

Internet Routing Protocols

Lecture 06

BGP Dynamics, Part II

Advanced Systems Topics

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Two BGP Mechanisms for Squashing Updates

- Rate limiting on sending updates
 - Send batch of updates every MinRouteAdvertisementInterval (MRAI) seconds (+/- random fuzz)
 - Default value is 30 seconds
 - A router can change its mind about best routes many times within this interval without telling neighbors
- Route Flap Dampening
 - Punish routes for “misbehaving”

Effective in dampening oscillations inherent in the vectoring approach

Must be turned on with configuration

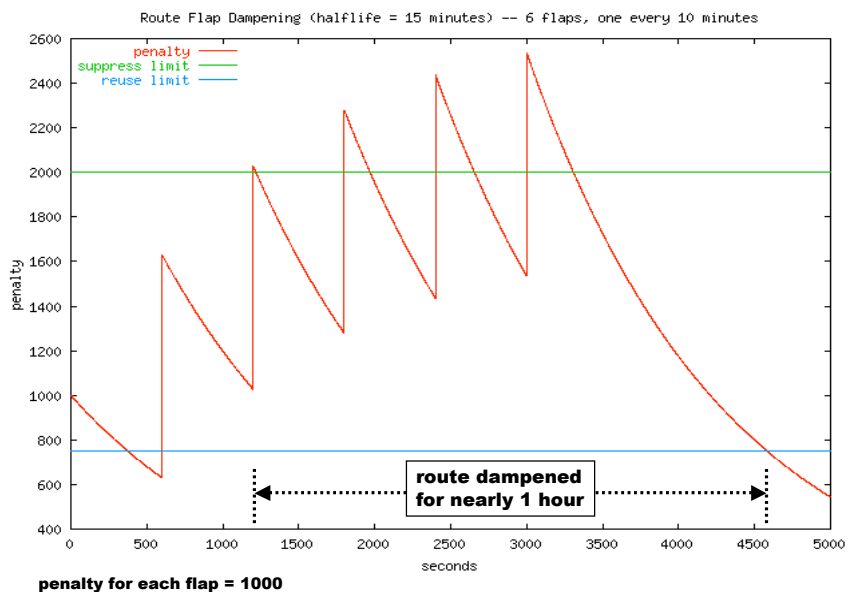
Route Flap Dampening (RFC 2439)

Routes are given a penalty for changing. If penalty exceeds suppress limit, the route is dampened. When the route is not changing, its penalty decays exponentially. If the penalty goes below reuse limit, then it is announced again.

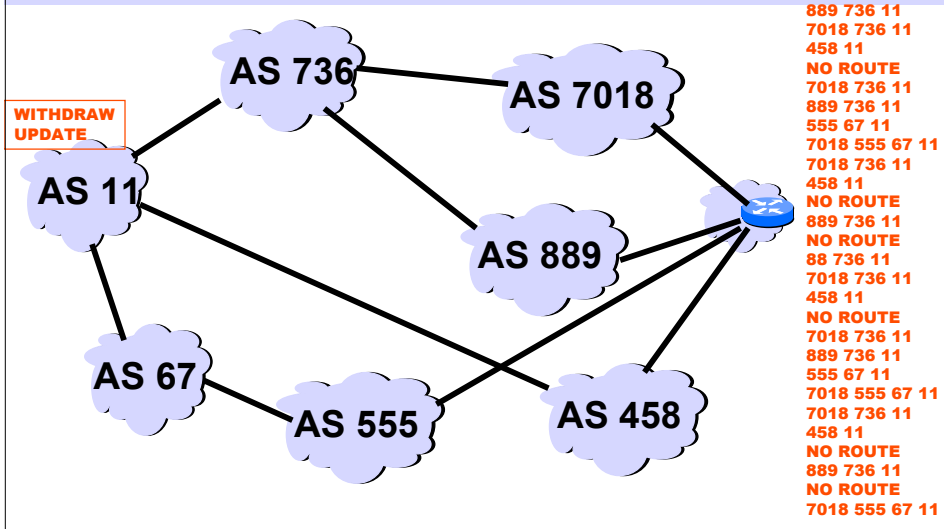
- Can dramatically reduce the number of BGP updates
- Requires additional router resources

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How it works



Problems with Flap Damping : punishes small updates for “well connected” destinations

