

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

UNILOC 2017 LLC and UNILOC USA, INC.	§	
	§	
Plaintiffs,	§	CIVIL ACTION NO 2:18-cv-00503
	§	
v.	§	
	§	PATENT CASE
GOOGLE LLC,	§	
	§	
Defendant.	§	JURY TRIAL DEMANDED

**ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiffs Uniloc 2017 LLC and Uniloc USA, Inc. (together “Uniloc”), as and for their complaint against defendant Google LLC (“Google”) allege as follows:

**THE PARTIES**

1. Uniloc 2017 LLC is a Delaware limited liability company having places of business at 620 Newport Center Drive, Newport Beach, California 92660 and 102 N. College Avenue, Suite 303, Tyler, Texas 75702.
2. Uniloc USA, Inc. is a Texas corporation having a place of business at Legacy Town Center I, Suite 380, 7160 Dallas Parkway, Plano, Texas 75024.
3. Uniloc holds all substantial rights, title and interest in and to the asserted patent.
4. On information and belief, Google, a Delaware corporation with its principal office at 1600 Amphitheatre Parkway, Mountain View, CA 94043. Google offers its products and/or services, including those accused herein of infringement, to customers and potential customers located in Texas and in the judicial Eastern District of Texas.

**JURISDICTION**

5. Uniloc brings this action for patent infringement under the patent laws of the United

States, 35 U.S.C. § 271 *et seq.* This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

6. This Court has personal jurisdiction over Google in this action because Google has committed acts within the Eastern District of Texas giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Google would not offend traditional notions of fair play and substantial justice. Google has committed and continues to commit acts of infringement in this District by, among other things, offering to sell and selling products and/or services that infringe the asserted patent.

7. Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400(b). Google is registered to do business in Texas, and upon information and belief, Google has transacted business in the Eastern District of Texas and has committed acts of direct and indirect infringement in the Eastern District of Texas. Google has a regular and established place of business in this District, as set forth below.

8. Google is a multinational technology company that collects, stores, organizes, and distributes data. In addition to its service model for distribution of data (e.g., movies, search results, maps, music, etc.), Google has an expansive regime that gathers data on residents of this District through the hardware devices it sells (e.g., phones, tablets, and home audio devices) and, also, through the operating systems and apps it provides. As an example, Google gathers data when a resident runs its operating systems and apps (e.g., location services).<sup>1</sup> As another example, Google gather's data when a resident interacts with Google's plethora of services such as search, email, and music and movie streaming. See <https://safety.google/privacy/data/> (indicating that Google

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<sup>1</sup> See e.g., "AP Exclusive: Google tracks your movements, like it or not," <https://apnews.com/828aefab64d4411bac257a07c1af0ecb/AP-Exclusive:-Google-tracks-your-movements,-like-it-or-not>

gathers data from “things you search for,” “Videos you watch,” “Ads you view or click,” “Your location,” “Websites you visit,” and “Apps, browsers, and devices you use to access Google services”). As yet another example, Google gathers data by listening and recoding everything a resident says within proximity of one of its products such as Google Home.<sup>2</sup> Others have reported that Google gathers “where you’ve been,” “everything you’ve ever searched – and deleted,” “all the apps you use,” “all of your YouTube history,” “which events you attended, and when,” “information you deleted [on your computer],” “your workout routine,” “years’ worth of photos,” and “every email you ever sent.”<sup>3</sup>

9. Google takes these massive amounts of gathered data on residents of this district and monetizes them, for example, through targeted advertising. Some have reported that “creepy” advertisements for items never searched for, but only spoken out loud appeared. *See e.g.*, <https://www.youtube.com/watch?v=zBnDWSvaQII> (conducting test on the term “dog toys” spoken out loud, but never searched; tester claims targeted “dog toy” advertisements only appeared after speaking the phrase out loud).

10. In addition to extensive data gathering of information on residents of this District, Google has a substantial presence in the District directly through the products and services Google provides residents of this District (some of which also gather data).<sup>4</sup> One of Google’s main

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<sup>2</sup> *See* <https://www.unilad.co.uk/technology/google-is-listening-to-everything-we-say-and-you-can-hear-it-back/> (“Tech giant and the font of all pub quiz knowledge, Google, can quietly record many of the conversations that people have in close proximity to its products.”).

<sup>3</sup> *See* <https://www.theguardian.com/commentisfree/2018/mar/28/all-the-data-facebook-google-has-on-you-privacy>.

<sup>4</sup> Non-limiting examples include Google Search, Maps, Translate, Chrome Browser, YouTube, YouTube TV, Google Play Music, Chromecast, Google Play Movies and TV, Android Phones, Android Wear, Chromebooks, Android Auto, Gmail, Google Allo, Google Duo, Google+, Google Photos, Google Contacts, Google Calendar, Google Keep, Google Docs, Google Sheets, Google Slides, Google Drive, Google Voice, Google Assistant, Android operating system, Project Fi Wireless phone systems, Google Pixel, Google Home, Google Wifi, Daydream View, Chromecast Ultra.

businesses in this District is delivering information, including digital content such as movies, music, apps, and advertising.

11. Google describes itself as an “information company.”<sup>5</sup> Its vision is “to provide access to the world’s information in one click,” and its mission is “to organize the world’s information and make it universally accessible and useful.”<sup>6</sup> Making information available to people wherever they are and as quickly as possible is critical to Google’s business.

Google Global Cache (GGC)

12. As Google’s CEO, Sundar Pichai, explains, “We want to make sure that no matter who you are or where you are or how advanced the device you are using—Google works for you.”<sup>7</sup> To meet this goal, Google developed a content delivery network that it calls the Edge Network.

