

A Comparison of Public Policy Approaches to the IPv4-IPv6 Transition

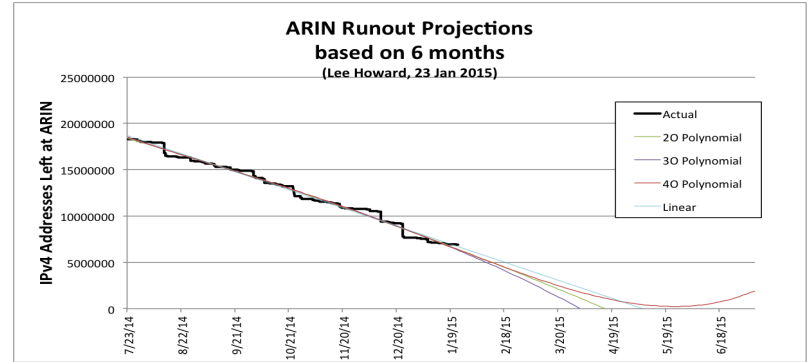
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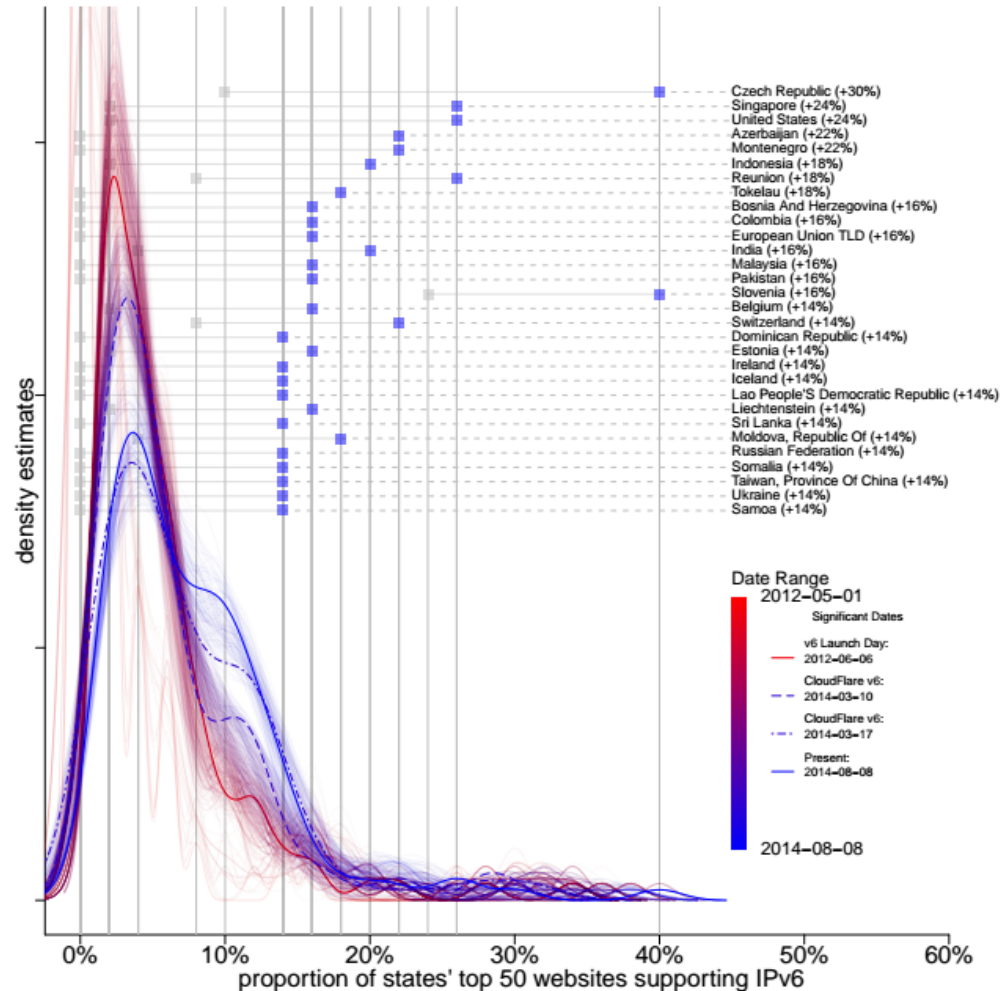
IPv4 Runout as a Public Policy Issue

- IPv4 is status quo
- IPv4 costs will rise
 - TCO of CGN
 - IPv4 market
- IPv6 may be costly, hurried, islandy
 - Costs: Equipment, Knowledge, Prioritization
 - Hurried: error prone
- Coordination needed to maximize network effect



