

# Autonomous System Numbers

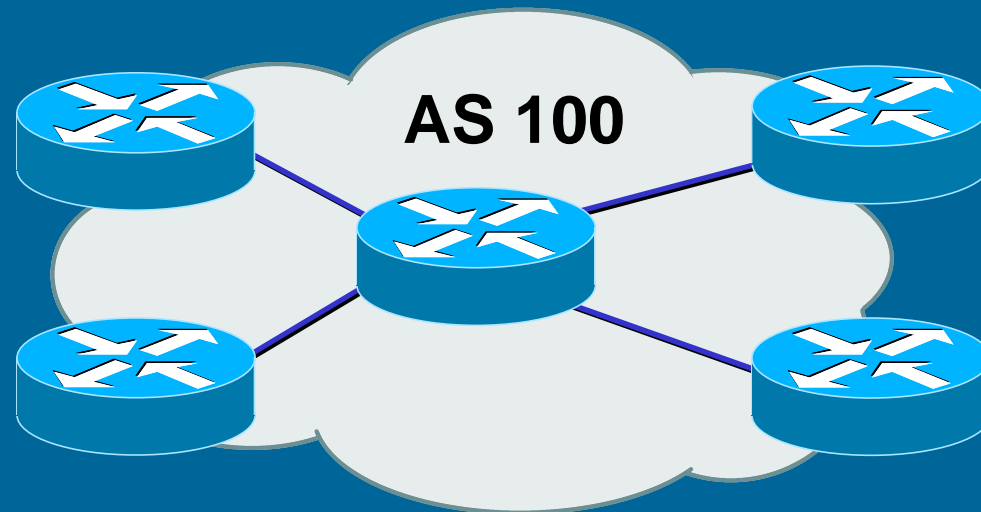
INET 2000

Network Training Workshops

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

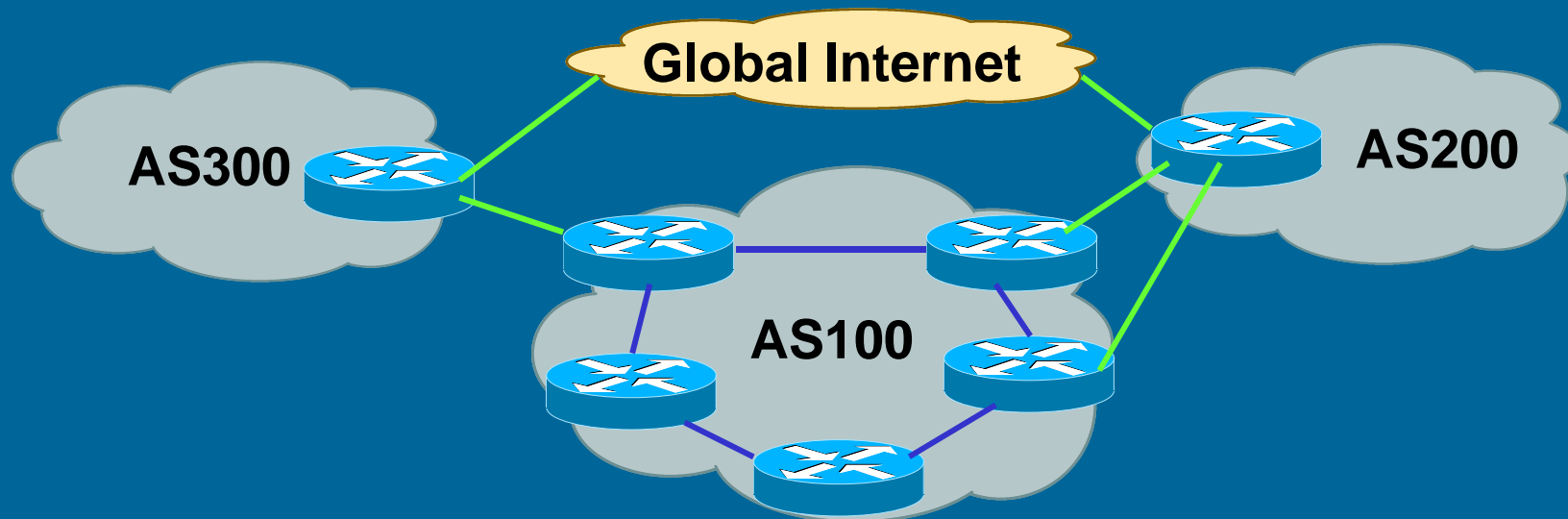
# What is an 'Autonomous System' ?