13. One non-limiting example of physical presence in this District is Google’s Edge Network. Google provides web-based services, such as YouTube, YouTube TV, and Google Play, to users throughout the world. These services are in high demand. Google reports that Google Play reaches more than 1 billion Android users and that YouTube serves over 1.8 billion users per month.<sup>8</sup> Studies show that YouTube alone is responsible for approximately 20% of all internet traffic.<sup>9</sup> YouTube TV, which has been described as an “add-on to YouTube” allows Google to essentially become the local TV provider for residents of this District. For example, residents in this District obtain local Dallas-Fort Worth area channels such as WFAA, ABC (Channel 8); CBS

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<sup>5</sup> See “This Year’s Founder’s Letter” by Alphabet CEO, Sundar Pichai, <https://blog.google/inside-google/alphabet/this-years-founders-letter/>.

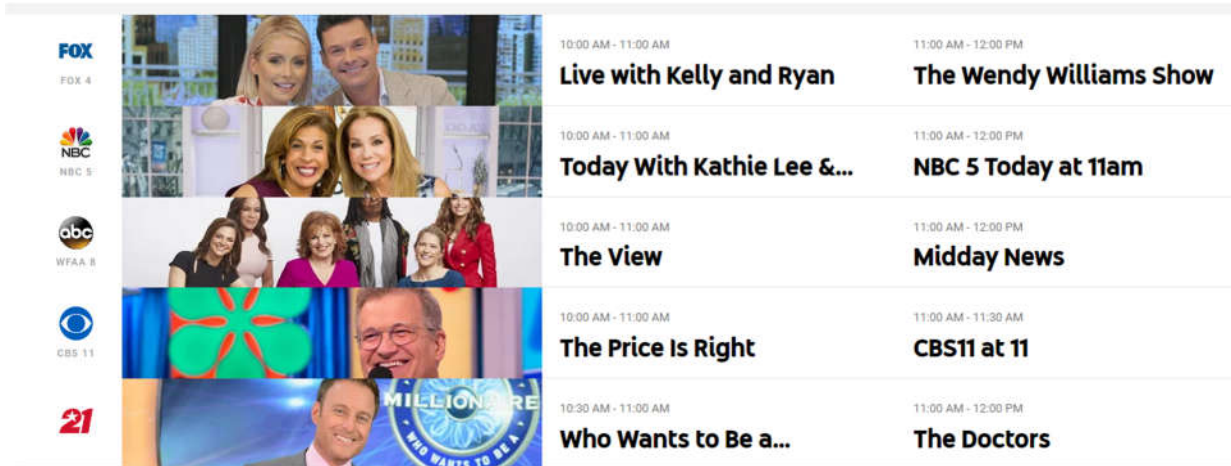
<sup>6</sup> <http://panmore.com/google-vision-statement-mission-statement>.

<sup>7</sup> See e.g., <http://time.com/4311233/google-ceo-sundar-pichai-letter/>.

<sup>8</sup> See <https://www.theverge.com/2018/5/3/17317274/youtube-1-8-billion-logged-in-monthly-users-brandcast-2018>

<sup>9</sup> See <https://www.sandvine.com/hubfs/downloads/archive/2016-global-internet-phenomena-report-latin-america-and-north-america.pdf> and <http://testinternetspeed.org/blog/half-of-all-internet-traffic-goes-to-netflix-and-youtube/>

(Channel 11); NBC (Channel 5); and Fox (Channel 4).<sup>10</sup>



Source: <https://tv.youtube.com/live> (as accessed from this District).

To verify a resident should receive such local channels, Google verifies a location of such resident.

14. Google's Edge Network, itself, has three elements: Core Data Centers, Edge Points of Presence, and Edge Nodes. The Core Data Centers (there are eight in the United States) are used for computation and backend storage. Edge Points of Presence are the middle tier of the Edge Network and connect the Data Centers to the internet. Edge Nodes are the layer of the network closest to users. Popular content, including YouTube TV, YouTube, video advertising, music, mobile apps, and other digital content from the Google Play store, is cached on the Edge Nodes, which Google refers to as Google Global Cache or "GGC".

15. Google Global Cache is recognized as "one of Google's most important pieces of infrastructure,"<sup>11</sup> and Google uses it to conduct the business of providing access to the world's information. GGC servers in the Edge Nodes function as local data warehouses, much like a shoe manufacturer might have warehouses around the country. Instead of requiring people to obtain

<sup>10</sup> See, e.g. <https://support.google.com/youtubetv/answer/7068923?hl=en> and [https://support.google.com/youtubetv/answer/7370552?hl=en&ref\\_topic=7071745](https://support.google.com/youtubetv/answer/7370552?hl=en&ref_topic=7071745).

<sup>11</sup> <http://blog.speedchecker.xyz/2015/11/30/demystifying-google-global-cache/>.

information from distant Core Data Centers, which would introduce delay, Google stores information in the local GGC servers to provide quick access to the data.

16. Caching and localization are vital for Google's optimization of network resources. Because hosting all content everywhere is inefficient, it makes sense to cache popular content and serve it locally. Doing so brings delivery costs down for Google, network operators, and internet service providers. Storing content locally also allows it to be delivered more quickly, which improves user experience. Serving content from the edge of the network closer to the user improves performance and user happiness. To achieve these benefits, Google has placed Edge Nodes throughout the United States, including in this District. Google describes these nodes as the workhorses of video delivery.

17. Just like brick-and-mortar stores, Google's GGC servers independently determine what content to cache based on local requests. The GGC servers in Google's Edge Nodes include software that Google refers to as "µstreamer." µstreamer is responsible for serving video content from YouTube and other Google services, along with other large content such as Google Play applications and Chrome downloads. It operates on a content-delivery platform at the edge of Google's network called "bandaid"; it does not run in the core (except for some internal testing purposes), unlike the majority of the Google services, such as search or Gmail.

18. Using µstreamer and bandaid, a GGC server handles requests directly from its clients, predominantly YouTube's video players. When such a request is received, if the content is stored in the node's local cache, the node will serve it to the end user, improving the user experience and saving bandwidth. If cache-eligible content is not already stored on the node, and the content is cache-eligible, the node will retrieve it from Google, serve it to the user, and store it for future requests.

