HURRICANE ELECTRIC
INTERNET SERVICES

32-bit ASNs

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An Introduction to 32-bit ASNs

- What is an ASN
- Who cares?
- What's the difference between a 16-bit and 32-bit ASN?
- What's the big deal?
- Do I have to do anything?
- When will 32-bit ASNs be issued?
- When will 16-bit ASNs be deprecated?

What is an ASN

- An ASN is a unique number to represent an Autonomous System on the internet.
- An Autonomous System is a collection of prefixes sharing a common routing policy.
- ASs come in three flavors:
  - Stub
  - Multihomed
  - Transit

Who Cares?

- ISPs
- End Sites that are Multihomed
- Anyone doing BGP for any other reason
- Members of the IETF
- Others

What's the difference between a 16-bit and 32-bit ASN?

- For starters, a 16-bit ASN is 16 bits and ranges from 0-65535. A 32-bit ASN is 32 bits and ranges from 0-4,294,967,295
- Additionally, 16-bit ASNs are understood by ALL BGP-4 speaking routers while 32-bit ASNs may require a software or hardware upgrade to be fully supported.
- Don't worry, there's backwards compatibility for routers that aren't up to full support yet.

What's the big deal

- Well, despite the rhetoric, not a lot.
- There is no looming catastrophe.
- Really, it's not a major issue unless you have code or routers that need to be upgraded.
- Even then, it's pretty straight forward.
- However, 16-bit ASN runout will probably happen before IPv4 runout.

Do I have to do anything?

- Like all things in the internet, the answer is “It depends.”
- If you don’t own a router and aren’t responsible for the software maintenance on someone’s provisioning or account management system, probably not.
- If you fit into one of those two categories, relax. No need to panic yet, but, I would pay attention to the rest of this if I were you.

When will 32-bit ASNs be issued

- Surprisingly, there are multiple answers to this question.
- 1: All 16-bit ASNs are 32-bit ASNs
- 2: Some 32-bit ASNs have been issued.
- 3: When we run out of 16-bit ASNs, only 32-bit ASNs will be issued.
- 4: RIRs are, mostly, no longer making a distinction between 16-bit and 32-bit ASNs, but, they are (mostly) issuing in numeric order.

When will 16-bit ASNs be deprecated

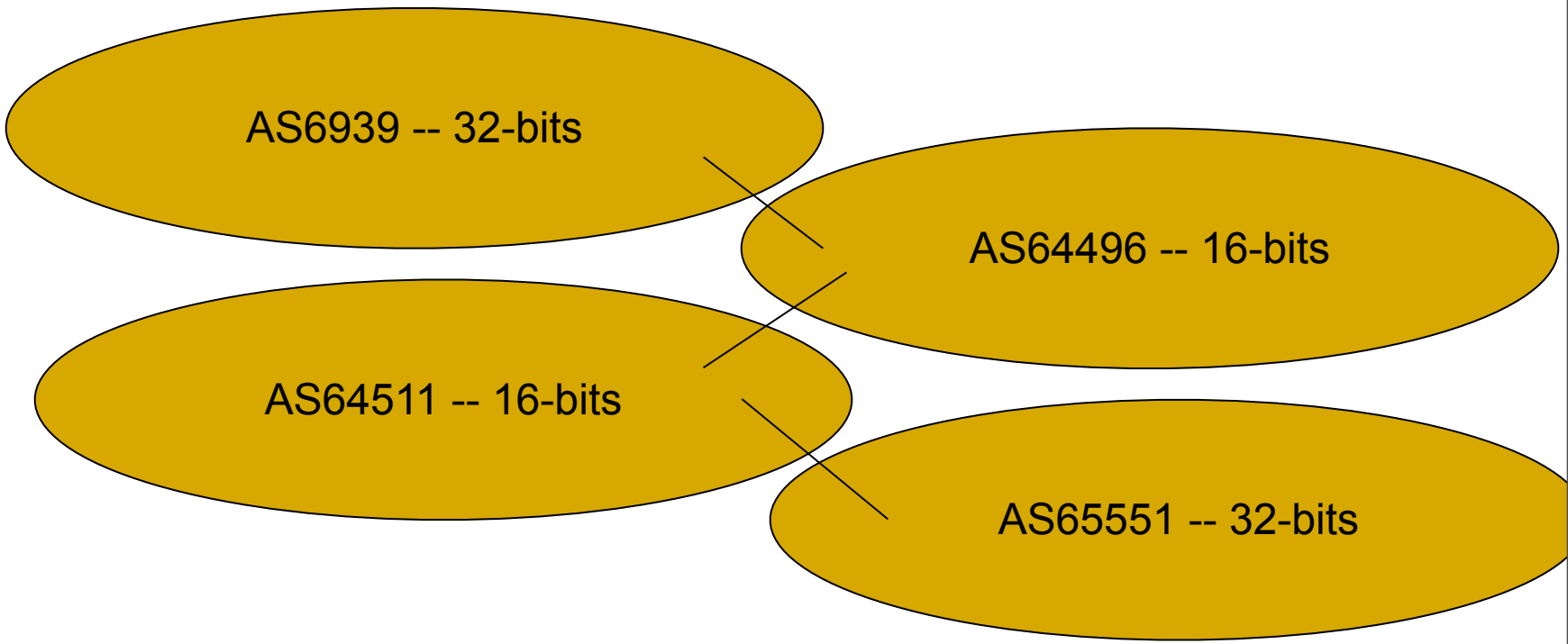
- Never (or at least no plan to do so at this time)
- BUT: We will run out of them. Probably in a year or so (before we run out of IPv4 addresses, most likely).
- This means you want to make sure you are ready for 32-bit ASNs (at least in routing updates, if not your own) soon.

What about the transition?

- Some 32-bit ASNs will be issued before all routers fully support 32-bit ASNs.
- AS23456 is a reserved 16-bit ASN.
- Stand-in for any 32-bit ASN in the path
- Substituted by last 32-bit capable router before handing information to 16-bit only router.
- Community Attribute (transitive) “NEW_AS_PATH” contains 32-bit path components.

