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

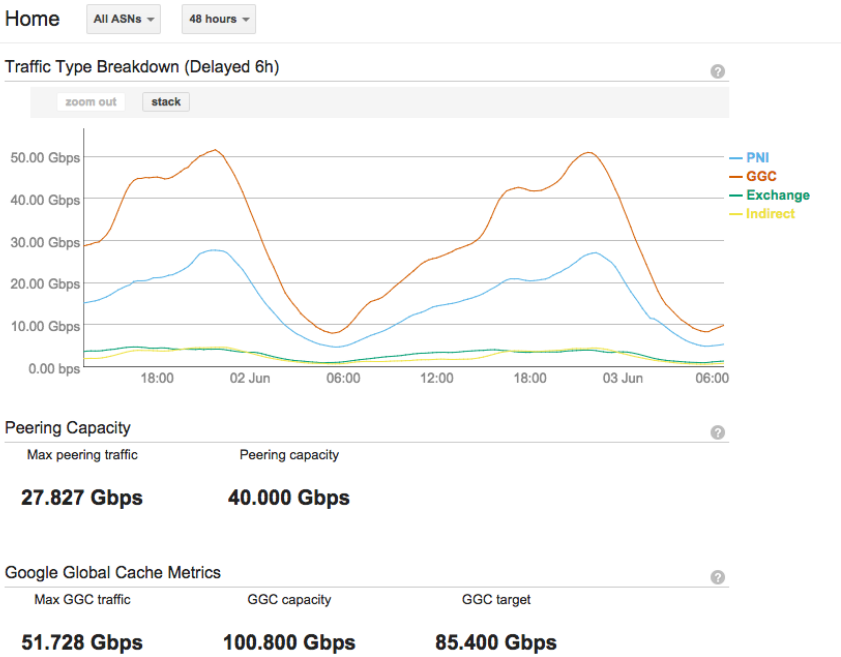
Deeper Dialog

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

To ISPs	To Google
Low-friction interactions for routine operations	Fewer errors, more automation
Visibility into Google’s traffic management	Informed peers and aligned actions
Clear capacity-planning information	On-time capacity
Performance data you can’t easily get another way	Performance improvement for ISP/Google users