19. µstreamer is largely autonomous, in the sense that almost all decisions related

to serving a particular request are made locally, without coordinating with other servers. Like a brick-and-mortar store sells directly to customers from inventory and stocks that inventory based on local customer demand, μstreamer in each GGC node decides—independently from other nodes in Google’s Edge Network— whether to serve requested content, whether to cache content, and whether to send requests to other servers.

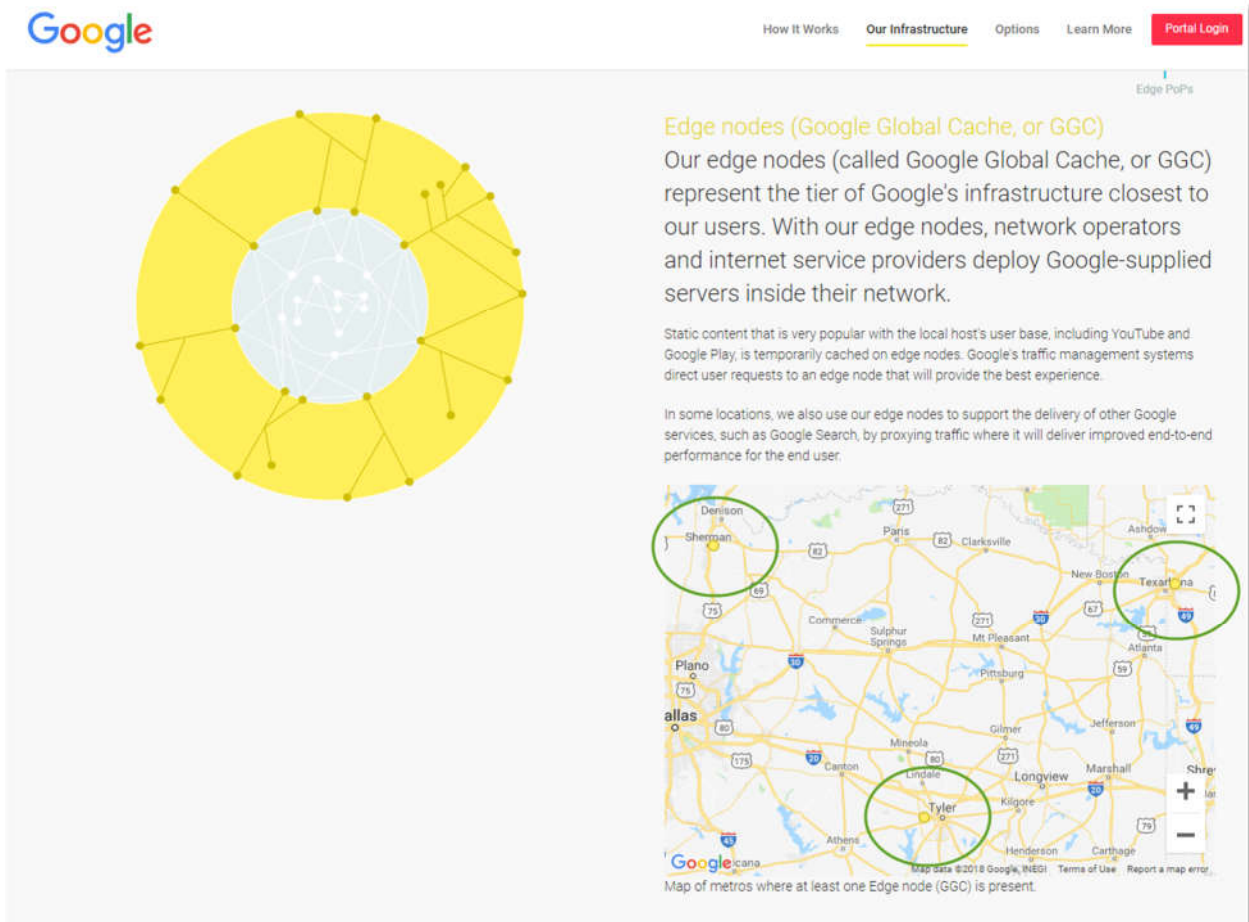
20. Google’s GGC servers are housed in spaces in the District leased by Google. Google’s GGC servers are housed in spaces leased by Google from Internet Service Providers (ISPs) whose networks have substantial traffic to Google and are interested in saving bandwidth. Hosting Google servers allows ISPs to save both bandwidth and costs, as they do not incur the expense of carrying traffic across their peering and/or transit links.

21. When an ISP agrees to host a GGC server, the parties enter into a Global Cache Service Agreement, under which Google provides:

- hardware and software— including GGC servers and software—to be housed in the host’s facilities;
- technical support; service management of the hardware and software; and
- content distribution services, including content caching and video streaming.

In exchange, the host provides, among other things, a physical building, rack space where Google’s computer hardware is mounted, power, and network interfaces. All ownership rights, title, and intellectual property rights in and to the equipment (i.e., the hardware and software provided by Google) remain with Google and/or its licensors.

22. Multiple ISPs hosted GGC servers are in this District. Google provides the location of its GGC servers, namely Sherman, Tyler, and Texarkana.



The screenshot shows the Google Infrastructure page. On the left is a diagram of a circular network structure with a central blue node and an outer yellow ring of nodes connected by lines. On the right, the text reads:

**Edge nodes (Google Global Cache, or GGC)**  
 Our edge nodes (called Google Global Cache, or GGC) represent the tier of Google's infrastructure closest to our users. With our edge nodes, network operators and internet service providers deploy Google-supplied servers inside their network.

Static content that is very popular with the local host's user base, including YouTube and Google Play, is temporarily cached on edge nodes. Google's traffic management systems direct user requests to an edge node that will provide the best experience.

In some locations, we also use our edge nodes to support the delivery of other Google services, such as Google Search, by proxying traffic where it will deliver improved end-to-end performance for the end user.