Gratuitous Animated Example

- Here's how an AS Path makes its way through 32-bit and 16-bit ASNs and routers



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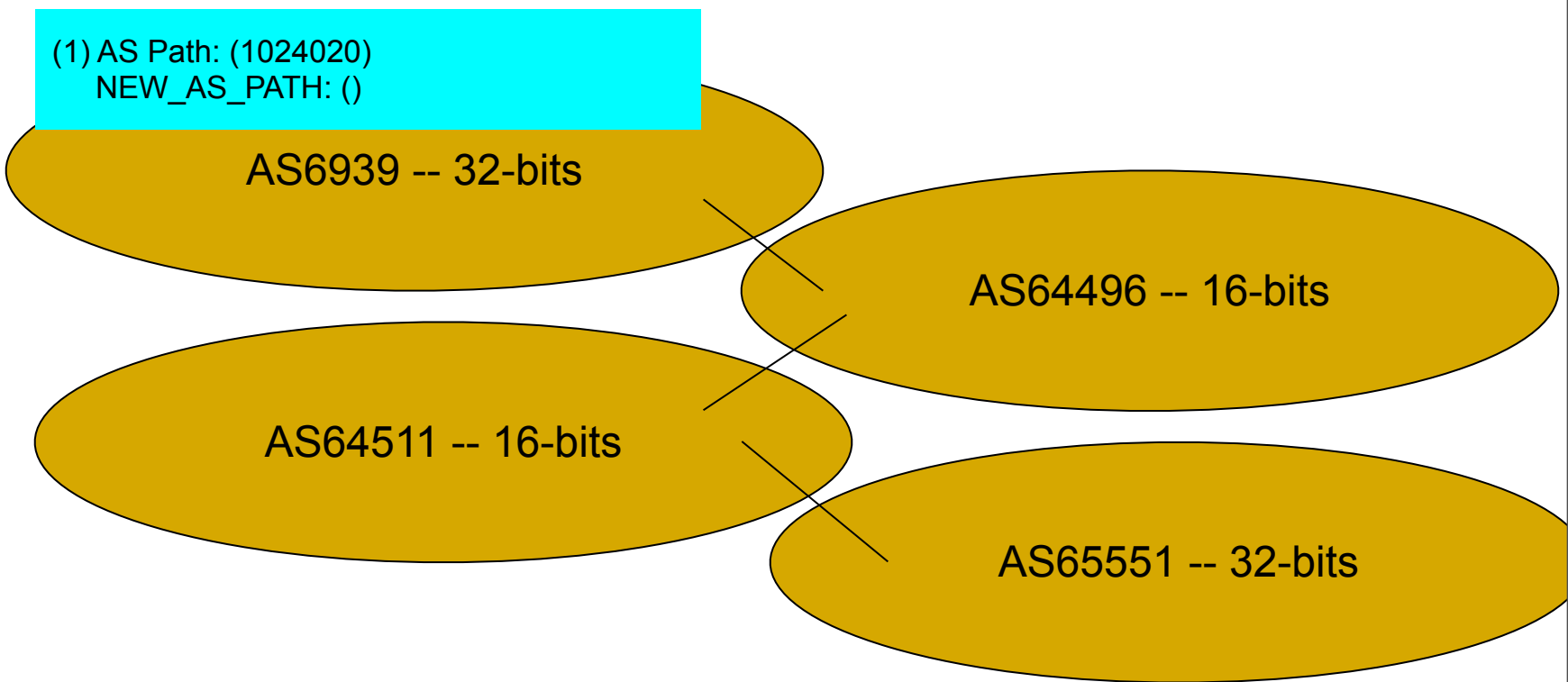

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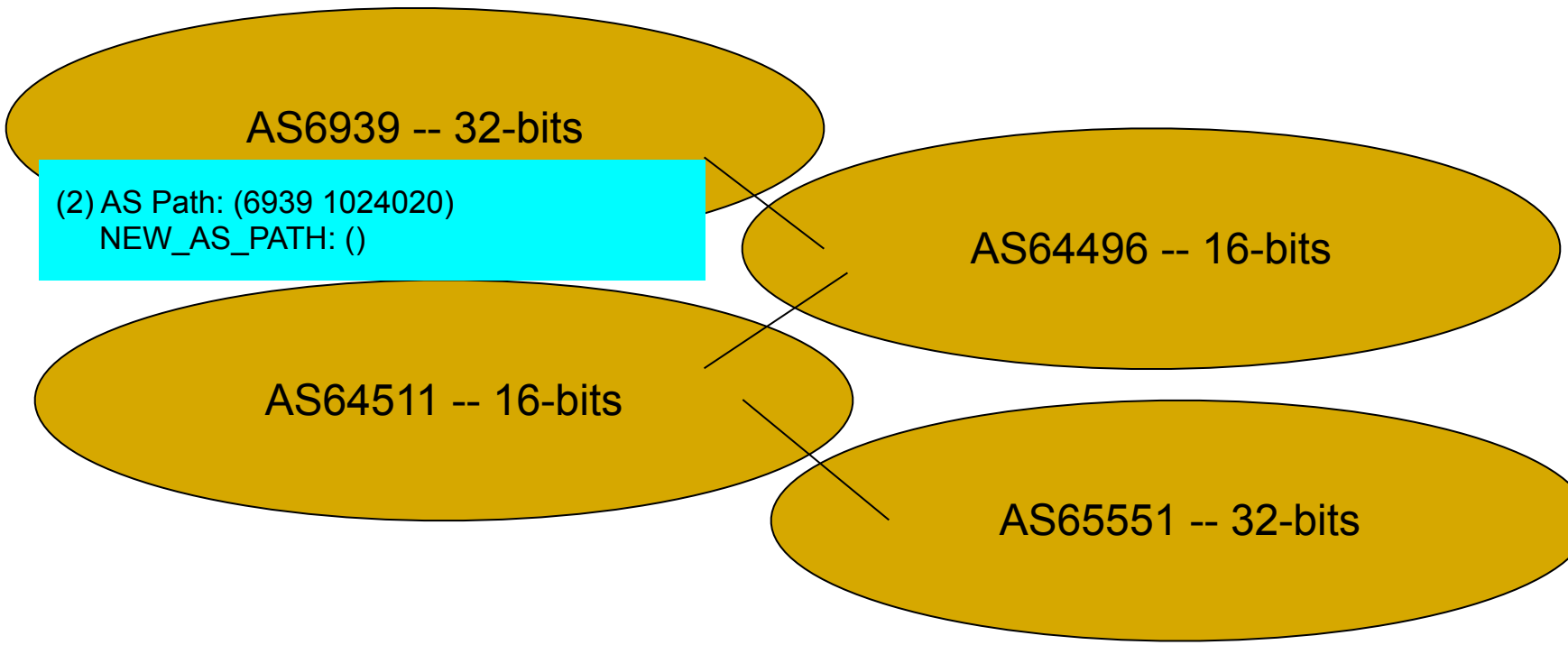