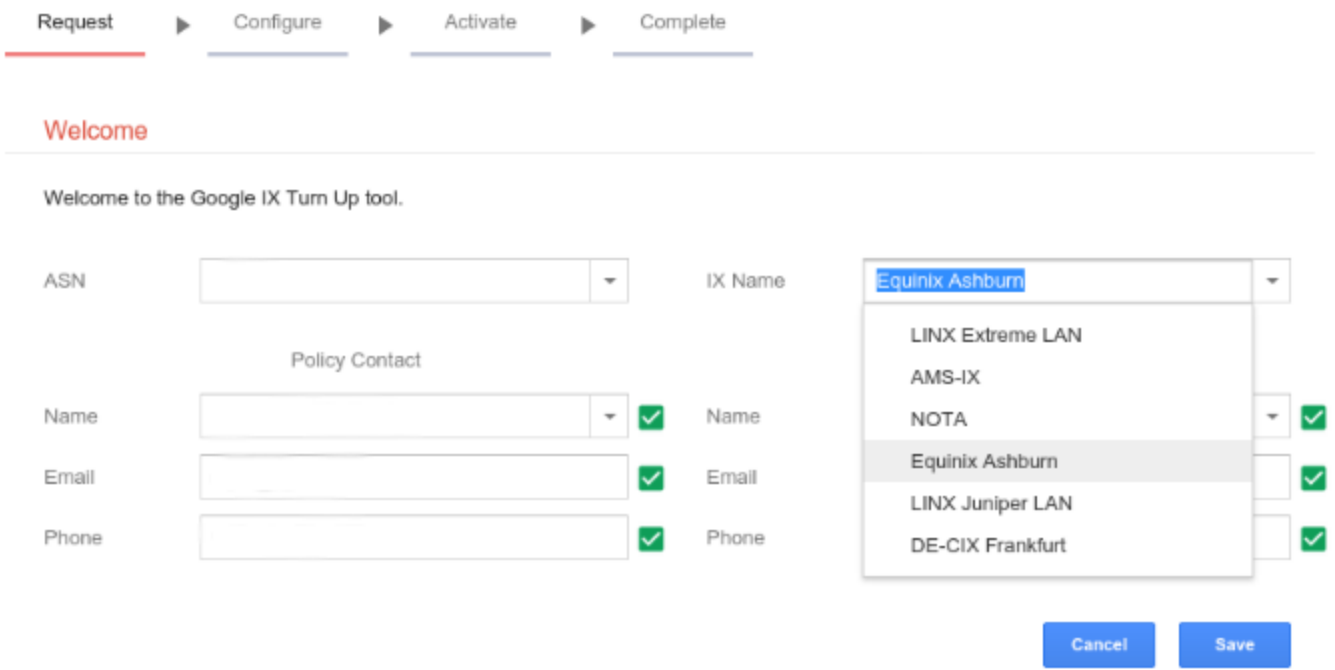
Streamlining Communication

Email is bad for scale and accuracy!

Build structured interactions for things like...

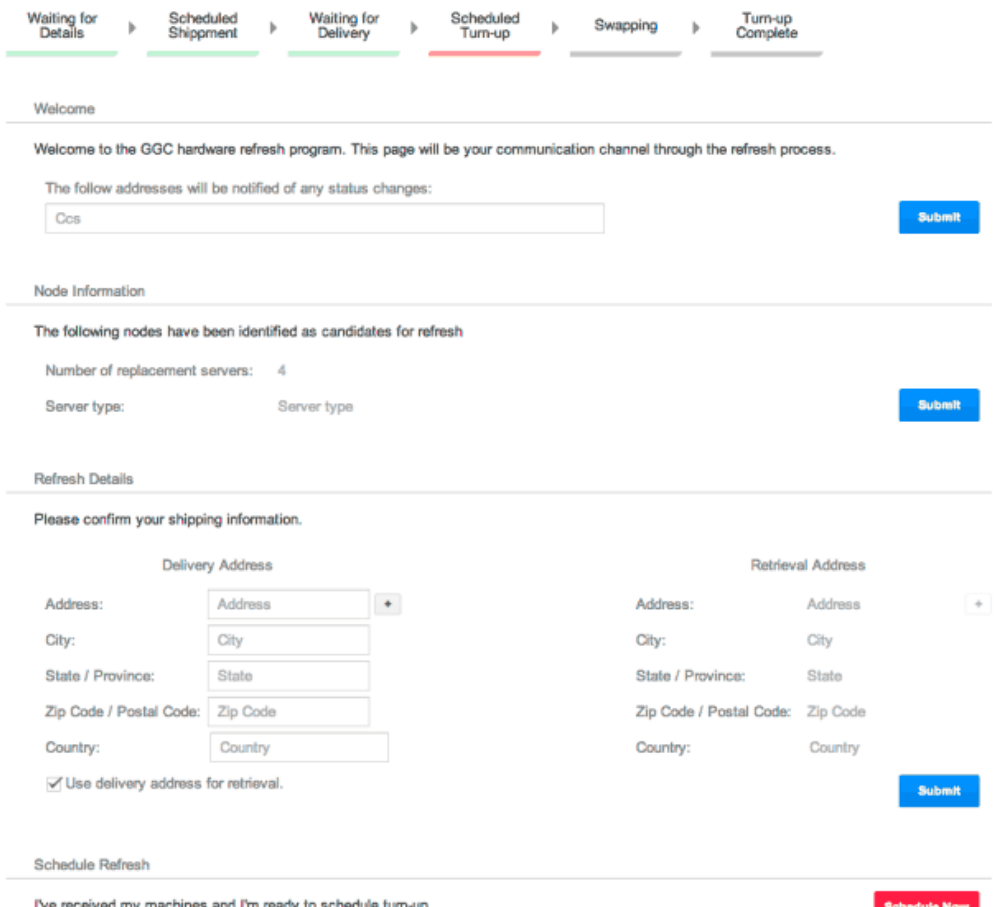
- Starting a relationship
- Augments
- Planned maintenance
- Circuit down
- Adjusting GGC configuration
- Repairing failed GGC hardware