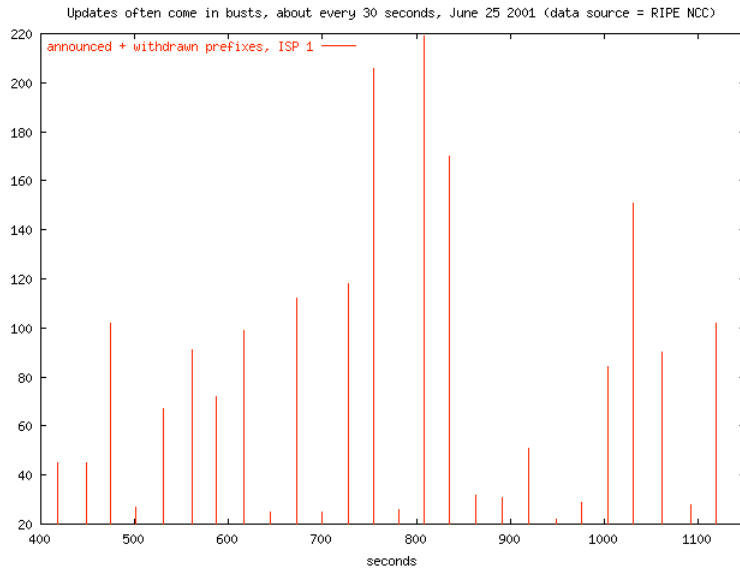


The prefix is not “misbehaving” -- it is BGP!!

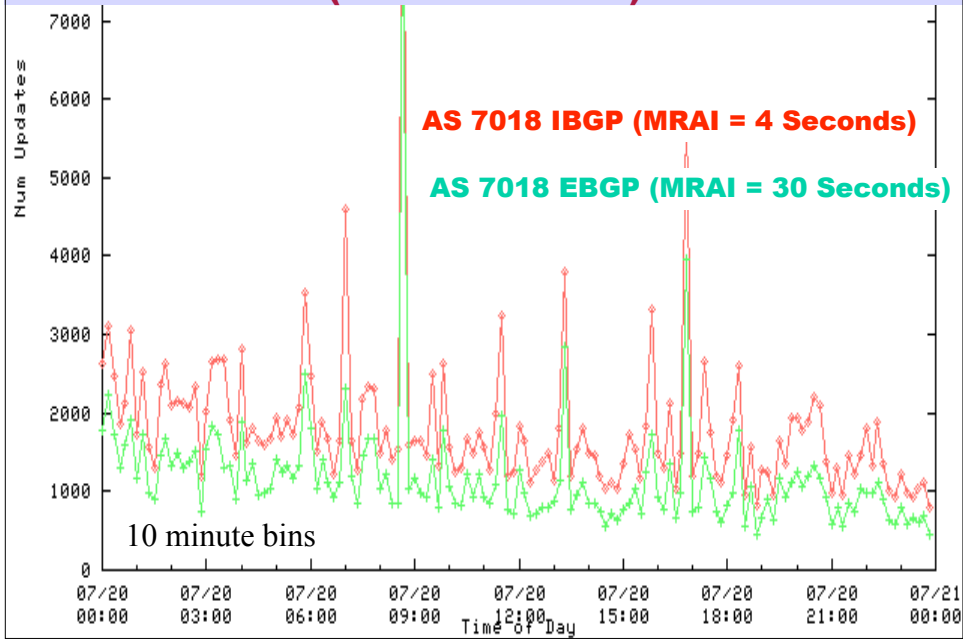
Rate Limiting



30 Second Bursts

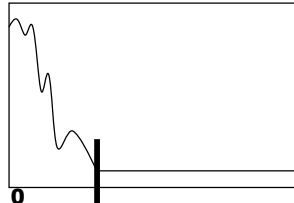


Rate limiting in action (IBGP vs EBGP)



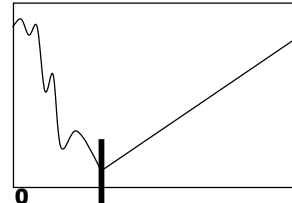
Why is Rate Limiting Needed?

Updates
to convergence



MinRouteAdvertisementInterval

Time
to convergence



MinRouteAdvertisementInterval

Rate limiting dampens some of the oscillation inherent in a vectoring protocol.

SSFNet (www.ssfnet.org) simulations,
An Experimental Analysis of BGP Convergence Time --T. Griffin and B.J. Premore.
ICNP 2001.

Two Main Factors in Delayed Convergence

- BGP can explore many alternate paths before giving up or arriving at a new path
 - No global knowledge in vectoring protocols
- Rate limiting timer slows everything down

**Current interval (30 seconds) was picked
“out of the blue sky”**

What you should do now ...

- Read and think about lecture notes,
- Read and think about RFC 1058 (RIP)
- Read and think about
 - Damping BGP. ISP column by Geoff Huston
 - <http://www.potaroo.net/ispcol/2007-06/dampbgp.html>