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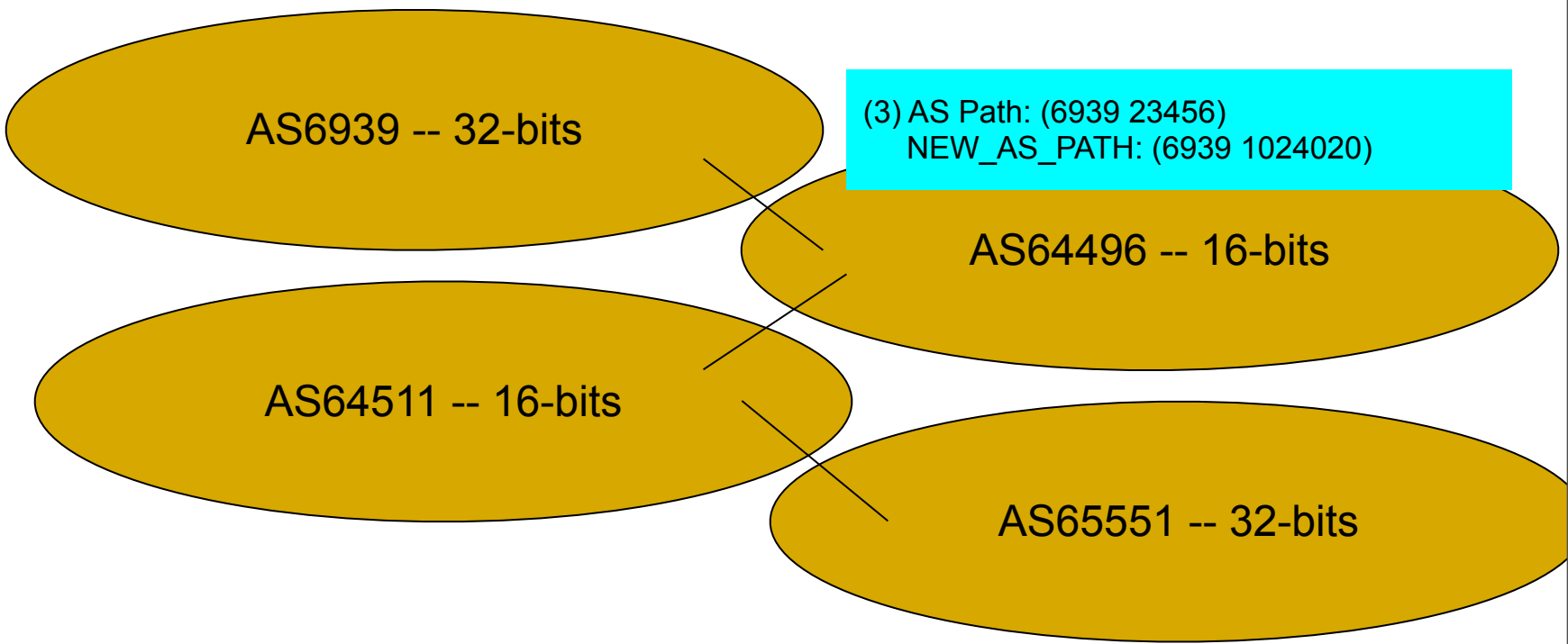

