff at ISP
 - Require an ‘introduction’ to APNIC
 - To ensure confidentiality

members
only

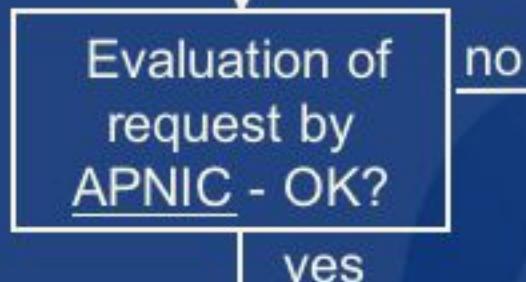
ISP address request

Life Cycle

Step 1



Step 2



Step 3



ISP address request

- overview

- Contact Details
- Network Information
- Existing Customer Network Information
- Existing Infrastructure Network Information
- Future Network Plan
- Additional Information

ISP address request

ISP
Req

APNIC - ISP Address Request - 1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address: http://www.apnic.net/apnic-bin/isp-request-form.pl

http://www.apnic.net/services/ipv4/

APNIC

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APNIC – ISP Address Request

Applicant information

APNIC will use these contact details for all correspondence relating to this request. Please enter the APNIC account name of the organisation that requires the address space.

Your name: Name

You must be registered with APNIC as a contact person for this organisation.

Your email address: E-mail address

APNIC account name:
Example: SPARKYNET-ID APNIC Account name

Create password for this request
(8 characters): Password

Confirm password:

Cancel Next

[Help] [Error messages] [Text Only Version]

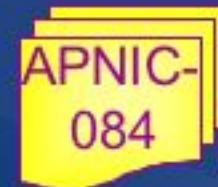
1. applicant 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. plan 9. comments 10. c

Done

Must be current member to receive service

ISP address request instructions

- Complete the documentation
 - ISP Address Request Form
 - Web Form:
 - <http://www.apnic.net/services/ipv4/>
 - Plain text
 - <http://ftp.apnic.net/apnic/docs/isp-address-request>
- The more detailed and precise
 - Fewer iterations with APNIC
 - Quicker resolution time
- *Read the quick tips!*
<http://www.apnic.net/faq/isp-request-tips.html>



Contact details

APNIC - ISP Address Request - 2 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print E-mail Discuss

Address http://www.apnic.net/apnic-bin/isp-request-form.pl

APNIC – ISP Address Request

Contact details

The details you enter here will be used as the network contact and security information for the address allocation.

Administrative contacts (NIC handles):
Example: KX9-AP

JB46-AP

Admin contact

Technical contacts (NIC handles):
Example: XA7-AP

JB46-AP

Tech contact

Maintainer object:
Example: MAINT-SPARK-AP

MAINT-AU-JEFFBRIGHT

help file!

Save Cancel Previous Next

[Help] [Error messages] [Text Only Version]

1. applicant 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. plan 9. comments 10. confirm

Done Internet

Administrative & Technical contacts, Maintainer

Network name

ISP
Req

APNIC - ISP Address Request - 3 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss

Address: http://www.apnic.net/apnic-bin/isp-request-form.pl

APNIC Asia Pacific Network Information Centre

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APNIC – ISP Address Request

Network name

The details you provide here will be used to identify the proposed network in the APNIC Whois database.

Name of network: TESTNET

Description of organisation: (Example: SparkyNet, Sdn Bhd, Internet Services Provider, Penang, Malaysia)

Country: AU AUSTRALIA

Name of network

Description of Organisation

Country

Save Cancel Previous Next

[Help] [Error messages] [Text Only Version]

1. applicant 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. cable 9. future 10. comments 11. confirm

Internet

Description of organisation not entered...

Error description

ISP
Req

APNIC - ISP Address Request - Error - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address http://www.apnic.net/apnic-bin/isp-request-form.pl

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APNIC – ISP Address Request

Error #Description

* Description has not been entered

For more help, see the [Troubleshooting Guide](#).

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Troubleshooting guide

Error: "Description has not been entered"

Troubleshooting guide

ISP
Req

APNIC - 065 ISP IP Address Request Form : Troubleshooting guide - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search

Address: <http://www.apnic.net/info/faq/troubleshooting.html>

http://www.apnic.net/info/faq/troubleshooting.html

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You're here: Home → Info & FAQ → APNIC FAQs

Quick Links

Troubleshooting guide for the APNIC IPv4 ISP Request Form

Error Message	How to fix the error
Overlaps found within whois cust-networks	Overlaps were found within entries in the APNIC Whois Database inetnum objects that you registered. You need to fix either the whois entry or the cust-network line.
Error parsing address and netmask	The IP address or subnet mask you have provided is not in the correct format. You need to fix the incorrect IP address field or the incorrect subnet mask field. [more]
Overlaps found within cust-networks	Overlaps were found within the two cust-networks mentioned in the error message. You need to fix the incorrect line.
Overlaps found within infrastructure	Overlaps found within the two infrastructure lines mentioned in the error message. You need to fix the incorrect line.
Overlaps found within cust-network and infrastructure	Overlaps found between a cust-network line and an infrastructure line provided. You need to fix the incorrect line.
Could not find inetnum object in whois database	Cust-network line provided has not been updated into the APNIC Database. You need to update the database entry for that customer assignment.
More than one inetnum object found in whois database	Overlaps found within whois entries within the database. You need to fix the database entries.
Problem retrieving inetnum object in whois database	System error accessing the APNIC Whois Database. Please try again later or contact APNIC staff if you experience this error message.
Netname mismatches against	Cust-network netname provided is not the same as the netname registered in the

Description of organisation

APNIC - ISP Address Request - 3 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss

Address http://www.apnic.net/apnic-bin/ip-request-form.pl

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APNIC – ISP Address Request

Network name

The details you provide here will be used to identify the proposed network in the APNIC Whois database.

Name of network:
Example: SPARKYNET

Description of organisation:
Example: SparkyNet, Sdn Bhd, Internet Service Provider, Penang, Malaysia

Country: AU

Description of Organisation 

Save Cancel Previous Next

[Help] [Error messages] [Text Only Version]

1. applicant 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. plan 9. comments 10. confirm

http://www.apnic.net/templates/include/forms/ipc_guide.htm?descr_1_help

Internet

Name of network, Description of Org., Country

Internet connectivity

ISP
Req

APNIC - ISP Address Request - 4 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Discuss

Address http://www.apnic.net/apnic-bin/isp-request-form.pl Go Links

APNIC Asia Pacific Network Information Centre Services | Membership | Information | Documents | Training | Contact | Search

APNIC – ISP Address Request

Internet connectivity

The information you provide here describes certain aspects of how the network connects to the Internet.

Internet connectivity type:

- Peering-point
- Service-provider
- Other

Connection providers:

Connect-Provider-1
Connect-Provider-2

Save Cancel Previous Next

[Help] [Error messages] [Text Only Version]

1. applicant 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. plan 9. comments 10. confirm

Internet

Topological information

Connection providers

Internet connectivity type, Connection providers

Network configuration

ISP
Req

The screenshot shows a Microsoft Internet Explorer window displaying the APNIC - ISP Address Request form. The page title is "APNIC – ISP Address Request" and the sub-section is "Planned network configuration". A red speech bubble on the right contains the text "Expectation is 'classless'". A red circle highlights the "Subnets", "All 0s subnet", and "All 1s subnet" checkboxes under the heading "Indicate the following configurations to be supported by this network:". At the bottom of the form are buttons for "Save", "Cancel", "Previous", and "Next". Below the form are links for "Help", "Error messages", and "Text Only Version". A navigation bar at the bottom includes steps 1 through 10: 1. applicant, 2. contact, 3. network, 4. connect, 5. config, 6. customer, 7. infra, 8. plan, 9. comments, 10. confirm.

Expectation
is
'classless'

Indicate the following configurations to be supported by this network:

- Supernets
- Subnets
- All 0s subnet
- All 1s subnet

Save Cancel Previous Next

[Help] [Error messages] [Text Only Version]

1. applicant 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. plan 9. comments 10. confirm

Supernets, Subnets, All 0s subnet, All 1s subnet...

Existing customer network

APNIC - ISP Address Request - 6 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://www.apnic.net/apnic-bin/isp-request-form.pl>

Existing customer network

If this organisation has existing customer networks, then you must use the fields below to provide a description of all assignments made to those networks.

If this organisation has not received an IP allocation previously and has not made assignments to customers, then you should skip this section.

Name	<input type="text" value="CUST-NET1"/>	How to complete this page
Address	<input type="text" value="203.108.131.8"/>	There are two options for completing this section:
Mask	<input type="text" value="255.255.255.248"/>	<ol style="list-style-type: none"> 1. Use the form to build up your information, line by line <ul style="list-style-type: none"> Use the fields on the left of the form to specify the required elements for each line. When you have completed the fields, click "Add Information" to transfer that line to the text box in the correct format. Repeat this process for each line required.
Hosts now	<input type="text" value="4"/>	<ol style="list-style-type: none"> 2. Upload a text file <ul style="list-style-type: none"> If you have a text file on a local drive, which describes this information in the correct format, you may click "Upload Text File". Follow the prompts to locate the file and attach it to this request form; Only text files may be uploaded in this section.
Hosts in 6 months	<input type="text" value="4"/>	
Hosts in 1 year	<input type="text" value="6"/>	
Subnets now	<input type="text" value="1"/>	
Subnets in 6 months	<input type="text" value="1"/>	
Subnets in 1 year	<input type="text" value="1"/>	
Date assigned	<input type="text" value="20030101"/>	

Add information

Upload Text File

CUST-NET1 203.108.131.8 255.255.255.248 4/6/6 1/1/1 20030101

Instructions**Add information****Upload text file**

ISP address request evaluation

- ‘Customer network’ fields

Registration

- Check all customer assignments are in the APNIC ‘whois’ database accurately

Policy

- Prefix distribution of all customer assignments
- ‘Classless’ assignments NOT on /24 boundaries

Existing network infrastructure

APNIC - ISP Address Request - 7 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss

Address: http://www.apnic.net/apnic-bin/isp-request-form.pl Go Links

Existing network infrastructure information

This section is used to describe the address assignments you are currently using for your network infrastructure, that is, the addresses that you did not assign to customers and which do not appear in the APNIC Whois database and the CUST-NETWORK field.

Address	211.12.29.160	How to complete this page
Mask	255.255.255.240	There are two options for using this page to provide details of your network infrastructure:
Connect	<input type="radio"/> None <input checked="" type="radio"/> Perm <input type="radio"/> Transient	<ol style="list-style-type: none"> Use the form to build your assignment details <ul style="list-style-type: none"> Use the fields on the left of the form to specify the required elements for each assignment to your network infrastructure. When you have completed the fields, click "Add Information" to transfer that assignment information to the text box in the correct format. Repeat this process for each assignment to your network infrastructure. Upload a text file <ul style="list-style-type: none"> If you have a text file on a local drive describing your network infrastructure assignments in the correct format, you may click "Upload Text File". Follow the prompts to locate the file and attach it to this request form.
Max	14	
Hosts now	10	
Hosts in 6m	10	
Hosts in 1 yr	14	
Detailed descr of subnet	LAN Web Hosting	

Add Information

BROWSE... Add information

Upload Text File Upload text file

211.12.29.0 255.255.255.192 YES 62 30/62/62 PRI Dialup Modems
211.12.29.64 255.255.255.192 YES 62 30/50/62 NOC & Ops mgmt PCs
211.12.29.128 255.255.255.224 YES 30 20/25/25 R & D LAN

Address, Mask, Connect, Max, Hosts now, 6m, 1yr, description

New cable/DSL services

ISP
Req

APNIC - ISP Address Request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address: <http://www.apnic.net/apnic-bin/isp-request-form.pl> Go Links

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APNIC – ISP Address Request

Allocations for cable/DSL service providers

Use this section to indicate whether you are establishing a new cable or DSL service.

Is the address space you are requesting now required for establishing a new cable or DSL service?

Yes 

No

new cable or DSL service?

Save Cancel Previous Next

1. applicant 1.1 initial criteria 2. contact 3. network 4. connect 5. config 6. customer 7. infra 8. 9. 10. 11. cable future comments confirm

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Done Internet

New cable/DSL services

APNIC - ISP Address Request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address: <http://www.apnic.net/apnic-bin/isp-request-form.pl> Go Links

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APNIC – ISP Address Request

New Cable/DSL service – Bootstrap criteria

This section allows you to take advantage of the simplified bootstrap evaluation criteria for new cable or DSL services.

Apply the “new cable/DSL bootstrap criteria”?

Do you want to APNIC to apply the “new cable/DSL bootstrap criteria” when evaluating your request?