- ◆ Definition of an AS
  - ◆ Collection of networks with the same routing policy, usually under single ownership, trust & administrative control



# What is an 'Autonomous System' ?

- ◆ When do I need an AS?
  - ◆ Multi-homed network to different providers and
  - ◆ Routing policy different to external peers



# ASN Guidelines

- ◆ Factors that don't count

- ◆ Transition
- ◆ 'Future proofing'
- ◆ Multi-homing to the same upstream
  - ◆ *RFC2270: Using dedicated AS for sites homed to a single provider*
- ◆ Service differentiation
  - ◆ *RFC1997: BGP Communities attribute*

- ◆ Recommended reading

- ◆ *RFC1930: Guidelines for creation, selection and registration of an Autonomous System*

# Requesting an ASN

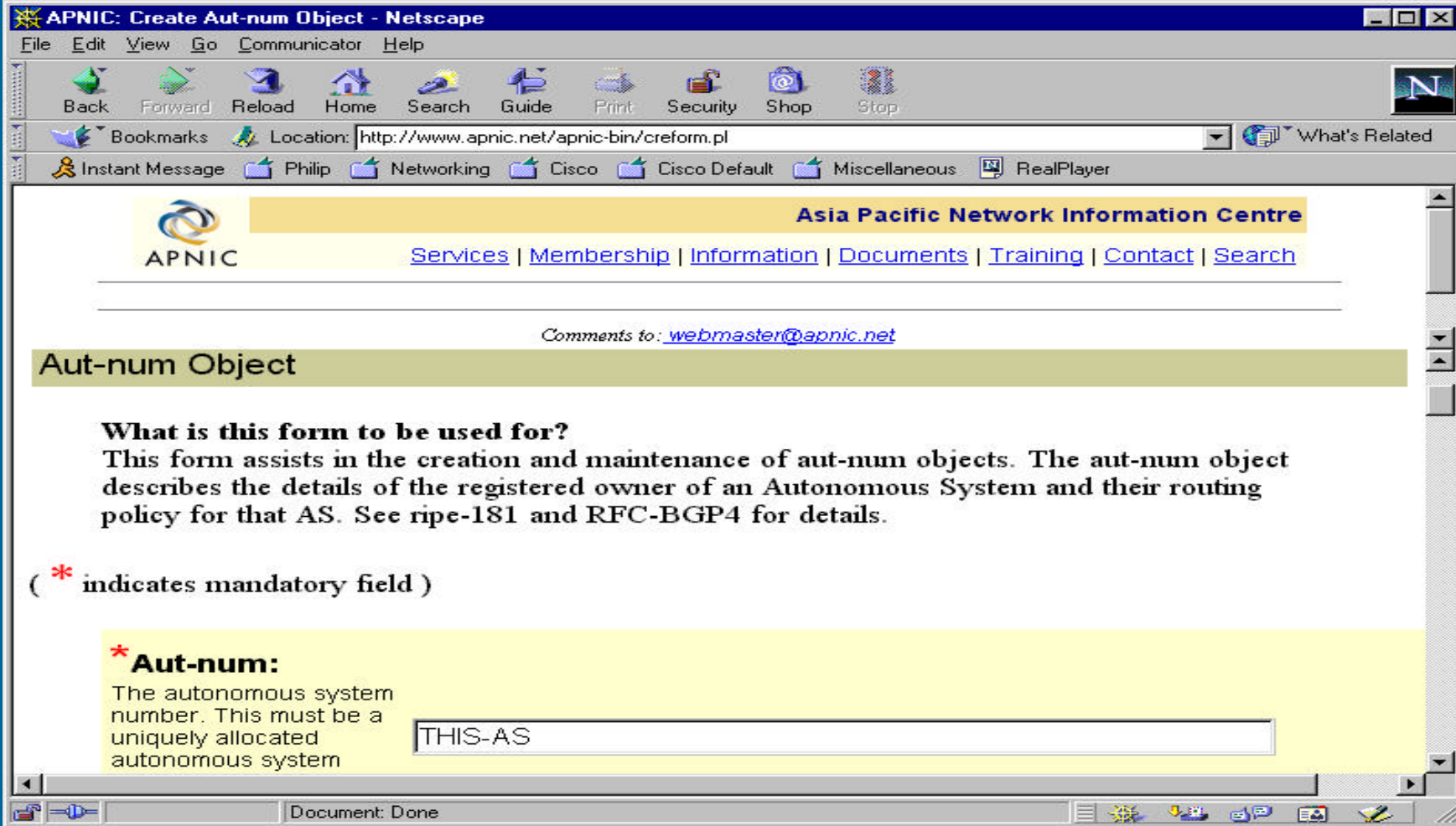
- ◆ Complete the request form
  - ◆ web forms available (APNIC and RIPE NCC)
    - ◆ <http://www.apnic.net/db/aut-num.html>
    - ◆ <http://www.ripe.net/cgi-bin/web147cgi>
  - ◆ text form (ARIN)
    - ◆ <http://www.arin.net/regserv/templates/asntemplate.txt>
- ◆ Must include routing policy
  - ◆ Multiple as-in and as-out lines
- ◆ Contacts for upstream providers required