Below the text is a map of Texas with three locations circled in green: Sherman, Tyler, and Texarkana. The map is titled "Map of metros where at least one Edge node (GGC) is present."

Source: <https://peering.google.com/#/infrastructure>

23. Suddenlink Communications, for example, is an ISP that hosts six GGC servers in Tyler, Texas.

24. CableOne is an ISP that hosts three GGC servers in Sherman, Texas, and three GGC servers Texarkana, Texas.

25. Google caches content on these GGC servers located in this District.

26. Google's GGC servers located in this District cache content that includes, among other things: (i) video advertising; (ii) apps; and (iii) digital content from the Google Play store.

27. Google's GGC servers located in this District deliver cached content for the items in the preceding paragraph to residents in this District.

28. Google generates revenue (i) by delivering video advertising, (ii) from apps,



and (iii) from digital content in the Google Play store.

29. Google treats its GGC servers in this District the same as it treats all of its other GGC servers in the United States.

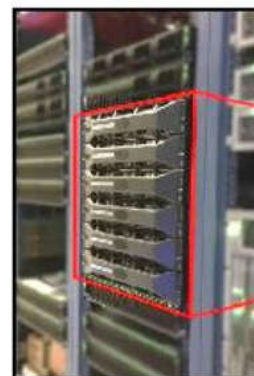
30. The photographs below show Google’s GGC servers hosted by Suddenlink and the building where they are located at 322 North Glenwood Boulevard, Tyler, Texas 75702.



**Exterior**



**Interior Rack Spaces**



**Google GGC Servers**

31. Google not only exercises exclusive control over the digital aspects of the GGC, Google, but also exercises exclusive control over the physical server and the physical space within which the server is located and maintained.

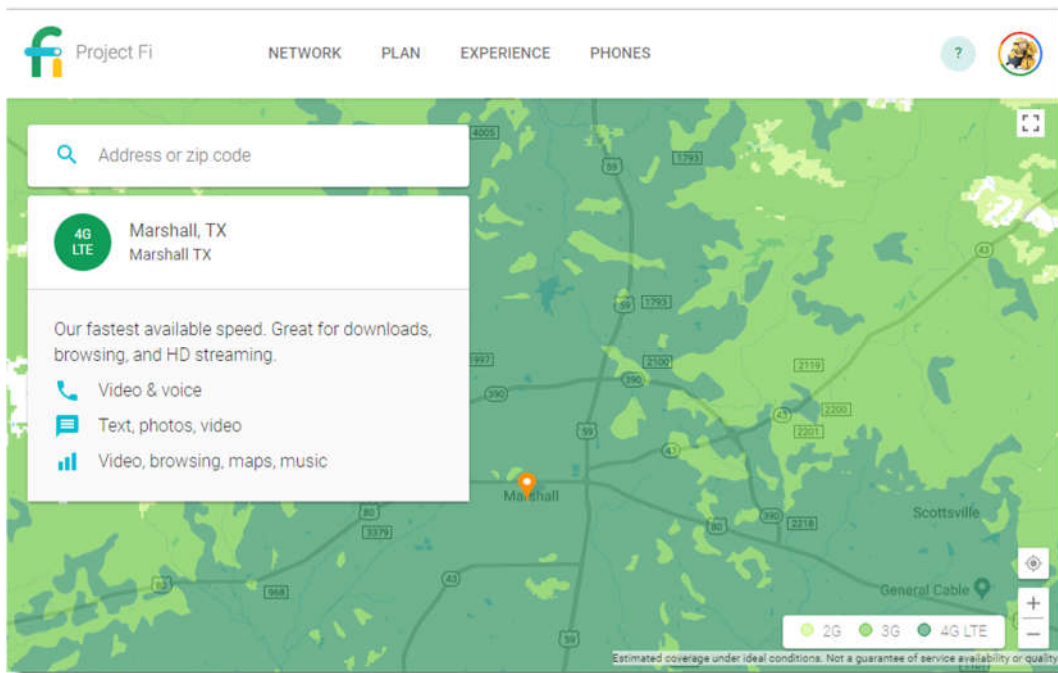
32. This District has previously determined that the GGC server itself and the place of the GGC server, both independently and together, meet the statutory requirement of a “physical place.” See *Seven Networks, LLC v. Google, LLC*, Case No. 2:17-cv-00442-JRG (E.D. Tex.)(Jul. 19, 2018) at Page 24.

33. Likewise, this District has determined that GGC servers and their several locations within this District constitute “regular and established place[s] of business” within the meaning of the special patent venue statute See *Seven Networks, LLC v. Google, LLC*, Case No. 2:17-cv-00442-JRG (E.D. Tex.)(Jul. 19, 2018) at page 38.

34. Similarly, this District has determined that the GGC servers and their locations within the various ISPs within this District are “places of Google” sufficient to meet the statutory requirement of § 1400(b). *See Seven Networks, LLC v. Google, LLC*, Case No. 2:17-cv-00442-JRG (E.D. Tex.)(Jul. 19, 2018) at page 41.

