Autonomous System Numbers
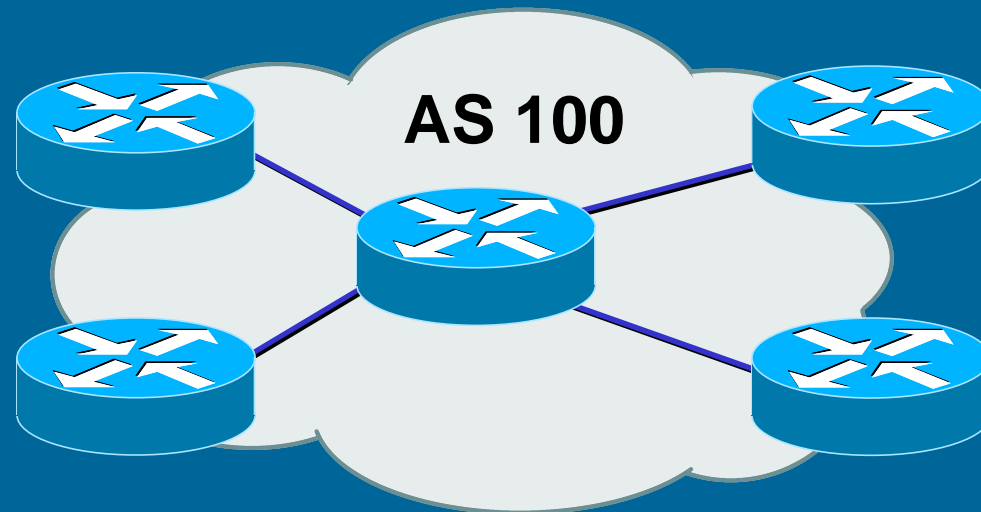
INET 2000
Network Training Workshops

Overview

- 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

AS 100

What is an 'Autonomous System' ?

