

## 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 Cloud Networking Incident #19020

We've received a report of an issue with Cloud Networking.

Incident began at **2019-10-22 16:47** and ended at **2019-10-22 21:35** (all times are **US/Pacific**).

DATE	TIME	DESCRIPTION															
✓ Oct 31, 2019	12:07	<div><h4>ISSUE SUMMARY</h4><p>On Tuesday 22 October, 2019, Google Compute Engine experienced 100% packet loss to and from ~20% of instances in us-west1-b for a duration of 2 hours, 31 minutes. Additionally, 20% of Cloud Routers, and 6% of Cloud VPN gateways experienced equivalent packet loss in us-west1. Specific service impact is outlined in detail below. We apologize to our customers whose services or businesses were impacted during this incident, and we are taking immediate steps to improve the platform's performance and availability.</p></div> <div><h4>DETAILED DESCRIPTION OF IMPACT</h4><p>On Tuesday 22 October, 2019 from 16:20 to 18:51 US/Pacific, the Google Cloud Networking control plane in us-west1-b experienced failures in programming Google Cloud's virtualized networking stack. This means that new or migrated instances would have been unable to obtain network addresses and routes, making them unavailable Existing instances should have seen no impact; however, an additional software bug, triggered by the programming failure, caused 100% packet loss to 20% of existing instances in this zone. Impact in the us-west1 region for specific services is outlined below:</p><div><h5>Compute Engine</h5><p>Google Compute Engine experienced 100% packet loss to 20% of instances in us-west1-b. Additionally, creation of new instances in this zone failed, while existing instances that were live migrated during the incident would have experienced 100% packet loss.</p></div><div><h5>Cloud VPN</h5><p>Google Cloud VPN experienced failures creating new or modifying existing gateways in us-west1. Additionally, 6% of existing gateways experienced 100% packet loss.</p></div><div><h5>Cloud Router</h5><p>Google Cloud Router experienced failures creating new or modifying existing routes in us-west1. Additionally, 20% of existing cloud routers experienced 100% packet loss.</p></div><div><h5>Cloud Memorystore</h5><p>&lt;1% of Google Cloud Memorystore instances in us-west1 were unreachable, and operations to create new instances failed. This affected basic tier instances and standard tier instances with the primary node in the affected zone. None of the affected instances experienced a cache flush, and impacted instances resumed normal operations as soon as the network was restored.</p></div><div><h5>Kubernetes Engine</h5><p>Google Kubernetes Engine clusters in us-west1 may have reported as unhealthy due to packet loss to and from the nodes and master, which may have triggered unnecessary node repair operations. ~1% of clusters were affected of which most were Zonal clusters in us-west1-b. Some regional clusters in us-west1 may have been briefly impacted if the elected etcd leader for the master was in us-west1-b, until it was re-elected.</p></div><div><h5>Cloud Bigtable</h5><p>Google Cloud Bigtable customers in us-west1-b without high availability replication and routing configured, would have experienced a high error rate. High Availability configurations had their traffic routed around the impact zone, and may have experienced a short period of increased latency.</p></div><div><h5>Cloud SQL</h5><p>Google Cloud SQL instances in us-west1 may have been temporarily unavailable. ~1% of instances were affected during the incident.</p></div><h4>ROOT CAUSE</h4><p>Google Cloud Networking consists of a software stack which is made up of two components, a control plane and data plane. The data plane is where packets are processed and routed based on the configuration set up by the control plane. Each zone has its own control plane service, and each control plane service is sharded such that network programming is spread across multiple shards. Additionally, each shard is made up of several leader elected [1] processes.</p><p>During this incident, a failure in the underlying leader election system (Chubby [2]) resulted in components in the control plane losing and gaining leadership in short succession. These frequent leadership changes halted network programming, preventing VM instances from being created or modified.</p><p>Google's standard defense-in-depth philosophy means that existing network routes should continue to work normally when programming fails. The impact to existing instances was a result of this defense-in-depth failing: a race condition in the code which handles leadership changes caused programming updates to contain invalid configurations, resulting in packet loss for impacted instances. This particular bug has already been fixed, and a rollout of this fix was coincidentally in progress at the time of the outage.</p><h4>REMEDIATION AND PREVENTION</h4><p>Google engineers were alerted to the problem at 16:30 US/Pacific and immediately began investigating. Mitigation efforts began at 17:20 which involved a combination of actions including rate limits, forcing leader election, and redirection of traffic. These efforts gradually reduced the rate of packet loss, which eventually led to a full recovery of the networking control plane by 18:51.</p><p>In order to increase the reliability of Cloud Networking, we will be taking these immediate steps to prevent a recurrence:</p><p>We will complete the rollout of the fix for the race condition during leadership election which resulted in incorrect configuration being distributed. We will harden the components which process that configuration such that they reject obviously invalid configuration. We will improve incident response tooling used in this particular failure case to reduce time to recover.</p><p>Google is committed to quickly and continually improving our technology and operations to prevent service disruptions. We appreciate your patience and apologize again for the impact to your organization. We thank you for your business.</p><p>[1] <a href="https://landing.google.com/sre/sre-book/chapters/managing-critical-state/#highly-available-processing-using-leader-election">https://landing.google.com/sre/sre-book/chapters/managing-critical-state/#highly-available-processing-using-leader-election</a> [2] <a href="https://ai.google/research/pubs/pub27897">https://ai.google/research/pubs/pub27897</a></p></div> <tr><td>✓ Oct 22, 2019</td><td>21:35</td><td><div>The issue with Cloud Networking has been resolved for all affected projects as of Tuesday, 2019-10-22 19:19 US/Pacific.</div><div>We will publish analysis of this incident once we have completed our internal investigation.</div><div>We thank you for your patience while we've worked on resolving the issue.</div></td></tr> <tr><td>✗ Oct 22, 2019</td><td>20:23</td><td><div>Summary: We've received a report of issues with multiple Cloud products including Google Compute Engine, Cloud Memorystore, Google Kubernetes Engine, Cloud Bigtable and Google Cloud Storage</div><div>Description: We've received a report of issues with multiple Cloud products including Google Compute Engine, Cloud Memorystore, Google Kubernetes Engine, Cloud Bigtable and Google Cloud Storage starting around Tuesday, 2019-10-22 16:47 US/Pacific. 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