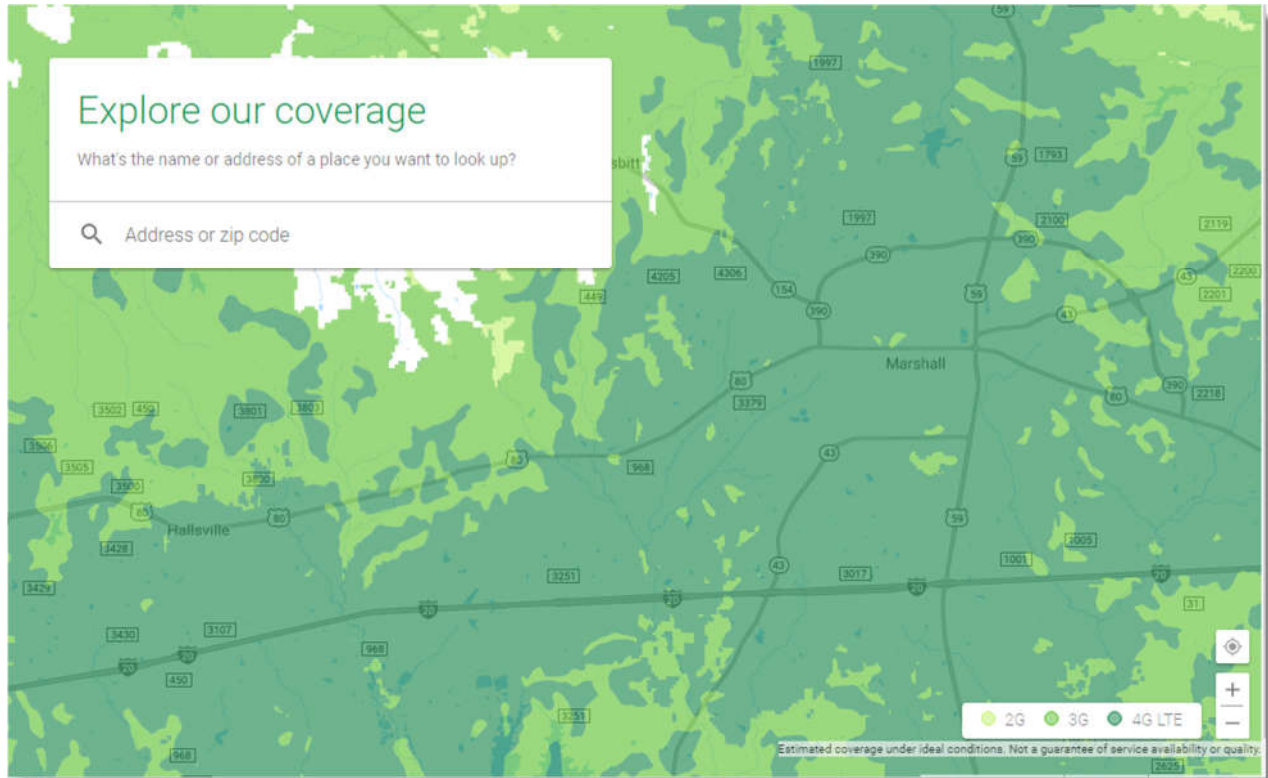
*Google’s Cell Phone Service (aka Google Fi)*

35. Google also provides phone, messaging, and data services in this District from its wireless phone services called Google Fi. Via this Google Fi service, Google provides its customers voice and high-speed data coverage (4G LTE) for cities such as Tyler and Marshall, TX.



Source: <https://fi.google.com/coverage?q=Marshall%2C%20TX%2C%20USA>

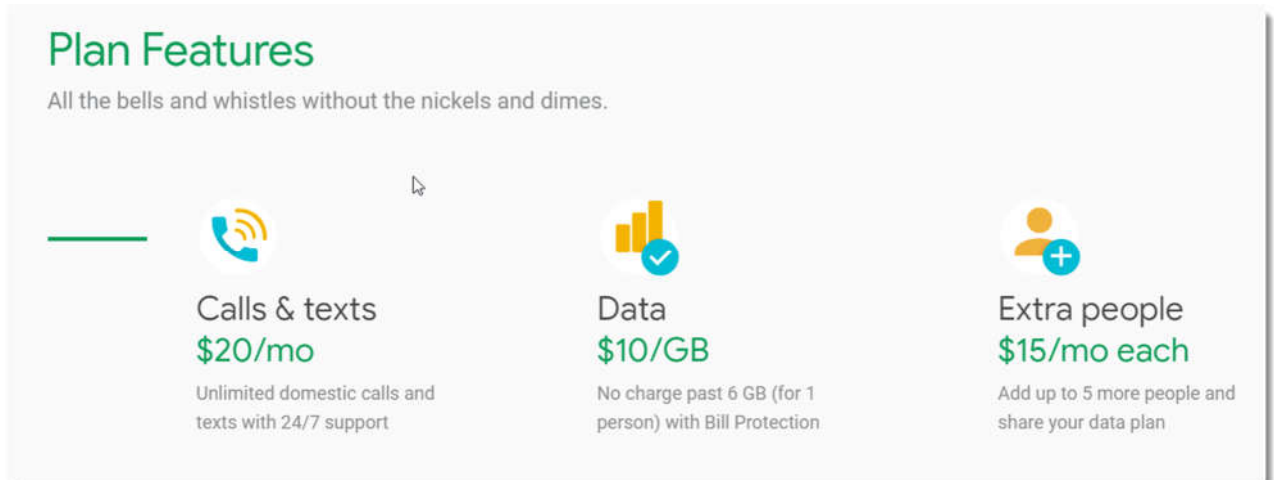
36. The cell towers used for Google’s services are fixed geographical locations. They are “regular” and “established” because they operate in a “steady, uniform, orderly, and methodical manner” and are sufficiently permanent. They are “of the defendant” because Google has contractual and/or property rights to use the cell towers to operate its business. Google also ratifies the service locations through its coverage lookup service.



Source: <https://fi.google.com/coverage?>

37. With this coverage lookup service, Google advertises its ability to provide cell coverage in this District and it selected cell towers in and near this District to provide the advertised coverage (e.g., 2G, 3G, or 4GLTE) depending on the location in the District. See <https://fi.google.com/coverage?>. Google is not indifferent to the location of its cell towers. It “established” and “ratified” them where they are for a specific business purpose.

38. Residents of this District also directly contract with and are billed by Google for these services.



**Plan Features**  
All the bells and whistles without the nickels and dimes.

- Calls & texts**  
\$20/mo  
Unlimited domestic calls and texts with 24/7 support
- Data**  
\$10/GB  
No charge past 6 GB (for 1 person) with Bill Protection
- Extra people**  
\$15/mo each  
Add up to 5 more people and share your data plan

Source: <https://fi.google.com/about/plan>

39. Google also determines which cell tower a particular project Fi customer will use while within the District.

✓ What determines when Project Fi moves me between cellular networks?