Exchange-Peering Turnup



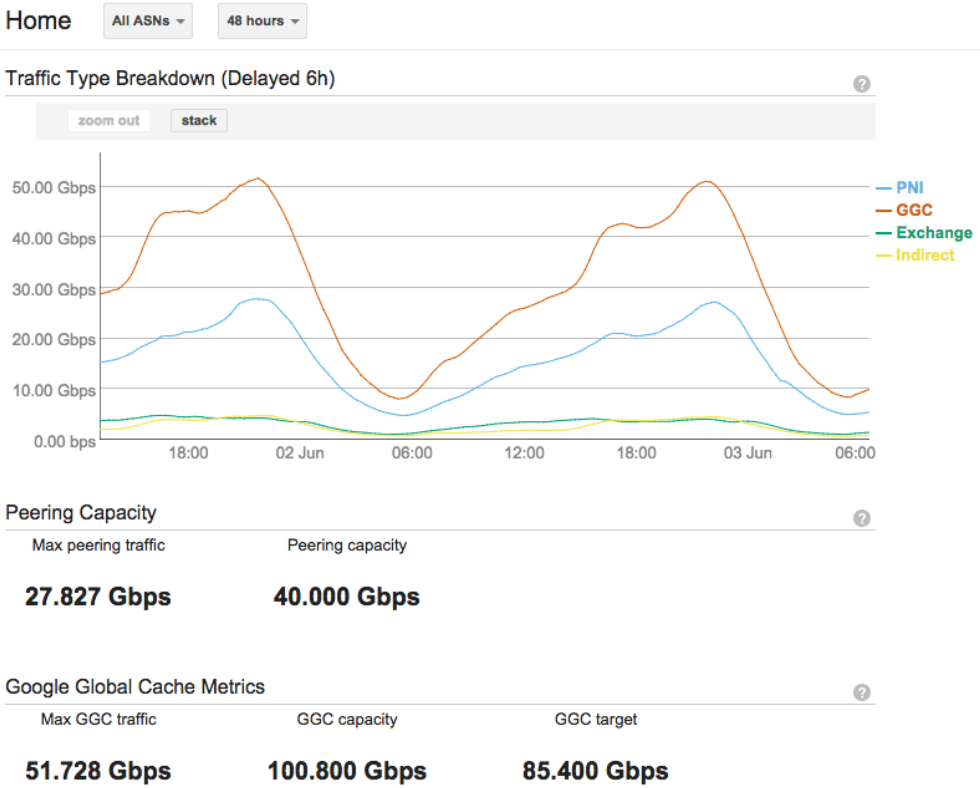
You can watch an Exchange-Peering provision in real-time!

