Use of Default in the 'DFZ'

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Randy Bush <randy@psg.com>

Olaf Maennel <olaf@maennel.net>

Matt Roughan <matthew.roughan@adelaide.edu.au>

Steve Uhlig <steve.uhlig@gmail.com>

<http://archive.psg.com/090615.nanog-default.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?

Bogon Diagnosis Work

- R&D for ARIN to enable them to diagnose what ASs were filtering newly allocated address space. See preso from NANOG 40 June 2007.

- Though ARIN never deployed, we continued to measure to see how long it takes to get filters removed.
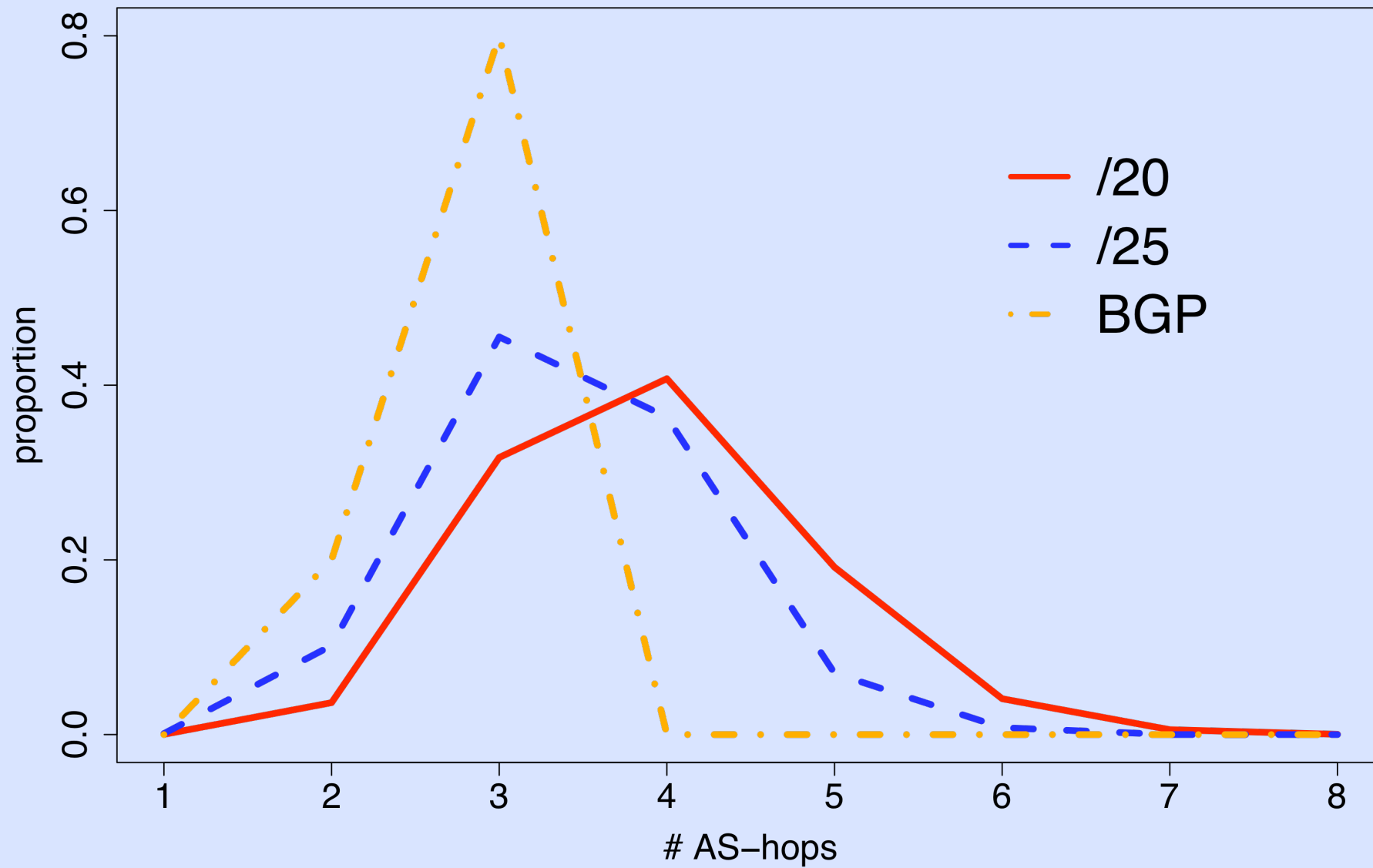
- Bored, we turned the tool to other use

