

### Incident Details

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On Sunday August 30<sup>th</sup> 2020 from 06:15am to 10:30am EST -0500, the Internet Service Provider CenturyLink/Level 3 experienced a catastrophic network failure which caused a global routing event to take place. CenturyLink circuits around the globe started to report abnormal communication and degraded services. QSG blocked traffic destined or received from the failed ISP. Routes advertised globally stopped updating despite stale status which resulted in traffic not migrating over to redundant connections. This affected access from/to 517,872 prefixes. The QSG network team was able to report the issues to the upstream peers and request adjustments. The adjustments from the upstream peers however ran into the same propagation blocks present on the Internet backbone.

The root cause of this issue originated when CenturyLink/Level3 reported a multiple geographic region failure that currently services a diverse group of service providers globally. As the QSG service went completely down if accessed over a retained path via CenturyLink, QSG attempted to remove CenturyLink from our network blend completely per our disaster recovery protocol. This interface adjustment affected the transit capacity of multiple 10gbps circuits. This solution alleviated the lost CenturyLink service, but restoration didn't take place due to the outage effectively keeping the circuit present regardless of its removal. CenturyLink IP NOC was notified of the failure in protocol and confirmed a mass outage was present preventing their team from processing any further adjustments. QSG services remained degraded for a period of nearly 4 hours while Vendor IP teams worked towards resolution. The service affecting outage made client contact difficult via phone and significantly delayed via Email. Internal communication tools provided by a 3rd party vendor (Slack) were also experiencing the affects of the outage which further limited communication success.

Quantum Services sincerely apologizes for any inconvenience that this incident has caused. As a method to minimize any future resiliency challenges we will be evaluating numerous internal controls to determine if additional measures would have limited or prevented this event. Our teams have started the engagement process to review all logs, and records and make hardening recommendations.

## Incident Timelines

All times in EST- 0500

<b>6:04am</b>	QSG received a abnormal transit alert from 3rd party monitoring of upstream circuit CenturyLink. This event lasted 1 minute via ping.
<b>7:29am</b>	Customer tickets are being reported and critical alarms started to present themselves internally but not via third party external monitors
<b>8:14am</b>	QSG verified a network event. Isolation tasks started and dispatch process initiated. Outage is significant but doesnt seem limited to QSG alone.
<b>8:28am</b>	QSG technician on-site noted outbound access but abnormal return function given high latency and degraded service via CenturyLink pathing on XE-1/1/0.0.
<b>8:57am</b>	CenturyLink, Cloudflare, Google, Twitters confirms that the bgp routing table issue is globally affecting customers
<b>9:12am</b>	A ticket has been opened with CenturyLink regarding the issues with handling eBGP multipathing and circuit degradation.
<b>9:23am</b>	QSG made the decision to remove CenturyLink from the network peers entirely. BGP was re-loaded and routes removed from local network. No improvement noticed. Issue must be external to network.
<b>9:38am</b>	QSG contacted upstream partners to request adjustment. Partners have already been working to resolve on own networks. Resolution pending for additional partner networks as well.
<b>10:26am</b>	QSG recieved notice that a pending repair was to take place shortly via CenturyLink. Shortly after announcement we saw global route adjustments take place. Connectivity started to resolve to normal transit levels.

## Corrective Actions Pending

- Begin initial review of our disaster recovery policy to determine any shortfalls.
- Design a secondary non-dependent contact method for outage incidents.
- Make available an incident tracking/status portal for mass incident resolution.
- Review complete outage report from vendors and partners, determine hardening procedures internally. Make recommendations public if necessary

## Outage Vendor Notes

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- Resolution Details
  - Start time: August 30, 2020 10:00 GMT
  - Stop Time: August 30, 2020 15:00 GMT
  - Root Cause: An offending flowspec announcement prevented BGP from establishing correctly, impacting client services.
  - Fix Action: The NOC deployed a configuration change to block the offending flowspec announcement, restoring stability to the BGP protocols.
  - Summary: On August 30, 2020 10:04 GMT, CenturyLink identified an issue to be affecting users across multiple markets. The IP Network Operations Center (NOC) was engaged, and initial research identified that an offending flowspec announcement prevented Border Gateway Protocol (BGP) from establishing across multiple elements throughout the CenturyLink Network and Peers. The IP NOC deployed a global configuration change to block the offending flowspec announcement, which allowed BGP to begin to correctly establish. As the change propagated through the network, the IP NOC observed all associated service affecting alarms clearing and services returning to a stable state.
- 08/30/2020 11:03:09 GMT - On August 30, 2020 at 10:00 GMT, CenturyLink identified a Market Wide service impact. As this network fault is impacting multiple clients, the event has increased visibility with CenturyLink leadership. As such, client trouble tickets associated to this fault have been automatically escalated to higher priority.
- The NOC is engaged and investigating in order to isolate the cause. Please be advised that updates for this event will be relayed at a minimum of hourly unless otherwise noted. The information conveyed hereafter is associated to live troubleshooting effort and as the discovery process evolves through to service resolution, ticket closure, or post incident review, details may evolve.

## Incident Categorization

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Incident Reference: CenturyLink/ BGP Outage

Incident Date: 8/30/2020

Severity Level: Severity 1 – Service Failure