GGC Node Upgrade



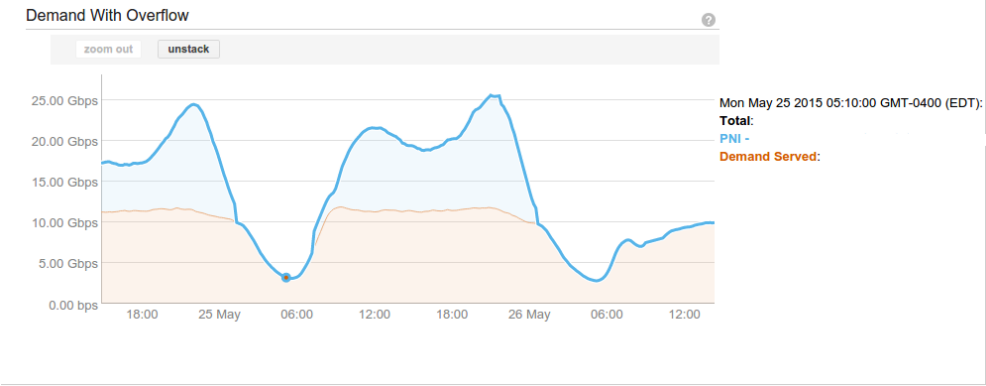
Visibility

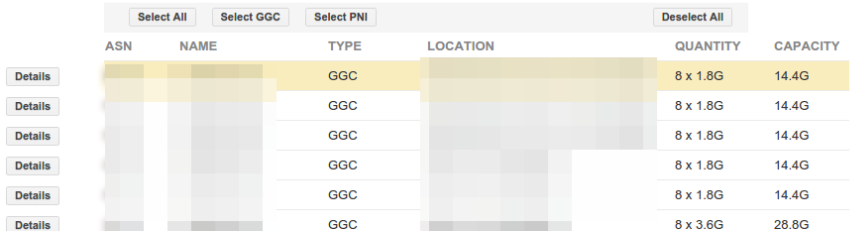
Visibility - Clear Operational Status



Quickly see traffic-breakdown and drill down into traffic-flows.

Visibility - Google Traffic Management

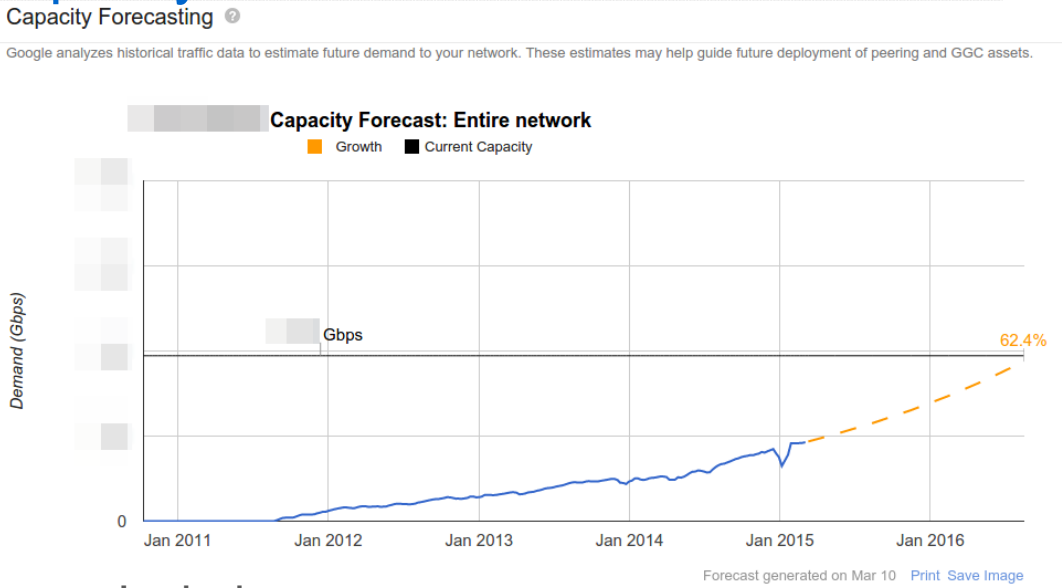




Shows:

- How Google will overflow traffic
- Where traffic is overflowing now
- Where each prefix can be served

Visibility - Capacity



Launching Soon. Includes...