An Example, a /25

- We announced a /25 to NTT

- They passed it only to customers

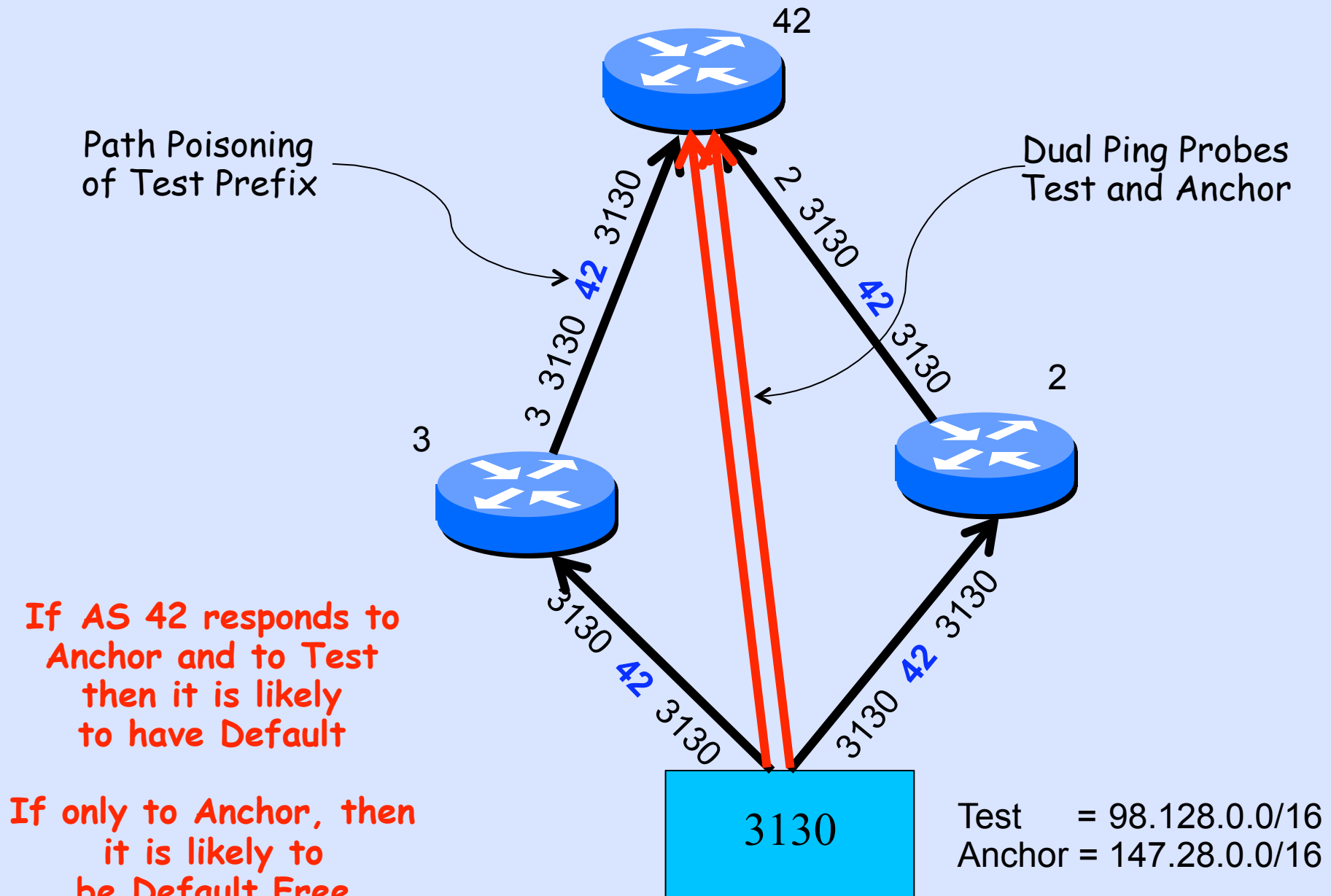- RV/RIS/… showed 15 ASs could see it

Whoops!