# Requesting an ASN

*customers*

- ◆ Procedures
  - ◆ Can request via member, or directly through 'non-member' schedule (ARIN and APNIC only)
- ◆ If customer disconnects from member
  - ◆ Customer keeps AS
  - ◆ Modify database entry for AS
    - ◆ member removes maintainer protection
    - ◆ customer updates policy
- ◆ Transfers of ASNs
  - ◆ Need legal documentation (mergers etc)
  - ◆ Should be returned if no longer required

# Request Form (APNIC example)



The screenshot shows a Netscape browser window titled "APNIC: Create Aut-num Object - Netscape". The address bar shows the URL "http://www.apnic.net/apnic-bin/creform.pl". The browser's toolbar includes buttons for Back, Forward, Reload, Home, Search, Guide, Print, Security, Shop, and Stop. Below the toolbar, there are bookmarks for Philip, Networking, Cisco, Cisco Default, Miscellaneous, and RealPlayer. The main content area displays the APNIC logo and the text "Asia Pacific Network Information Centre". A navigation bar contains links for Services, Membership, Information, Documents, Training, Contact, and Search. Below this, there is a comment field with the text "Comments to: webmaster@apnic.net". The main heading is "Aut-num Object". A paragraph explains the form's purpose: "What is this form to be used for? This form assists in the creation and maintenance of aut-num objects. The aut-num object describes the details of the registered owner of an Autonomous System and their routing policy for that AS. See ripe-181 and RFC-BGP4 for details." A note indicates that an asterisk (\*) denotes a mandatory field. The first mandatory field is labeled "\* Aut-num:" and is described as "The autonomous system number. This must be a uniquely allocated autonomous system". The input field for this field contains the text "THIS-AS". The browser's status bar at the bottom shows "Document: Done".

APNIC: Create Aut-num Object - Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Guide Print Security Shop Stop

Bookmarks Location: <http://www.apnic.net/apnic-bin/creform.pl> What's Related

Instant Message Philip Networking Cisco Cisco Default Miscellaneous RealPlayer

APNIC Asia Pacific Network Information Centre

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Comments to: [webmaster@apnic.net](mailto:webmaster@apnic.net)

## Aut-num Object

**What is this form to be used for?**  
This form assists in the creation and maintenance of aut-num objects. The aut-num object describes the details of the registered owner of an Autonomous System and their routing policy for that AS. See ripe-181 and RFC-BGP4 for details.

( \* indicates mandatory field )

