

AS Topology Visibility - You Can't Get There from Here

2010.04.14 / Tokyo BGP Research/Ops Workshop

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<<http://archive.psg.com/100414.tokyo-visibility.pdf>>

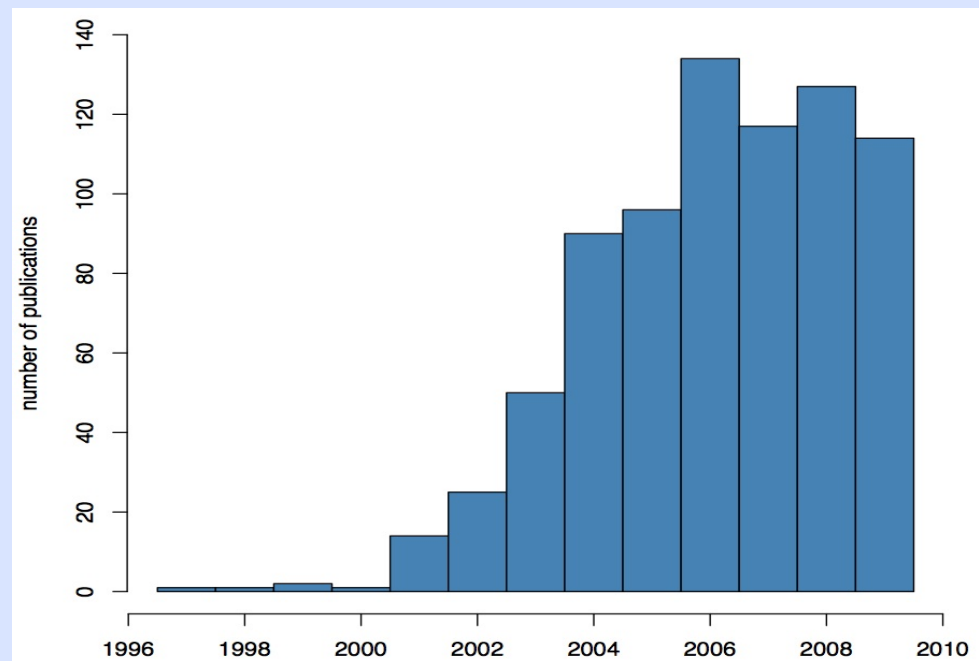
We Study *Visibility*

- What is the real routing graph of the Internet?
- What is the AS topology of BGP routing?
- How do we debug our network?
 - Are ping and traceroute the best we can do?
- How biased is our methodology?

RIPE-RIS & RouteViews

- RIPE RIS/RouteViews were designed for operators
- Researchers discovered them - most without consideration of limitations

Google Scholar search for papers mentioning the term "RouteViews"



Bogon Diagnosis Work

- R&D for ARIN to enable them to diagnose what ASs were filtering newly allocated address space. See 2007 SIGCOMM NetMgt Workshop.
- Though ARIN never deployed, we continued to measure to see how long it takes to get filters removed.
- Bored, we turned the tool to other use