When multiple carriers are available, Project Fi will move you to the network that our analysis shows will be fastest in your current location, whether that is 4G LTE, 3G, or 2G. We're constantly learning and improving, to account for factors such as newly-built towers or newly-available radio frequencies. And if your current network is providing weak or no coverage, we'll adjust in real time to find you a stronger connection.

Source: <https://fi.google.com/about/faq/#network-and-coverage-4>

Google Cloud Interconnect (GCI) and Direct Peering

40. Google additionally services its customers in this District (and other districts) through yet other facilities it has in this District. More particularly, Google's equipment is located in this District in Denton County Texas at two facilities referred to as "Megaport." At the Megaport facilities in this District, Google offers two services: Google Cloud Interconnect (GCI) and Direct Peering.

41. Google Cloud's Interconnect (GCI) is a service from Google that allows customers to connect to Google Cloud Platform directly as opposed to, for example, over the public network.



### Partner Interconnect

You can also extend your data center network into your Google Cloud projects through the service providers you know and love, Partner Interconnect offers enterprise-grade connections similar to Dedicated Interconnect. This solution allows you to add connectivity from your on-premises network to your GCP VPC through one of Google Cloud's many [service provider partners](#).

Partner Interconnect gives you bandwidth options from 50Mbps - 10Gbps allowing you to connect to your VPC and to extend your corporate data center's IP space into the Google cloud by choosing the bandwidth that works best for your needs. This allows you to work with our partners to get similar SLA options as provided by Dedicated Interconnect when you are not able to meet us at one of our dedicated interconnect locations.

Please see the Partner Interconnect [documentation](#) for details on how to create a Partner Interconnect in your GCP Project.

Source: <https://cloud.google.com/interconnect/>

42. Google's Direct Peering services allows its customers to exchange Internet traffic between its customers network and Google's at one of its broad-reaching Edge network locations such as the one at Megaport.

## Direct Peering



[SEND FEEDBACK](#)

Connect your business network directly to Google at any of 100+ locations in 33 countries around the world and exchange high throughput cloud traffic.

### What is direct peering?

Google allows you to establish a direct [peering](#) connection between your business network and Google's. With this connection you will be able to exchange Internet traffic between your network and Google's at one of our broad-reaching Edge network locations. Visit [Google's peering site](#) to find out more information about edge locations.

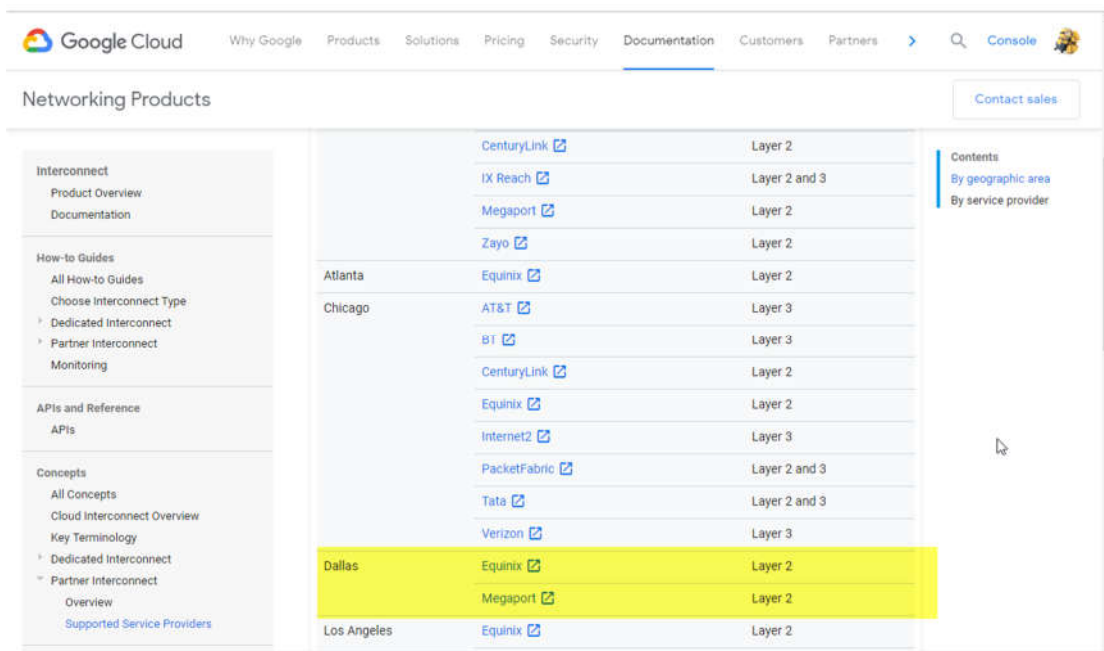
Direct peering with Google is done by exchanging BGP routes between Google and the peering entity. After a direct peering connection is in place, you can use it to reach all of Google's services including the full suite of Google Cloud Platform products.