Yes
- If Yes, please complete the rest of this page.

No
- If No, please skip the rest of this page and proceed to the next page.

Details of CMTS equipment

Please provide the following details of the CMTS equipment to be used for this service.

Location :
Make :
Model :
Quantity :

Instructions

How to complete this page

There are two options for using this page to provide details of your cable/DSL equipment:

1. Use the form to build your CMTS details
 - Use the fields on the left of the form to specify the required elements for each location in your planned new cable or DSL network.
 - When you have completed the fields, click “Add Information” to transfer that equipment list to the text box in the correct format.
 - Repeat this process for each location in your planned new cable or DSL network.

Done Internet

Use the form to build your CMTS details...

Future network plan

ISP

Req

APNIC - ISP Address Request - 8 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Discus

Address: <http://www.apnic.net/apnic-bin/isp-request-form.pl> Go Links

Future network plan

This section is used to describe the plans for using the requested address space in the network infrastructure over the next year. Planned assignments to customers are not to be described in this section.

Address:	0.0.1.128	How to complete this page
Mask:	255.255.255.240	There are two options for using this page to provide future network plan:
Connect:	<input type="radio"/> NO (No connection to the Internet) <input checked="" type="radio"/> YES (Permanent connection to the Internet) <input type="radio"/> PART (Transient connection to the Internet)	<ol style="list-style-type: none">Use the form to build your assignment:<ul style="list-style-type: none">Use the fields on the left of the form to enter required elements for each planned assignment to your network infrastructure.When you have completed the fields, click "Add Information" to transfer that assignment information to the text box in the correct format.Repeat this process for each planned assignment to your network infrastructure.Upload a text file:<ul style="list-style-type: none">If you have a text file on a local drive describing your planned network infrastructure assignments in the correct format, you may click "Upload Text File".Follow the prompts to locate the file and attach it to this request form.
Max:	14	
Hosts now:	4	
Hosts in 6 months:	6	
Hosts in 1 year:	12	
Detailed description of subnet:	Loopback Interface	

Add Information Browse... Upload Text File

0.0.0.0 255.255.255.0 YES 254 40/120/240 8 PRI Dialup Modems
0.0.1.0 255.255.255.192 YES 62 20/35/60 Ops Mgmt Servers LAN
0.0.1.64 255.255.255.192 YES 62 20/40/60 Mail, DNS, Web servers

Done

Infra-
structure &
Projections

IP require-
ment
(max, now,
in 6 months
in 1 year)



Address, Mask, Connect, IP requirement, description

ISP request evaluation

- ‘Infrastructure’ & ‘network-plan’ fields
 - Policy
 - Technical descriptions are detailed enough so APNIC can understand why subnet size was chosen
 - Do customer projections match infrastructure plans?
 - Efficient subnet assignments
 - ‘Best current practice’
 - Name based virtual web hosting
 - Dynamic dial up
 - More on this to follow...

Additional comments

APNIC - ISP Address Request - 9 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address http://www.apnic.net/apnic-bin/isp-request-form.pl

Additional Comments

This section is used to provide more information on any unclear aspects of your request. In particular, refer to the sections "Internet connectivity information" and "Network configuration details". You should also use this section to explain why you are not able to obtain the required address space from your upstream ISP.

How to complete this section

There are two options for using this section to provide additional comments:

1. Enter your comments directly into the text field
2. Upload a text file
 - If you have a text file on a local drive setting out your additional comments, you may select "Upload Text File"
 - Follow the prompts to locate the file and have it automatically attached to this request form.

Additional comments including:

- network topology diagrams
- additional information on any other aspect of this request

Browse Upload Text File

Done Internet

Upload Text File



Additional Info - Topology, Deployment, Equipment & Services

- POP topology
 - Diagrams showing network / POP design
- Deployment plan
 - Give details of phases of deploying equipment
- Equipment and services
 - Specifications, number of ports
 - Details of how implement services
 - explain acronyms or special services
- Miscellaneous
 - Anything not covered by the form, anything unusual



Additional info

- Renumbering & return policy

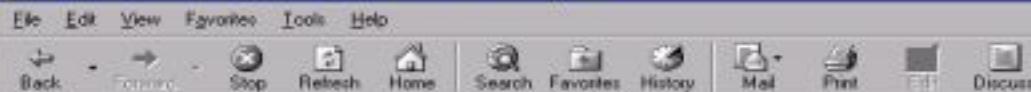
- Renumbering?
 - one-for-one exchange to assist renumbering
 - needs confirmation from upstream ISP to confirm renumbering will take place
- ‘No Questions Asked’ return prefix policy
 - swap 3 or more discontiguous prefixes (ISP or customers) for single prefix, no charge
 - <ftp://ftp.apnic.net/apnic/docs/no-questions-policy>
 - Form for returning addresses
 - <ftp://ftp.apnic.net/apnic/docs/address-return-request>

Confirm details

ISP

Req

APNIC - ISP Address Request - 10 - Microsoft Internet Explorer



Address: http://www.apnic.net/apnic-bin/isp-request-form.pl

Go Links

APNIC – ISP Address Request

Confirm details

Please check your information:

Your Name:	Test Person
Your Email Address:	test_person@company.com
Account Name:	APNIC-AP
Admin Contact Handles:	JB46-AP
Technical Contact Handles:	JB46-AP
Maintainer:	MAINT-AU-JEFFBRIGHT
Netname:	TESTNET
Description:	Brisbane, Australia. Internet Service Provider (a web hosting company)
Country:	AU
Connectivity:	Peering-point No Service-provider Yes Other No
Connection Providers:	Connect-Provider-1 Connect-Provider-2
Do you support:	Supernets Yes Subnets Yes All Os Yes All Tel Yes

Check your
information!

ISP address request

- Checklist

- ✓ All fields are syntactically correct
- ✓ Supplied documentation correct
 - format defined in the APNIC-084
- ✓ Provided all IP addresses currently held
- ✓ Updated all customer assignments in DB
 - Deleted objects that are no longer valid

ISP address request - parsing

ISP
Req

APNIC - ISP Address Request - 11 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address: <http://www.apnic.net/apnic-bin/isp-request-form.pl> Go Links

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APNIC – ISP Address Request

warnings below 80% utilization of available IP addresses

You have successfully parsed and analysed your ISP Request.

Save Cancel Previous Submit

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Done Internet

Successful parsing of ISP Request

ISP address request - submission

ISP
Req

APNIC - ISP Address Request - Submit - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address Go Links

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APNIC – ISP Address Request

Submit ISP Request

Your ISP Request has been submitted

Feedback on new ISP request form

Thank you for using APNIC's new ISP request form. We are very interested in hearing about your experiences with the form. We designed this form to help all our members and want to know how we can improve it. Please submit any suggestions or thoughts about this form to webmaster@apnic.net.

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Done Internet



Questions ?

Evaluation by APNIC

- Virtual web hosting

- Name based hosting
 - ‘*Strongly recommended*’
 - Use ‘infrastructure’ field to describe web servers
- IP based hosting
 - Permitted on technical grounds
 - SSL, virtual ftp..
 - Use ‘infrastructure’ field to describe web servers
 - Special verification for IP based
 - If more than /22 used for this purpose
 - Requestor must send list of URLs of virtual domain and corresponding IP address

Cable, DSL services

- 1:1 contention ratio
 - Can be either statically or dynamically assigned
 - Means 1 IP address per customer
- Greater than 1:1 contention ratio
 - Preferred because conserves address space
- Choice of addressing is optional for members
 - dynamic addressing is encouraged
- Verification for DSL Services
 - Equipment details
 - Ex: BRAS, Number of ports
 - Purchase requests



New Cable services

- Bootstrapping criteria for new cable service
 - Applies to startup providers commencing new cable service
 - Allocation size based on assumption that requestor will assign a /24 to each CMTS in their network
 - Complete additional information with make, model & quantity information
 - Purchase requests for equipments may be asked

New Cable services

- Through 'infrastructure' description
 - Additional information needed
 - Head-end location, # Homes passed , Devices(CMTS), Capacity of CMR per CMTS , # Current Users # Assigned IP's for each CMTS, Additional CMTS in 6 months time, Growth rate/month
 - Example:

Headend	Homespassed	Device	Capacity
Brisbane	15000	Motorola	1000

Current Users	IP	Device-Added	G-rate/Month
750	800	1	1254

Customer assignments

- Customer growth estimation
 - The invoice for the additional CMTS purchased for the expansion
- Required to report customer assignments greater than /30
 - Through second opinion process
 - Register the assignment in APNIC whois database



Evaluation by APNIC

- summary

- All address space held should be documented
 - Check other RIR, NIR databases for historical allocations
- ‘No reservations’ policy
 - Reservations may never be claimed
 - Fragments address space
 - Customers may need more or less address space than is actually reserved

First allocation

- Must meet criteria
 - (discussed in policy section)
- Requires clear detailed and accurate request
- Implementation of 'Best Current Practice'
- Efficient assignments planned
- Always a /20 'slow start'
 - Exceptions made for very large networks but not common



Subsequent allocations

- 80% overall utilisation
 - Unless large assignment pending
- Demonstrated conservative assignments
- Correct customer registrations in db
 - Need to fix inconsistencies before next allocation
- Allocation size to cover 1 year need
 - Based on previous utilisation rate
- Contiguous allocation not guaranteed
 - But every effort made

APNIC approval

Dear xxxx

I am pleased to advise you that in response to your request for Internet resources, APNIC has allocated the following range of IPv4 addresses to the organisation below.

**** IMPORTANT THINGS TO KNOW ****

1. The address range allocated to your organisation is portable
If you change transit providers, the address range remains with your organisation.

2. Assignments and sub-allocation from this address range to customers are non-portable

Customers who cease connectivity with your organisation must return any addresses your organisation has assigned or sub-allocated to them.

3. Assignment Window (AW)

If the amount of address space your organisation wishes to assign or sub-allocate to a customer is greater than your assignment window then please email <hostmaster@apnic.net> for approval.

For more information on APNIC's new policy on sub-allocating space to customers, see: <http://www.apnic.net/meetings/14/results.html>

4. Aggregation

This new allocation should, wherever technically possible, be aggregated with any other address ranges the organisation announces to its upstream or transit ISP.

5. No guarantee of routability

APNIC cannot guarantee that any address space will be globally routable.

**Assignments
& sub-
allocations
are non-
portable**

**APNIC
expectation:
Announce
allocation as
single
aggregate**

Allocation object & contacts

inetnum: 202.60.128.0 - 202.60.159.255
netname: ROLTANET
descr: Rolta India Limited
descr: Rolta Center II
descr: MIDC Marol
descr: Andheri(East)- Mumbai-400 093
country: IN
admin-c: VS9-AP
tech-c: SD34-AP
mnt-by: APNIC-HM
mnt-lower: MAINT-IN-SANTOSHDESAI
changed: hostmaster@apnic.net 19990323
status: ALLOCATED PORTABLE
source: APNIC

person: Vinay Sawarkar
address: Rolta Center II, MIDC, Andheri,
address: Mumbai-400 093
country: IN
phone: +91-22-832 7708
fax-no: +91-22-836 5992
e-mail: vinay@rolta.com
nic-hdl: VS9-AP
mnt-by: MAINT-IN-SANTOSHDESAI
changed: vinay@rolta.com 20000526
source: APNIC

person: Santosh Desai
address: Rolta Center II, MIDC, Andheri,
address: Mumbai-400 093
country: IN
phone: +91-22-832 7708
fax-no: +91-22-836 5992
e-mail: santosh@rolta.com
nic-hdl: SD34-AP
mnt-by: MAINT-IN-SANTOSHDESAI
changed: santosh@rolta.com 20000526
source: APNIC

Contacts for network



Questions ?