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

Global Internet

AS300

AS200

AS100
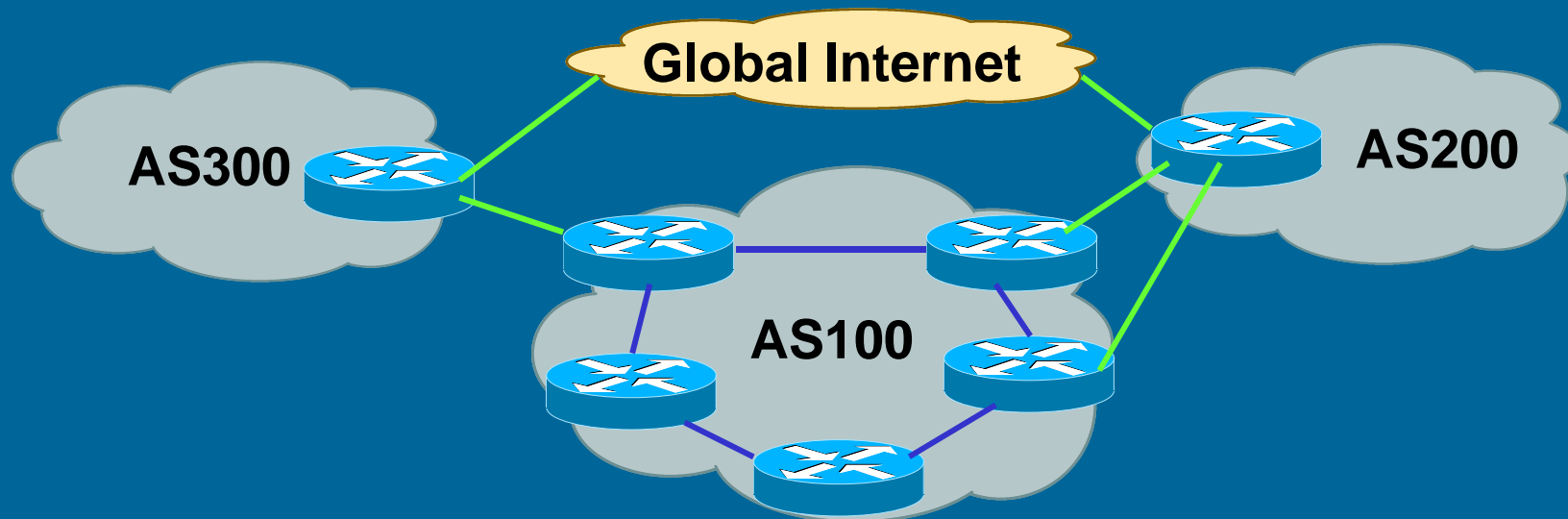
ASN Guidelines

- **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*
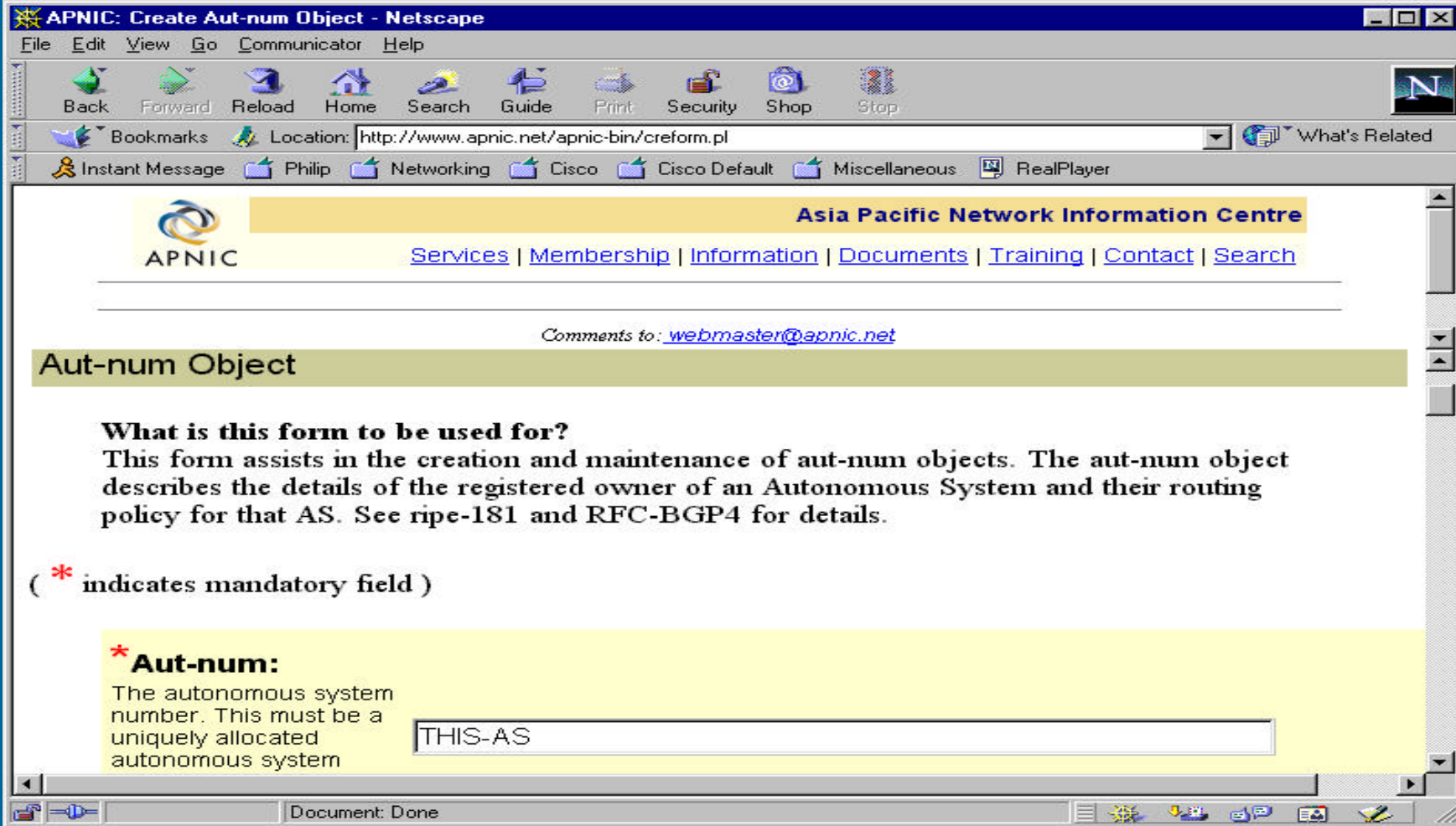
Requesting an ASN