- Per-Asset Time-To-Capacity
- Proactive Notification of Fullness

Deeper Conversations

Going beyond capacity

Performance Overview

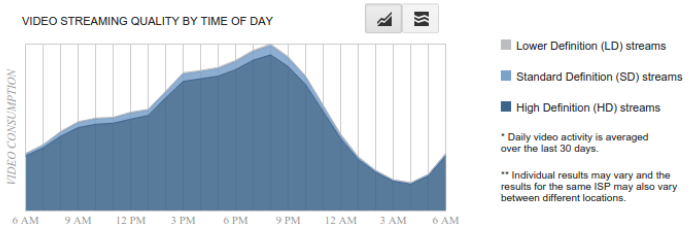
Location

City | Download Locations | Download Prefixes | Search by text

CITY	QUALITY	HD	SD	LD	STREAMS
[redacted]	HD	94.36%	4.73%	0.91%	8.28%
[redacted]	HD	94.01%	5.13%	0.87%	4.02%
[redacted]	HD	94.16%	4.95%	0.89%	3.61%
[redacted]	HD	95.36%	3.92%	0.72%	3.58%
[redacted]	HD	94.56%	4.63%	0.81%	3.47%
[redacted]	HD	93.08%	5.69%	1.23%	3.2%
[redacted]	HD	93.25%	5.86%	0.9%	3.2%
[redacted]	HD	94.51%	4.6%	0.89%	3.08%
[redacted]	HD	91.11%	7.96%	0.94%	2.94%
[redacted]	HD	94%	5.06%	0.94%	2.66%
[redacted]	HD	94.77%	4.41%	0.82%	2.59%
[redacted]	HD	94.79%	4.4%	0.81%	2.45%
[redacted]	HD	92.97%	5.95%	1.08%	1.8%
[redacted]	HD	94.73%	4.45%	0.82%	1.75%
[redacted]	HD	92.29%	6.77%	0.94%	1.6%
[redacted]	HD	94.2%	4.92%	0.88%	1.59%