Internet Registry Procedures

IP Address Management

Revision of routing protocols

- Interior Gateway Protocol (IGP)
 - Examples are OSPF, EIGRP, ISIS
 - Used to find optimum route to a host in ISP network
 - Convergence becomes important with scaling
- Border Gateway Protocol (BGP)
 - Can be interior (iBGP) and exterior (eBGP)
 - Used to carry traffic across your network and to/from the Internet
 - Can use BGP attributes for routing policy

Principles of addressing

- Separate customer & infrastructure address pools
 - Manageability
 - Different personnel manage infrastructure and assignments to customers
 - Scalability
 - Easier renumbering - customers are difficult, infrastructure is relatively easy

Principles of addressing

- Further separate infrastructure
 - ‘Dynamic’ infrastructure for IGP
 - Carrying network infrastructure addresses used by a routing protocol where alternate paths to host exist
 - Eg. p2p addresses of backbone connections
 - Eg. router loopback addresses
 - ‘Static’ infrastructure
 - Static routing of infrastructure (where no alternative path exists)
 - Carry in iBGP

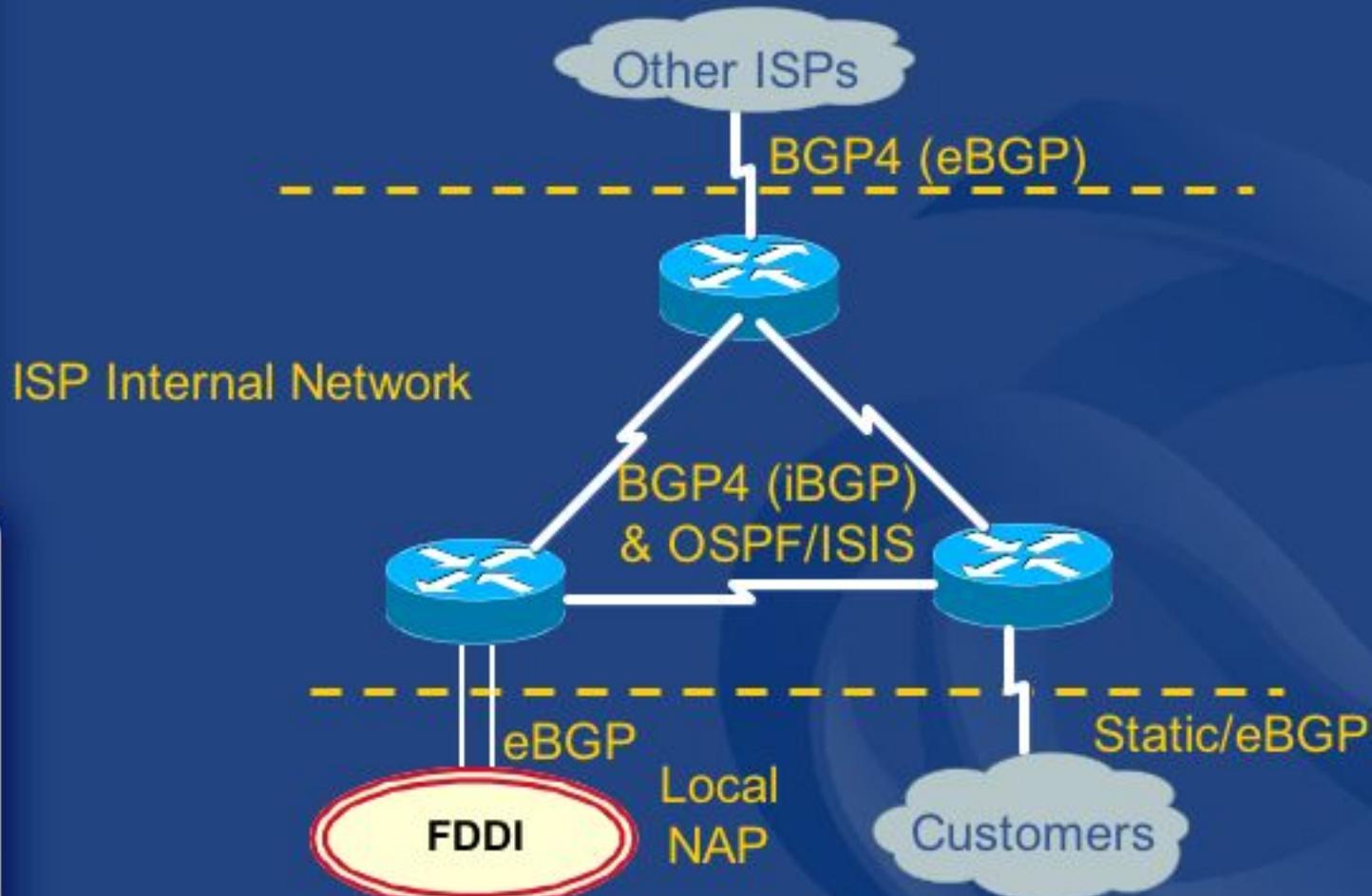


Principles of addressing

- Further separate infrastructure
 - ‘Static’ infrastructure examples
 - RAS server address pools, CMTS
 - Virtual web and content hosting LANs
 - Anything where there is no dynamic route calculation
- Customer networks
 - Carry in iBGP , do not put in IGP
 - No need to aggregate address space carried in iBGP
 - Can carry in excess of 100K prefixes



Hierarchy of routing protocols



Management - simple network

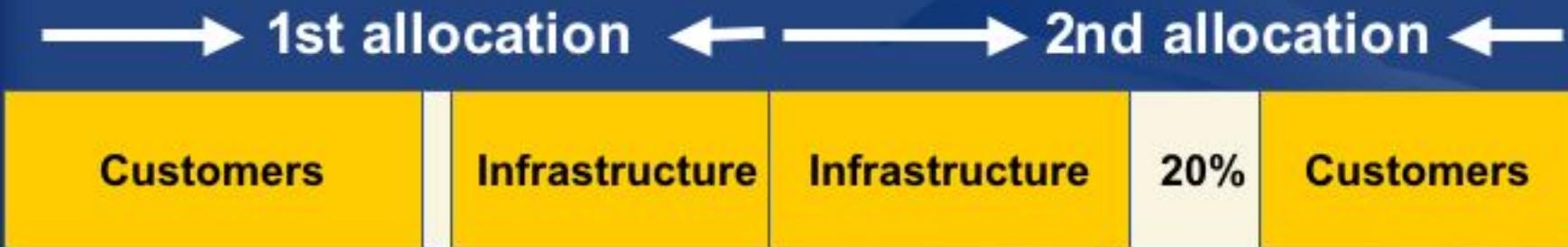
- First allocation from APNIC
 - Infrastructure is known, customers are not
 - 20% free is trigger for next request



- Grow usage of blocks from edges
- Assign customers sequentially

Management - simple network

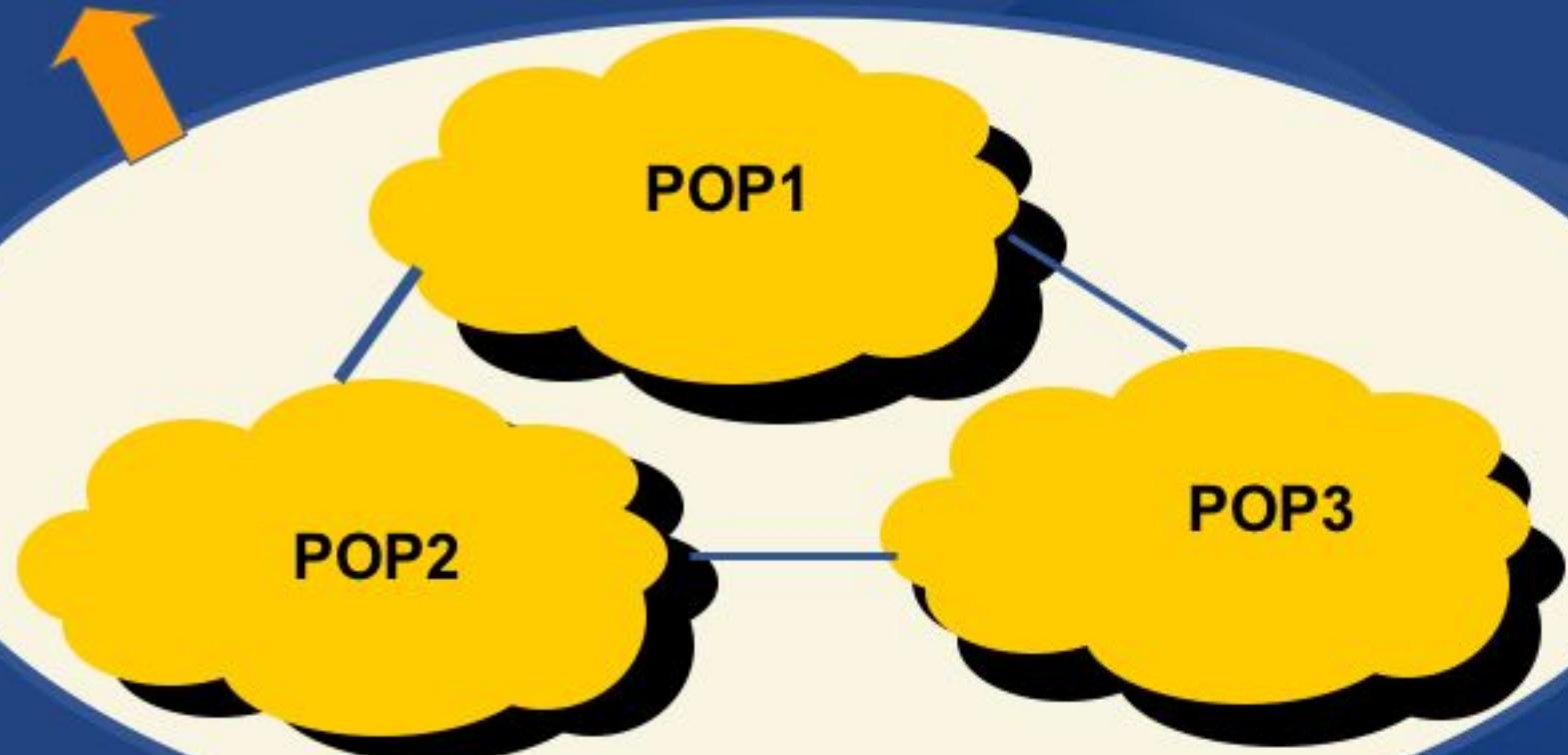
- If second allocation is contiguous



- Reverse order of division of first block
- Maximise contiguous space for infrastructure
 - Easier for debugging
- Customer networks can be discontiguous

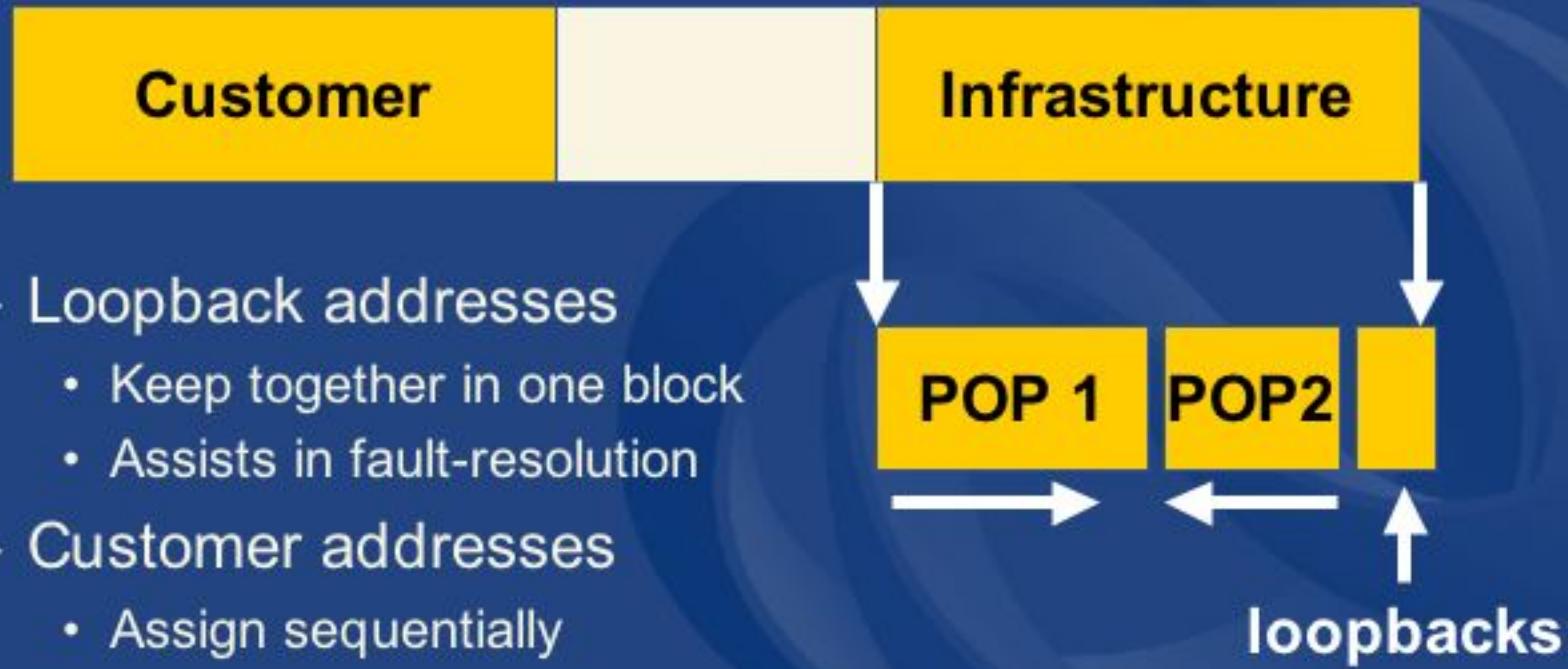
Management - many POPs

- WAN link to single transit ISP



Management - many POPs

- POP sizes
 - Choose address pool for each POP according to need



- Loopback addresses
 - Keep together in one block
 - Assists in fault-resolution
- Customer addresses
 - Assign sequentially

Management - many POPs

- /20 minimum allocation not enough for all your POPs?
 - Deploy addresses on infrastructure first
- Common mistake:
 - Reserving customer addresses on a per POP basis
- Do not constrain network plans due to lack of address space
 - Re-apply once address space has been used

Questions ?

