



The Routing Aggregation Policy

A Failed Social Experiment
at the LINX

Nigel Titley

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What is LINX

- London Internet Exchange
- One of largest IXPs in the world
- 205 members
- 90Gb peak traffic
- 7 locations in London
- Ethernet based
- Founded in 1994

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Social Responsibility

- LINX founders had a sense of social responsibility
 - Routing policy must be registered in a “public routing registry”
 - Routes should be “aggregated as far as possible”
- Warm and fuzzy
- Not very enforceable

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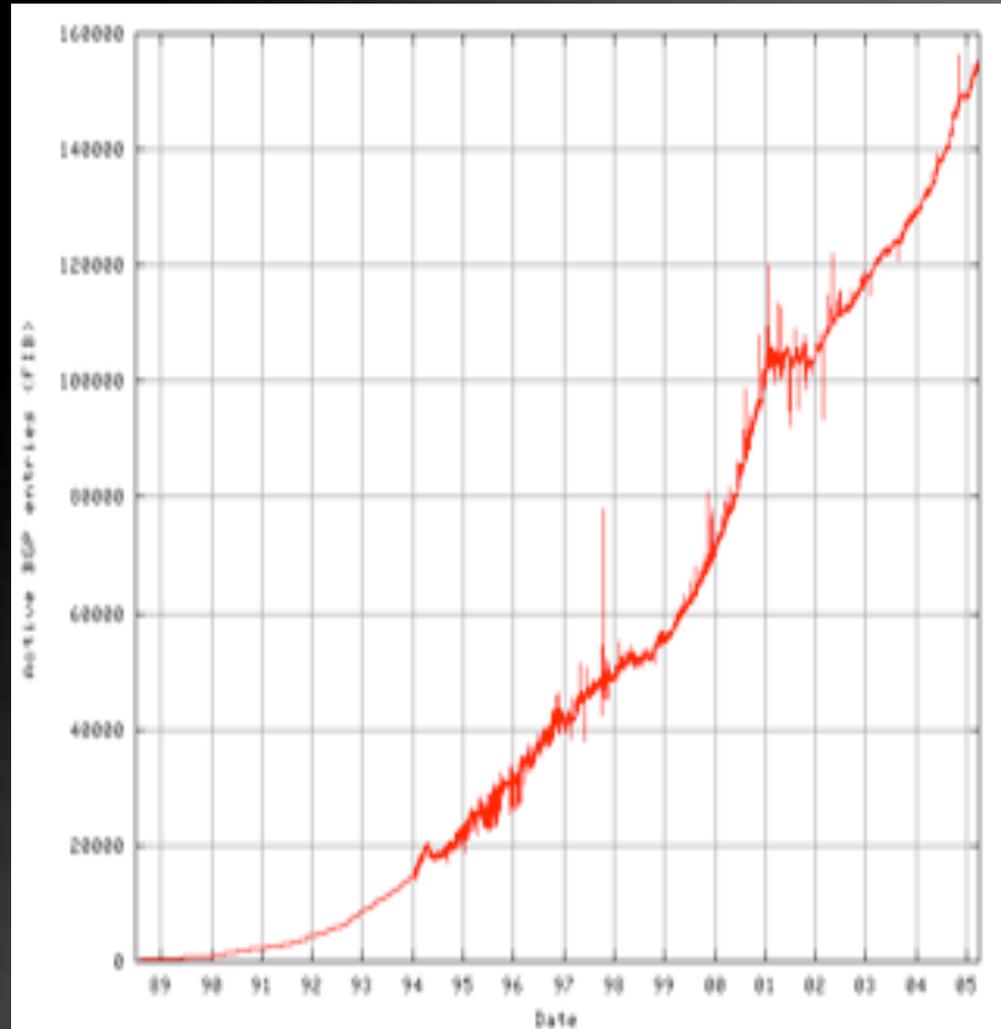
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The CIDR report

- Produced every week
- Issued to NANOG list (and others)
 - <http://www.cidr-report.org>
- Shows the extent of the problem