- We used ping from the /25 to 'all' ASs

- 1024 ASs could get packets back to us!

- They receive the BGP announcement and not show in Route Views / RIS?

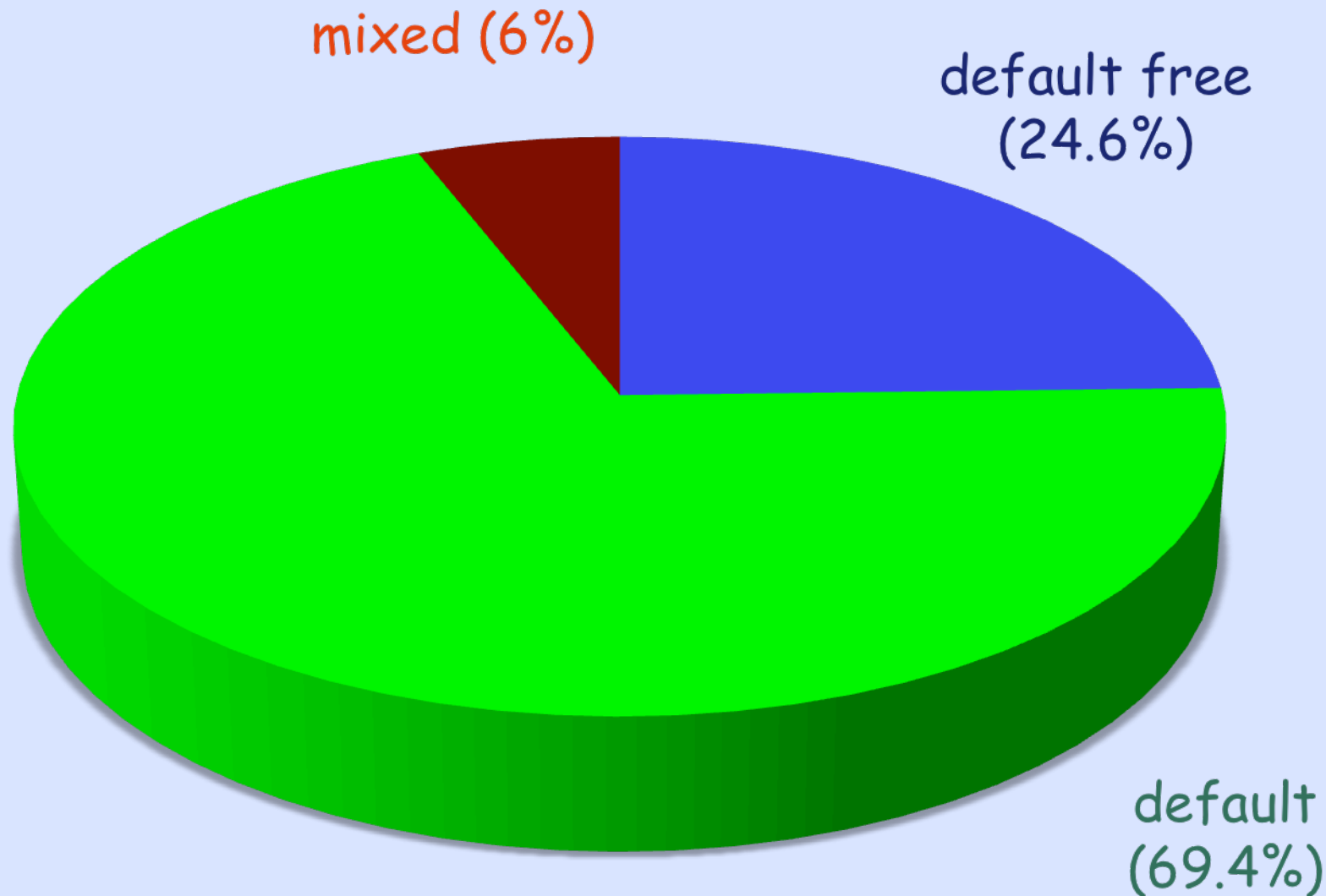- They default to someone who could see us?

