Google fPIF

Google Global Cache - enabling content

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Google is...

Search, Maps, Photos

Youtube, Play

G Suite, Drive
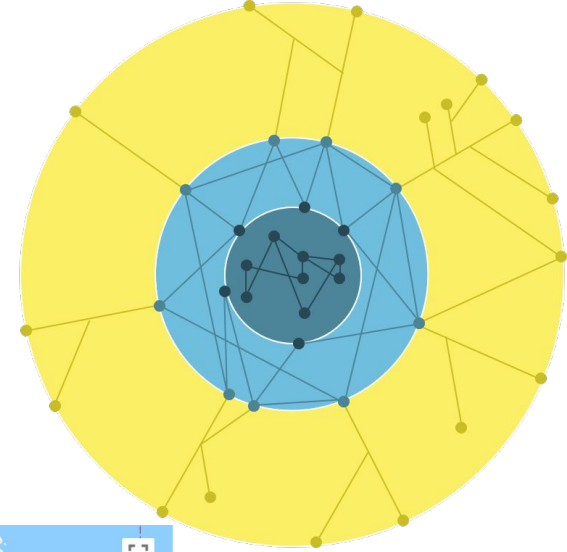
Android

Google Cloud Platform

...

Google builds...

African peering hubs & GGC
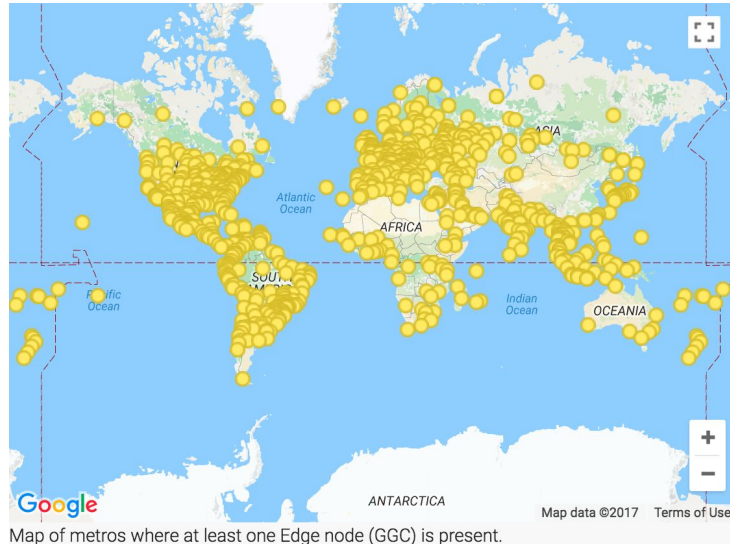

Map of metros where at least one Edge PoP is present.