Source: <https://cloud.google.com/interconnect/docs/how-to/direct-peering>

43. In establishing such a direction connection, Google provides the necessary physical

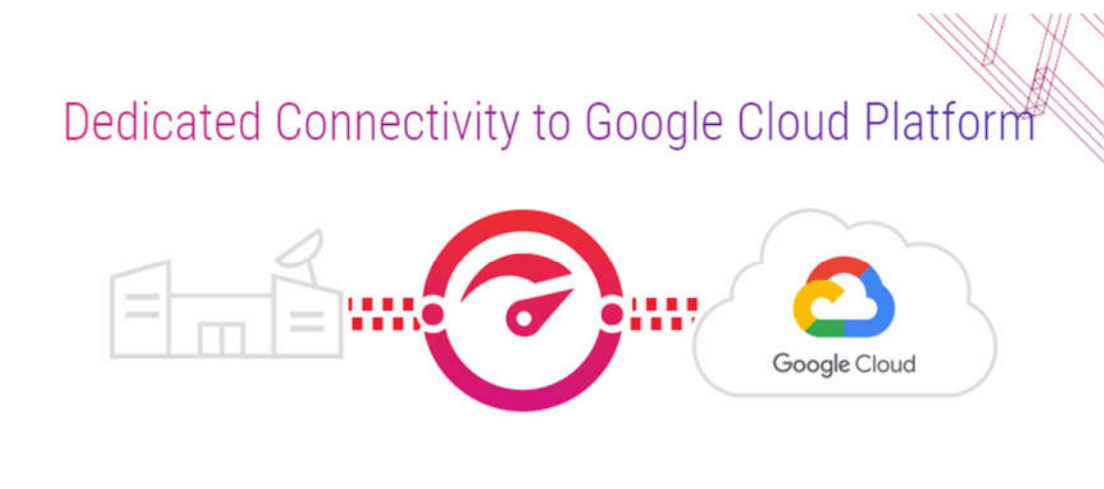


equipment at Megaport to enable such GCI or Direct Peering connections. Google advertises only two GCI facilities in Texas – the Equinix facility and Megaport facility (the latter is located in this District).



Source: <https://cloud.google.com/interconnect/docs/concepts/service-providers#by-location>

44. Clicking on the Megaport link from screenshot of Google’s website in the preceding paragraph directs a customer as to the details of directly connecting to Google’s equipment at the facility in this District to connect to Google’s GCI service.



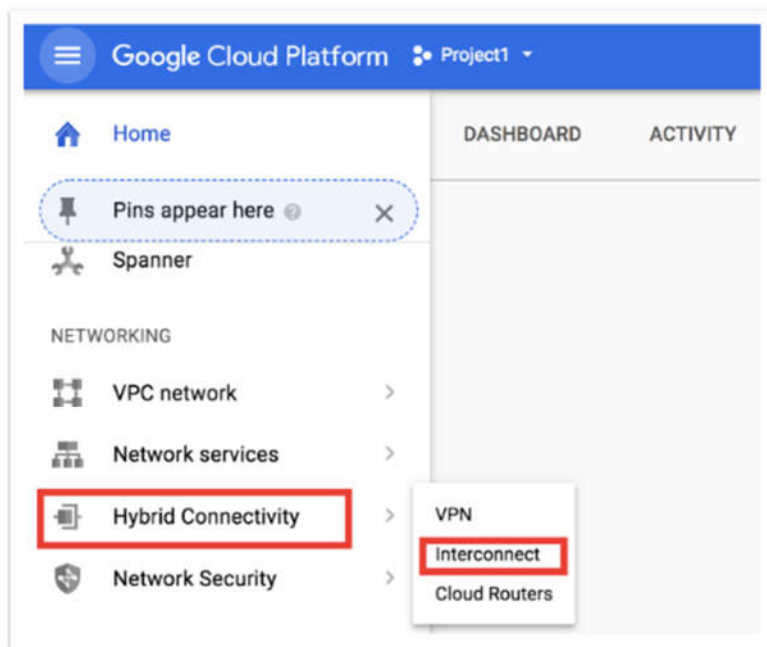
<https://www.megaport.com/services/google-cloud-partner-interconnect/>

45. More particularly, the Google-linked Megaport site explains how a Google customer can use the Google Cloud Platform console to enable connection to the Google equipment at the Megaport facility in this district.

## VXC Deployment Steps

First, you will need to log in to your Google Cloud Console and create a Pairing Key: [Google Console Link](#)

Next, click on the main menu in the Google Console, then select 'Hybrid Connectivity' and 'Interconnect' from the drop-down.



Source: [https://knowledgebase.megaport.com/cloud-connectivity/google-cloud/?\\_ga=2.258056911.476938490.1538320465-1560947970.1538320465](https://knowledgebase.megaport.com/cloud-connectivity/google-cloud/?_ga=2.258056911.476938490.1538320465-1560947970.1538320465)

46. Both Google's website and Megaport's website advertise the peering service and point a consumer the website, [www.peeringdb.com](http://www.peeringdb.com), for details. The peering DB website lists Megaport Dallas as a Google peering facility.

## Who can peer with Google?

Any Google Cloud Platform customers that meet Google’s technical peering requirements specified in [our peering page](#) can be considered for the direct peering service. Google can peer at the Internet Exchanges (IXPs) and private facilities that are listed in our [PeeringDB entry](#).

Source: <https://cloud.google.com/interconnect/docs/how-to/direct-peering>

### Megaport – Google IX Peering Locations:

- MegalX: Ashburn, Dallas, Los Angeles, Seattle, Singapore, Sofia, Sydney
- AMS-IX: Chicago, New York, Bay Area

See [PeeringDB](#) for additional details.

<https://knowledgebase.megaport.com/cloud-connectivity/google-cloud-platform-direct-peering/>

The screenshot shows the PeeringDB website interface. At the top, there is a search bar and navigation links for 'Register or Login'. Below the search bar, the profile for 'Google LLC' is displayed, including details like 'Organization', 'Also Known As', 'Company Website', 'Primary ASN' (15169), 'IRR Record' (AS-GOOGLE), and 'Route Server URL'. To the right, a table titled 'Public Peering Exchange Points' lists various exchange points with columns for 'Exchange', 'ASN', 'IPv4', 'IPv6', and 'Speed'. The 'MegalX Dallas' entry is circled in green.

Exchange	ASN	IPv4	IPv6	Speed	RS Peer
MegalX Dallas	15169	206.53.174.7	2006:a980:0:3::9	10G	✓
MegalX Los Angeles	15169	206.53.172.10	2006:a980:0:7::7	10G	✓
	15169		2006:a980:0:5::a		✓

<https://www.peeringdb.com/net/433>

47. Megaport’s website also confirms in its “Looking Glass” tool the presence of Google at its facility – (AS No. 15169).