/25 AS Hops

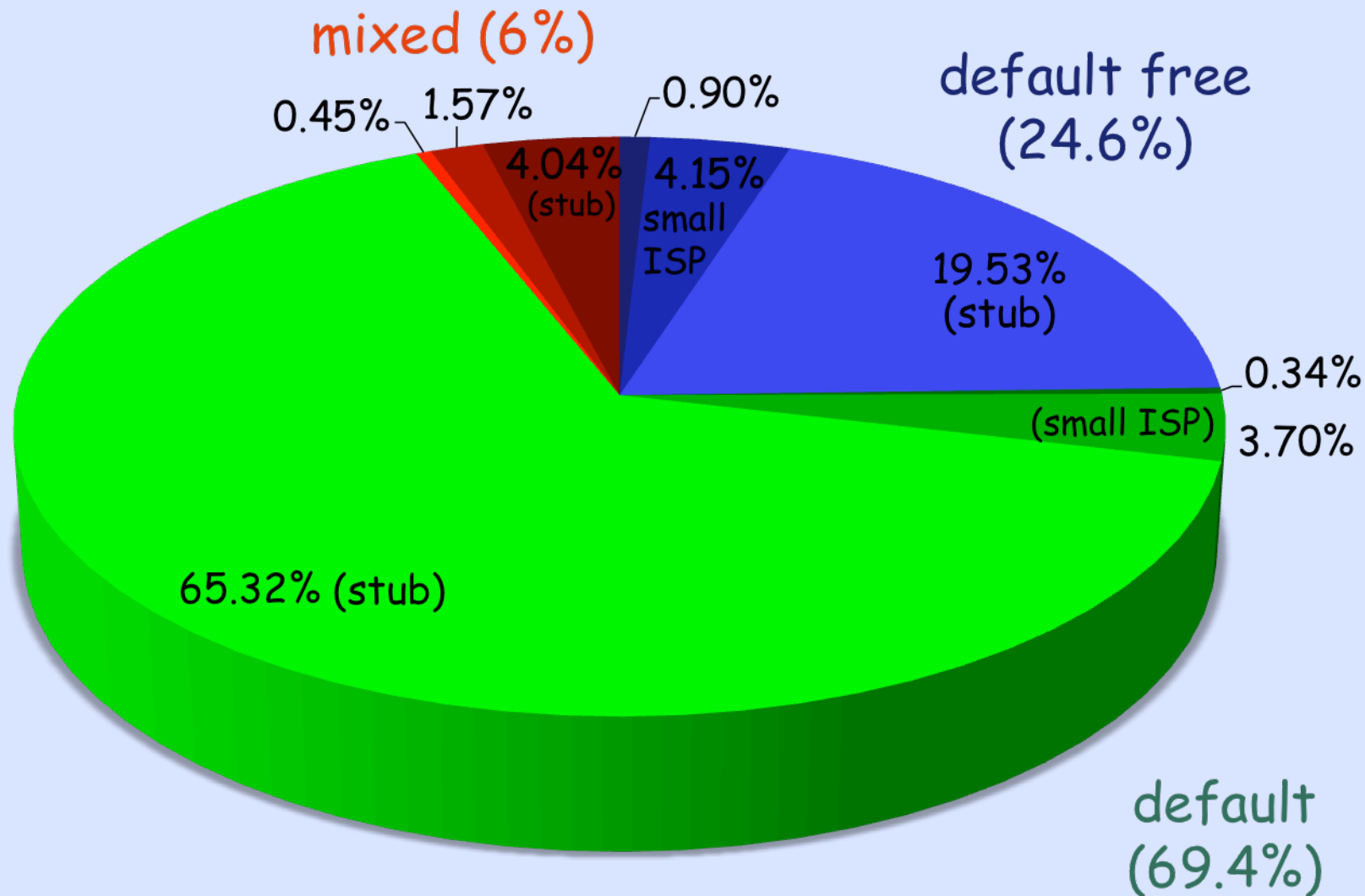# How Much of This was Due to Default as Opposed to Poor BGP Visibility?