Second opinion request

- Assignment Window
- Second Opinion Request Form
- Evaluation



What is an assignment window?

“The amount of address space a member may assign without a ‘second opinion’”

- All members have an AW
 - Starts at zero, increases as member gains experience in address management
- Second opinion process
 - Customer assignments require a ‘second-opinion’ when proposed assignment size is larger than members AW



Assignment window

- Size of assignment window
 - Evaluated after about 5 2nd-opinion requests
 - Increased as member gains experience and demonstrates understanding of policies
 - Prefix length normally reduced by 1 bit at a time
 - Assignment window may be reduced, in rare cases
- Why an assignment window?
 - Monitoring ongoing progress and adherence to policies
 - Mechanism for member education

Why assignment window?

- Motivation
 - Support the LIR during start up
 - Standardise criteria for request evaluation
 - Familiarise the LIR with APNIC policies
 - Ensure accurate data is being kept
 - Treat everyone fairly

FAQ

- <http://www.apnic.net/faq/awfaq.html>



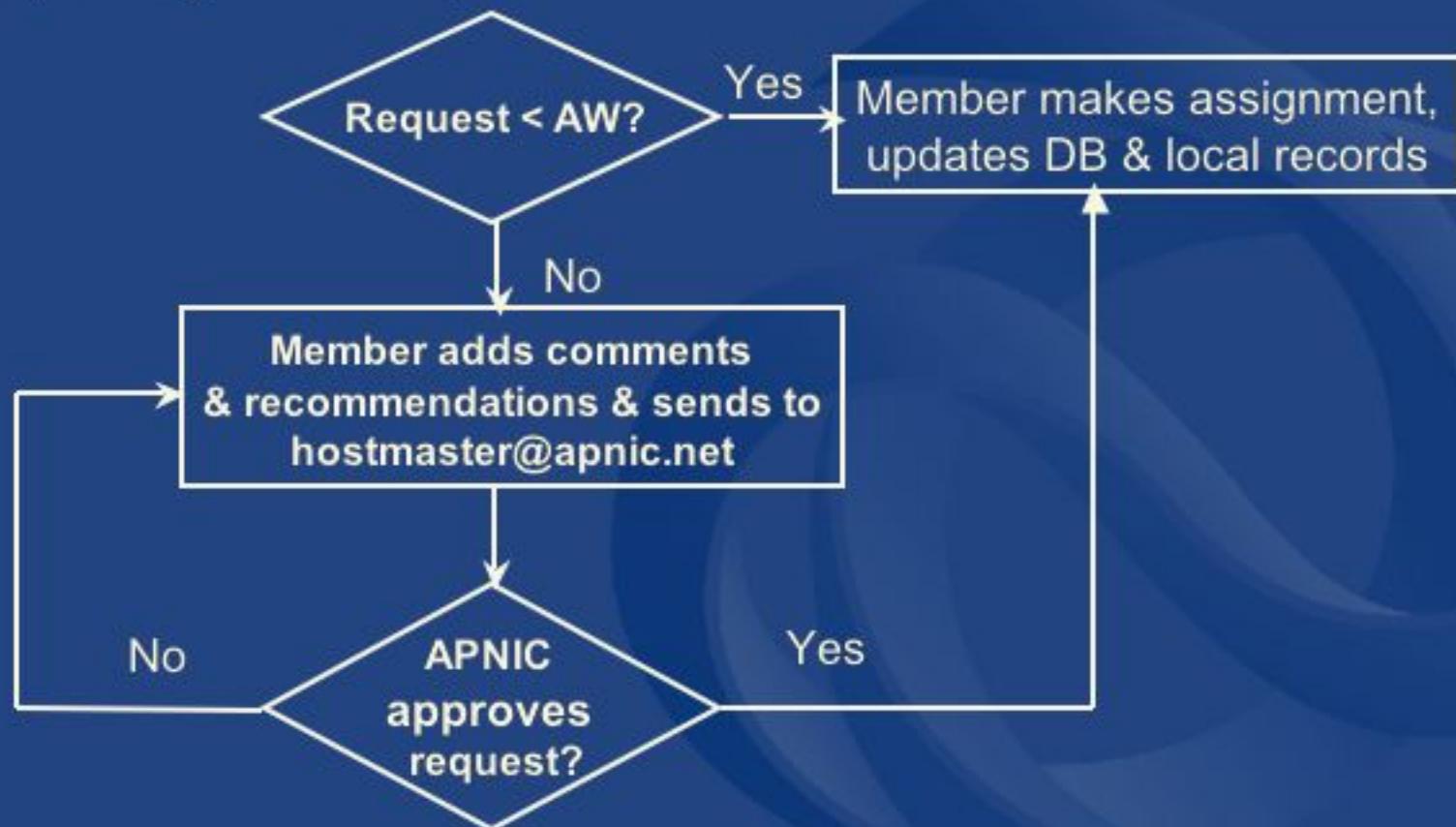
Assignment window process

Step 1 - Member and customer complete 2nd Opinion Request form

Step 2 - Member evaluates customers requirements

Step 3 - Assignment Window procedure

iteration



Second opinion request form

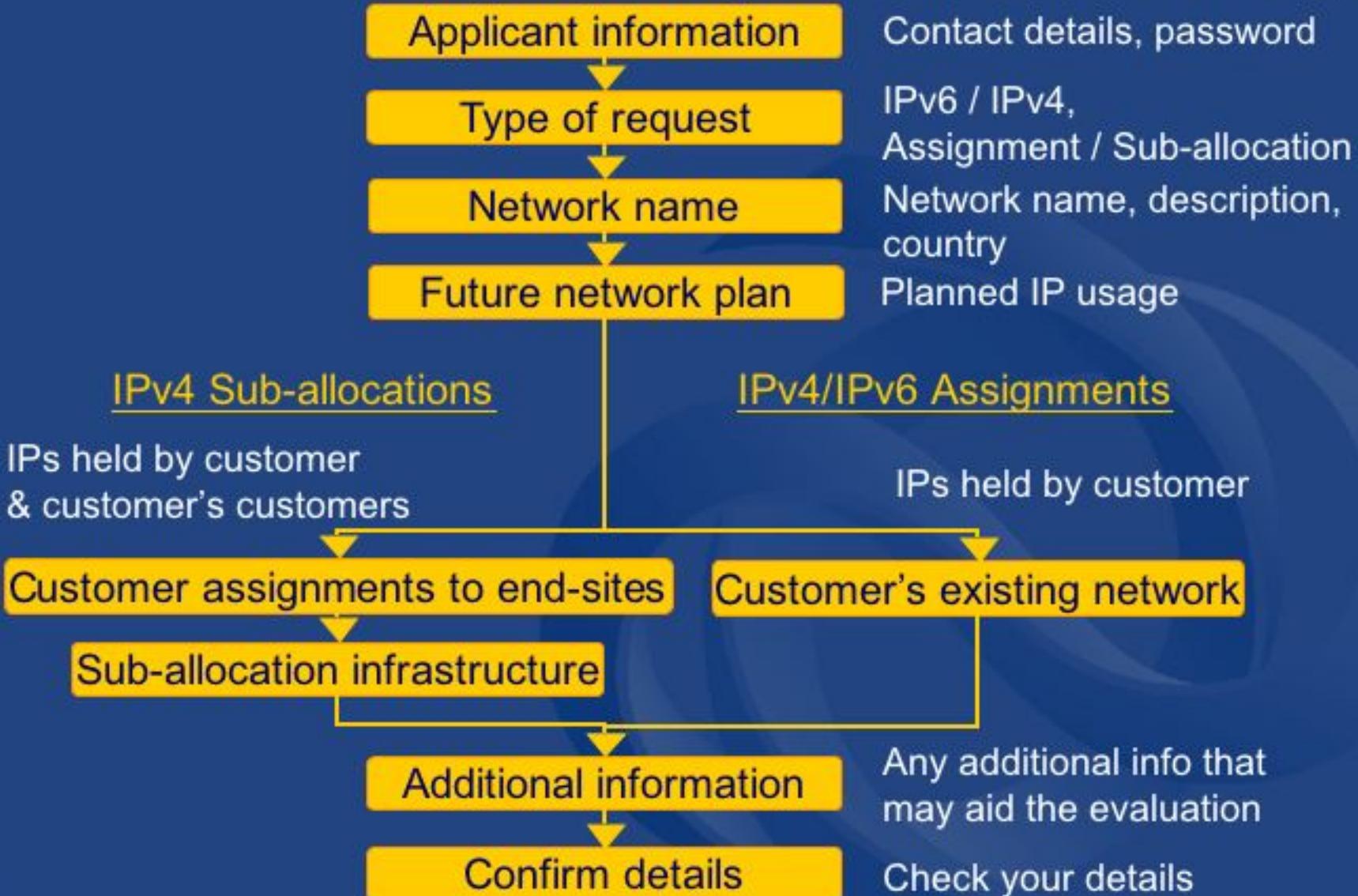
Used to seek approval for:

- IPv4 assignments & sub-allocations
- Multiple/additional IPv6 /48s to a single customer

Before you start:

- Separate form for each request
- Help buttons available
- Form can be saved by use of password

Overview of 2nd opinion form



Applicant information

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.apnic.net/apnic-bin/second-opinion-request.pl Go

APNIC Asia Pacific Network Information Centre

Info & FAQ | Resource services | Training | Meetings | Membership | Documents | Whois & Search | Internet community

APNIC second opinion request

Applicant information

APNIC will use these contact details for all correspondence relating to this request. Please enter the APNIC account name of the organisation that requires the address space assignment.

Your name:

Your email address:

APNIC account name:
Examples:
Non-member: SPARKYNET-NON-ID
Member example: SPARKYNET-ID

Your relationship to organisation applying for membership:

Create a password for this request: (min. 8 characters)

Confirm password:

Cancel Next

Help buttons

Password allows saving work

<http://www.apnic.net/apnic-bin/second-opinion-request.pl>

Type of 2nd opinion request

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://www.preview.apnic.net/apnic-bin/second-opinion-form.pl> Go

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APNIC second opinion request

Type of second opinion request

This provides information about the type of second opinion you are requesting.

Which IP version do you wish to request?

IPv4 [?](#)
 IPv6 [?](#)

Which type of second opinion are you requesting?

Assignment (IPv4 or IPv6) [?](#)
Select this if you are distributing IP addresses for the end user's infrastructure

Sub-allocation (IPv4 only) [?](#)
Select this if you are distributing IP addresses to an organisation that will further distribute the address space to their end users.

Address prefix requested: /26 [?](#)

IPv4 example: /26
IPv6 example: /47

Save Cancel Previous Next

Network name

2nd Op

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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APNIC second opinion request

Network name

The details you provide here will be used to identify the proposed network in the APNIC Whois Database

Name of network: Example: SPARKYNET 

Description of organisation: Example: SparkyNet, Sdn Bhd, Indonesia 

Country: Select a country 
 

Internet



Future network plan

2nd Op

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: <http://www.preview.apnic.net/apnic-bin/second-opinion-form.pl> Go

APNIC second opinion request

Future network plan

The information you provide here summarises how the customer will use the IPv4 address space within the next year.

Size of planned subnet: Example: 0.0.0.0/28

Deploy now: Example: /29

Deploy within 6 months: Example: /29

Deploy within 1 year: Example: /28

Detailed description of subnet: Example: web hosting facility

How to complete this page

There are two options for using this page to provide details of your customer's network infrastructure:

Use the form to build your assignment details:

- Use the fields on the left of the form to specify the required elements for each assignment to your network infrastructure.
- When you have completed the fields, click "Add information" to transfer that assignment information to the tool box in the correct format.
- Repeat this process for each assignment to your customer's network infrastructure.

Upload a text file

- If you have a text file on a local drive describing your network infrastructure assignments in the correct format, you may click "Upload text file".
- Follow the prompts to locate the file and attach it to this request form.

