APNIC Member's Training Course

Internet Resource Management Essentials

26th August 2008

Christchurch, New Zealand

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

Overview

- IRMe
  - Introduction to APNIC
  - APNIC community & policy development
  - APNIC meetings
  - APNIC policies – allocation and assignment
  - APNIC policy update
  - APNIC procedures – IPv4, 2nd Opinion Request Form
  - APNIC policy and procedures – IPv6
  - APNIC policy and procedures - ASN
  - APNIC Whois database – recap
  - Privacy of customer assignment
  - MyAPNIC
  - IPv4 unallocated address space exhaustion
  - Current policy discussion
  - APNIC procedures – reverse DNS
  - APNIC statistics

APNIC 26

APNIC

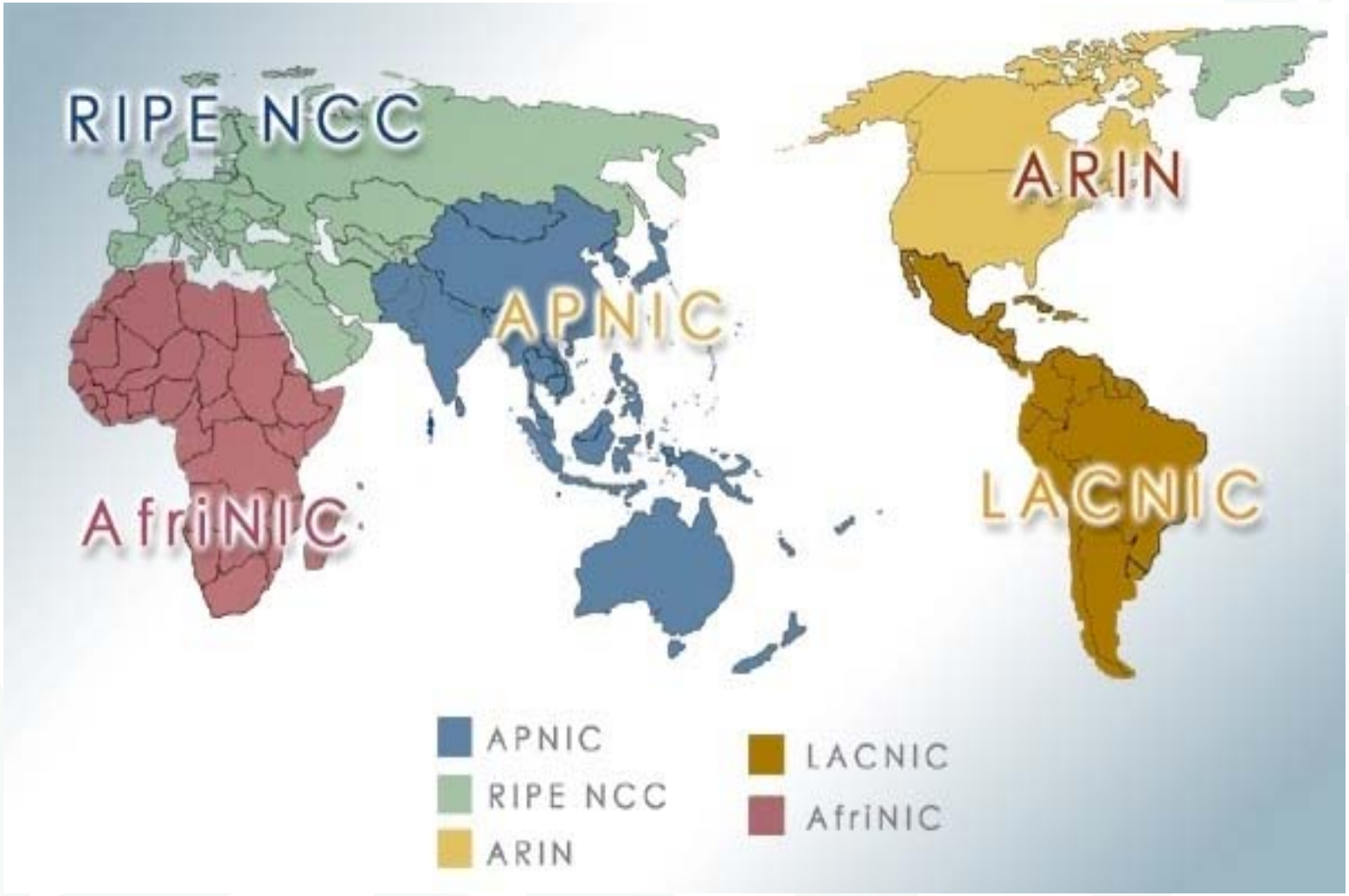
Introduction to APNIC

Asia Pacific Network Information Centre

What is APNIC?

- Regional Internet Registry (RIR) for the Asia Pacific region
  - One of five RIRs currently operating around the world
  - Non-profit, membership organisation
    - Open participation, democratic, bottom-up processes
  - Responsible for distributing Internet resources throughout the AP region
- Industry self-regulatory body
  - Consensus-based, open, and transparent decision-making and policy development
- Meetings and mailing lists
  - Open to anyone
  - http://www.apnic.net/meetings/26/index.html
  - http://www.apnic.net/community/lists/index.html

Where is APNIC region?



What does APNIC do?

Resource service

- IPv4, IPv6, ASNs
- Reverse DNS delegation
- Resource registration
  - Authoritative registration server
    - whois
    - IRR

Policy development

- Facilitating the policy development process
- Implementing policy changes

Information dissemination

- APNIC meetings
- Web and ftp site
- Publications, mailing lists
- Outreach seminars

http://www.apnic.net/community/lists/

Training & Outreach

- Training
  - Internet Resource management
  - DNS workshops

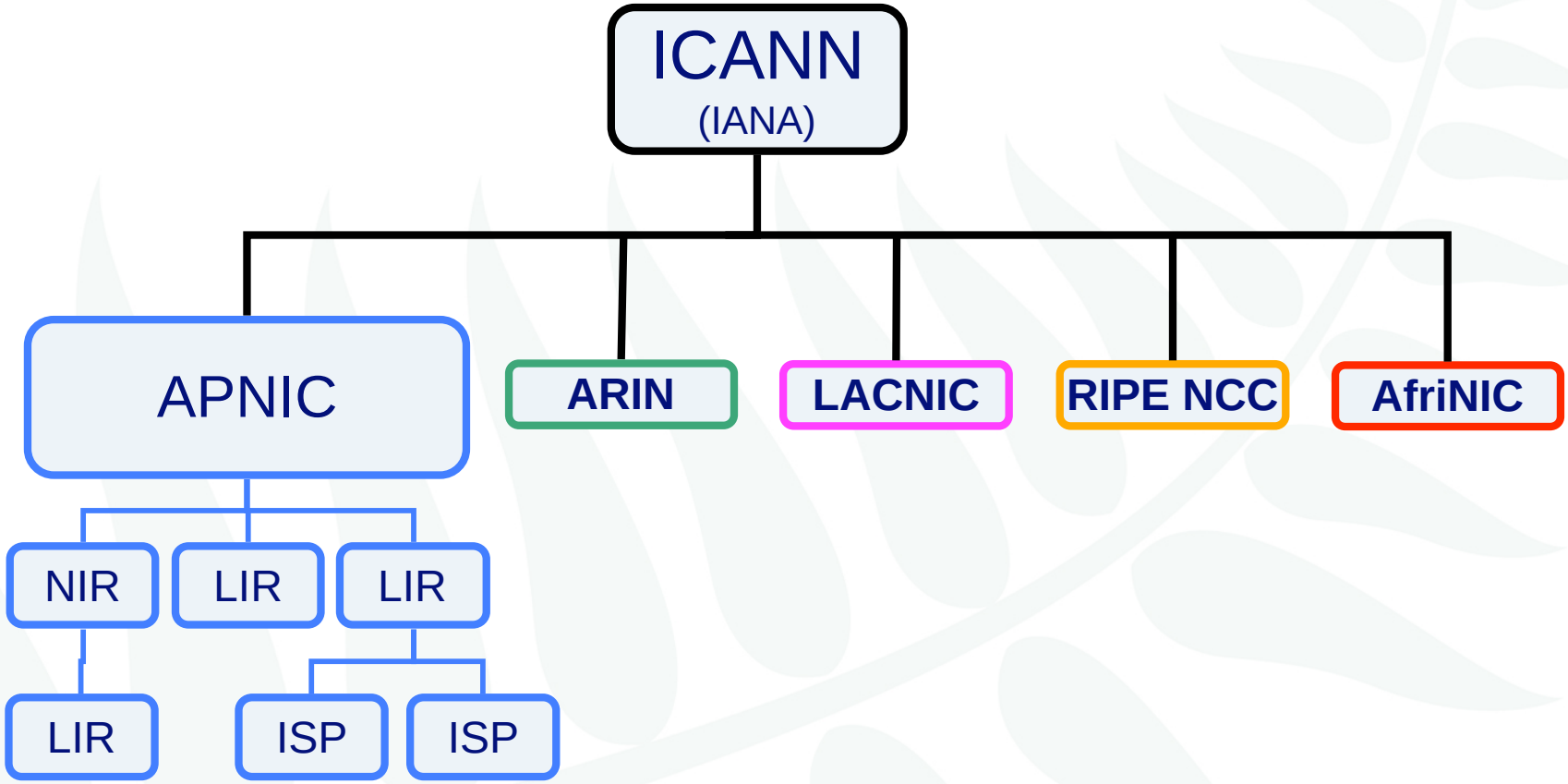
- Subsidised for members

Schedule:
http://www.apnic.net/training

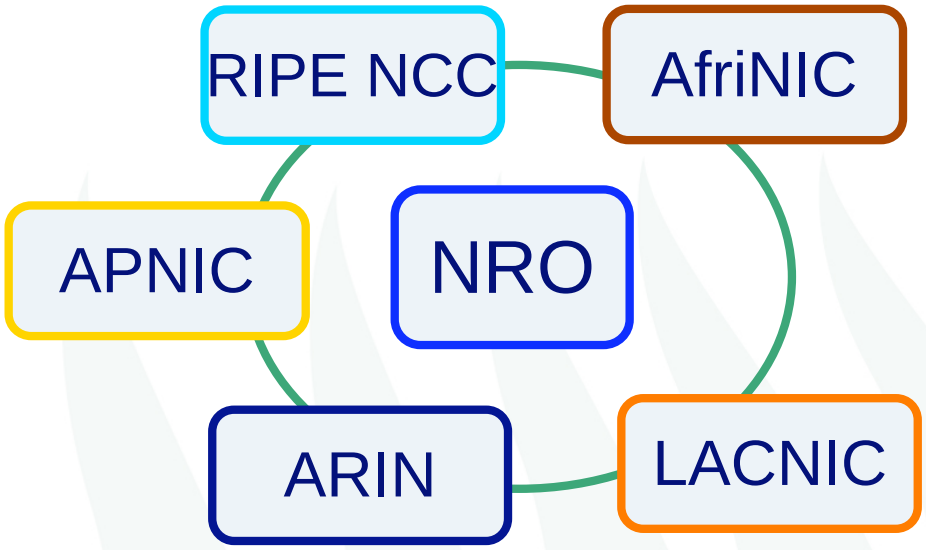
APNIC is NOT

- A network operator
  - Does not provide networking services
    - Works closely with APRICOT forum
- A standards body
  - Does not develop technical standards
    - Works within IETF in relevant areas (IPv6 etc)
- A domain name registry or registrar
    - Will refer queries to relevant parties

Internet Registry structure



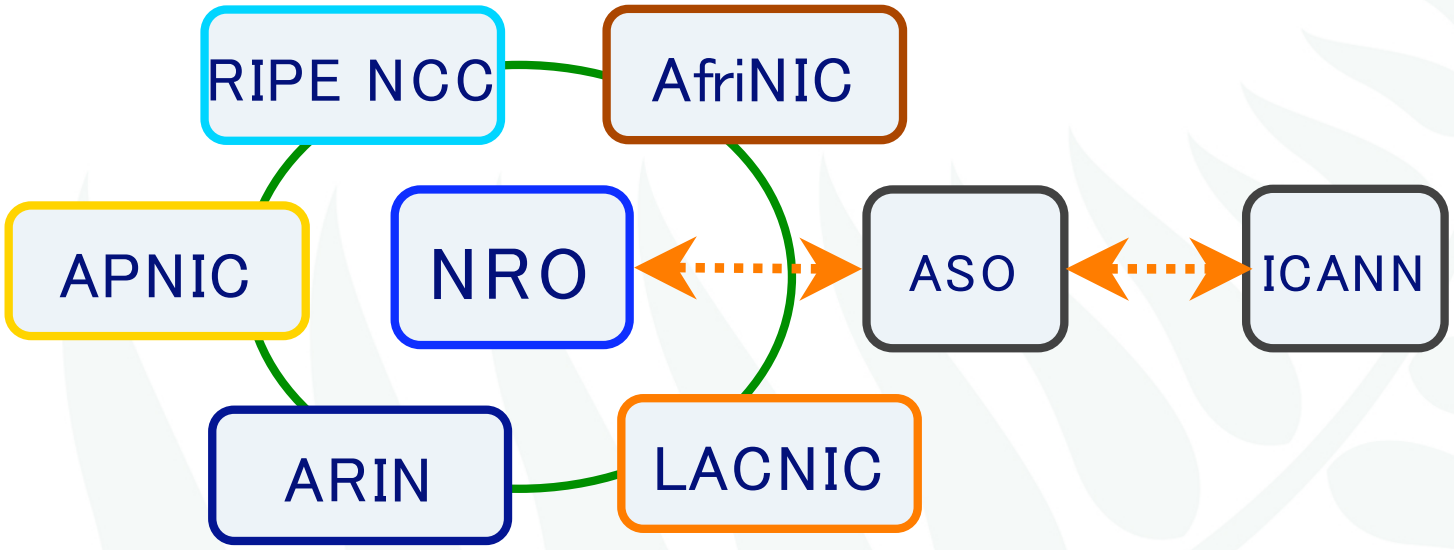
Global policy coordination



The main aims of the NRO:

- To protect the unallocated number resource pool
- To promote and protect the bottom-up policy development process
- To facilitate the joint coordination of activities e.g., engineering projects
- To act as a focal point for Internet community input into the RIR system

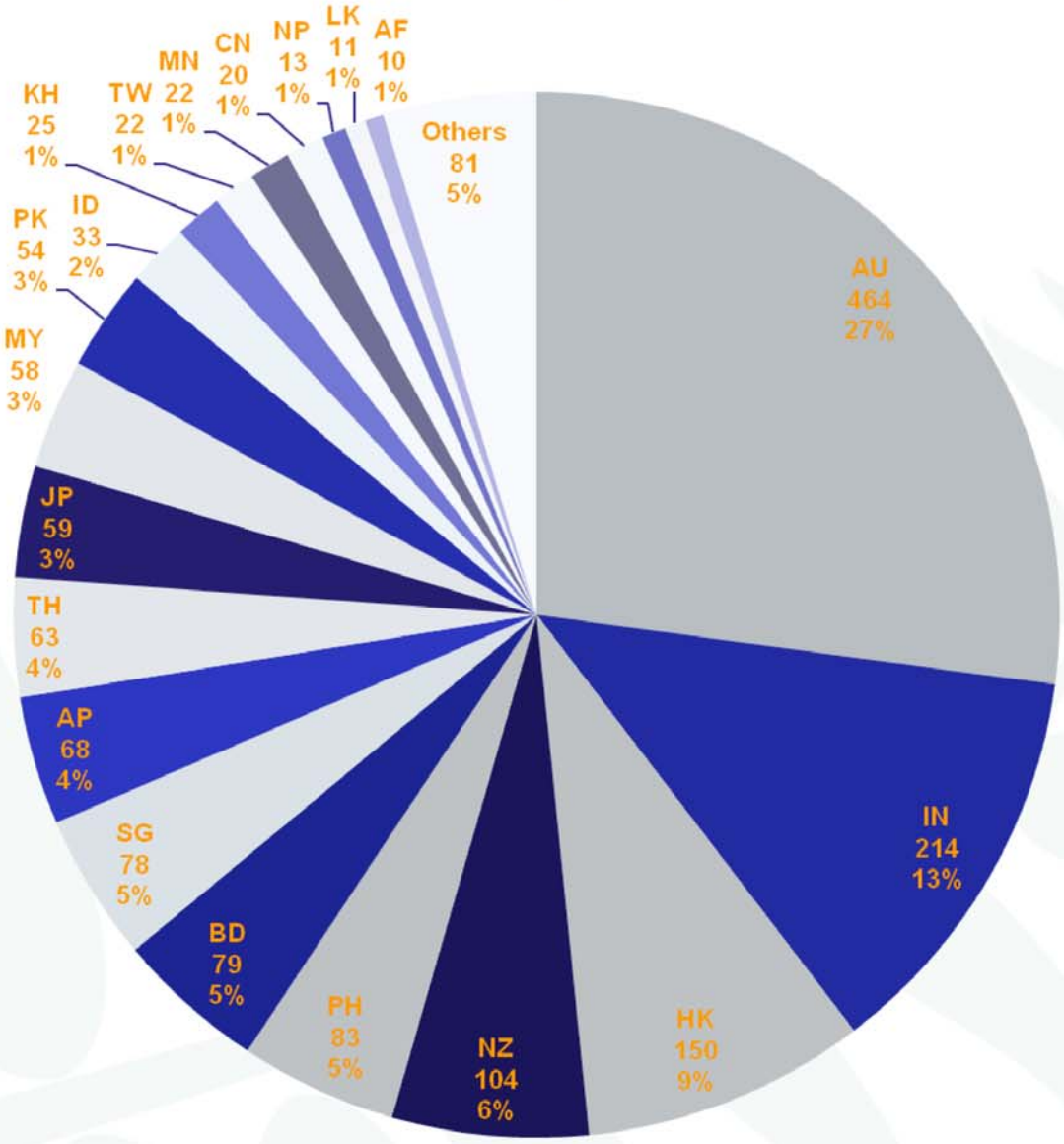
Global policy coordination



The main function of ASO:

- ASO receives global policies and policy process details from the NRO
- ASO forwards global policies and policy process details to ICANN board

APNIC membership



Source: APNIC statistic data - Last update May 2008

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Questions?

APNIC Community & Policy Development

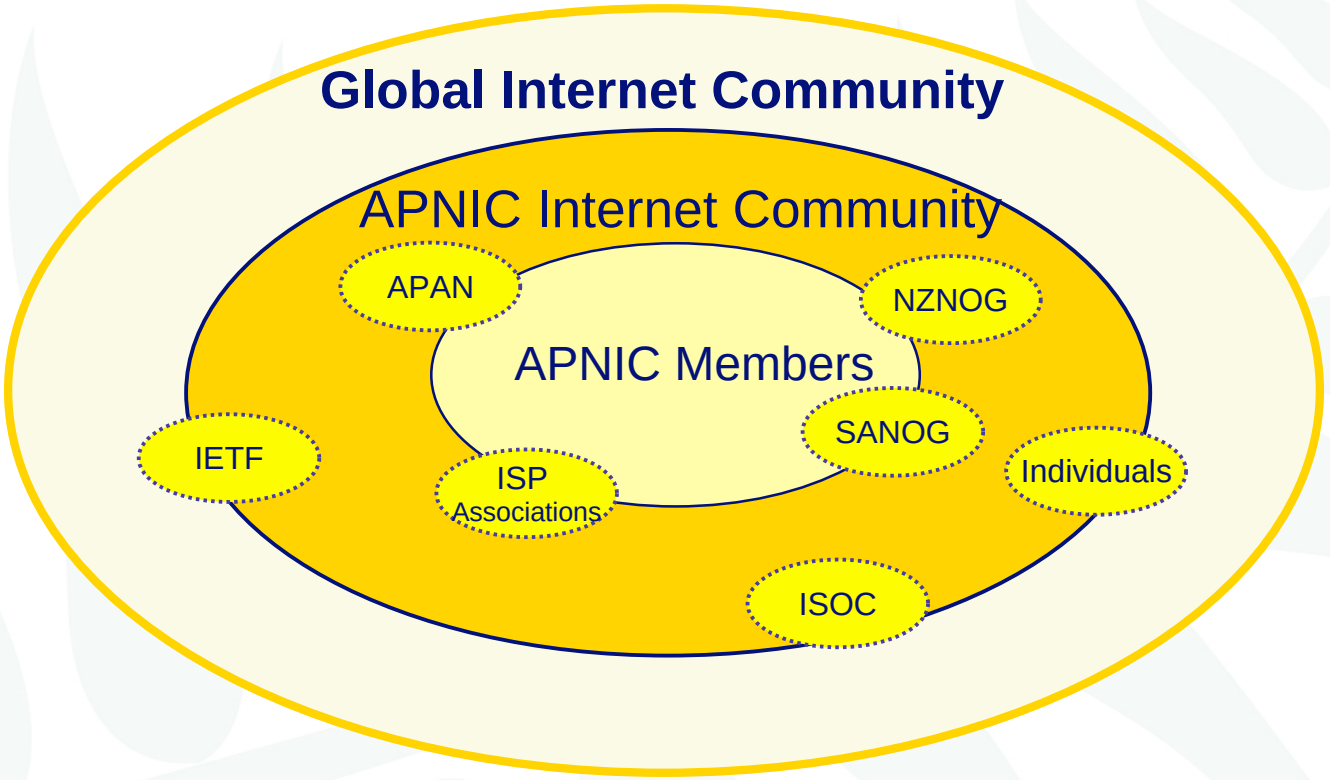
What is the APNIC community?

- **Open** forum in the Asia Pacific
  - Open to any interested parties
- Voluntary participation
- Decisions made based on consensus
- Public meetings
- Mailing lists
  - web archived

- *A voice in regional Internet operations through participation in APNIC activities*

You are part of APNIC community!

- **Open** forum in the Asia Pacific
  - Open to any interested parties



– A voice in regional Internet operations through participation in APNIC

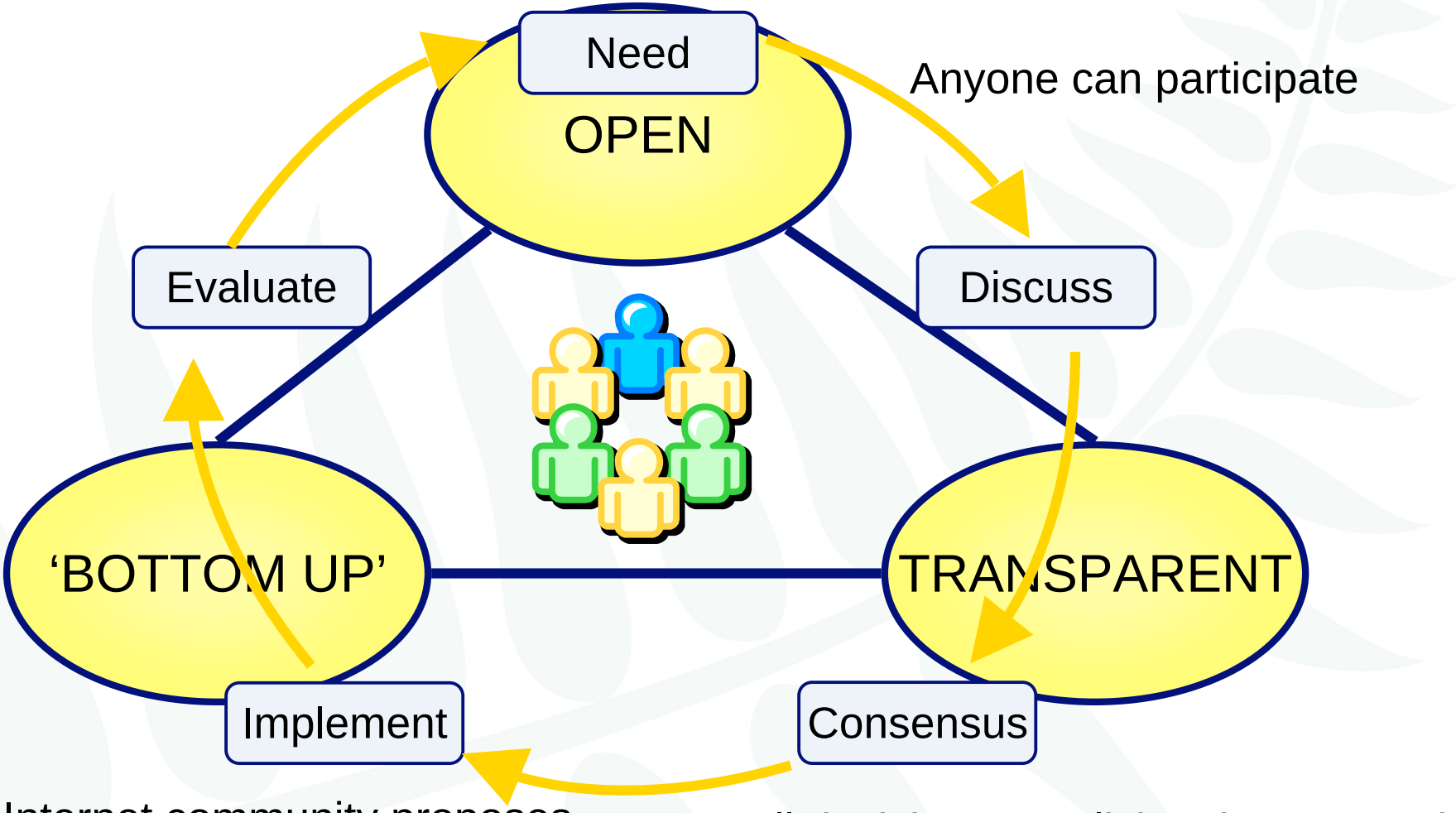
Policy development

- Industry self-regulatory process
  - Policy is developed by the AP Internet community to suit needs of region
  - Facilitated by RIR staff
- Policy implementation
  - APNIC shares with its members and their customers a collective responsibility
    - RIR process
    - ISPs and other affected parties

Participation in policy development

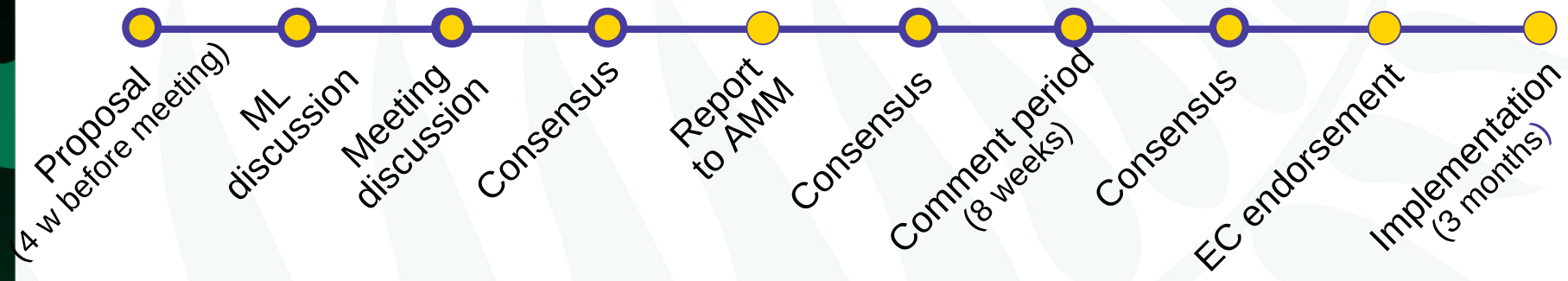
- Why should I bother?
  - Responsibility as an APNIC member
    - To be aware of the current policies for managing address space allocated to you
  - Business reasons
    - Policies affect your business operating environment and are constantly changing
    - Ensure your ‘needs’ are met
  - Educational
    - Learn and share experiences
    - Stay abreast with ‘best practices’ in the Internet

Policy Development Process



The policy development process

Need Discuss Consensus Implement



You can participate!

More information about policy development can be found at:
http://www.apnic.net/docs/policy/dev

How to make your voice heard

- Contribute on the public mailing lists
  - http://www.apnic.net/community/lists/index.html
- Attend meetings
  - Or send a representative
  - Watch webcast (video streaming) from the meeting web site
  - Read live transcripts from the meeting web site
  - And express your opinion via Jabber chat
- Give feedback
  - Training or seminar events

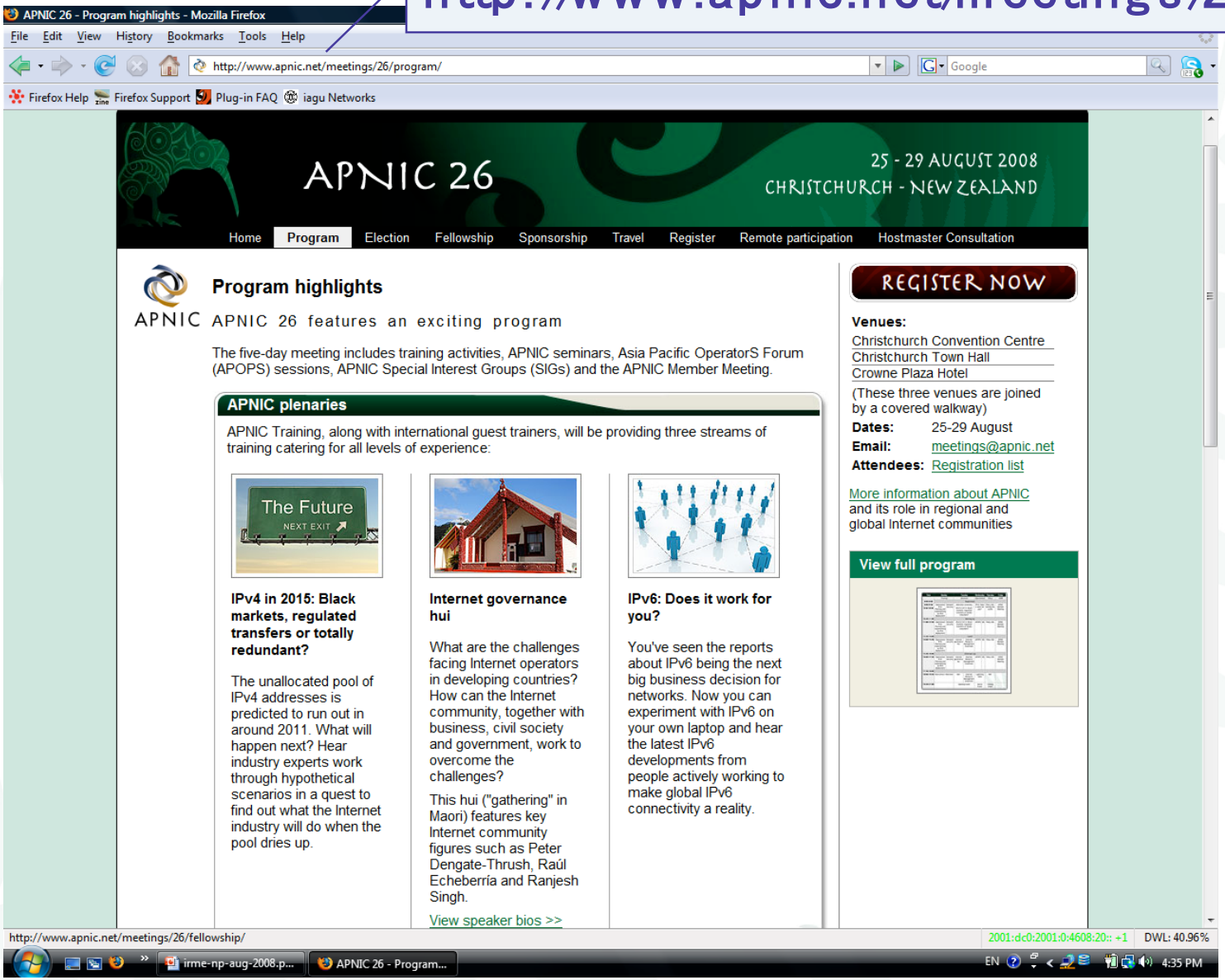
APNIC meetings

Next meetings

- **APNIC 26**
  - Christchurch, New Zealand
  - 25 - 29 August 2008
- **APNIC 27**
  - Held in conjunction with APRICOT 2009
  - Manila, Philippines
  - 18 - 27 February 2009
- **APNIC 28**
  - Beijing, China
  - 24 - 28 August 2009
- **APNIC 29**
  - Held in conjunction with APRICOT 2010
  - Kuala Lumpur, Malaysia
  - 24 Feb – 5 Mar 2010

APNIC 26

http://www.apnic.net/meetings/26/



APNIC meetings

- Participate remotely

– **Video streaming**

  - Selected sessions are video streamed live via unicast and multicast

– **Audio streaming**

  - For users with lower bandwidth follow live audio streamed in MP3 format

– **Live transcripts**

  - Live transcripts of selected sessions available via Jabber and web browsers

– **Jabber chat**

  - Jabber chat rooms give people around the world the chance to participate in meeting sessions in near real time

Sponsorship invite for APNIC 26 and 27

- Aim
  - Reduce delegate costs (important for developing economies in region)
- Benefits
  - Promote products and services to international audience
  - Align brand with a credible forum
- Sponsorship opportunities
  - Social events
  - Exhibition booths
  - Day sponsorship
  - Training program sponsorship
  - Webcast
  - Fellowships
- Contact
  - meetings@apnic.net

APNIC policies

Internet registry allocation and assignment

Policies

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

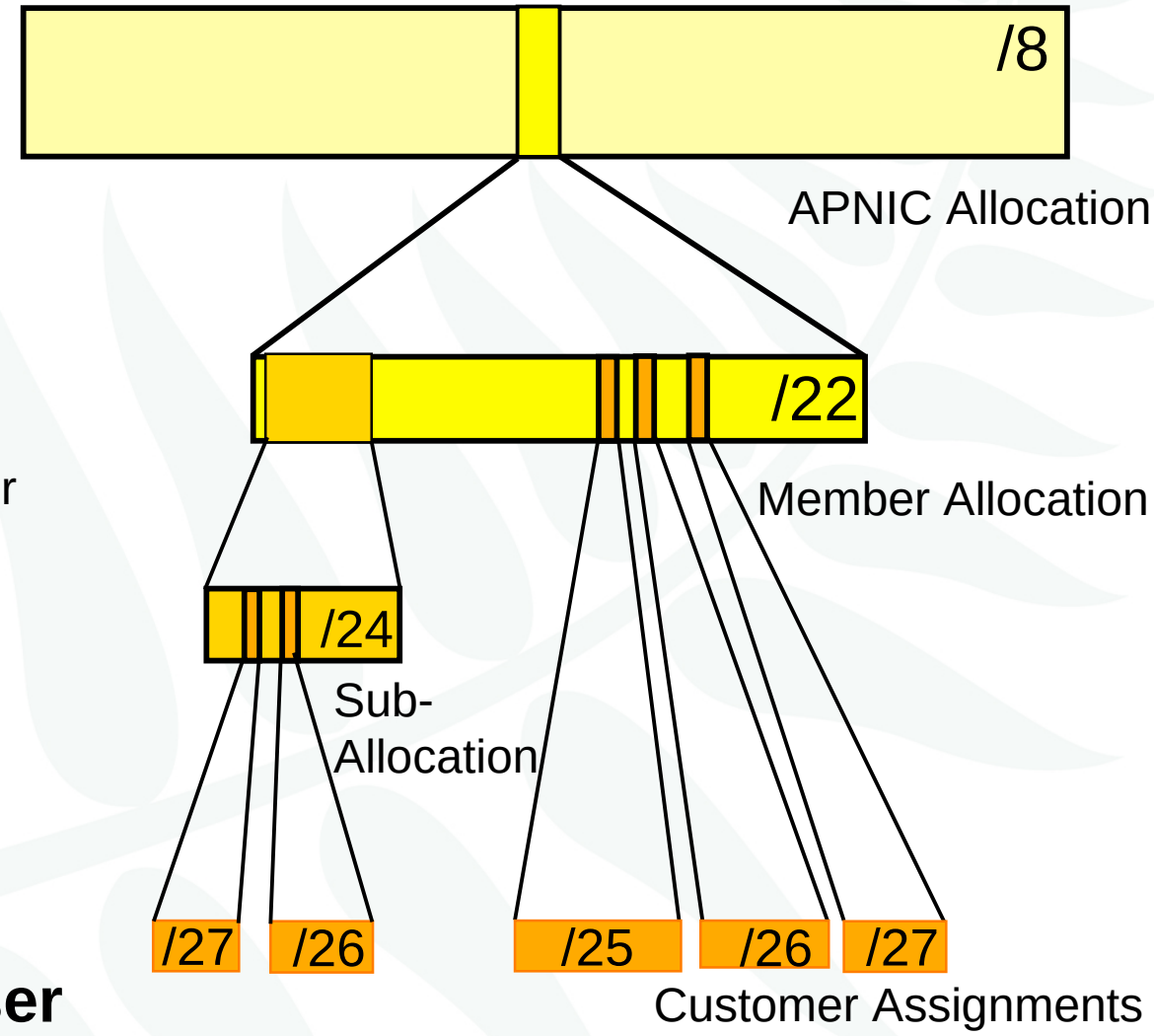
APNIC Member

Allocates
to downstream

Assigns
to end-user

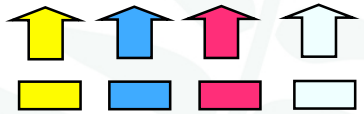
Downstream
Assigns
to end-user

Customer / End User



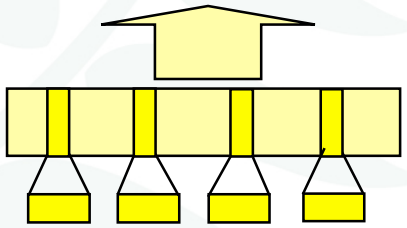
Portable & non-portable

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

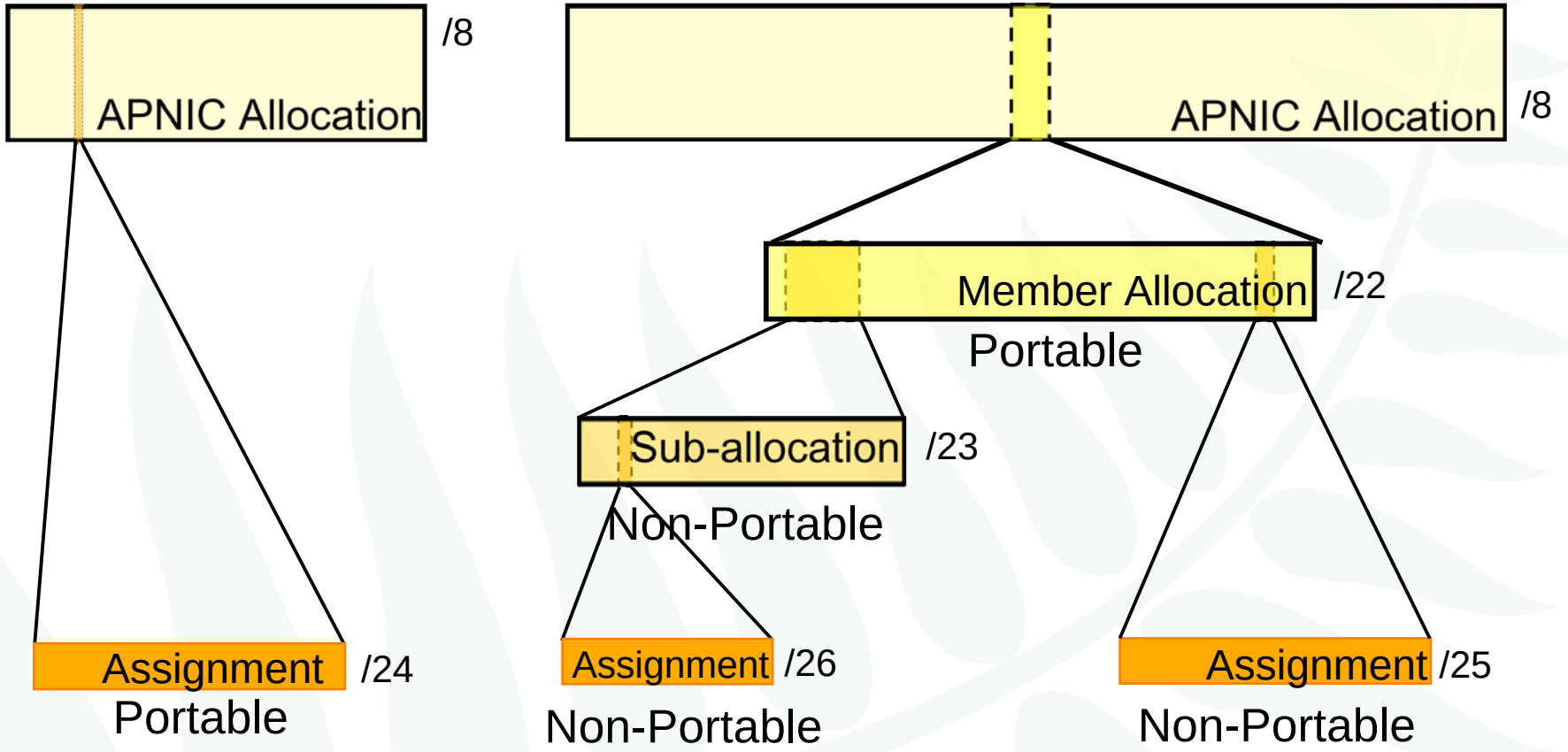


- Customer uses ISP's address space
  - Must renumber if changing ISP
- Only way to effectively scale the Internet

Portable allocations

- Allocations made by APNIC/NIRs"

Address management hierarchy



- Describes “portability” of the address space

Internet resource management objectives

Conservation

- Efficient use of resources
- Based on demonstrated need

Aggregation

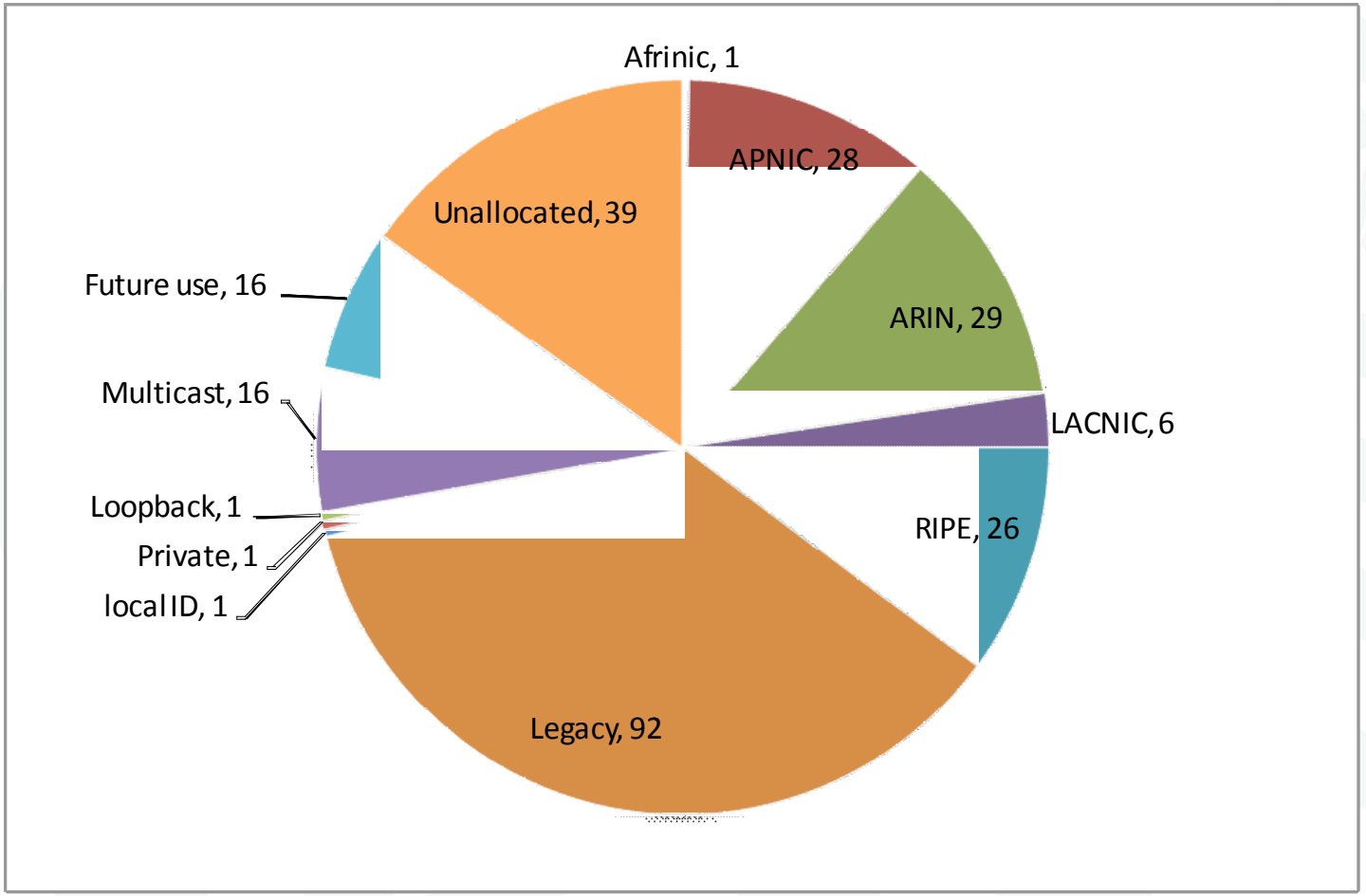
- Limit routing table growth
- Support provider-based routing

Registration

- Ensure uniqueness
- Facilitate trouble shooting

Uniqueness, fairness and consistency

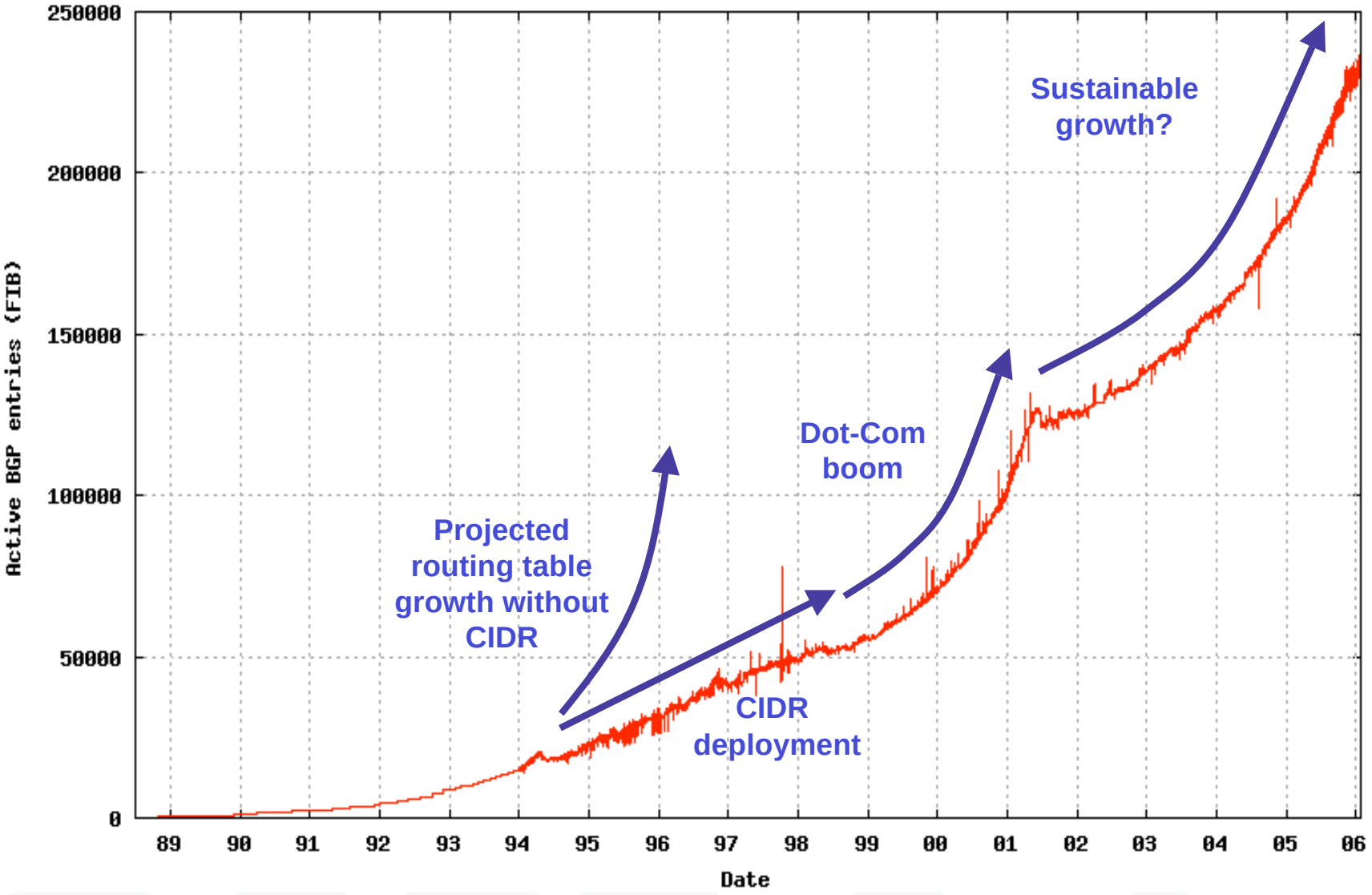
Why do we need policies?
- Global IPv4 Delegations (in /8)



Total /8 blocks: 256

As of 14/08/08

Growth of global routing table



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

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-allocations 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

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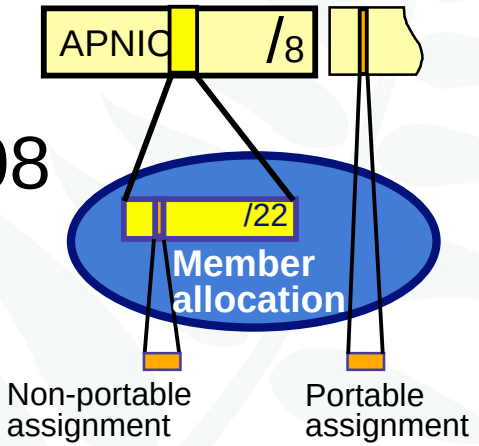
Initial IPv4 allocation

- prop-053: Changing minimum IPv4 allocation size to /22
  - Implemented on 4th August 2008
  - The minimum allocation size has been reduced to /22
  - Two of the criteria for an initial allocation have been updated to show:
    - An LIR must have used a /24 from their upstream provider or demonstrate an immediate need for a /24
    - An LIR must demonstrate a detailed plan for use of a /23 within a year



prop-53

- prop-053: Changing minimum IPv4 allocation size to /22
- Initial allocation criteria be changed
  - **From**
    - Initial allocation size /21
  - **To**
    - Initial allocation size /22
- Implemented on 4th August 2008

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

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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

Portable assignments

- Small multihoming assignment policy
  - *For (small) organisations who require a portable assignment for multi-homing purposes*

Criteria

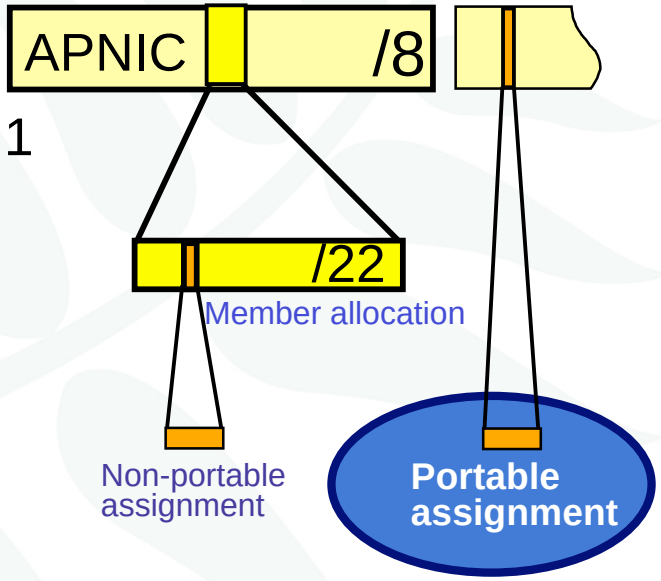
1a. Applicants currently multihomed

OR

1b. Demonstrate a plan to multihome within 1 month

2. Agree to renumber out of previously assigned space

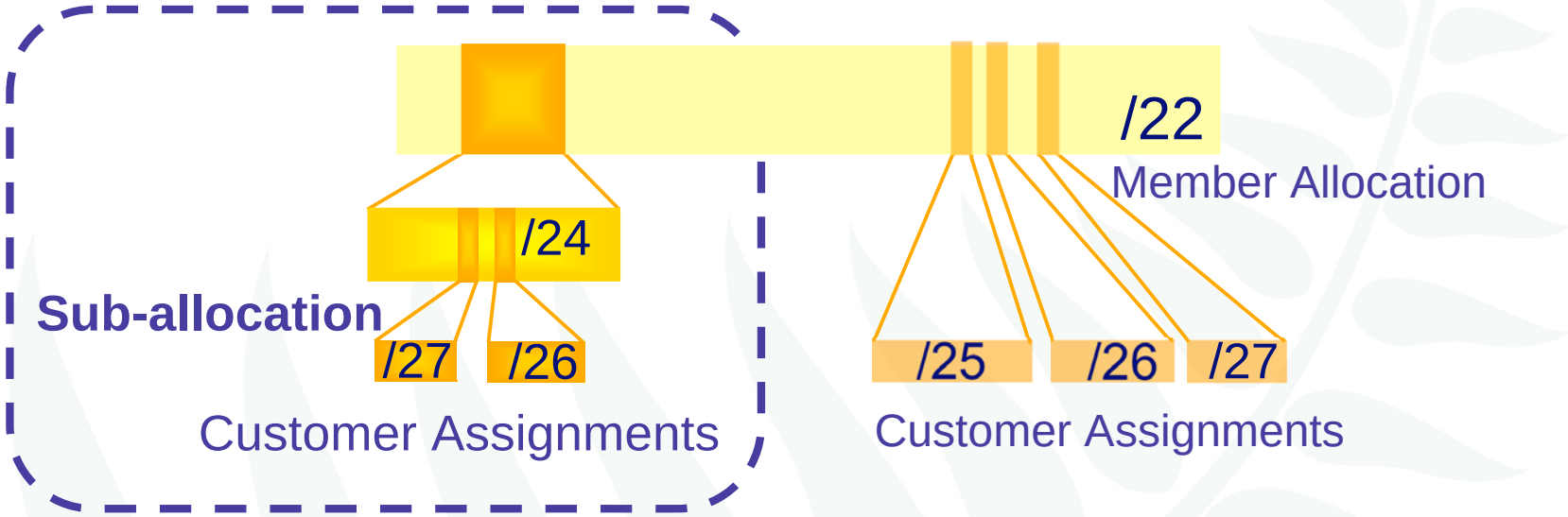
Demonstrate need to use 25% of requested space immediately and 50% within 1 year



Policy for IXP assignments

- Criteria
  - 3 or more peers
  - Demonstrate “open peering policy”
- APNIC has a reserved block of space from which to make IXP assignments

Sub-allocations



- No max or min size
  - Max 1 year requirement
- Assignment Window & 2nd Opinion applies
  - to both sub-allocation & assignments
    - Sub-allocation holders don't need to send in 2nd opinions

Sub-allocation guidelines

- Sub-allocate cautiously
  - Seek APNIC advice if in doubt
  - If customer requirements meet min allocation criteria:
    - Customers should approach APNIC for portable allocation
- Efficient assignments
  - LIRs responsible for overall utilisation
    - Sub-allocation holders need to make efficient assignments
- Database registration
  - Sub-allocations & assignments to be registered in the db

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Portable critical infrastructure assignments

- What is Critical Internet Infrastructure?
  - Domain registry infrastructure
    - Root DNS operators, gTLD operators, ccTLD operators
  - Address Registry Infrastructure
    - RIRs & NIRs
    - IANA
- Why a specific policy ?
  - Protect stability of core Internet function
- Assignment sizes:
  - IPv4: /24
  - IPv6: /32

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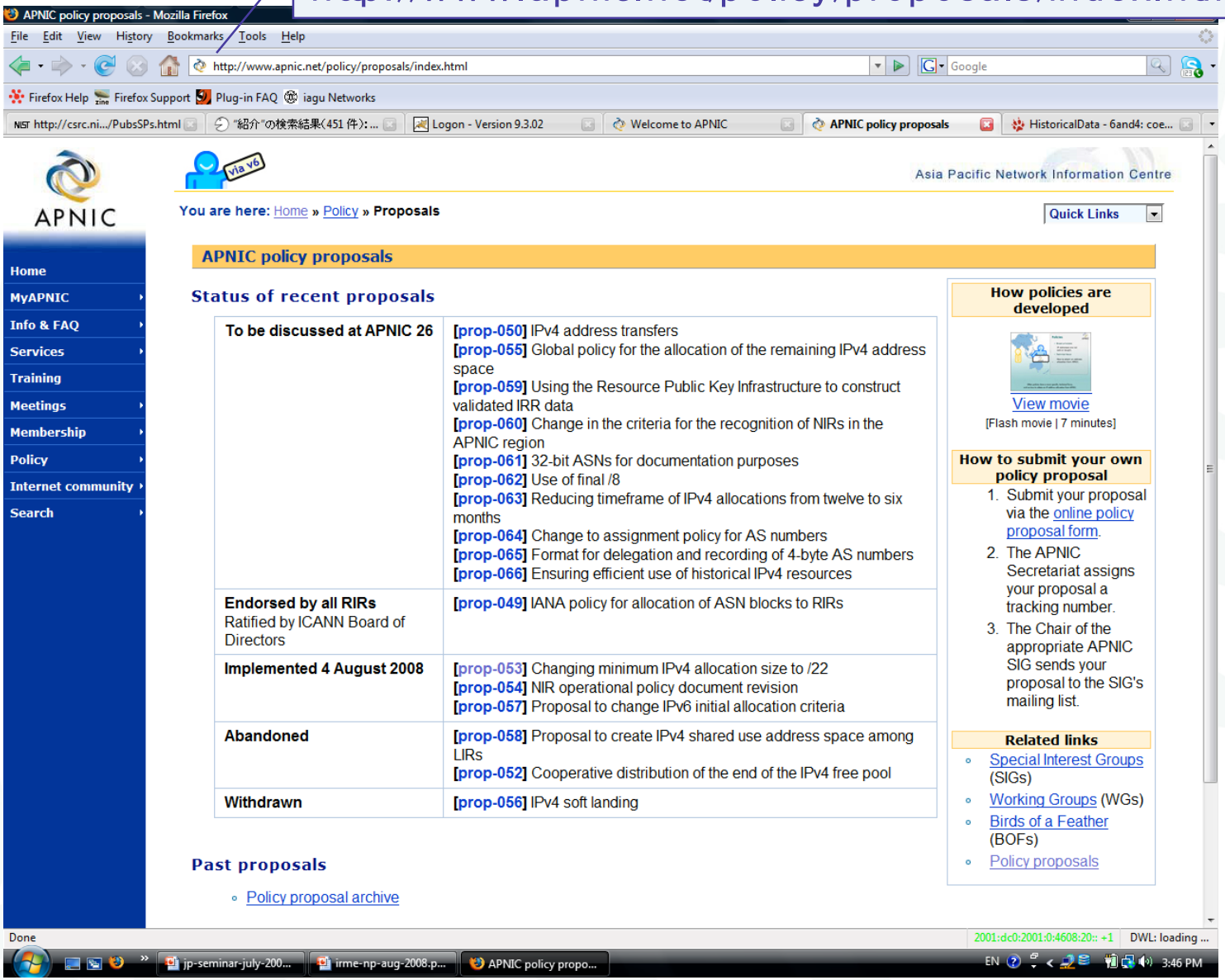
Supporting historical resource transfer

- Bring historical resource registrations into the current policy framework
  - Allow transfers of historical resources to APNIC members
    - the recipient of the transfer must be an APNIC members
    - no technical review or approval
    - historical resource holder must be verified
    - resources will then be considered "current"
- Address space subject to current policy framework
- We will talk this topic in more details later

APNIC policy update

Status of recent policy proposals

http://www.apnic.net/policy/proposals/index.html



prop-53

- prop-053: Changing minimum IPv4 allocation size to /22
- Initial allocation criteria be changed
  - **From**
    - Initial allocation size /21
  - **To**
    - Initial allocation size /22
- Implemented on 4th August 2008

prop-57

- Proposal to change IPv6 initial allocation criteria
  - Proposed by the JPNIC community
  - to remove barrier from current IPv6 initial allocation criteria
  - Adding one condition
    - Current LIRs with IPv4 allocations to receive IPv6 initial allocations without a plan for 200 assignments
    - See next slide for more details
- Current status
  - Implemented on 4th August 2008

prop-57

- Initial allocation criteria be changed
  - **From**
    - Have a plan for making at least 200 assignments to other organizations within two years.
  - **To**
    - Have a plan for making at least 200 assignments to other organizations within two years;

      - OR
    - Be an existing LIR with IPv4 allocations from an RIR/NIR which makes IPv6 assignments and/or sub-allocations to other organizations and announces the allocation in the inter-domain routing system within two years.