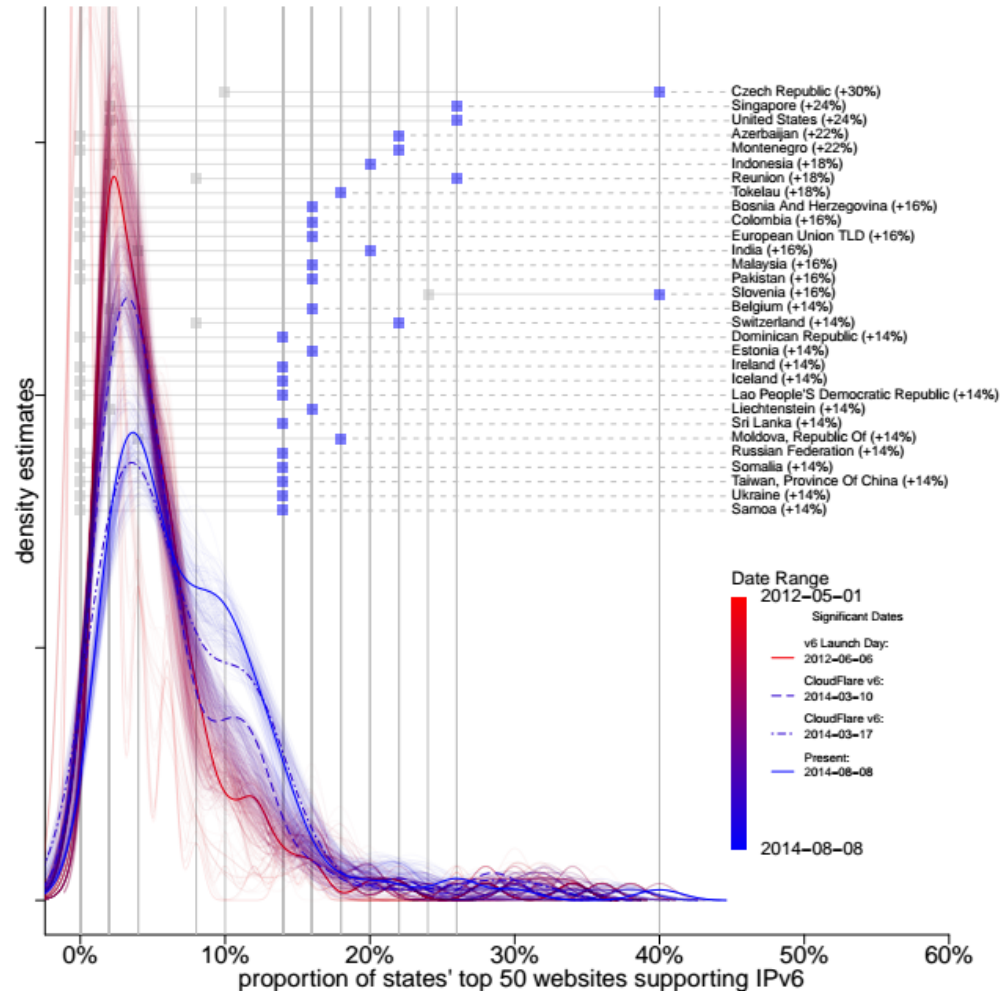
IPv6 Deployment

- Each line is a date
- greater area under the curve for a given range = more countries in that range
- White space shows significant jumps in deployment
 - 2012 World IPv6 Launch
 - 2014 CloudFlare enables many



IPv6 Incentives

1. Government public policy efforts
2. Hybrid public-private
3. Charismatic IPv6 policy entrepreneurs within the firm and epistemic community



Government Public Policy Efforts

1. Government public policy efforts
 - a. Providing government services over IPv6
 - b. Incent private industry to support IPv6
 - c. Provide funding for private industry
2. Hybrid public-private
3. Private Institutions and Operational Epistemic Communities

Countries with High Web Adoption of IPv6

	Policy Type	Small Group	Single Company	Web%	Web Rank
Czech Republic	1a	y		34	1
Slovenia		y		30	2
United States	1a	y		28	3
Norway				26	4
Singapore	1a, 1b, 1c			22	6
Montenegro			y	22	6
Columbia			y	22	6
Hong Kong			y	20	9

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Countries with High ISP Adoption of IPv6

	Policy Type	Small Group	Single Company	ISP%	ISP Rank
Belgium	1b	y		30.4	1
United States	1a	y		14.5	2
Germany		y		13.16	3
Luxembourg			y	11.6	4
Peru			y	11.1	5
Norway			y	10.2	6
Switzerland			y	9.7	7
Czech Republic	1a		y	7.9	8
Japan		y		6.2	12
Singapore	1a, 1b, 1c			2.6	18
Slovenia		y		0.9	26
Bolivia				0.84	28
Costa Rica				0.02	84

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Hybrid Public-Private Incentives

- A. Government as legitimating convener
- B. RIR as policy entrepreneur

The Engineer/C-level gap

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Private Institutions and Operational Epistemic Communities

1. Government public policy efforts
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 - a. Individual firms' internal incentives
 - b. Operational epistemic communities
 - c. Policy entrepreneurs



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United States	1a, 3a, 3b, 3c	y		14.5	2
Germany	3a	y		13.16	3
Luxembourg	3a		y	11.6	4
Peru	2b, 3a		y	11.1	5
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Summary

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3. Charismatic IPv6 policy entrepreneurs within the firm and epistemic community
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Conclusions

Governments desiring to foster IPv6 should:

- a. Require IPv6 for government web sites and vendors
- b. Coordinate with industry representatives to leverage operational knowledge and capacity
- c. Review data retention and privacy laws and CGN

Countries with high deployment tend to have:

- 1. One or more large operators deploying
- 2. Strong operational epistemic communities
- 3. A charismatic IPv6 policy entrepreneur