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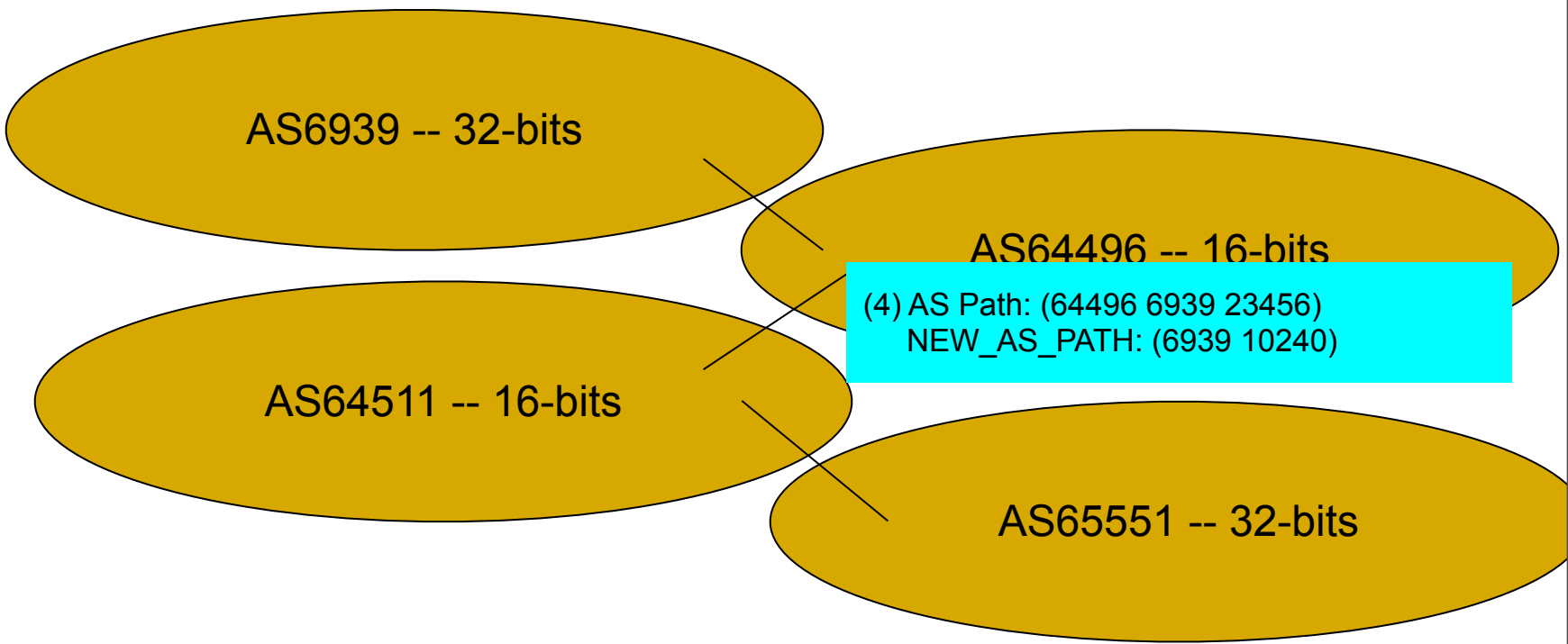

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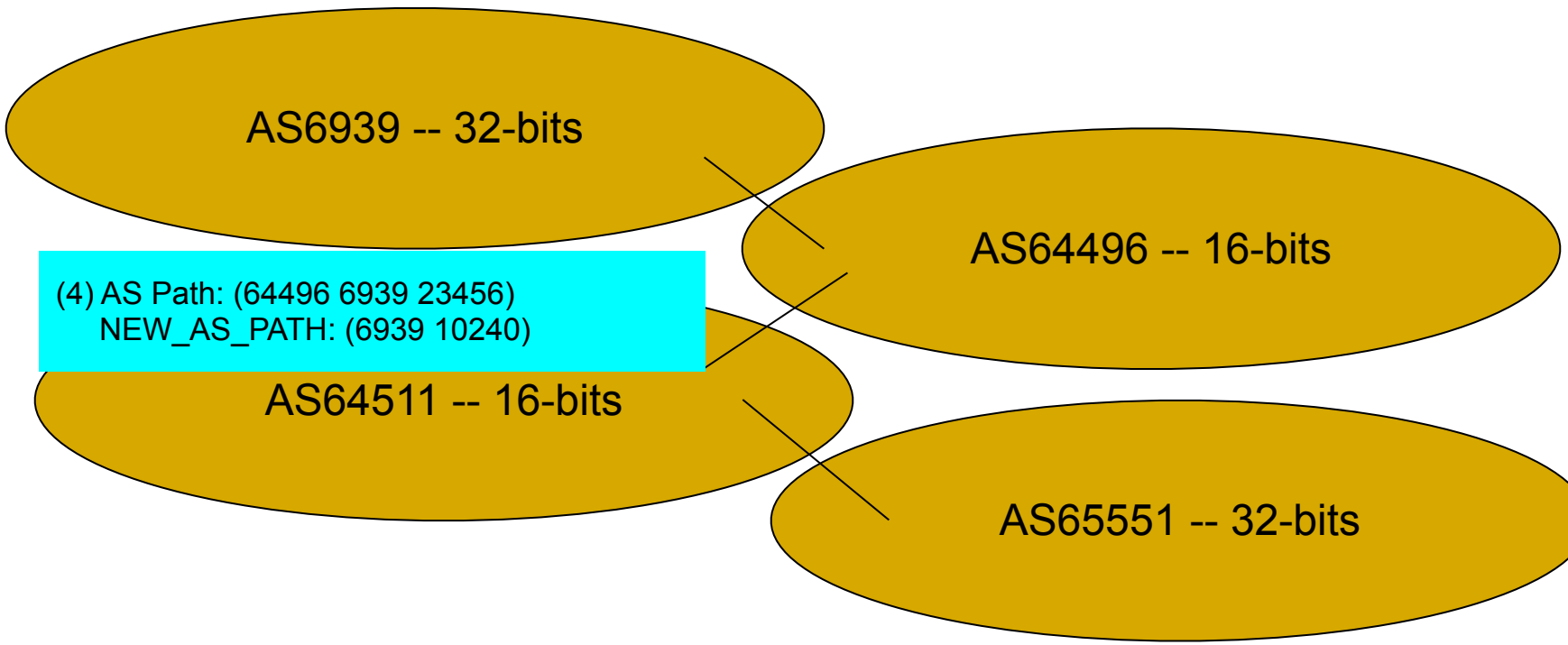