APNIC procedures

Ongoing request from

ISP address request

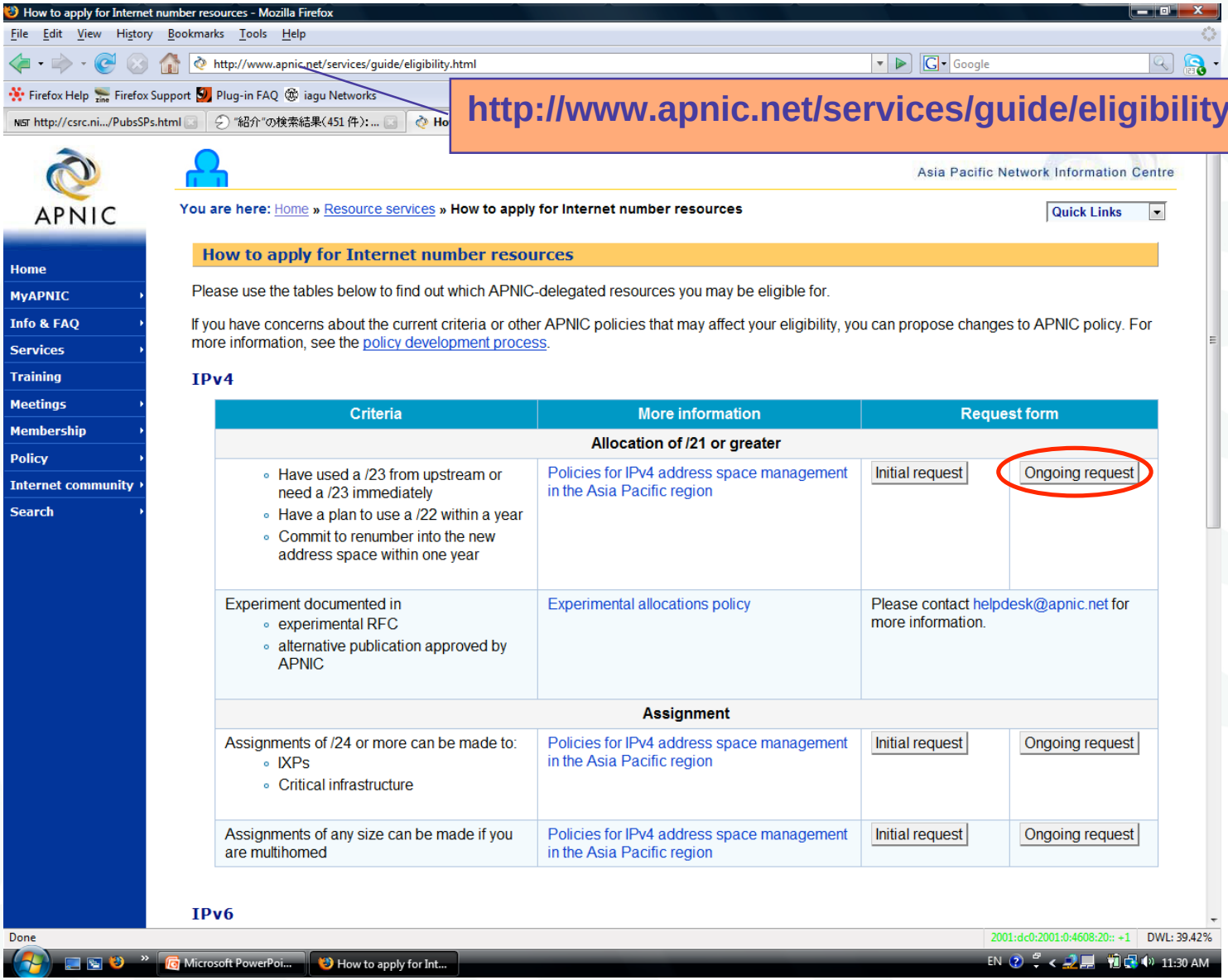
members only

- 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

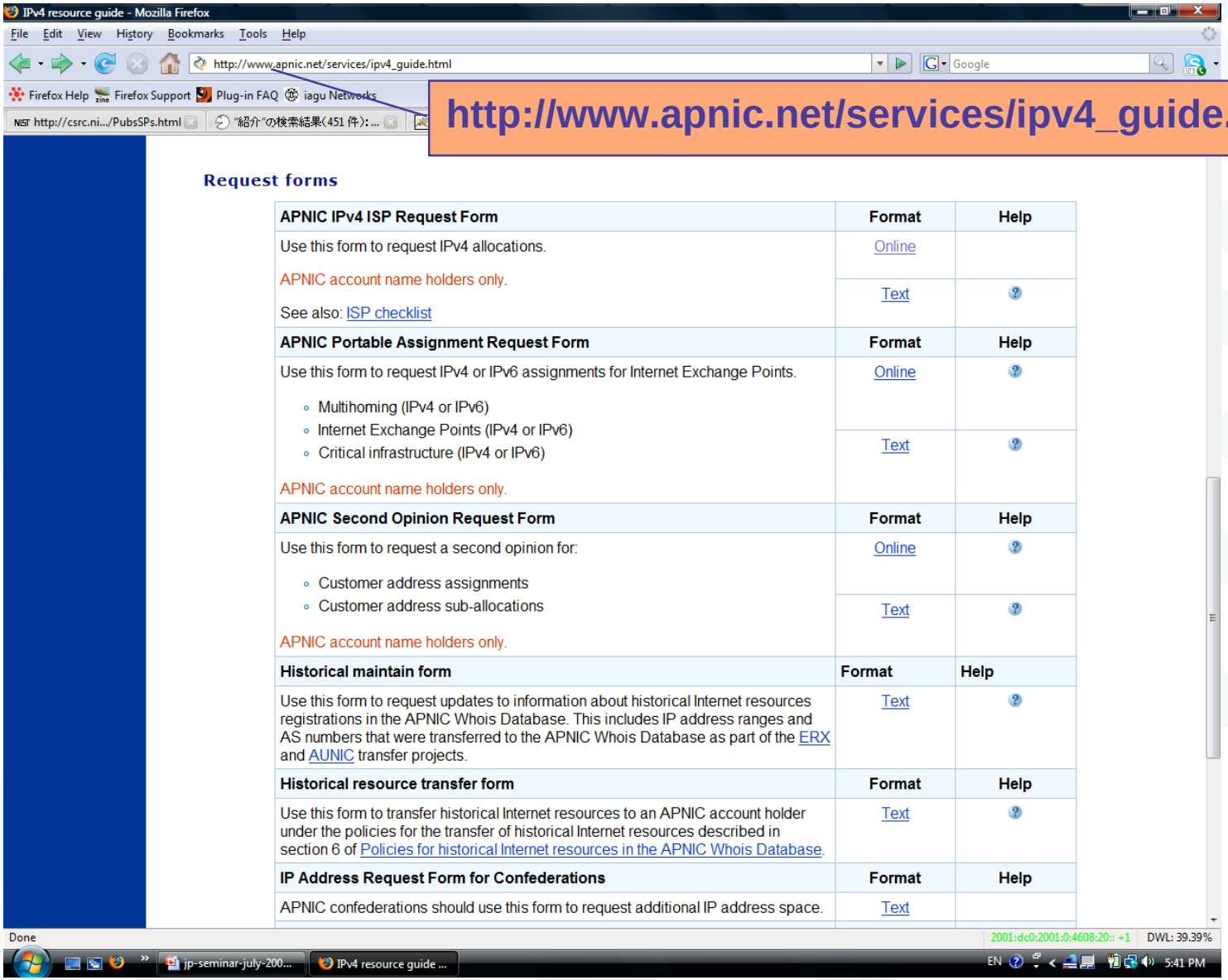
ISP address request - Overview

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

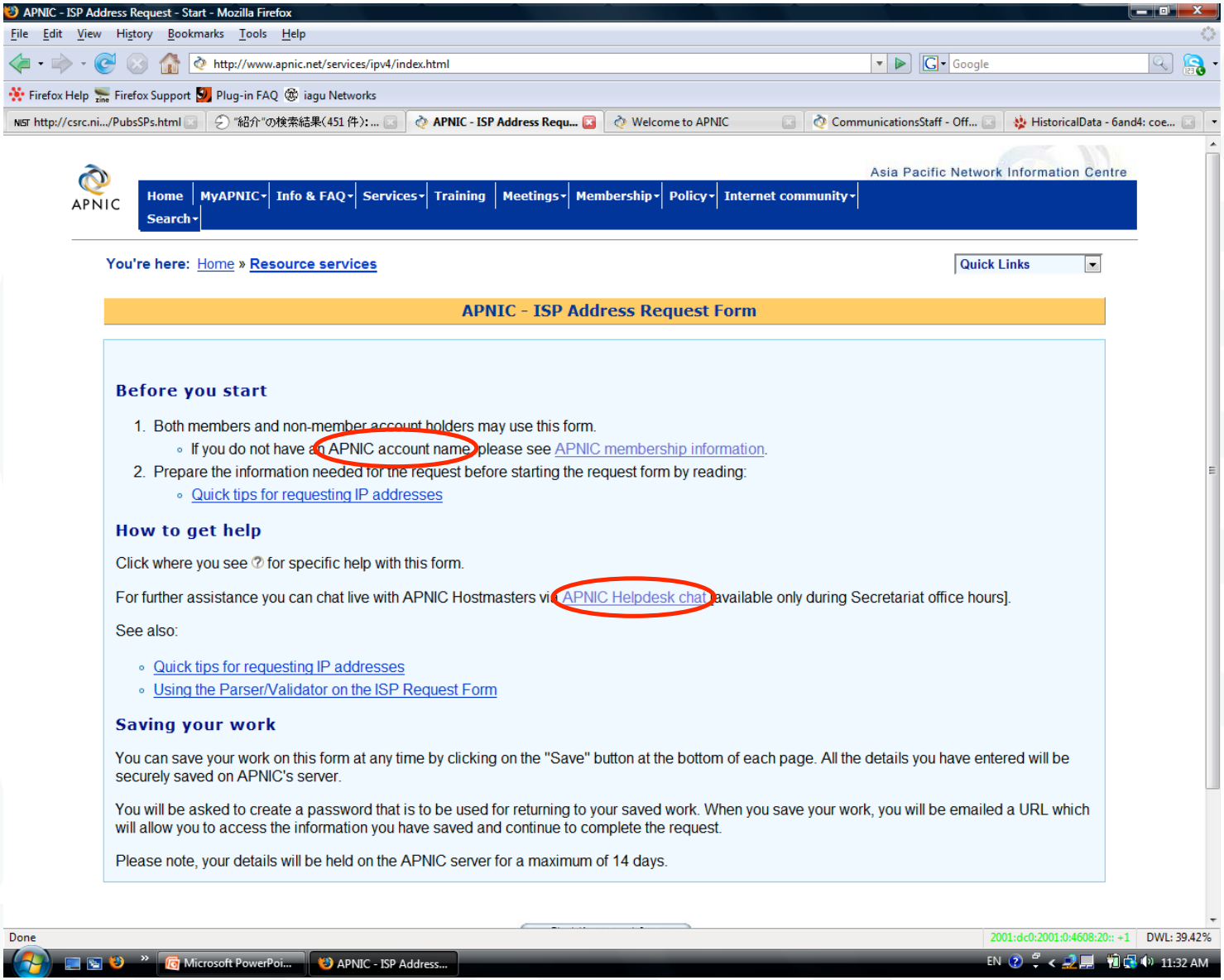
How to apply Internet number resources



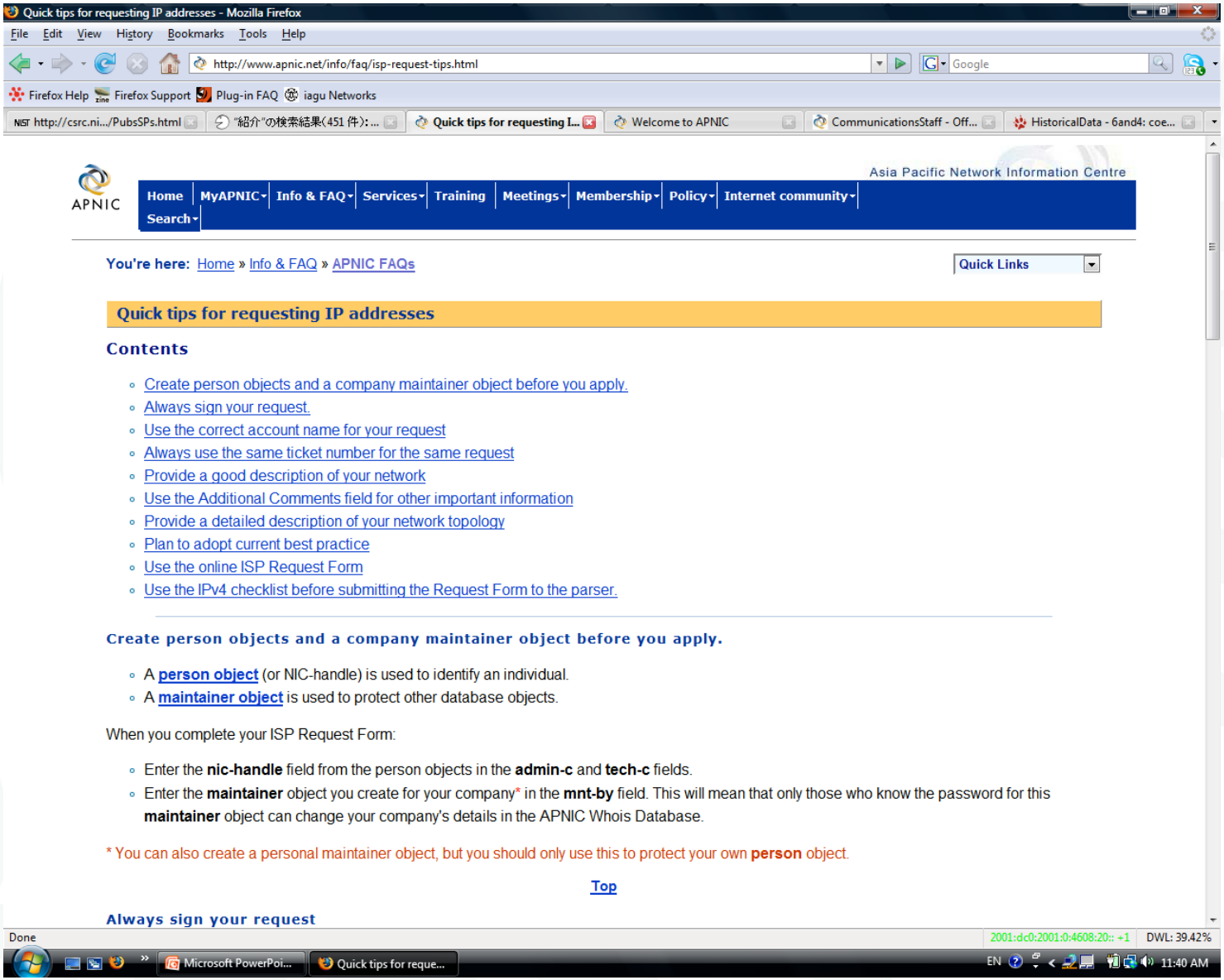
IPv4 ISP request form



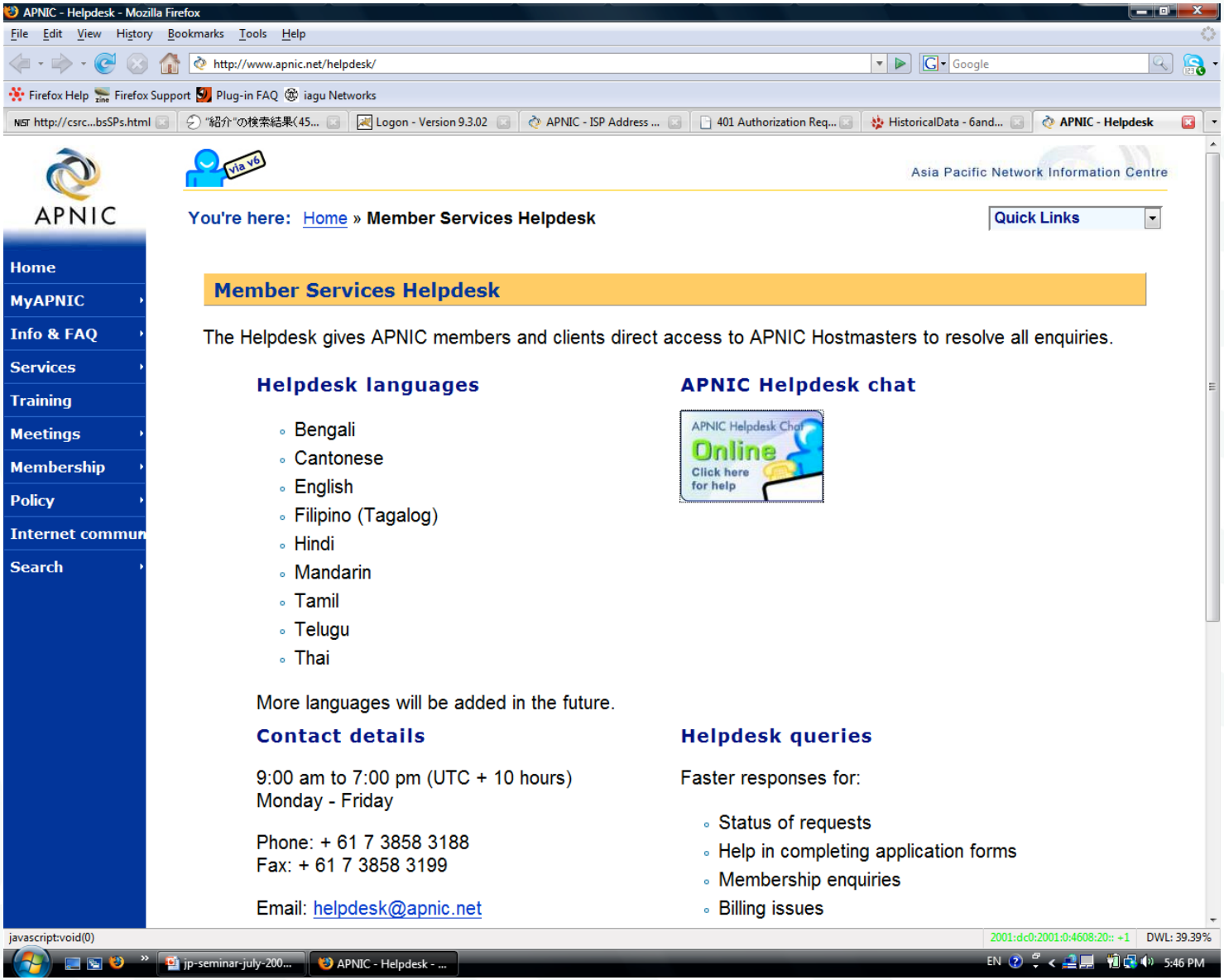
Ongoing request



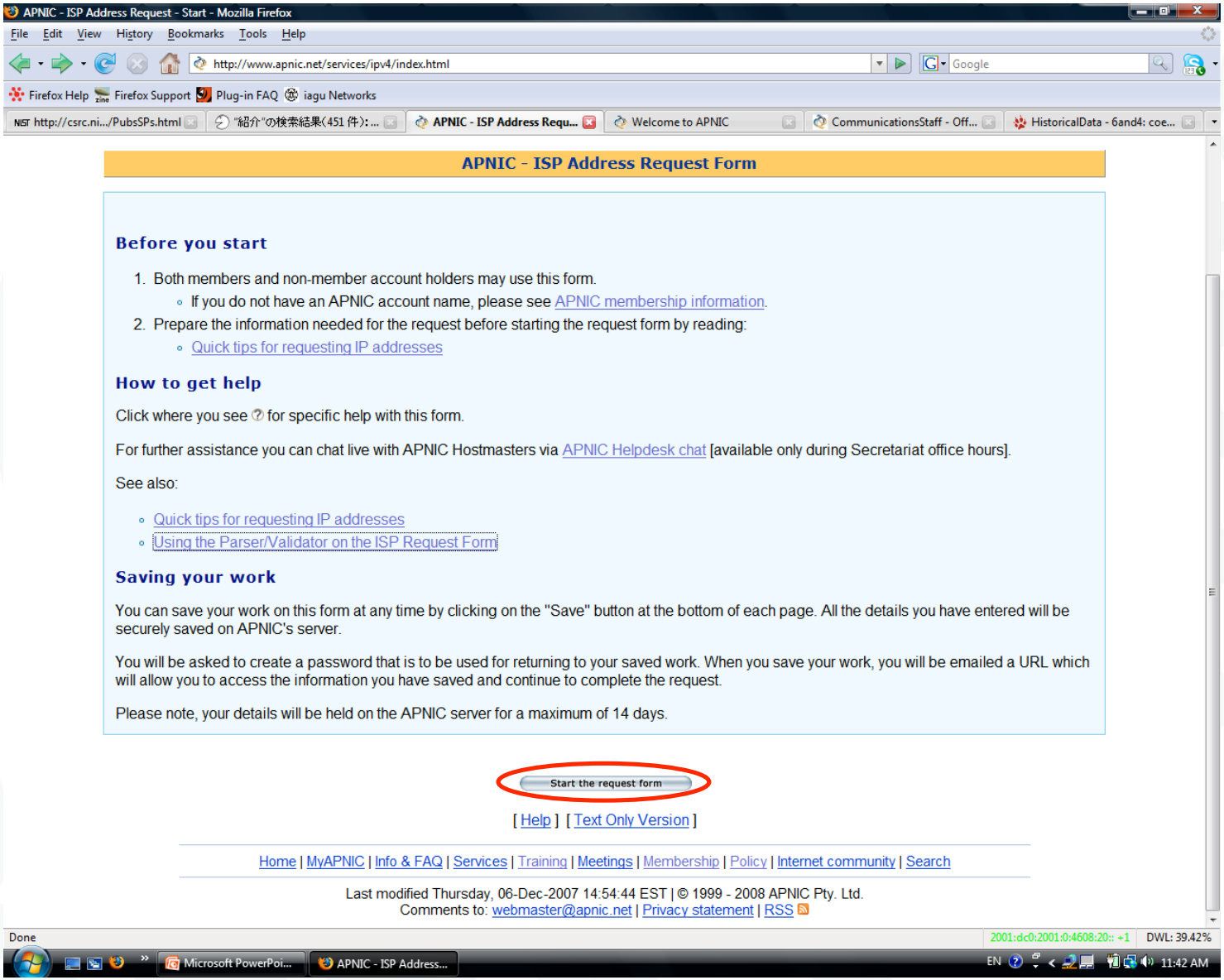
Quick tips for requesting IP addresses



APNIC Helpdesk chat



Ongoing request



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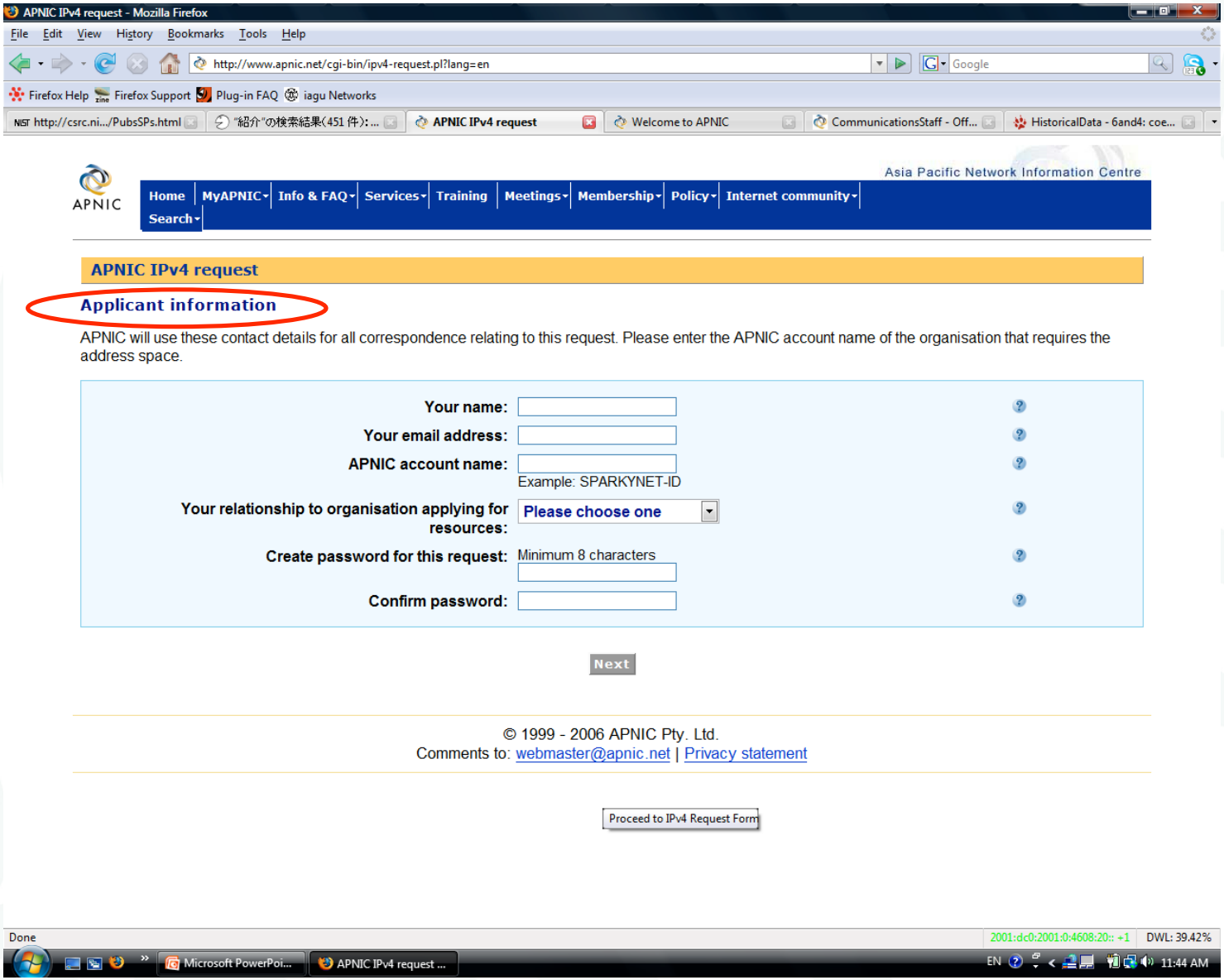

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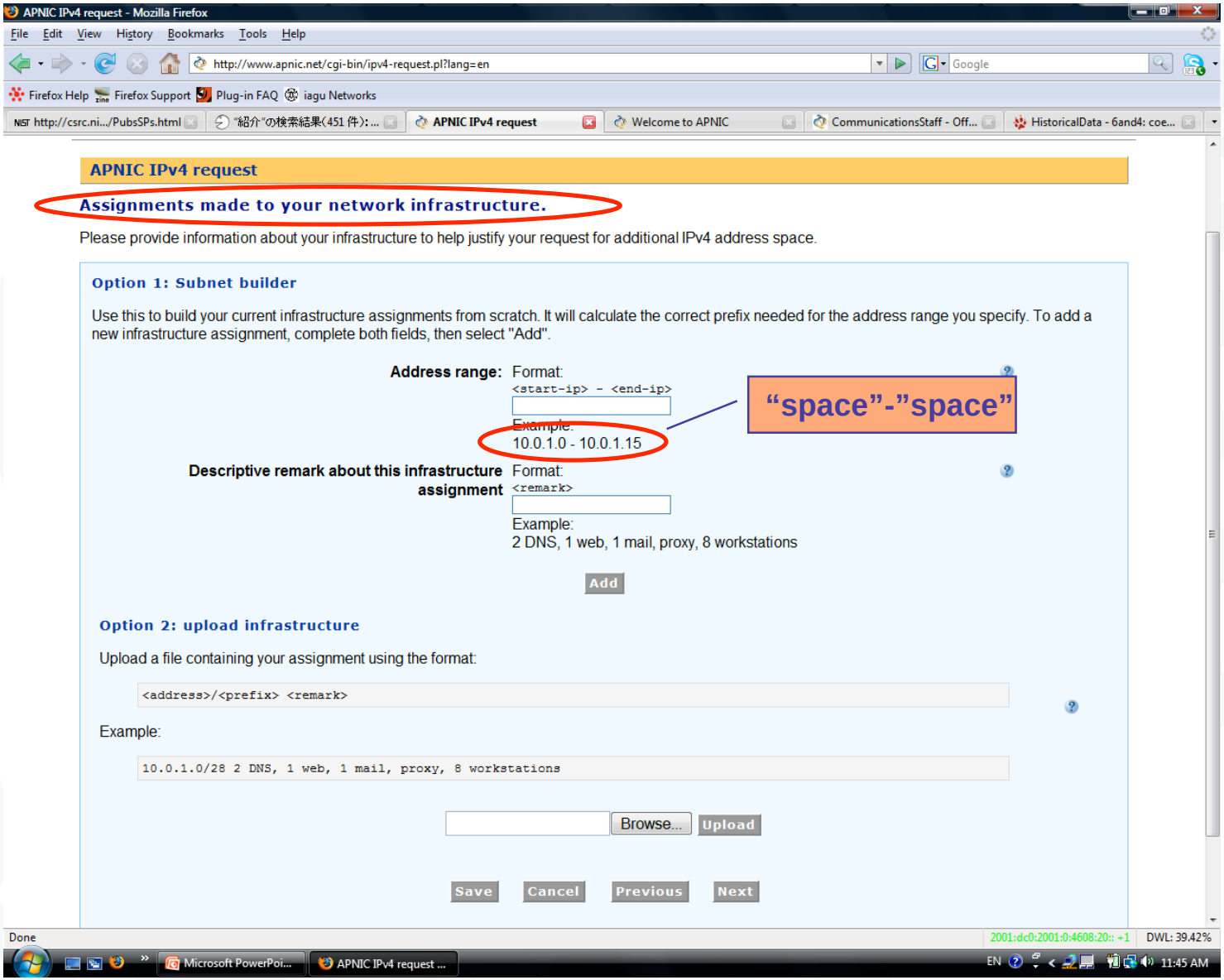

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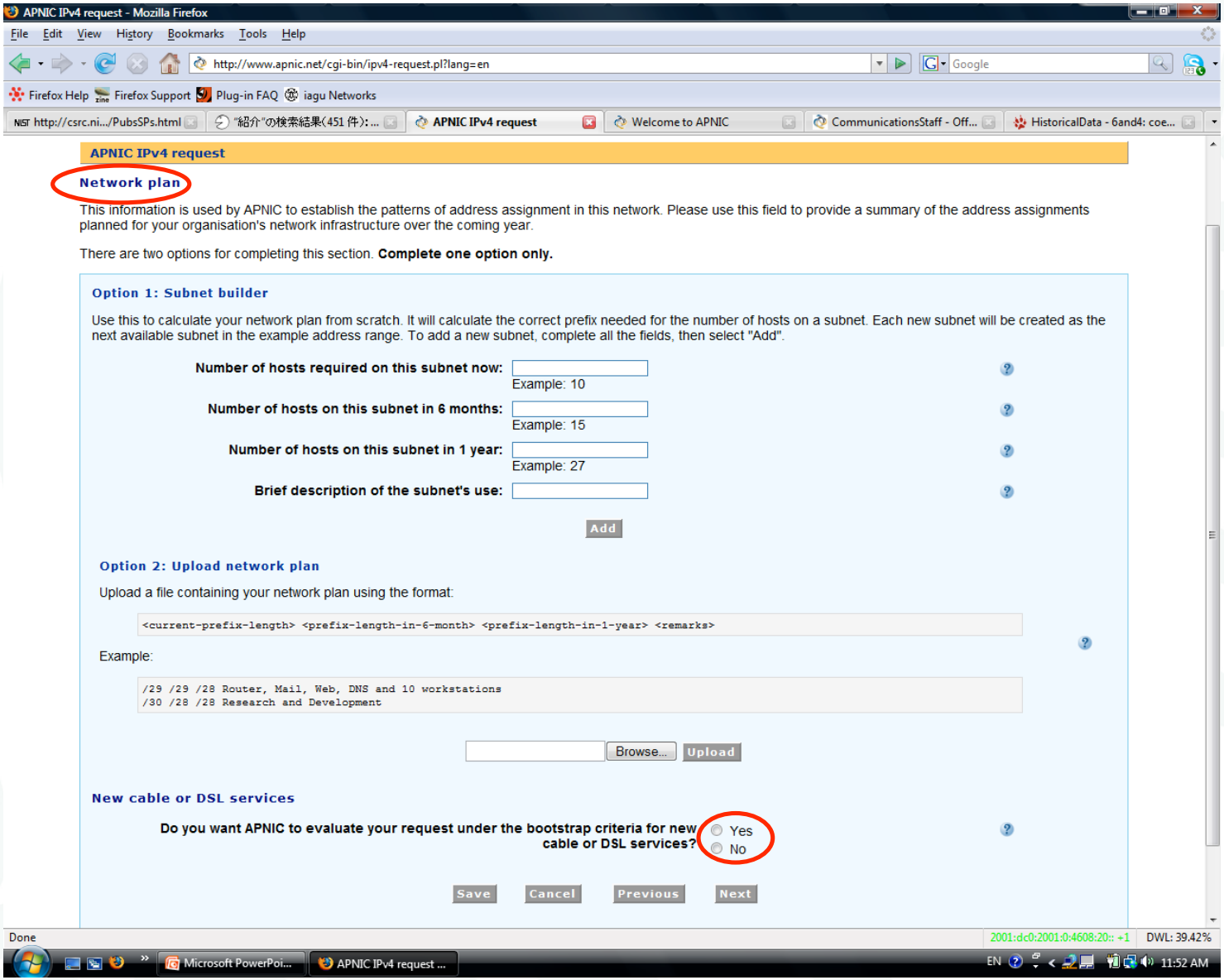
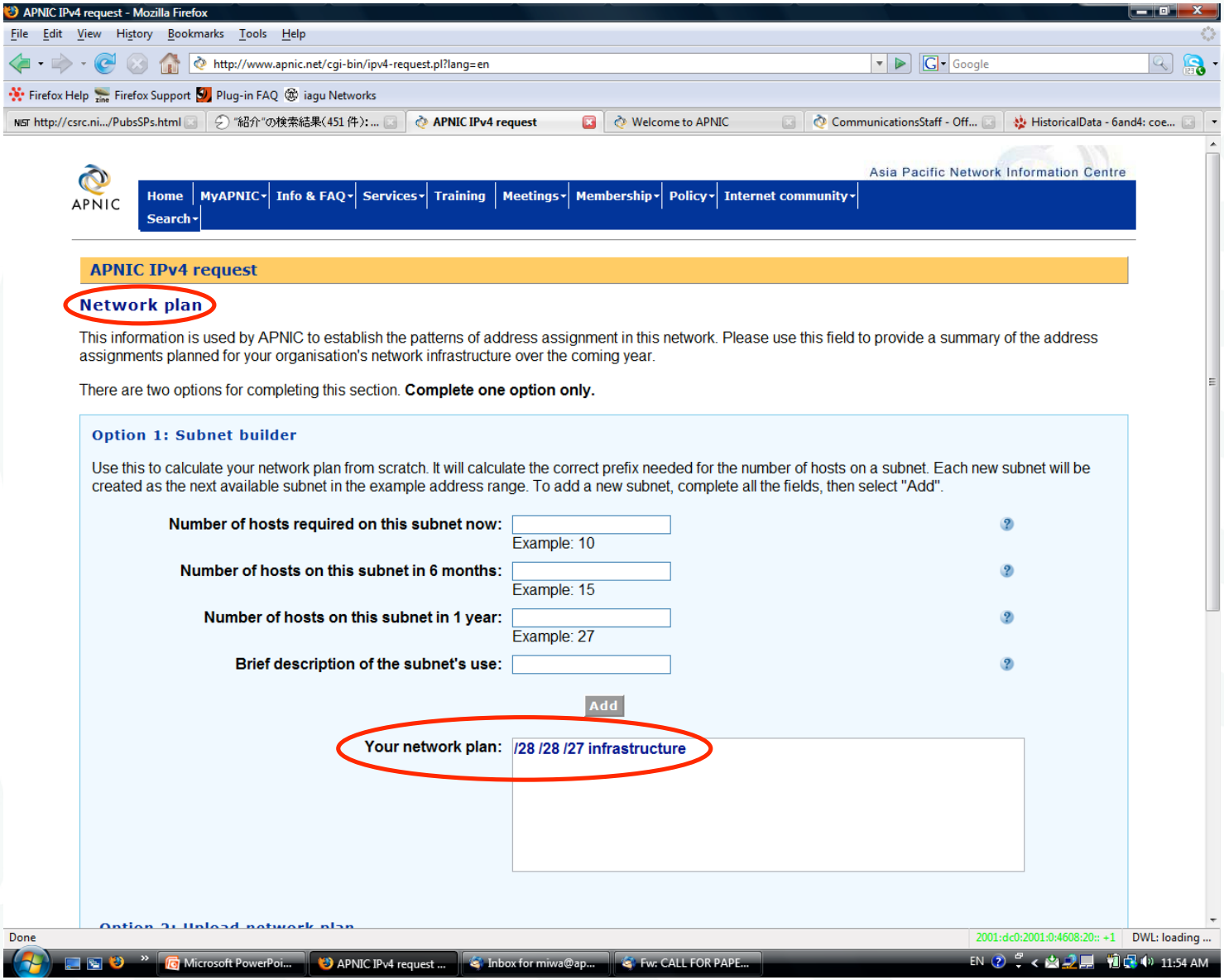


Ongoing request form



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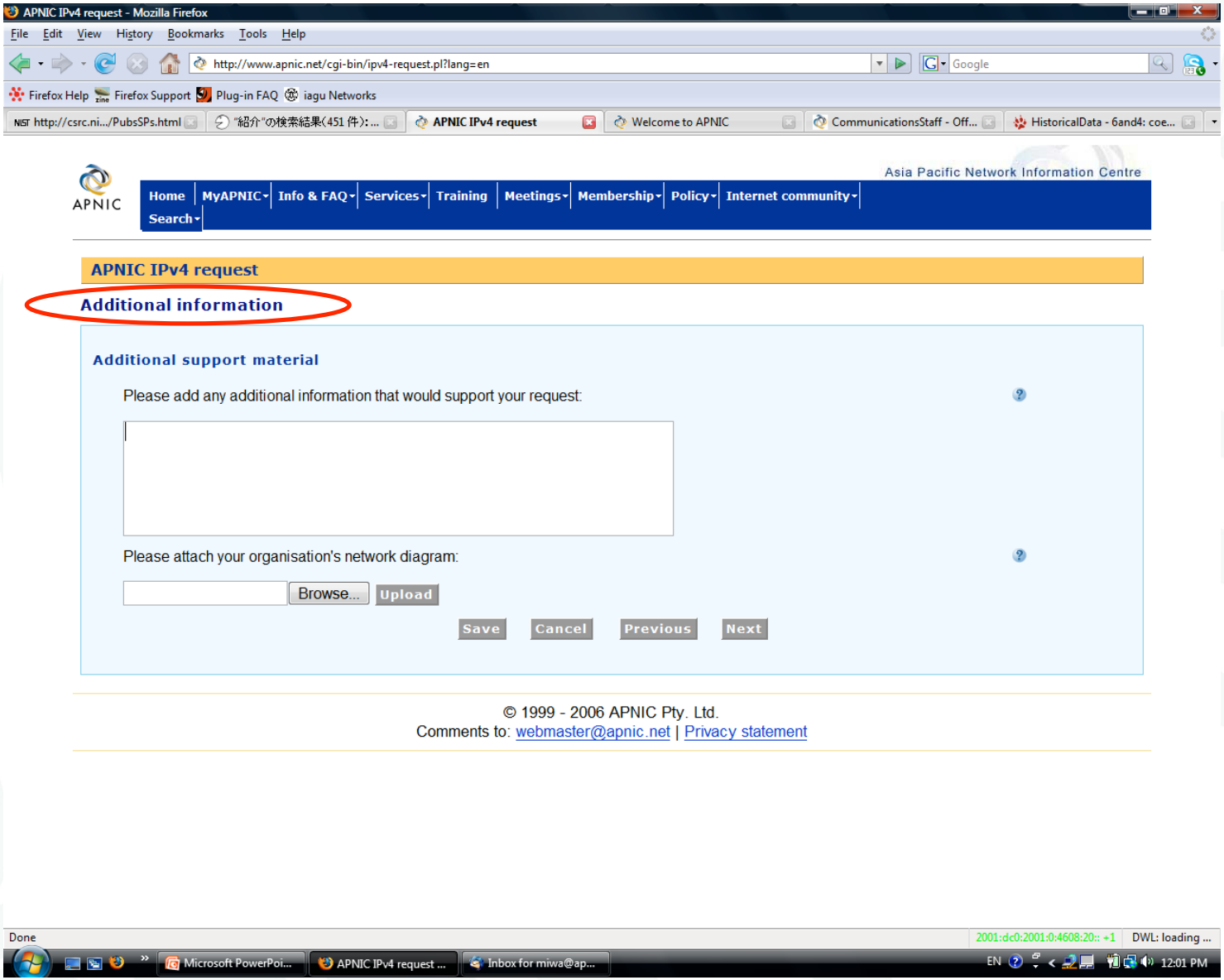

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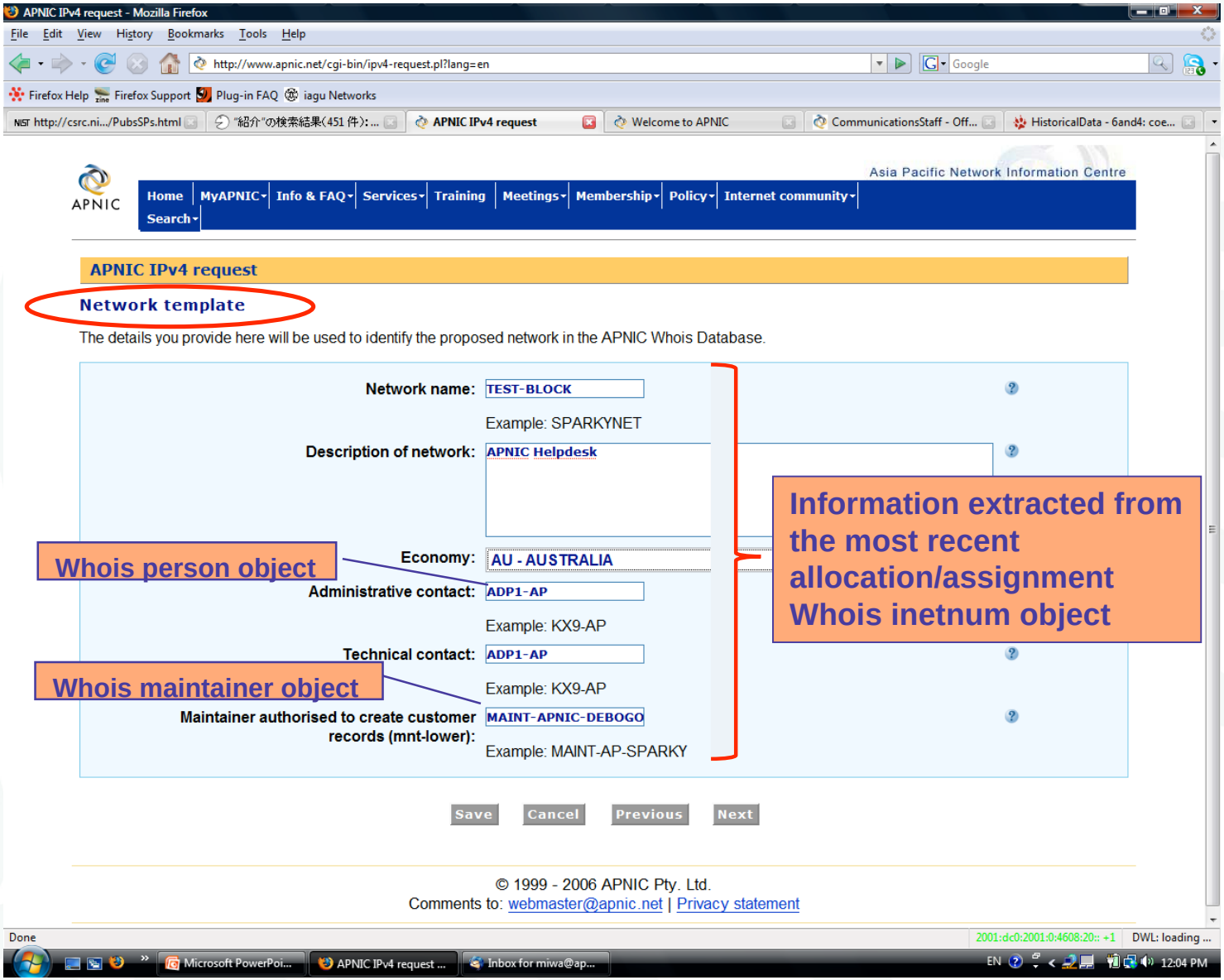
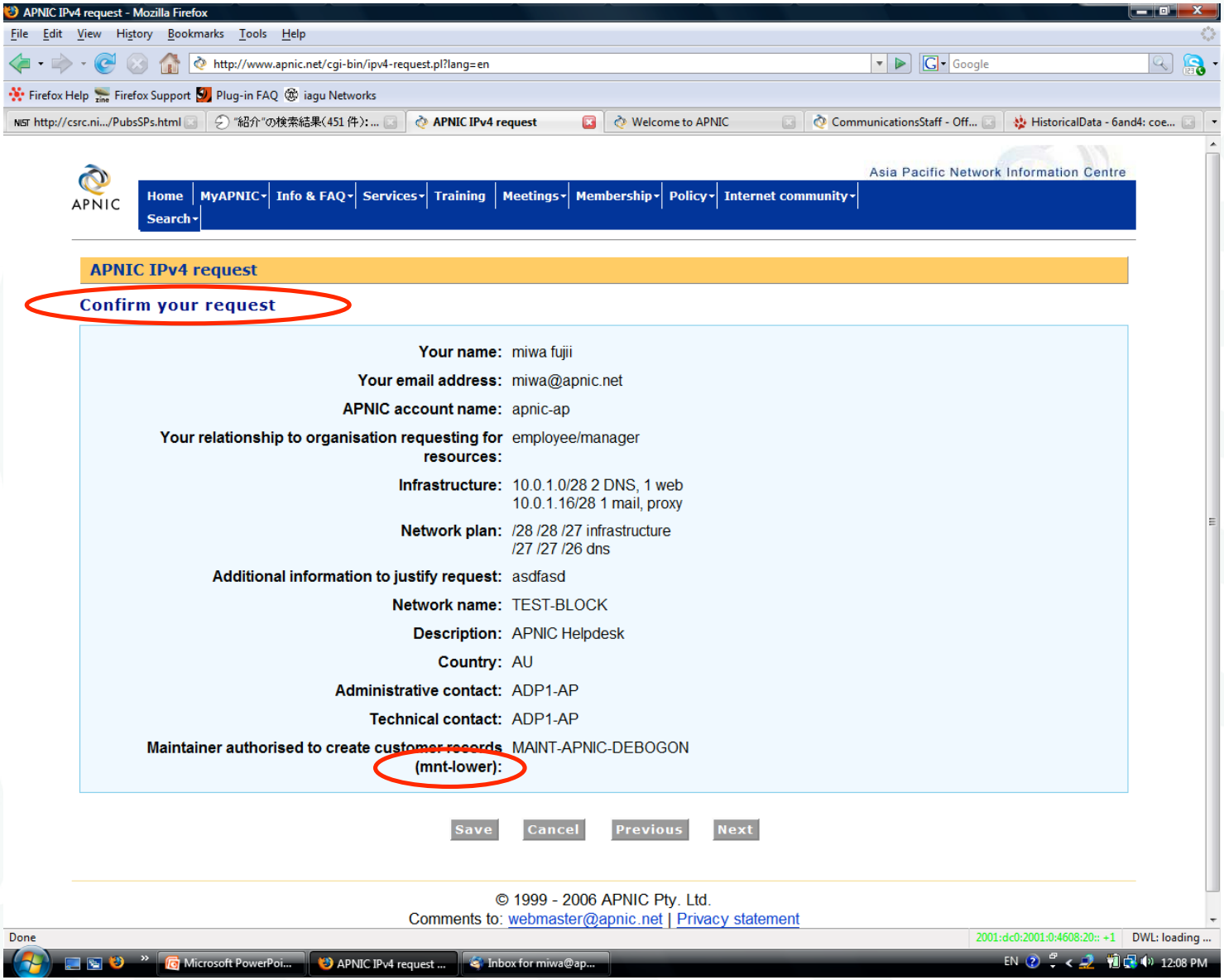
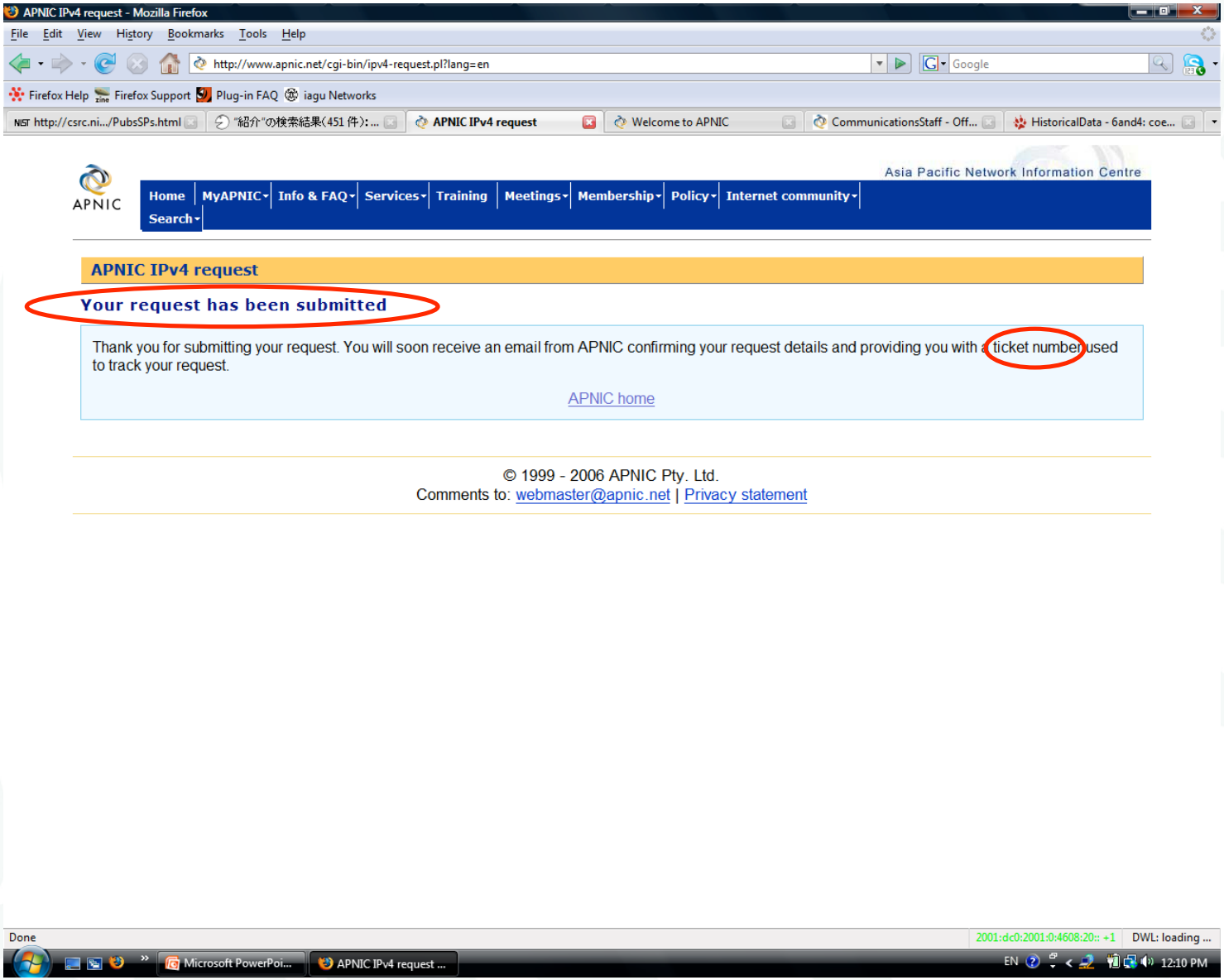


