Providing Self-Service to Google’s Peers

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Background
Relevant Background on Google

Google...

- Is one of the largest content-providers on the Internet
- Maintains a global peering footprint with a generally open peering policy
- Offers an Google-managed cache for in-operator offload (GGC)
- Scale requires advanced traffic-control system
- Provides a transparency-report of network performance (Video Quality Report)
Peering At Google Scale

Presents challenges...

Communicating
Generally Open Peering Policy = thousands of relationships

Visibility
GGC+PNI makes it harder to understand how traffic is served

Deeper Dialog
How do we collaborate with operators to improve delivery quality and efficiency?
Google’s ISP Portal

peering.google.com is...

- An external documentation site
- A logged-in portal for ISPs
- A ticketing system
- A workflow system
- A data-analysis tool
- An API endpoint
ISP Portal Goals

We want our portal to provide:

- Structured information exchange that speeds up routine interactions
- Insight into how Google is sending traffic to your network (and why)
- A clear view on what we’ll need to grow together (traffic-levels, augments)
- Actionable information about how to improve delivery quality and efficiency
### Benefits

<table>
<thead>
<tr>
<th>To ISPs</th>
<th>To Google</th>
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<tbody>
<tr>
<td>Low-friction interactions for routine operations</td>
<td>Fewer errors, more automation</td>
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<tr>
<td>Visibility into Google’s traffic management</td>
<td>Informed peers and aligned actions</td>
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<tr>
<td>Clear capacity-planning information</td>
<td>On-time capacity</td>
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<tr>
<td>Performance data you can’t easily get another way</td>
<td>Performance improvement for ISP/Google users</td>
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Streamlining Communication
Email is bad for scale and accuracy!

Build structured interactions for things like...

- Starting a relationship
- Augments
- Planned maintenance
- Circuit down
- Adjusting GGC configuration
- Repairing failed GGC hardware
You can watch an Exchange-Peering provision in real-time!
GGC Node Upgrade

Welcome

Welcome to the GGC hardware refresh program. This page will be your communication channel through the refresh process.

The follow addresses will be notified of any status changes:

| Ocs | Submit |

Node information

The following nodes have been identified as candidates for refresh

| Number of replacement servers: | 4 |

Server type: | Server type |

Refresh Details

Please confirm your shipping information.

<table>
<thead>
<tr>
<th>Delivery Address</th>
<th>Retrieval Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Address</td>
</tr>
<tr>
<td>City</td>
<td>City</td>
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<td>State / Province</td>
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<td>Country</td>
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</table>

Use delivery address for retrieval.

Schedule Refresh

We received my machines and I'm ready to schedule turn-up.
Visibility
Visibility - Clear Operational Status

Quickly see traffic-breakdown and drill down into traffic-flows.
Visibility - Google Traffic Management

Shows:
- How Google will overflow traffic
- Where traffic is overflowing now
- Where each prefix can be served
Launching Soon. Includes...

- Per-Asset Time-To-Capacity
- Proactive Notification of Fullness
Deeper Conversations
Going beyond capacity
Performance Tools

Interconnect Points

GGCs

Users
Actionable Suggestions

Notifications

Notifications are simple alerts indicating ways you can improve your use of GGC or the way you peer with Google’s network. Click on a notification for more information and recommended steps to fix the issue. This view is updated on a daily basis.

Traffic is approaching capacity
Your peak traffic is at 71% of capacity

Some of your prefixes are not announced to GGC or peering
33 of your prefixes are only announced to transit

Some of your prefixes are announced more specifically to transit
1 prefix should be more specific for GGC and/or peering

None of your ASNs has an entry in PeeringDB

Some of your prefixes are not announced to GGC or peering

Your problematic prefixes:

... 23 more ...

What is the issue?
We have detected that some of your users’ prefixes are being announced to transit but not to your GGCs or peering routers.

How are my users affected?
When traffic is routed to transit instead of GGC or peering, it may travel a longer path than necessary and will not take advantage of your cache capacity. This can result in degraded user experience in the form of rebuffer rates.

How can I fix this?
Visit the detailed BGP diagnostics page to learn more about where and how Google is seeing your prefixes announced. Adjust your routing configuration to ensure that all prefixes announced to transit are announced to GGC and peering. Once the change is made, check back here in a day to verify that this notification is no longer active.
Success Stories

- Worked with one operator to go from 53% HD-rated to 95% with no capex
- Detected BGP misconfiguration affecting 150k users with prefix-report
- Detected unintended transit-overflows
- Multi-ASN network leaking inconsistent routes
Future
Deeper Performance Insight

We’re continuing to work on...

- Linking application-level performance with network issues
- Understand transport-level signals of issues
- Deeper understanding of access networks
- Understanding the best opportunities to expand deployment
Evolution

We’re working on...

- Automation: more happens while you watch
- APIs: ingest the data any way you like
- Alerting: proactively notify of actionable events
- Covering more performance issues with actionable suggestions
Getting Access

If you think this can help you, visit:

http://peering.google.com/signup