ARIN & CAIDA IPv6 Survey

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IPv4 Exhaustion

- Problem
  - IANA will run out of IPv4 addresses sometime in the next 2~3 years
  - How do we accommodate continued growth?
- Solutions
  - IPv6 transition
    - Internet will transition from IPv4 based addresses to IPv6 based addresses.
  - IPv4 transfer
    - ISPs will buy/transfer address space from those who have to those who need.
  - NATs of NATs
    - Mutli-layer NATs will be used for internal growth.

Surveys

Ask the community what they are doing and thinking.

- March 2008 ARIN/CAIDA survey (done)
  - IPv6 transition only
  - ARIN region only
- Oct. ARIN/CAIDA/????? survey
  - IPv6 transition and IPv4 transfer
  - ARIN and others?

March 2008 Survey

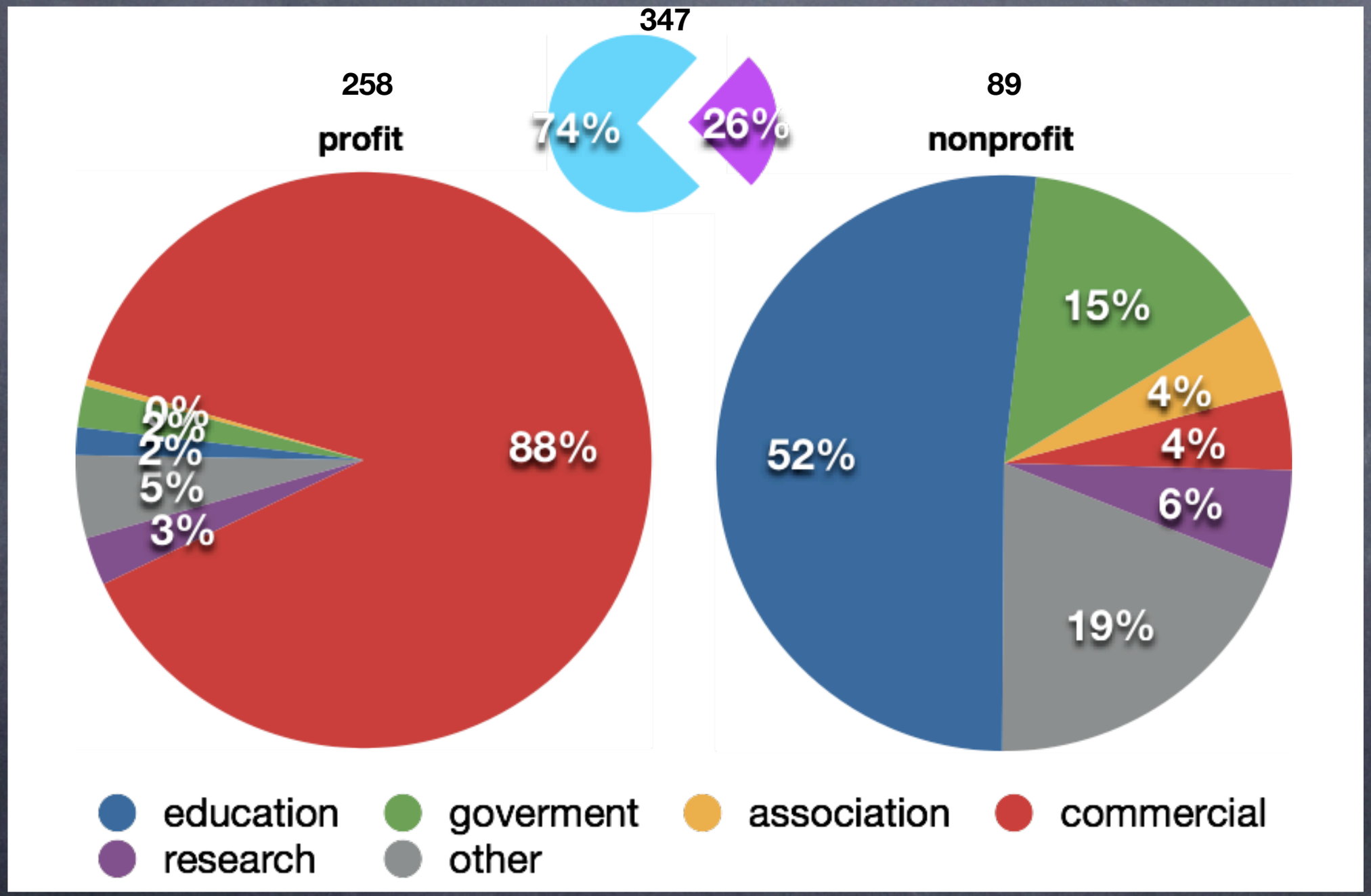
- Survey
  - overview
  - dates and goals
  - respondents
- Results
  - deployment
  - deployment breakdown
  - biggest hurdles to:
    - IPv6 deployment
    - IPv6 allocation