Ongoing request form



Ongoing request form

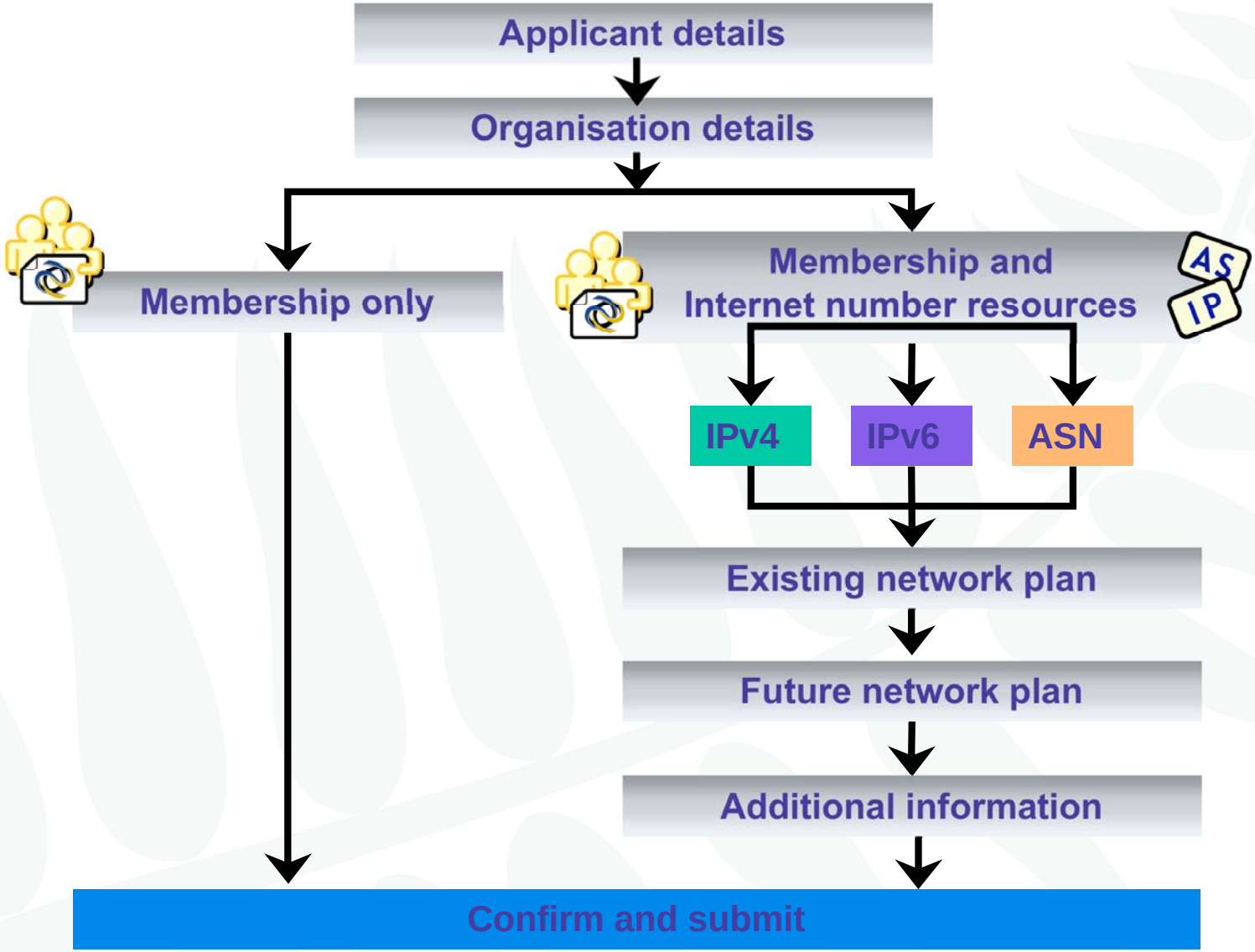


APNIC procedures

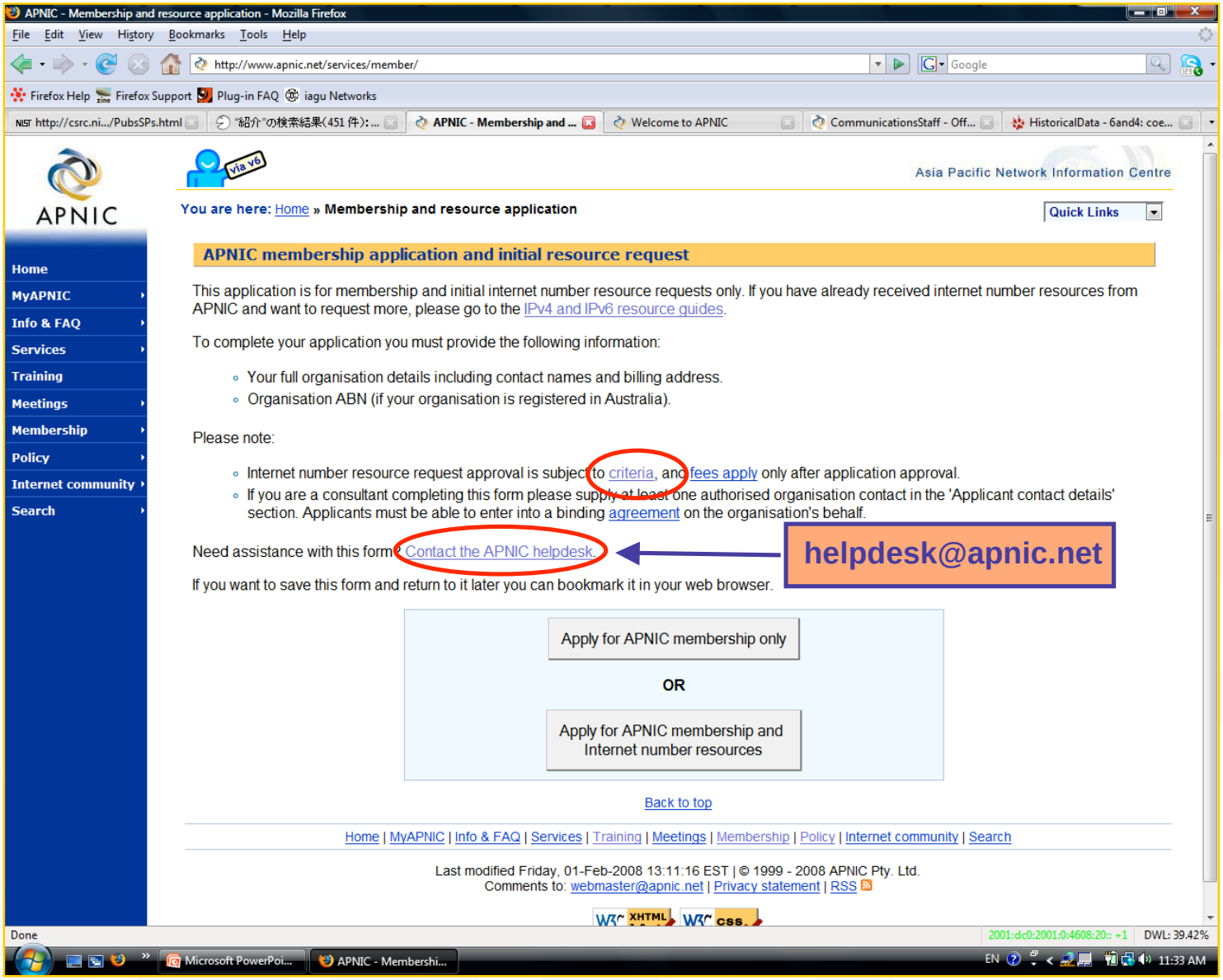
Initial request

Applying for APNIC membership and Internet resources

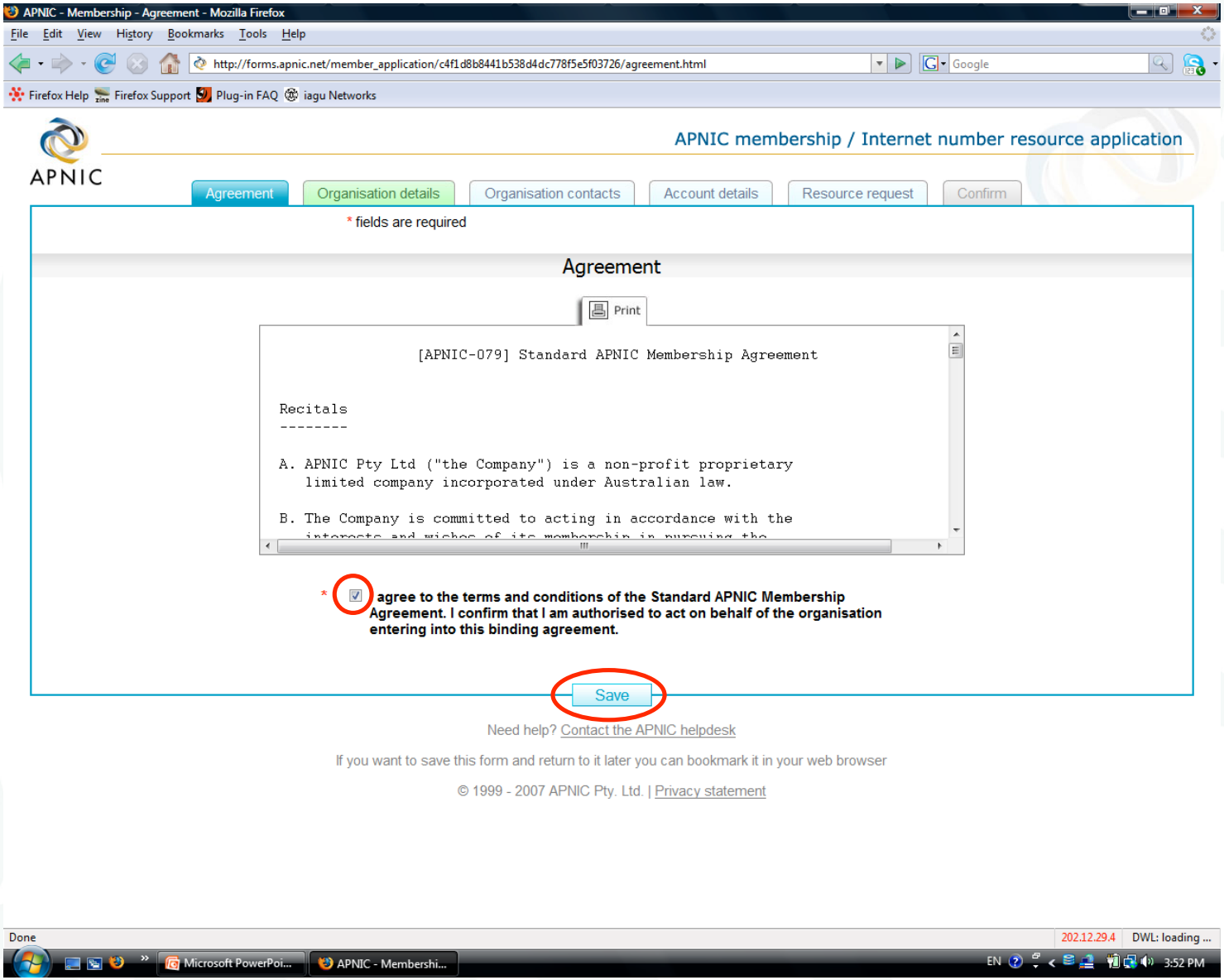
2. Streamline processes



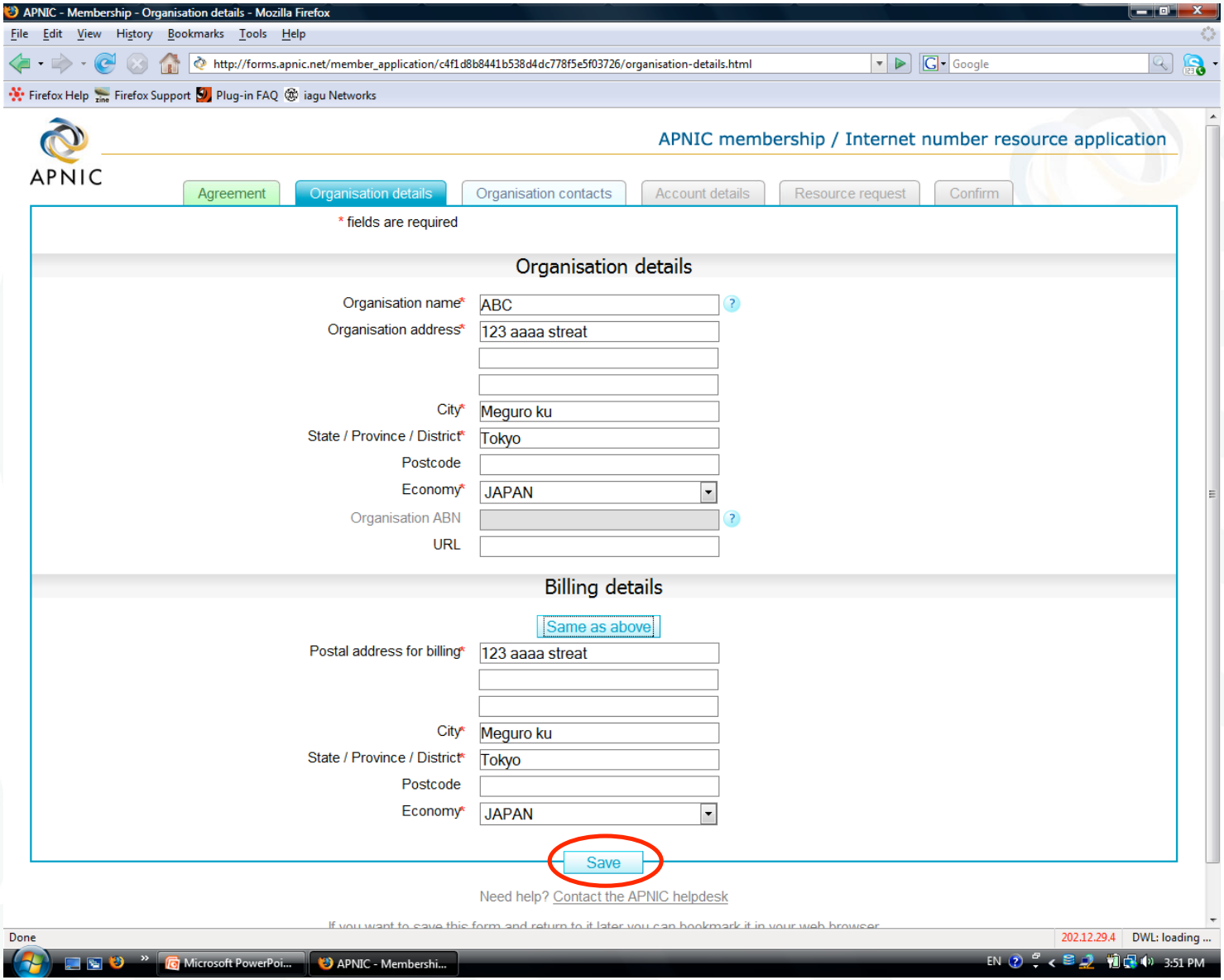
Initial request



APNIC membership and Internet resource application



APNIC membership and Internet resource application



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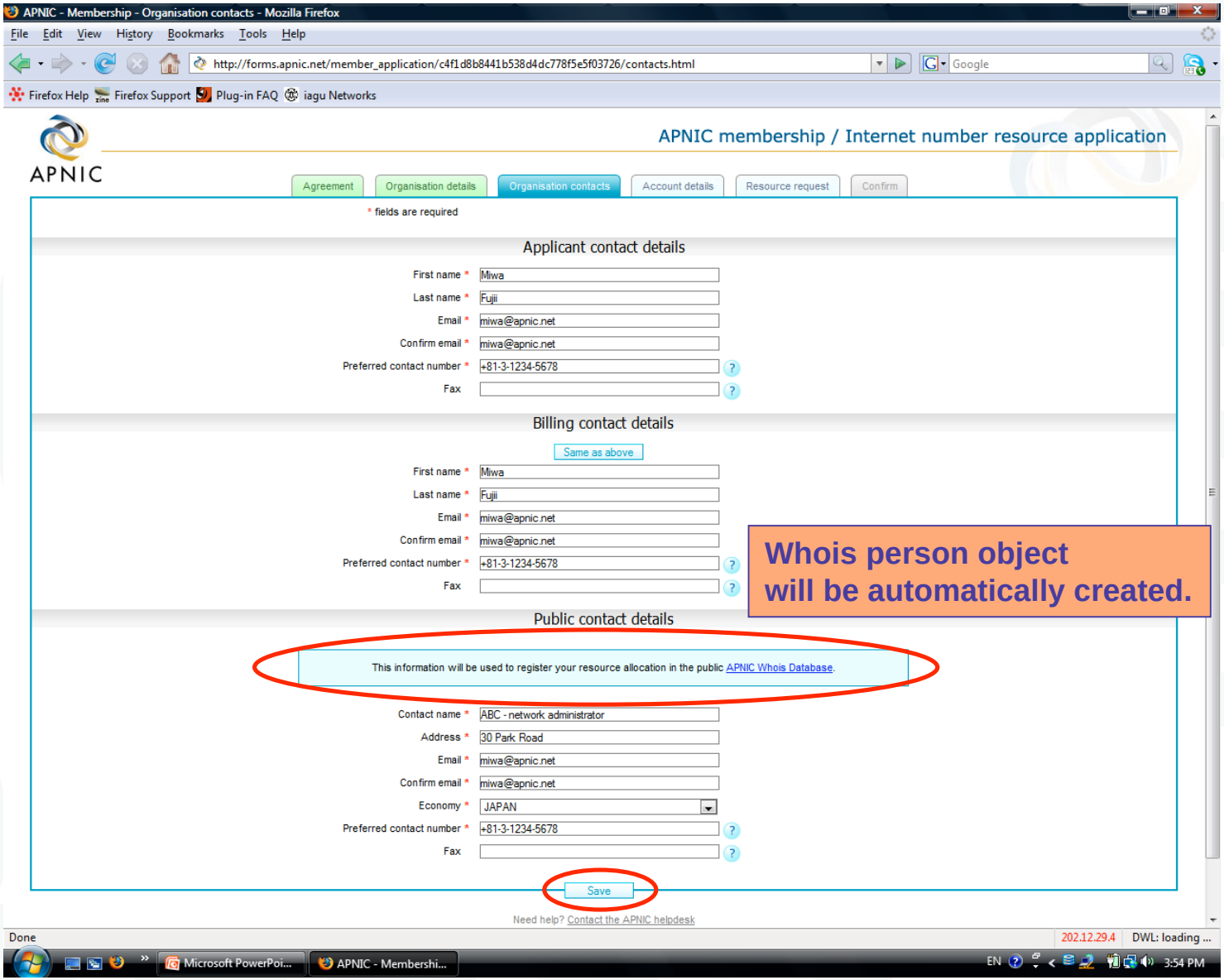

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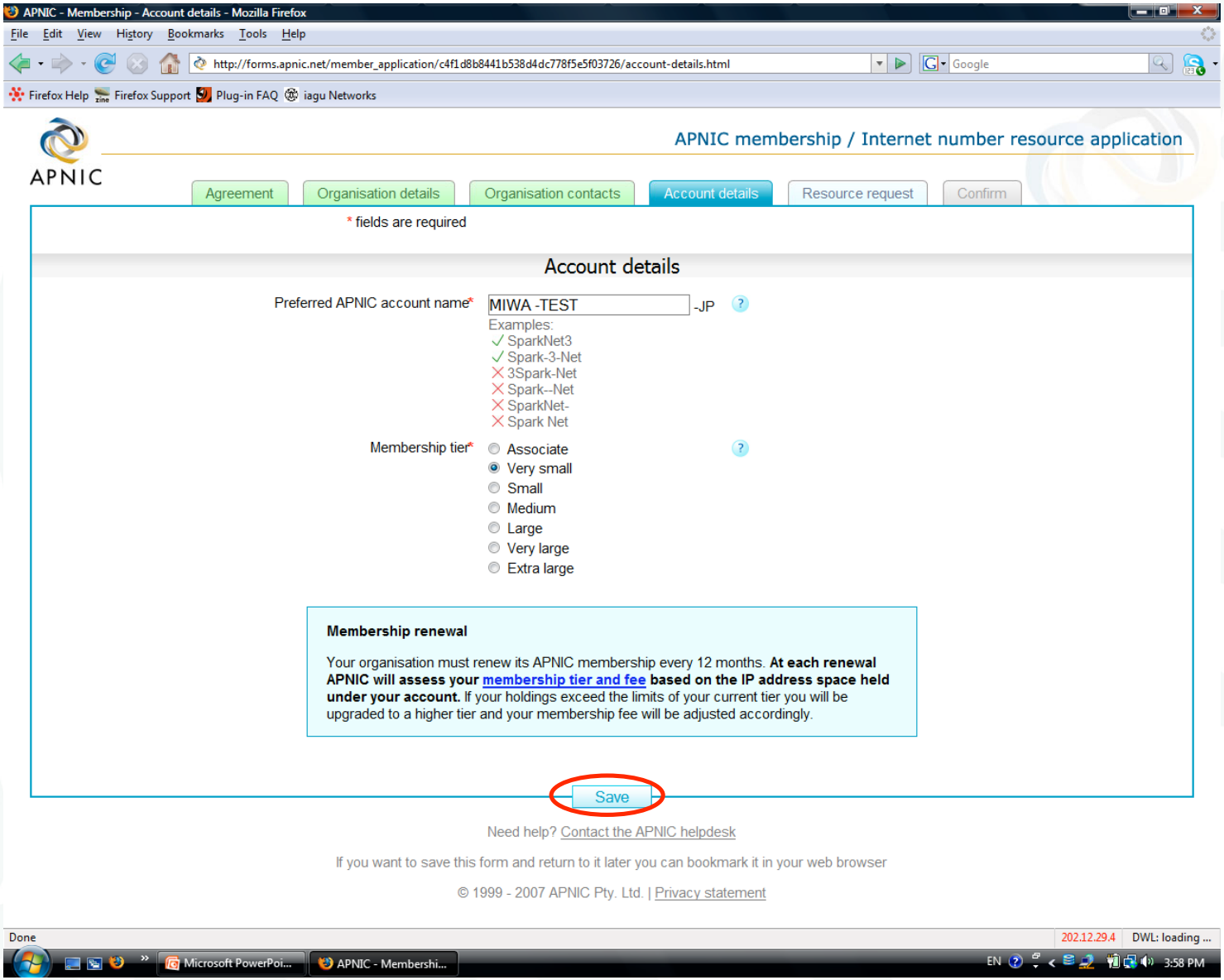

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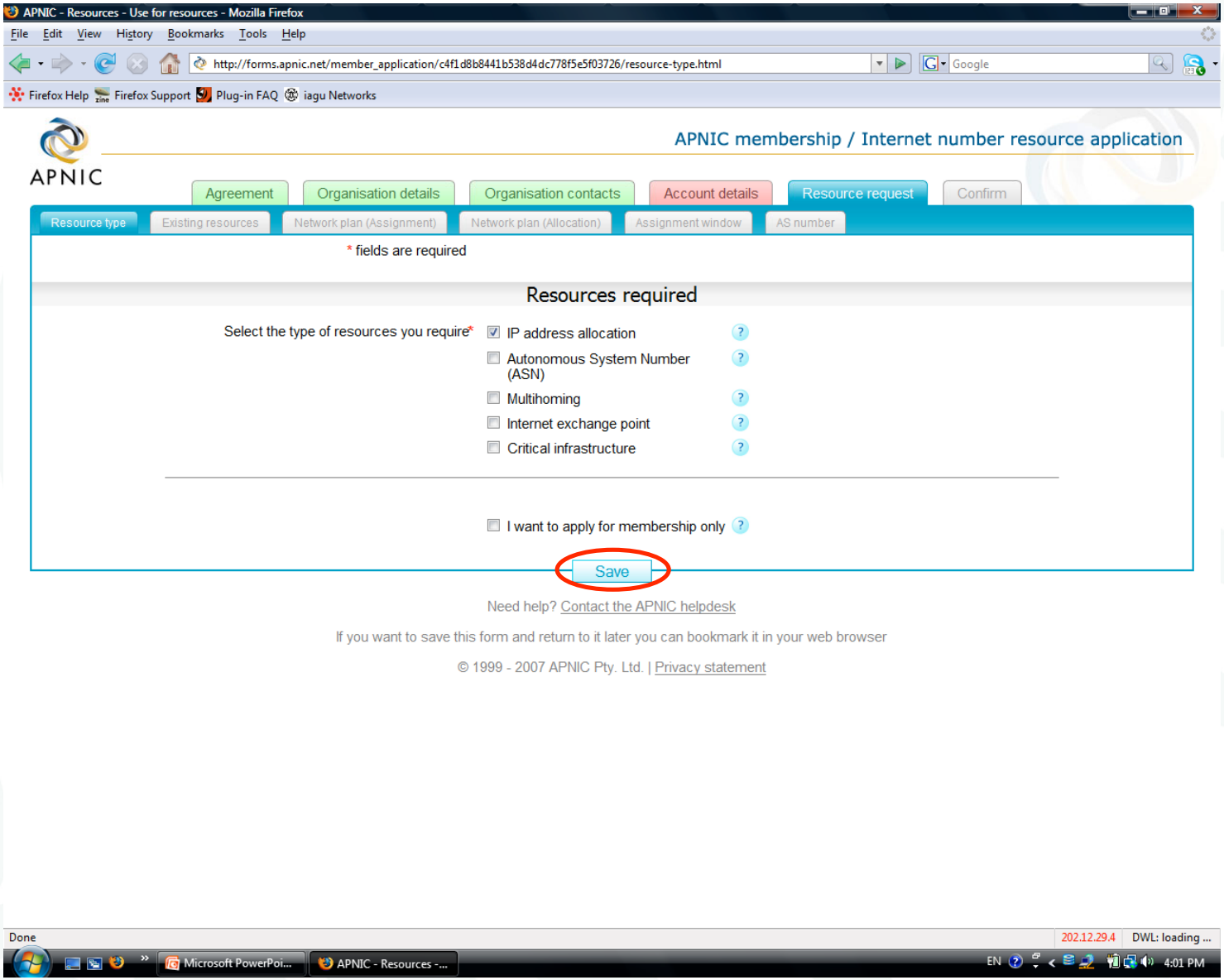

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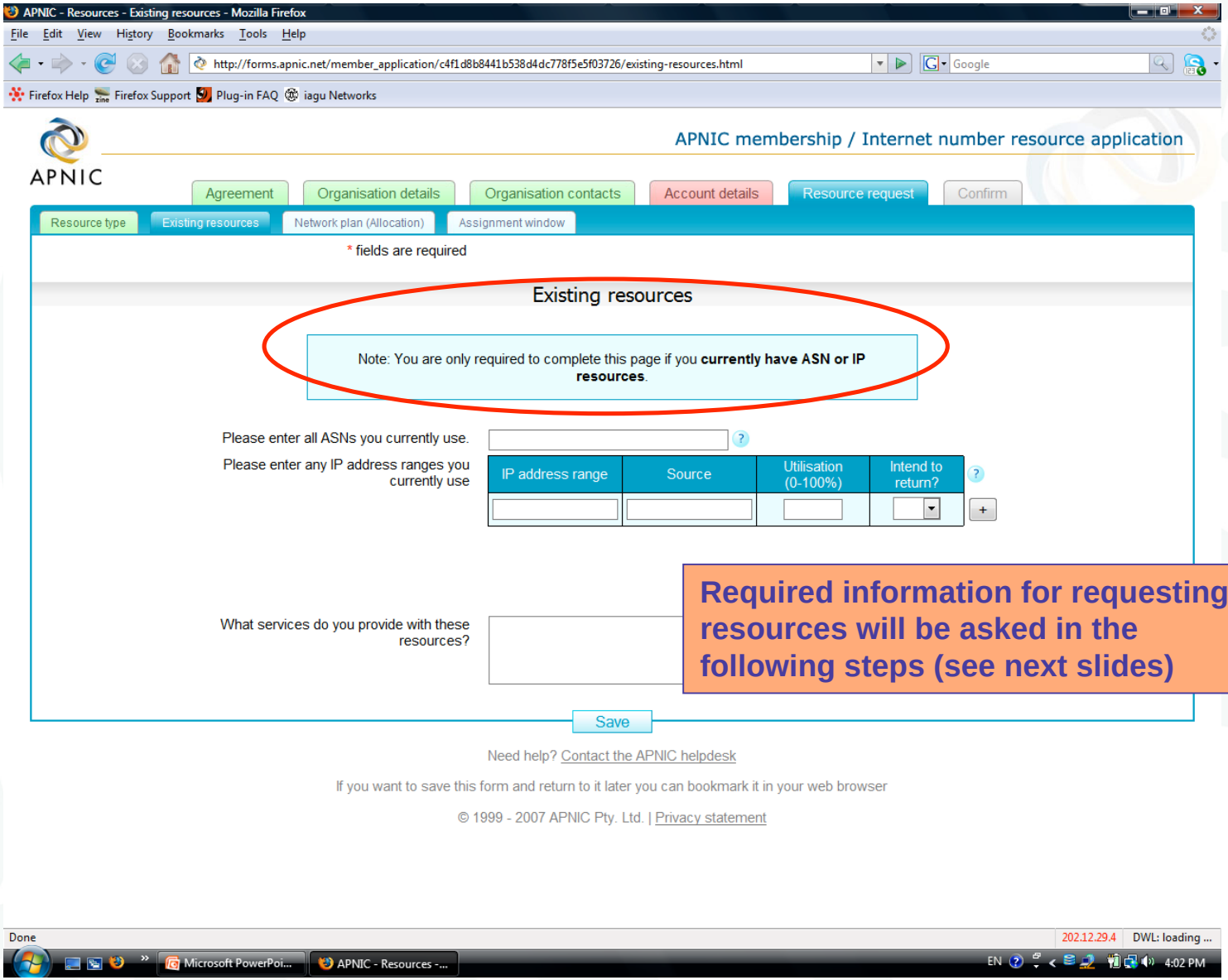

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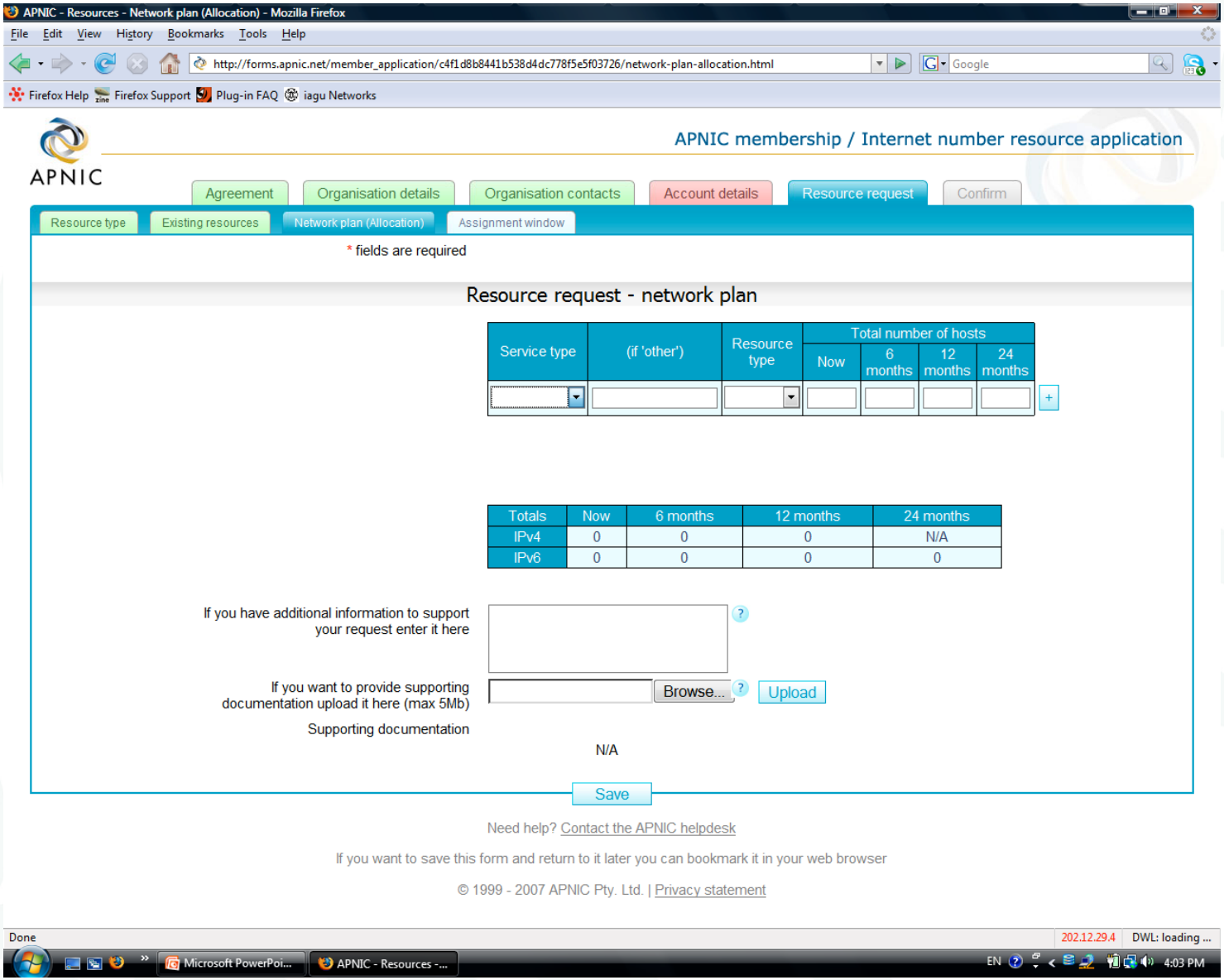
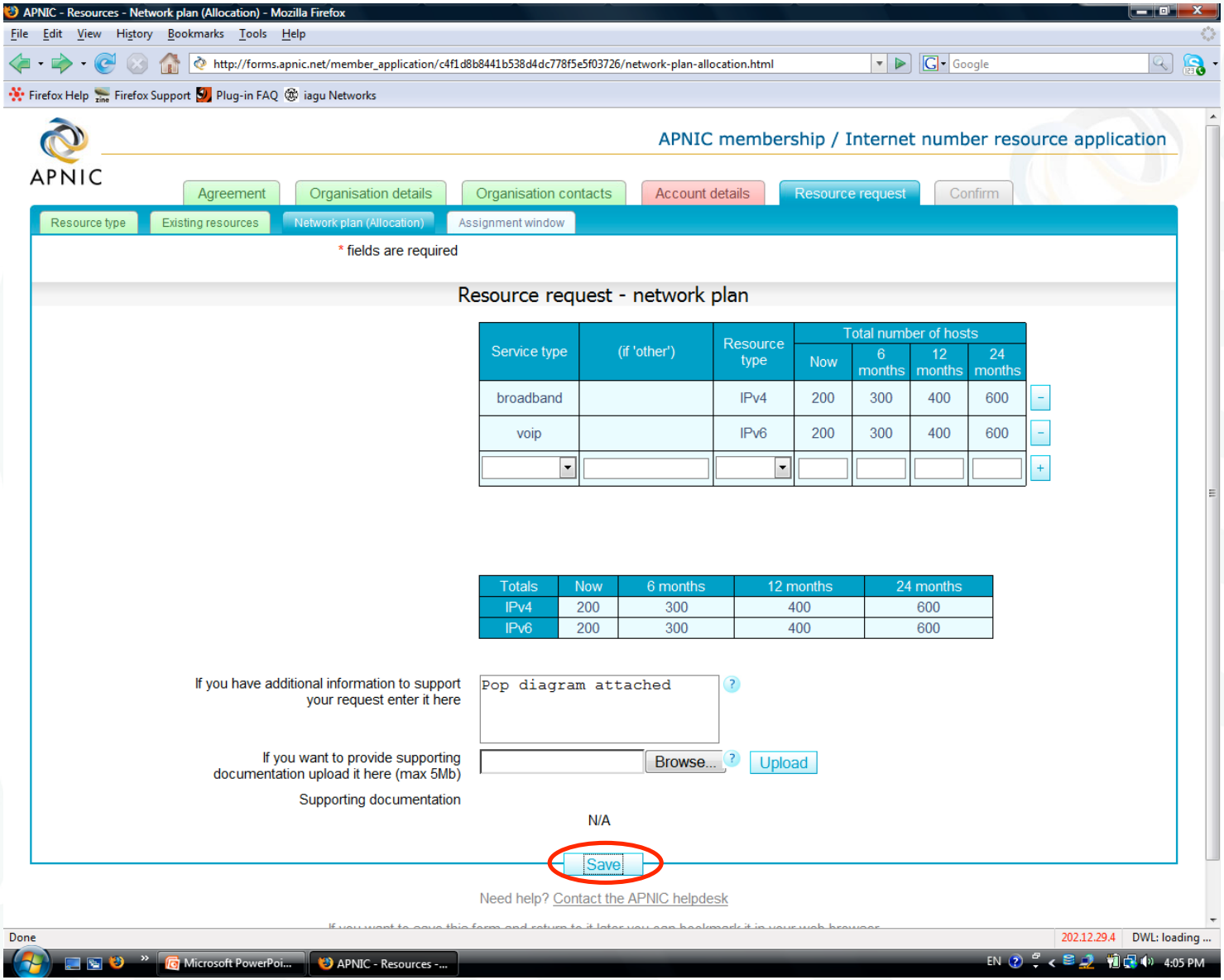


APNIC membership and Internet resource application



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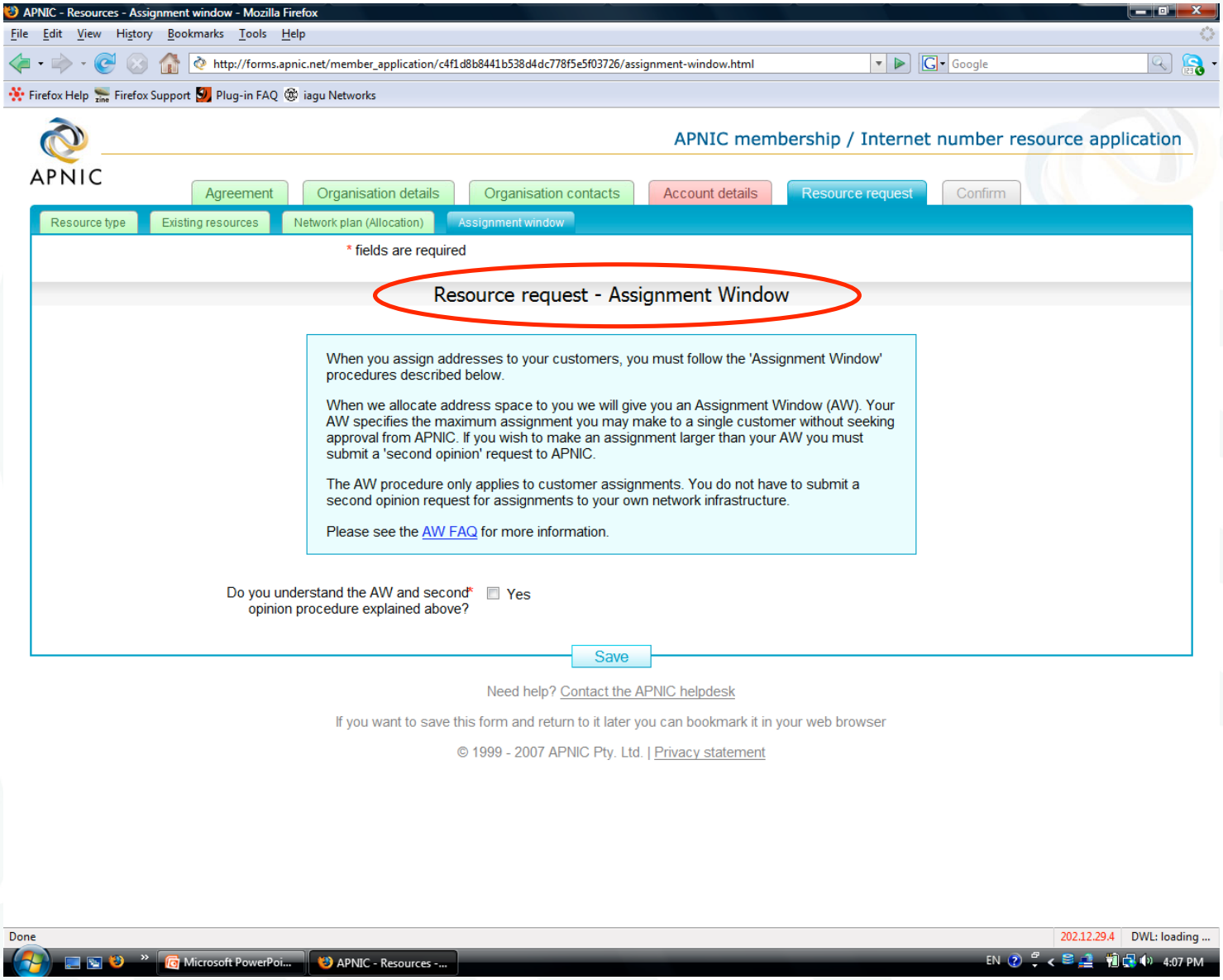
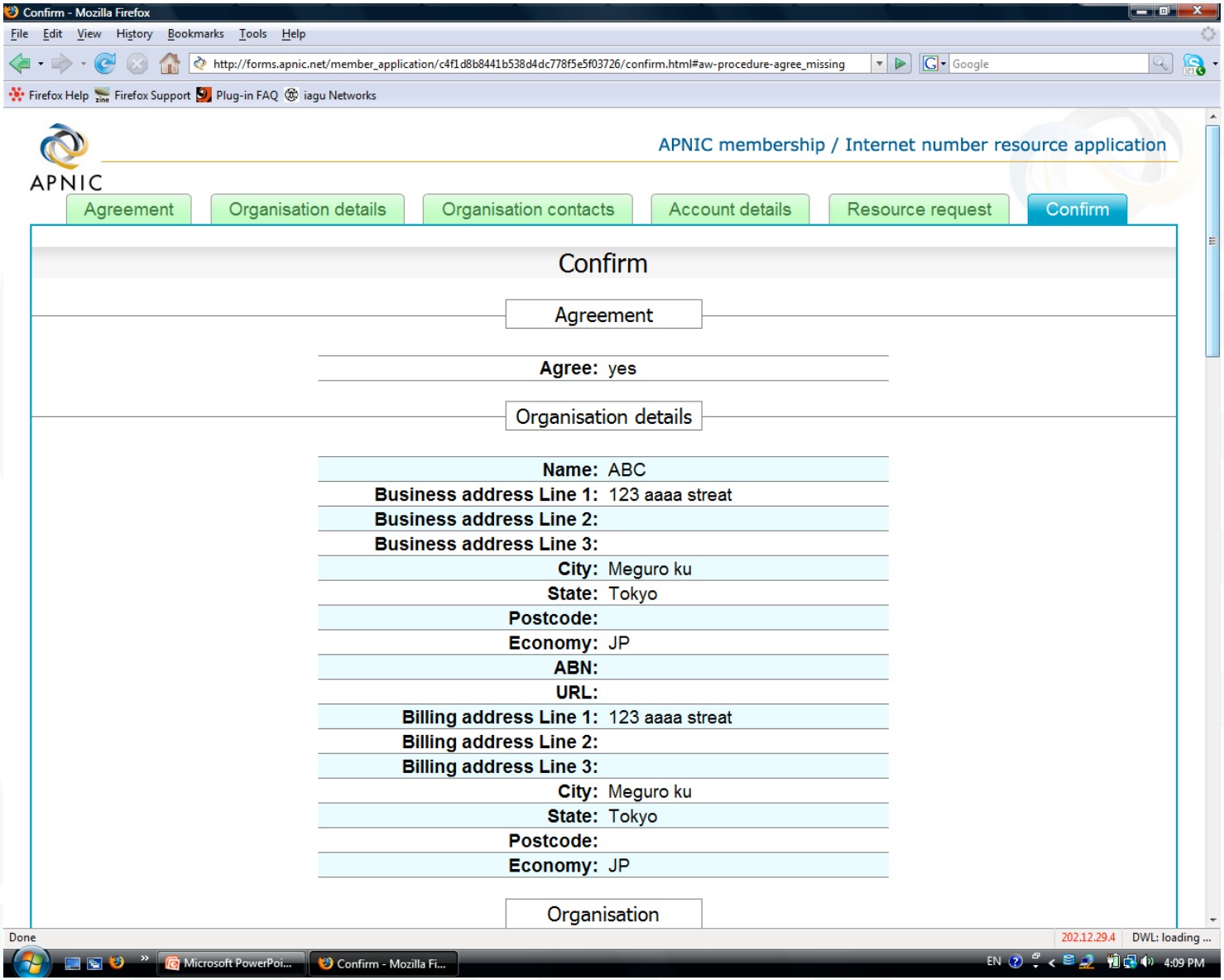


APNIC membership and Internet resource application



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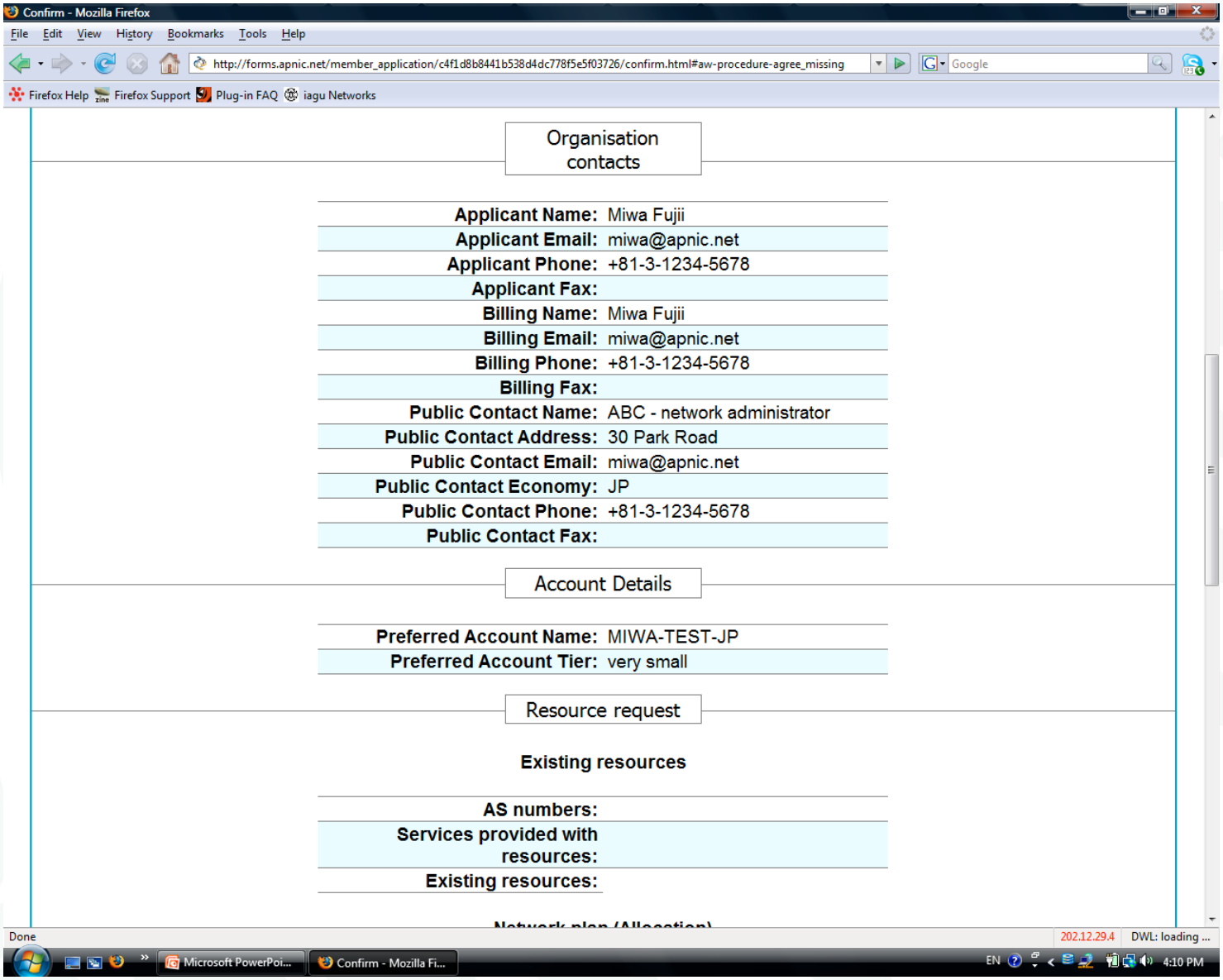
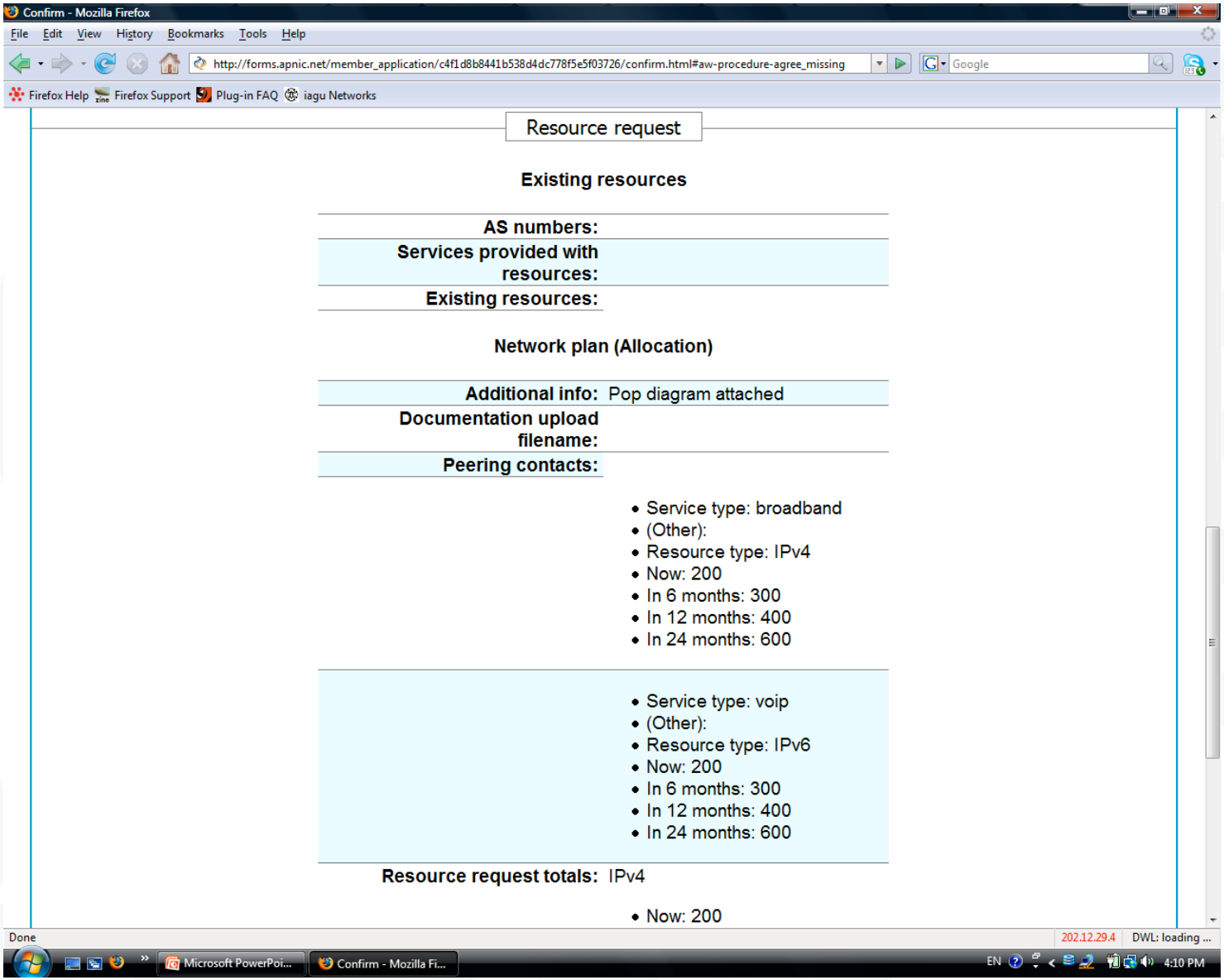