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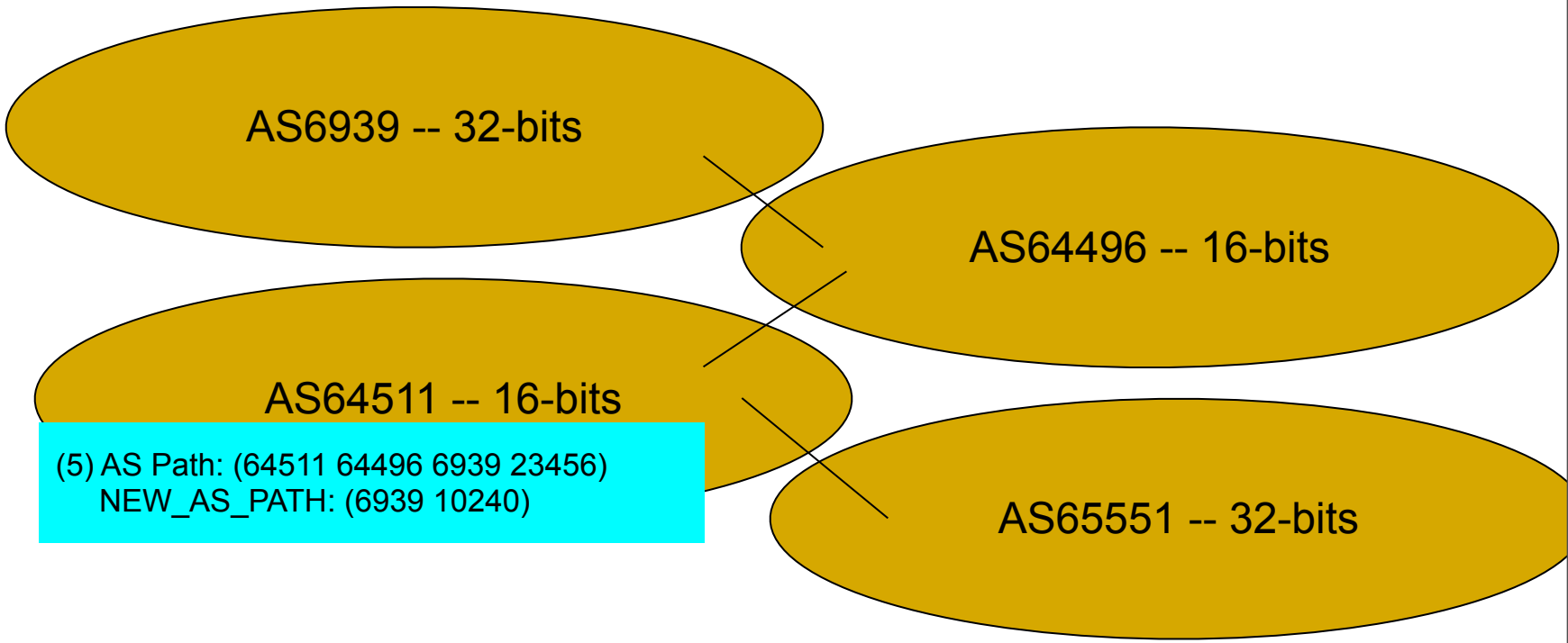

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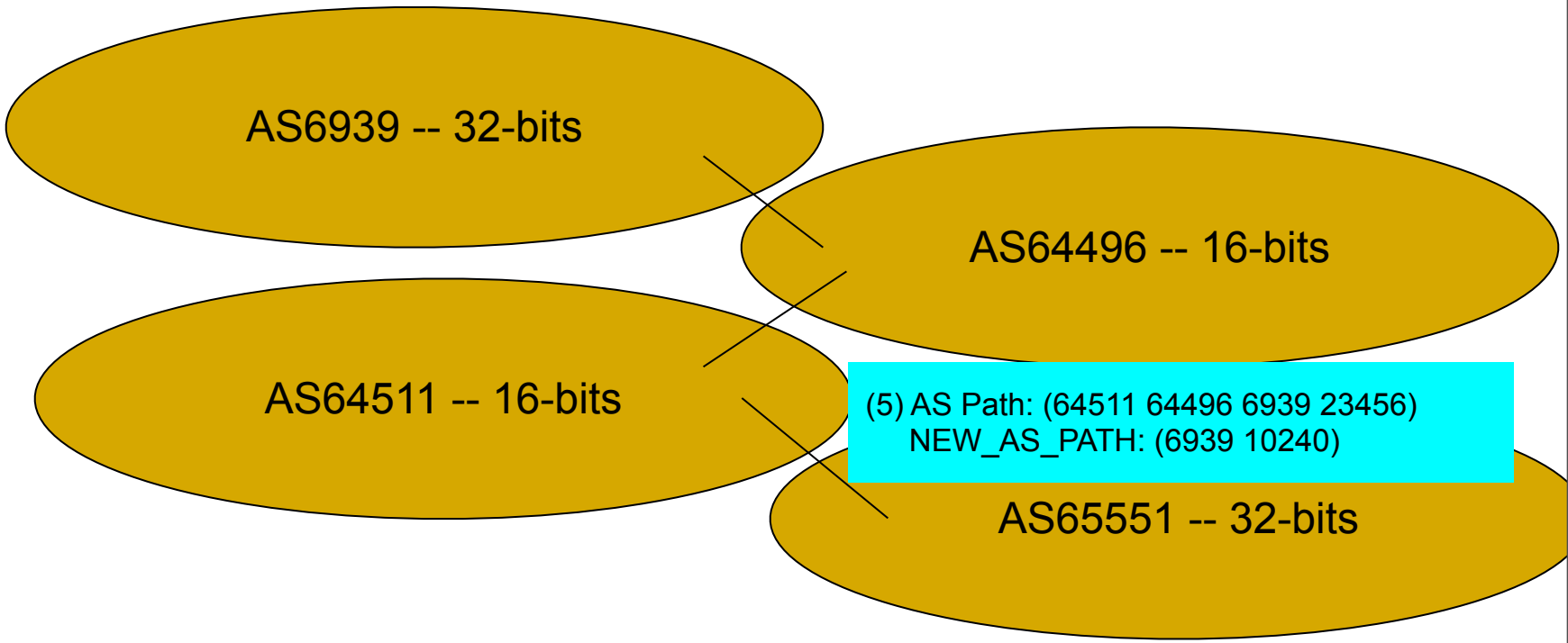