**\* Aut-num:**  
The autonomous system number. This must be a uniquely allocated autonomous system

THIS-AS

Document: Done



# The AS Object

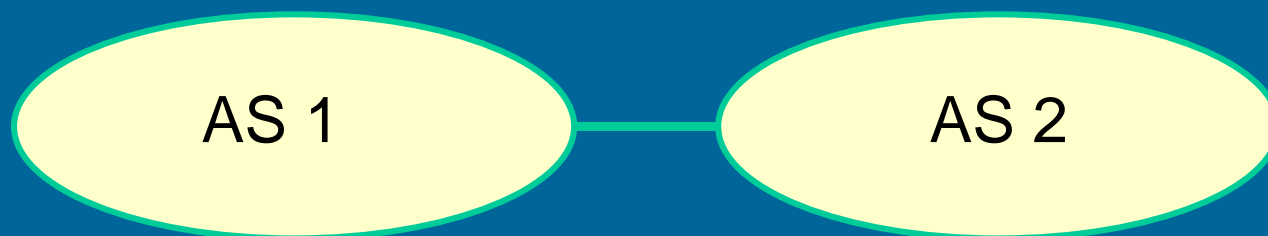
## ◆ An example

```
aut-num:      AS4777
as-name:      APNIC-NSPIXP2-AS
descr:        Asia Pacific Network Information Centre
descr:        AS for NSPIXP2, remote facilities site
as-in:        from AS2500 100 accept ANY
as-in:        from AS2524 100 accept ANY
as-in:        from AS2514 100 accept ANY
as-out:       to AS2500 announce AS4777
as-out:       to AS2524 announce AS4777
as-out:       to AS2514 announce AS4777
default:      AS2500
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  
RIPE-181**

# Representation of Routing Policy

## Basic concept

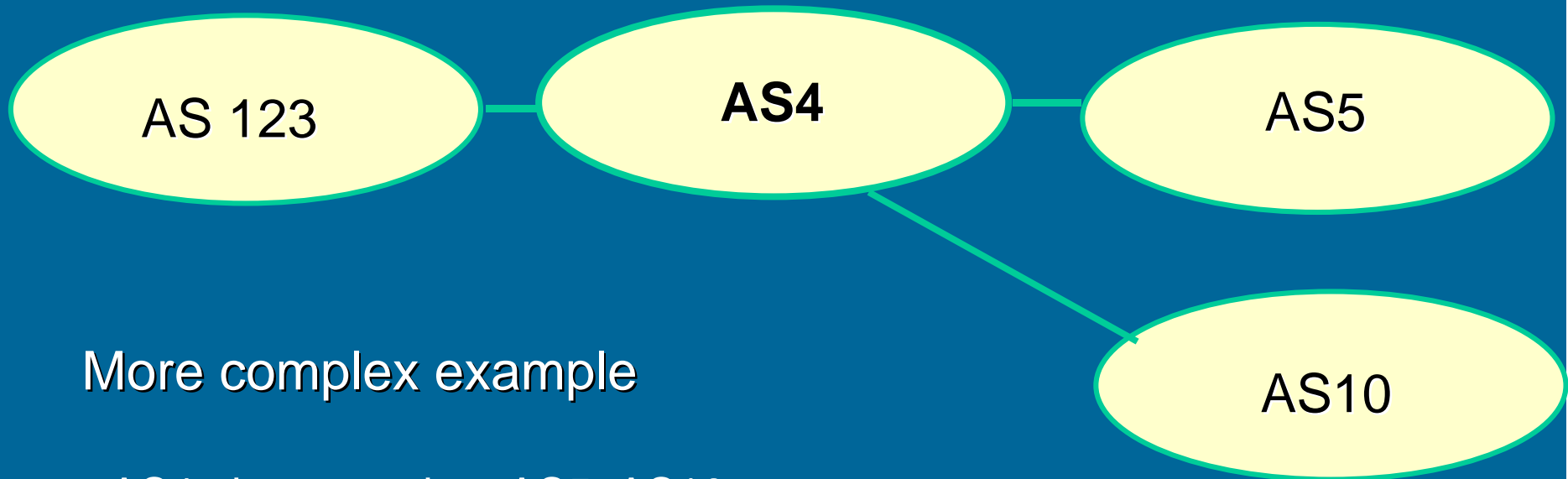


***COST per AS shows preference  
lower cost means 'preferred'***

aut-num: AS1  
<administrivia go here>  
as-in: from AS2 100 accept AS2  
as-out: to AS2 announce AS1

aut-num: AS2  
<administrivia go here>  
as-in: from AS1 100 accept AS1  