ARIN and CAIDA IPv6 Survey

- When:
  - We conducted the survey between March 10 and March 24 2008.
- Goals:
  - To capture IPv6 penetration data in the ARIN Region
    - (Canada, portions of the Caribbean, and the US)
    - to capture community input (inc. non members)

March 2008 Survey
survey:http://www.caida.org/publications/presentations/2008/arin_survey/arin_survey_qs.pdf

Who Responded (cont.)



March 2008 Survey
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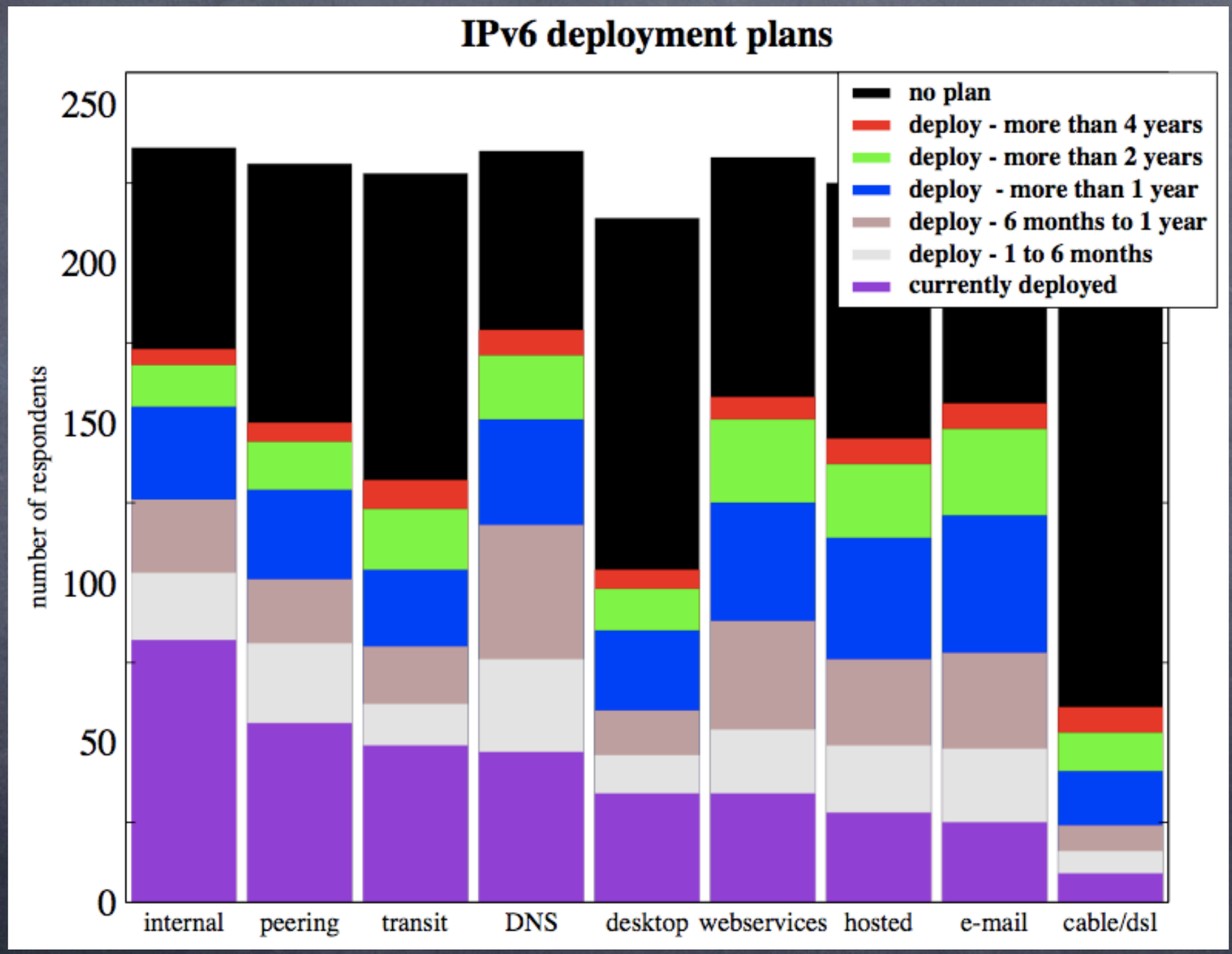
IPv6 Deployment Plans