- **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 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
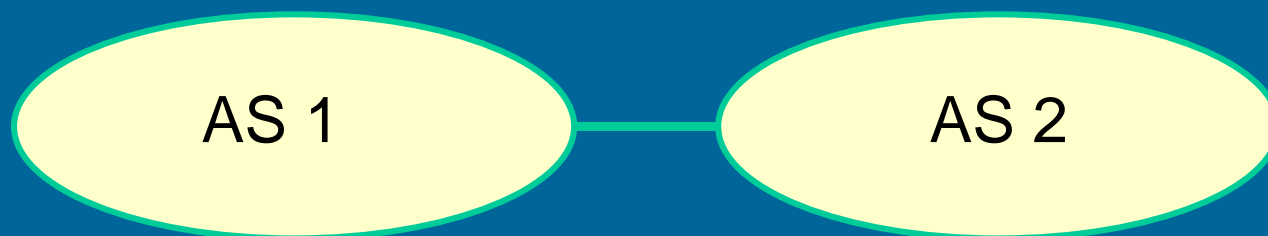
AS 1 —— AS 2

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
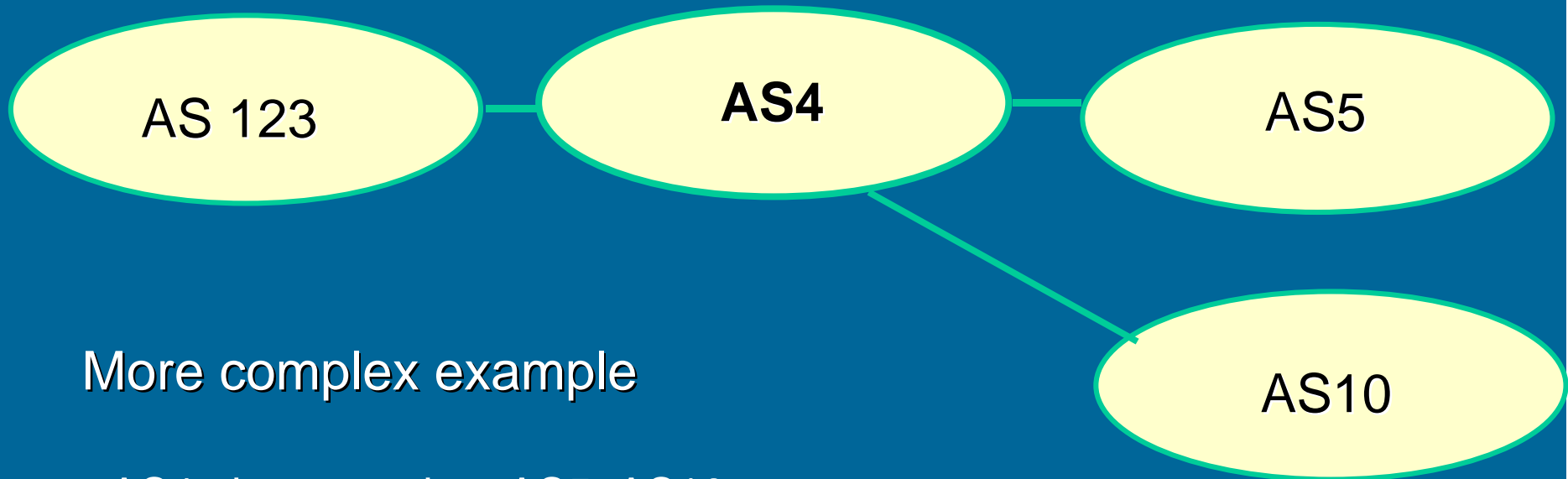
AS 123 — **AS4** — AS5