Previous 1 2 3 4 5 ... 11 Next

Hourly Breakdown -



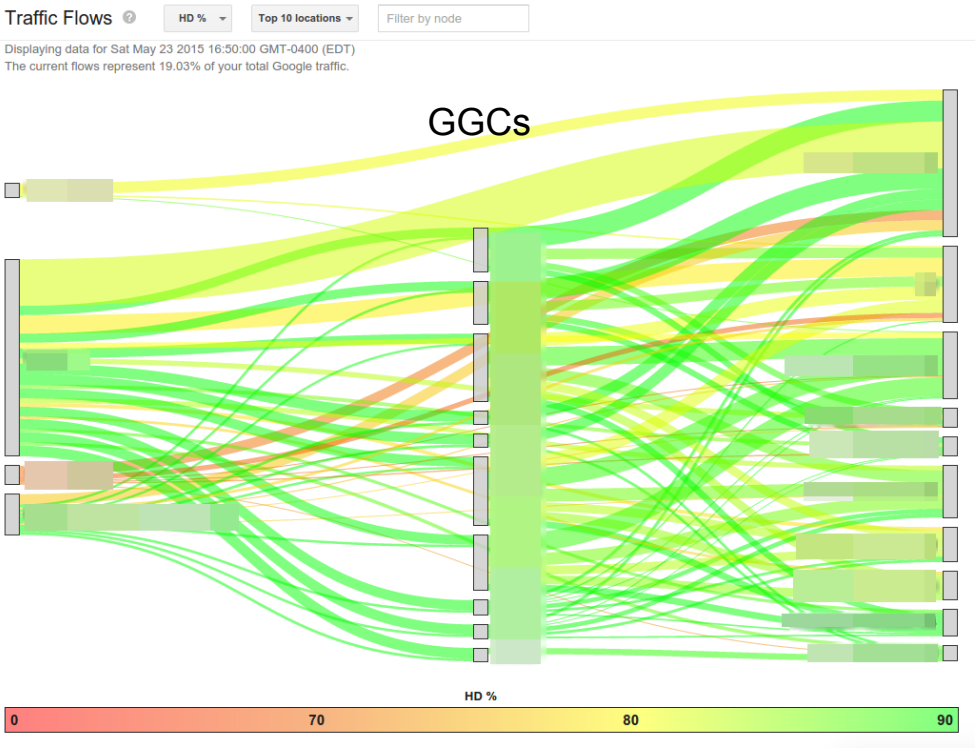
Prefix Breakdown

PREFIX	95TH% EGRESS	95th% RETRANSMITS	HD STREAMS	STREAMS	HD STREAMS / STREAM
[redacted]	[redacted]	[redacted]	1.78%	1.74%	1.02
[redacted]	[redacted]	[redacted]	1.62%	1.65%	0.98
[redacted]	[redacted]	[redacted]	1.33%	1.3%	1.02
[redacted]	[redacted]	[redacted]	1.31%	1.28%	1.02
[redacted]	[redacted]	[redacted]	1.25%	1.27%	0.98
[redacted]	[redacted]	[redacted]	1.25%	1.24%	1.01
[redacted]	[redacted]	[redacted]	1.26%	1.24%	1.02
[redacted]	[redacted]	[redacted]	1.26%	1.23%	1.02
[redacted]	[redacted]	[redacted]	1.19%	1.22%	0.98
[redacted]	[redacted]	[redacted]	1.22%	1.21%	1.01
[redacted]	[redacted]	[redacted]	1.21%	1.21%	1
[redacted]	[redacted]	[redacted]	1.2%	1.18%	1.02
[redacted]	[redacted]	[redacted]	1.17%	1.15%	1.02
[redacted]	[redacted]	[redacted]	1.15%	1.14%	1.01
[redacted]	[redacted]	[redacted]	1.15%	1.14%	1.01
[redacted]	[redacted]	[redacted]	1.14%	1.12%	1.02
[redacted]	[redacted]	[redacted]	1.11%	1.08%	1.03
[redacted]	[redacted]	[redacted]	1.08%	1.07%	1.01
[redacted]	[redacted]	[redacted]	1.07%	1.07%	1
[redacted]	[redacted]	[redacted]	1.07%	1.06%	1.01
[redacted]	[redacted]	[redacted]	1.07%	1.06%	1.01

Send feedback

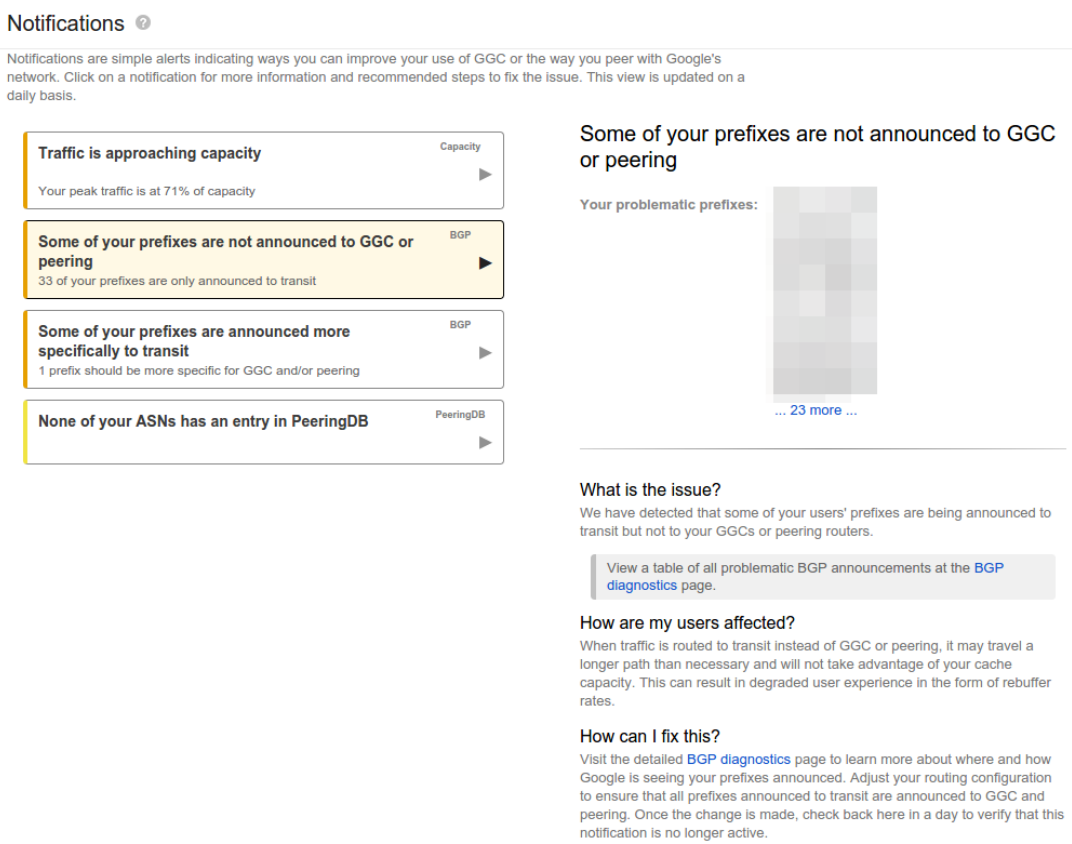
Performance Tools

Interconnect Points



Users

Actionable Suggestions



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