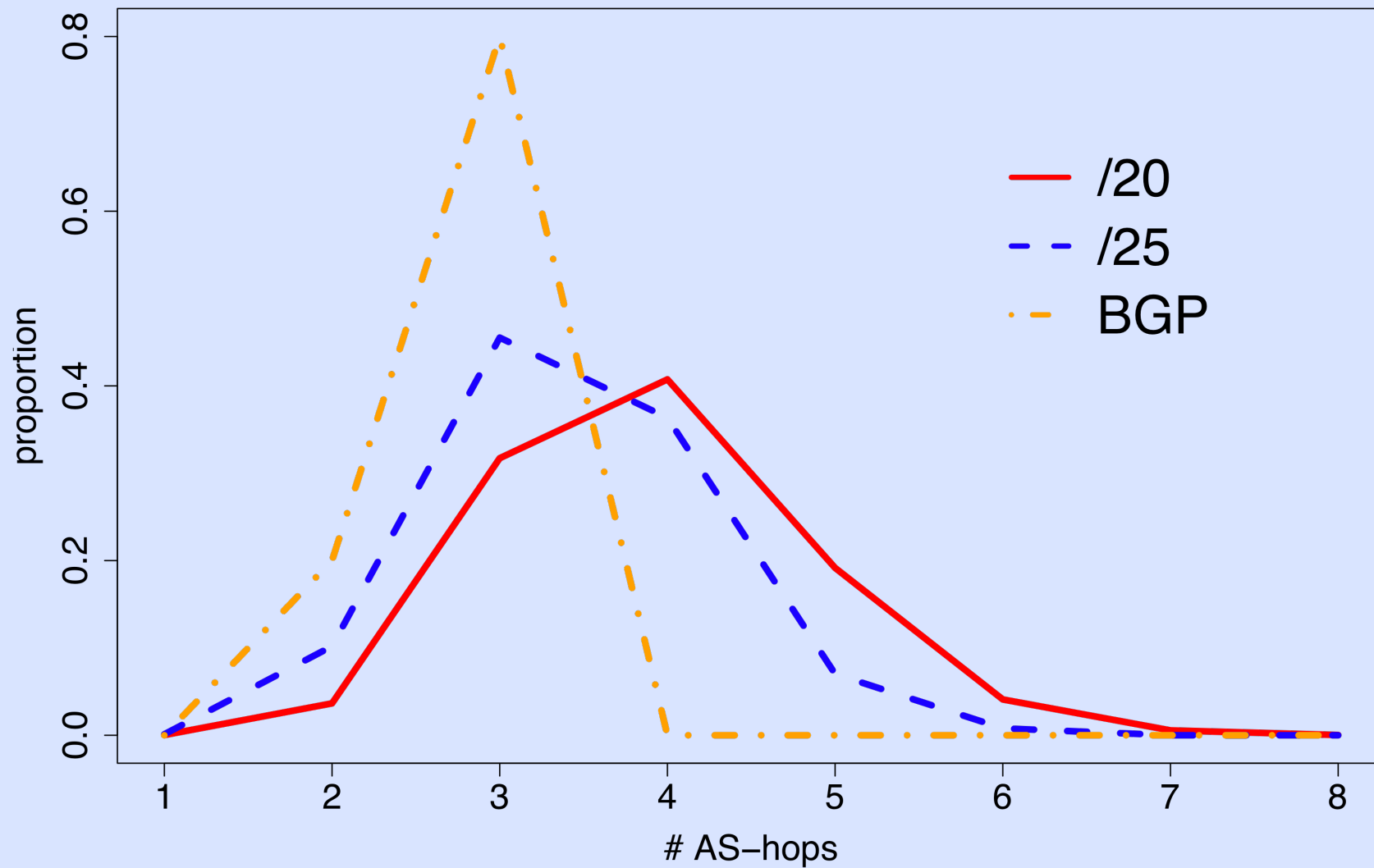
Announcing a /25

- We announced a /25 to NTT Global
- They passed it only to customers
- RV/RIS/... showed 15 ASs could see it

Whoops!