Add information

Upload text file

0.0.0.0/28 /29 /29 /28 web hosting facility

Customer's existing network

- IPv4 assignment request

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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APNIC second opinion request

Customer's existing network

If the end site you are requesting a second opinion for has received any addresses in the past, please specify the actual addresses assigned on each network.

Actual start address assigned: 202.5.10.0 Example: 202.5.10.0

Total prefix size of subnet: /29 Example: /29

Description of 1 router and 4 workstations subnet: Example: 1 router and 4 workstations

How to complete this page

There are two options for using this page to provide details of your customer's network infrastructure.

Use the form to build your assignment details

- Use the fields on the left of the form to specify the required elements for each assignment to your customer's network.
- When you have completed the fields, click "Add information" to transfer that assignment information to the text box in the correct format.
- Repeat this process for each assignment to your customer's network infrastructure.

Upload a text file

- If you have a text file on a local drive describing your network infrastructure assignments in the correct format, you may click "Upload text file".
- Follow the prompts to locate the file and attach it to this request form.

Add information

202.5.10.0 /29 1 router and 4 workstations

Upload text file

Add information

Upload text file

All previous assignments
- Check whois db

Customer's assignments to end-sites

- Sub Allocation Request

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

APNIC second opinion request

Customer's assignments to end-sites

This information summarises address assignments your customer has made to end sites from previous sub-allocations.

If the customer does not currently hold any IP address space, please leave this section blank.

Actual start address assigned: Example: 202.12.28.0

Total prefix size of subnet: Example: /29

Description of subnet: Example: FOO-AP

How to complete this page

There are two options for using this page to provide details of your customer's network infrastructure:

Use the form to build assignment details

- Use the fields on the left of the form to specify the required elements for each assignment to your customer's network.
- When you have completed the fields, click "Add information" to transfer that assignment information to the text box in the correct format.
- Repeat this process for each assignment to your customer's network infrastructure.

Upload a text file

- If you have a text file on a local drive describing your network infrastructure assignments in the correct format, you may click "Upload text file".
- Follow the prompts to locate the file and attach it to this request form.

Add information

Upload text file

← Add information →

Customer's (downstream provider's) customers

Sub-allocation infrastructure

- Sub-Allocation Request

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

APNIC second opinion request

Sub-allocation infrastructure

This information summarises the actual address prefixes used for the infrastructure of the customer network receiving the sub-allocation.

If the customer does not currently hold any IP address space, please leave this section blank.

Actual start address assigned: Example: 202.12.28.0

Total prefix assigned to the infrastructure: Example: /27

Description of subnet: Example: server farm

How to complete this page

There are two options for using this page to provide details of your customer's network infrastructure:

Use the form to build assignment details

- Use the fields on the left of the form to specify the required elements for each assignment to your customer's network.
- When you have completed the fields, click "Add information" to transfer that assignment information to the text box in the correct format.
- Repeat this process for each assignment to your customer's network infrastructure.

Upload a text file

- If you have a text file on a local drive describing your network infrastructure assignments in the correct format, you may click "Upload text file".
- Follow the prompts to locate the file and attach it to this request form.

Add information

Upload text file

Add information

Customer's
(downstream
provider's)
infrastructure

Additional information

APNIC second opinion request - Microsoft Internet Explorer

File Edit View Favorites Tools Help

APNIC Asia Pacific Network Information Centre Info & FAQ | Resource services | Training | Meetings | Membership | Documents | Whois & Search | Interne...

APNIC second opinion request

Additional information

This section is for you to provide whatever other details you feel may help justify your IPv4 second opinion request. In particular, it will help APNIC evaluate the request if you can provide:

- network topology diagrams
- detailed explanations of the address space usage and subnetting plans

How to complete this page

There are two options for using this section to provide additional comments:

1. Enter your comments directly into the text field.
2. Upload a file of any type:
 - If you have a file on a local drive setting out your additional comments, you may select "Upload file".
 - Follow the prompts to locate the file and have it automatically attached to this request form.

**Network design
Network topology
Deployment plan
Equipment
Services
Renumbering
Explanations
etc**



Upload File

Confirm details & submit

APNIC second opinion request - Microsoft Internet Explorer

APNIC second opinion request

Confirm details

You have completed a second opinion request for an assignment by an end site.

Please check your information:

Your name: Ky Xander
Your email address: kxander@spartynet.com
Account name: spartynet_id
Your relationship to organisation requesting second opinion: Employee / Manager
Address type: IPv4
Request type: Assignment
Prefix second opinion requested for: /27
Netname: Spartynet Sdn Bhd, Indonesia
Description: ID
Country code: 0.0.0.0/28 /29 /29 web hosting facility
Network plan: 0.0.0.0/28 /29 /29 web hosting facility
Customer's existing network: 202.5.10.0 /29 1 router and 4 workstations

Save **Cancel** **Previous** **Submit**



- Check your request
- Click Submit
- Confirmation is also sent via email

- Request submitted!

APNIC second opinion request - Microsoft Internet Explorer

APNIC second opinion request

Submit request

Your request has been submitted

2nd opinion evaluation (policy)

- Efficiency
 - More than 50% used in any one subnet?
 - Can different subnet sizes be used?
 - More than 80% used for previous assignment?
- Stockpiling
 - Is all address space held declared on form?
 - Has organisation obtained address space from more than one member/ISP?
- Registration
 - Is previous assignment in APNIC database and are they correct and up to date?



2nd opinion evaluation

2nd Op

- APNIC & Member evaluation
 - Should be the same
 - If NO, APNIC will ask member to obtain more information
 - iterative process
 - If YES, APNIC approves 2nd opinion request

2nd opinion request approval

2nd Op

Dear XXXXXXXX,

APNIC has approved your "second opinion" request to make the following assignment:

[netname]

[address/prefix]

- * Please ensure that you update the APNIC whois database to register this assignment before informing your customer or requesting reverse DNS delegation. Do this using the form at:

<http://www.apnic.net/apnic-bin/inetnum.pl>

Important:

Unregistered assignments are considered as "unused"



Customer assignment

- Member updates internal records
 - Select address range to be assigned
 - Archive original documents sent to APNIC
 - Update APNIC database
- Clarify ‘status’ of address space
 - APNIC requirement is ‘Non portable’
 - ‘Portable’ assignments are made by APNIC only with the end-user request form
 - Organisation must have technical requirement

Questions ?

The APNIC Database

Protection and Updating

Database protection

- maintainer object



mntner:	MAINT-WF-EX
descr:	Maintainer for ExampleNet Service Provider
country:	WF
admin-c:	ZU3-AP
tech-c:	KX17-AP
upd-to:	kxander@example.com
mnt-nfy:	kxander@example.com
auth:	CRYPT-PW apHJ9zF3o
mnt-by:	MAINT-WF-EX
referral-by:	MAINT-APNIC-AP
changed:	kxander@example.com 20020731
source:	APNIC

- protects other objects in the APNIC database

Creating a maintainer object

1. Fill out webform
 - Provide:
 - Admin-c & tech-c
 - password
 - email address etc
2. Completed form will be sent to you
3. Forward request to maint-request@apnic.net
4. Maintainer will be created manually
 - Manual verification by APNIC Hostmasters
5. Update your person object with mntner
http://www.apnic.net/services/whois_guide.html



Database protection

- Authorisation
 - “mnt-by” references a mntner object
 - Can be found in all database objects
 - “mnt-by” should be used with every object!
- Authentication
 - Updates to an object must pass authentication rule specified by its maintainer object



Authorisation mechanism

DB 2

inetnum: 202.137.181.0 – 202.137.185.255
netname: EXAMPLENET-WF
descr: ExampleNet Service Provider
.....

mnt-by: MAINT-WF-EX

mntner: MAINT-WF-EX
descr: Maintainer for ExampleNet Service Provider
country: WF
admin-c: ZU3-AP
tech-c: KX17-AP
upd-to: kxander@example.com
mnt-nfy: kxander@example.com
auth: CRYPT-PW apHJ9zF3o
mnt-by: MAINT-WF-EX
changed: kxander@example.com 20020731
source: APNIC

Authentication methods



- ‘auth’ attribute
 - <none>
 - Strongly discouraged!
 - Crypt-PW
 - Crypt (Unix) password encryption
 - Use web page to create your maintainer
 - PGP – GNUPG
 - Strong authentication
 - Requires PGP keys
 - MD5
 - Soon available

Mnt-by & mnt-lower

DB 2

- ‘mnt-by’ attribute
 - Can be used to protect any object
 - Changes to protected object must satisfy authentication rules of ‘mntner’ object.
- ‘mnt-lower’ attribute
 - Also references mntner object
 - Hierarchical authorisation for inetnum & domain objects
 - The creation of child objects must satisfy this mntner
 - Protects against unauthorised updates to an allocated range - highly recommended!



Authentication/Authorisation

DB 2

- APNIC allocation to member
 - Created and maintained by APNIC

Inetnum: 203.146.96.0 – 203.146.127.255
netname: LOXINFO-TH
descr: Loxley Information Company Ltd.
Descr: 304 Suapah Rd, Promprab, Bangkok
country: TH
admin-c: KS32-AP
tech-c: CT2-AP
mnt-by: **APNIC-HM**
mnt-lower: **LOXINFO-IS**
changed: hostmaster@apnic.net 19990714
source: APNIC



Only APNIC can change this object

Authentication/Authorisation

DB 2

- Member assignment to customer
 - Created and maintained by APNIC member

Inetnum: 203.146.113.64 - 203.146.113.127
netname: SCC-TH
descr: Sukhothai Commercial College
Country: TH
admin-c: SI10-AP
tech-c: VP5-AP
mnt-by: LOXINFO-IS
changed: voraluck@loxinfo.co.th 19990930
source: APNIC

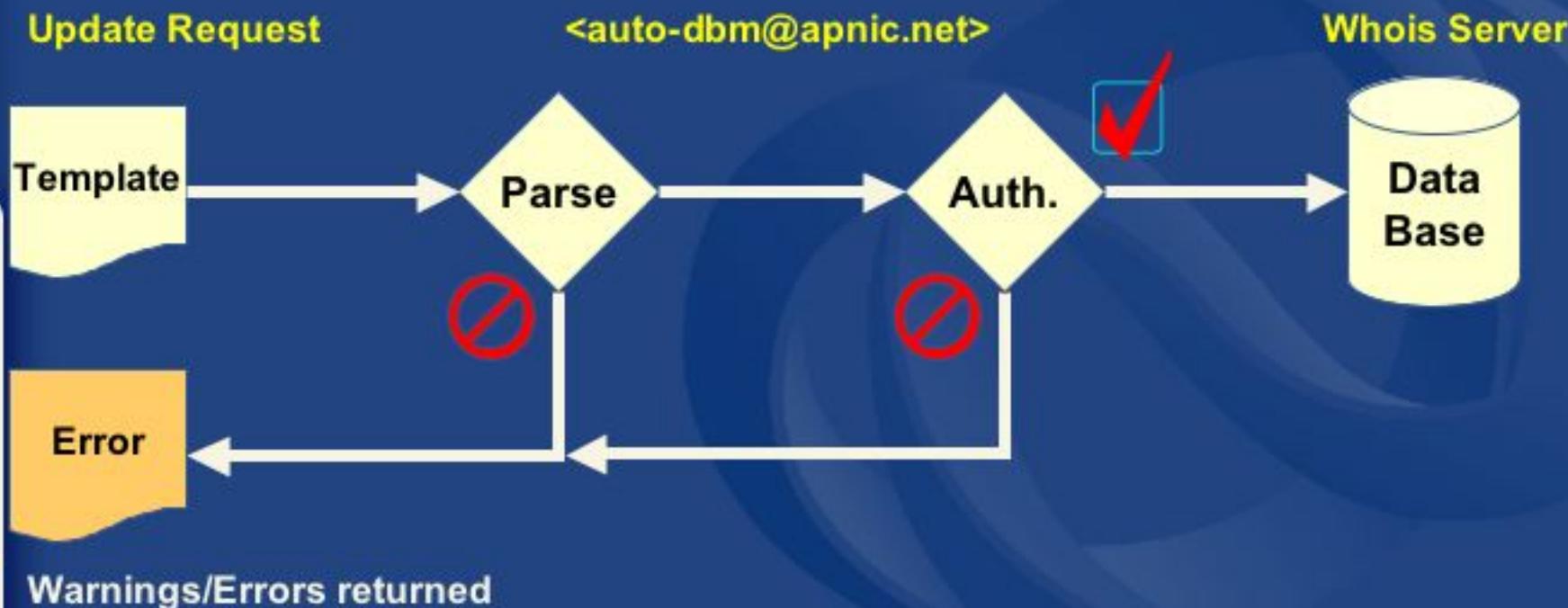


Only LOXINFO-IS can change this object

Database update process

DB 2

- Email requests to <auto-dbm@apnic.net>
- Each request contains an object template



Database update process

- Update transactions
 - Create a new object
 - Change an object
 - Delete an object
- Updates are submitted by email
 - E-mail to: <auto-dbm@apnic.net>
- Email message contains template representing new or updated object

Template



Database update - web

- Creates a template through the web form

Template

- Template will be sent to you by email
- This should be forwarded to:

<auto-dbm@apnic.net>

- Common error

- to reply to the email 
 - (Adds extra character in front of each line)

http://www.apnic.net/services/whois_guide.html

Auth.