01-Jul-1988 to 30-Mar-
2005

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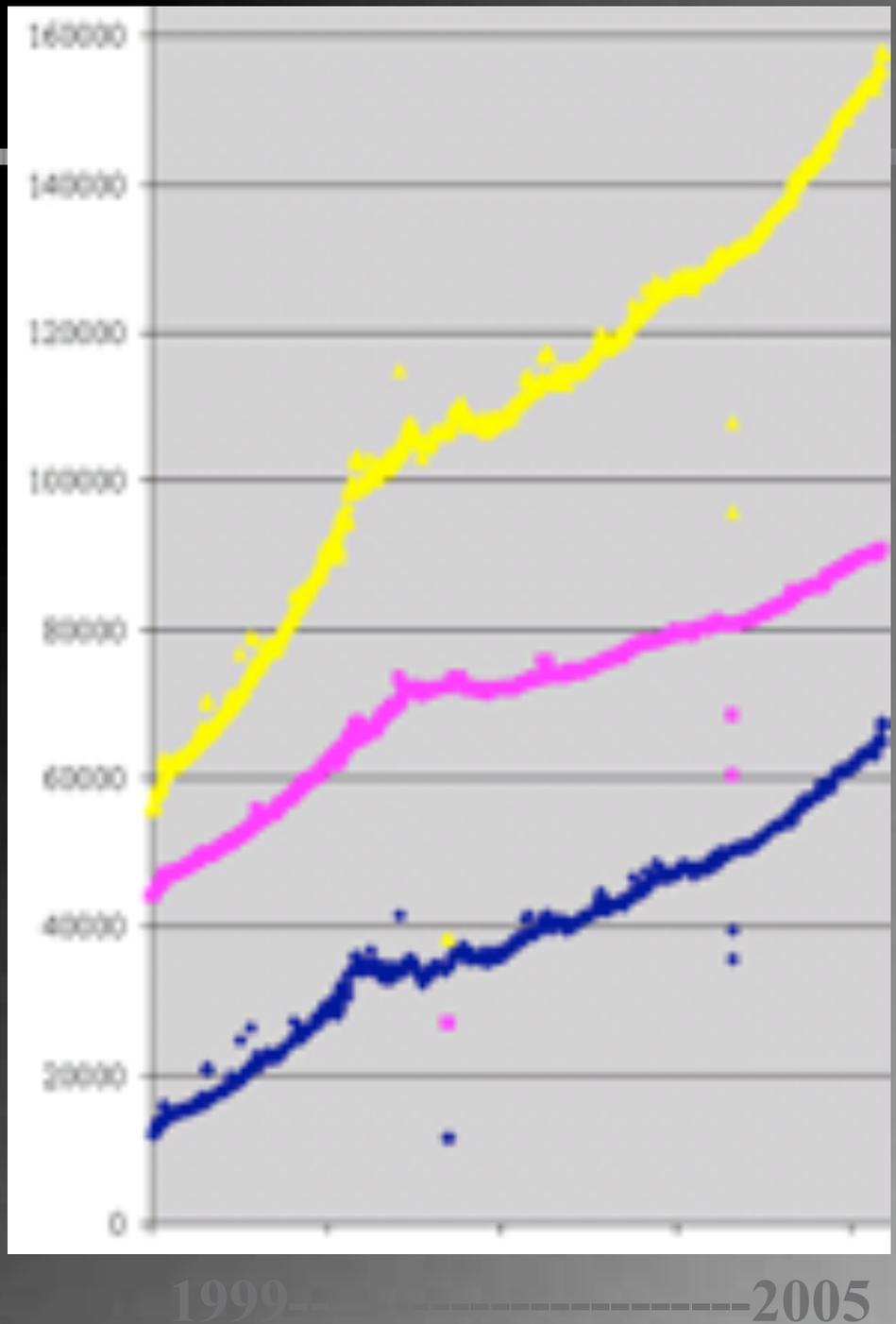
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More data

Graph shows:

- Total observed prefixes
- Total prefixes if all routes were fully aggregated
- Proportion that is due to deaggregation

Source:
Philp Smith



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Enforcement

- LINX48 passed a resolution to adopt a mandatory, enforceable, route aggregation policy
 - Fairly close vote (19 votes for, 17 votes against)
 - Council charged with coming up with an algorithm and a means of enforcement.

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Proposed Rules

- Announced blocks should be less than $(N * 2) + 3$
- Where N is the number of fully aggregated blocks
- Proposed to reduce this slightly to $(N * 1.5) + 3$ in 2006

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What happened next?

- Wrote script to identify erring members
- Used CIDR list and 2x metric to identify members who needed to take action
- Allow a reasonable amount of time for such action
 - Start discussions with members
- Noted that provision needed to be made for transient/emergency situations
- Review at LINX quarterly meetings
 - 'Name & Shame'

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Progress

- Substantial improvements (Dec'04):
 - UPC moved from 8th to 63rd on the list
 - Limelight moved from 23rd to the bottom
 - COLT, Entanet, Rednet, Solnet, Netservices all moved to 0%
 - So, things could be changed!
- Private contact, from members who exceeded the '2x' metric, indicated that they did plan to fix it.