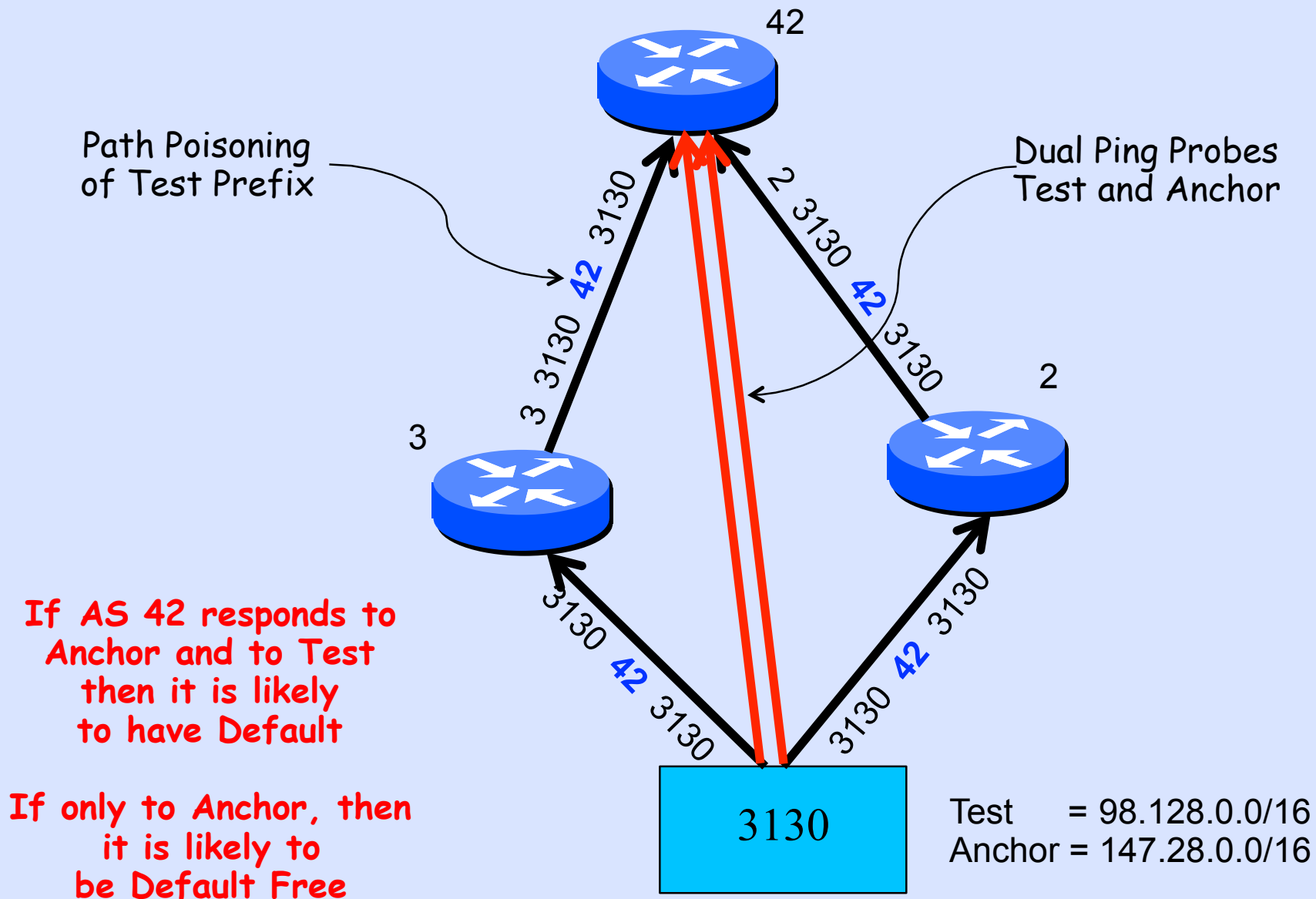
- We used ping from the /25 to 'all' ASs
- 1024 ASs could get packets back to the /25 source!
- So Route-Views and RIS were off by a FACTOR OF 60!
- And one was as good/bad as another, adding more views did not help.