APNIC membership and Internet resource application



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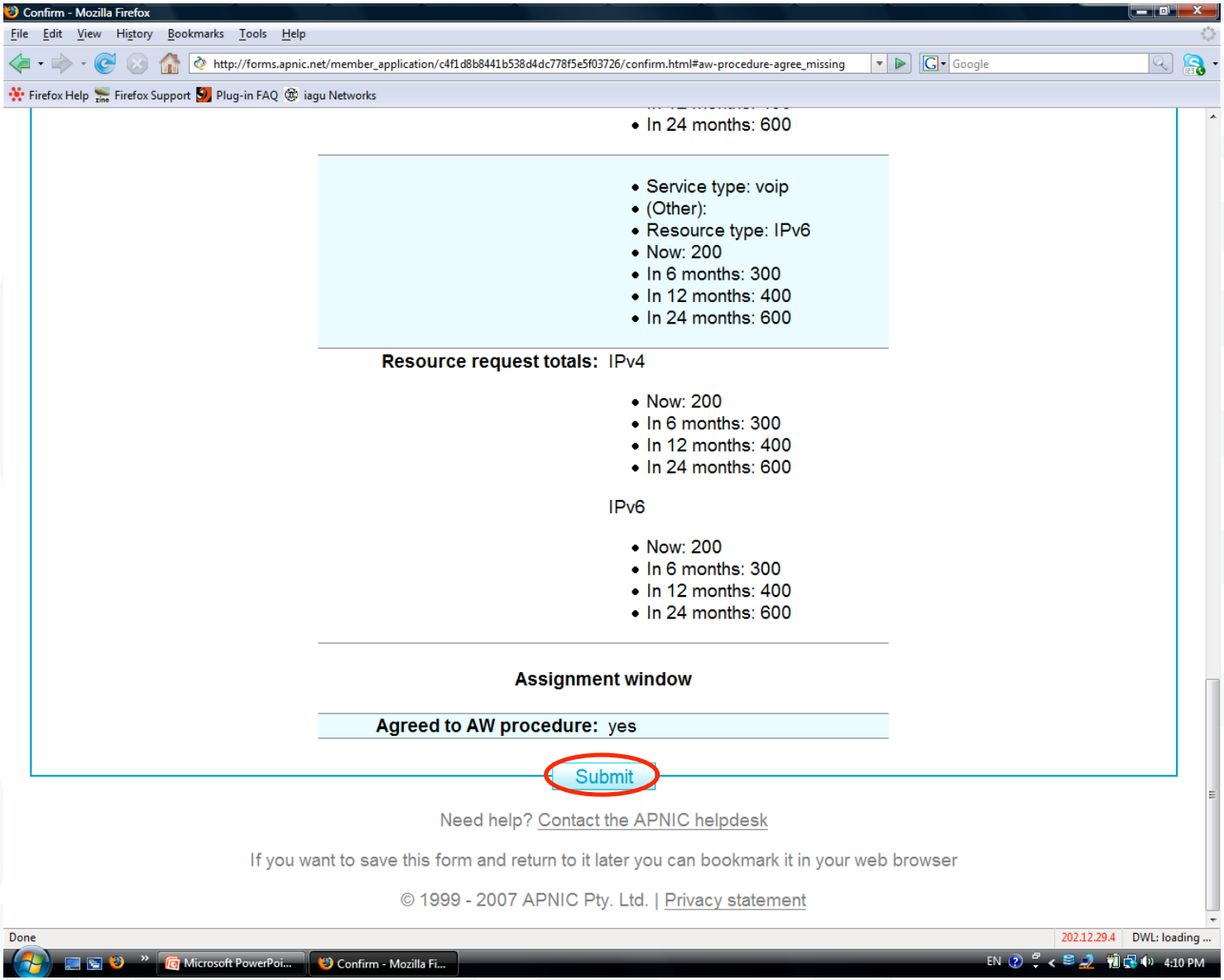
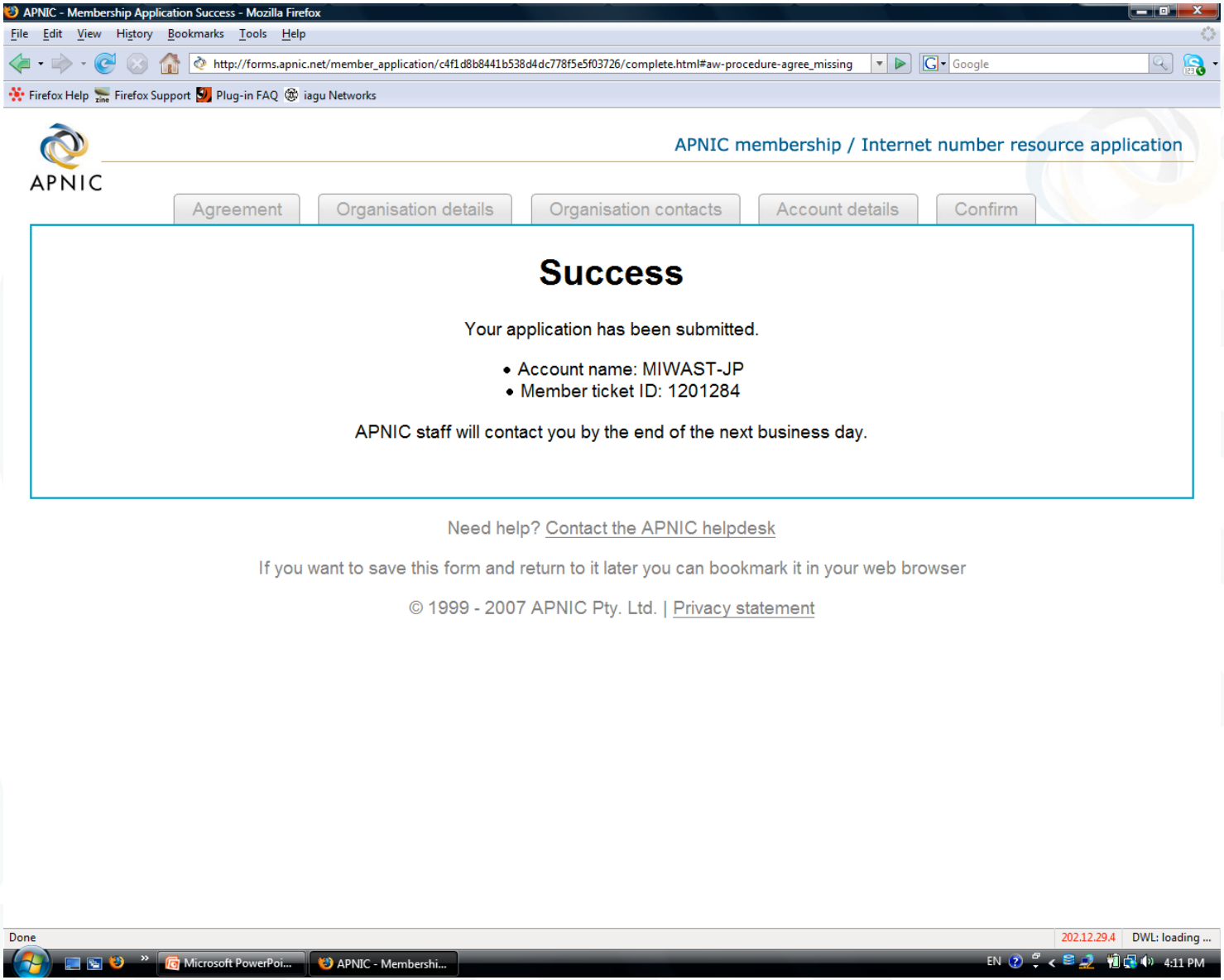
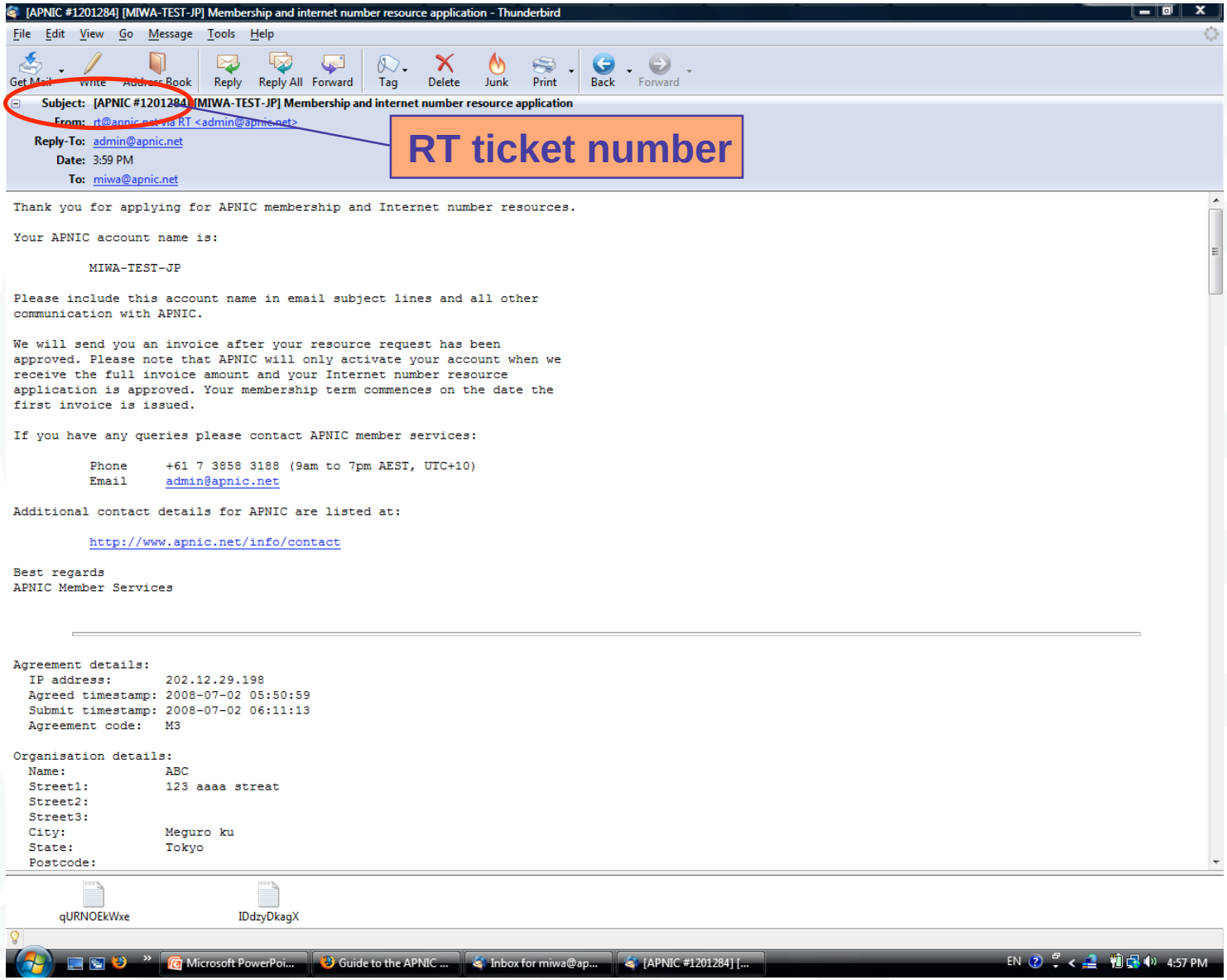


APNIC membership and Internet resource application



RT ticket


[APNIC #1201284] [MIWA-TEST-JP] Membership and internet number resource application - Thunderbird
File Edit View Go Message Tools Help
Get Mail Write Address Book Reply Reply All Forward Tag Delete Junk Print Back Forward
Subject: [APNIC #1201284] [MIWA-TEST-JP] Membership and internet number resource application
From: rt@apnic.net via RT <admin@apnic.net>
Reply-To: admin@apnic.net
Date: 3:59 PM
To: miwa@apnic.net
RT ticket number
Thank you for applying for APNIC membership and Internet number resources.
Your APNIC account name is:
MIWA-TEST-JP
Please include this account name in email subject lines and all other communication with APNIC.
We will send you an invoice after your resource request has been approved. Please note that APNIC will only activate your account when we receive the full invoice amount and your Internet number resource application is approved. Your membership term commences on the date the first invoice is issued.
If you have any queries please contact APNIC member services:
Phone +61 7 3858 3188 (9am to 7pm AEST, UTC+10)
Email admin@apnic.net
Additional contact details for APNIC are listed at:
http://www.apnic.net/info/contact
Best regards
APNIC Member Services
Agreement details:
IP address: 202.12.29.198
Agreed timestamp: 2008-07-02 05:50:59
Submit timestamp: 2008-07-02 06:11:13
Agreement code: M3
Organisation details:
Name: ABC
Street1: 123 aaaa streat
Street2:
Street3:
City: Meguro ku
State: Tokyo
Postcode:
qURNOEkWxe
IDdzyDkagX
Microsoft PowerPoi...
Guide to the APNIC ...
Inbox for miwa@ap...
[APNIC #1201284] [...
EN
4:57 PM

ISP request and evaluation

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

ISP request evaluation

- ‘Infrastructure’ & ‘network-plan’
  - 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

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Additional Information - Topology & deployment

- POP topology
  - Diagrams showing network design
  - Diagrams showing POP design
    - does network/POP topology description correlate with addressing plan and current infrastructure?
    - larger requests will require additional documentation
- Deployment plan
  - Give details of phases of deploying equipment
    - does deployment plan match information in network-plan fields?

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Additional Information - Equipment and services

- Equipment and services
  - Specifications, number of ports
    - information that cannot fit onto fields of form
  - Details of how implement services
    - explain acronyms or special services

- Miscellaneous
  - Anything not covered by the form, anything unusual also can be declared
    - Supplementary information very useful to the hostmaster when evaluating your request

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Additional information - 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

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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 receipts

Evaluation by APNIC

- 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

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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 /22 ‘slow start’ (newly implemented on 04/08/2008)
  - 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

Questions?

Assignment and sub-allocation procedures

Assignment Window &
2nd Opinion process

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 three 2nd-opinion requests
  - Increased as member gains experience and demonstrates understanding of policies
    - Assignment window may be reduced, in rare cases
- Why an assignment window?
  - Monitoring ongoing progress and adherence to policies
  - Mechanism for member education

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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

Second opinion request form

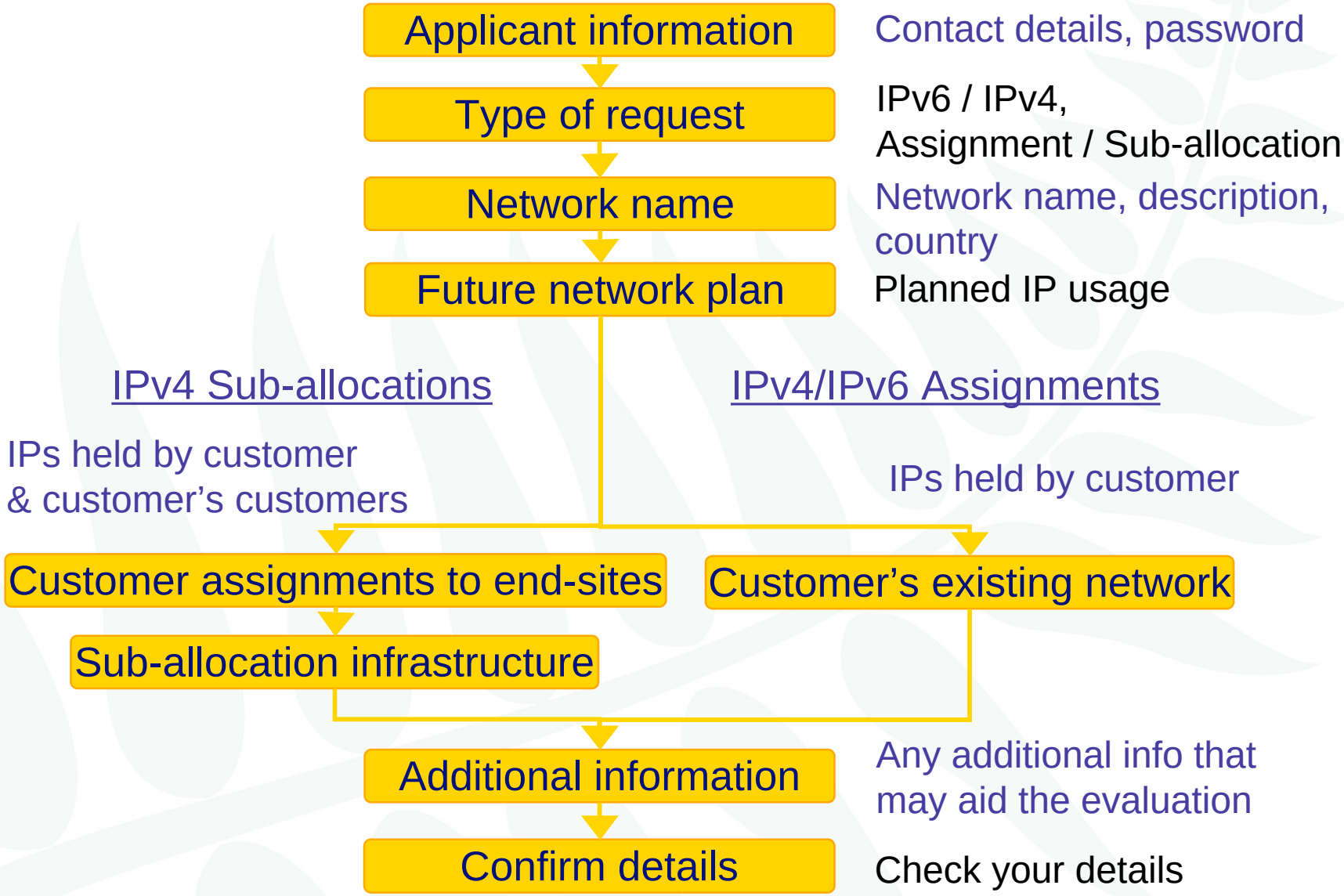
Used to seek approval for:

- 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



APNIC 2nd opinion request form

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APNIC second opinion request

APNIC second opinion request form

Before you start

The APNIC Second Opinion Request Form will lead LIRs through the steps required to seek APNIC's approval to:

- make assignments or sub-allocation of IPv4 address space to customers that exceed the LIR's Assignment Window
- assign multiple or additional IPv6 /48s to a single customer

Important:

- For each type of request, you must submit a separate request form.
- Only APNIC members may use this form.

If you are an APNIC member, but have forgotten your account name, please contact billing@apnic.net. You will need to provide details of the name and location of your organisation.

How to get help

Click where you see ? for specific help with this form.

Saving your work

You can save your work on this form at any time by clicking on the "Save" button at the bottom of the page you are working on. All the details you have entered will be securely saved on APNIC's server.

You will be asked to create a password that is to be used for returning to your saved work.

When you save your work, you will be emailed a URL which will allow you to access the information you have saved and continue to complete the request.

Please note, your details will be held on the APNIC server for a maximum of 14 days.

Start the form

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:	Amante Alvaran
Your email address:	amante@apnic.net
APNIC account name:	APNIC-AP Example: SPARKYNET-ID
Your relationship to organisation applying for resources:	Employee / Manager
Create a password for this request: (min. 8 characters)	••••••••••
Confirm password:	••••••••••

Next

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:

IPv4 example: /26
IPv6 example: /47

Save Previous Next

APNIC second opinion request

Save request

The information you have entered to this point has been saved. It will be retained on APNIC's server for **14 days**.

- To return to your request now, select "Continue"
- To return to your request later, use the following URL.

  http://www.apnic.net/apnic-bin/second-opinion-form.pl?form_id=c9935b7049dc9d3305dd6a19a0db6cc9

  For your convenience, APNIC has sent an email with this URL to you at **amante@apnic.net**
- To leave this form now, select "Exit"

Exit Continue

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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: MANTSTESTONLY

Example: SPARKYNET

Description of organisation: Amante Test Only for training purpose

Example: SparkyNet, Sdn Bhd, Internet Service Provider, Pinang, Indonesia

ISO 3166 code: AUSTRALIA (AU)

Save Previous Next

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: 0.0.0.0/27
Example: 0.0.0.0/28

Deploy now: /29
Example: /29

Deploy within 6 months: /28
Example: /29

Deploy within 1 year: /27
Example: /28

Detailed description of subnet: NOC Network
Example: 12 web servers

Add information

0.0.0.0/27 /29,/28,/27 NOC Network

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 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.

Choose File no file selected

Upload text file

Save Previous Next

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 address space usage and subnetting plans

This for the NOC Network

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.

Choose File no file selected

Upload file

Save Previous Next

APNIC second opinion request

Confirm details

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

Please check your information:

Your name:	Amante Alvaran
Your email address:	amante@apnic.net
Account name:	APNIC-AP
Your relationship to organisation requesting second opinion:	Employee / Manager
Address type:	IPv4
Opinion type:	Assignment
Prefix second opinion requested for:	/24
Netname:	MANTSTESTONLY
Description:	Amante Test Only for training purpose
ISO 3166 code:	AU
Network plan:	0.0.0.0/27 /29,/28,/27 NOC Network
Customer's existing network:	
Additional Information:	This for the NOC Network