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Discussion with Large ISPs

- Further discussions:
 - *In terms of large blocks of IP addresses we felt that this would be an acceptable reason to de-aggregate address space.*
 - *Specifically we decided that anything shorter than a /15 may be reduced to multiple /16 blocks.*

Other possible influences

- Make good route aggregation a requirement in transit contracts
 - Put together a LINX BCP, and perhaps some standardised wording, for inclusion in transit purchase contracts
- Make good route aggregation a peering agreement requirement
- If ISPs used these approaches, there would be much less need for compulsion through (IXP) rules

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Other bodies with influence

- Euro-IX gave LINX a platform at a Forum to explain what was going on
 - It was discussed and there is a collective understanding of the issue
 - Some IXPs agreed to take it back home to their own organisation for consideration
- RIPE50
- APRICOT'06

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RIPE statement

RIPE document ripe-345 states:

- *Routing decisions for blocks of address space are the sole responsibility of network operators. However, network operators taking routing decisions based on prefix length are requested and encouraged to route at least blocks of sizes corresponding to the "smallest allocation" and larger.*

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What happened then

- Many members improved their aggregation
- Many members were not aware of how badly they were aggregated
- However:
 - Member backlash (mainly from large, badly aggregated non-UK members)

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The Failure

- LINX 50 threw out the mandatory aggregation policy
- Converted it to a BCP instead
- The Experiment was in one sense a failure

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The Success

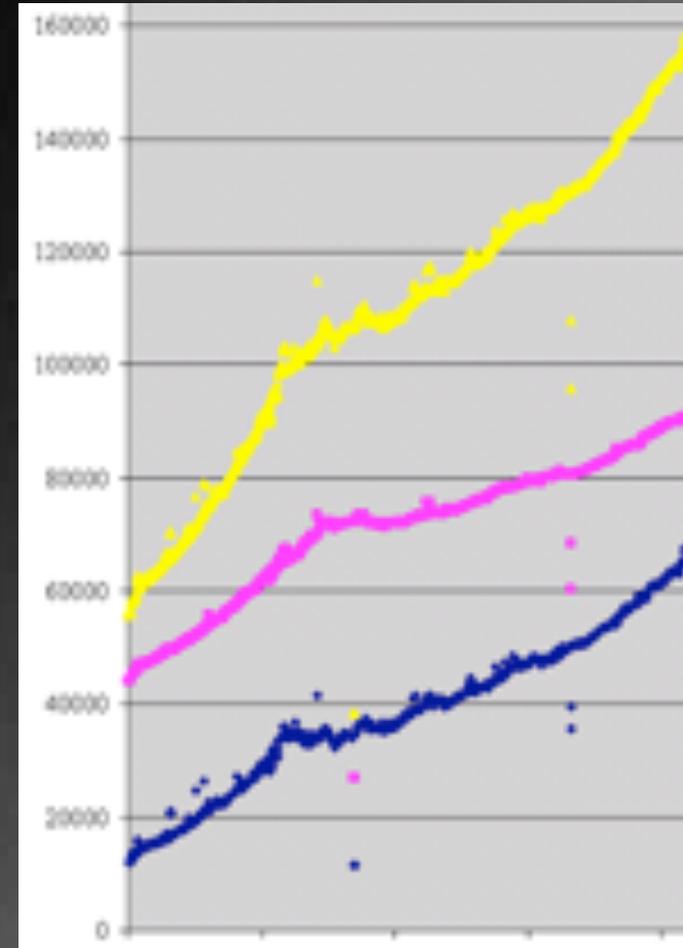
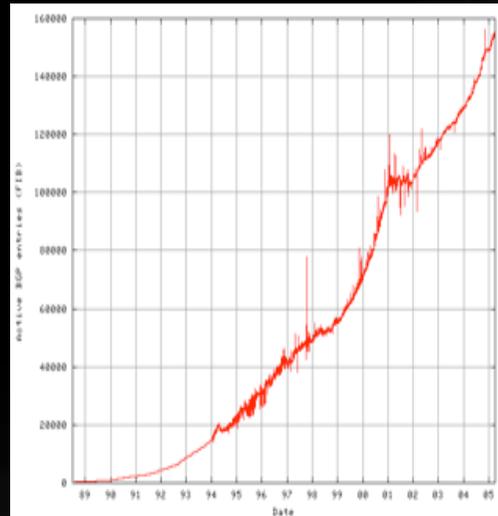
- Some members will only peer if you meet the BCP
- It raised the profile of aggregation
- An online check is now available to see if any AS meets the BCP

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Questions?

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