/25 AS Hops

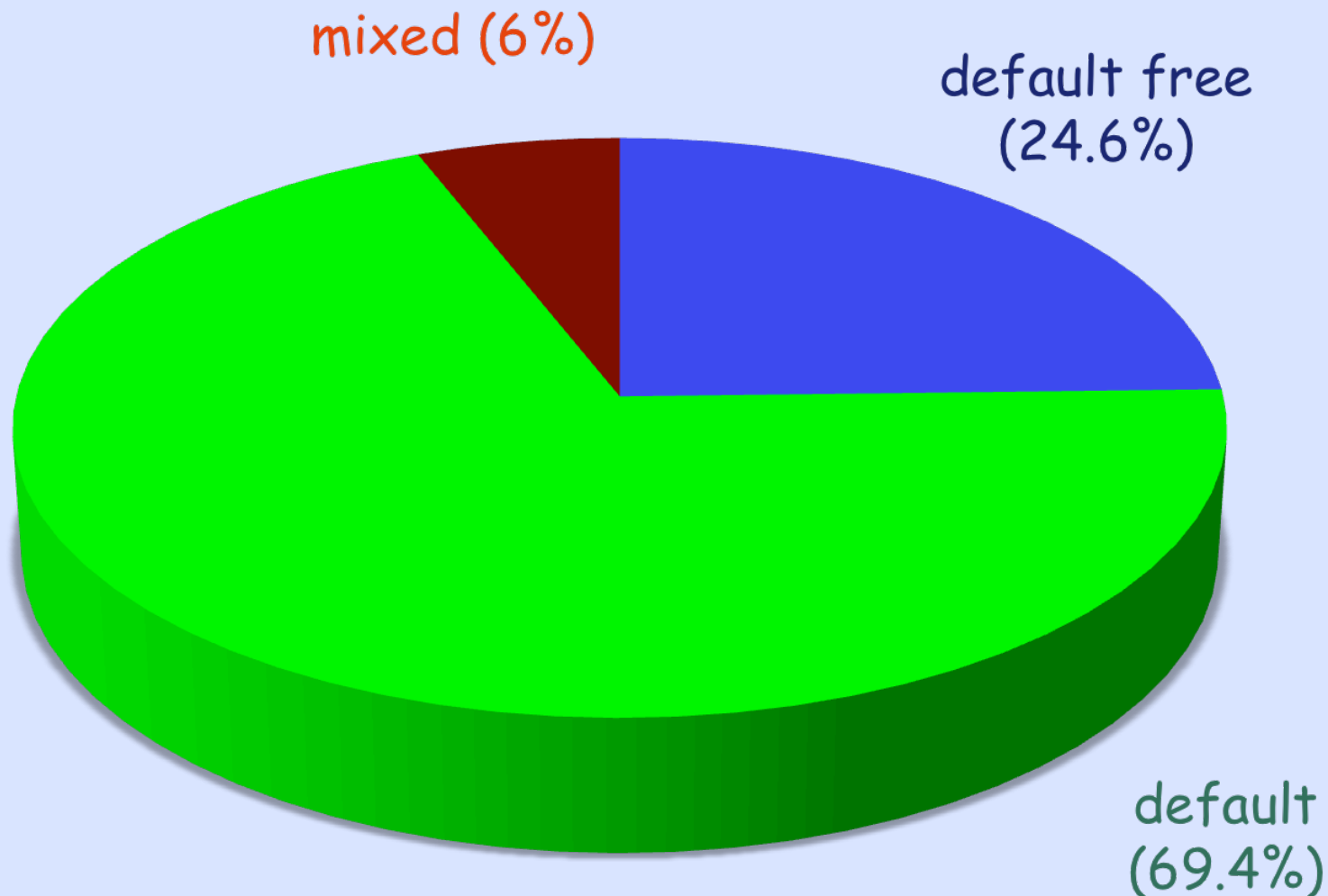


How Much of This
was Due to Default
as Opposed to Poor
BGP Visibility?