AS10

More complex example

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

Representation of Routing Policy

AS 123 — AS4 — AS5
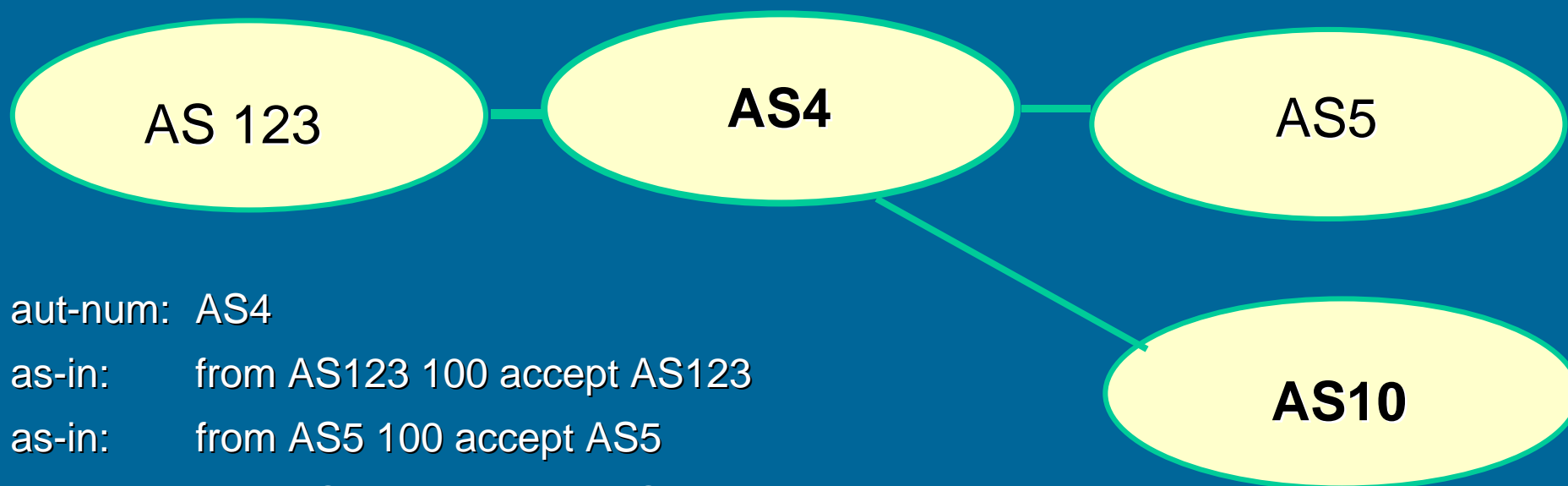
AS4 — AS10

```
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
```