Maps from peering.google.com

~70% of Africa traffic is exchanged in-continent, ~80% for Sub-Saharan Africa

Map of metros where at least one Edge node (GGC) is present.
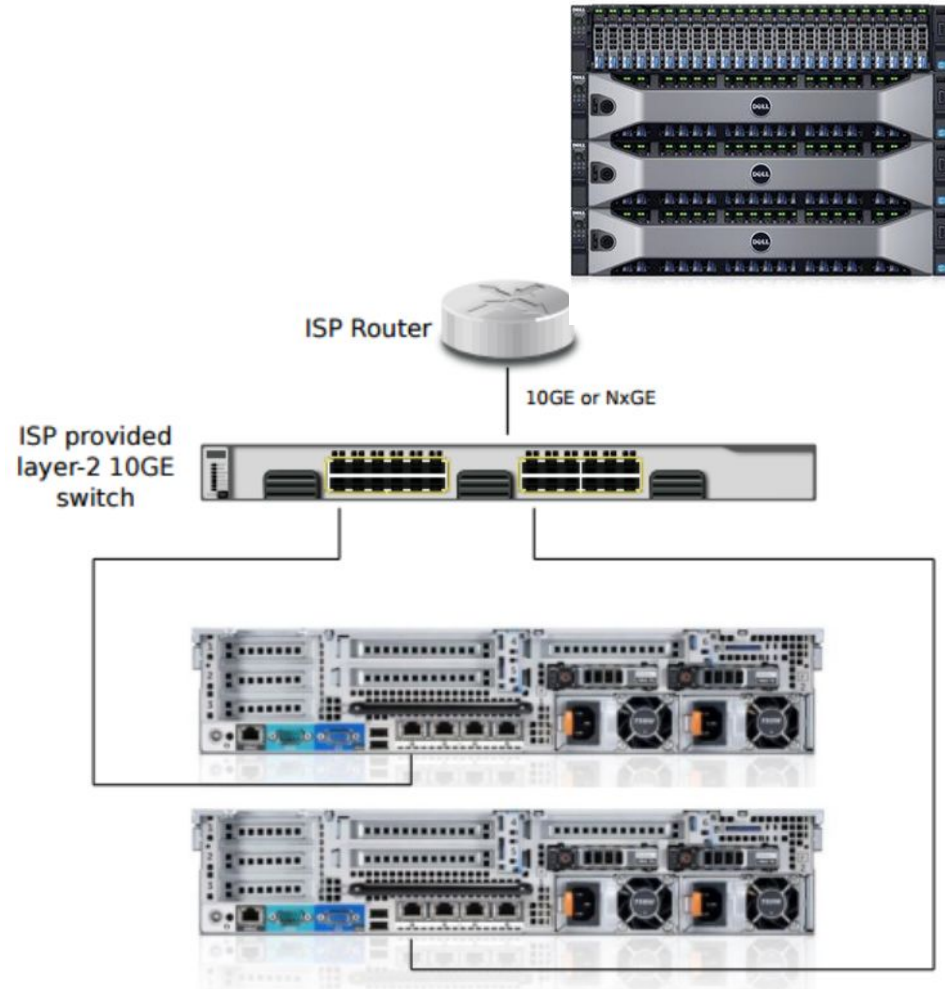
Google

Google Global Cache

Google Global Cache is hosted by ISPs.
GGCs are machines inside ISP networks
(and do not "peer")

IXPs or wholesale providers are not
natural targets for GGC

Google ships hardware and runs the GGC
service, hosts provide O&M

Cache-fill traffic is a fraction of
user-facing traffic

ISP Router

10GE or NxGE
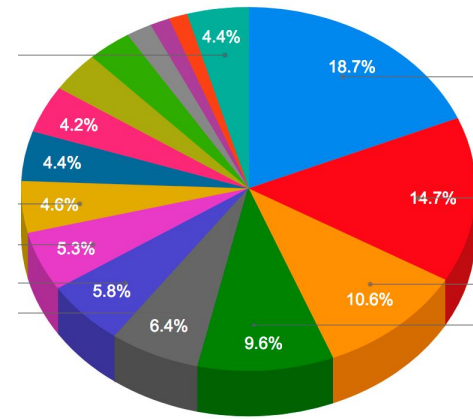
ISP provided
layer-2 10GE
switch

Cache sharing

Sharing a cache can make sense when we need to serve many small networks that would not justify hosting their own caches.
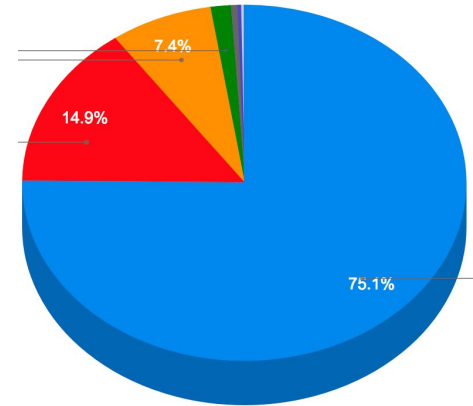
Sharing a cache does not necessarily make sense otherwise