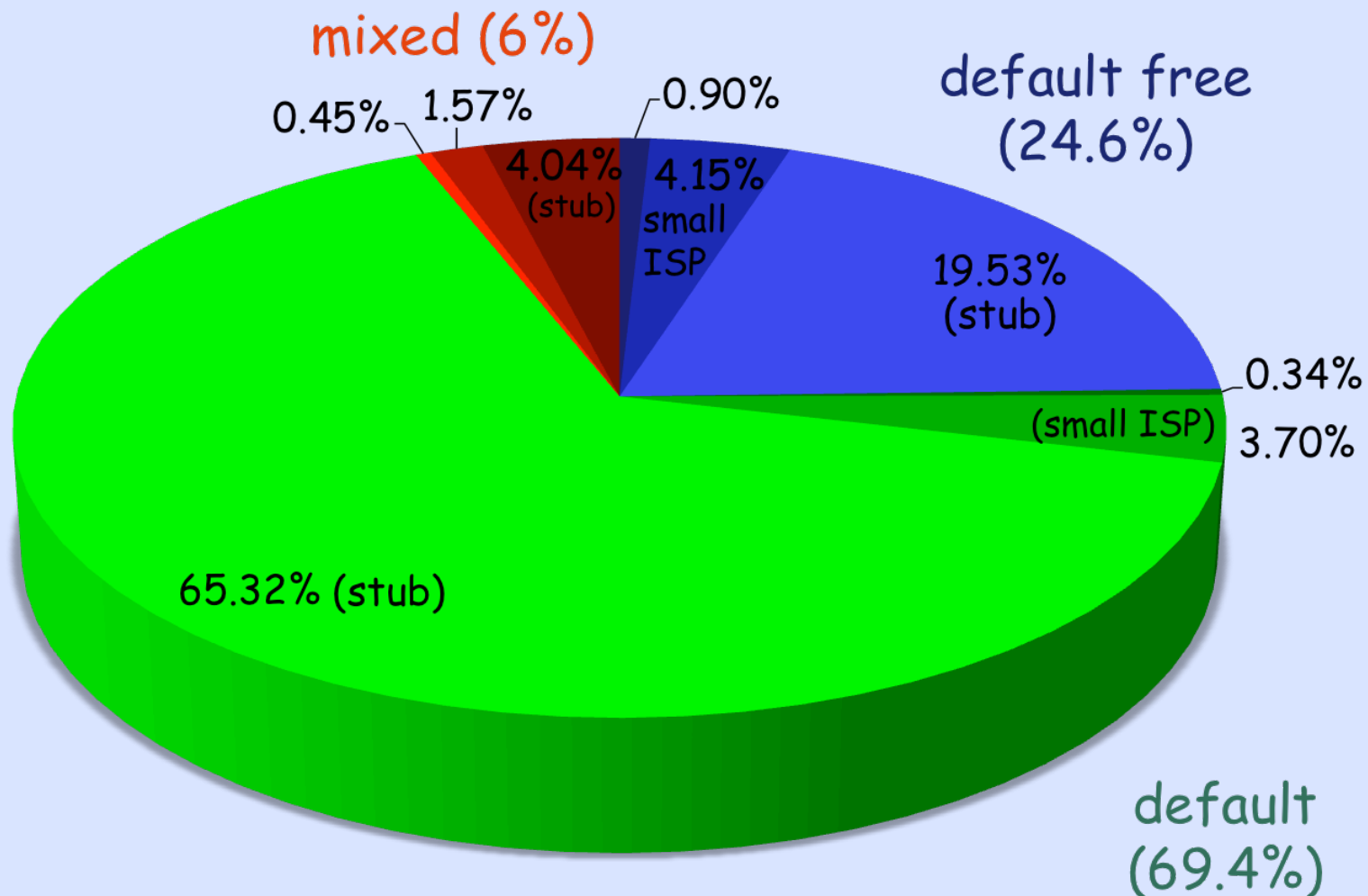
Default Detection



Use of Default toward /25



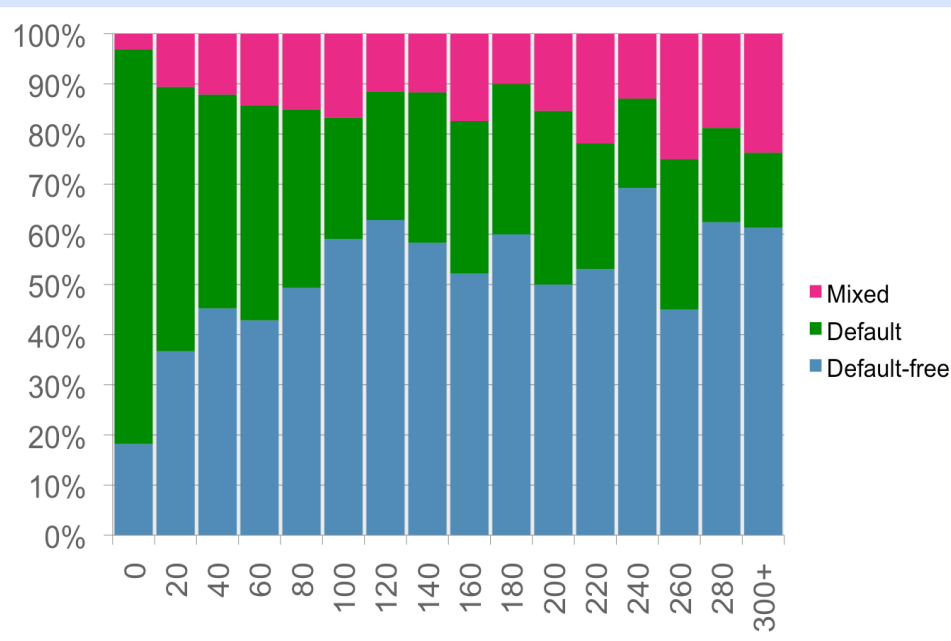
Defaults in /25-Experiment



Default Free Zone?
Not Really!