Default Detection

Path Poisoning
of Test Prefix

Dual Ping Probes
Test and Anchor

42

2 3130

42 3130

3130 **42**

3 3130 **42**

3 3130

2

3

If AS 42 responds to
Anchor and to Test
then it is likely
to have Default

3130 **42** 3130

3130 **42** 3130

If only to Anchor, then
it is likely to
be Default Free

3130

Test   = 98.128.0.0/16
Anchor = 147.28.0.0/16

Defaults in /25-Experiment

mixed (6%)

default free (24.6%)

default (69.4%)

Defaults in /25-Experiment

mixed (6%)

0.45% 1.57%

0.90%

4.04% (stub)

4.15% small ISP

default free (24.6%)

19.53% (stub)

0.34% (small ISP)

3.70%

65.32% (stub)

default (69.4%)

Default Routing

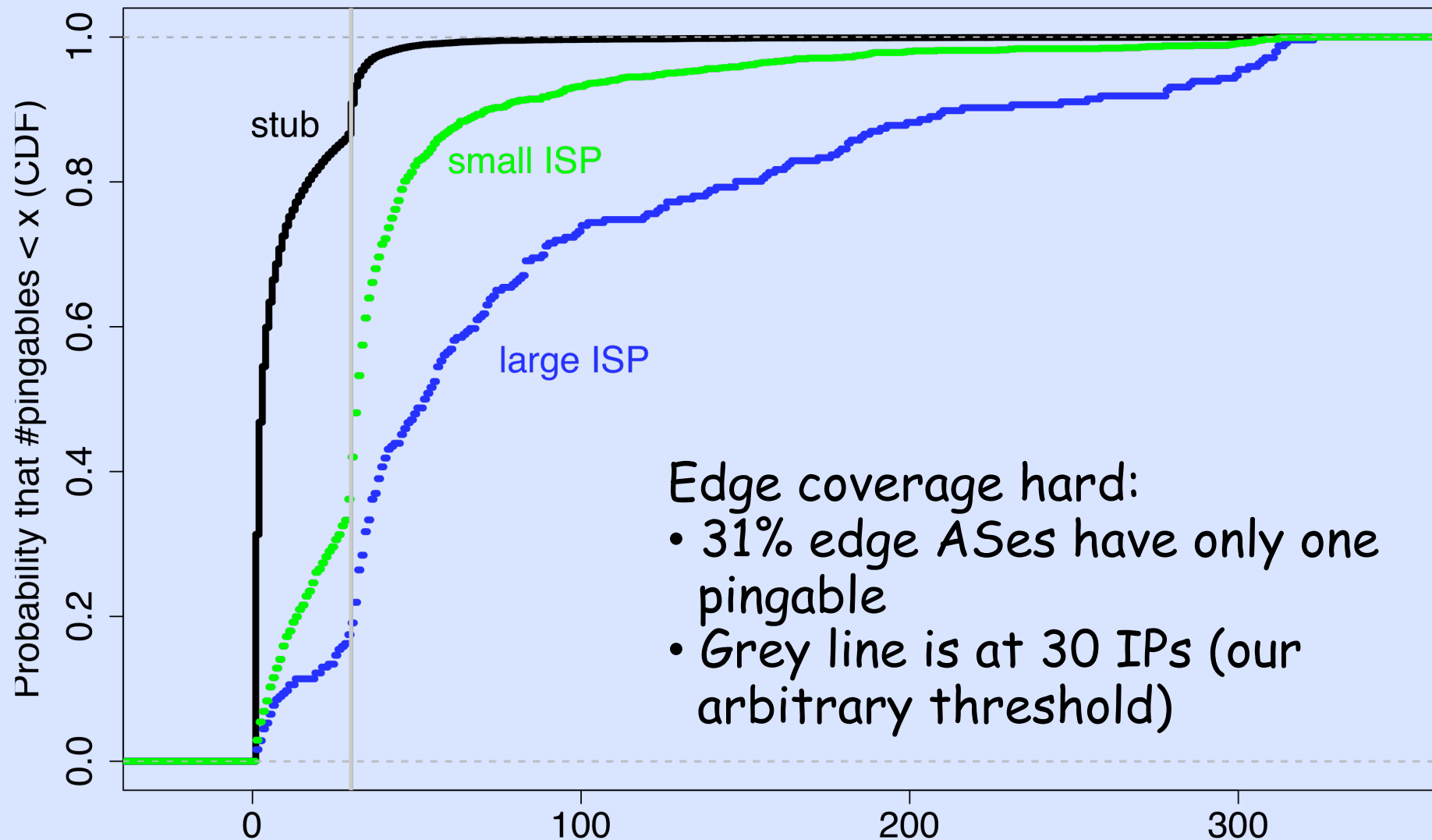|	tested/total	default	default-free	mixed
stub	24,224/31,517	77.1%	19.3%	3.6%
small ISP	1,307/1,361	44.5%	42.2%	13.3%
large ISP	246/255	17.1%	60.6%	22.3%
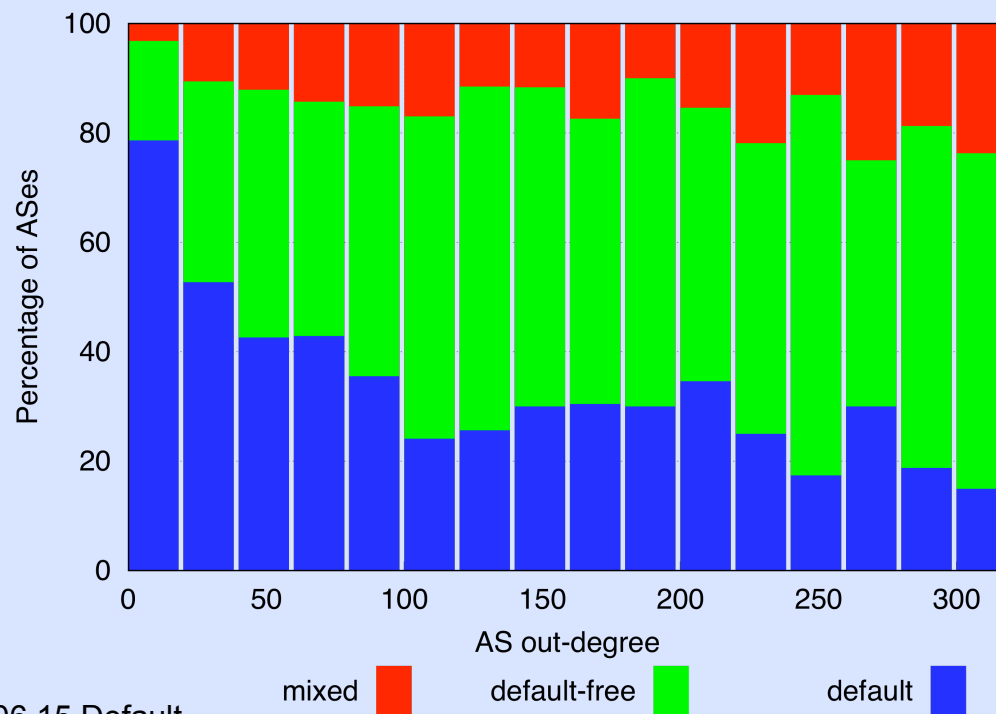
Breakdown of default routing use as a function of AS out-degree

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

Coverage and Issues

Coverage: **25,780 ASes**   154,683 prefixes

Edge coverage hard:
- 31% edge ASes have only one pingable
- Grey line is at 30 IPs (our arbitrary threshold)

Default Free Zone

my

<bleep>

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

- How can we improve our vision?

Please Validate!

http://psg.com/default/