Using Randomness to Reduce Inter-domain Forwarding State

Stephen Strowes
Cosener's
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University of Glasgow
Image source: http://bgp.potaroo.net/as6447/
Image source: http://www.caida.org/
Suggests

• To maintain this, the level of connectivity must be increasing
  • i.e., the number of interconnections between ASes must be rising
Intuition

• Lots of connections between transit networks...
• Network might function surprisingly well with a deliberately-reduced volume of forwarding state in these ASes?
Proposition

- Randomise (some) forwarding decisions to reduce forwarding table size...
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- On receiving a BGP update
  - if path length > 1, make a decision re: whether to include route in FIB
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- On receiving packet, perform longest prefix matching
  - If match found, forward as normal
  - Else, choose random output port (!incoming)
Theory

- Forwarding table size and network path length are two opposing constraints
  - If you remove some state, you affect mean path length between pairs of points.
Ongoing

- Investigation of the effects on network path stretch w.r.t. the volume of state deliberately removed from the routing system using real data
  - AS relationships graph
  - Prefix-to-AS mappings
- Currently: Building a highly distributed simulator to experiment and analyse these algorithms using real models
Problem?

- This isn't immediately compatible with policy-based routing...
Questions?

• Contact: sds@dcs.gla.ac.uk

• Plenty of background if you google Geoff Huston or Dimitri Krioukov

• Lots of other related stuff: ID/Loc; LISP; Compact Routing; esoteric ideas like routing on flat labels, etc...