Testing Most ASes

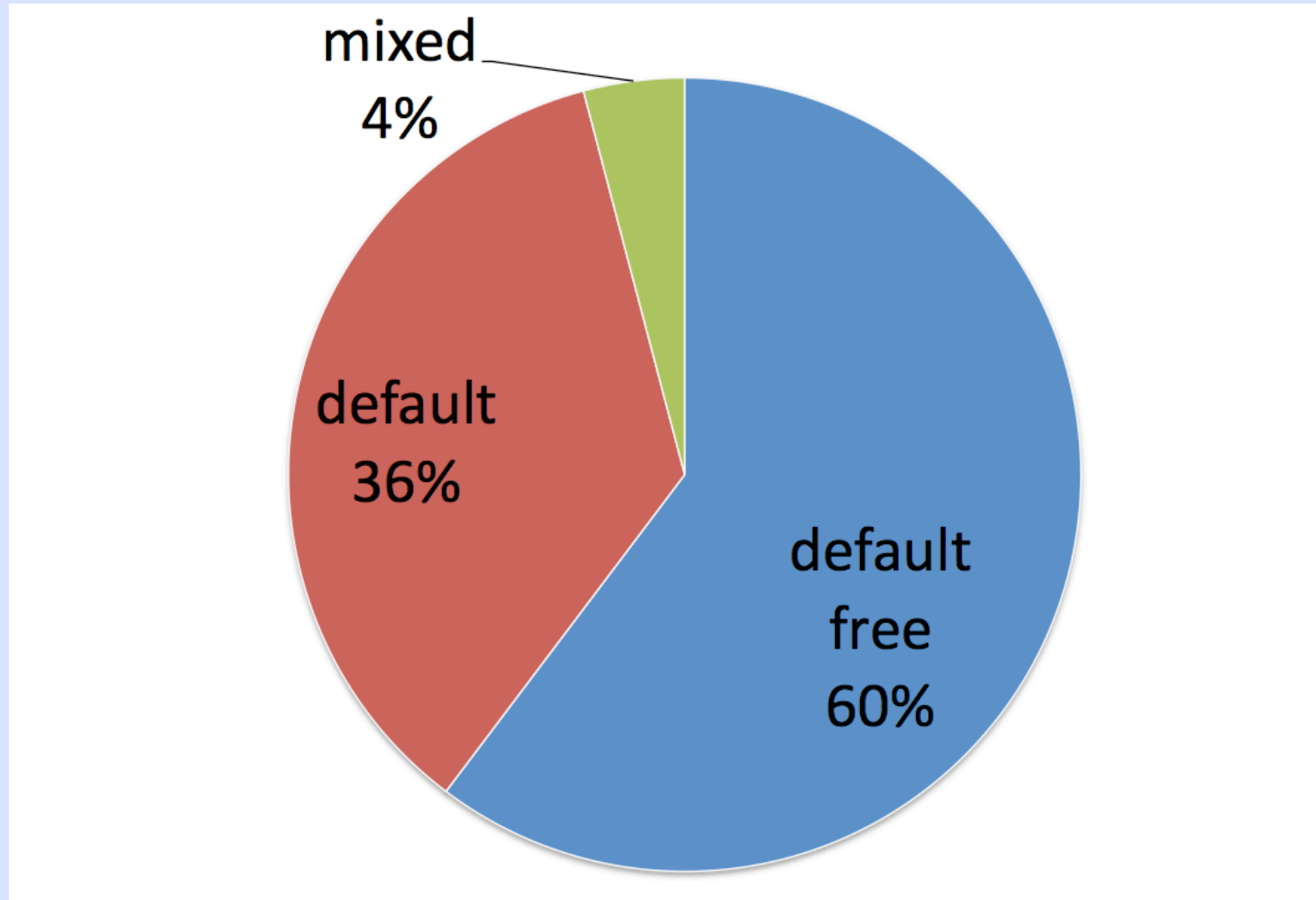
UCLA taxa	tested/total	default	default-free	mixed
stub	24,224/31,517	77.1%	19.3%	3.6%
small ISP	1,307/1,361	44.5%	42.2%	13.3%
large ISP	246/255	17.1%	60.6%	22.3%