March 2008 Survey

survey:http://www.caida.org/publications/presentations/2008/arin_survey/arin_survey_qs.pdf

Survey Categories

- Profit vs Non-profit
- Company size (employees)
  - small 1 - 100
  - medium 101 - 1,000
  - large 1001 - 10,000
  - x-large > 10,001
- ISP vs End-user

March 2008 Survey
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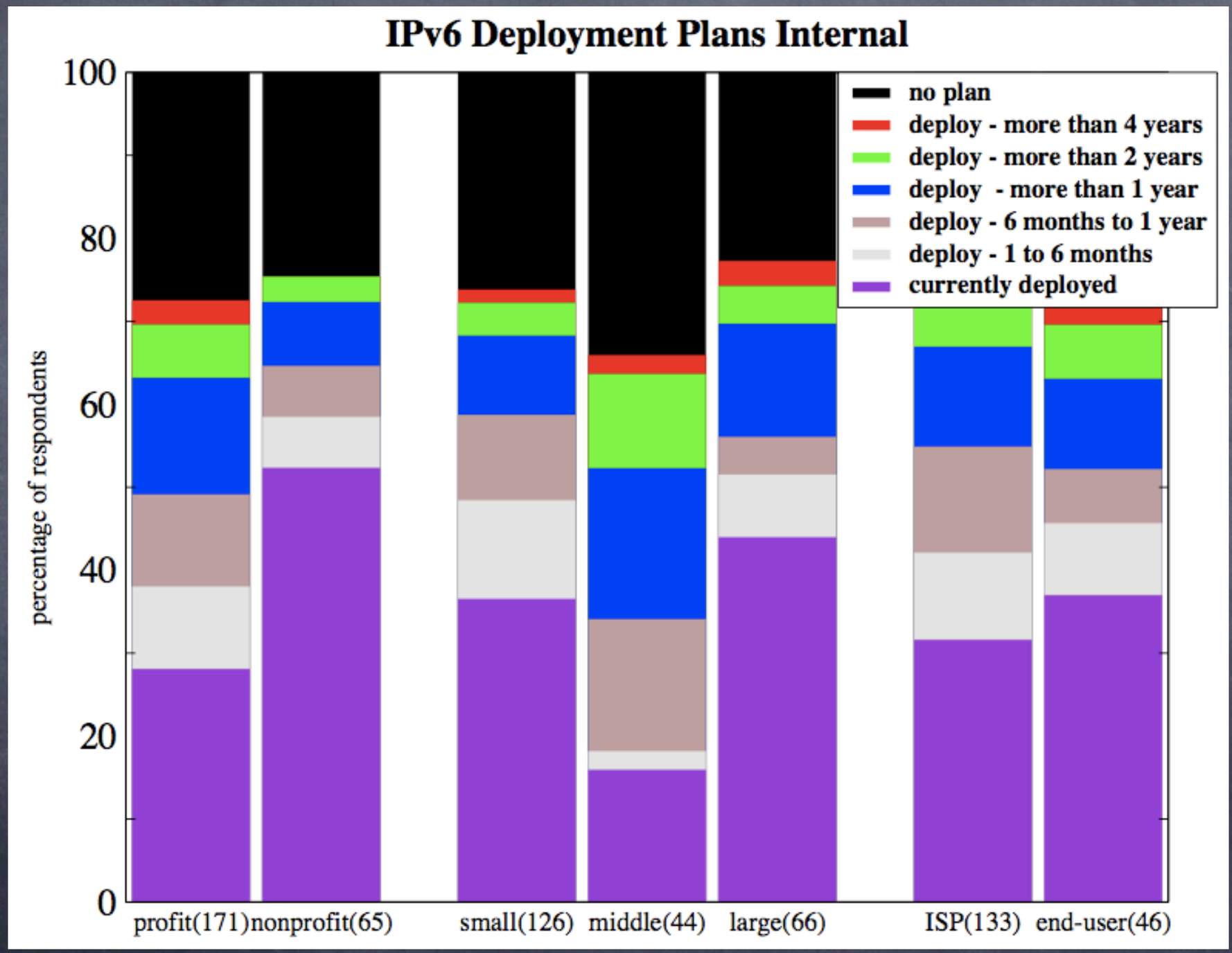
Internal IPv6 Deployment