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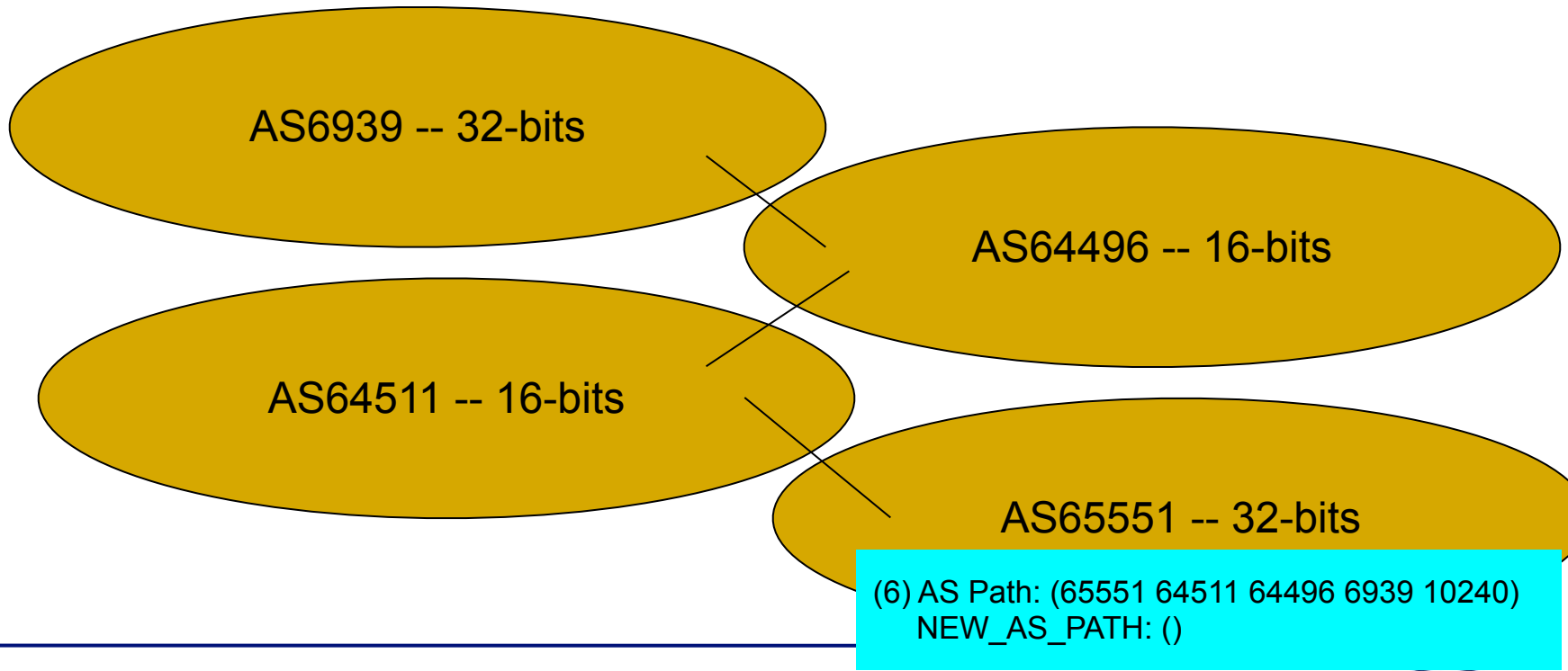

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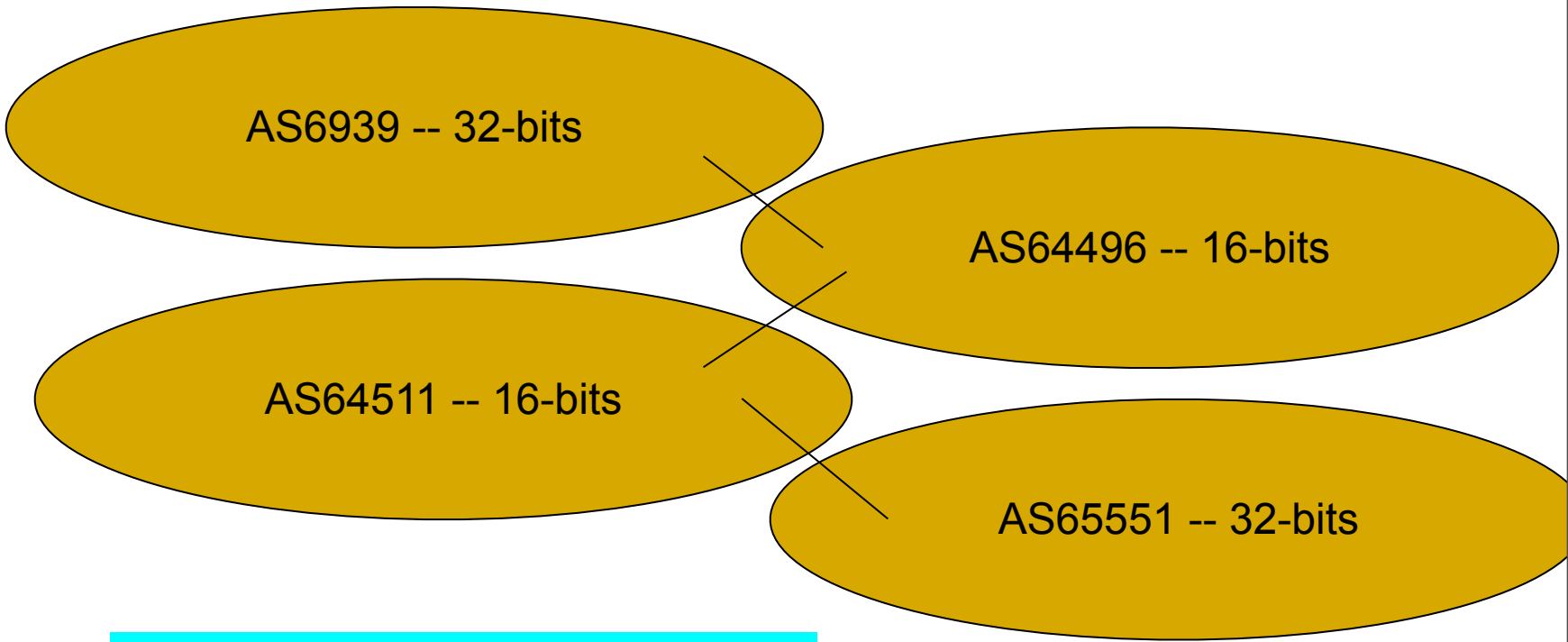