Save Previous Submit

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

- 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

```
Dear XXXXXXX,

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

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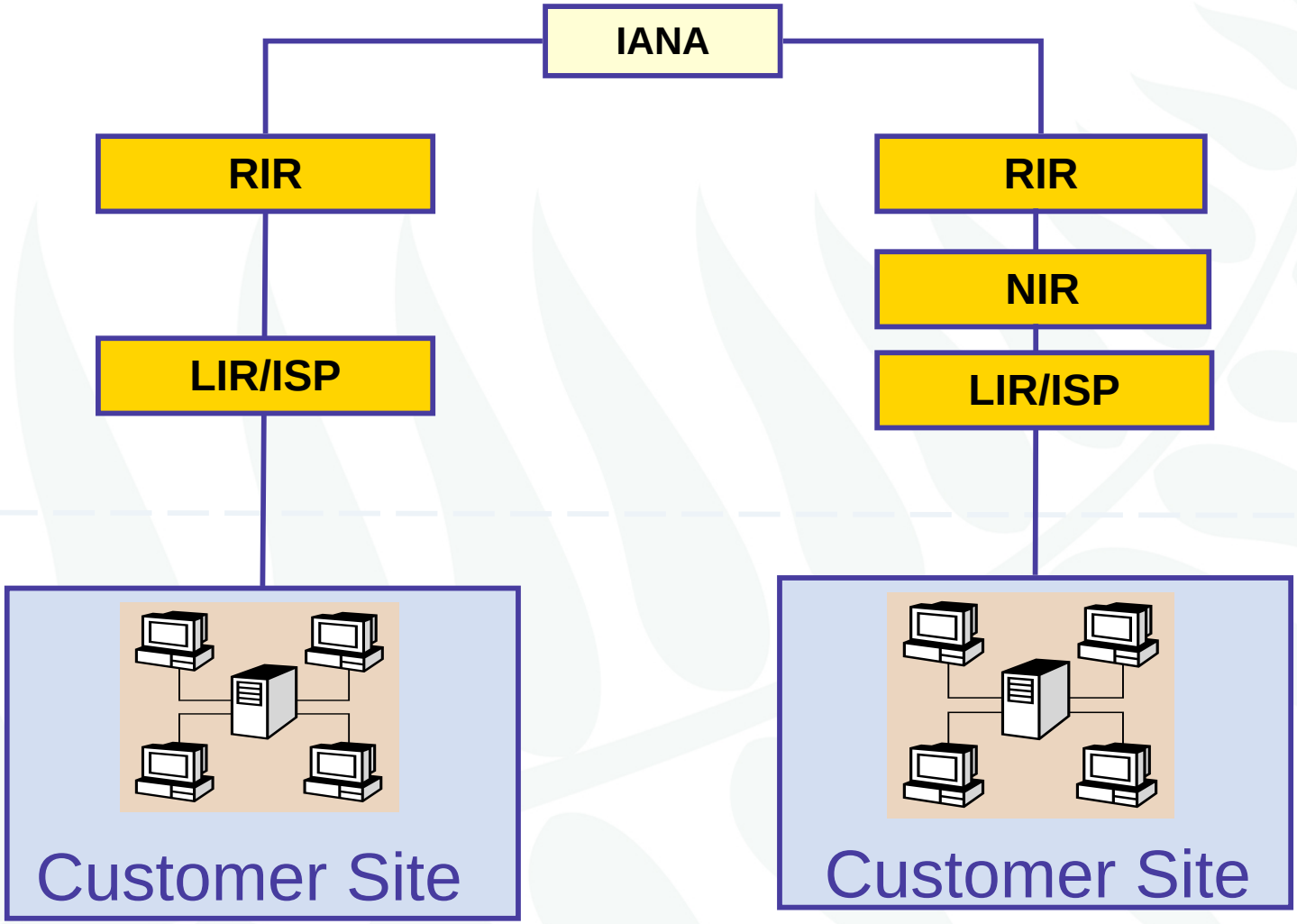
Questions?

IPv6 policy and procedures

IPv6 address management hierarchy



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IPv6 address policy goals

- Efficient address usage
  - Avoid wasteful practices
- Aggregation
  - Hierarchical distribution
  - Aggregation of routing information
  - Limiting number of routing entries advertised
- Minimise overhead
  - Associated with obtaining address space
- Registration, Uniqueness, Fairness & consistency

- Balance conflict of interests

APNIC 26
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IPv6 initial allocation

- Initial allocation criteria
  - Plan to connect 200 end sites within 2 years
    - Default allocation (“slow start”)
  - Or be an existing LIR with IPv4 allocations from an RIR/NIR which makes IPv6 assignments and/or sub-allocations to other organizations and announces the allocation in the inter-domain routing system within two years
- Initial allocation size is /32
  - Larger initial allocations can be made if justified according to:
    - IPv6 network infrastructure plan
    - Existing IPv4 infrastructure and customer base
- License model of allocation
  - Allocations are not considered permanent, but always subject to review and reclamation

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End site assignment policy for IPv6

- Any size longer than /48
  - Decision is up to LIRs or ISPs
    - Implication: any size between /64 - /48
  - Global coordination is required
  - Assuming the HD ratio changes to a larger value
    - HD ratio measurement unit: /48 => /56
      - Implication: Register all assignments shorter than /56?
    - HD ratio: 0.8 => 0.94
  - Achieve more efficient address utilisation
    - useful lifetime of IPv6 to encompass a period in excess of 100 years

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IPv6 utilisation

- Utilisation determined from end site assignments
  - LIR responsible for registration of all /48 assignments
  - Intermediate allocation hierarchy not considered
- Utilisation of IPv6 address space is measured differently from IPv4
  - Use HD ratio to measure
- Subsequent allocation may be requested when IPv6 utilisation requirement is met

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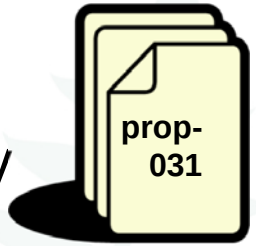
Amend IPv6 assignment and utilisation requirement



- IPv6 assignment and utilisation requirement policy
  - HD ratio: 0.8 => 0.94
  - Measurement unit: /48 => /56
- The HD ratio threshold is
  - HD=log(/56 units assigned) / log (16,777,216)
  - 0.94 = 6,183,533 x /56 units
- Calculation of the HD ratio
  - Convert the assignment size into equivalent /56 units
    - Each /48 end site = 256 x /56 units
    - Each /52 end site = 16 x /56 units
    - Each /56 end site = 1 x /56 units
    - Each /60 end site = 1/16 x /56 units
    - Each /64 end site = 1/256 x /56 units
- Current status
  - Implemented

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IPv6 utilisation (HD = 0.94)

- The ratio 0.94 will be implemented soon (March 2007)
- Percentage utilisation calculation

IPv6 Prefix	Site Address Bits	Total site address in /56s	Threshold (HD ratio 0.94)	Utilisation %
/42	14	16,384	9,153	55.9%
/36	20	1,048,576	456,419	43.5%
/35	21	2,097,152	875,653	41.8 %
/32	24	16,777,216	6,185,533	36.9%
/29	27	134,217,728	43,665,787	32.5 %
/24	32	4,294,967,296	1,134,964,479	26.4 %
/16	40	1,099,511,627,776	208,318,498,661	18.9 %

RFC 3194

> "In a hierarchical address plan, as the size of the allocation increases, the density of assignments will decrease."

Subsequent allocation

- Must meet HD = 0.94 utilisation requirement of previous allocation (subject to change)
    - From March 2007
- Other criteria to be met
  - Correct registrations (all /48s registered)
  - Correct assignment practices etc
- Subsequent allocation results in a doubling of the address space allocated to it
  - Resulting in total IPv6 prefix is 1 bit shorter
  - Or sufficient for 2 years requirement

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IXP IPv6 assignment policy

- Criteria
  - 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

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IPv6 portable assignment for multihoming

- The current policy did not allow IPv6 portable assignment to end-sites
  - Obstructs setting redundancy connectivity for stable network operation
  - Size: /48, or a shorter prefix if the end site can justify it
  - To be multihomed within 3 months
  - Assignment from a specified block separately from portable allocations address space
- Current status
  - Implemented

How do I apply for IPv6 addresses?

Check your eligibility for IPv6 addresses

Read IPv6 policies

http://www.apnic.net/docs/policy/ipv6-address-policy.html

Read IPv6 guideline

http://www.apnic.net/docs/policy/ipv6-guidelines.html

Do you have an APNIC account?

If not, become an APNIC member or open a non-member account

Complete an IPv6 address request form

Submit the form hostmaster@apnic.net

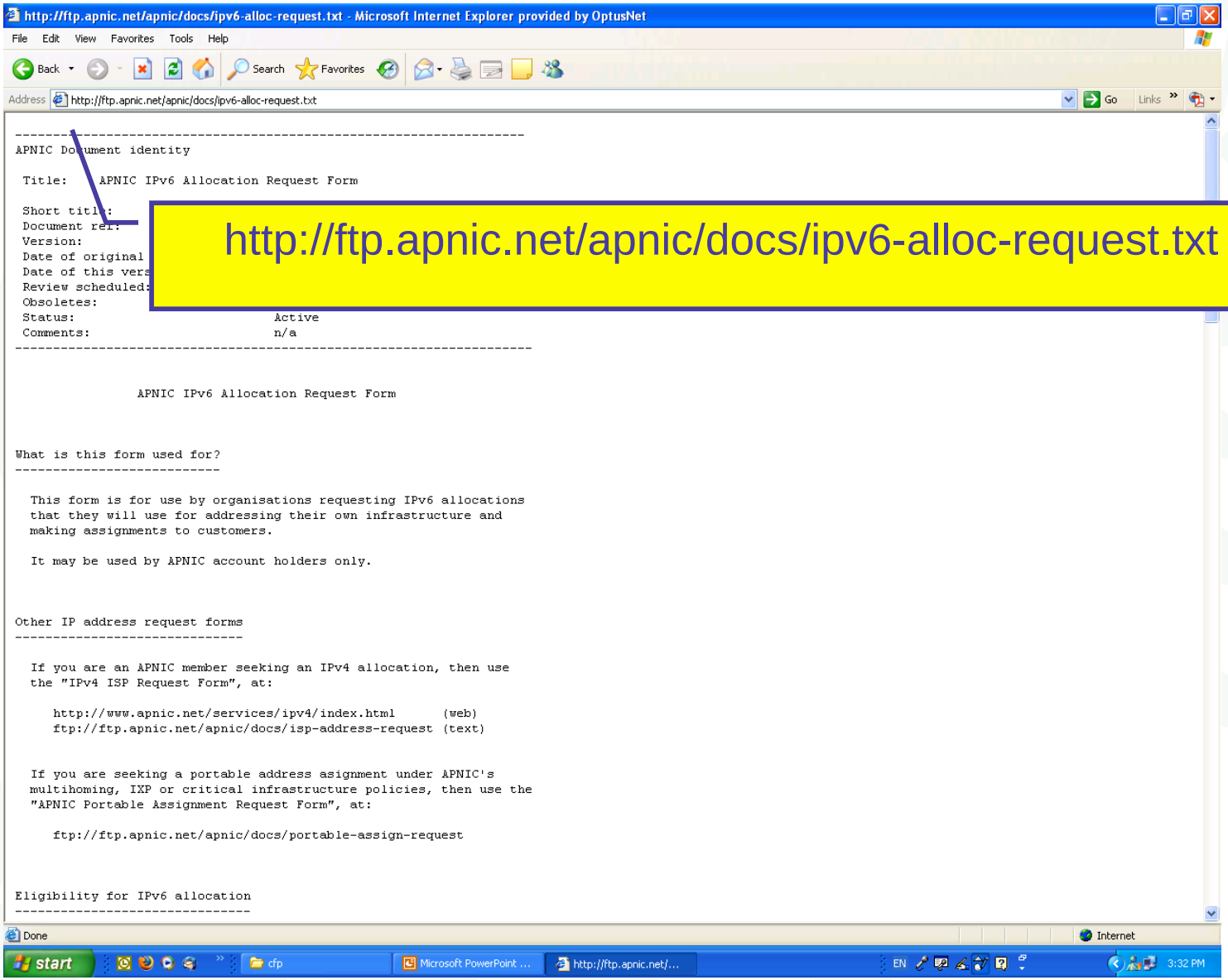
Questions:
email: helpdesk@apnic.net

Helpdesk chat: http://www.apnic.net/helpdesk

IPv6 address request form

- http://ftp.apnic.net/apnic/docs/ipv6-alloc-request.txt

IPv6 address request form



http://ftp.apnic.net/apnic/docs/ipv6-alloc-request.txt

IPv6 address request form

- Requester template
  - Name, email, acct-name, org-relationship:
- Network template
  - Netname, descr, country, admin-c, tech-c, remarks, changed, mnt-lower
- IPv6 usage template
  - Services, cust-types, cust-network, infrastructure, network-plan
- Additional information

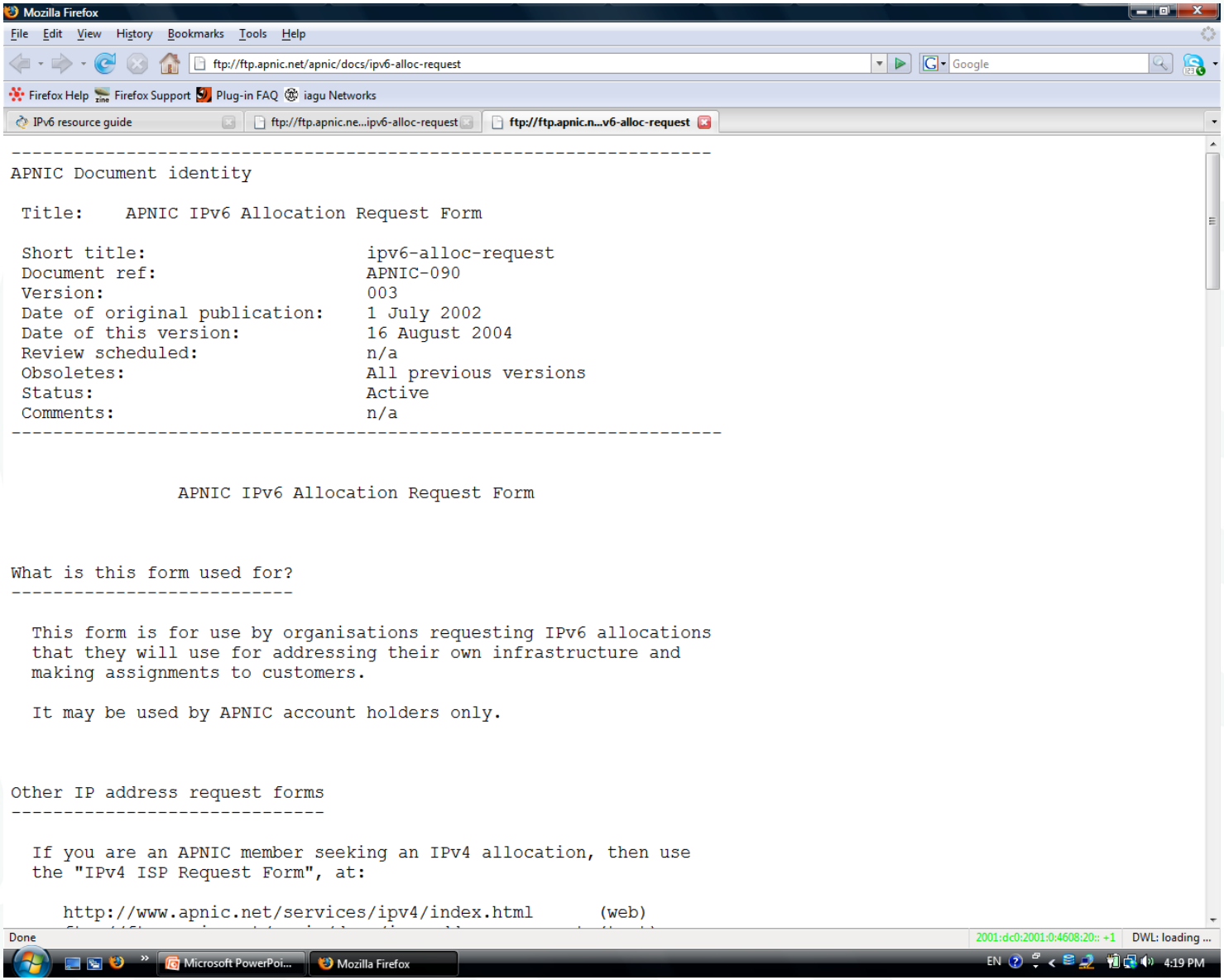
APNIC procedures

IPv6

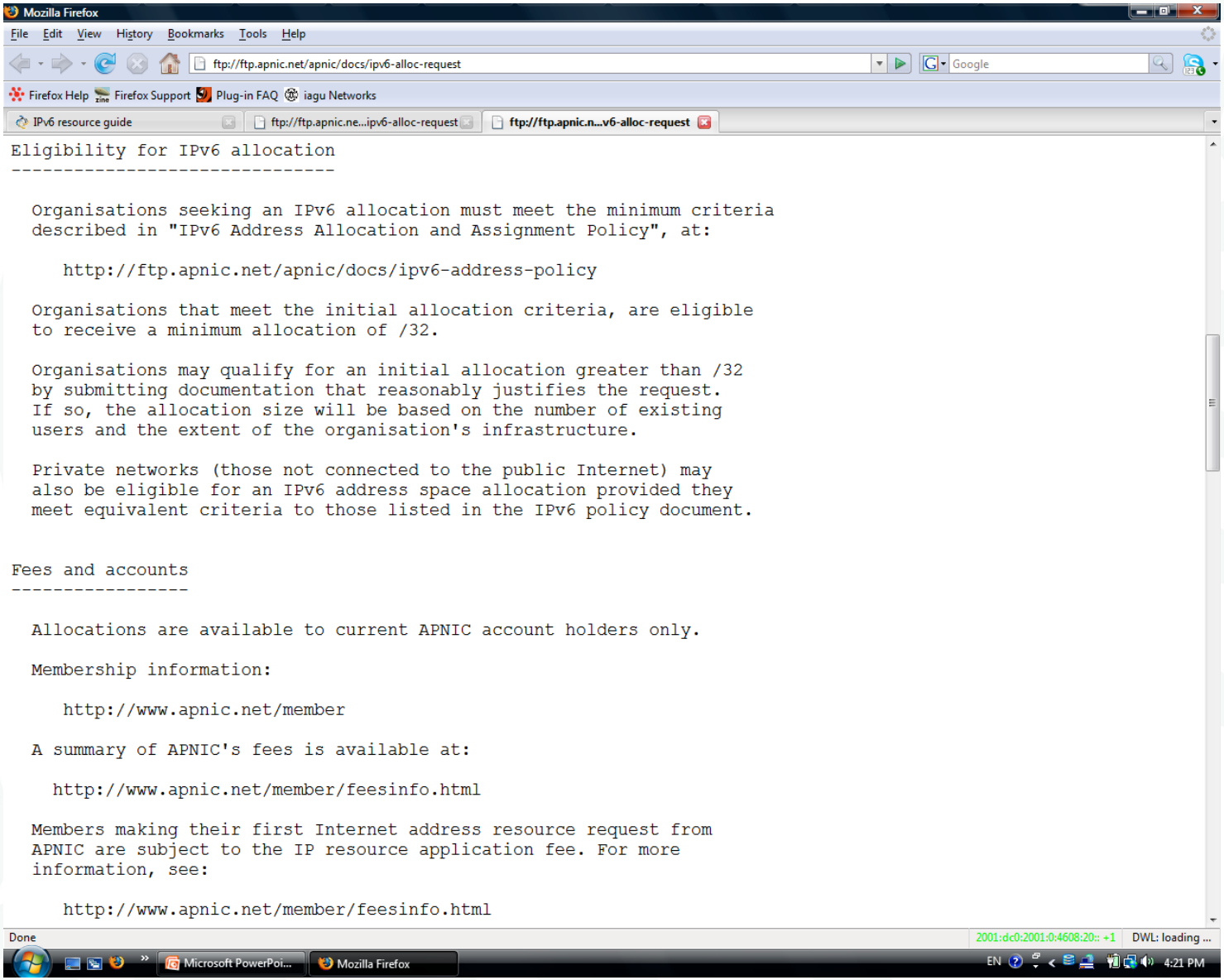
For existing APNIC members

IPv6 resource guide

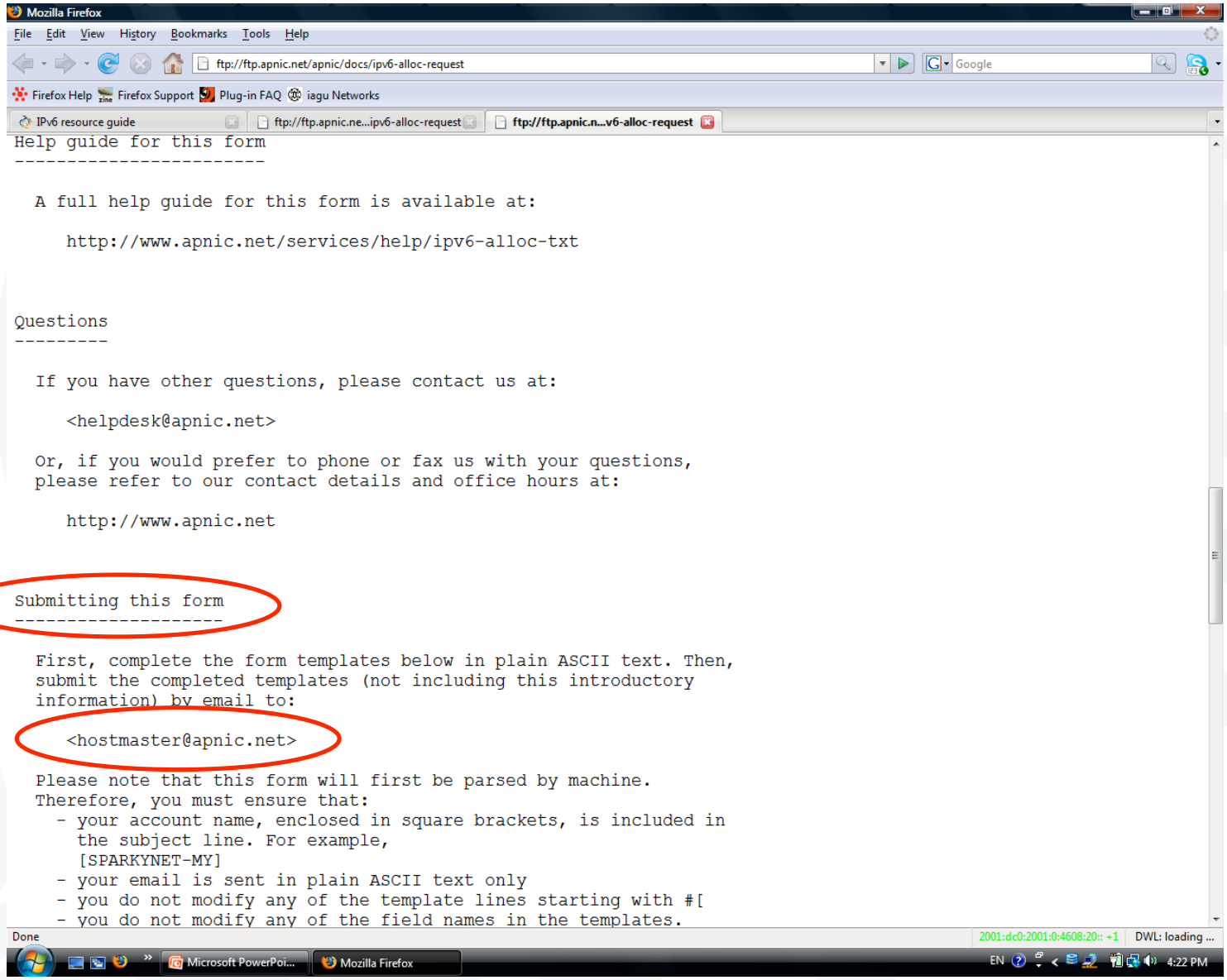
IPv6 allocation request txt form



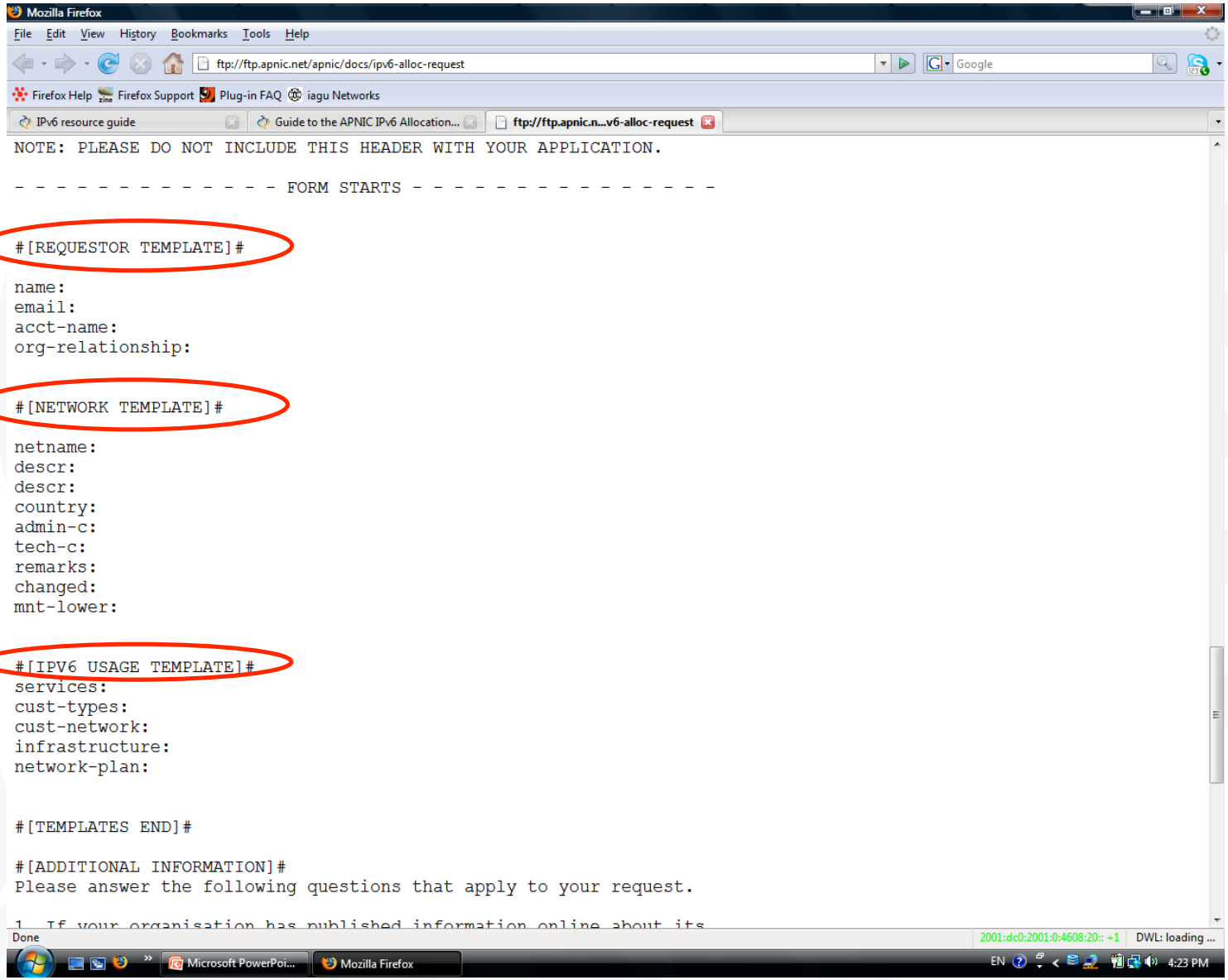
IPv6 allocation request txt form



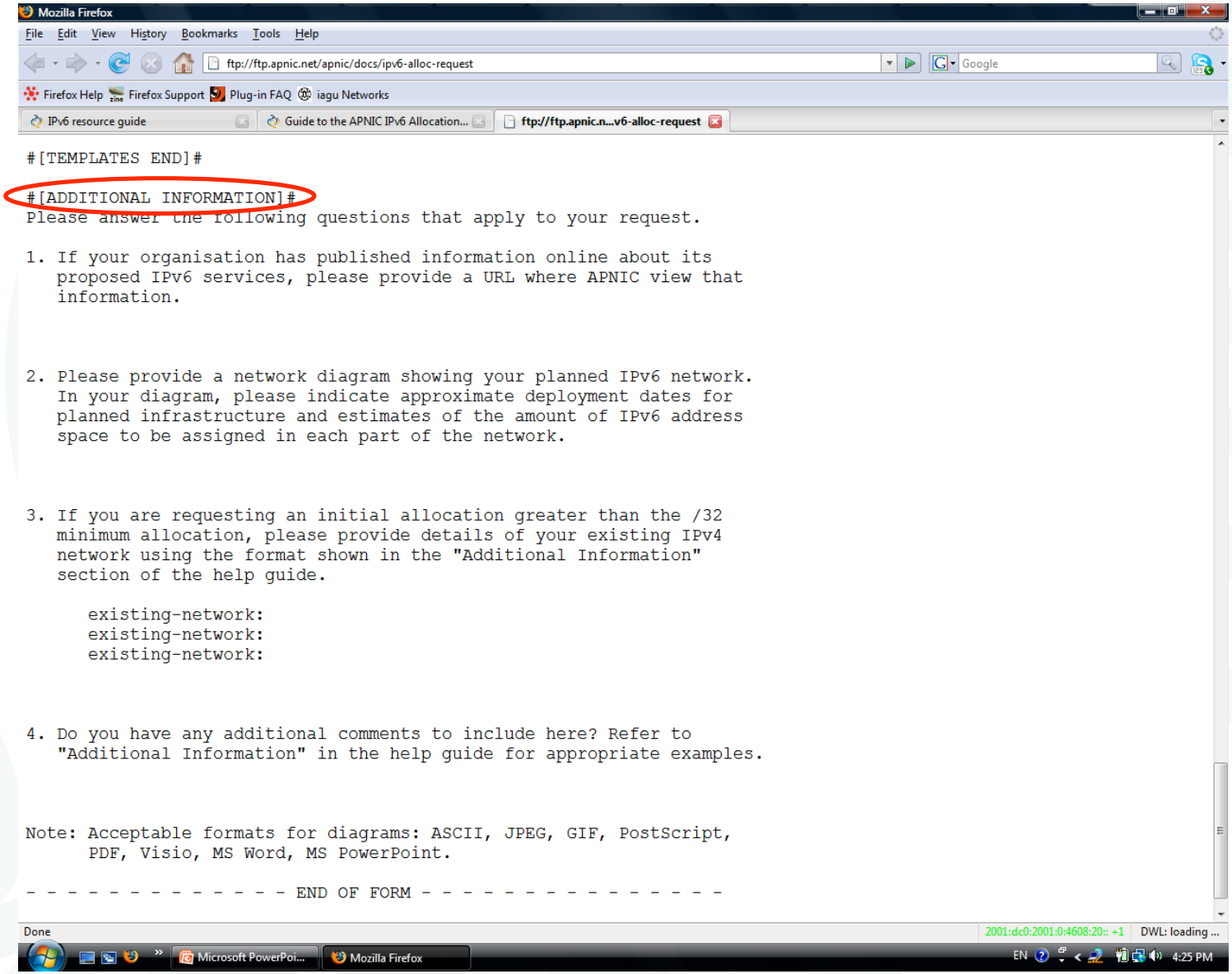
IPv6 allocation request txt form



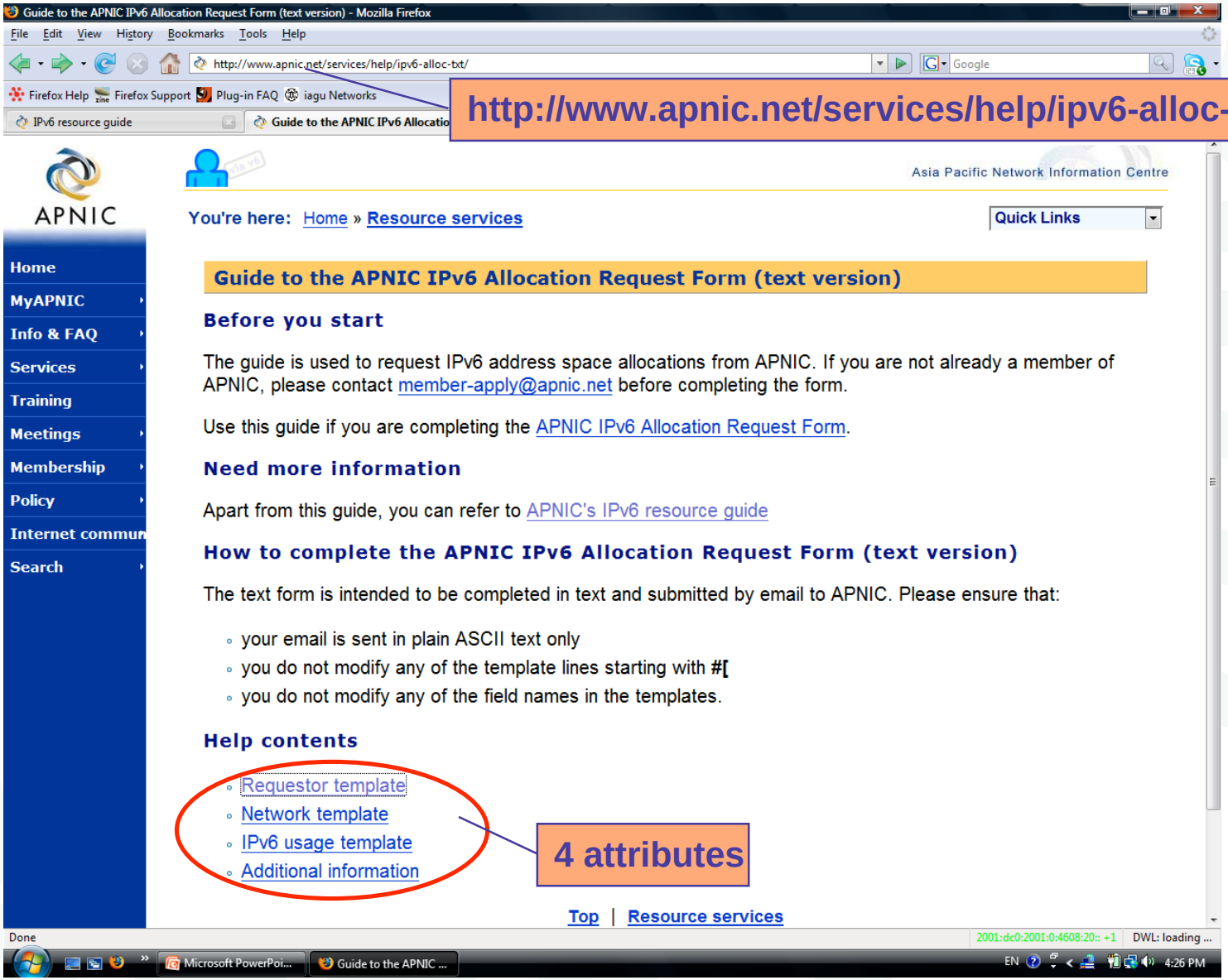
IPv6 allocation request txt form



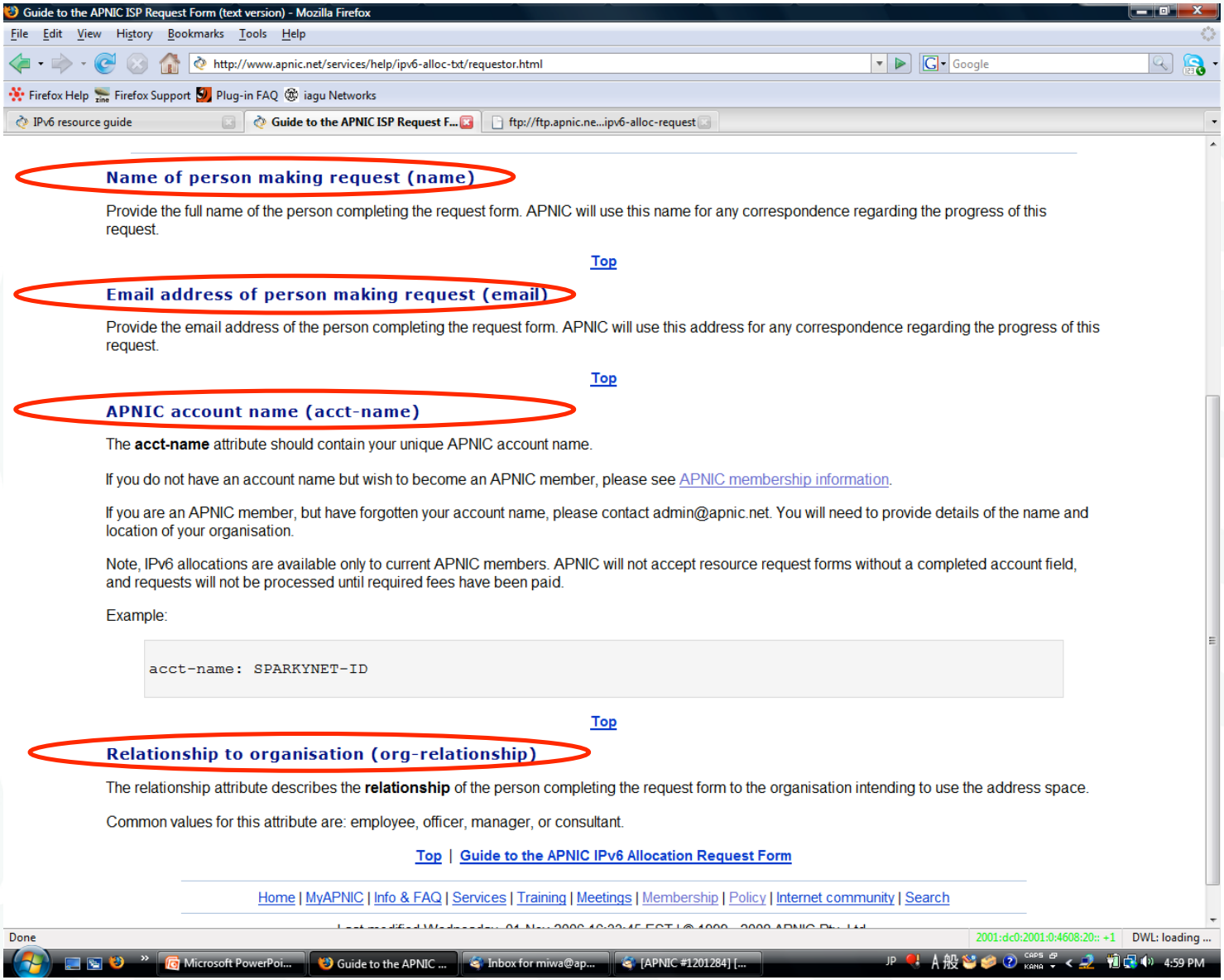
IPv6 allocation request txt form



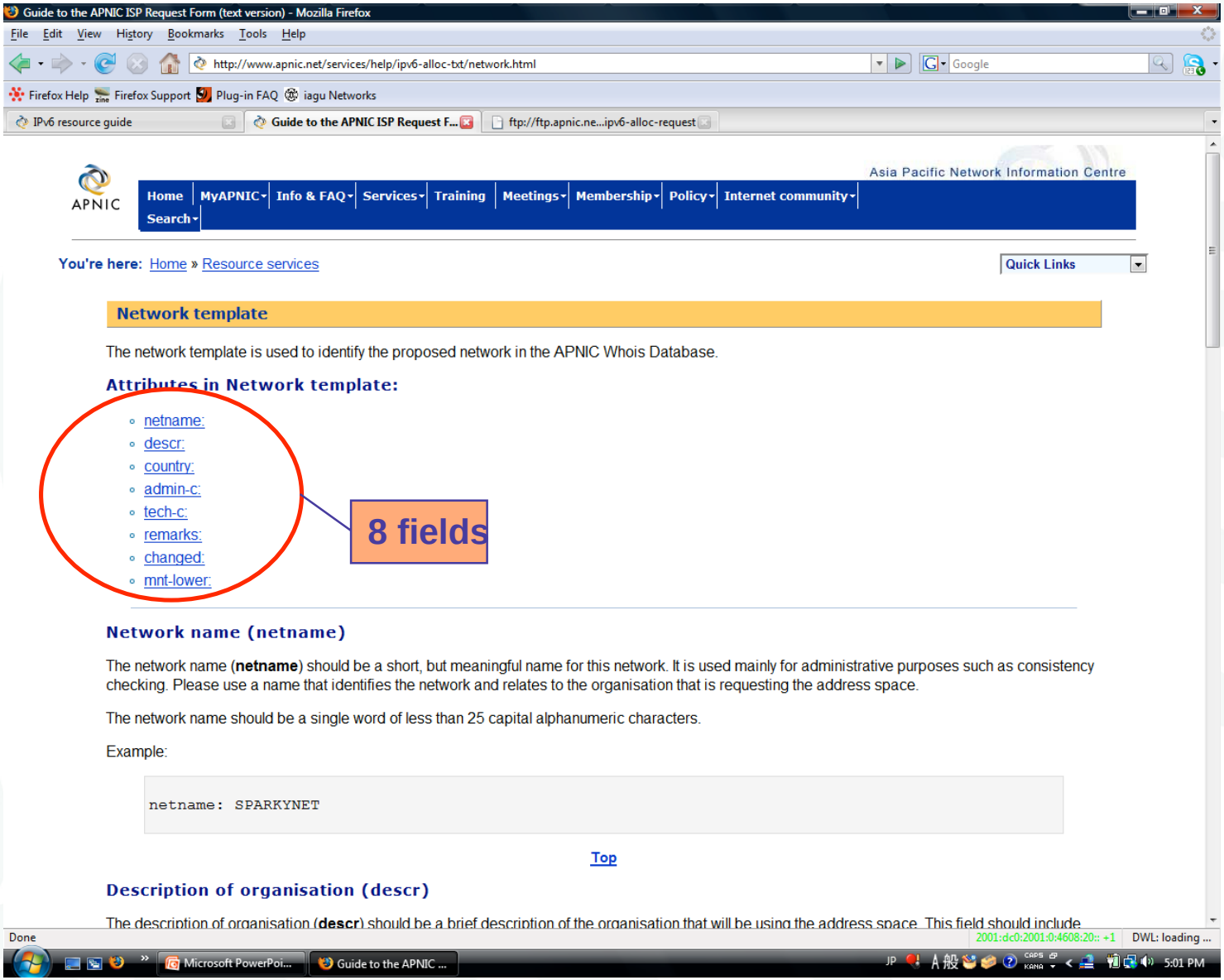
Guide to the IPv6 allocation request form



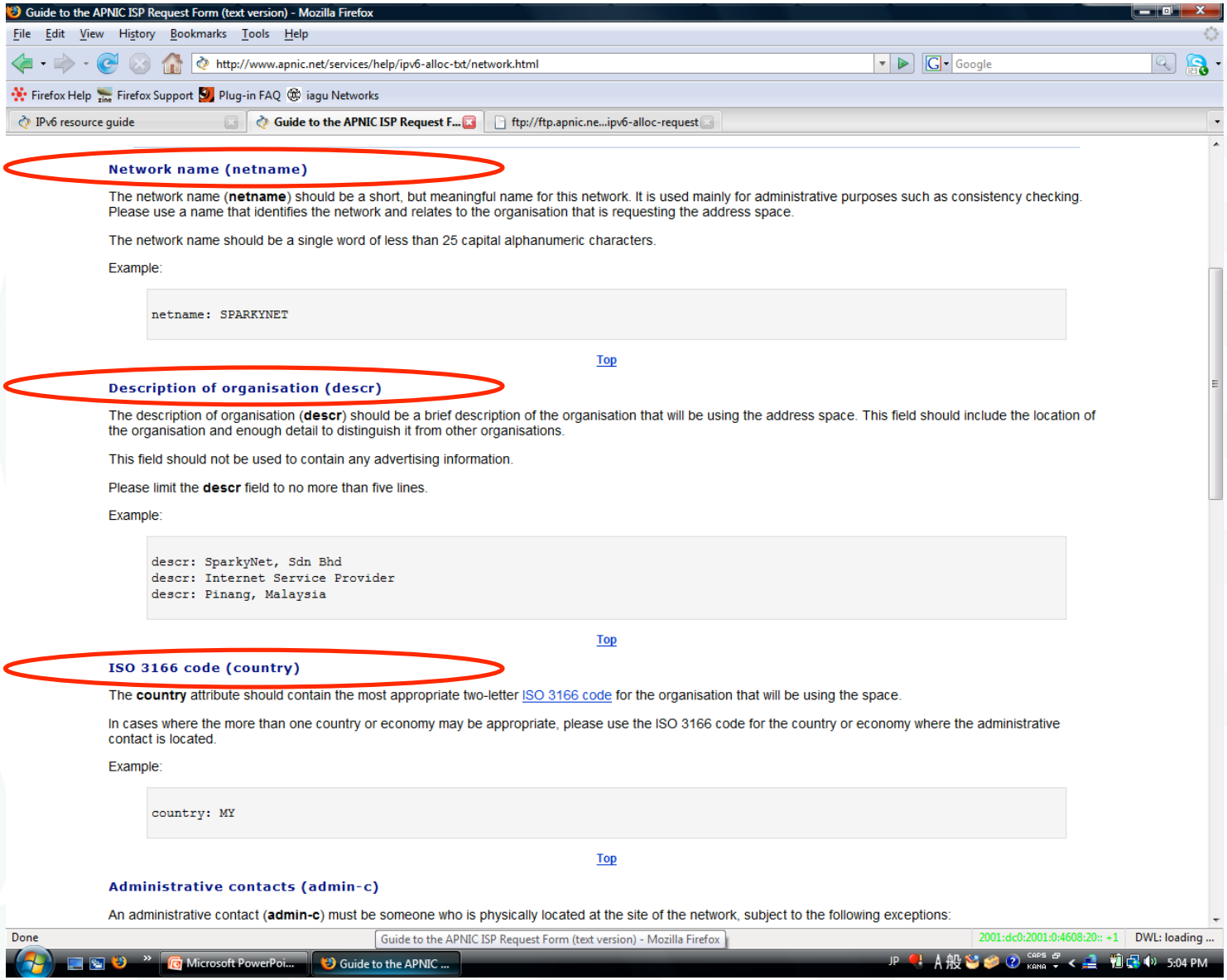
Request template



Network template



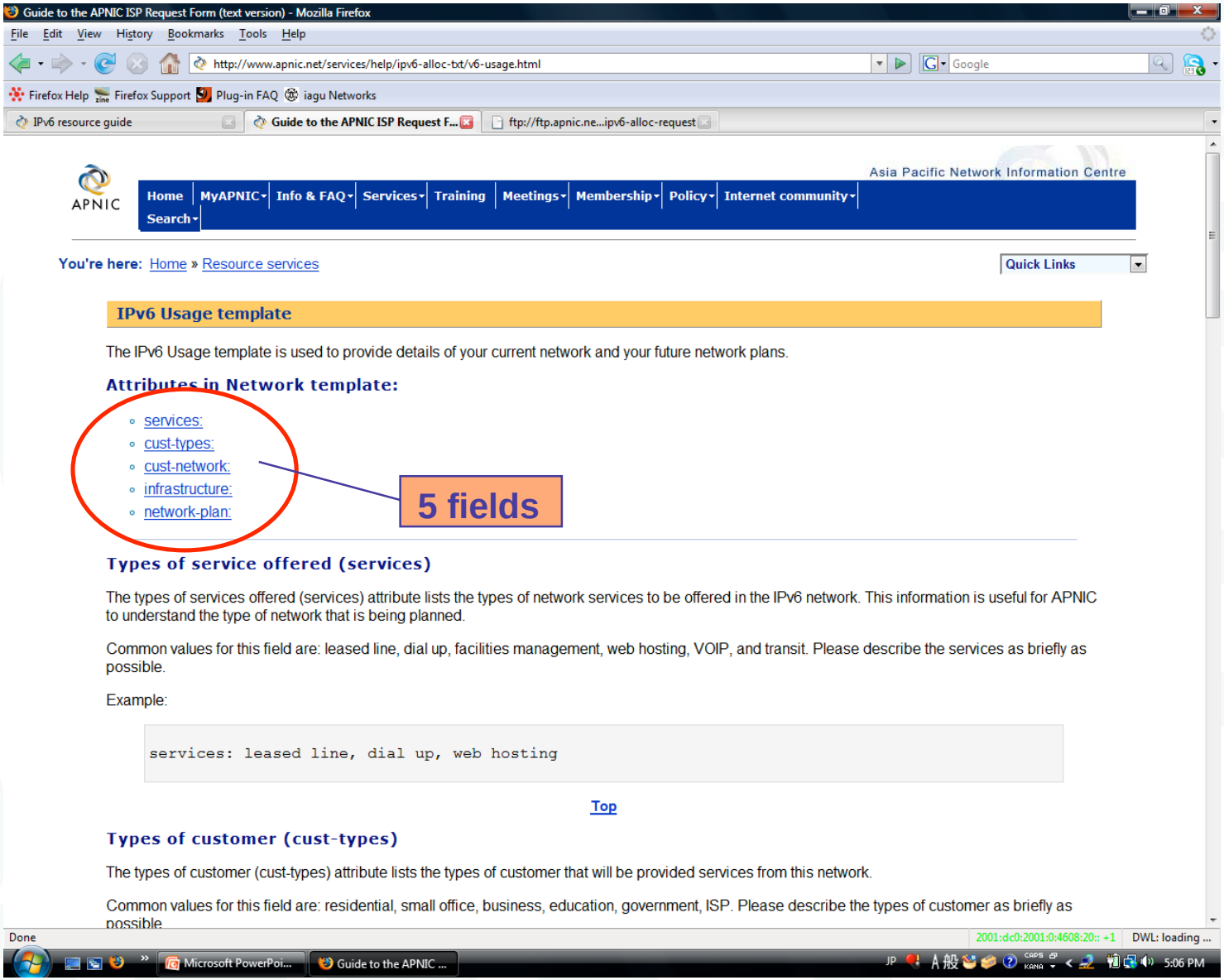
Network template



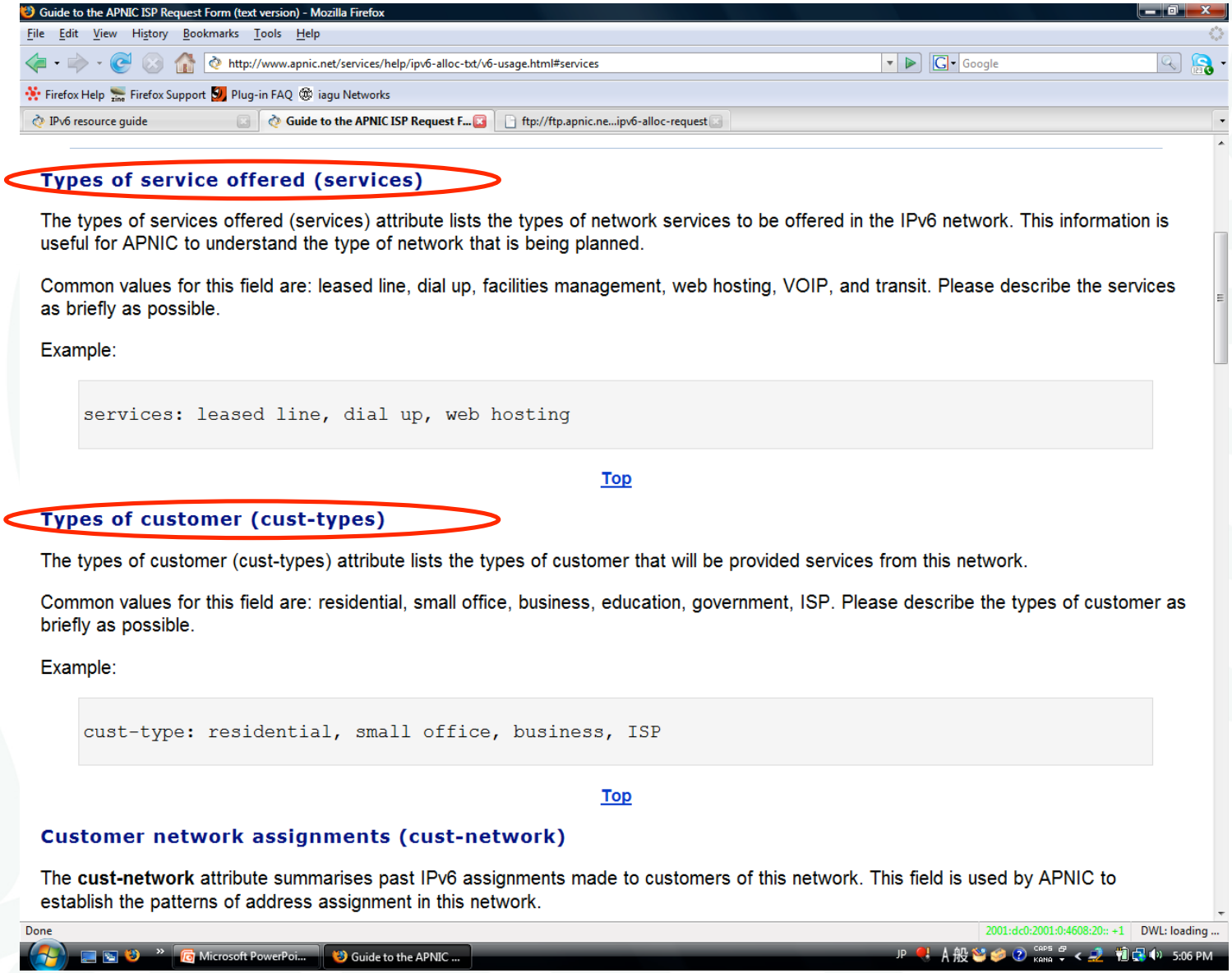
Network template

Network template

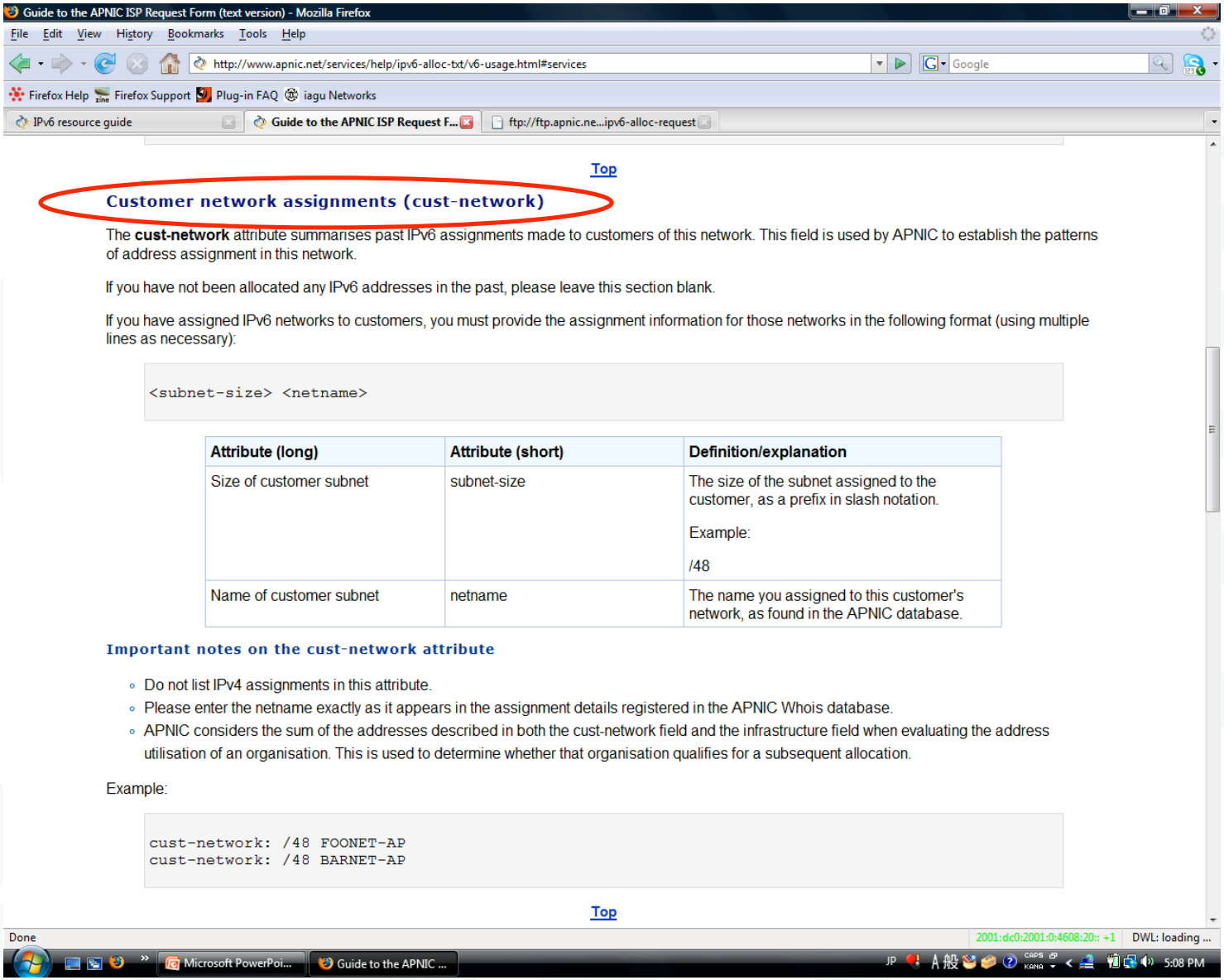
IPv6 usage template



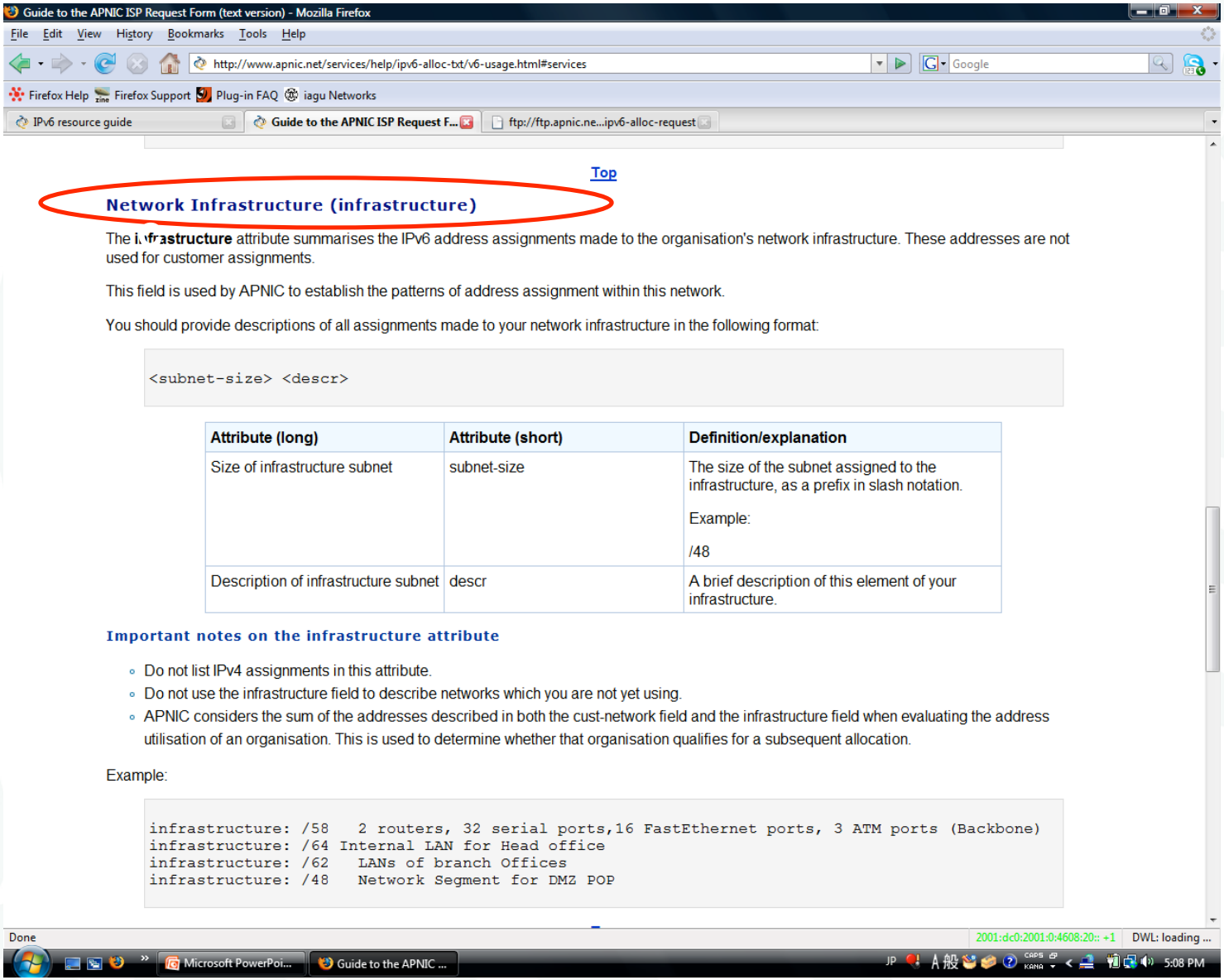
IPv6 usage template



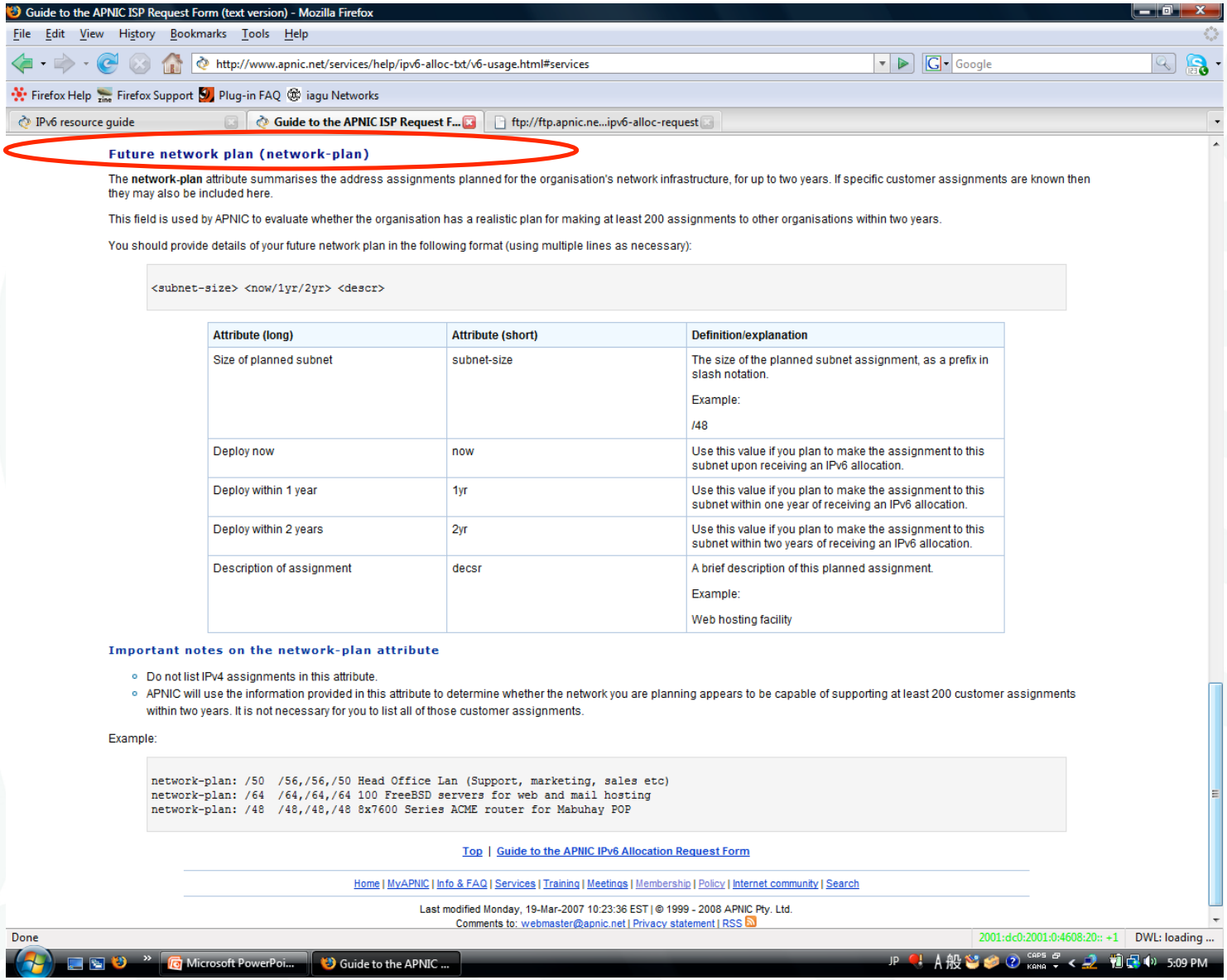
IPv6 usage template



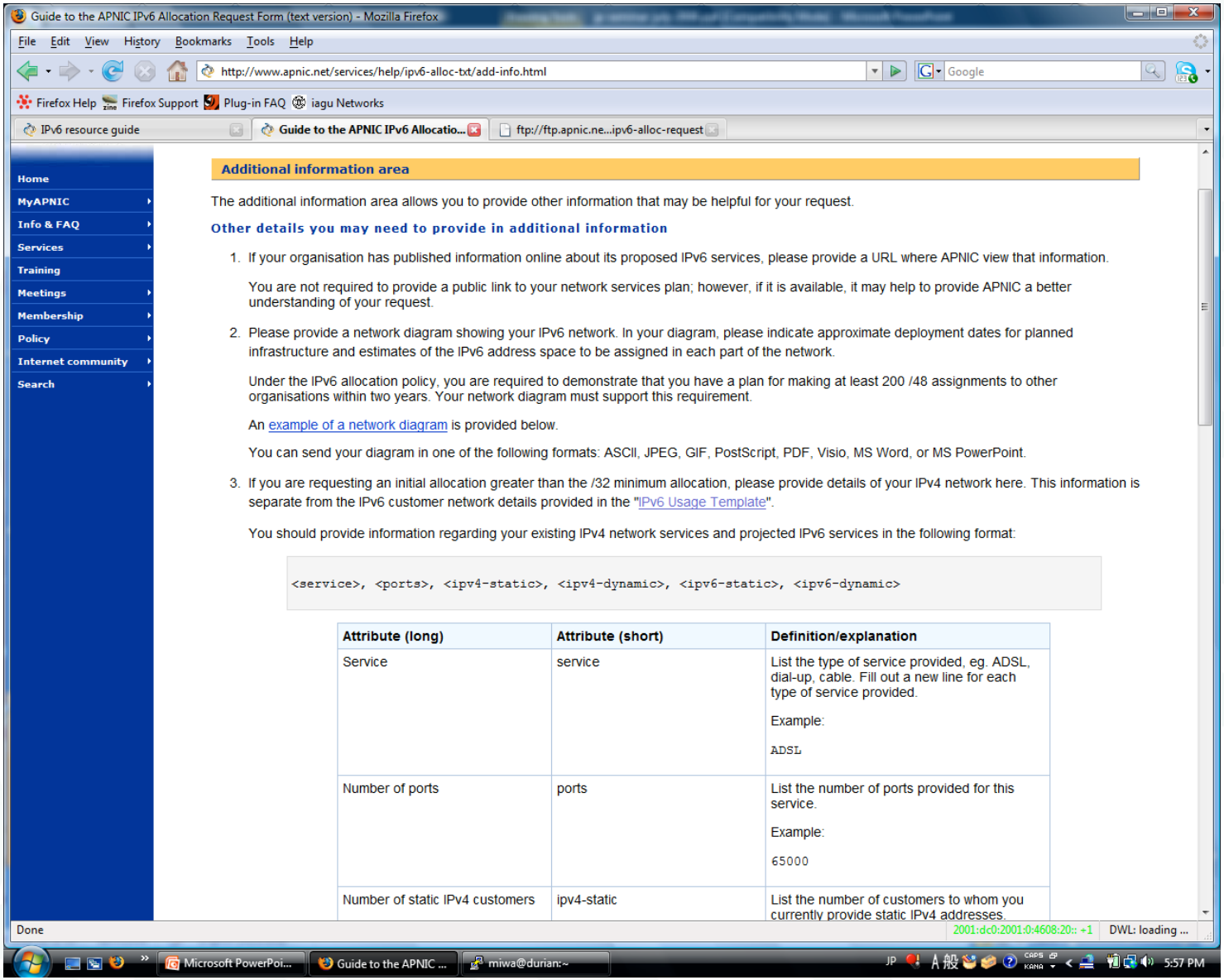
IPv6 usage template



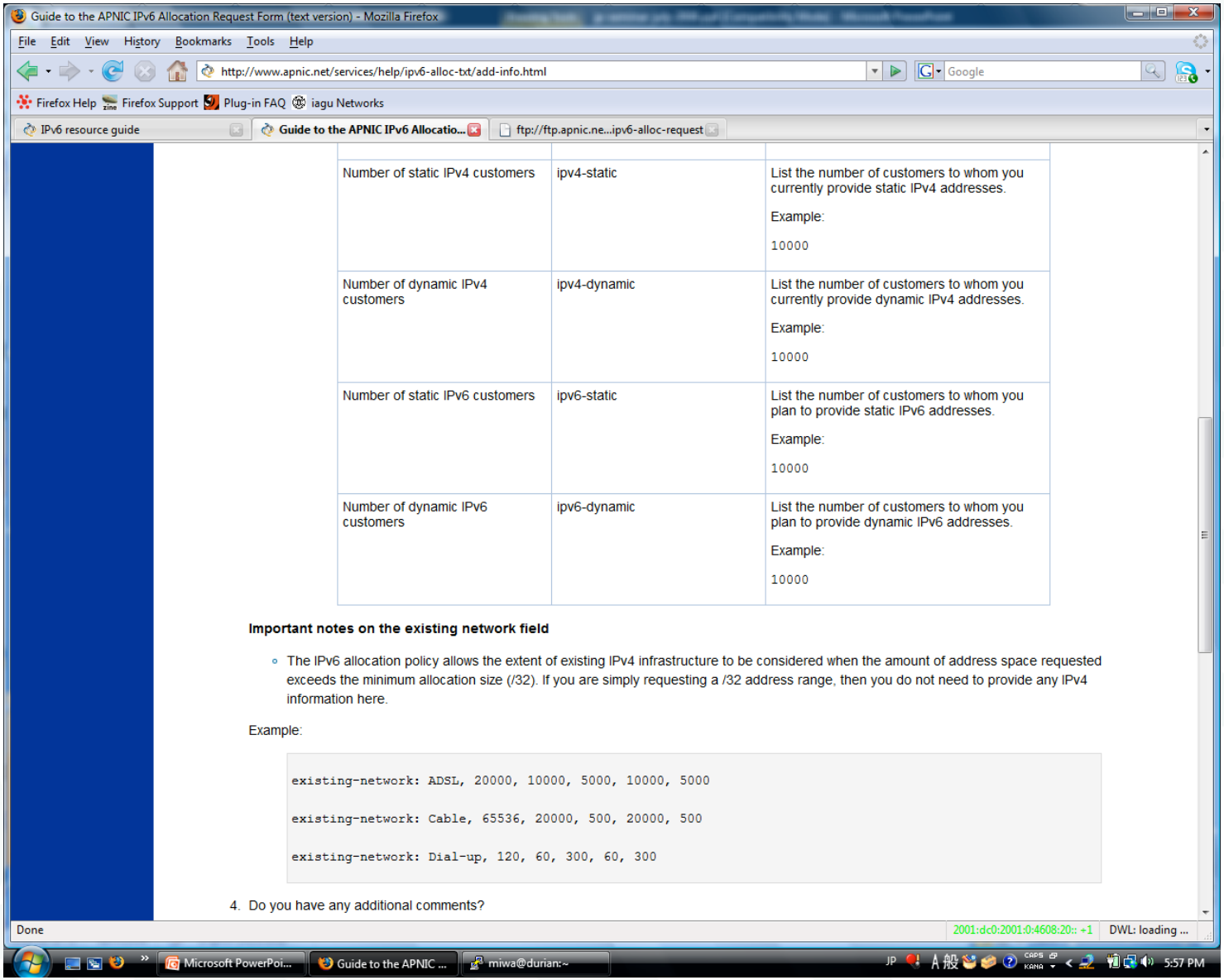
IPv6 usage template



Additional information



Additional information



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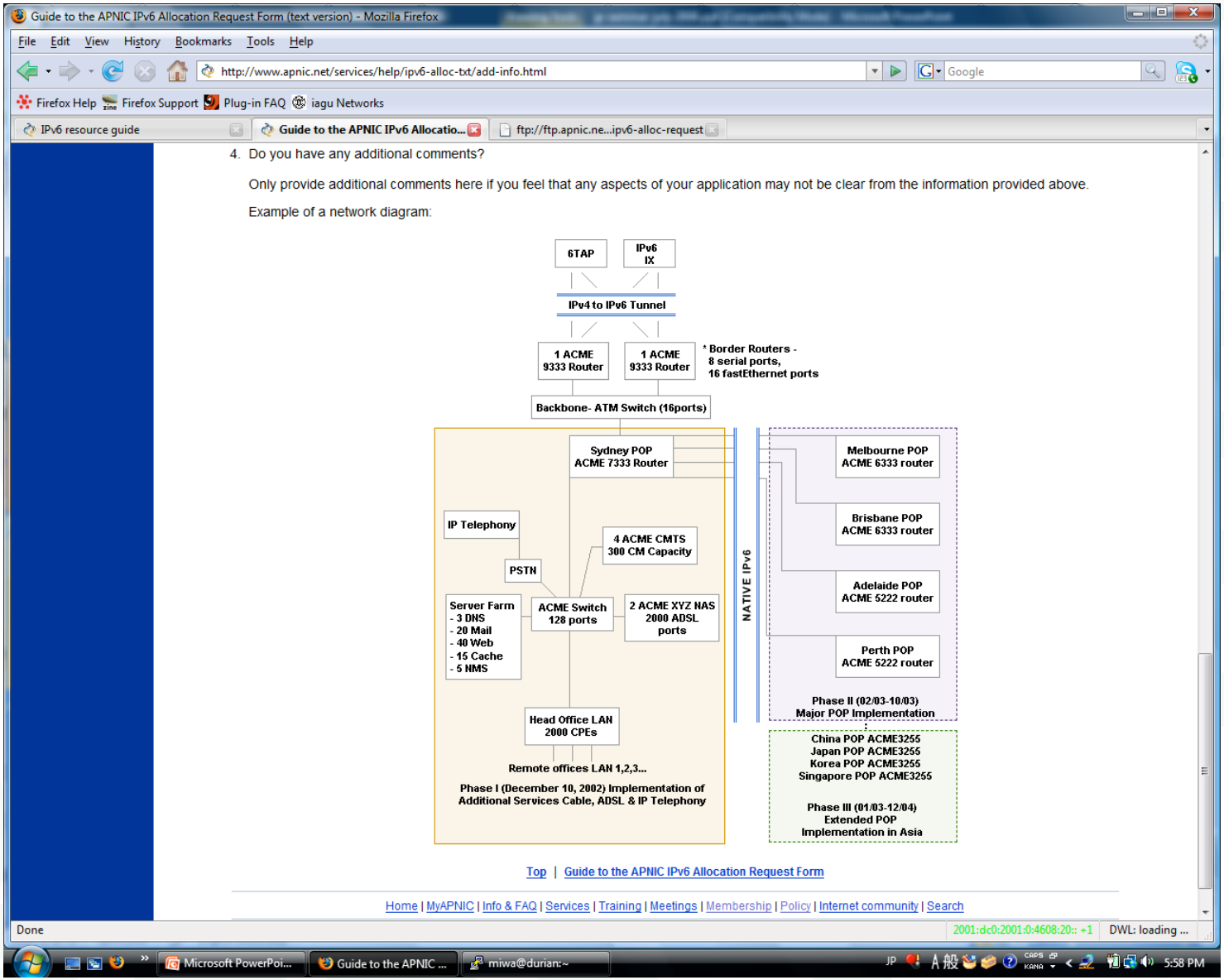

Sample inet6num object