March 2008 Survey

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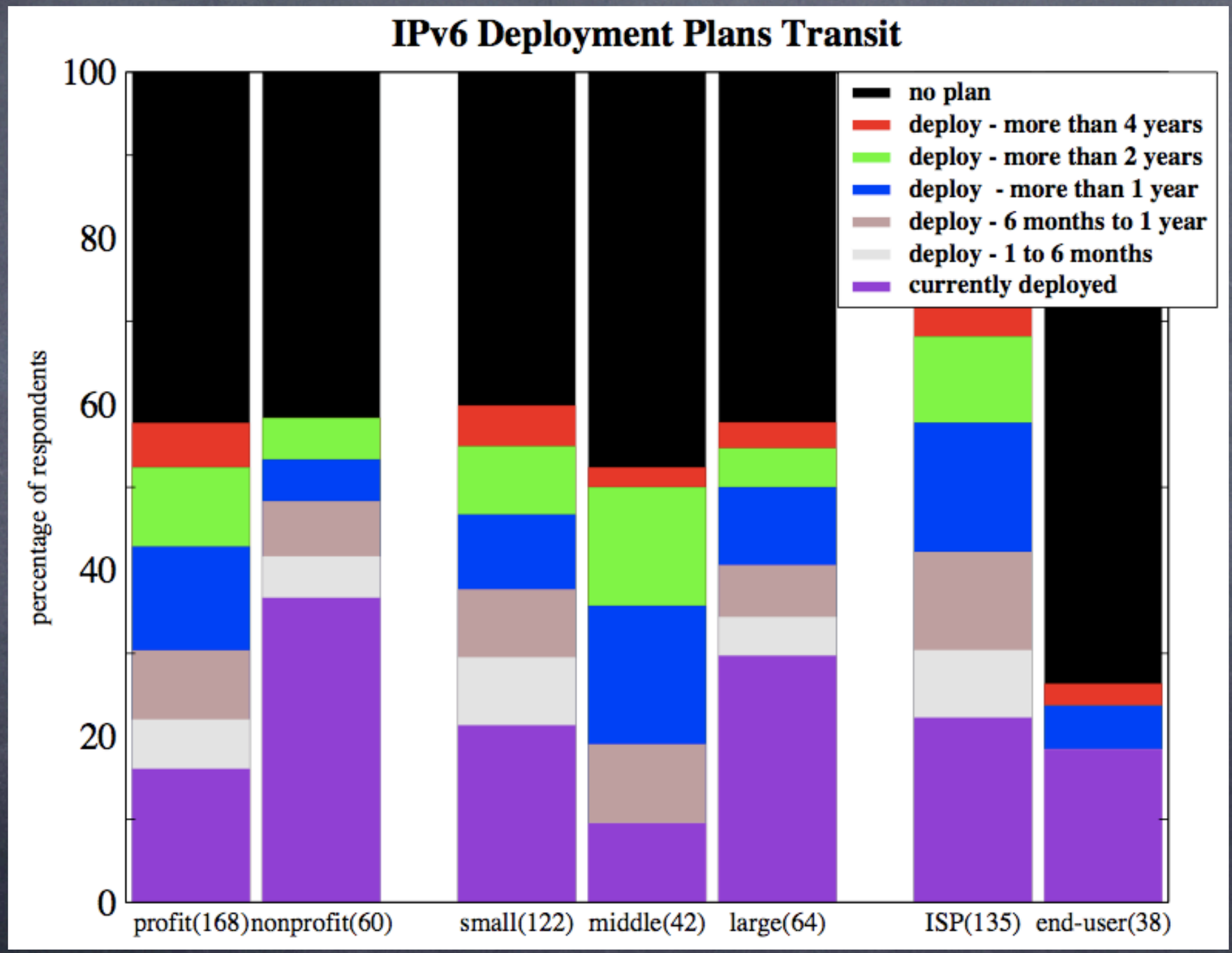
Transit IPv6 Deployment