Authorisation

- Parser checks the maintainer object referenced in “mnt-by” attribute
- Failed Authorisation
 - Template NOT corrected
 - object NOT accepted
 - Automatic email notification sent
 - to requestor
 - Automatic email notification sent
 - to “notify” address



Database update process

- Successful update
 - If Parse and Auth. steps succeed, database is updated
 - Confirmation by email to requestor
- Mirror to public server
 - Updates mirrored to “whois.apnic.net”
 - may take up to 60 minutes



Updating an existing object

DB 2

- Change relevant fields
- Add your maintainer password
- Update the changed attribute
- Email updated object to:

<auto-dbm@apnic.net>

- Note
 - Primary keys cannot be modified



Deleting an object

DB 2

- Copy object as-is in database into email
- Add your maintainer password
- Leave the changed attribute

```
inetnum:      202.182.224.0 - 202.182.225.255
netname:      SONY-HK
...
mnt-by:       MAINT-CNS-AP
changed:      ph@macroview.com 19990617
source:       APNIC
password:   x34zky
delete:     no longer required me@company.com
```

Note: Referenced objects cannot be deleted (02/99)



Forgotten the password ?

Requires legal documentation

Unfortunately we cannot change the password for the maintainer until we have received a fax with your company's letterhead confirming the request to modify the password.

In the fax, please include the following:

0. Attention: APNIC Database Administration Department
1. The APNIC Account name of your company and your personal nic handle. If you do not have an APNIC account, then please state 'NON-MEM'.
2. The current maintainer object which is to be modified, as obtained from 'whois -h whois.apnic.net MAINTAINER-OBJECT'
3. The new password/authorisation for the maintainer.
4. The signature of a contact for the maintainer.

**Confirmation
by fax
required on
company
letter head**

We do not recommend using personal names for maintainer objects



Questions ?

Reverse DNS Delegation

Registry Procedures

Overview

- Reverse DNS Delegation
- APNIC & Member responsibilities
- Reverse network delegations (/16)
- Reverse network delegations (/24)
- Subnet delegations
- Delegation procedures



What is ‘Reverse DNS’?

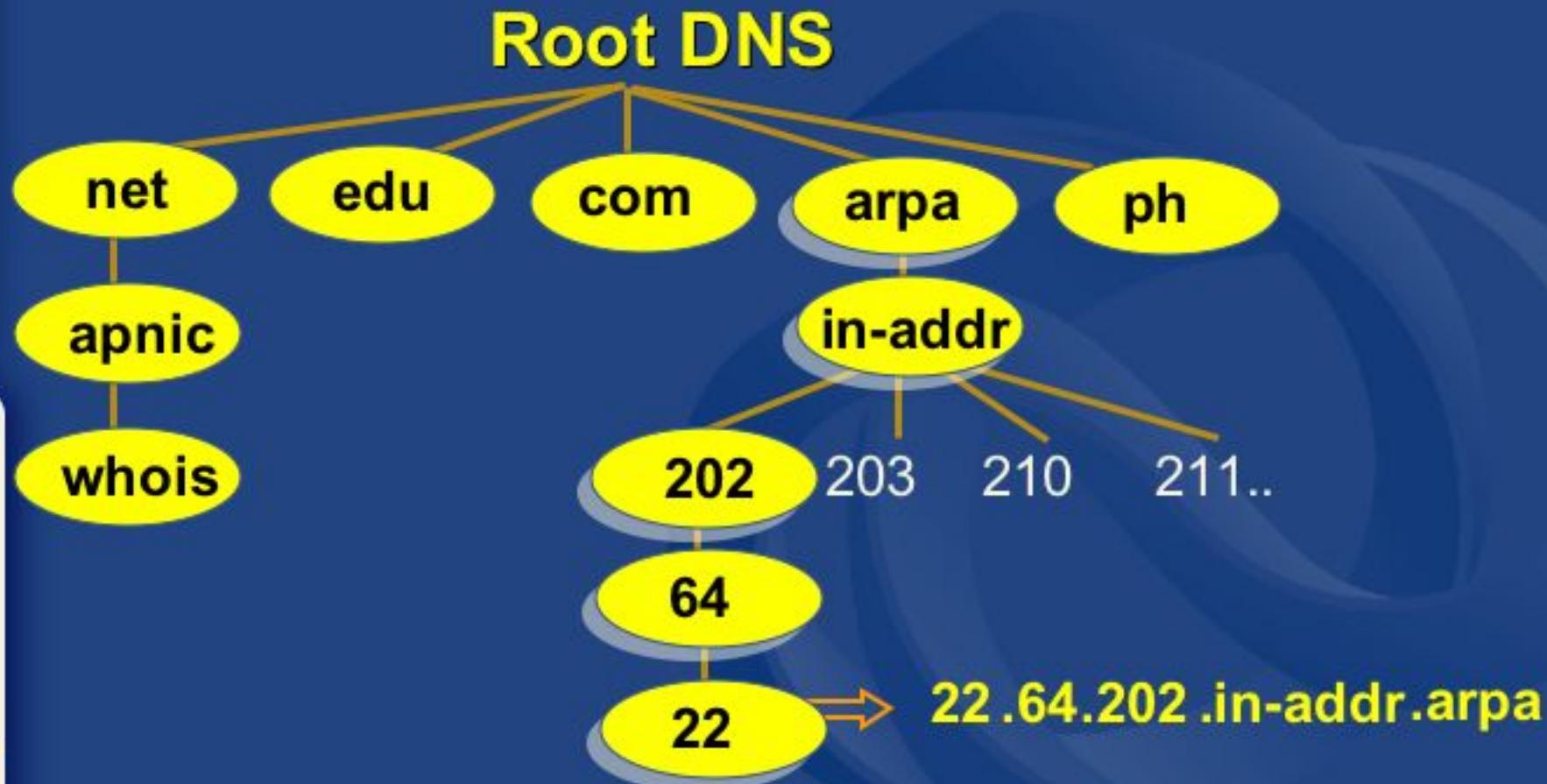
- ‘Forward DNS’ maps names to numbers
 - svc00.apnic.net -> 202.12.28.131
- ‘Reverse DNS’ maps numbers to names
 - 202.12.28.131 -> svc00.apnic.net

In-addr.arpa

- Hierarchy of IP addresses
 - Uses ‘in-addr.arpa’ domain
 - INverse ADDRess
- IP addresses:
 - Less specific to More specific
 - 210.56.14.1
- Domain names:
 - More specific to Less specific
 - delhi.vsnl.net.in
 - Reversed in in-addr.arpa hierarchy
 - 14.56.210.in-addr.arpa

Reverse DNS delegation

- Mapping numbers to names - 'reverse DNS'



Reverse DNS - why bother?

- Service denial
 - That only allow access when fully reverse delegated eg. anonymous ftp
- Diagnostics
 - Assisting in trace routes etc
- Registration
 - Responsibility as a member and Local IR

Member responsibilities

- Are to
 - Be familiar with APNIC procedures
 - Ensure that addresses are reverse-mapped
 - Maintain nameservers for allocations
 - Minimise “pollution” of DNS
 - syntax or configuration errors
- Are not to
 - Manage reverse delegation of zones for addresses not (yet) assigned or allocated



/16 network delegations

If a member has a /16 allocated, APNIC will delegate the entire zone to the member

- APNIC requirements are
 - Entire /16 is allocated to organisation
 - Member manages network delegations to customers
 - Member's NS is primary
 - Other secondary servers are recommended
 - Recommend asking APNIC to secondary zone



/24 network delegations

If a member has an allocation smaller than a /16 (eg. /19) then APNIC delegates each /24 separately

- APNIC requirements are
 - Each /24 address is assigned or allocated
 - One NS set up as primary
 - At least one other NS set up as secondary



Subnet delegations

Reverse delegation is also possible for a /24 shared by more than one customer

- APNIC requirements
 - Same as for network delegations; we reverse delegate the entire /24
 - Read “classless in-addr.arpa delegation”
 - <http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2317.txt>



Delegation procedures

- Upon allocation, member is asked if they want /24 place holder domain objects with member maintainer
 - Gives member direct control
- Standard APNIC database object,
 - can be updated through online form or via email.
- Nameserver/domain set up verified before being submitted to the database.
- Protection by maintainer object
 - (current auths: NONE, CRYPT-PW, PGP).
- Zone file updated 2-hourly

Example ‘domain’ object

domain:	124.54.202.in-addr.arpa
descr:	co-located server at mumbai
country:	IN
admin-c:	VT43-AP
tech-c:	IA15-AP
zone-c:	IA15-AP
nserver:	dns.vsnl.net.in
nserver:	giasbm01.vsnl.net.in
mnt-by:	MAINT-IN-VSNL
changed:	gpsingh@vsnl.net.in 20010612
source:	APNIC



Delegation procedures

- Complete the documentation
 - <http://www.apnic.net/db/domain.html>
- On-line form interface
 - Real time feedback
 - Gives errors, warnings in zone configuration
 - serial number of zone consistent across nameservers
 - nameservers listed in zone consistent
 - Uses database ‘domain’ object
 - examples of form to follow..

Reverse DNS request form

Rev DNS

Create Domain Object - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.apnic.net/apnic-bin/creform.pl Go Google Links

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Create Domain Object

Domain Object

What is this form to be used for?
This form assists in the creation and maintenance of domain objects. The domain class:

(* indicates mandatory field)

*Domain:

*Descr:
Please change this field . This is added by
http://www.apnic.net/db/domain.html
The reverse delegation zone for the

Country:

*Admin-c:

An admin-c must be someone physically located at the site of the network.



Request form

Create Domain Object - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.apnic.net/apnic-bin/jcreform.pl

*Nserver: dns.vsnl.net.in
giasbm01.vsnl.net.in

Remarks:

Notify: This email address will be notified by the APNIC database when this object changes

*Mnt-by: MAINT-WF-EX

*Password:
You must supply a password for one of the maintainers listed in this field

Mnt-lower:
* This stops ad-hoc additions
* beneath this zone.



Evaluation

- Parser checks for
 - ‘whois’ database
 - IP address range is assigned or allocated
 - Must be in APNIC database
 - Maintainer object
 - Mandatory field of domain object
 - Nic-handles
 - zone-c, tech-c, admin-c



Online errors (also via email)

Domain Update Results - Microsoft Internet Explorer

Please wait while your request is processed.
Parsing and validating your submission ...

Errors encountered

Your update request was unable to be completed due to the following errors. Please correct them and try again. If the error is temporary in nature, correct the error and 'Reload' this page (possibly this frame).

- *ERROR*. SOA on "ns.apnic.net" does not match SOA on "svc00.apnic.net". All nservers must respond with the same SOA.
- *ERROR*. NS RR for ns.telstra.net found on svc00.apnic.net but not in supplied template.
- *ERROR*. NS RR for ns.telstra.net found on svc00.apnic.net but not in supplied template.
- *ERROR*. NS RR for ns.telstra.net found on ns.apnic.net but not in supplied template.
- *ERROR*. NS RR for ns.telstra.net found on ns.apnic.net but not in supplied template.
- *ERROR*. cross-check of listed NS RR failed.

Request submission error

Domain Update Results - Microsoft Internet Explorer

File Edit View Go Favorites Help

Verifying your authorisation

Your maintainer uses the 'CRYPT-PW' or 'NONE' authorisation schema. Attempting to submit your request directly to the database.

Update results

Connection closed.

% Rights restricted by copyright. See
<http://www.apnic.net/db/dbcopyright.html>

Update FAILED: [domain] 174.202.in-addr-arpa

domain: 174.202.in-addr.arpa

descr: in-addr.arpa zone for 202.174/16

admin-c: DNS3-AP

tech-c: DNS3-AP

zone-c: DNS3-AP

nserver: ns.apnic.net

nserver: svc00.apnic.net

mnt-by: MAINT-AP-DNS-DEFAULT

changed: dns-admin@apnic.net 20000215

source: APNIC

ERROR: authorisation failed, request forwarded to maintainer

Update failed

Authorisation failed

Processing completed

Successful update

Domain Update Results - Microsoft Internet Explorer

Please wait while your request is processed.