Default routing use as a function of AS out-degree

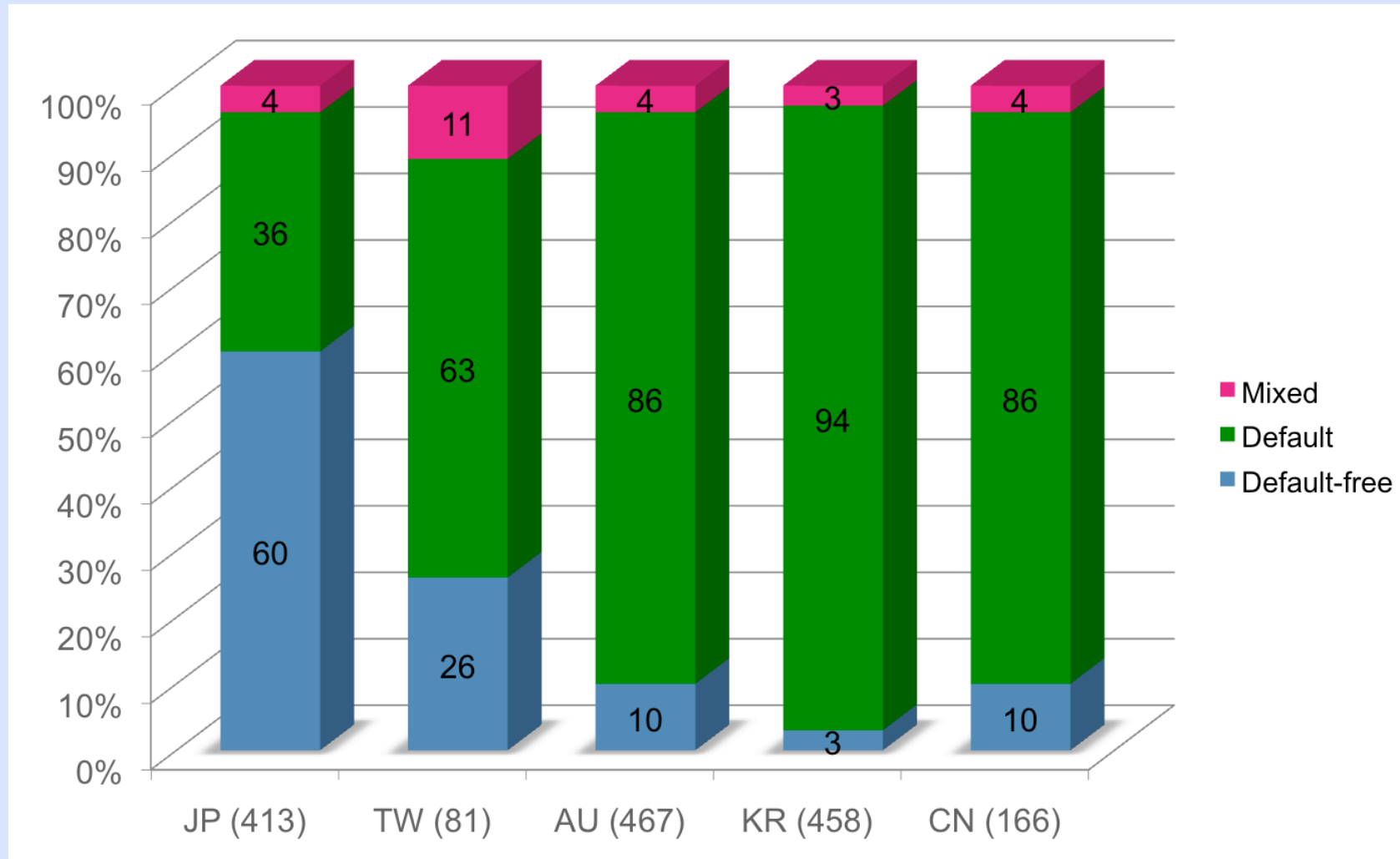
ASes with out-degree ≥ 300 are combined in the last value.

But Japan is Different



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Asia Varies Widely



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Validation – We Asked

- 216 operators answered,
- 172 (79.6%) said “correct”,
- 21 (9.7%) “almost” correct (e.g., correctly measured, but network is more complex),
- 10 (4.6%) believed we were right (did not recheck),
- 8 (3.7%) we measured wrongly (e.g., AS address space from different provider),
- 5 (2.3%) said we must be wrong 😊

R-Views / RIPE-RIS

- 1024 path-poisoned ASs could reach the test prefix
- Assume 70% used default
- The other 30%, or 307, had a path
- Only 15 of them showed up in RV/RIS
- RV/RIS was off by a factor of 20
- And that is a lower bound!

Our Glasses are Broken

- Looking in RV/RIS/... does not tell you if they can reach you
- Looking just in RV or RIS is as good (well bad) as hundreds of BGP feeds
- Researchers should be very wary of using RV/RIS data for many classes of analysis, e.g. AS topology, traffic
- Are Renesys-style presos bogus?

Work Supported By

- **Cisco**

*SUPPORTED IN PART BY A CISCO UNIVERSITY
RESEARCH PROJECT GIFT VIA KEIO UNIVERSITY*

- **Internet Initiative Japan**

- **Google, NTT, Equinix**