March 2008 Survey

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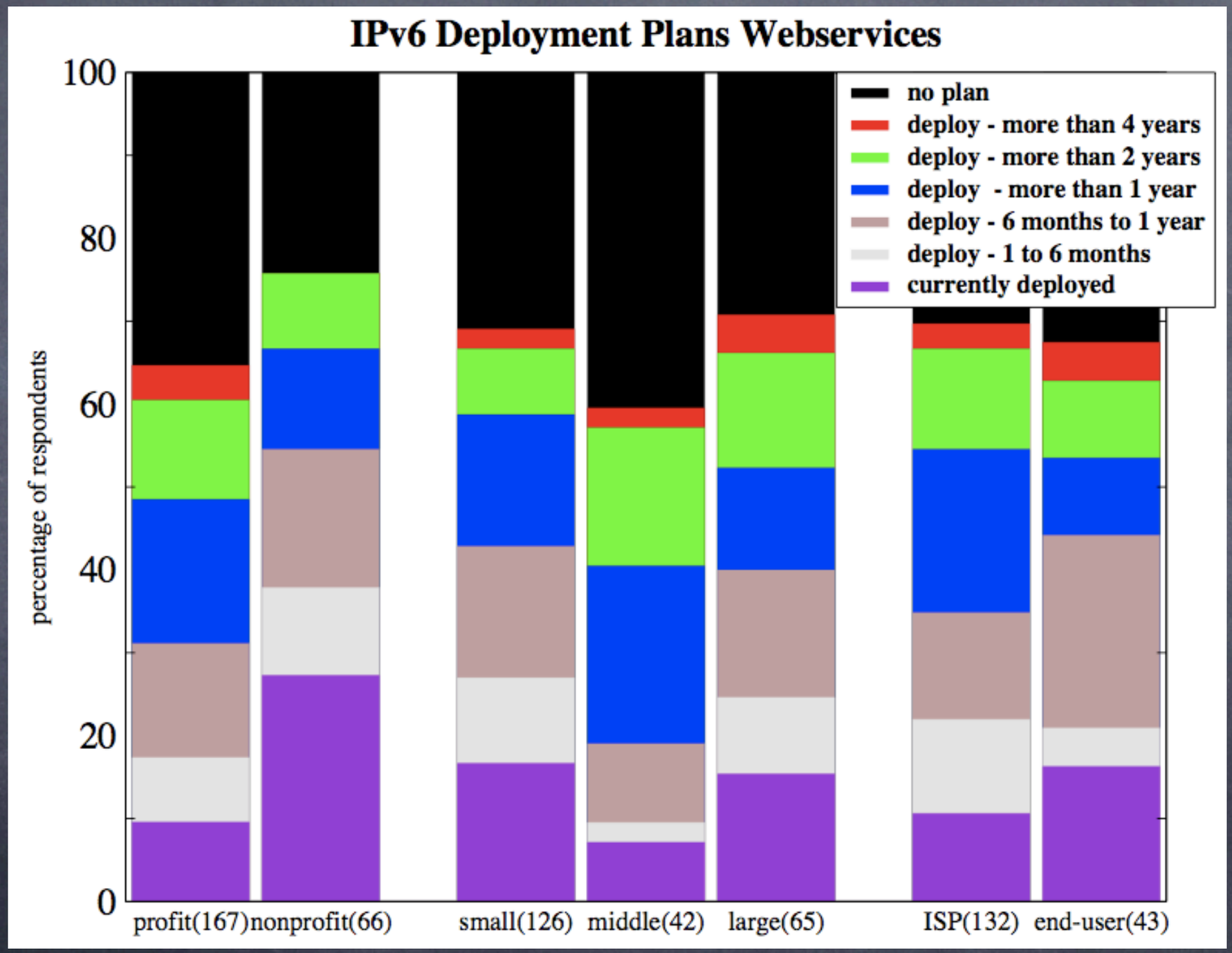
Web IPv6 Deployment