Most of the time, sharing the cost of hosting & filling the cache is a problem

Finding a neutral party to host the cache is also difficult

✓ Traffic profile country #1

⊘ Traffic profile country #2

Google

Autonomous shared caches

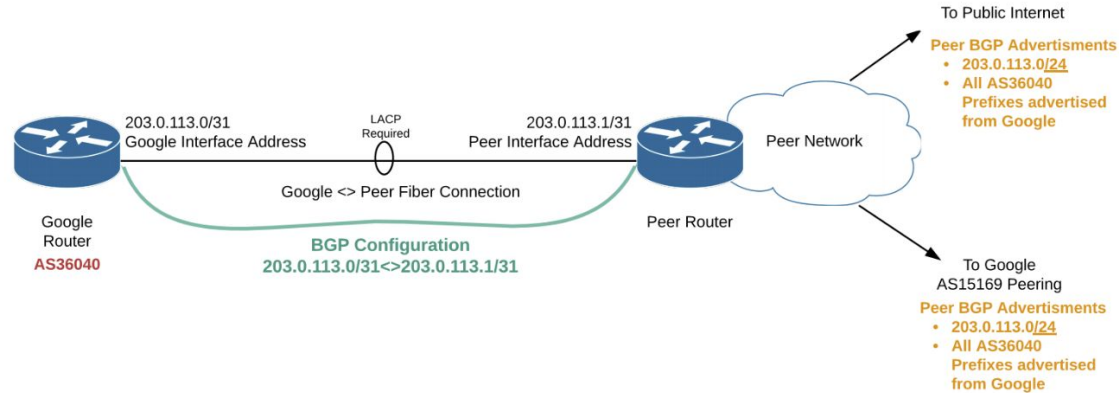Autonomous caches using AS36040 (not ISP-hosted), can connect many peers

Relies on each peers to announce a default route to the cache, and use peers as transits

Each peers ends up with a "virtual cache"

Makes cache-sharing more easy (no cache-fill cost to share)

In testing now in two locations in Africa

Private Peering

203.0.113.0/31
Google Interface Address

LACP
Required

203.0.113.1/31
Peer Interface Address

Peer Network

Google <> Peer Fiber Connection

Google Router
AS36040

BGP Configuration
203.0.113.0/31<>203.0.113.1/31

Peer Router

To Public Internet
Peer BGP Advertisments
• **203.0.113.0/24**
• **All AS36040 Prefixes advertised from Google**

To Google
AS15169 Peering
Peer BGP Advertisments
• **203.0.113.0/24**
• **All AS36040 Prefixes advertised from Google**

Notes:
• Private subnets are used for example only, all subnets should be publically routable during implementation
• 203.0.113.0/31: Peer Provided /31 from 203.0.113.0/24
    • 203.0.113.0/31: Google address within /31, assigned to peering interface on Google Router
    • 203.0.113.1/31: Peer address within /31, assigned to peering interface on Peer Router
• /31 must be advertisied to at least the Public Internet, and if available AS15169 peering contained within a least a /24 or greater
• Peer to advertise all origin AS36040 routes to at least the Public Internet, and if available AS15169 peering

Requirements for shared Google Global Cache

Sufficient addressable traffic shared with a large number of networks

A carrier neutral hosting location (ie. **anyone** can cheaply connect fiber or light up services to the location)

Enough networks able to peer at hosting location (IXPs can help aggregate)

Reliable and sufficient power

Technical know-how to install and maintain the cache hardware (swap optics, install configs etc…) with help from Google support

Google

Google EMEA Team and means to contact us

Google runs AS15169, AS36040, AS43514, AS19527

10+ peering managers, technical planners and project managers in EMEA

Register your network and ASN onto www.peeringdb.com (ASN is a requirement)

Write to your peering manager or to peering@google.com (NO SLA)

Preferred: apply online: https://isp.google.com/partner_request/

Register your interest

Google

Thank You - Questions?