Integrating Routing with Content Delivery Networks

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[See IEEE Infocom NOMEN 2012 workshop for additional details
http://www.ieee-infocom.org/2012/nomen/]
Current CDN Technology Issues:

- Vendor cache’s aren’t open
- Origins aren’t considered part of CDN

Useful CDN features:

- Single/open/unified control plane protocol:
  - Caches and origins
- Caches network aware:
  - Child cache->parent cache
  - Parent cache->origin
- CDN dynamically self-configures based on asset “hotness”
From CDN resource perspective, want to treat “foobar.com” differently from “foobar.com/olympics/”

How do we solve this in the network space?
  - Aggs and more specifics
    - 24.0.0.0/16 → 24.0.11.16
    - 24.0.0.0/24 → 24.0.1.4

Apply to content domain:
  - foobar.com → 24.0.3.17 !Cache’s IP
  - foobar.com/olympics → 24.0.141.15 !Cache’s IP
MP-BGP for Intra-CDN signaling
[BGP URI AF is control plane inside CDN]

URI AF NLRI:
• URI -> Cache/Origin NH IP
  • “foobar.com” -> 24.0.32.11
  • “foobar.com/olympics” -> 24.0.191.43

Operation:
• Origins announce URI->NH
• CDN (caches) process/select/propagate announcement down through CDN caches updating NH
• Caches perform standard prefix selection algorithm (on URIs)
• CDN is single ASN.
BGP URI – working code on caches and origins
Inter-CDN signaling via eBGP URI

CSP 16
ex1.com

CDN 42

CSP 22
ex2.com

ISP end-point
CDN VPNs [“multi-tenant”]

ISP CDN

01 02 03

ISP end-point

CDN 42  CDN 412  CSP 22

ISP BGP URI policy

VPN  VPN  VPN  VPN
Summary

Proposal:

- iBGP URI:
  - Intra-CDN/Origin signaling

- eBGP URI:
  - Inter-CDN signaling

- Leverage all the existing BGP know-how and apply it to CDN
  - Skills, knowledge, policy logic, features, tools, capacity planning, code bases, etc.

Benefits:

- ISP manages how content flows into their infrastructure from upstream CDNs

- Enables ISP to build own CDN in open vendor eco-system

- Enable ISP and Content sources to partner and develop cost effective delivery system via CDN VPNs
Thanks!