Parsing and validating your submission ...

Warnings generated

-

Verifying your authorisation

Your maintainer uses the 'CRYPT-PW' or 'NONE' authorisation schema. Attempting to submit your request directly to the database.

Update results

Connection closed.
* Rights restricted by copyright. See <http://www.apnic.net/db/dbcopyright.html>
Update OK: [domain] 174.202.in-addr.arpa

Update ok!

Processing completed.



Questions?

- Are all your zones, and your customer zones registered?

Database Administrivia

Role objects and advanced queries

Role object

- Represents a group of contact persons for an organisation
 - Eases administration
 - Can be referenced in other objects instead of the person objects for individuals
- Also has a nic-hdl
 - More info on role objects:
 - <http://www.apnic.net/db/role.html>

Role object - example

- Contains contact info for several contacts

Attributes	Values
role:	OPTUS IP ADMINISTRATORS
address:	101 Miller Street North Sydney
country:	AU
phone:	+61-2-93427681
phone:	+61-2-93420813
fax-no:	+61-2-9342-0998
fax-no:	+61-2-9342-6122
e-mail:	noc@optus.net.au
admin-c:	NC8-AP
tech-c:	NC8-AP
tech-c:	SC120-AP
nic-hdl:	OA3-AP
mnt-by:	MAINT-OPTUSCOM-AP
source:	APNIC

Creating a role object

- Whois –t role
 - Gives role object template
- Complete all fields
 - With the nic-hdls of all contacts in your organisation
- Send to

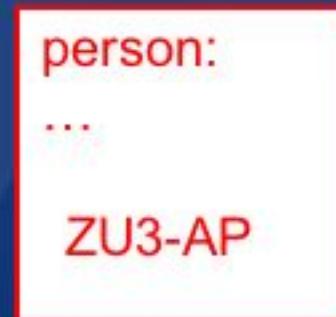
<auto-dbm@apnic.net>

Replacing contacts in the DB

- Using person objects

K. Xander is leaving my organisation. Z. Ulrich replaces him.

1. Create a person object for new contact (Z. Ulrich).
2. Find all objects containing old contact (K. Xander).
3. Update all objects, replacing old contact (KX17-AP) with new contact (ZU3-AP).
4. Delete old contact's (KX17-AP) person object.



inetnum:
202.0.10.0
...
ZU3-AP

inetnum:
202.0.12.127
...
ZU3-AP

inetnum:
202.0.15.192
...
ZU3-AP



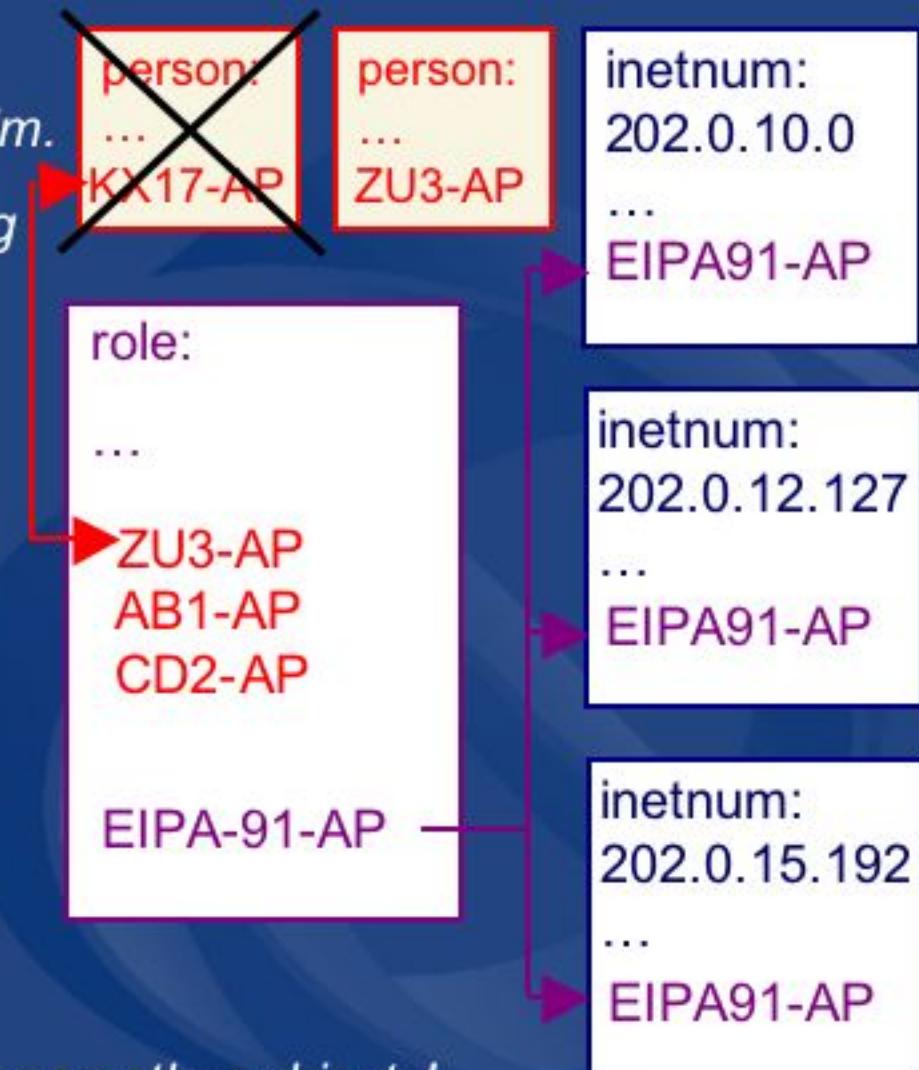
Replacing contacts in the DB

– Using a role object

K. Xander is leaving my organisation. Z. Ulrich replaces him.

I am using a role object containing all contact persons, which is referenced in all my objects.

1. Create a person object for new contact (Z. Ulrich).
2. Replace old contact (KX17-AP) with new contact (ZU3-AP) in role object
3. Delete old contact's person object.



No need to update any other objects!

Summary

DB admin

- Use **role objects** for all your contacts
 - Easier to administer your contacts
 - Keep the role object up-to-date

Questions ?

Autonomous System Numbers

Procedures

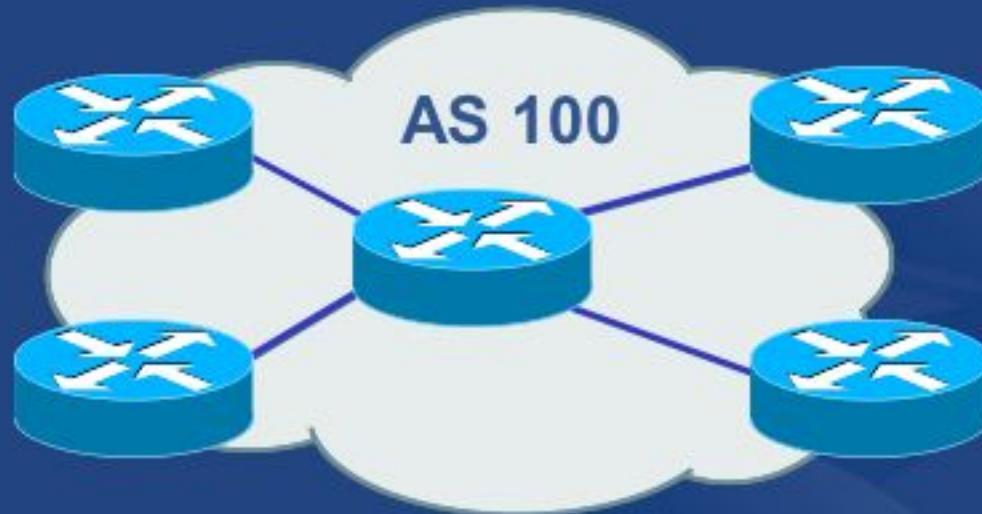
Overview

- What is an AS?
- Guidelines and procedures
- Application form (documentation)
- Policy expression



What is an Autonomous System?

ASN



- Collection of networks with same routing policy
- Usually under single ownership, trust and administrative control

When do I need an ASN?

- When do I need an AS?
 - Multi-homed network to different providers and
 - Routing policy different to external peers
- Recommended reading!
 - RFC1930: Guidelines for creation, selection and registration of an Autonomous System



When don't I need an ASN?

- Factors that don't count
 - Transition and 'future proofing'
 - Multi-homing to the same upstream
 - RFC2270: A dedicated AS for sites homed to a single provider
 - Service differentiation
 - RFC1997: BGP Communities attribute



Requesting an ASN

- Complete the request form
 - web form available:
 - <http://www.apnic.net/db/aut-num.html>
- Request form is parsed - real time
 - Must include routing policy
 - multiple import and export lines
 - Is checked for syntactical accuracy
 - based on RPSL (rfc2622)
 - Peers verified by querying routing table
 - [NO-PARSE] will not send request to parser



Requesting an ASN - customers

1. Requested directly from APNIC
 - AS number is “portable”
 2. Requested via member
 - ASN is “non-portable”
 - ASN returned if customer changes provider
- Transfers of ASNs
 - Need legal documentation (mergers etc)
 - Should be returned if no longer required

New policy
as of Nov-02



ASN request form

http://www.apnic.net/apnic-bin/creform.pl

Create Aut-num Object - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.apnic.net/apnic-bin/creform.pl Go

Google Search Web Search Site Page Info Up Highlight

APNIC Info & FAQ | Resource services | Training | Meetings | Membership | Documents | Whois & Search | Internet community

Create Aut-num Object

Aut-num Object

What is this form to be used for?
This form assists in the creation and maintenance of aut-num objects. The aut-num object describes the details of the registered owner of an Autonomous System and their routing policy for that AS. See [RFC 2622](#) for details.

Help completing this form
See the [Guide to the APNIC A/S Number Request Form](#)

(* indicates mandatory field)

Name:
The name of the person completing this form eg: Ky Xander

Account-name:
Your APNIC account name eg: ACME-PH

Org-relationship:
Relationship to organisation eg: Consultant (or employee or ...)

Guide to the ASN request form

Request form – routing policy

3 Create Aut-num Object - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.apnic.net/apnic-bin/creform.pl

Google Search Web Search Site Page Info Up Highlight

System (AS).

Descr:
A short description of this object and the name of the organisation associated with it.

Country:
Name of the country of the admin-c

Import:
Routing information your AS will accept from neighbouring Autonomous Systems

Import Information regarding RPSL syntax can be found in [RFC 2622](#)

from AS1 Action pref=100;
accept ANY
from AS2 Action pref=100;
accept ANY

Export:
generated routing information your AS will send to peer Autonomous Systems

Export Information regarding RPSL syntax can be found in [RFC 2622](#)

to AS1 announce THIS-AS
to AS2 announce THIS-AS

eg: to AS9444 Announce THIS-AS

Default:
If applicable, a description of how default routing policy is applied

peer AS <cost>

More information regarding RPSL syntax can be found in [RFC 2622](#)

eg: to AS9386 Action pref=10

Internet

from AS1 Action pref=100;
accept ANY
from AS2 Action pref=100;
accept ANY

to AS1 announce THIS-AS
to AS2 announce THIS-AS

Aut-num object example

aut-num: AS4777

as-name: APNIC-NSPIXP2-AS

descr: Asia Pacific Network Information Centre

descr: AS for NSPIXP2, remote facilities site

import: from AS2500 action pref=100; accept ANY

import: from AS2524 action pref=100; accept ANY

import: from AS2514 action pref=100; accept ANY

export: to AS2500 announce AS4777

export: to AS2524 announce AS4777

export: to AS2514 announce AS4777

default: to AS2500 action pref=100; networks ANY

admin-c: PW35-AP

tech-c: NO4-AP

remarks: Filtering prefixes longer than /24

mnt-by: MAINT-APNIC-AP

changed: paulg@apnic.net 19981028

source: APNIC

POLICY
RPSL



Questions ?