```
inet6num:       2001:0DB8::/32
netname:        IPV6-DOC-AP
descr:          IPv6 prefix for documentation purpose
country:        AP
admin-c:        HM20-AP
tech-c:         HM20-AP
status:         ALLOCATED PORTABLE
remarks:        This address range is to be used for documentation
remarks:        purpose only. For more information please see
remarks:        http://www.apnic.net/info/faq/ipv6-documentation-
                prefix-faq.html
mnt-by:         APNIC-HM
changed:        hm-changed@apnic.net 20040115
changed:        hm-changed@apnic.net 20040211
source:         APNIC
```

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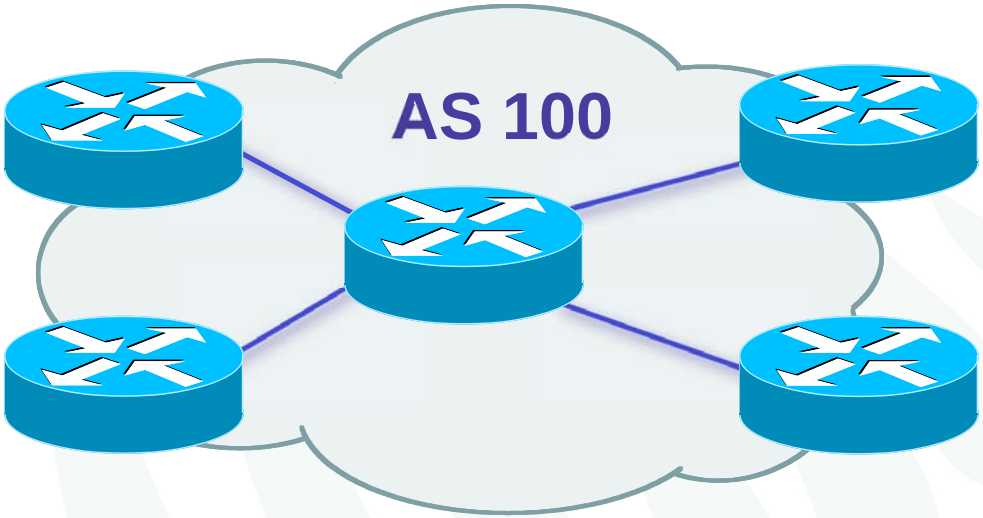
ASN

What is an Autonomous System?



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

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ASN policies

- An organisation is eligible for an ASN assignment if it:
  - is multihomed; and
  - has a single, clearly defined routing policy that is different from its providers' routing policies
- Registration requirement
  - All ASNs assigned must be publicly registered in the APNIC, or relevant NIR, Whois database
  - APNIC, or the relevant NIR, will create the aut-num object

ASN policies

- Providing ASN to customers
  - Same criteria as listed in the previous slide is applied
  - The requesting organisation is responsible for maintaining the registration on behalf of the customer
- If the customer ceases to receive connectivity from the requesting organisation
  - It must return the ASN
  - The requesting organisation is expected to enter into an agreement with the customer to this effect
- Any ASNs returned to the requesting organisation must then be returned to APNIC or the relevant NIR

ASN policies

- Current 2 byte ASN (16 bits)
  - Possibly run into the exhaustion by 2010
  - 4 byte ASN is developed by IETF
- 4 byte ASN distribution policy (32 bits)
  - Reached consensus in APNIC in 2006
- Timeline
  - Jan 2007: APNIC started allocating 4 byte ASN upon specific request default 2 byte ASN
  - Jan 2009: Default 4 byte ASN, 2 byte ASN on request
  - Jan 2010: 4 byte ASN only

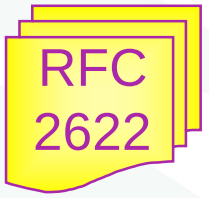
prop-064-v002

- prop-064-v002: Change to assignment policy for AS numbers
  - To create awareness earlier within the community for the need to support 4-byte AS numbers without mandating an absolute final adoption of 4-byte AS numbers

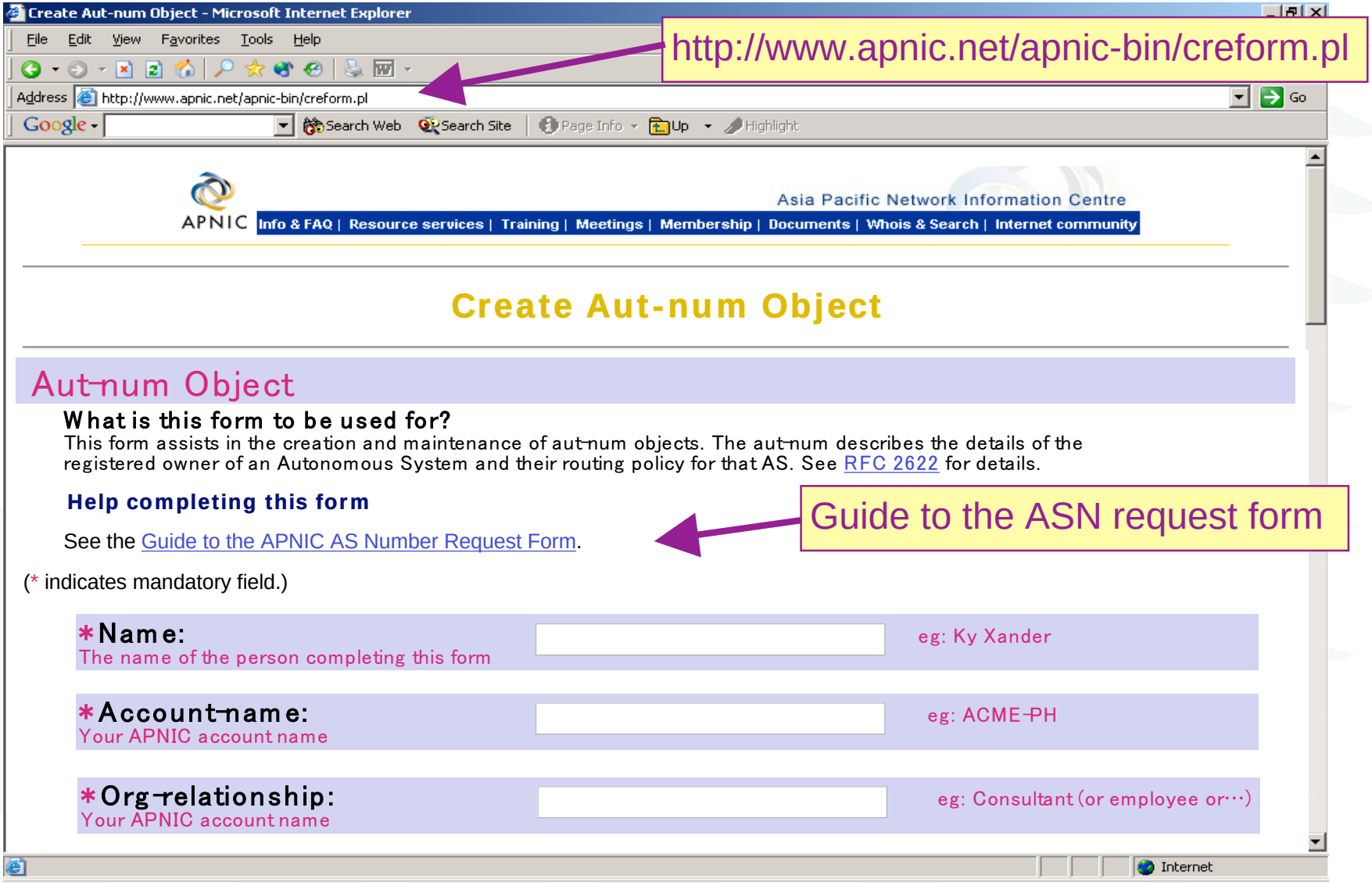
Requesting an ASN

- Complete the request form
  - web form available:
    - http://www.apnic.net/db/aut-num.html

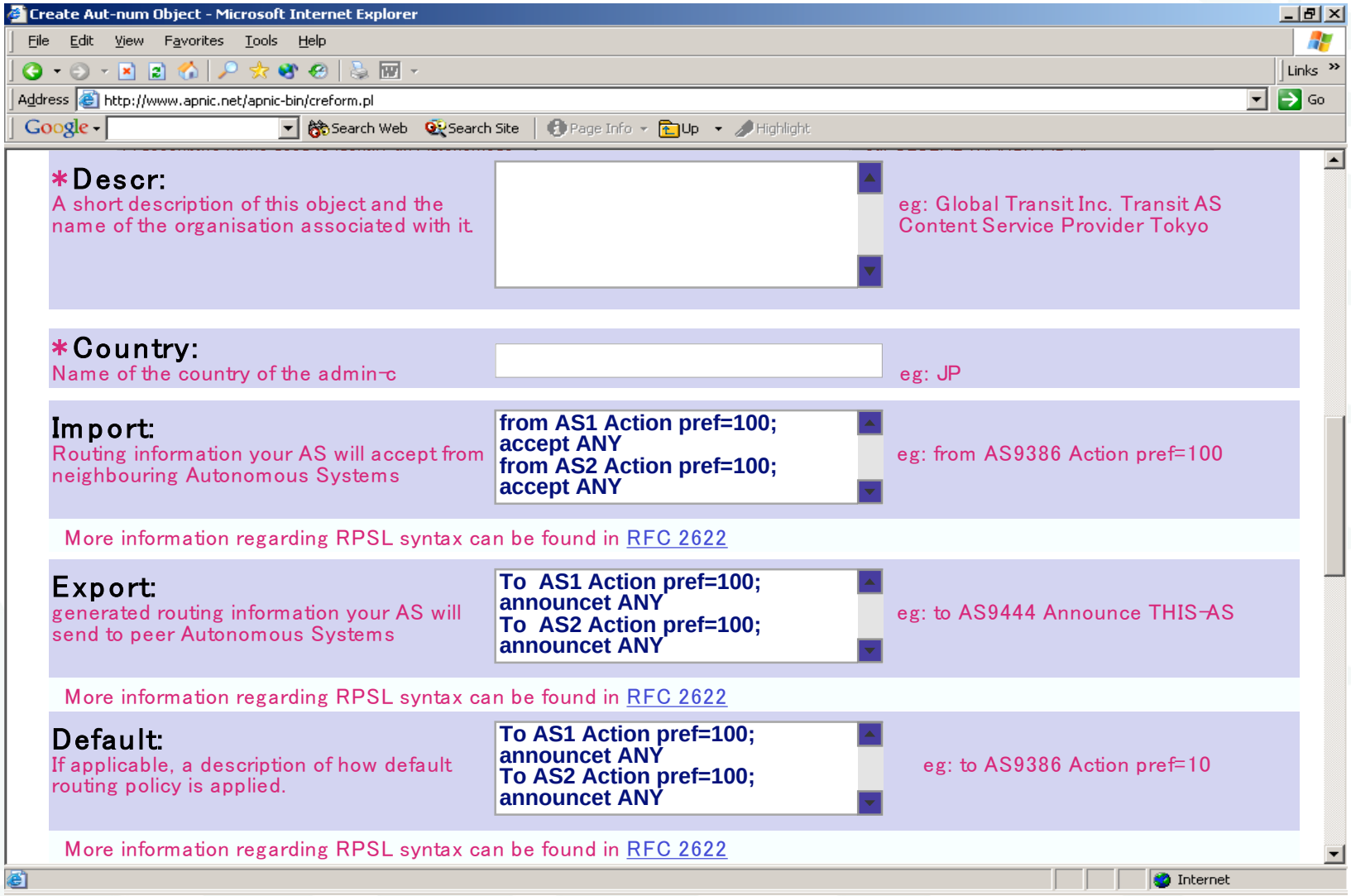
- Request form is parsed - real time
  - Must include routing policy
    - multiple import and export lines
  - Is checked for syntactical accuracy
    - based on RPSL (rfc2622)
  - Peers verified by querying routing table
  - [NO-PARSE] will not send request to parser



ASN request form



Request form – routing policy



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:	**rom 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

4 byte AS number

Updated Jan 2007

This modules is developed based on several articles written by Geoff Huston, APNIC Chief Scientist and George Michaelson, APNIC Senior R&D Officer

Acknowledgements

The material used in this course was created in collaboration Geoff Huston (APNIC) and George Michaelson (APNIC) and includes material provided by them.

APNIC acknowledges with thanks and appreciation the contribution and support of the above.

Background

- Current 2 byte ASN (16 bits)
  - Possibly run into the exhaustion by 2010
  - 4 byte ASN is developed by IETF
- 4 byte ASN distribution policy (32 bits)
  - Reached consensus in APNIC in 2006
- Timeline
  - APNIC started allocating 4 byte ASN upon specific request Jan 2007, default 2 byte ASN
  - Jan 2009: Default 4 byte ASN, 2 byte ASN on request
  - Jan 2010: 4 byte ASN only

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Canonical textual form of 4 byte ASN

- 2 byte only ASN
  - May be represented as a 16 bit value decimal number, with no leading zeros, or “.” character.
  - They may be represented as 4 byte ASN.
- 4byte ASN
  - If their value lies in the range 0 – 65535
    - 4 byte ASN may be represented identically as 2 byte only ASN.
  - Otherwise, they MUST be represented identically as for 4 byte only ASN.
    - For values in the range 0 – 65535 the canonical 4 byte ASN representation
    - 0. <16 bit decimal value>
- 4 byte only ASN
  - MUST be represented as two pairs of 16 bit decimal values with no leading zeros, separated by the “.” character.
  - <high order 16 bit value in decimal> **.** <low order 16 bit value in decimal>
    - E.g., a 4 byte ASN of value 65546 (decimal)
    - 1.10
- APNIC resource range: 2.0 ~ 2.1023

Ref: Canonical Textual Representation of 4 byte AS Numbers, draft-michaelson-4byte-as-repsentation-02

4 byte ASN approach

- Change as little as possible in the BGP spec
- Be ‘backward compatible’ with 2 byte BGP implementations
- Preserve AS semantics
  - Preserve loop detection capability
  - Preserver AS path length metric
- No ‘flag day’
  - Allow 2 byte implementations to continue to operate indefinitely in a mixed 2 / 4 byte AS world

4 byte AS transition

- In the 2 byte world we ‘lie’ about the 4 byte path
  - 4 byte ASs appear as AS23456 (AS_TRANS) in the 2 byte world
    - AS23456 is reserved for use in AS number pool transition.
  - As long as you preserver the integrity of path length and don’t change 2 byte values in the 2 byte world
    - BGP works in terms of path metric and loop detection
- In the 4 byte world we preserve 4 byte values of the entire AS path

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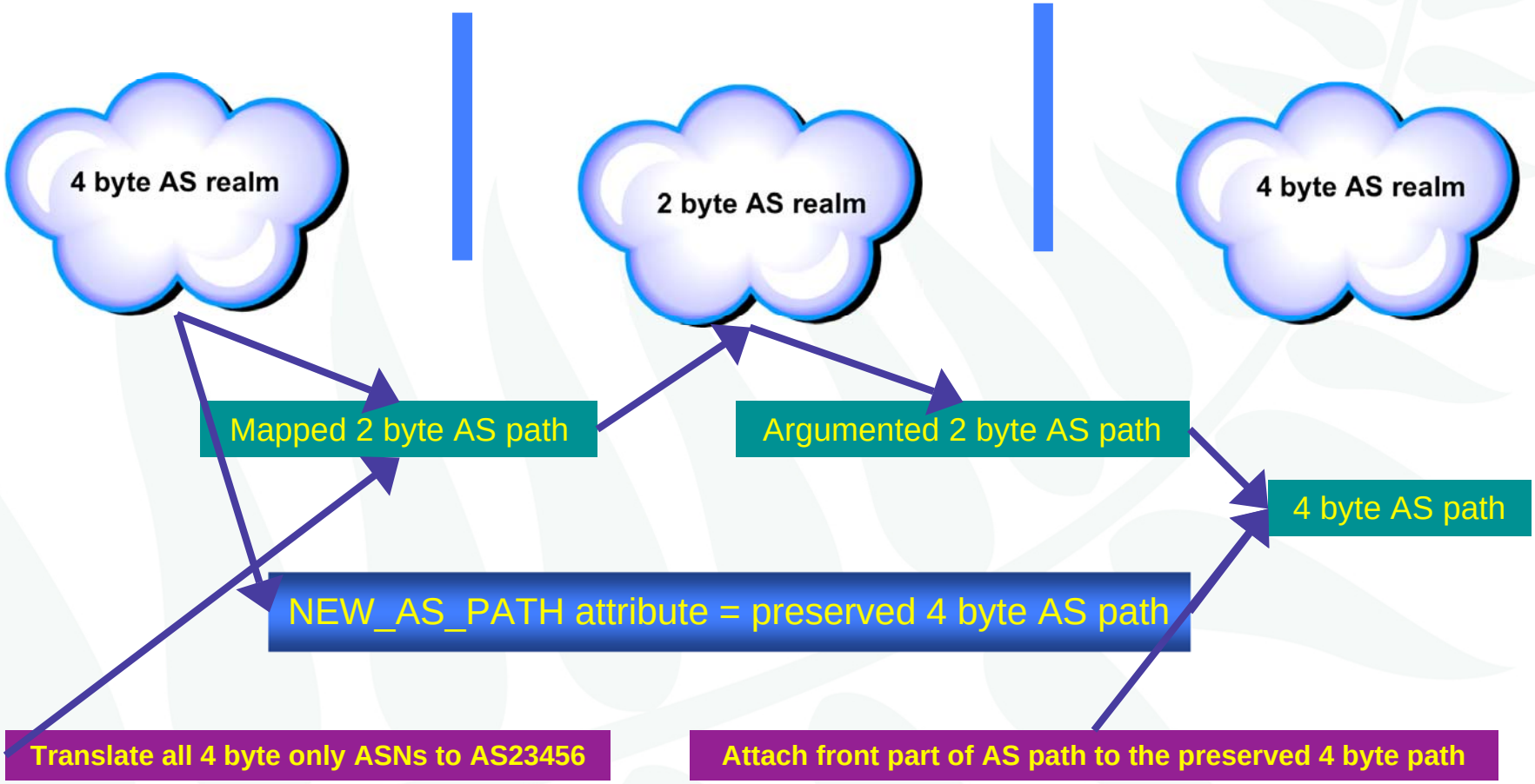
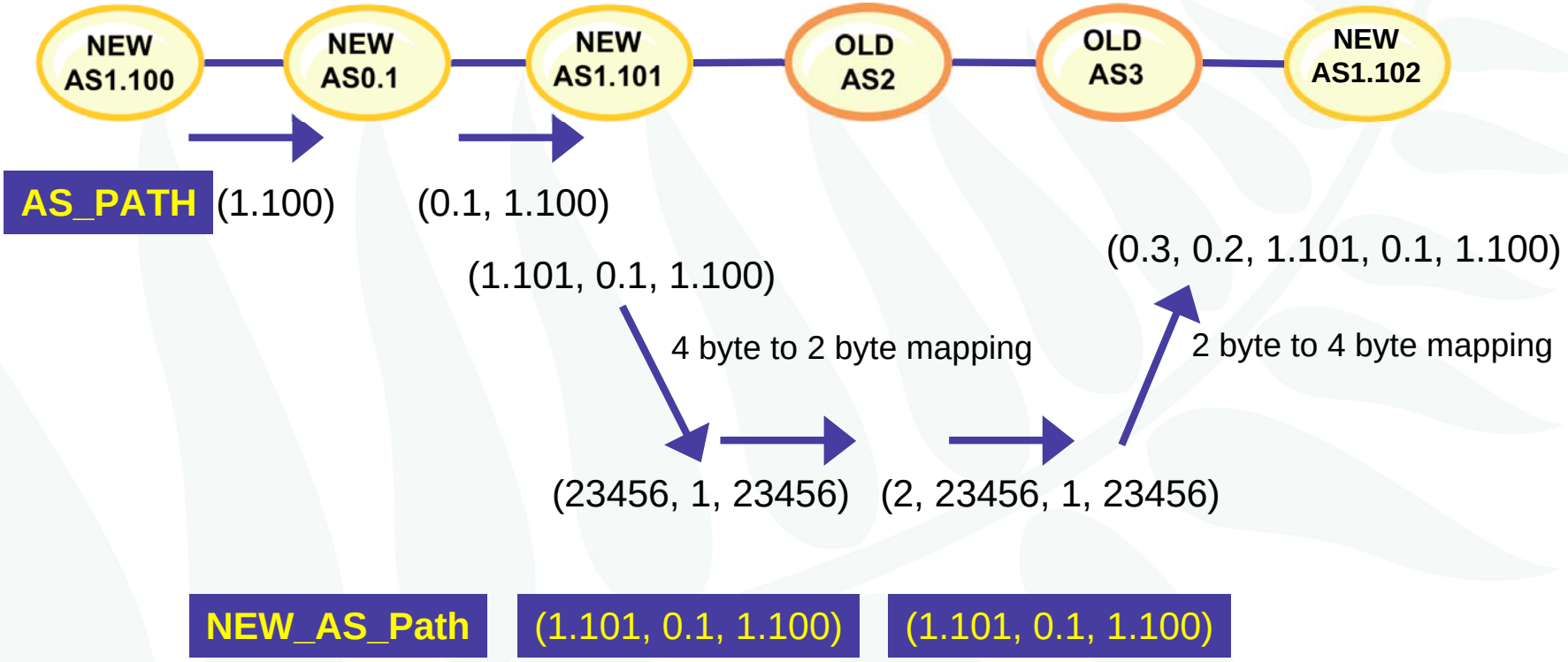
4 byte AS transition



NEW to OLD BGP AS Path mapping



Implications

- BGP speakers in 2 byte AS domains should support a new attribute
  - NEW_AS_PATH
  - But nothing fatally breaks even if you don't
  - Mixed 2/4 byte loops will get detected in the 2 byte world as a fallback
- AS23456 will appear in 2 byte AS paths
  - Both origin and transit
  - E.g. AS1.2 gets translated into AS23456 in a number of places, including in your Operations Support System (OSS).
  - You may need to
    - peer with AS23456
    - transit across AS23456, and
    - have multiple customers on AS23456
      - Your OSS to be confused?

Implications

- If you want to explicitly signal to a 4 byte AS using communities
  - Need to explicitly signal the 4 byte AS using BGP extended communities
    - RFC 4360:
      - BGP Extended Community Attribute (Feb 2006)
    - draft-rekhter-as4octet-ext-community-01.txt :
      - Four-octet AS Specific BGP Extended Community
- BGP memory requirements will increase
- BGP bandwidth requirements will increase
- BGP convergence times may increase in some cases
- If you proxy aggregate in the 2 byte world then make sure that the aggregate is strictly larger than the components
  - Otherwise loop detection may be harder
  - But proxy aggregation is not a common occurrence in today's BGP environment

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Implications

- No dynamic capability for 2 / 4 byte ASN support
  - You cannot flick from “2-byte OLD” to “4 byte NEW” mode within an active BGP session on the fly
- In a complex iBGP AS that wants to transition to using a 4 byte “home” AS then you are going to have to think about the transition very carefully
- Whois DB objects
  - E.g., aut-num, as-block, as-set, route, etc.

Current testing

- APNIC (Geoff Huston and George Michaelson) and Randy Bush (IIJ) conducted several tests on 4 byte ASNs in Jan 2007
- Test environments:
  - In a lab environment and in the public network
- The BGP implementations they tested:
  - The open source implementations Quagga and OpenBGPD
- Three types of test are conducted:
  1. Interoperability of the BGP implementations with each other and with 2 byte BGP (including Cisco BGP) – successful
  2. Tunneling of the NEW_AS_PATH attribute across old BGP speakers - so far the tests have all been successful
  3. Loop detection - successful

Available patches

- Code releases of BGP implementations with 4 byte AS number supported (http://www.potaroo.net/tools/bgpd/):
  - OpenBGPD 3.9
  - FreeBSD-patched OpenBGPD 3.9
  - OpenBGPD 4.0
- Quagga patch
  - http://quagga.ncc.eurodata.de/

Vendor implementation

- Cisco
  - IOS XR 3.4 (27/11/2006)
  - http://www.cisco.com/univercd/cc/td/doc/product/ioxsoft/iox34/reln_34.htm
  - IOS
    - 4 byte ASN will be available in IOS in the future but no fixed dates yet
- Juniper
  - JUNOSe 4-1-0 and later
    - BGP support for 4 byte ASNs
    - http://www.juniper.net/techpubs/software/erx/erx410/bookpdfs/sw-rn-erx410.pdf

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References

- prop-032-v002: 4-byte AS number policy proposal
  - http://www.apnic.net/docs/policy/discussions/prop-032-v002.txt
- Canonical Textual Representation of 4-byte AS Numbers draft-michaelson-4byte-as-representation-02
  - http://www.ietf.org/internet-drafts/draft-michaelson-4byte-as-representation-02.txt
- BGP Support for Four-octet AS Number Space draft-ietf-idr-as4bytes-12.txt
  - http://www.ietf.org/internet-drafts/draft-ietf-idr-as4bytes-12.txt

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Questions?

APNIC Whois database

Recap

LIR/ISP registration responsibilities

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 as private data
   - But you may change to be public data if you wish
   - Allocation object created by APNIC

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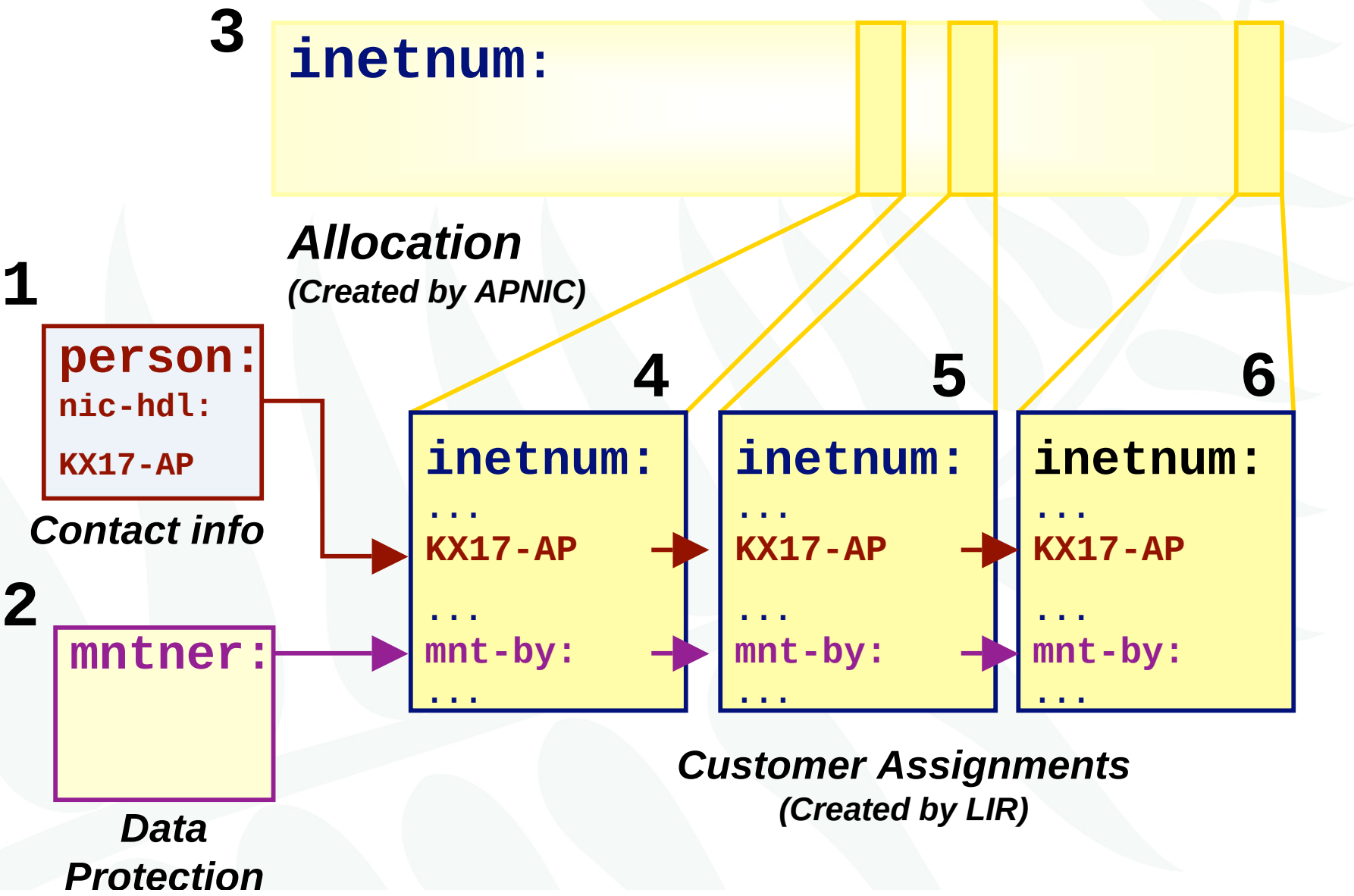
Using the db – step by step



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
  - Eg. HM20-AP

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

Replacing contacts in the db
- using person objects

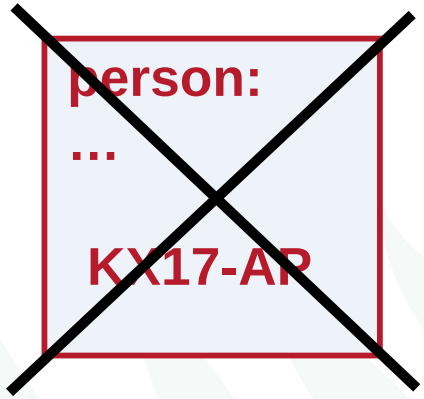
K. Xander is leaving my organisation. Z. Ulrich is replacing him.

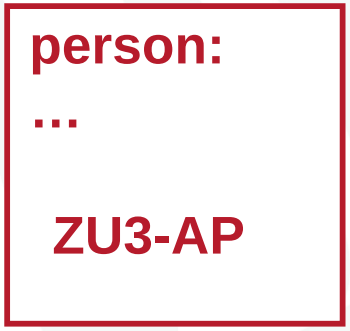
1. Create a person object for new contact (Z. Ulrich).

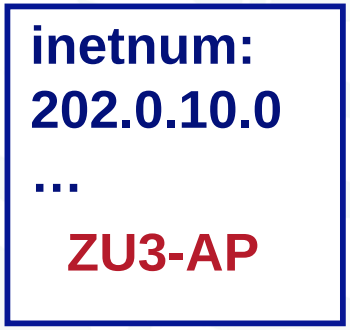
2. Find all objects containing old contact (K. Xander).

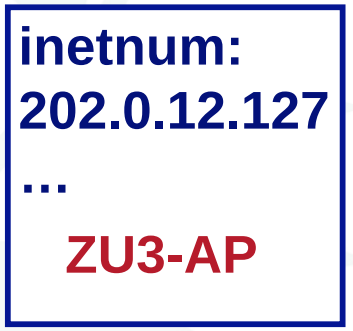
3. Update all objects, replacing old contact (KX17-AP) with new contact (ZU3-AP).

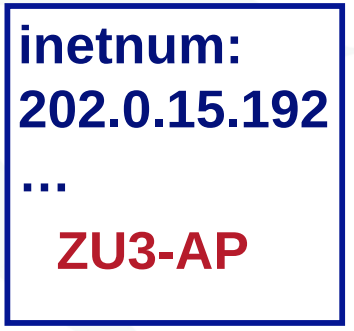
4. Delete old contact's (KX17-AP) person object.











Replacing contacts in the db
– *using a role object*

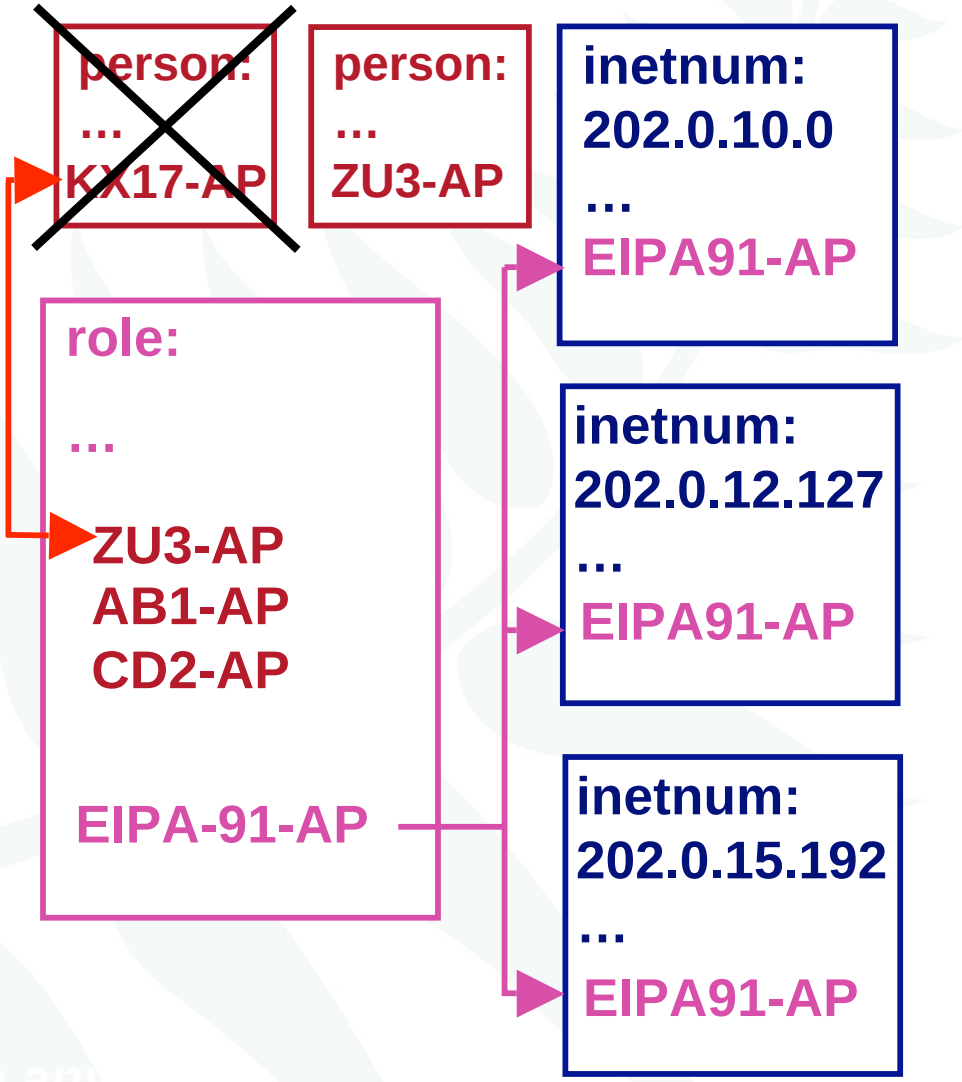
K. Xander is leaving my organisation. Z. Ulrich is replacing him.

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.

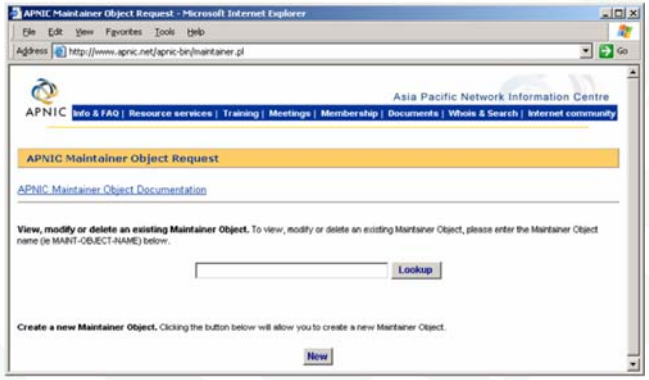


Database protection – maintainer object

```
mntner:      MAINT-AU-APNICTRAINING
descr:       APNIC Training
country:     AU
admin-c:     AA196-AP
tech-c:      AA196-AP
auth:        CRYPT-PW apuTnWIktOVWQ
mnt-by:      MAINT-AU-APNICTRAINING
referral-by: APNIC-HM
changed:     hm-changed@apnic.net 20080424
source:      APNIC
```

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

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APNIC

Authorisation mechanism

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
  - Crypt-PW
    - Crypt (Unix) password encryption
    - Use web page to create your maintainer
  - PGP – GNUPG
    - Strong authentication
    - Requires PGP keys
  - MD5
    - Available

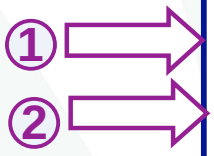
Mnt-by & mnt-lower

- ‘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

- 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
```