(6) AS Path: (65551 64511 64496 6939 10240)
NEW_AS_PATH: ()

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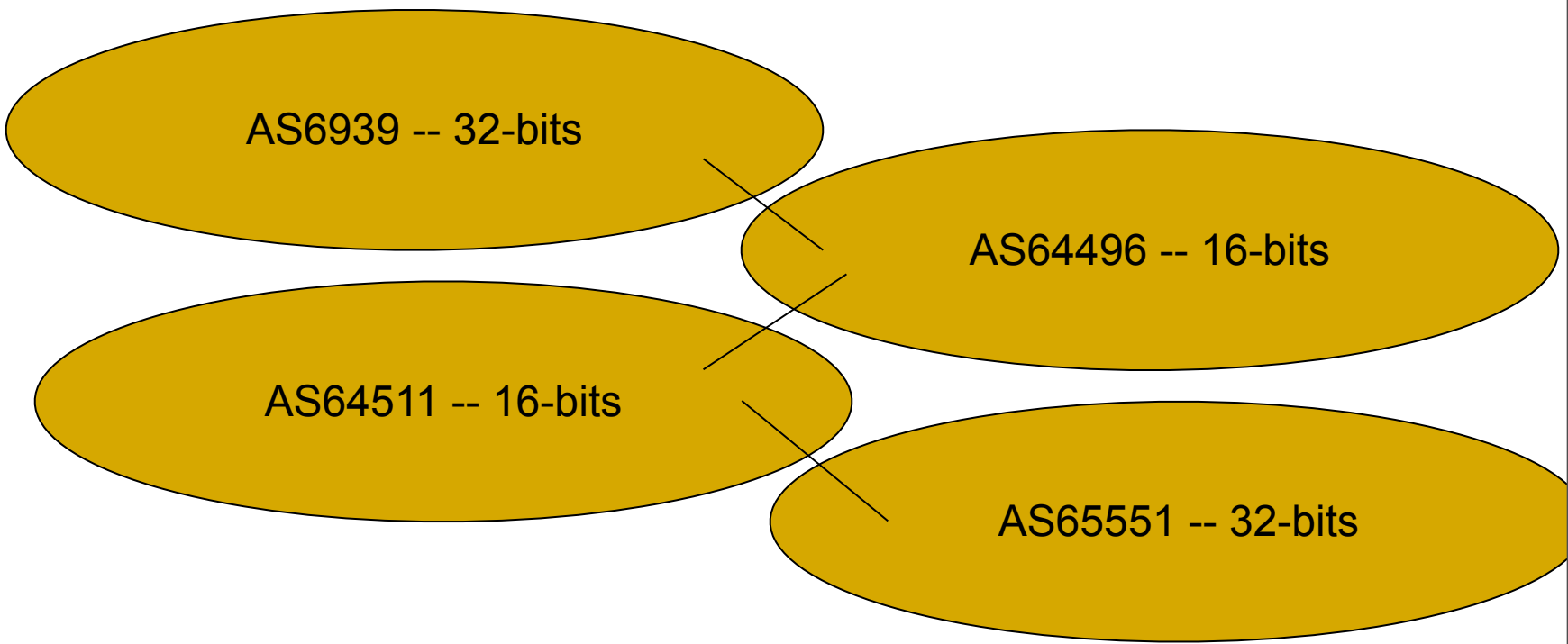
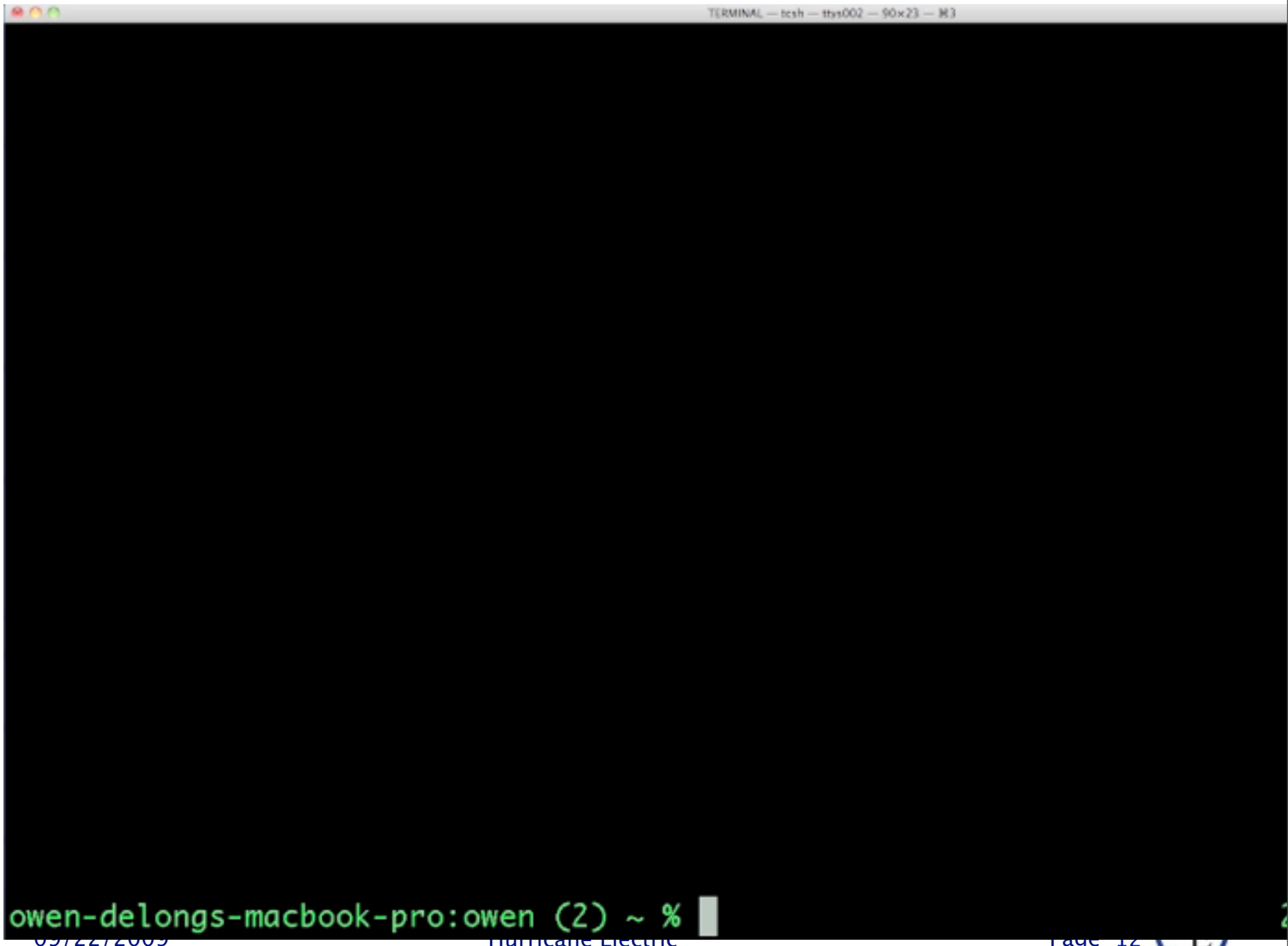