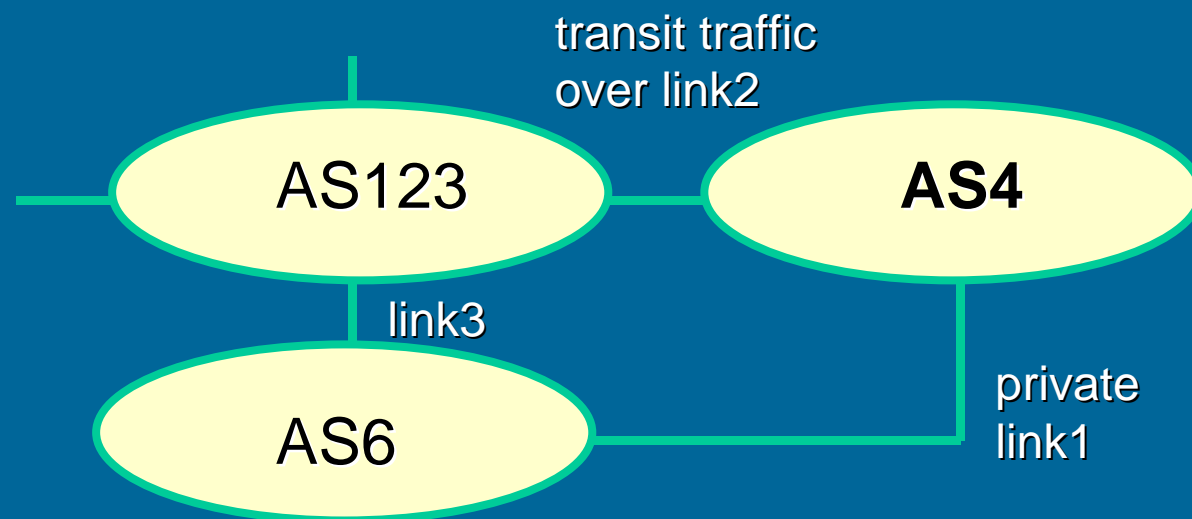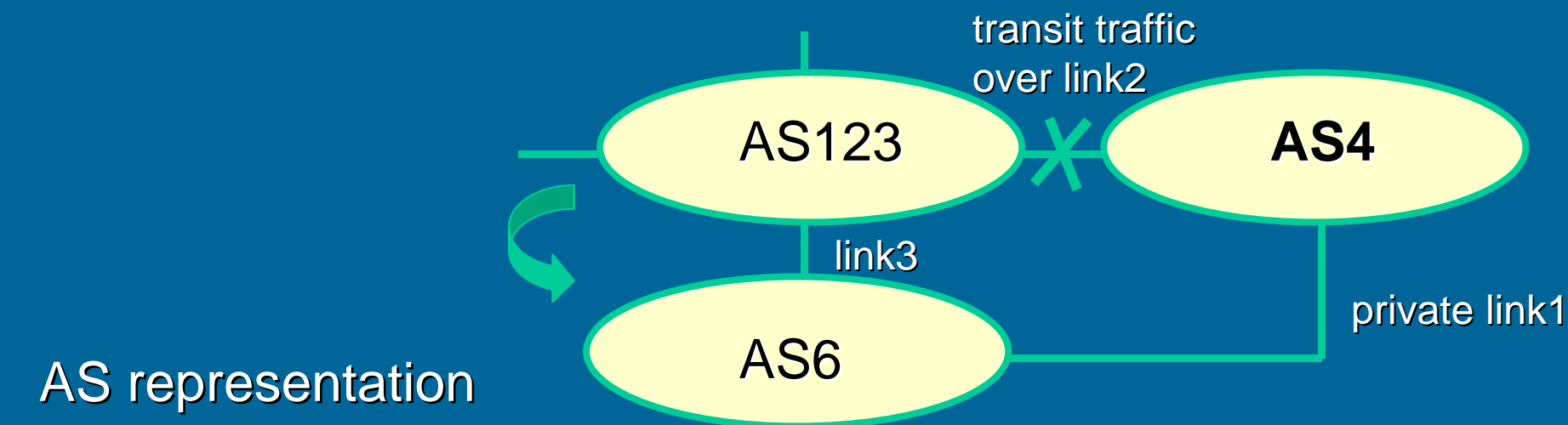
Not a path

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

transit traffic
over link2

AS123   AS4

link3

private link1

AS6

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?