

## Google Cloud Status Dashboard

This page provides status information on the services that are part of Google Cloud Platform. Check back here to view the current status of the services listed below. If you are experiencing an issue not listed here, please [contact Support](#). Learn more about what's posted on the dashboard in [this FAQ](#). For additional information on these services, please visit [cloud.google.com](#).

### Google Compute Engine Incident #16020

502s from HTTP(S) Load Balancer

Incident began at **2016-10-13 15:07** and ended at **2016-10-13 17:25** (all times are **US/Pacific**).

	DATE	TIME	DESCRIPTION
✔	Oct 18, 2016	13:15	<p>SUMMARY:</p> <p>On Thursday 13 October 2016, approximately one-third of requests sent to the Google Compute Engine HTTP(S) Load Balancers between 15:07 and 17:25 PDT received an HTTP 502 error rather than the expected response. If your service or application was affected, we apologize. We took immediate action to restore service once the problem was detected, and are taking steps to improve the Google Compute Engine HTTP(S) Load Balancer’s performance and availability.</p> <p>DETAILED DESCRIPTION OF IMPACT:</p> <p>Starting at 15:07 PDT on Thursday 13 October 2016, Google Compute Engine HTTP(S) Load Balancers started to return elevated rates of HTTP 502 (Bad Gateway) responses. The error rate rose progressively from 2% to a peak of 45% of all requests at 16:09 and remained there until 17:03. From 17:03 to 17:15, the error rate declined rapidly from 45% to 2%. By 17:25 requests were routing as expected and the incident was over. During the incident, the error rate seen by applications using GCLB varied depending on the network routing of their requests to Google.</p> <p>ROOT CAUSE:</p> <p>The Google Compute Engine HTTP(S) Load Balancer system is a global, geographically-distributed multi-tiered software stack which receives incoming HTTP(S) requests via many points in Google’s global network, and dispatches them to appropriate Google Compute Engine instances. On 13 October 2016, a configuration change was rolled out to one of these layers with widespread distribution beginning at 15:07. This change triggered a software bug which decoupled second-tier load balancers from a number of first-tier load balancers. The affected first-tier load balancers therefore had no forwarding path for incoming requests and returned the HTTP 502 code to indicate this.</p> <p>Google’s networking systems have a number of safeguards to prevent them from propagating incorrect or invalid configurations, and to reduce the scope of the impact in the event that a problem is exposed in production. These safeguards were partially successful in this instance, limiting both the scope and the duration of the event, but not preventing it entirely. The first relevant safeguard is a canary deployment, where the configuration is deployed at a single site and that site is verified to be functioning within normal bounds. In this case, the canary step did generate a warning, but it was not sufficiently precise to cause the on-call engineer to immediately halt the rollout. The new configuration subsequently rolled out in stages, but was halted part way through as further alerts indicated that it was not functioning correctly. By design, this progressive rollout limited the error rate experienced by customers.</p> <p>REMEDIATION AND PREVENTION:</p> <p>Once the nature and scope of the issue became clear, Google engineers first quickly halted and reverted the rollout. This prevented a larger fraction of GCLB instances from being affected. Google engineers then set about restoring function to the GCLB instances which had been exposed to the configuration. They verified that restarting affected GCLB instances restored the pre-rollout configuration, and then rapidly restarted all affected GCLB instances, ending the event.</p> <p>One of our guiding principles for avoiding large-scale incidents is to roll out global changes slowly and carefully monitor for errors. We typically have a period of soak time during a canary release before rolling out more widely. In this case, the change was pushed too quickly for accurate detection of the class of failure uncovered by the configuration being rolled out. We will change our processes to be more conservative when rolling out configuration changes to critical systems.</p> <p>As defense in depth, Google engineers are also changing the black box monitoring for GCLB so that it will test the first-tier load balancers impacted by this incident. We will also be improving the black box monitoring to ensure that our probes cover all use cases. In addition, we will add an alert for elevated error rates between first-tier and second-tier load balancers.</p> <p>We apologize again for the impact this issue caused our customers.</p>
✔	Oct 13, 2016	17:50	<p>The issue with Google Cloud Platform HTTP(s) Load Balancer returning 502 response code should have been resolved for all affected customers as of 17:25 US/Pacific. We will conduct an internal investigation of this issue and make appropriate improvements to our systems to prevent or minimize future recurrence. We will provide a more detailed analysis of this incident once we have completed our internal investigation.</p>
✖	Oct 13, 2016	17:00	<p>We are still investigating the issue with Google Cloud Platform HTTP(S) Load Balancers returning 502 errors, and will provide an update by 18:00 US/Pacific with current details.</p>
✖	Oct 13, 2016	16:28	<p>We are still investigating the issue with Google Cloud Platform HTTP(S) Load Balancers returning 502 errors, and will provide an update by 17:00 US/Pacific with current details.</p>
✖	Oct 13, 2016	16:12	<p>We are experiencing an issue with Google Cloud Platform HTTP(s) Load Balancer returning 502 response codes, starting at 2016-10-13 15:30 US/Pacific.</p> <p>We are investigating the issue, and will provide an update by 16:30 US/Pacific with current details.</p>