Real world live examples -- 32 bit AS-Path on a 16-bit router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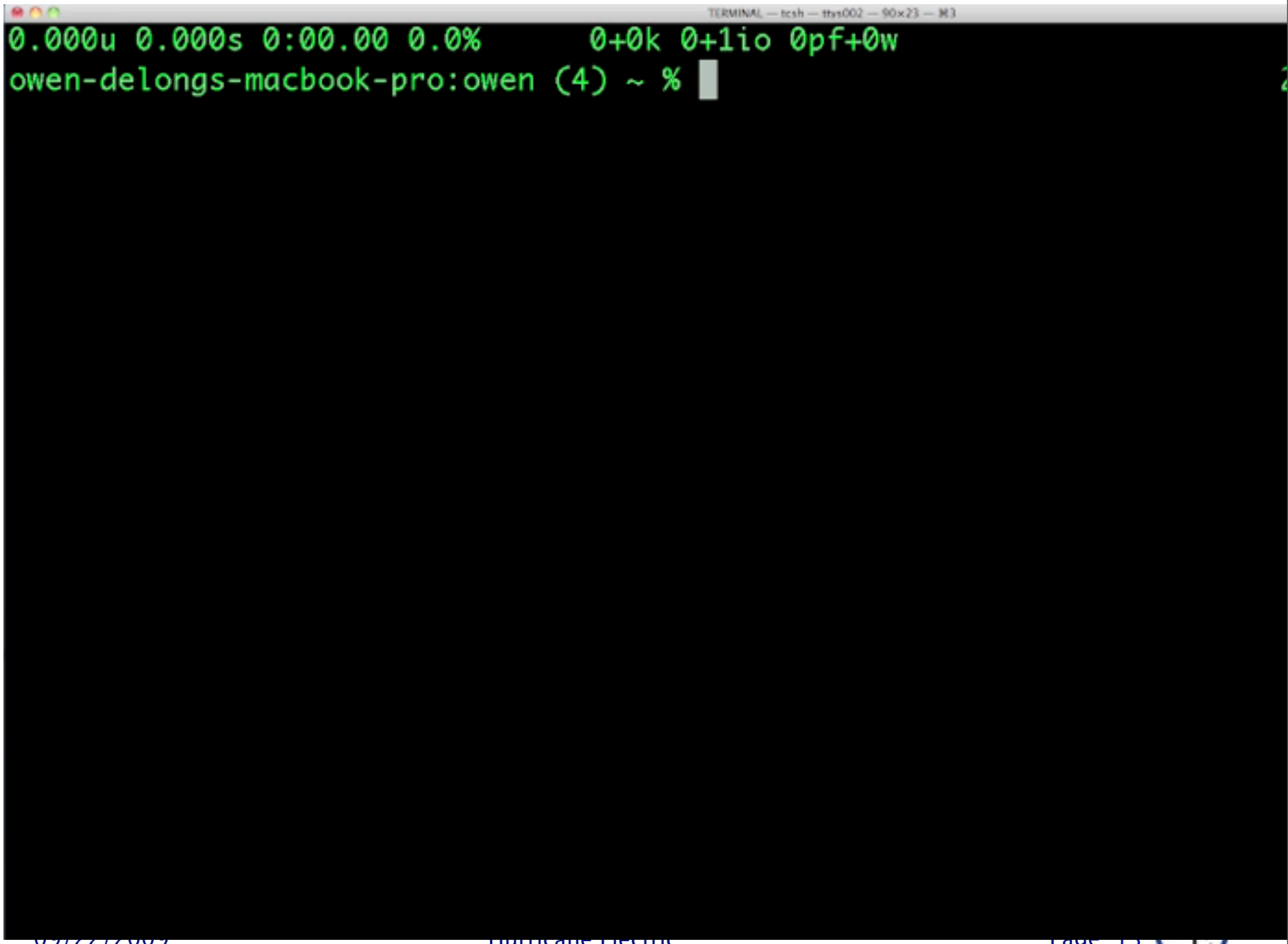
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The End

Copy of slides available at:
http://owend.corp.he.net/32bitasn.pdf

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