① ② 

1. Only APNIC can change this object
2. Only Loxinfo can create assignments within this allocation

Authentication/authorisation

- 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
```

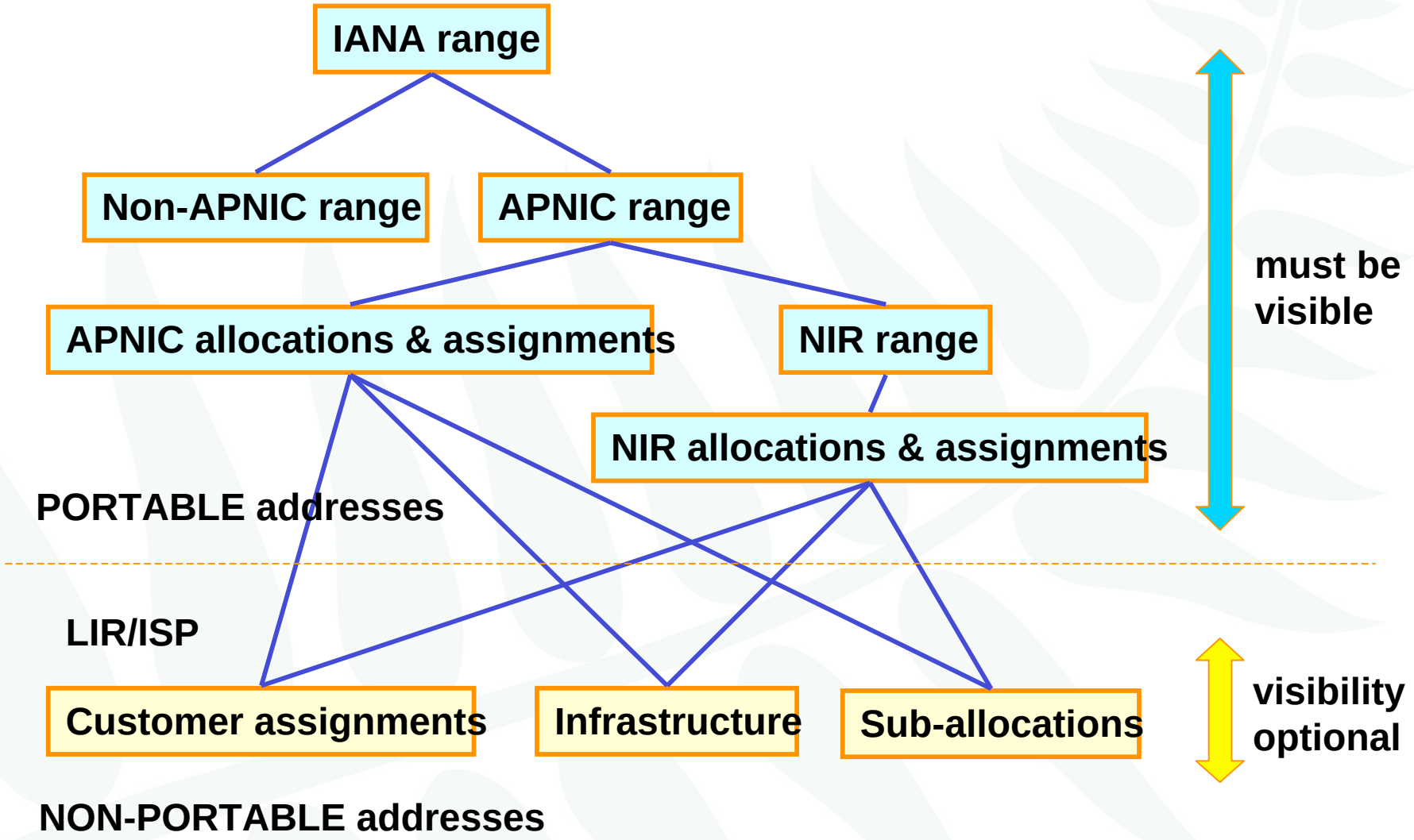
Only LOXINFO-IS can change this object

Privacy of customer assignments

Customer privacy

- Privacy issues
  - Concerns about publication of customer information
  - Increasing government concern
- APNIC legal risk
  - Legal responsibility for accuracy and advice
  - Damages incurred by maintaining inaccurate personal data
- Customer data is hard to maintain
  - APNIC has no direct control over accuracy of data
- Customer assignment registration is still mandatory

What needs to be visible?



MyAPNIC

Secured APNIC members website

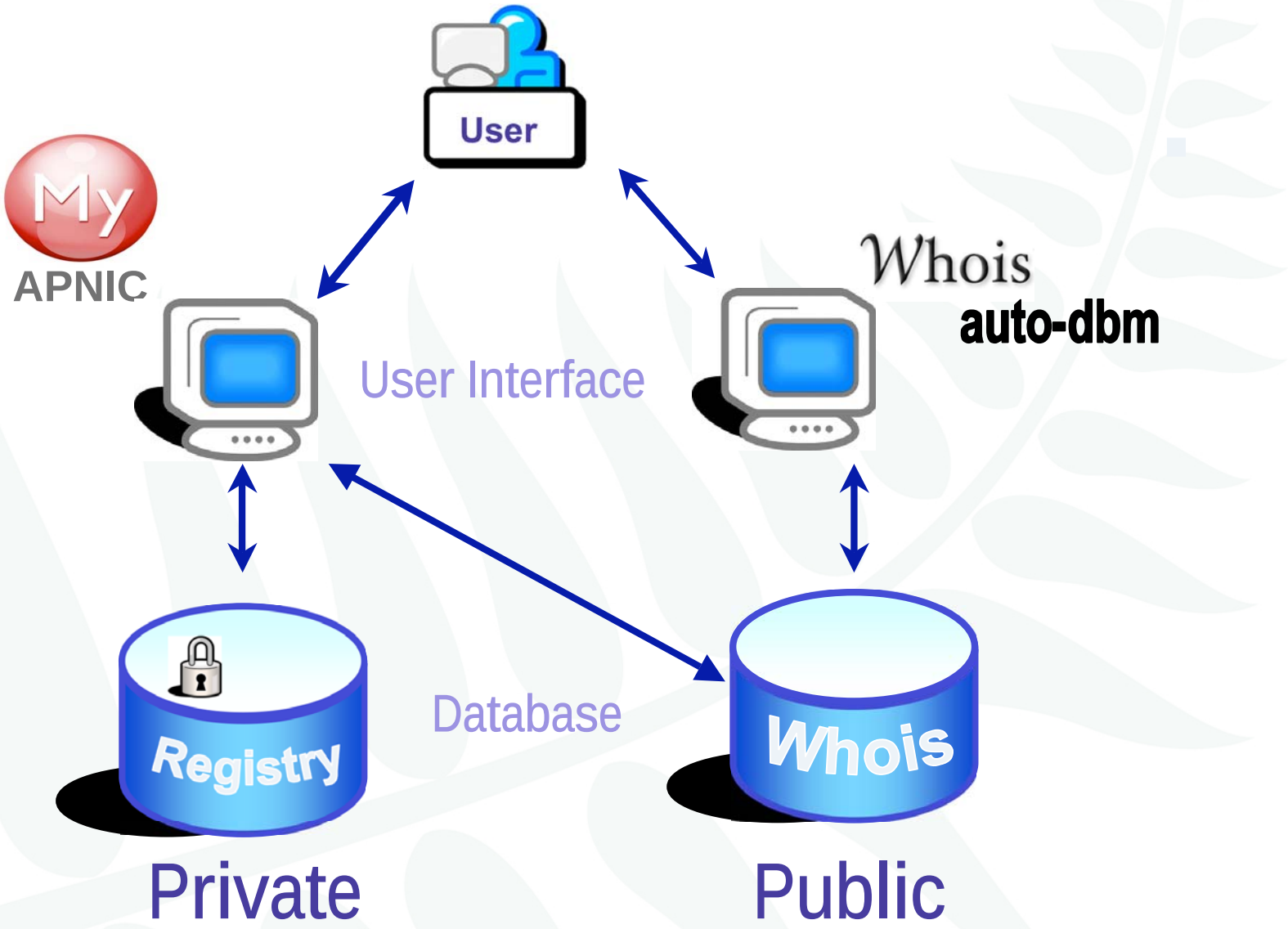
What can you do with MyAPNIC

- View all APNIC resources held by your organization
- Monitor the percentage of address space assigned to customers
- View current and past membership payments
- View the organization's current open tickets in the APNIC email ticketing system
- Vote in online elections
- View staff attendance at APNIC training and meetings

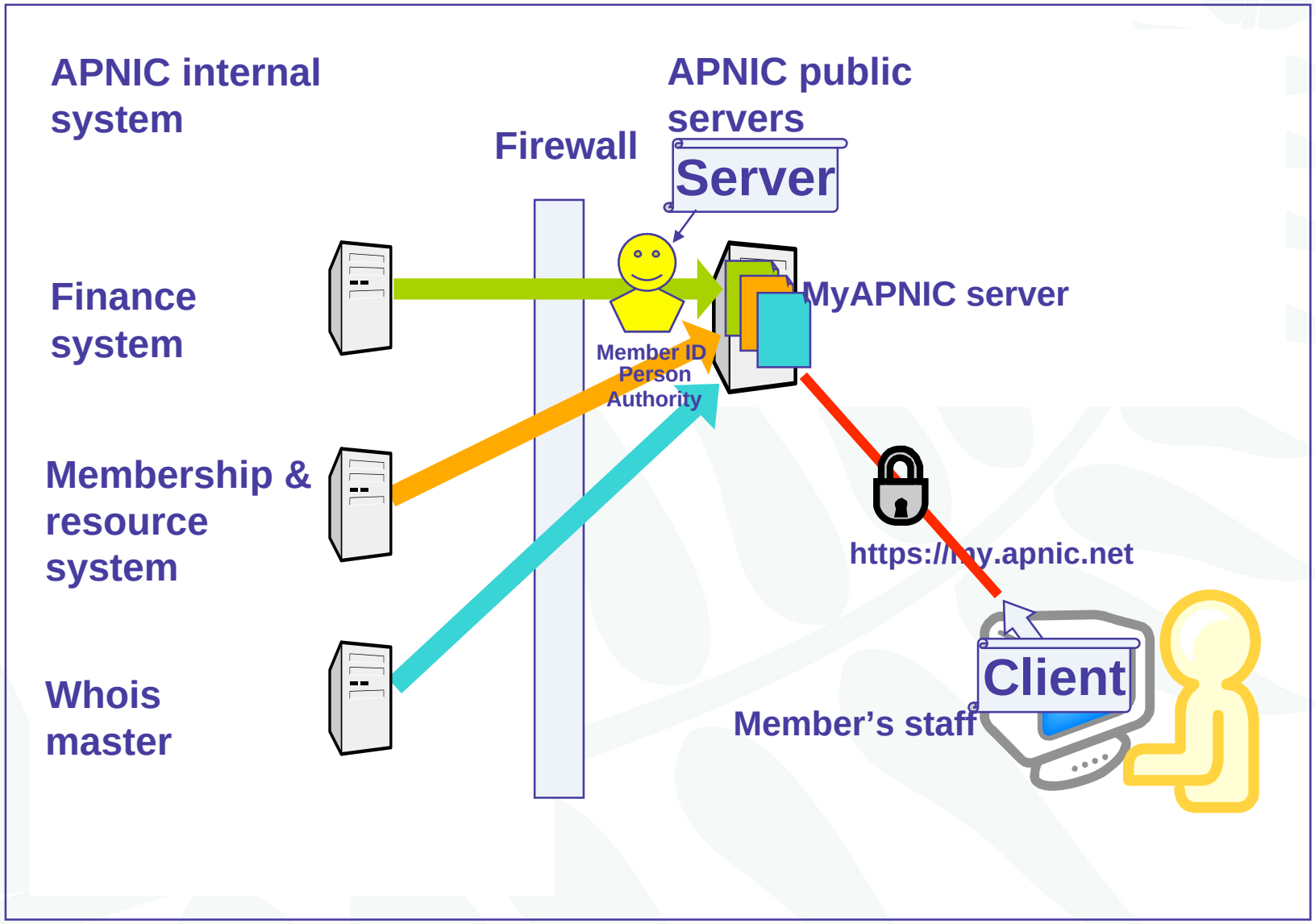
MyAPNIC

A day-to-day tool to manage your APNIC account and resources

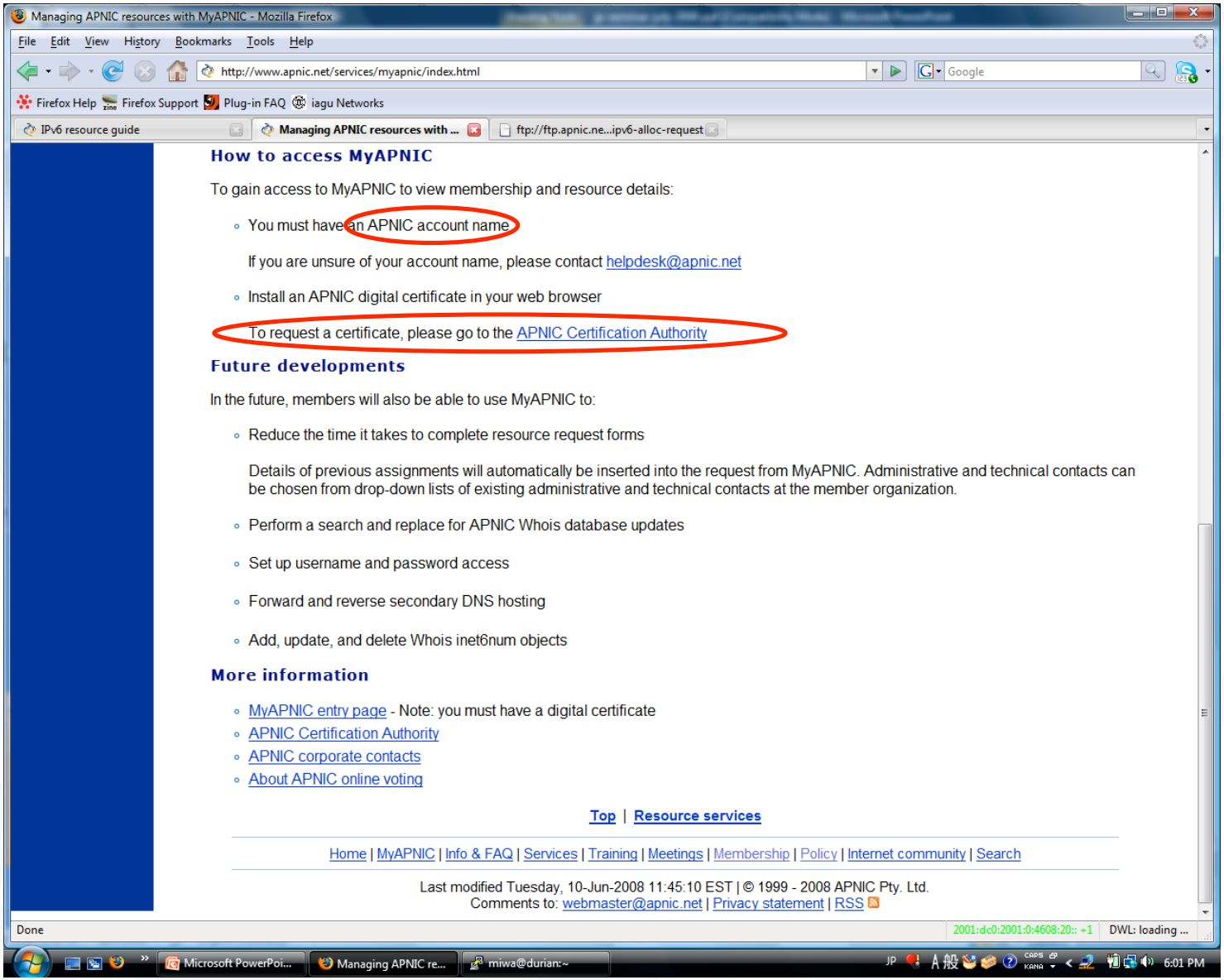
Database tools



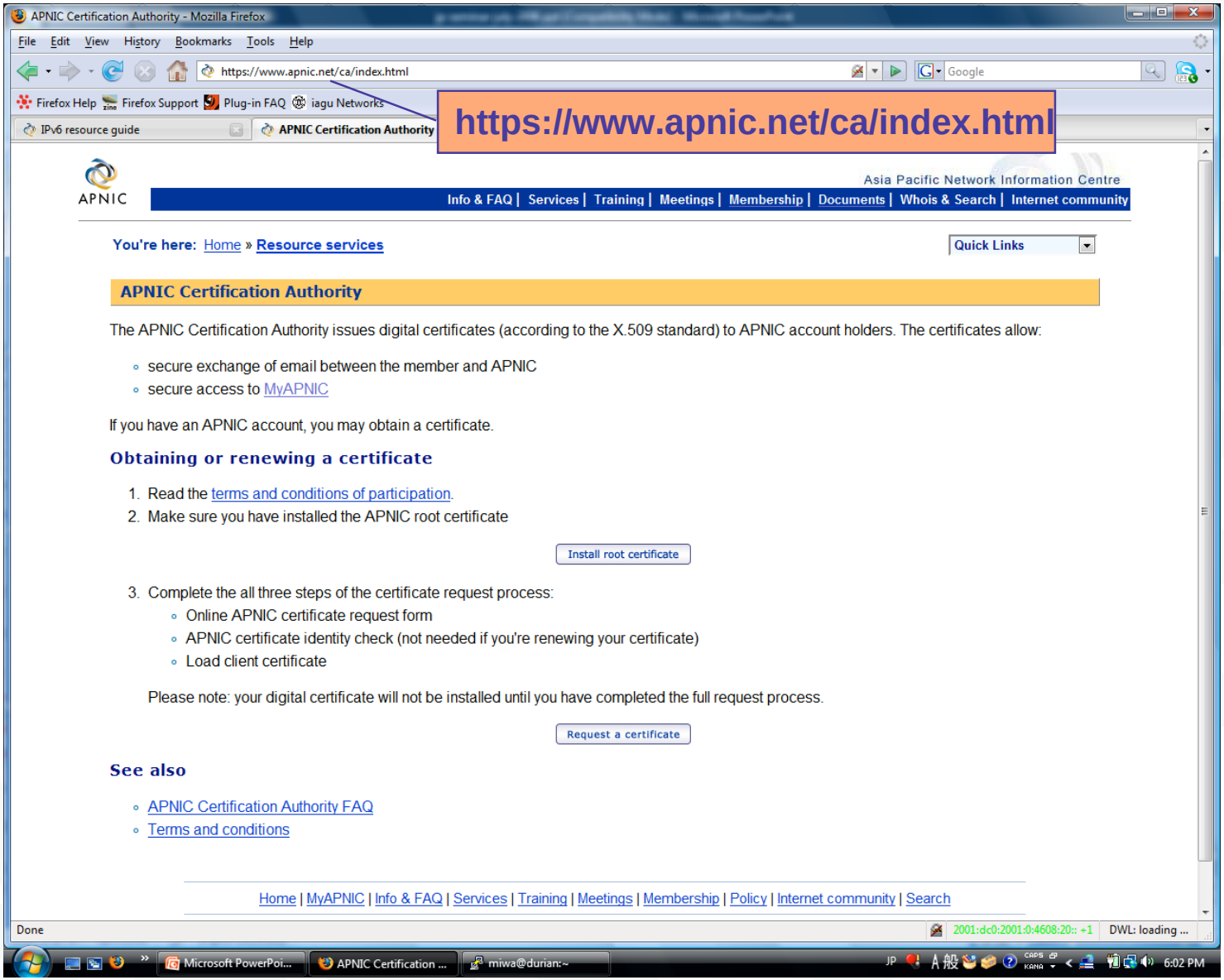
How it works


APNIC internal system
APNIC public servers
Firewall
Server
Finance system
MyAPNIC server
Member ID
Person
Authority
Membership & resource system
https://my.apnic.net
Client
Member's staff
Whois master

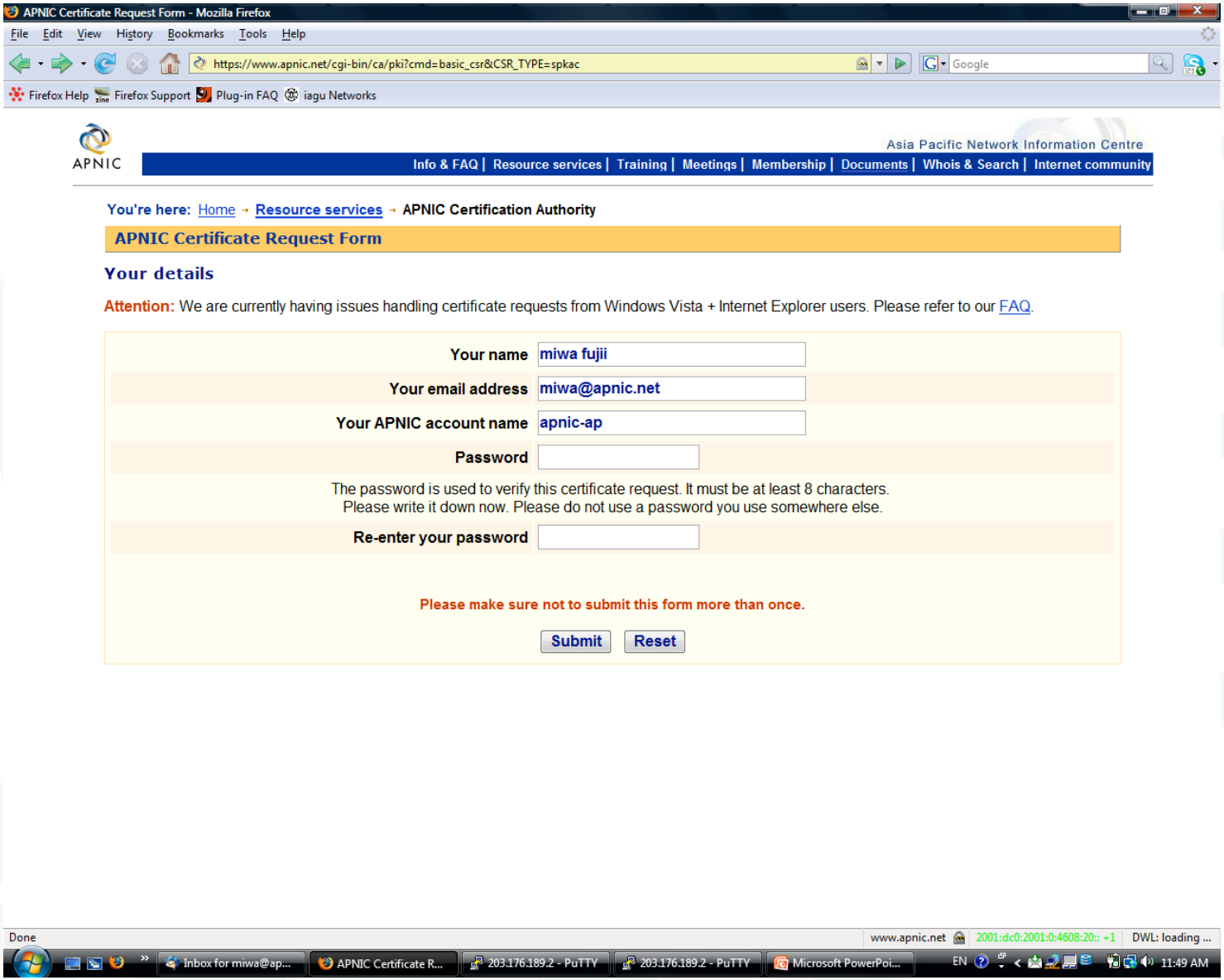
How to access MyAPNIC?



APNIC certificate authority



APNIC certificate request form



How can I obtain an APNIC digital certificate? (part A)

1. Fill in the online form: https://www.apnic.net/ca
2. Submit the form
3. For faster processing, scan the form and your photo ID, attach the images to an e-mail, and send it to:

   helpdesk@apnic.net

   - Without the form, APNIC will not process your request

How to use an APNIC digital certificate? (part B)

1. Load client certificate
   - Once a new certificate is issued to you, load it into your browser
     - You can export your certificate to a different computer or to a different browser
2. Verify client certificate
3. Go to https://my.apnic.net to make sure everything is working fine

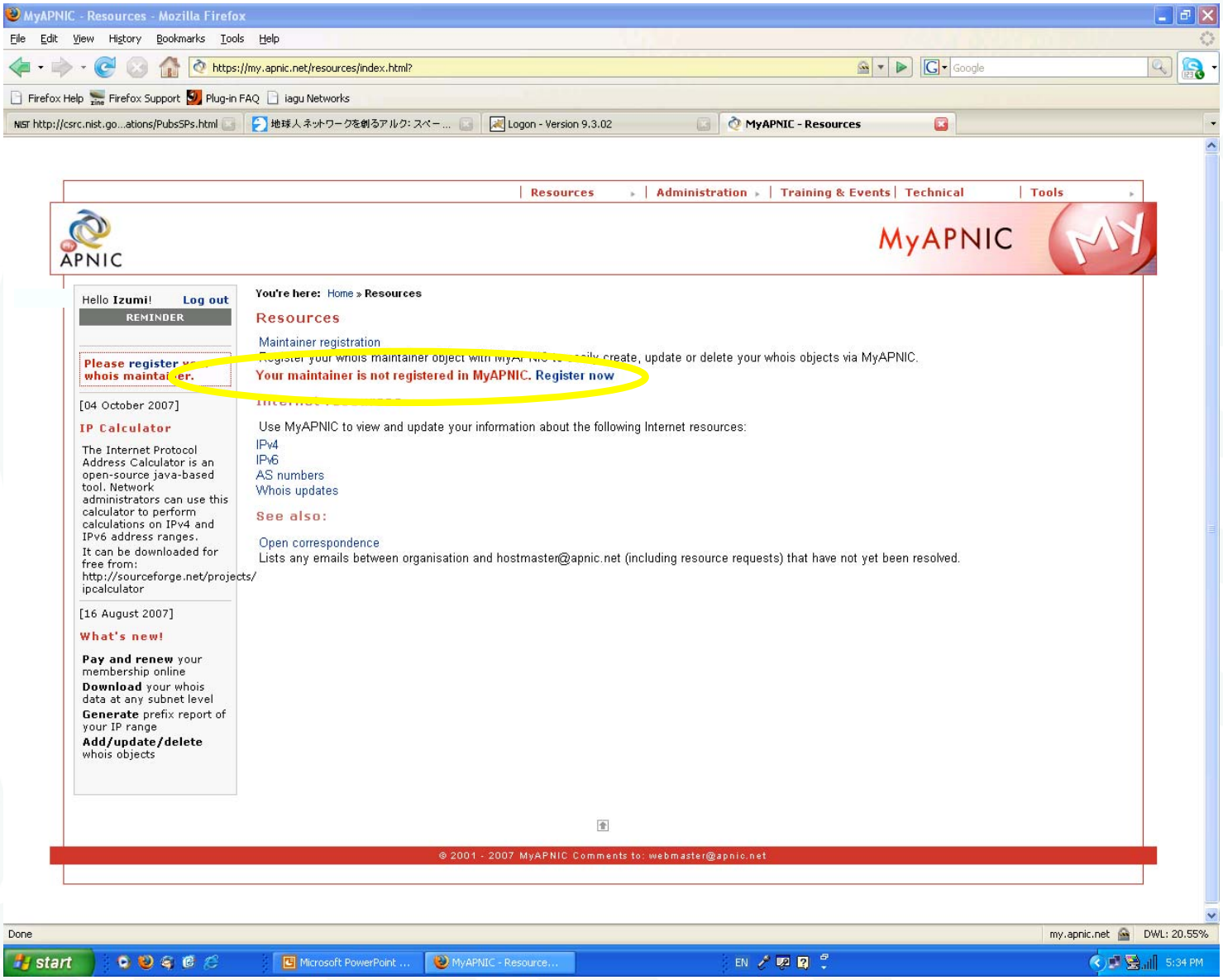
Common issues

- Issues in getting a certificate
  - Forgetting to send the photo ID
  - Downloading the certificate to the wrong computer
- Accessing MyAPNIC
  - Using a computer without a digital certificate
  - Expired certificate
    - It’s easy to renew! Just send a new request via https://www.apnic.net/ca (renewals do not require photo ID)

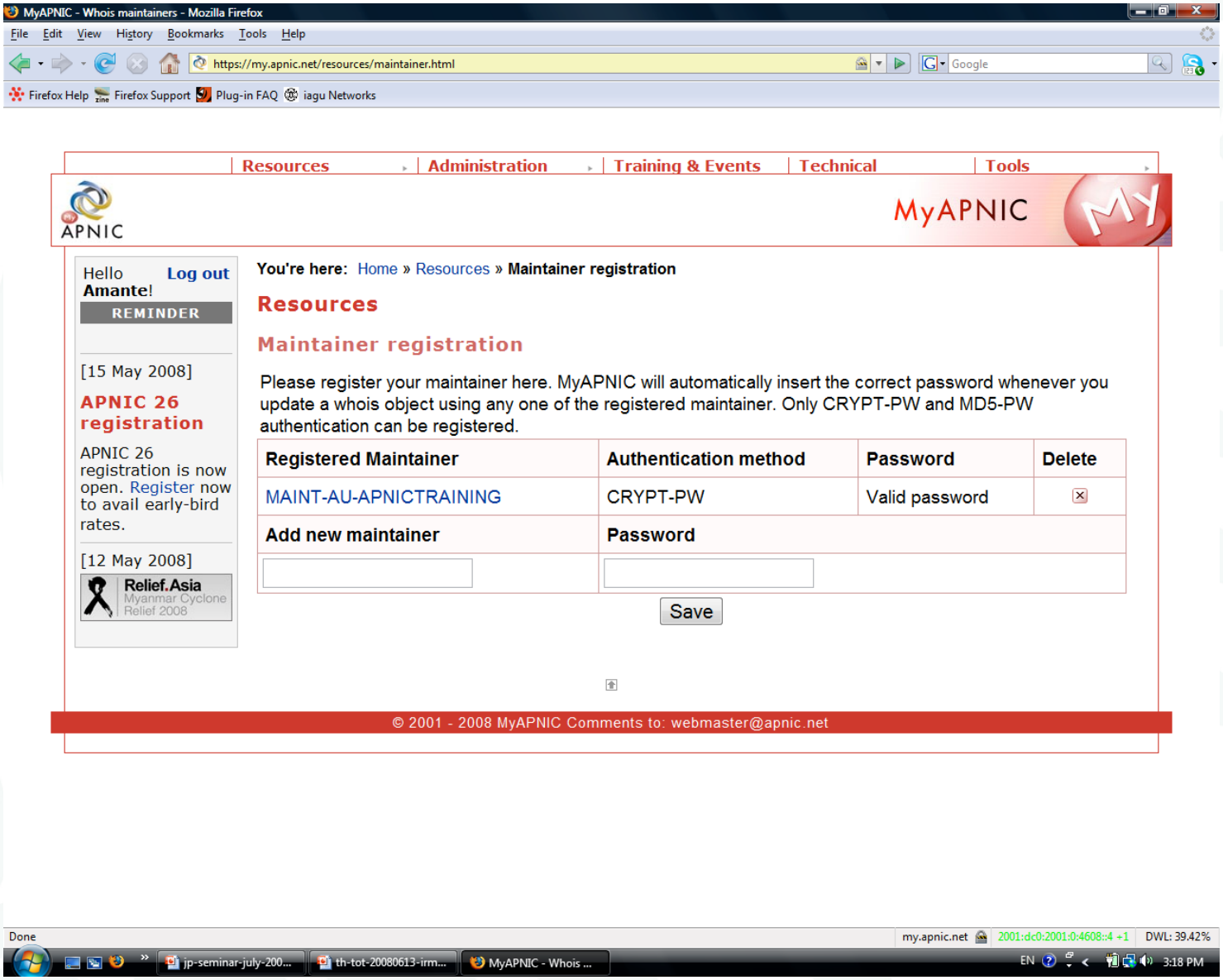
MyAPNIC

Screen caputer

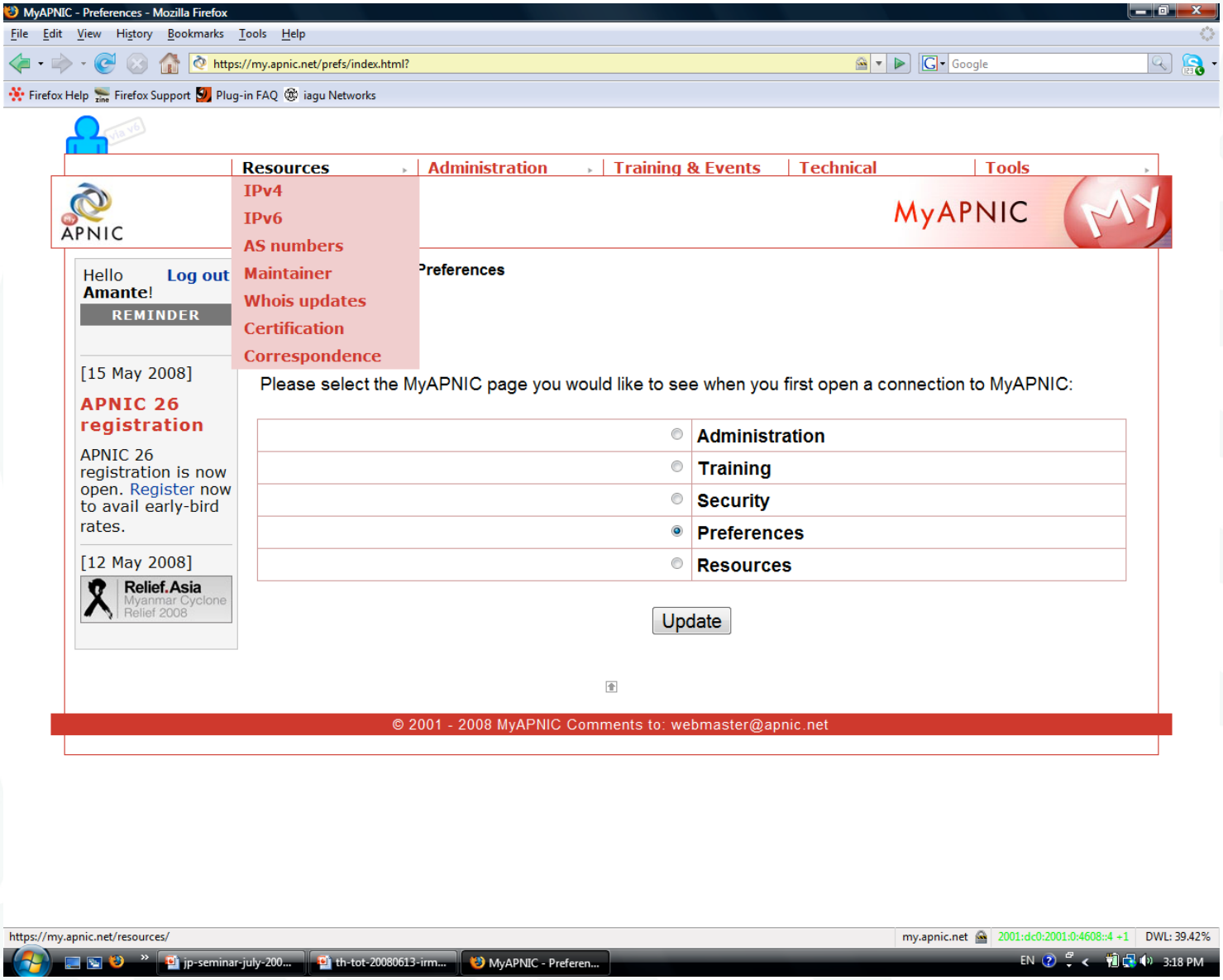
MyAPNIC: log in



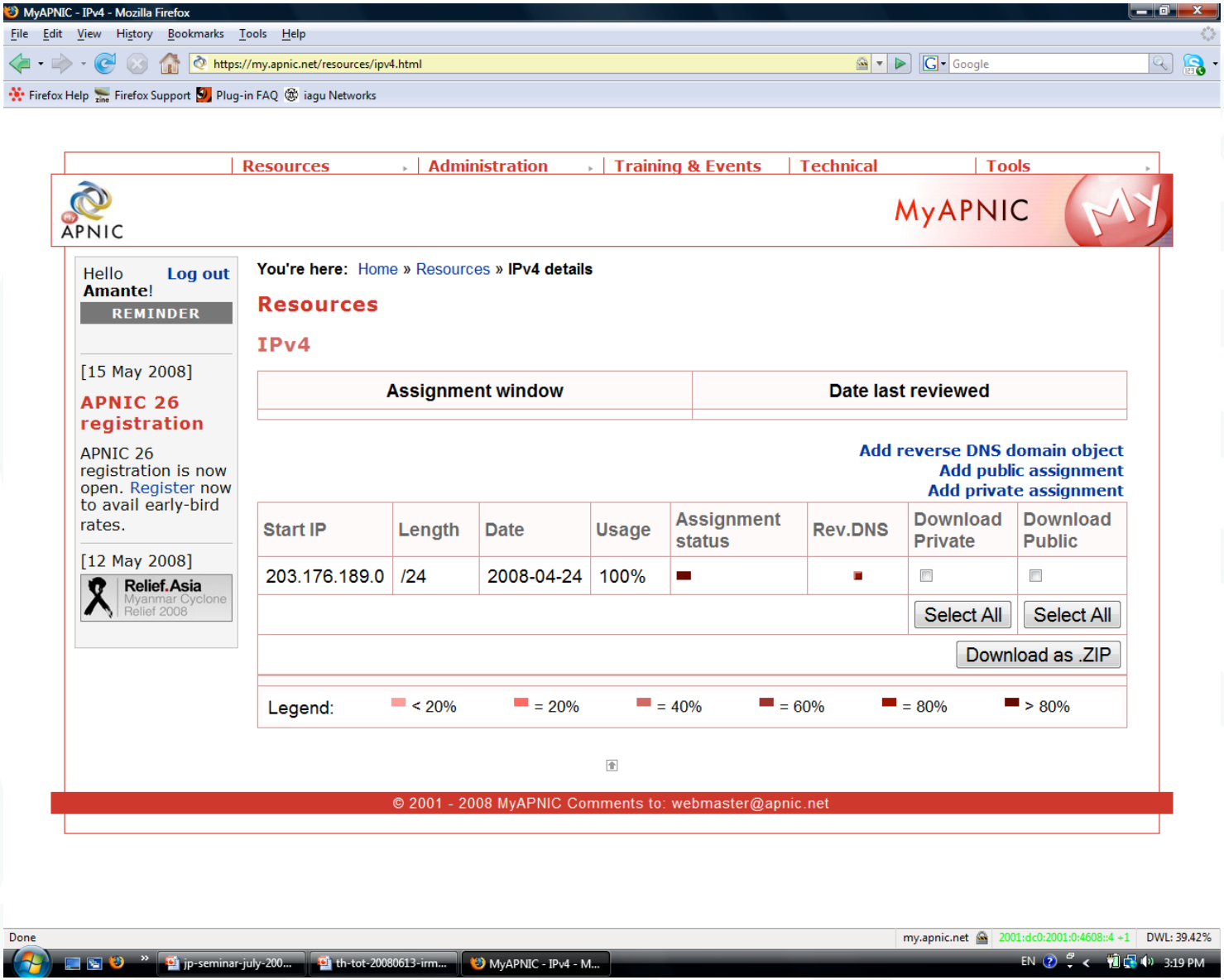
MyAPNIC: Maintainer registration



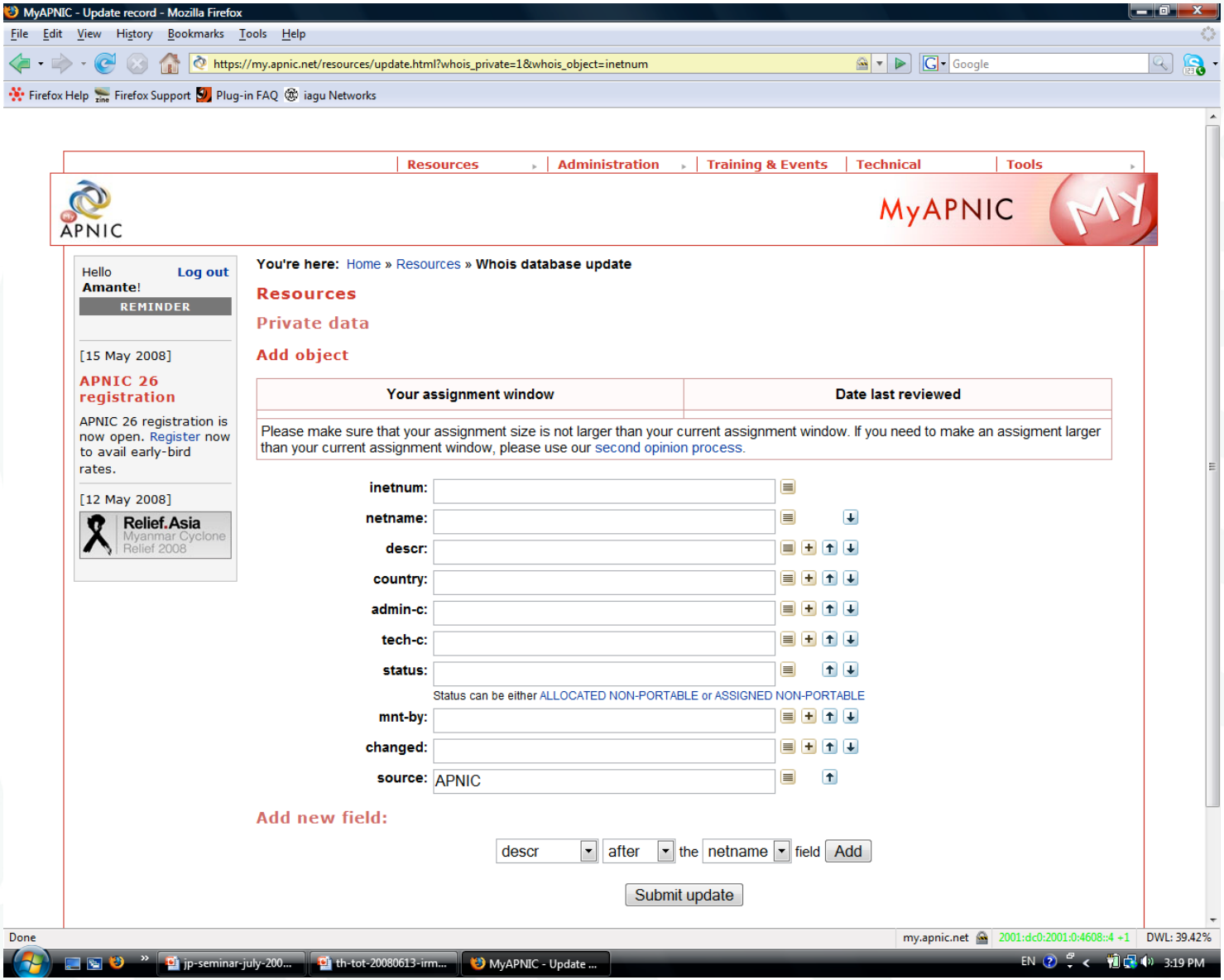
MyAPNIC: home page



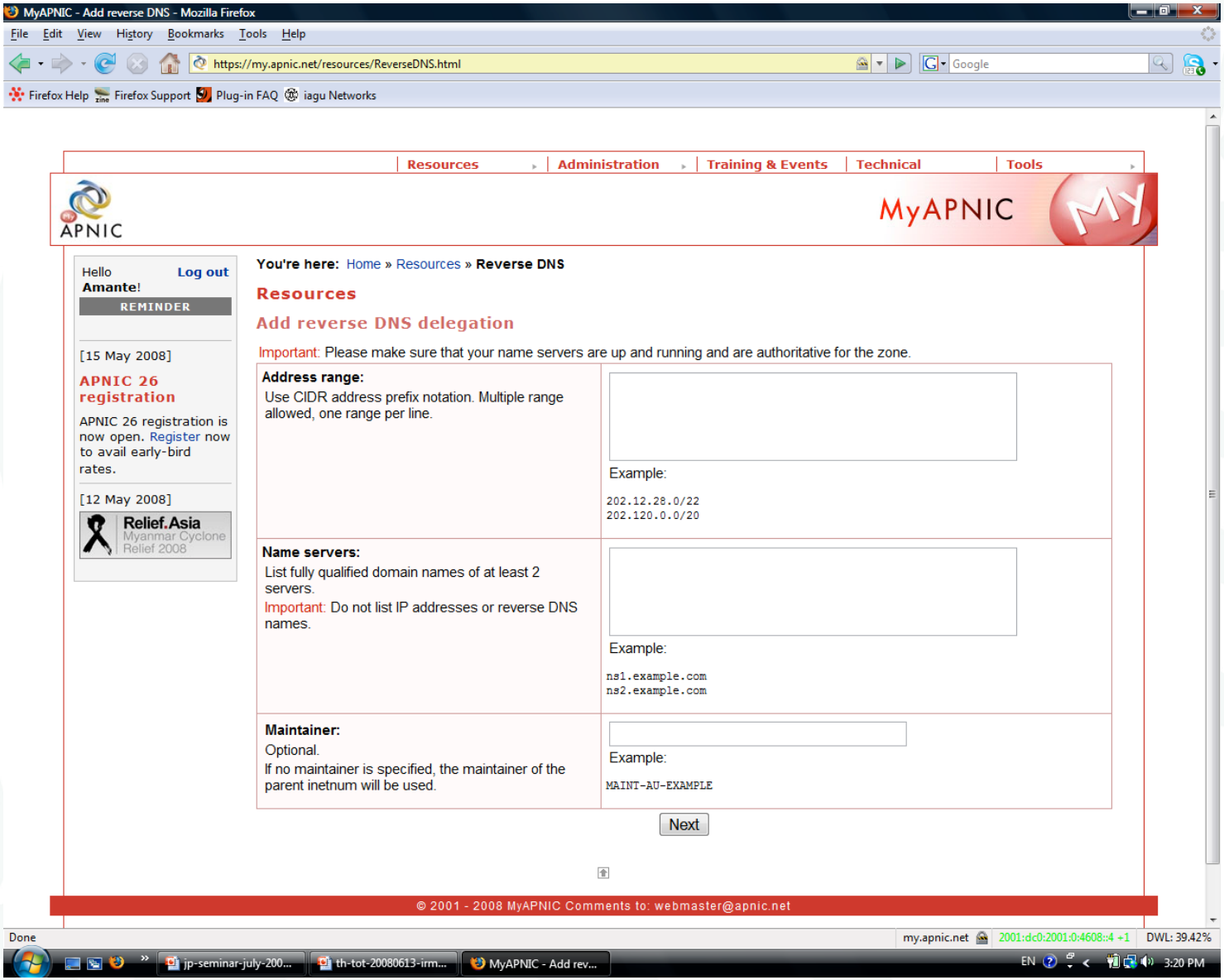
MyAPNIC: IPv4 resources



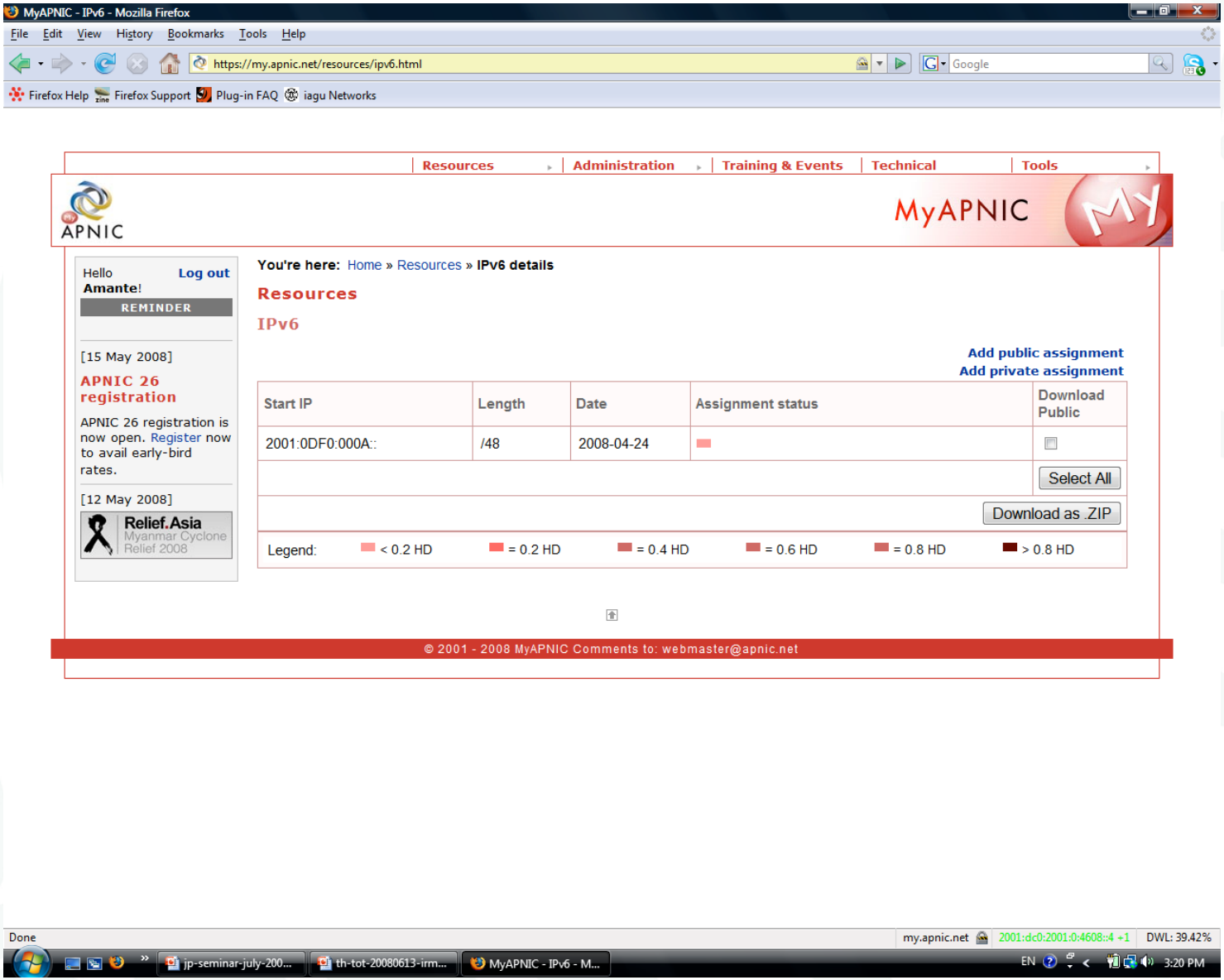
MyAPNIC: Private assignments registration



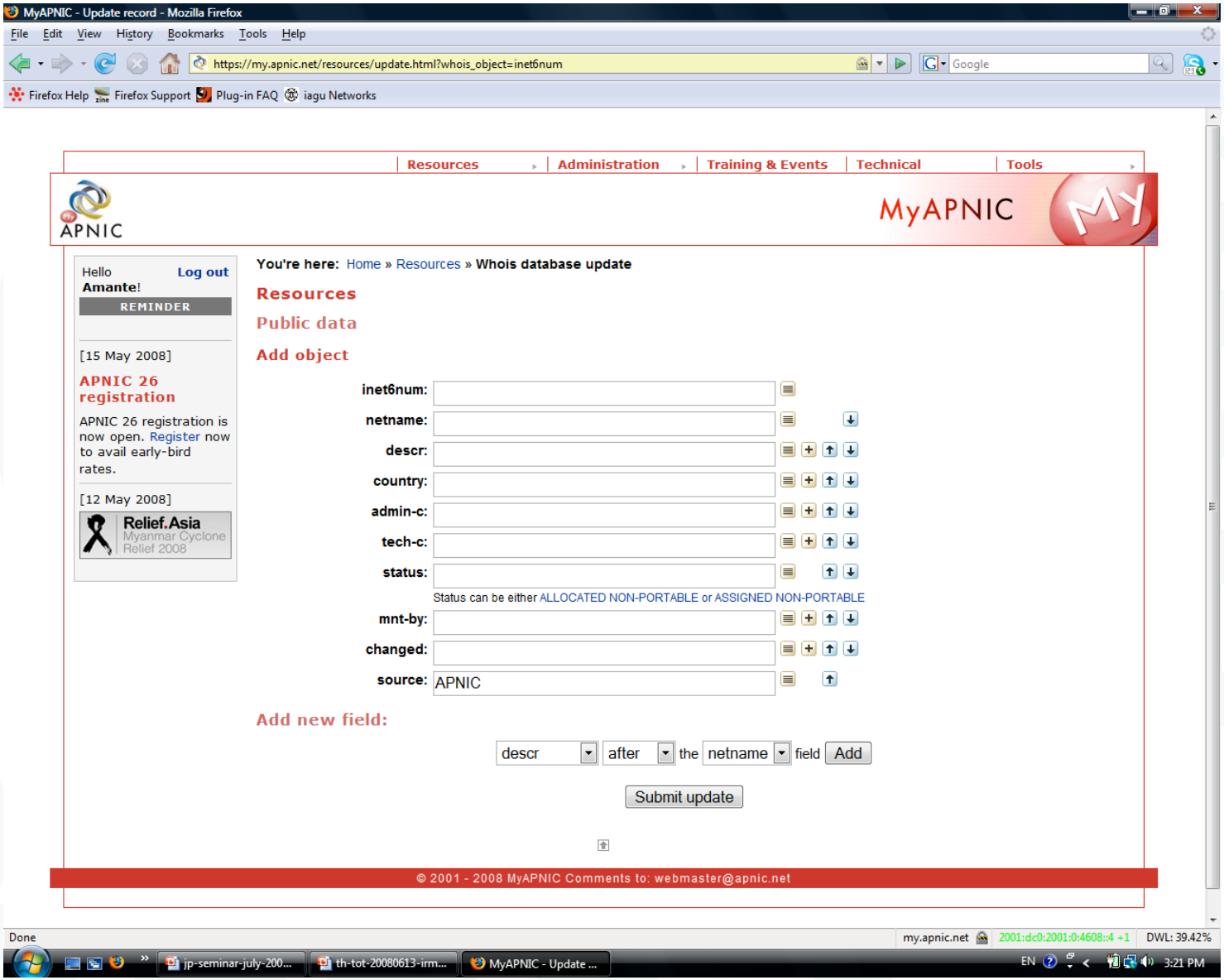
MyAPNIC: Reverse DNS delegation



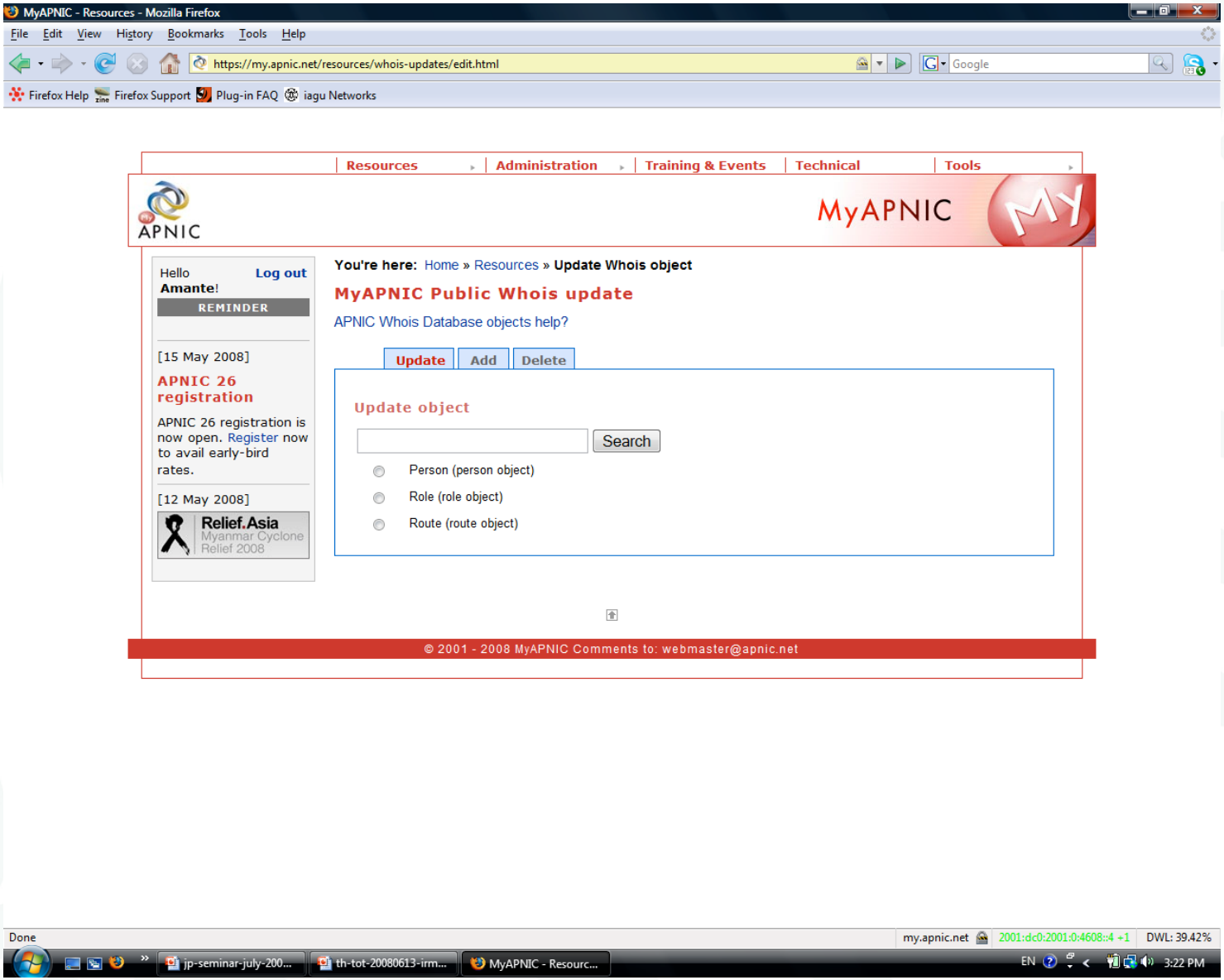
MyAPNIC: IPv6 resources



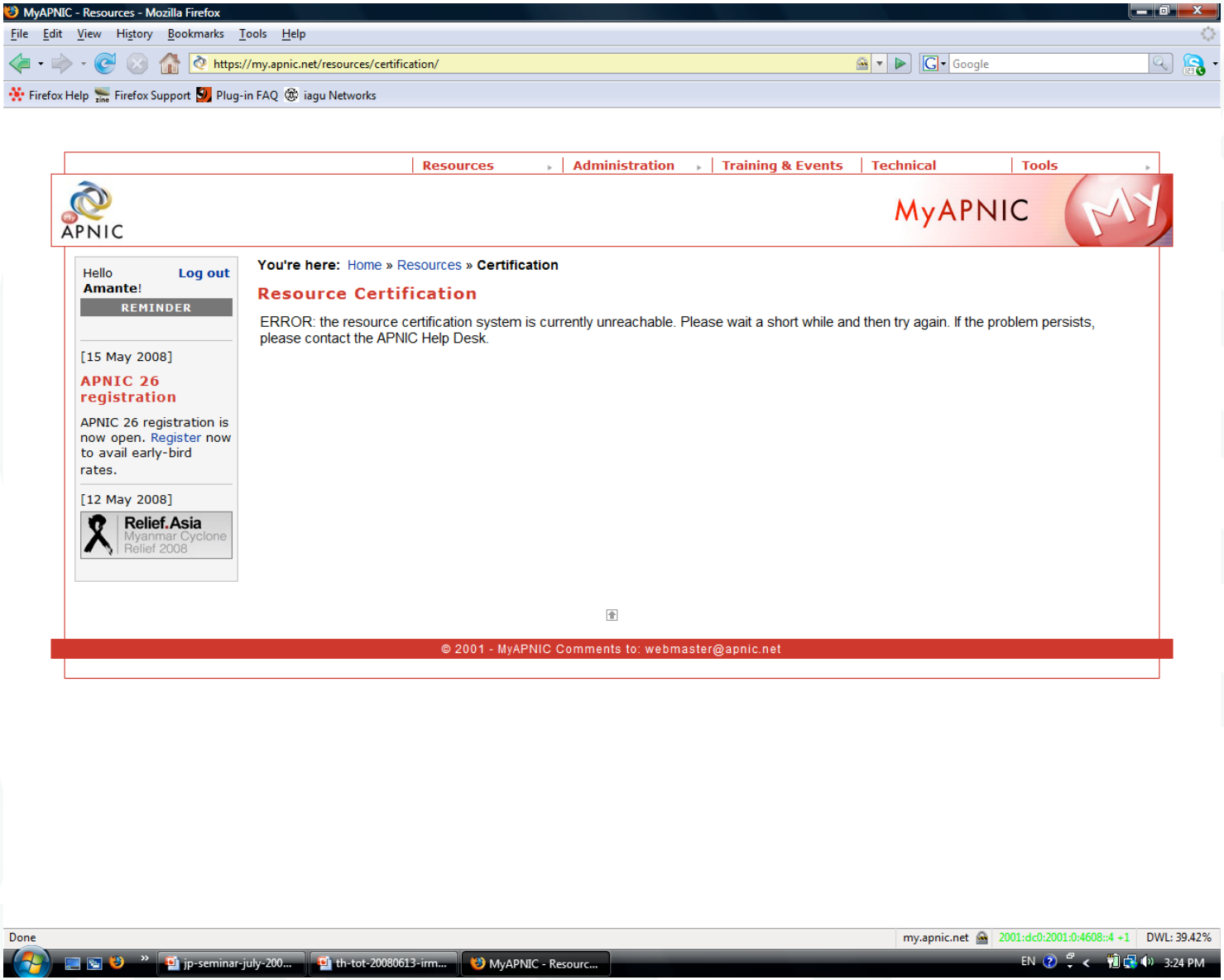
MyAPNIC: Public assignments registration



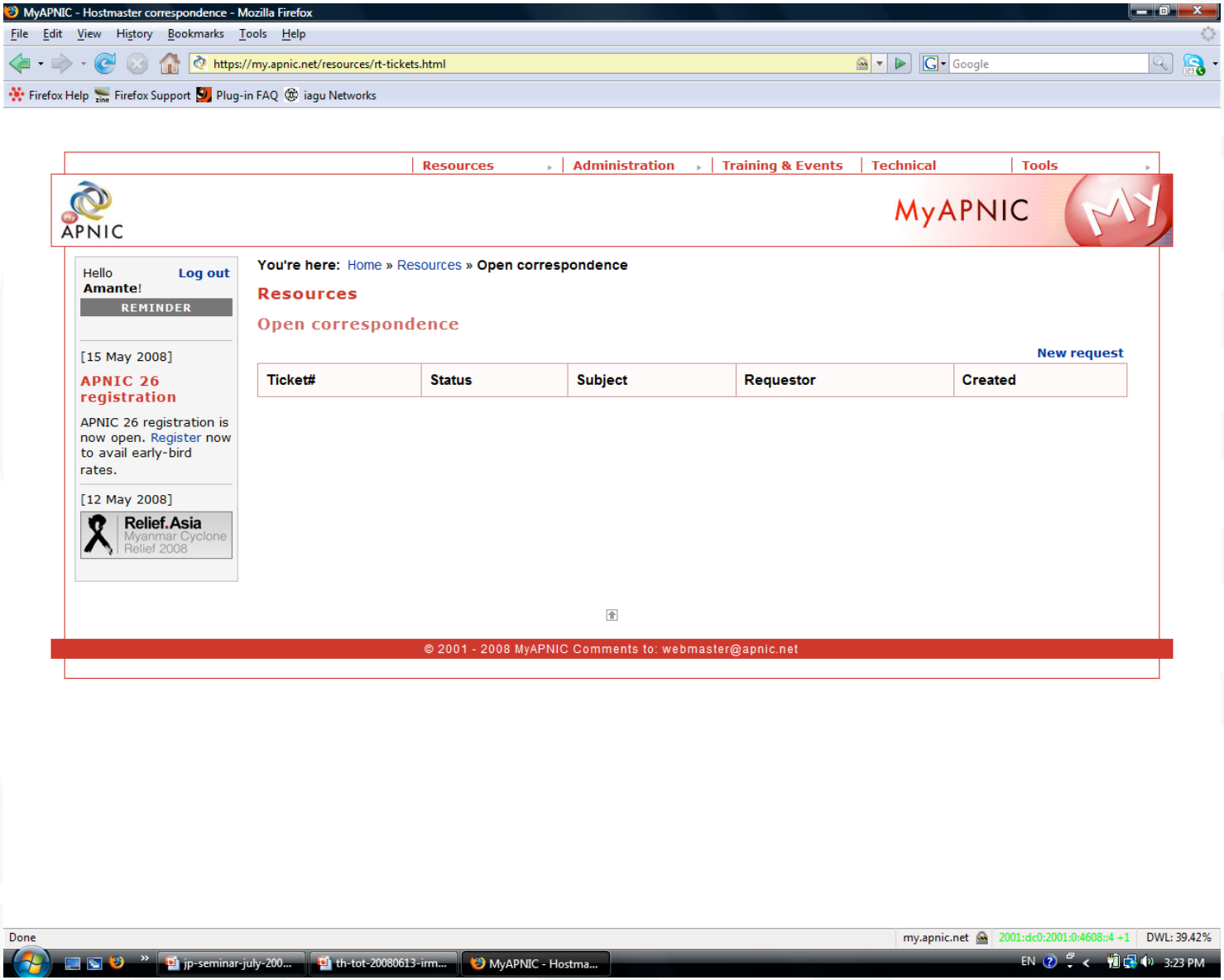
MyAPNIC: APNIC Whois Database (public) update



MyAPNIC: Certification



MyAPNIC: Correspondence



Questions?

IPv4 unallocated address space exhaustion

Acknowledgements

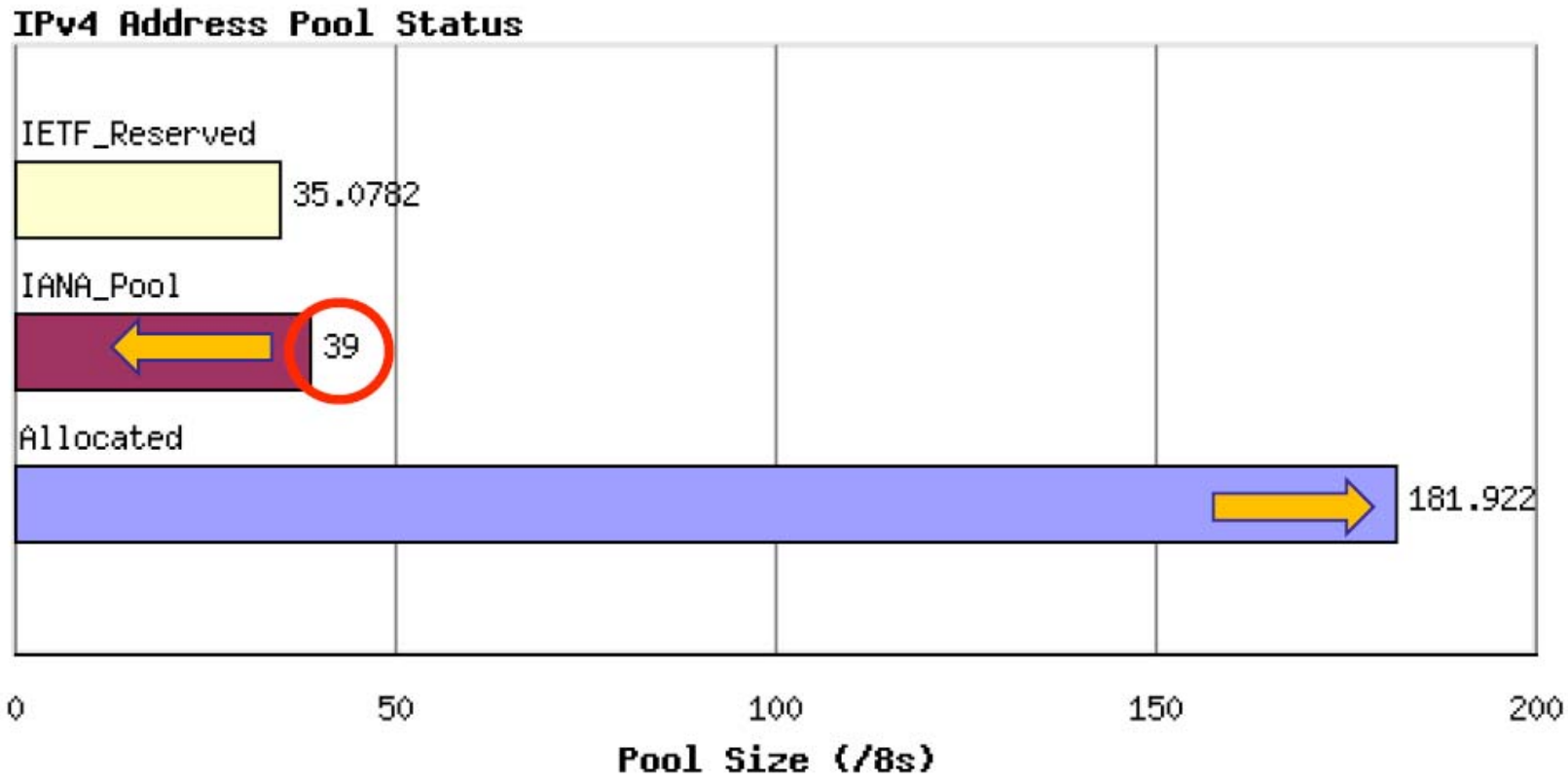
The material used in this course was created in collaboration with Randy Bush (IIJ) and Geoff Huston (APNIC) and includes material provided by them.

APNIC acknowledges with thanks and appreciation the contribution and support of the above.

IPv4 address exhaustion and IPv6 implementation

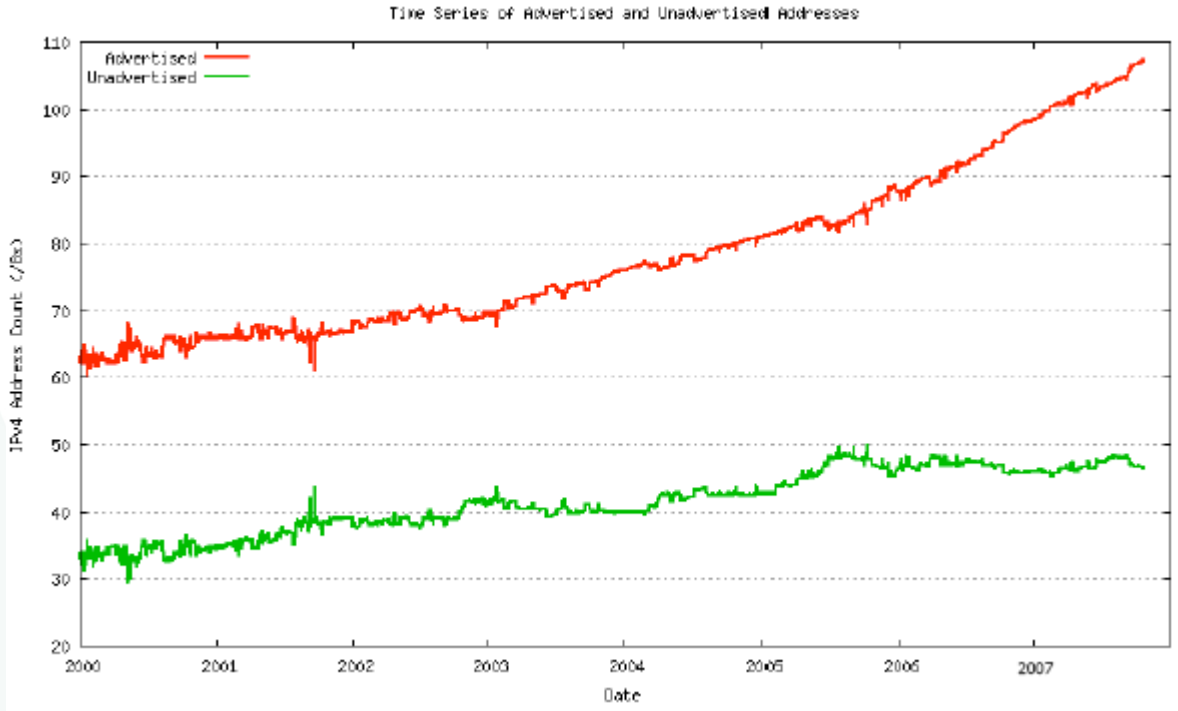
- Discussion
  - Does your company have a plan for coping with IPv4 unallocated address space exhaustion?
  - Are your staff educated about IPv6 technical knowledge?
  - Is your network equipment ready to deploy IPv6?
  - What other thought do you have?
- JPNIC community's effort
  - http://www.nic.ad.jp/en/ip/ipv4pool/ipv4exh-report-071207-en.pdf

Current status of IPv4



Ref: IPv4 unallocated address space exhaustion by Geoff Huston, Sept 20(

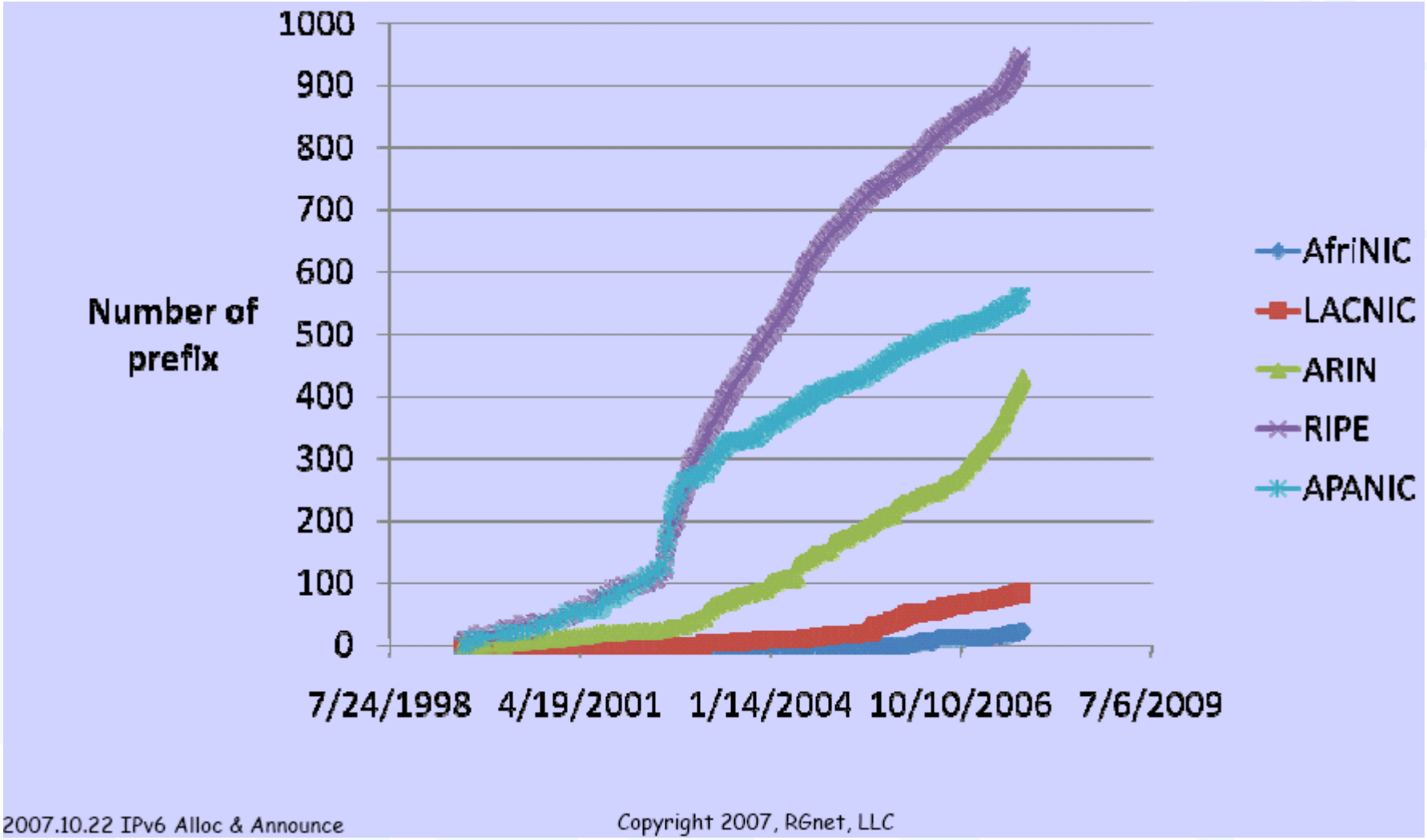
Advertised and unadvertised addresses



Ref: IPv4 unallocated address space exhaustion by Geoff Huston, Sept 20(

IPv6 allocation and announcements

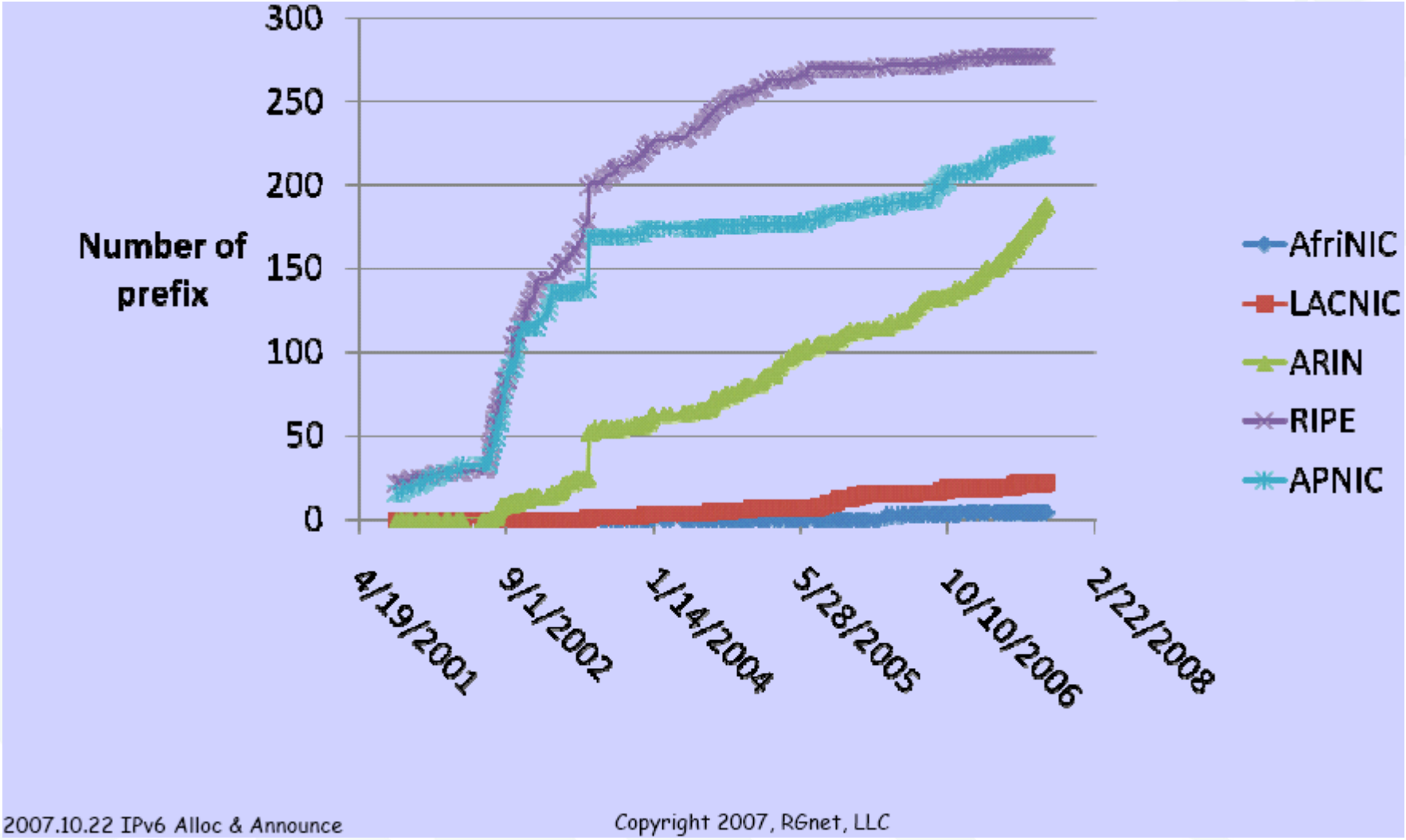
- Prefix allocation distribution



https://www.ripe.net/ripe/meetings/ripe-55/presentations/bush-ipv6-allocation.pdf

IPv6 allocation and announcements

- Prefix announcement distribution



https://www.ripe.net/ripe/meetings/ripe-55/presentations/bush-ipv6-allocation.pdf

APNIC 24 community resolution

- Endorsed at APNIC 24
  - Community resolution on IPv4 and IPv6 issues, 7 September 2007
- The APNIC community recognises that the remaining free pool of IPv4 address space is likely to be consumed within 2 to 4 years
  - Requires a concerted effort by the community
    - Responsible measures in managing remaining IPv4 addresses
    - Promote the adoption of IPv6
    - Call upon leading senior and expert members to provide strong leadership in the search of solutions to these issues

Where are we heading?

- IPv4 address consumption is speeding up
  - But remember “number of advertised address block” is about 1/3 of actually assigned/allocated address space
    - Gradually “Advertised addresses” will increase
  - Where is rapid consumption happening?
    - APNIC region
  - Possibly such address space will be traded in the market
- IPv4 UNALLOCATED address space exhaustion
  - According to Geoff’s model (dated: 22 Oct 2007), IANA will allocate its last IPv4 /8 to an RIR on 22 May 2010
    - Tomorrow’s prediction will be different!

https://www.ripe.net/ripe/meetings/ripe-55/presentations/huston-ipv4

Where are we heading?

- Some possible scenarios (but may need to implement all):
  - Persist in IPv4 networks using more NATs
    - NAT's deployment cost can be internalised by ISPs
    - NATs on steroid
      - Standardise its specification?
  - Address markets emerging for IPv4
    - Remember so much "unadvertised address space"
  - Routing fragmentation
  - IPv6 transition
    - But IPv6 is not backward compatible with IPv4 on the wire
    - So dual stack is mandatory
      - Dual stack requires IPv4 addresses
      - So we need to stretch IPv4

https://www.ripe.net/ripe/meetings/ripe-55/presentations/huston-ipv4

Where are we heading?

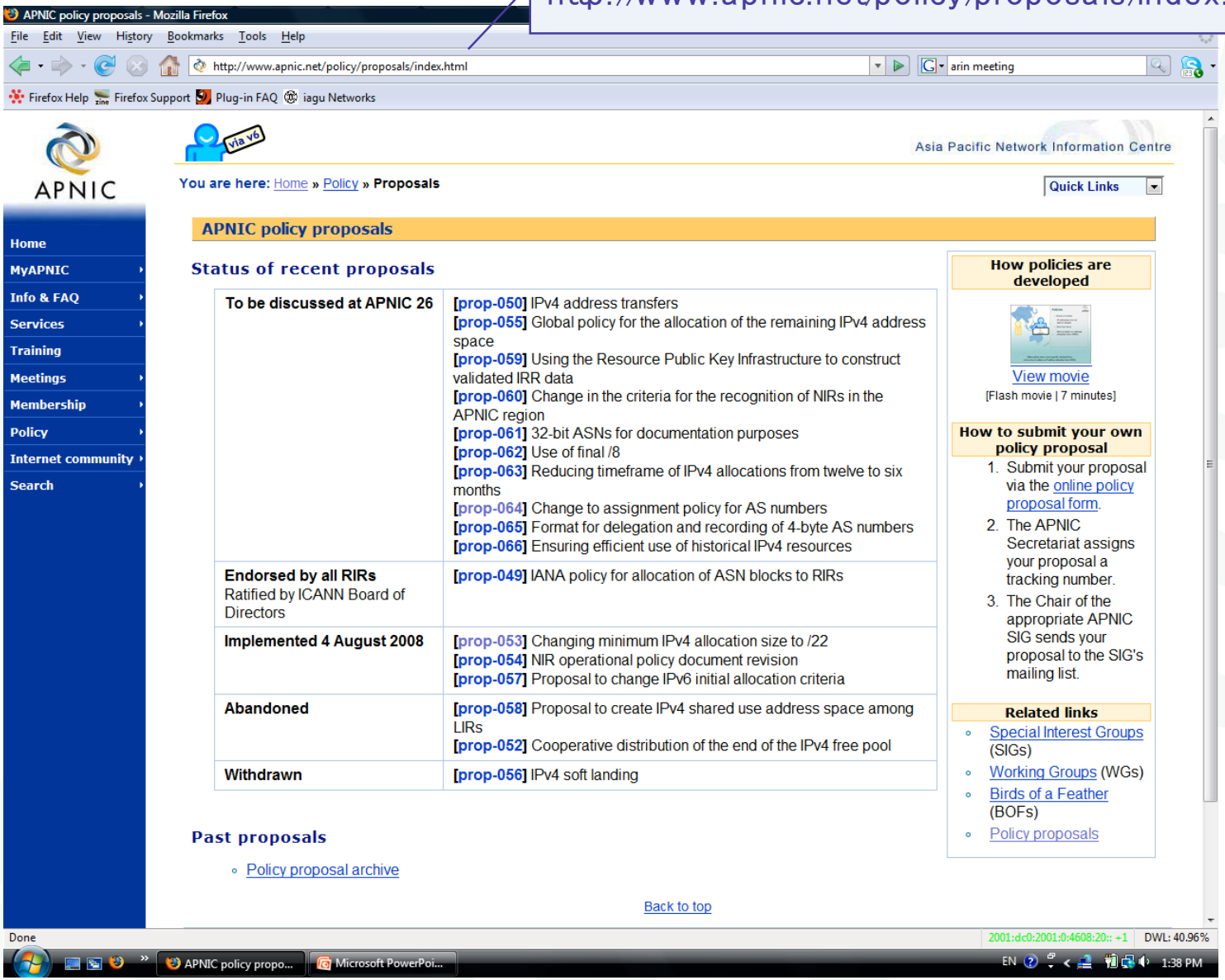
- We should preserve the functionality and integrity of the Internet as a service platform
  - Functionality of applications
  - Viability of routing
  - Capability to sustain continued growth
  - Integrity of the network infrastructure

https://www.ripe.net/ripe/meetings/ripe-55/presentations/huston-ipv4

Current policy discussion

Current policy proposals

http://www.apnic.net/policy/proposals/index.html



Key issues driving current discussion

- IPv4 depletion
  - How to distribute remaining IPv4 fairly
  - How to manage IPv4 after remaining free pool is exhausted
- Security and authentication of IP address stewards
  - Routing security
  - Accurate whois data
- Note:
  - “problem” and “solution” text in the coming slides is based on each proposal author’s ideas
  - do not necessarily reflect the views of the community or the Secretariat

IPv4 proposals under discussion

- Discussion continuing from APNIC 25

[prop-050] IPv4 address transfers

[prop-055] Global policy for the allocation of the remaining IPv4 address space

- New proposals

[prop-059] Using the Resource Public Key Infrastructure to construct validated IRR data

[prop-060] Change in the criteria for the recognition of NIRs in the APNIC region

[prop-061] 32-bit ASNs for documentation purposes

[prop-062] Use of final /8

[prop-063] Reducing timeframe of IPv4 allocations from twelve to six months

[prop-064] Change to assignment policy for AS numbers

[prop-065] Format for delegation and recording of 4-byte AS numbers

[prop-066] Ensuring efficient use of historical IPv4 resources

prop-050: IPv4 address transfers

- Problems this proposal aims to address
  - Current APNIC policies limit registration of transfers to resources related to mergers and acquisitions of operational networks
  - There will continue to be a demand for IPv4 after the exhaustion of the unallocated address pool
  - The APNIC resource registry needs to accurately reflect current address distribution information

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prop-050: IPv4 address transfers

- Proposed solution
  - Remove APNIC policy restrictions on registrations of IPv4 transfers between current APNIC account holders.
- Address blocks transferred:
  - Must be /24 or larger
  - Must be in APNIC administered range
  - Are subject to all current APNIC policies from the time of transfer
- Source of transfer ineligible to receive IPv4 address blocks from APNIC for 24 months after transfer

prop-050:IPv4 address transfers

- Proposal statistics
  - Version 1 presented APNIC 24
    - No consensus sought
  - Version 2 presented at APNIC 25
    - No consensus
    - Author asked to continue refining proposal
  - Version 3 to be presented at APNIC 26
    - Summarizes discussion held in other RIR regions

prop-50: Global policy for the allocation of the remaining IPv4 address space

- The problem…
  - Issues each RIR region will face during the exhaustion period vary by region as the level of development of IPv4 and IPv6 are widely different.
  - As a result, applying a global co-ordinated policy may adequately address issues in a certain region while it may not work for the others.

prop-50: Global policy for the allocation of the remaining IPv4 address space

- Proposed solution…
  - IANA reserves one /8 for each RIR now.
  - Later, when IANA receives a request for IPv4 address space that cannot be fulfilled using the remaining IANA IPv4 free pool, IANA will allocate each RIR a single /8 from the reserved block.