March 2008 Survey

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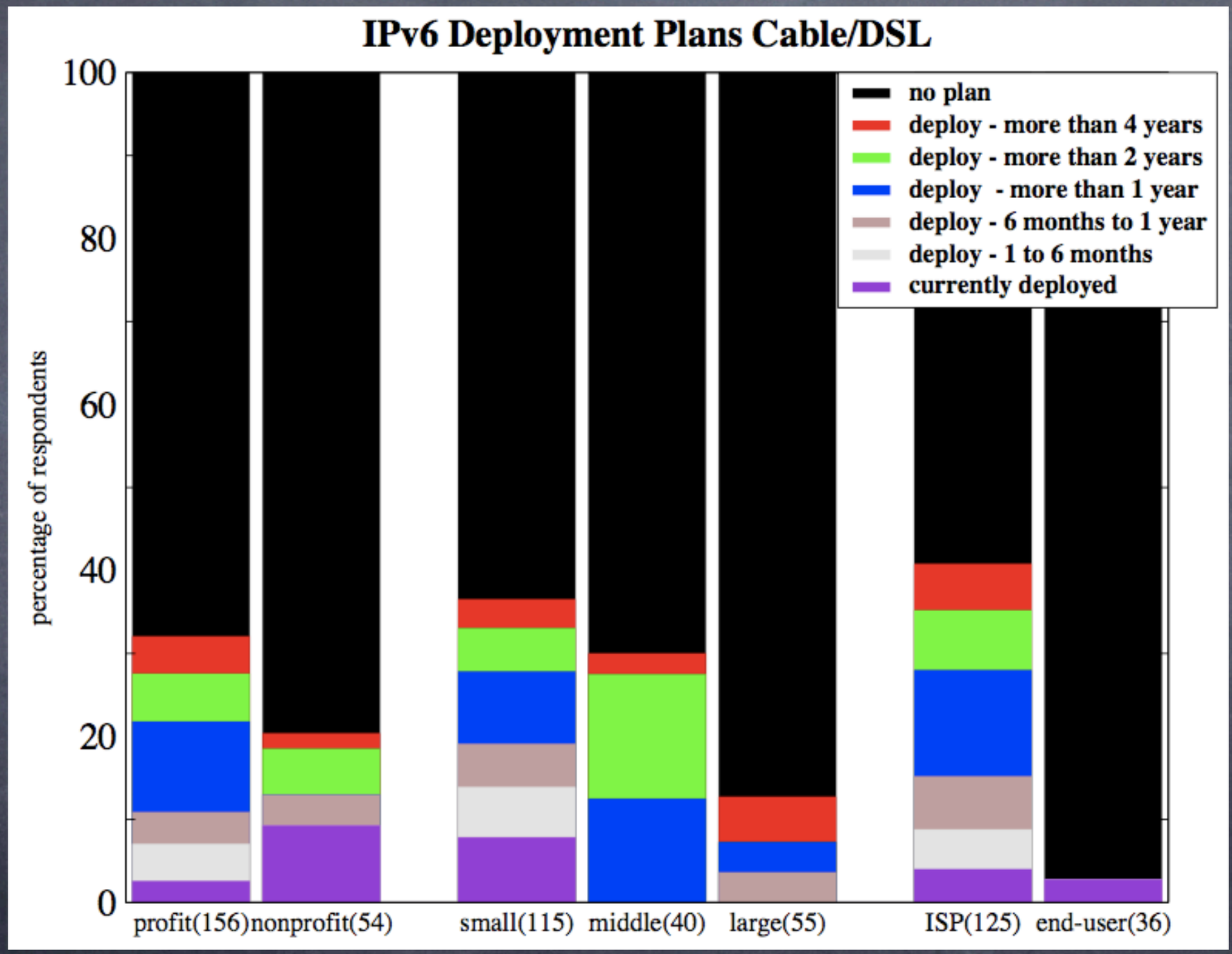
DSL/Cable IPv6 Deployment



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Biggest Hurdles to IPv6 Deployment

ARIN
American Registry for Internet Numbers

caida
www.caida.org

Biggest hurdles	# of responses	% of responses
Cost, time, business case	79	36.41%
Vendor support, back-office	51	23.50%
Knowledge, education	40	18.43%
User demand	39	17.97%
Upstream transit	38	17.51%
Dual-stack Interoperability	31	14.29%
Multihoming	9	4.15%
Allocation Policy	5	2.30%
Performance	4	1.84%