as-out: to AS1 announce AS2

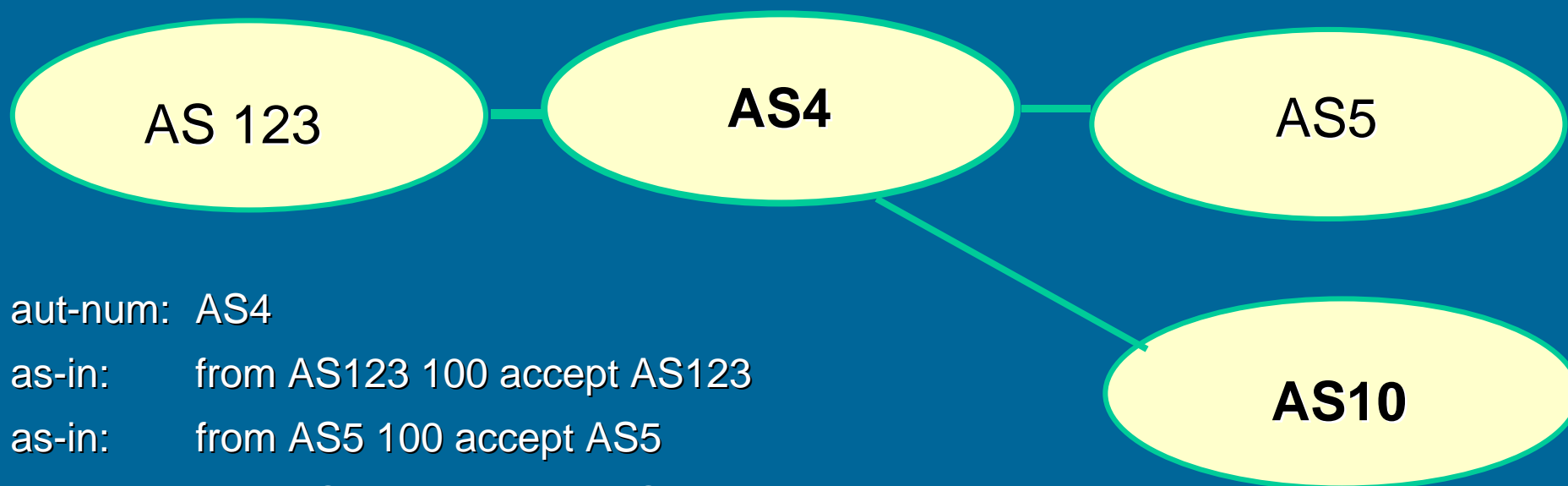
# Representation of Routing Policy



More complex example

- AS4 gives transit to AS5, AS10
- AS4 gives local routes to AS123

# Representation of Routing Policy



aut-num: AS4

as-in: from AS123 100 accept AS123

as-in: from AS5 100 accept AS5

as-in: from AS10 100 accept AS10

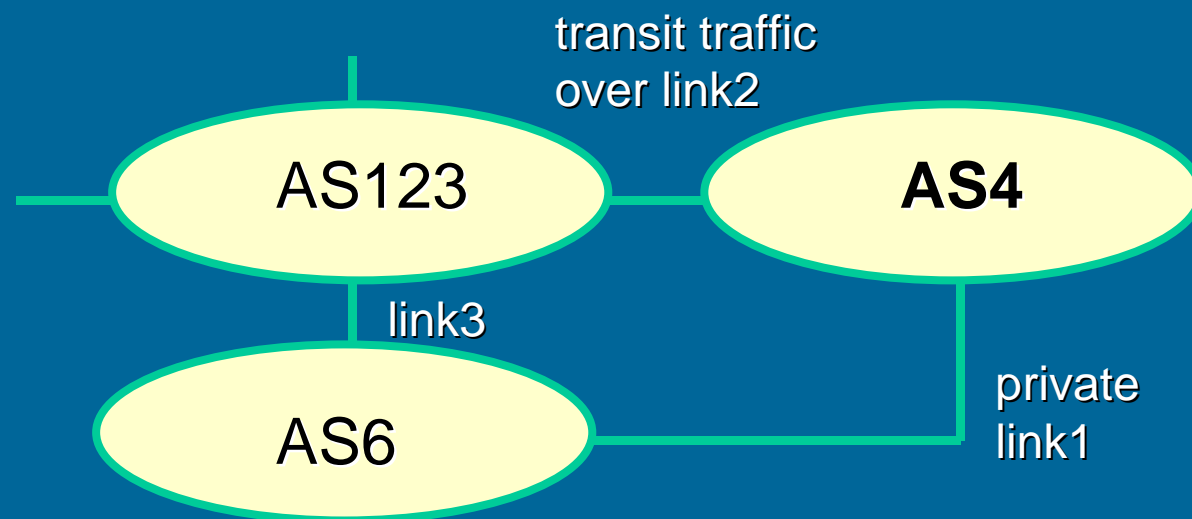
as-out: to AS123 announce AS4

as-out: to AS5 announce AS4 AS10

as-out: to AS10 announce AS4 AS5

*Not a path*

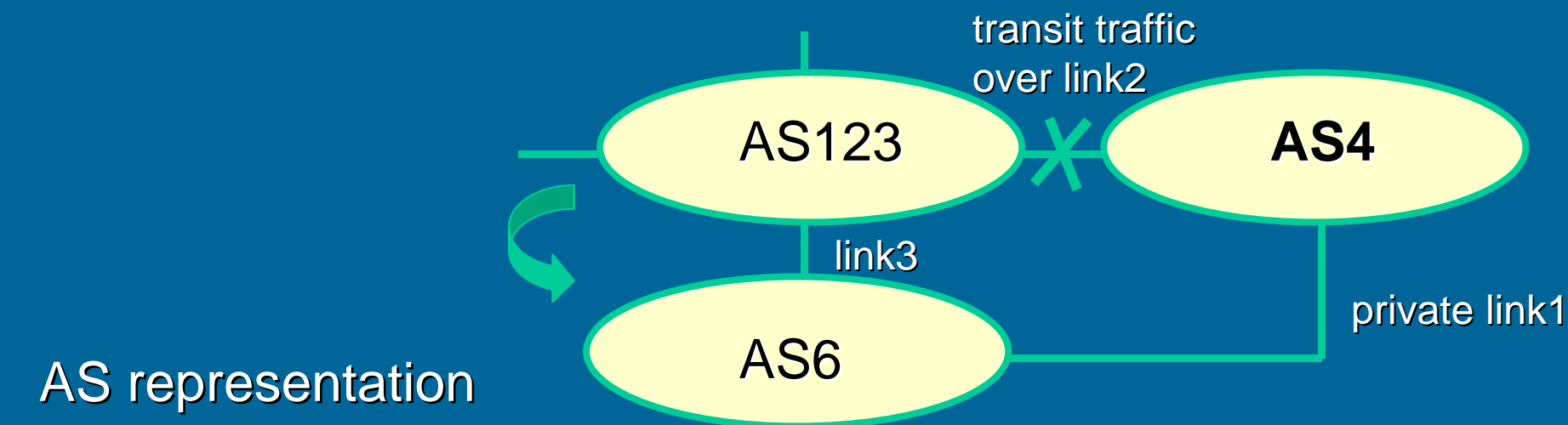
# Representation of Routing Policy



## More complex example

- AS4 and AS6 private link1
- AS4 and AS123 main transit link2
- backup all traffic over link1 and link3 in event of link2 failure

# Representation of Routing Policy



## AS representation

aut-num: AS4

as-in: from AS123 100 accept ANY ← *full routing received*

as-in: from AS6 50 accept AS6

as-in: from AS6 200 accept ANY *higher cost for backup route*

as-out: to AS6 announce AS4

as-out: to AS123 announce AS4

# Routing Policy Specification Language

- ◆ RPSL
  - ◆ Derived from RIPE-181
  - ◆ New object specification language
    - ◆ more expressive syntax
    - ◆ advanced aut-num and routing policy options
    - ◆ introduces route objects and route macros
  - ◆ Basic conversion very simple

# RPSL Conversion Tools

◆ <http://www.isi.edu/ra/rps/transition/>

## **Welcome to the RPSL Transition Page**

This page presents the latest information on the transition from RIPE-181 to the new Routing Policy Specification Language. The information will be updated frequently; visit often to stay up-to-date.

- [Query a mirrored copy of the Internet Routing Registry](#)
- [Query a mirrored copy of the IRR that has been converted to RPSL](#)
- [Convert RIPE-181 objects to RPSL / Perform RPSL syntax checks](#)
- [Access ISI's RPSL-capable database server](#)
- [Download the RIPE-to-RPSL converter tool](#)
- [Transition Plan](#)
- [RPSL Transition Presentation to NANOG, October 1997](#)



# Questions?