  - Any remaining /8s in the IANA free pool will then be allocated to the RIR that makes the last request to IANA.

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prop-055: Global policy for the allocation of the remaining IPv4 address space

- Proposal statistics
  - Proposal is amalgamation of APNIC 24 proposals:
    - prop-051: Global policy for the allocation of the remaining IPv4 address space
    - prop-046: IPv4 countdown policy proposal
  - Presented at APNIC 25
    - Majority support but not consensus
    - Returned to mailing list for more discussion

prop-062: Use of final /8

- The problem…
  - How should APNIC use the final /8 if prop-055 is implemented?
  - How can new networks connected to a dual IPv4/IPv6 Internet after the free pool exhaustion
  - What happens if a new disruptive technology needs IPv4?

prop-062: Use of final /8

- The solution…
  - Reserve the final /8 in the APNIC region for three things:
    - Each new LIR can receive a single /22 allocation
    - Each existing LIR can receive a single /22 allocation
    - Reserve a /16 for potential future technologies that may need IPv4 addresses
- To be presented at APNIC 26

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prop-063: Reducing timeframe of IPv4 allocation from 12 to 6 months

- The problem…
  - With the imminent depletion of the free pool, it's possible that networks receiving an allocation to meet their needs for the next 12 months may mean that other networks don't have a chance to get any allocation before the free pool is exhausted
- Proposed solution
  - Make allocations based on a six months needs basis, reducing it from 12 months
- To be presented at APNIC 26

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prop-066: Ensuring efficient use of historical IPv4 resources

- The problem…
  - While the remaining free pool is gradually being depleted, a lot of historical IPv4 addresses are still being unused.
  - When LIRs request more space from APNIC, they do not have to demonstrate that their historical address space is being used.
  - LIRs can currently justify resources from the APNIC free pool while still not utilising their historical resources.
- The solution
  - Include historical resources when calculating an LIR's usage rate.
- To be presented at APNIC 26

Other policy proposals at APNIC 26

- prop-059: Using the Resource Public Key Infrastructure to construct validated IRR data
- prop-060: Change in the criteria for the recognition of NIRs in the APNIC region
- prop-061: 32-bit ASNs for documentation purposes
- prop-064: Change to assignment policy for AS numbers
- prop-065: Format for delegation and recording of 4-byte AS numbers

prop-059: Using the Resource Public Key Infrastructure to construct validated IRR data

- The problem…
  - Resource Public Key Infrastructure (RPKI) is an attempt to improve routing security.
  - But most ideas for implementing RPKI are hard to implement because trust models for Internet Routing Registires and RPKI are different.
- Proposed solution
  - Create an IRR that contains ‘route’ objects generated using an RPKI
  - Network operators can choose to prioritise routes in this new IRR over other IRRs.
- To be presented at APNIC 26

prop-060: Change in the criteria for the recognition of NIRs in the APNIC region

- The problem
  - To recognise a new NIR under current policy, it must have the support of both the community and the relevant government body in the country of the proposed NIR.
  - NIRs can be dominated by government interests.
- Proposed solutions
  - Allow NIRs to be approved with community approval only.
  - New NIRs are approved through a vote by APNIC members.
  - Limit government positions on NIR boards
- To be presented at APNIC 26

prop-061: 32-bit ASNs for documentation purposes

- The problem…
  - There is currently no range of four-byte AS numbers that is dedicated for use in Internet documentation.
  - Any AS number used now in documentation may be used by a real network in future, leading to problems.
- Proposed solutions
  - Designate four four-byte AS numbers to be used in documentation.
- To be presented at APNIC 26

prop-064: Change to assignment policy for AS numbers

- The problem…
  - Lack of awareness of 4 byte ASNs in the general provider community to support 4-byte AS numbers or equipment vendors to implement and support 4-byte AS numbers
- Proposed solutions
  - To create an intermediary stage where LIRs will be assigned a 4-byte AS number by default unless it is unsuitable
    - 1 July 2009
- To be presented at APNIC 26

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prop-065: Format for delegation and recording of 4-byte AS numbers

- The problem…
  - ASDOT is widely regarding as being incompatible with a number of operational systems and router configurations.
    - Specifically, the '.' within the AS number is incompatible with IRR and RPSL.
    - It also has the potential to break many regular expressions in existing router configurations.
    - Due to these issues, the operator community is hesitant to adopt ASDOT.
- Proposed solution
  - APNIC adopt ASPLAIN as the default format for documenting 4-byte AS numbers.
  - APNIC Whois Database be modified to return the same record for queries submitted in either ASDOT or ASPLAIN format
  - APNIC would document delegations of all 4-byte AS numbers in ASPLAIN format and migrate existing whois data
- To be discussed at APNIC 26

Reverse DNS Delegation

Registry Procedures

Reverse DNS - why bother?

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

APNIC & Member responsibilities

- APNIC
  - Manage reverse delegations of address block distributed by APNIC
  - Process members requests for reverse delegations of network allocations
- Members
  - Be familiar with APNIC procedures
  - Ensure that addresses are reverse-mapped
  - Maintain nameservers for allocations
    - Minimise pollution of DNS

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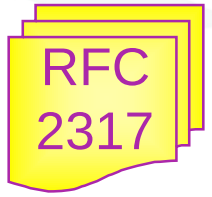
Reverse delegation requirements

- /24 Delegations
  - Address blocks should be assigned/allocated
  - At least two name servers
  - Can ask APNIC to be the secondary zone
- /16 Delegations
  - Same as /24 delegations
  - APNIC delegates entire zone to member
  - Recommend APNIC secondary zone
- < /24 Delegations
  - Read “classless in-addr.arpa delegation”



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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
  - (auths: 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**

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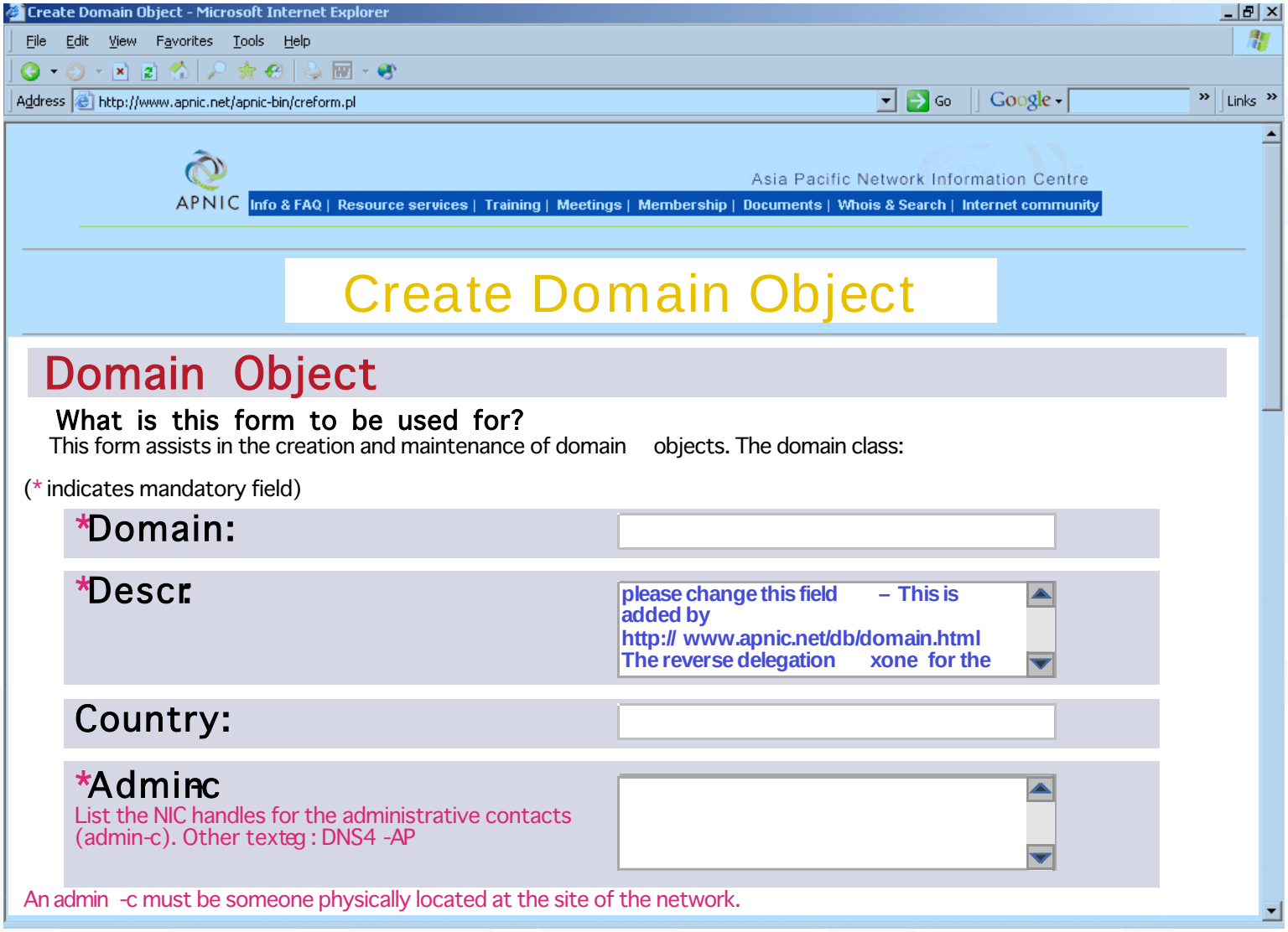
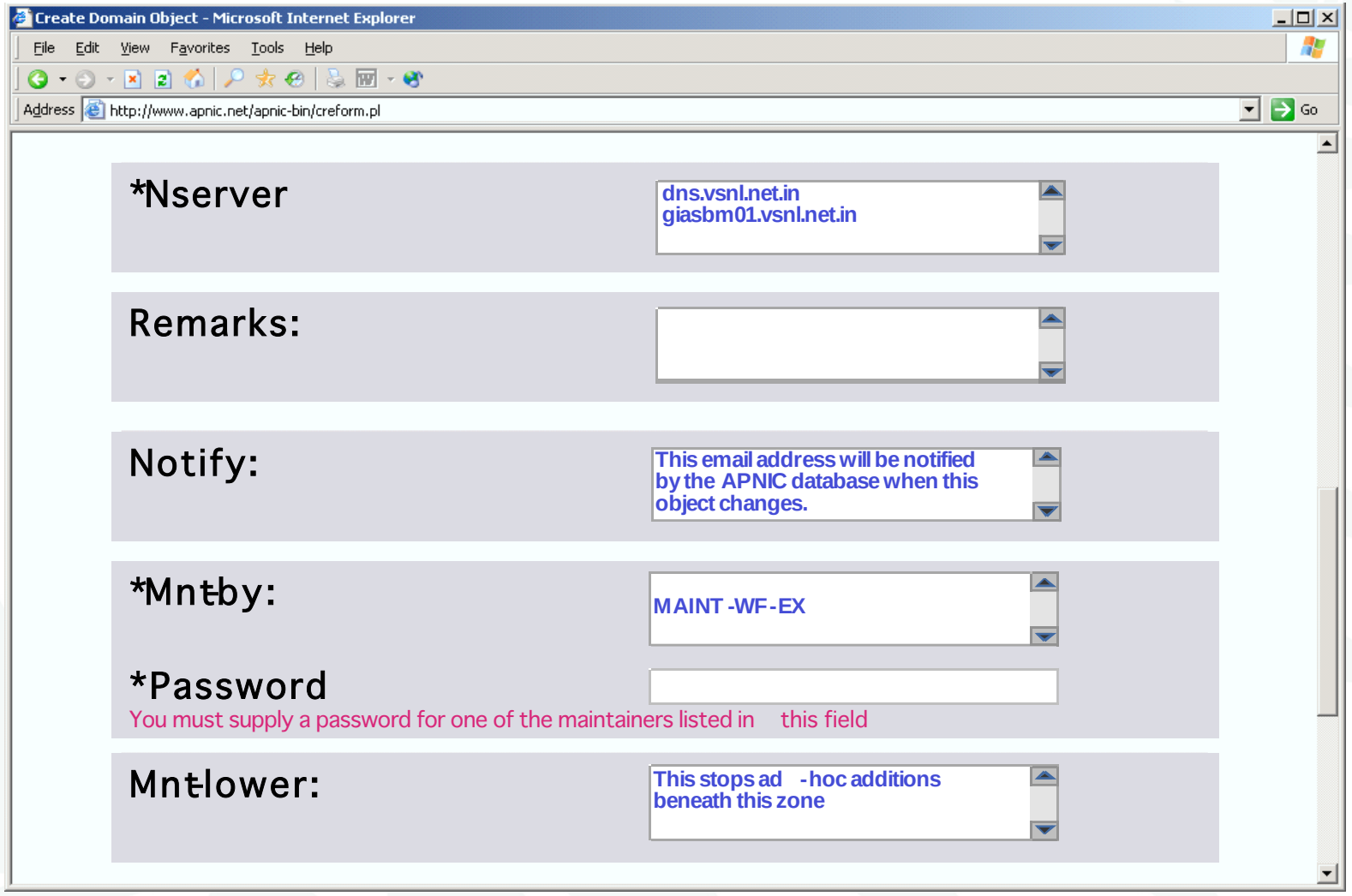
Delegation procedures – request form

- 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



Request form



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

Creation of domain objects

- APNIC highly recommend you to use MyAPNIC when creating domain objects
  - MyAPNIC parser will check the maintainer of ‘inetnum’ object
  - If the password matches no errors will be returned
- Can use MyAPNIC to create multiple domain objects at once
  - ex: If you are allocated a /19, you can provide the full IP range and 32 domain objects can be created in one go

Questions?

Member services

Member Services Helpdesk

-One point of contact for all member enquiries
-Online chat services

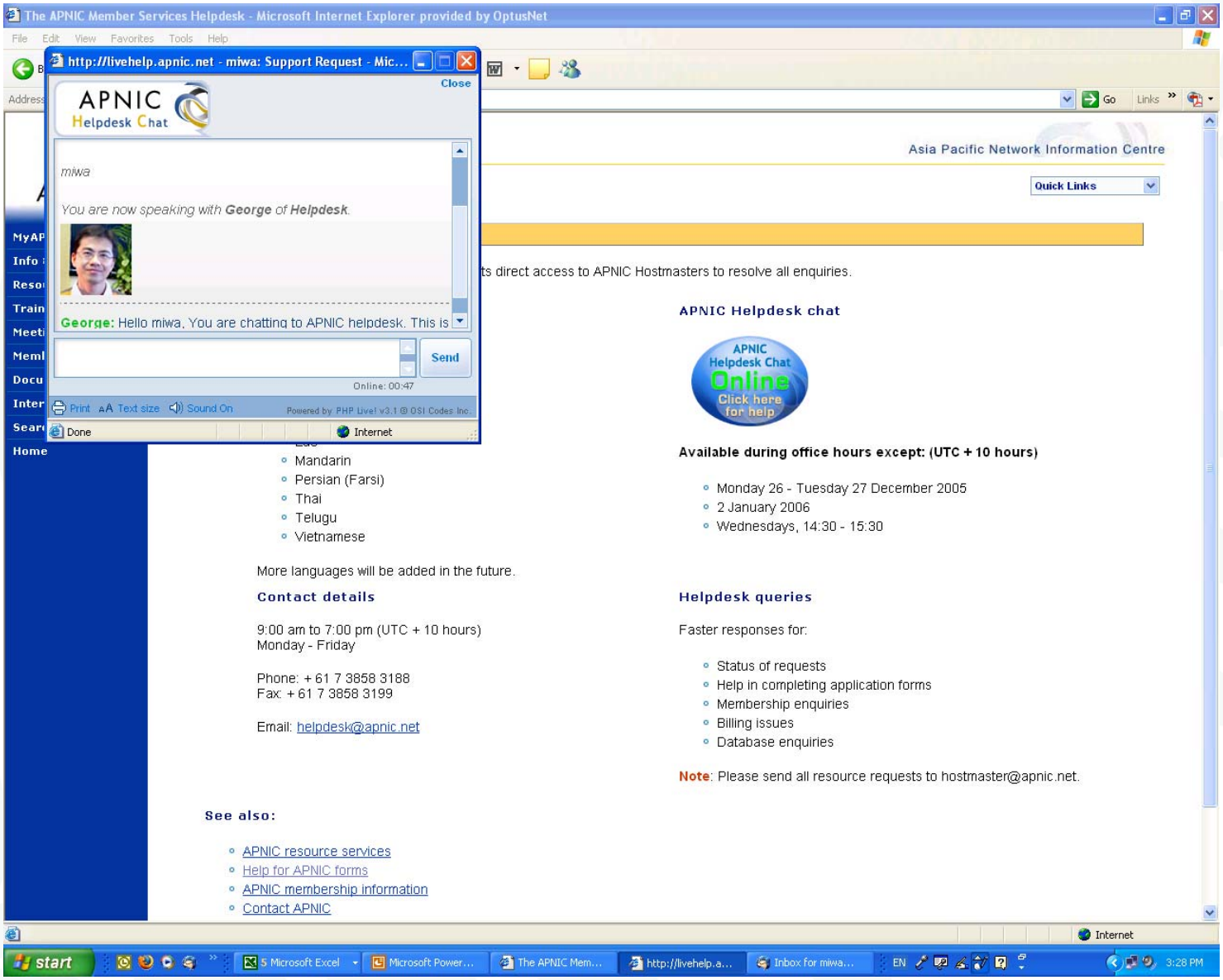
Helpdesk hours

9:00 am –7:00 pm (AU EST, UTC + 10 hrs)

ph: +61 7 3858 3188 fax: 61 7 3858 3199

- *More personalised service*
  - Range of languages:
    Cantonese, Filipino, Mandarin, Thai, Vietnamese etc.
- *Faster response and resolution of queries*
  - IP resource applications, status of requests, obtaining help in completing application forms, membership enquiries, billing issues & database enquiries

APNIC Helpdesk chat



ICONS


ICONS - Home - Microsoft Internet Explorer provided by OptusNet
File Edit View Favorites Tools Help
Back Search Favorites
Address http://icons.apnic.net/index.php?option=com_frontpage&Itemid=1
Go Links
Home
icons
Internet Community of Online Networking Specialists
Sharing knowledge and experience for Internet development
Home | ICONS blog | How-to guides | Network tools | News feeds | Community | Photo gallery | Events
Search
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IP addressing in China
2-byte and 4-byte AS Numbers
The APNIC debogon project
Open standards and processes on the Internet
Grey power enlisted in the fight against spam
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APNIC
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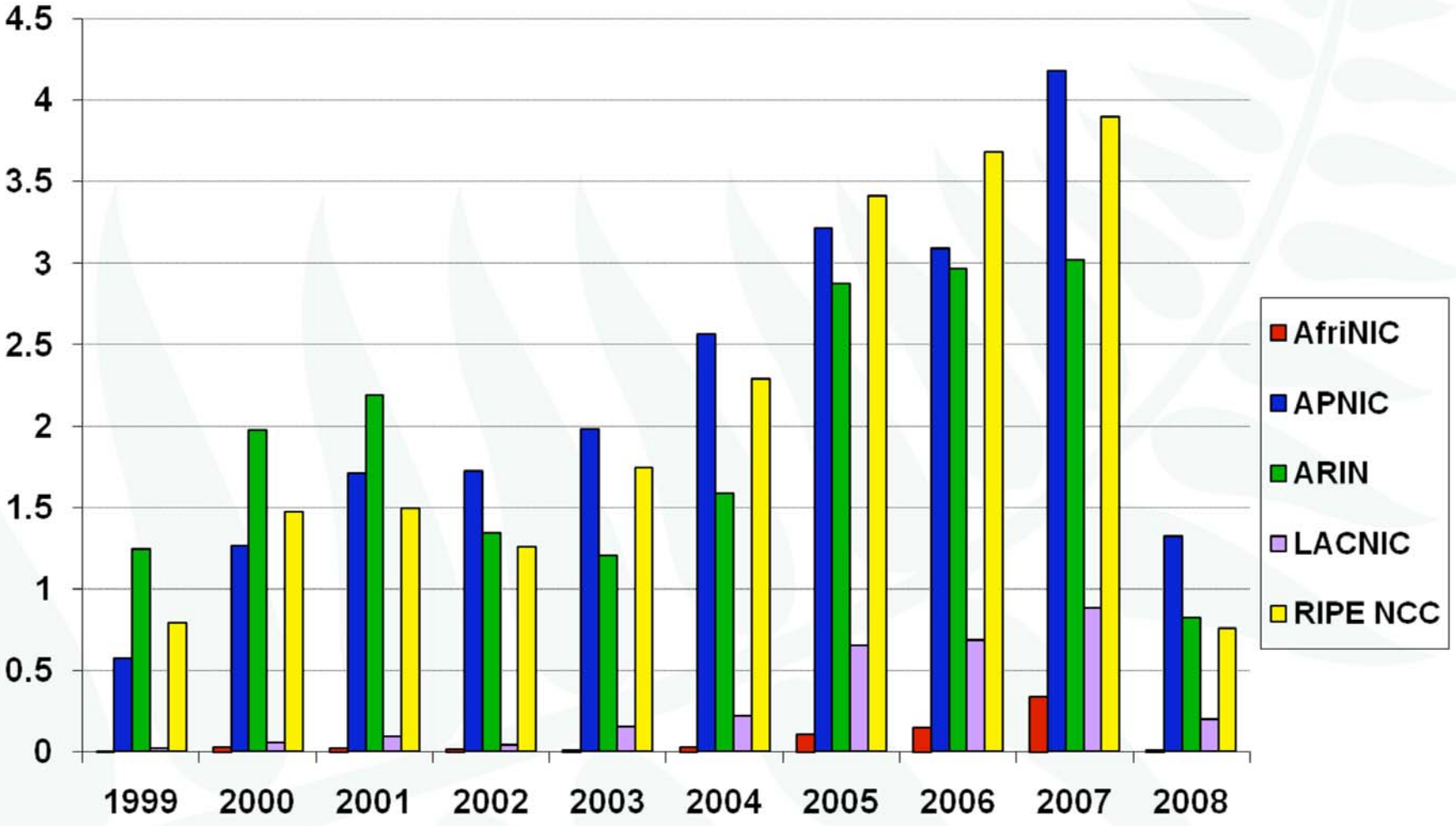
SANOG
Internet
start
NP-IRME-17042007.ppt
NP-IPv6-18-2004200...
ICONS - Home - Micro...
ICONS - Mozilla Firefox
EN
4:58 PM

Number resource allocation statistics

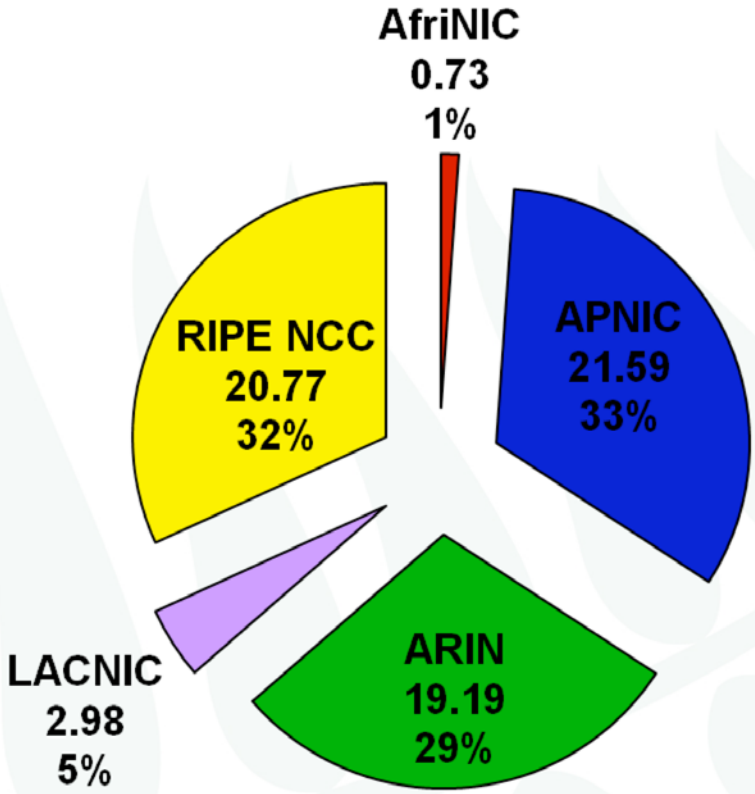
IPv4 allocations RIRs to LIRs/ISPs

Yearly comparison (/8s) - data up to Mar 2008



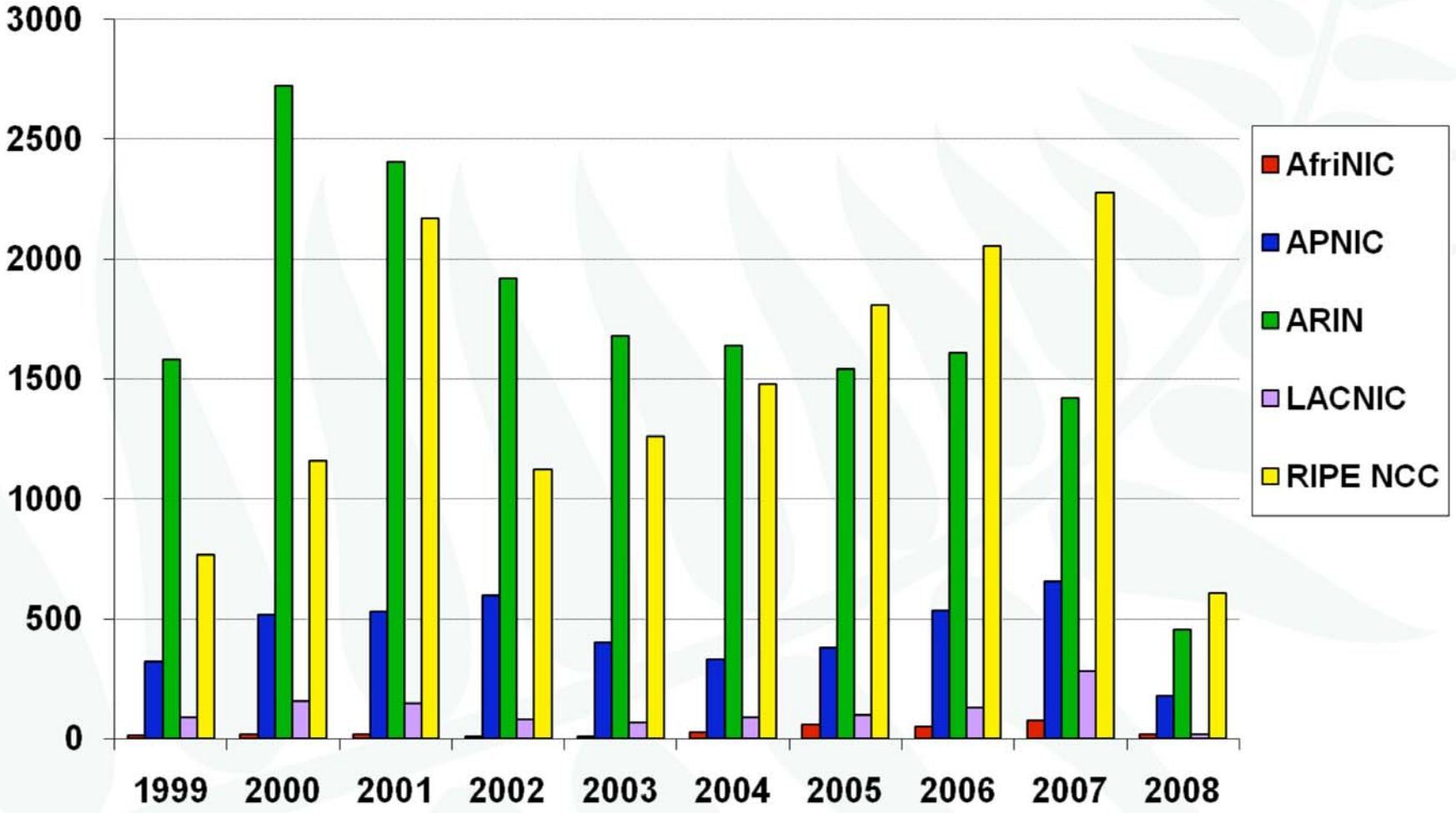
IPv4 allocations RIRs to LIRs/ISPs

Cumulative total (Jan 1999 – Mar 2008)



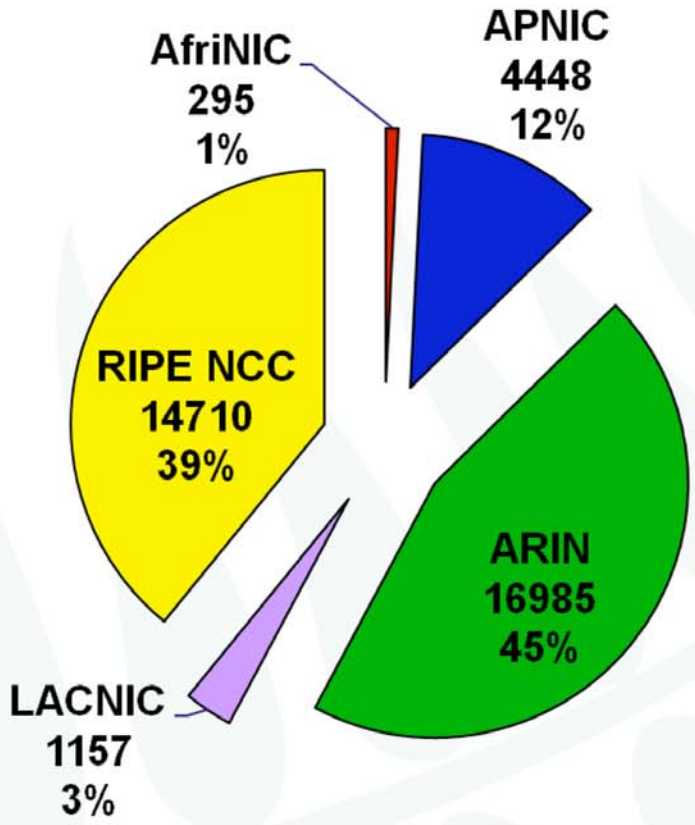
ASN assignments: RIRs to LIRs/ISPs

Yearly comparison - data up to Mar 2008



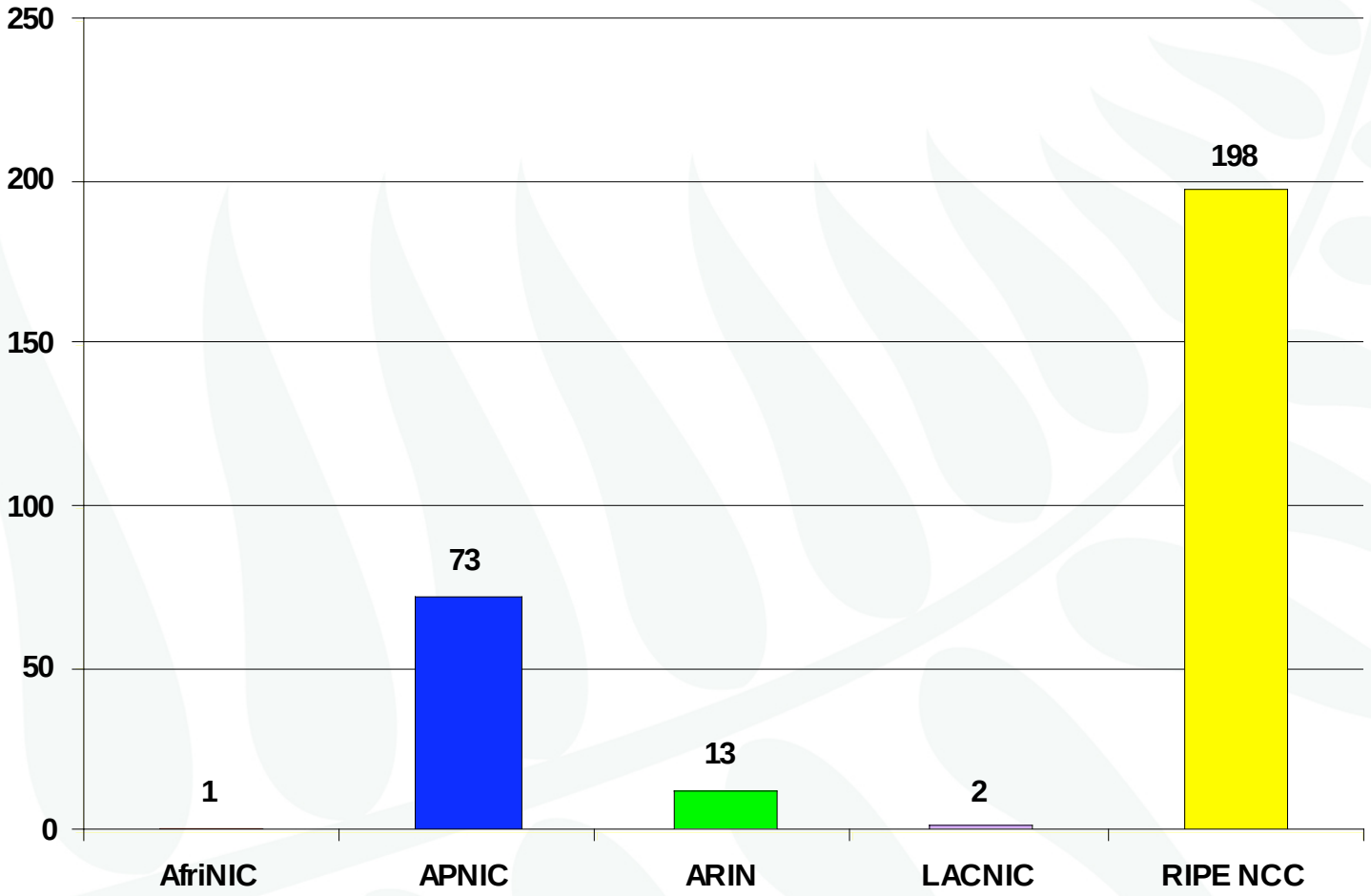
ASN assignments: RIRs to LIRs/ISPs

Cumulative total (Jan 1999 – Mar 2008)



IANA IPv6 allocations to RIRs

issued as /23s prior to Oct 2006



IANA IPv6 allocations to RIRs

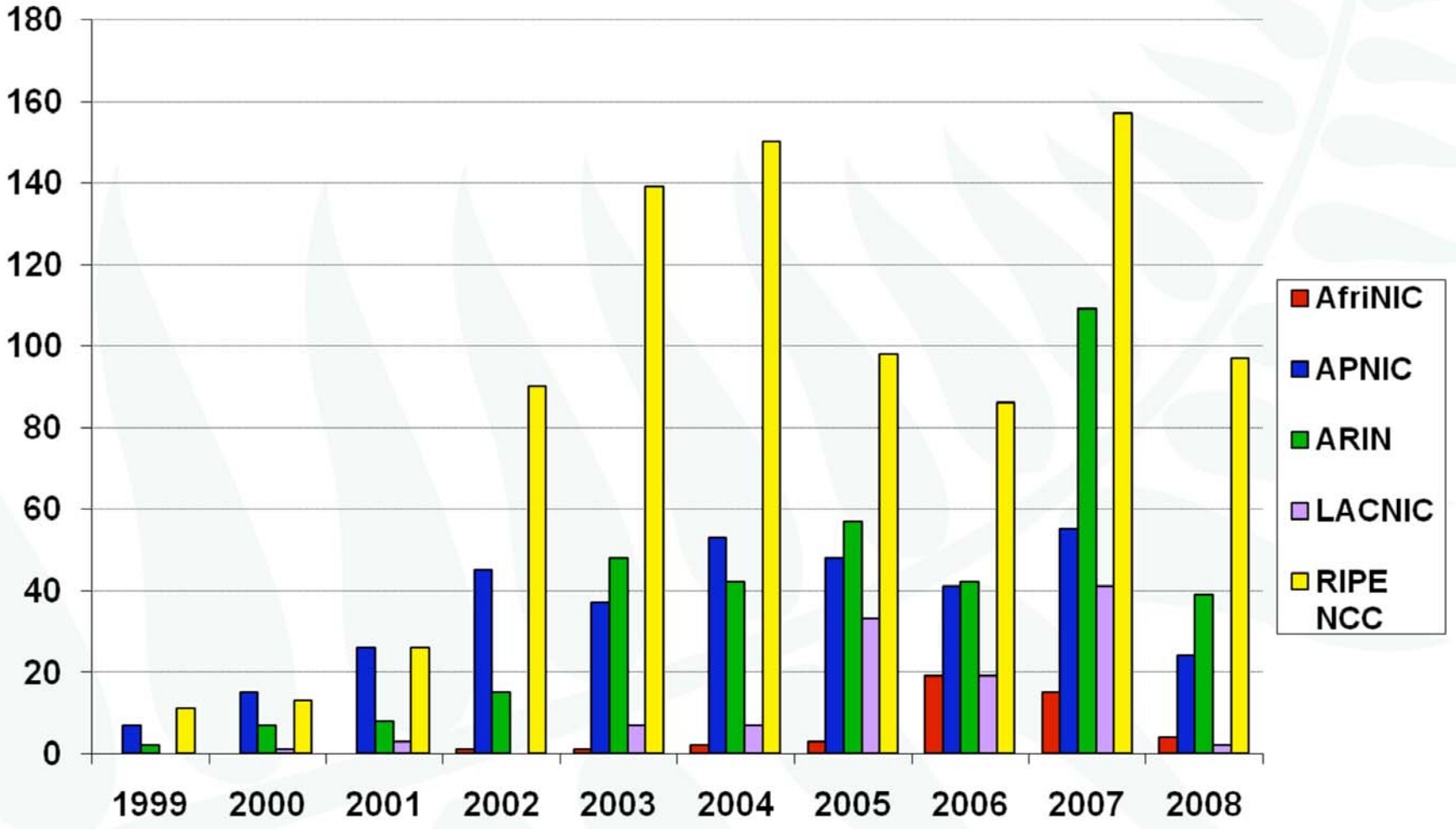
issued in Oct 2006

RIR	IPv6 Address
AfriNIC	2C00:0000::/12
APNIC	2400:0000::/12
ARIN	2600:0000::/12
LACNIC	2800:0000::/12
RIPE NCC	2A00:0000::/12

Some /23s from the previous slide are incorporated in these /12s

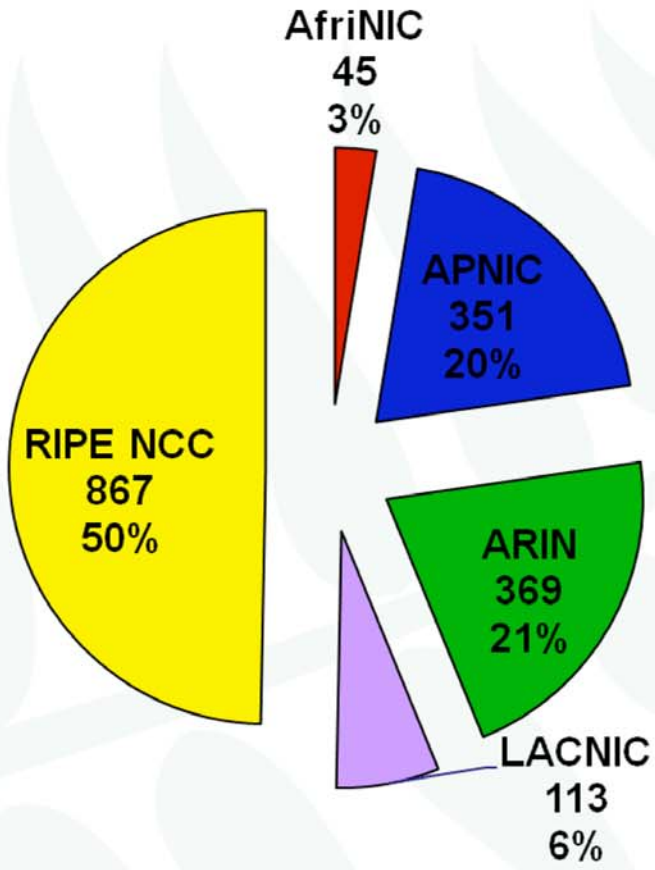
IPv6 Allocations: RIRs to LIRs/ISPs

Yearly comparison – data up to Mar 2008

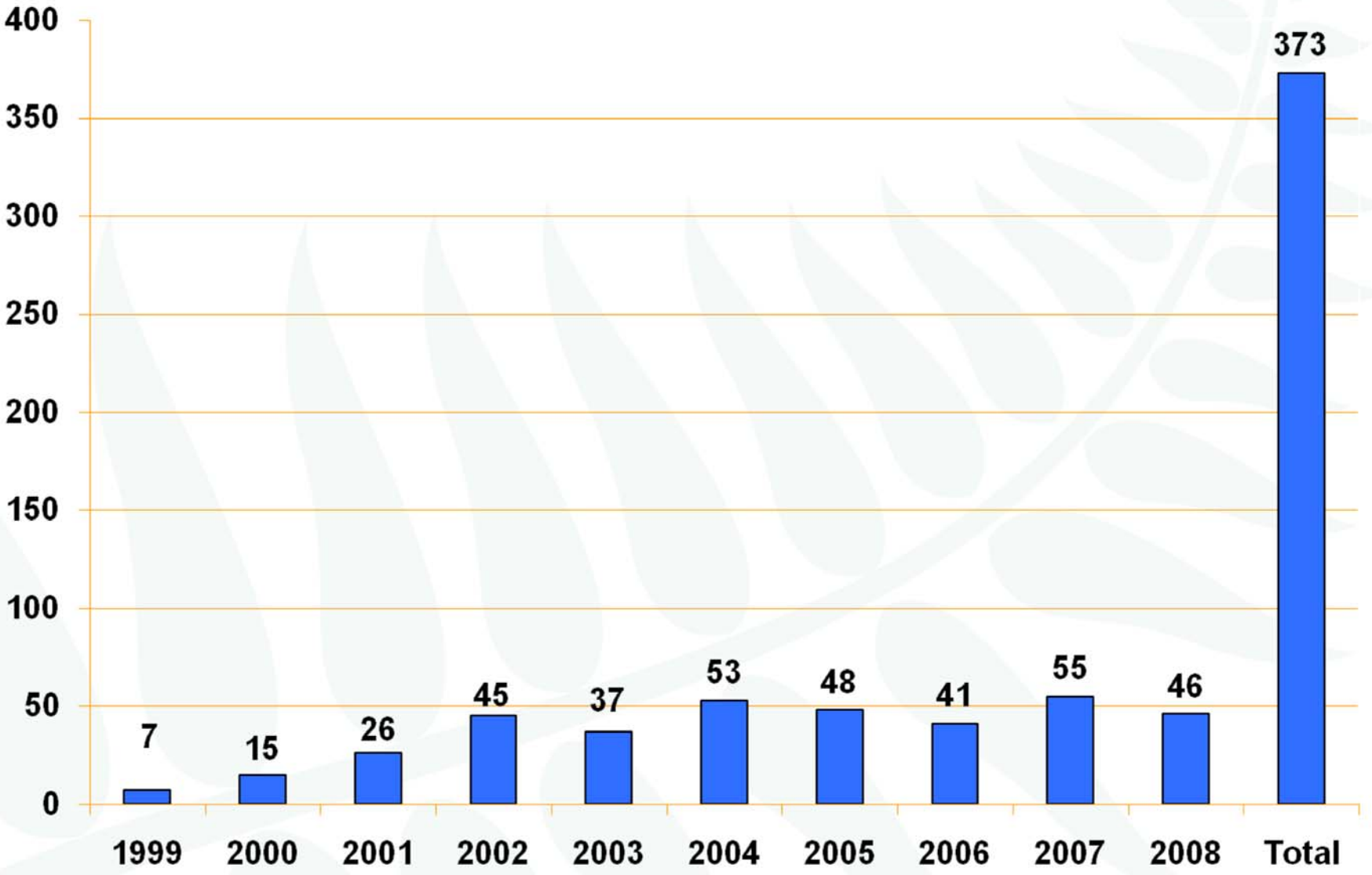


IPv6 allocations RIRs to LIRs/ISPs

Cumulative total (Jan 1999 – Mar 2008)



APNIC delegations by year (allocation)



Source: APNIC statistic data, as of May 2008

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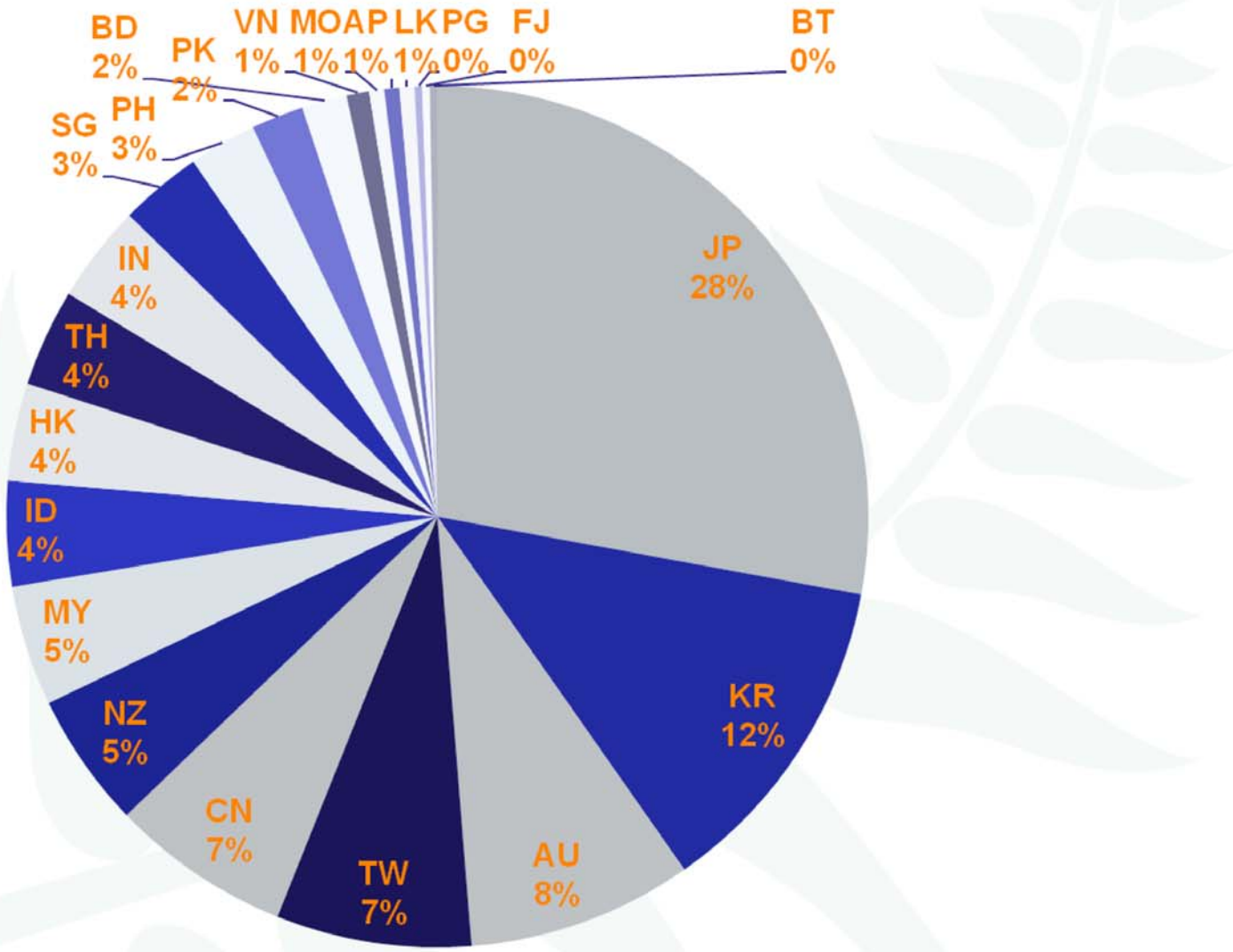
APNIC IPv6 allocation by economy



Source APNIC statistics data, as of May 2008

Discussion

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Thank you!