- Want to learn more about RPSL and routing policy?
 - *Come to the IRR tutorial tomorrow, Tuesday!*

IPv6

Overview, Policies & Procedures

IPv6 address policy

- goals

- Efficient address usage
 - Avoid wasteful practices
- Aggregation
 - Hierarchical distribution
 - Aggregation of routing information
 - Limiting no of routing entries advertised into the Internet
- Minimise overhead
 - Associated with obtaining address space
- Registration, Uniqueness, Fairness & consistency

IPv6 initial allocation criteria

- Be an LIR
 - Not be an end site
- Plan for at least 200 /48 assignments to other organisations within 2 years
- Plan to provide IPv6 connectivity to organisations and to end sites

IPv6 allocation policy

- initial allocation

- First allocation size ('Slow start')
 - /32 if no previous assignment history
 - Large allocation facilitates the creation of hierarchy within allocation
 - Larger possible if technically justified
 - Previous assignment history taking into account
 - Existing /35 holders
 - Eligible to have /35 expanded to a /32

IPv6 assignments

- /48s assignments per end site
 - /64 only one subnet
 - /128 only one device connecting
- Multiple /48s
 - Should be reviewed by RIR/NIR
 - Second opinion process follows
- ISP infrastructure
 - /48 per POP

Portable IPv6 assignments for IXPs

- Demonstrate ‘open peering policy’
 - 3 or more peers
 - Portable assignment size: /48
 - All other needs should be met through normal processes
 - /64 holders can “upgrade” to /48
 - Through NIRs/ APNIC
 - Need to return /64
- New policy
as of Dec-02

References

- IPv6 Resource Guide
 - http://www.apnic.net/services/ipv6_guide.html
- IPv6 Policy Document
 - <http://www.apnic.net/policies.html>
- IPv6 Address request form
 - <http://ftp.apnic.net/apnic/docs/ipv6-alloc-request>

FAQ

- <http://www.apnic.net/info/faq/IPv6-FAQ.html>

Questions ?

- *More IPv6 to be discussed in the IPv6 technical SIG on Wednesday*

Summary

What we have covered today

Summary - responsibilities

- As an APNIC member and custodian of address space
 - Be aware of your responsibilities
 - Register customer assignments in APNIC database
 - Keep this data up-to-date & accurate
 - Educate your customers
 - Document your network in detail
 - Keep local records
 - Register reverse DNS delegations

Summary

- “Do the right thing”
 - Think about routing table size & scalability of Internet
 - Encourage renumbering
 - Announce aggregate prefixes
 - Think global not local

Thank you !!

Your feedback is appreciated

Supplementary Reading

Introduction

- Regional Registry web sites
 - APNIC
 - <http://www.apnic.net>
 - ARIN
 - <http://www.arin.net>
 - RIPE NCC
 - <http://www.ripe.net>
- APNIC past meetings
 - <http://www.apnic.net/meetings>

Introduction

- APNIC members
 - <http://www.apnic.net/members.html>
- Membership
 - Membership procedure
<http://www.apnic.net/membersteps.html>
 - Membership application form
<http://www.apnic.net/apnic-bin/membership-application.pl>
 - Membership fees
<http://www.apnic.net/docs/corpdocs/FeeSchedule.htm>



Member services helpdesk

- One point of contact for all member enquiries
 - Extended operating hours
 - 9:00 am to 7:00 pm (Australian EST, UTC + 10 hrs)
- More personalised service
 - Range of languages
 - including Cantonese, Filipino, Mandarin, Thai, Vietnamese etc.
- Faster response and resolution of queries
 - such as IP resource applications, status of requests, obtaining help in completing application forms, membership enquiries, billing issues & database enquiries



Introduction to APNIC & IR Policies

- Classless techniques
- CIDR
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1517-19.txt>
 - Network Addressing when using CIDR
<ftp://ftp.uninett.no/pub/misc/eidnes-cidr.ps.Z>
 - Variable Length Subnet Table
<http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1878.txt>
- Private Address Space
 - Address Allocation for Private Internets
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1918.txt>
 - Counter argument: Unique addresses are good
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1817.txt>

APNIC Mailing Lists

- apnic-talk
 - Open discussion relevant to APNIC community and members
 - e.g. policies, procedures etc
- apnic-announce
 - Announcements of interest to the AP community
- ipv6-registry
 - IPv6 allocation and assignment policies
- http://www.apnic.net/net_comm/lists/
- subscribe via <majordomo@apnic.net>
- archives at <http://ftp.apnic.net/apnic/mailing-lists>

The RIR System

- “Development of the Regional Internet Registry System”
 - Internet Protocol Journal
 - Short history of the Internet
 - http://www.cisco.com/warp/public/759/ij_4-4/ij_4-4_region.html

Policies & the Policy Environment

- Policy Documentation
 - Policies for address space management in the Asia Pacific region
 - <http://www.apnic.net/docs/policy/add-manage-policy.html>
 - RFC2050: Internet Registry IP allocation Guidelines
 - <http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2050.txt>

Address Request Procedures

- Addressing Guidelines
 - Designing Addressing Architectures for Routing & Switching Howard C. Berkowitz
- Address Request Forms
 - ISP Address Request Form
<http://www.apnic.net/services/ipv4/>
 - Second-opinion Request Form
 - <http://cgi.apnic.net/apnic-bin/second-opinion-request.pl>
 - No Questions Asked
<http://ftp.apnic.net/apnic/docs/no-questions-policy>

APNIC Database

- APNIC Database Documentation
 - <http://ftp.apnic.net/apnic/docs/database-update-info>
 - <http://ftp.apnic.net/apnic/docs/maintainer-request>
 - <http://www.apnic.net/apnic-bin/maintainer.pl>
 - http://www.apnic.net/services/whois_guide.html
- RIPE Database Documentation
- Database ‘whois’ Client
 - <http://ftp.apnic.net/apnic/dbase/tools/ripe-dbase-client.tar.gz>
 - <http://www.apnic.net/apnic-bin/whois2.pl>

Person Object Template

person:	[mandatory]	[single]	[lookup key]
address:	[mandatory]	[multiple]	[]
country:	[optional]	[single]	[]
phone:	[mandatory]	[multiple]	[]
fax-no:	[optional]	[multiple]	[]
e-mail:	[mandatory]	[multiple]	[lookup key]
nic-hdl:	[mandatory]	[single]	[primary/look-up key]
remarks:	[optional]	[multiple]	[]
notify:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]



Role Object Template

role:	[mandatory]	[single]	[lookup key]
address:	[mandatory]	[multiple]	[]
country:	[optional]	[single]	[]
phone:	[mandatory]	[multiple]	[]
fax-no:	[optional]	[multiple]	[]
e-mail:	[mandatory]	[multiple]	[lookup key]
trouble:	[optional]	[multiple]	[]
admin-c:	[mandatory]	[multiple]	[inverse key]
tech-c:	[mandatory]	[multiple]	[inverse key]
nic-hdl:	[mandatory]	[single]	[primary/look-up key]
remarks:	[optional]	[multiple]	[]
notify:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]

Maintainer Object Template

mntner:	[mandatory]	[single]	[primary/look-up key]
descr:	[mandatory]	[multiple]	[]
country:	[optional]	[single]	[]
admin-c:	[mandatory]	[multiple]	[inverse key]
tech-c:	[optional]	[multiple]	[inverse key]
upd-to:	[mandatory]	[multiple]	[inverse key]
mnt-nfy:	[optional]	[multiple]	[inverse key]
auth:	[mandatory]	[multiple]	[]
remarks:	[optional]	[multiple]	[]
notify:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
referral-by:	[mandatory]	[single]	[inverse key]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]



Inetnum Object Template

inetnum:	[mandatory]	[single]	[primary/look-up key]
netname:	[mandatory]	[single]	[lookup key]
descr:	[mandatory]	[multiple]	[]
country:	[mandatory]	[multiple]	[]
admin-c:	[mandatory]	[multiple]	[inverse key]
tech-c:	[mandatory]	[multiple]	[inverse key]
rev-srv:	[optional]	[multiple]	[inverse key]
status:	[mandatory]	[single]	[]
remarks:	[optional]	[multiple]	[]
notify:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
mnt-lower:	[optional]	[multiple]	[inverse key]
mnt-routes:	[optional]	[multiple]	[inverse key]
mnt-irt:	[optional]	[multiple]	[inverse key]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]



Aut-num Object Template

aut-num:	[mandatory]	[single]	[primary/look-up key]
as-name:	[mandatory]	[single]	[]
descr:	[mandatory]	[multiple]	[]
country:	[optional]	[single]	[]
member-of:	[optional]	[multiple]	[]
import:	[optional]	[multiple]	[]
export:	[optional]	[multiple]	[]
default:	[optional]	[multiple]	[]
remarks:	[optional]	[multiple]	[]
admin-c:	[mandatory]	[multiple]	[inverse key]
tech-c:	[mandatory]	[multiple]	[inverse key]
cross-mnt:	[optional]	[multiple]	[inverse key]
cross-nfy:	[optional]	[multiple]	[inverse key]
notify:	[optional]	[multiple]	[inverse key]
mnt-lower:	[optional]	[multiple]	[inverse key]
mnt-routes:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]

Domain Object Template

domain:	[mandatory]	[single]	[primary/look-up key]
descr:	[mandatory]	[multiple]	[]
country:	[optional]	[single]	[]
admin-c:	[mandatory]	[multiple]	[inverse key]
tech-c:	[mandatory]	[multiple]	[inverse key]
zone-c:	[mandatory]	[multiple]	[inverse key]
nserver:	[mandatory]	[multiple]	[inverse key]
sub-dom:	[optional]	[multiple]	[inverse key]
dom-net:	[optional]	[multiple]	[]
remarks:	[optional]	[multiple]	[]
notify:	[optional]	[multiple]	[inverse key]
mnt-by:	[mandatory]	[multiple]	[inverse key]
mnt-lower:	[optional]	[multiple]	[inverse key]
refer:	[optional]	[single]	[]
changed:	[mandatory]	[multiple]	[]
source:	[mandatory]	[single]	[]



Reverse DNS

- Request Forms
 - <http://www.apnic.net/db/revdel.html>
 - <http://www.apnic.net/db/domain.html>
- Classless Delegations
 - <http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2317.txt>
- Common DNS configuration errors
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1537.txt>

Reverse DNS

- Domain name structure and delegation
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1591.txt>
- Domain administrators operations guide
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1033.txt>
- Taking care of your domain
 - <ftp://ftp.ripe.net/ripe/docs/ripe-114.txt>
- Tools for DNS debugging
 - <http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2317.txt>

AS Assignment Procedures

- Guidelines for the creation, selection, and registration of an AS
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1930.txt>
- Routing Policy Specification Language (RPSL)
 - <http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2280.txt>

IPv6

- IPv6 Address Allocation & Assignment Policy
 - <http://ftp.apnic.net/apnic/docs/ipv6-address-policy>
- IPv6 Address request form
 - <http://ftp.apnic.net/apnic/docs/ipv6-alloc-request>
- FAQ
 - <http://www.apnic.net/info/faq/IPv6-FAQ.html>



IPv6: HD Ratio 0.8

IPv6 prefix	Site addr bits	Total site addrs in /48s	Threshold	Util%
42	6	64	28	43.5%
36	12	4096	776	18.9%
35	13	8192	1351	16.5%
32	16	65536	7132	10.9%
29	19	524288	37641	7.2%
24	24	16777216	602249	3.6%
16	32	4294967296	50859008	1.2%
8	40	1099511627776	4294967296	0.4%
3	45	35184372088832	68719476736	0.2%

RFC3194 "The Host-Density Ratio for Address Assignment Efficiency"

Other Supplementary Reading

- Operational Content Books
 - ISP Survival Guide - Geoff Huston
- BGP Table
 - <http://www.telstra.net/ops/bgptable.html>
 - <http://www.merit.edu/ipma/reports>
 - http://www.merit.edu/ipma/routing_table/mae-east/prefixlen.990212.html
 - <http://www.employees.org/~tbates/cidr.hist.plot.html>
- Routing Instability
 - <http://zounds.merit.net/cgi-bin/do.pl>



Other Supplementary Reading

- Routing & Mulithoming
 - Internet Routing Architectures - Bassam Halabi
 - BGP Communities Attribute
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1997.txt>
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1998.txt>
 - Multihoming
 - Using a Dedicated AS for Sites homed to a Single Provider
<http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2270.txt>

Other Supplementary Reading

- Filtering
 - Egress Filtering
<http://www.cisco.com/public/cons/isp>
 - Network Ingress Filtering: Defeating Denial of Service Attacks which employ IP Source Address Spoofing
<http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2267.txt>
- Dampening
 - case studies at
<http://www.cisco.com/warp/public/459/16.html>
- Traceroute Server
 - <http://nitrous.digex.net>

Other Supplementary Reading

- Renumbering
 - Network Renumbering Overview: Why Would I Want It and What Is It Anyway?
 - <http://ftp.apnic.net/ietf/rfc/rfc2000/rfc2071.txt>
 - Procedures for Enterprise Renumbering
 - <http://www.isi.edu/div7/pier/papers.html>
- NAT
 - The IP Network Address Translator
 - <http://ftp.apnic.net/ietf/rfc/rfc1000/rfc1631.txt>