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Biggest Hurdles to IPv6 Allocation

	Response Percent	Response Count
Have not gotten around to it yet	45.2%	103
Our infrastructure does not support it	32.5%	74
Do not see the need	30.7%	70
ISP does not support v6	22.4%	51
Cannot afford the expense	16.7%	38
Cannot meet the requirements	8.3%	19
Other	20.2%	46
		228

March 2008 Survey
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Next Survey

- Goals:
  - Capture IPv6 penetration
  - Capture thoughts on IPv4 transfer
- New Survey Sections
  - Self Classification
  - Current Allocations/Assignments
  - Current Deployment
  - Plans

March 2008 Survey
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Self Classification

- organization type
  - education / government / association / commercial / R&D
- financial structure
  - profit / nonprofit
- services (multiple)
  - transit / content / eyeballs
- size (employees)
  - < 100 / < 1,000 / < 10,000 / < 100,000
- operational regions (multiple)
  - city / state:province / single country / North America / South America / Europe / Africa / Asia / Oceania

Current Allocations/Assignments

- source(s) of allocations/assignments (multiple)
  - AFRINIC / ARIN / APNIC / LACNIC / RIPE / IANA
- current allocations/assignment (multiple)
  - IPv4 / IPv6
- motivation for getting IPv6 (multiple)
  - Customer demand / problem getting IPv4 / be “ahead of game” / test IPv6 product support / government mandate
- reasons for not getting IPv6 (multiple)
  - upgrade cost / no transit provider support / time / no infrastructure support / understanding(meeting) requirements / security concerns / lack of IPv6 content
- has been(will be) largest hurdle for IPv6
  - dual support / cost / vendor support / legacy network / legacy application /transit provider / end users / multi-home / IPv6 expertise
- reason for turning off IPv6
  - technical problems / user demand / budget issues

Current Deployment

- Do you have IPv6?
  - yes / no
- IPv6 setup
  - dual-stack / separate infrastructure
- IPv6 external connectivity
  - Native IPv6 / tunneled IPv6 / NAT
- relative size of IPv4 vs IPv6
  - IPv6 << IPv4 / IPv6 < IPv4 / IPv6 =~ IPv4 / IPv6 > IPv4 / IPv6 >> IPv4
- how does IPv6 profile differ from IPv4 (workload, application types, etc)

Future Plans

- current plan for IPv4 exhaustion
  - wait and see / IPv4 market / NAT / transition to IPv6

IPv6	now	1~6m	6m~1y	1~2y	2~4y	4y~
Internal network						
peering						
transit						
DNS service						
desktop/end user						
hosting services						
email						
cable/DSL modems						

IPv4 Transfer

- Are you in favor of IPv6 transfer?
  - yes/no
- What is your primary reason for support
  - cost of IPv6 / lack of faith in IPv6
- greatest reason for concern (allow ranking?/ high/ middle/low)
  - windfall profits / transfer poor -> rich / speculation / pricing / router table growth / slows IPv6 / obtaining IPv4 / government interference
- How much address space do you expect to need next year?
- If you can’t get it, how much would it cost you?

IPv4 transfer proposals

	ARIN	RIPE NCC	APNIC
trigger for starting	Last IANA block allocated	none	none
Relationship to RIR	seller/buyer reside in ARIN territory	RIPE/IANA IPv4 to RIPE member	APNIC/IANA IPv4 address to APNIC member
eligiblity	any ARIN member	LIR only, no end user	any APNIC member
time restrictions	no selling for 2 years after buying	no selling for 2 years after buying	no selling for 2 years afer buying
need assessment	buyer shows need	none	none
fees	transfer fee + normal fees	normal fees	transfer fee + normal fees
aggregation	/24 minimum*	/21 minimum	/24 minimum

IPv4 Transfer

- how long should address be held before they can be sold.
  - 6 months / 12 months / 18 months / 24 months
- RIR control transfer block deaggregation to ensure supply of smaller blocks
  - yes/no
- holder deaggregation rights
  - limited / full to /22 / no deaggregation
- limit frequency of requests to protect against deaggregations?
  - yes/no
- preferred RIR proposal
  - haven't read / ARIN / APNIC / RIPE / none / against all
- why do you prefer a given proposal

Suggestions?