The screenshot shows the Megaport Looking Glass interface. On the left, a sidebar lists various IX locations: Ashburn IX (ASN: 64216), Auckland IX (ASN: 63839), Brisbane IX (ASN: 58942), Dallas IX (ASN: 64222), Las Vegas IX (ASN: 64220), Los Angeles IX (ASN: 64220), Melbourne IX (ASN: 58943), and Perth IX (ASN: 58941). The main content area displays a table of ASes with columns for DESCRIPTION, AS, RS1, and RS2. The AS 15169 (Google Inc.) is highlighted in grey, and its details are shown in a modal window below. The modal window shows the primary route for AS 15169, with a table of prefixes and their associated metrics.

DESCRIPTION	AS	RS1	RS2	Details	Routes
Akamai International B.V.	20940	●	●	Details	Routes
CloudFlare	13335	●	●	Details	Routes
DSV AS	49362	●	●	Details	Routes
Google Inc	15169	●	●	Details	Routes

PREFIX	BEST	NEXT HOP	LOCAL PREF	ORIGIN	AS PATH	SINCE
104.132.0.0/14	Y	206.53.174.7	100	36384	15169 36384	2018-08-23 22:12
104.132.113.0/24	Y	206.53.174.7	100	41264	15169 41264	2018-09-25 23:23
104.132.114.0/24	Y	206.53.174.7	100	41264	15169 41264	2018-09-07 19:02
104.132.116.0/24	Y	206.53.174.7	100	41264	15169 41264	2018-09-19 14:47
104.132.117.0/24	Y	206.53.174.7	100	41264	15169 36384 41264	2018-09-24 02:19
104.132.118.0/24	Y	206.53.174.7	100	41264	15169 41264	2018-09-21 20:03
104.132.119.0/24	Y	206.53.174.7	100	41264	15169 41264 41264	2018-09-30 10:14

Source: <https://portal.megaport.com/tools/looking-glass>

48. Both of Megaport’s “Dallas” locations are in the Eastern District of Texas in Denton County.<sup>12</sup> The larger Megaport facility, the Carrollton facility, is located at 1649 West Frankford Rd and is the largest of its kind in the state of Texas.<sup>13</sup> The smaller Megaport facility, the Lewisville facility, is located at 2501 St. State Hwy 121.

49. The Google equipment at Megaport’s facilities which provide the GCI and Direct Peering services for Google customer are fixed geographical locations. They are “regular” and “established” because they operate in a “steady, uniform, orderly, and methodical manner” and are sufficiently permanent. They are “of the defendant” because Google holds contractual and/or property rights to use this space and to maintain this equipment. Google also ratifies the equipment through advertising of the Megaport location as authorized to provide these Google services.

<sup>12</sup> <https://www.megaport.com/blog/cyrusone-brings-dallas-closer-cloud/>

<sup>13</sup> *Id.*

Other Google Presence in this District

50. In addition to the Google presence described above, Google has other pervasive contacts in this District.

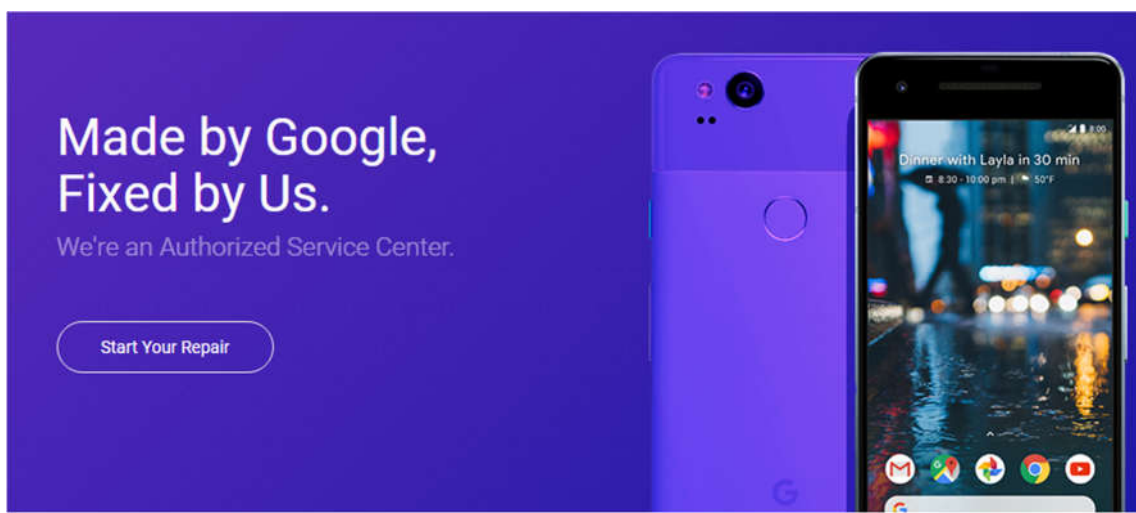
51. Google has multiple authorized repair centers in the Eastern District. A resident can visit Google’ website to find a list of these repair centers:

United States	<a href="#">uBreakiFix</a>	Pixel, Pixel XL, Pixel 2, Pixel 2 XL	Walk-in	<ul style="list-style-type: none"> <li><a href="#">uBreakiFix</a></li> <li>Phone: 1-877-320-2237</li> </ul>
	<a href="#">Puls</a>	Pixel, Pixel XL, Pixel 2, Pixel 2 XL	At home (Dial-in)	<ul style="list-style-type: none"> <li><a href="#">Puls</a></li> <li>Phone: (855) 256-3709</li> </ul>
	<a href="#">Google</a>	Pixel, Pixel XL, Pixel 2, Pixel 2 XL	Mail-in	<ul style="list-style-type: none"> <li><a href="#">Google</a></li> <li>Repair program currently expanding, option might not be available</li> </ul>

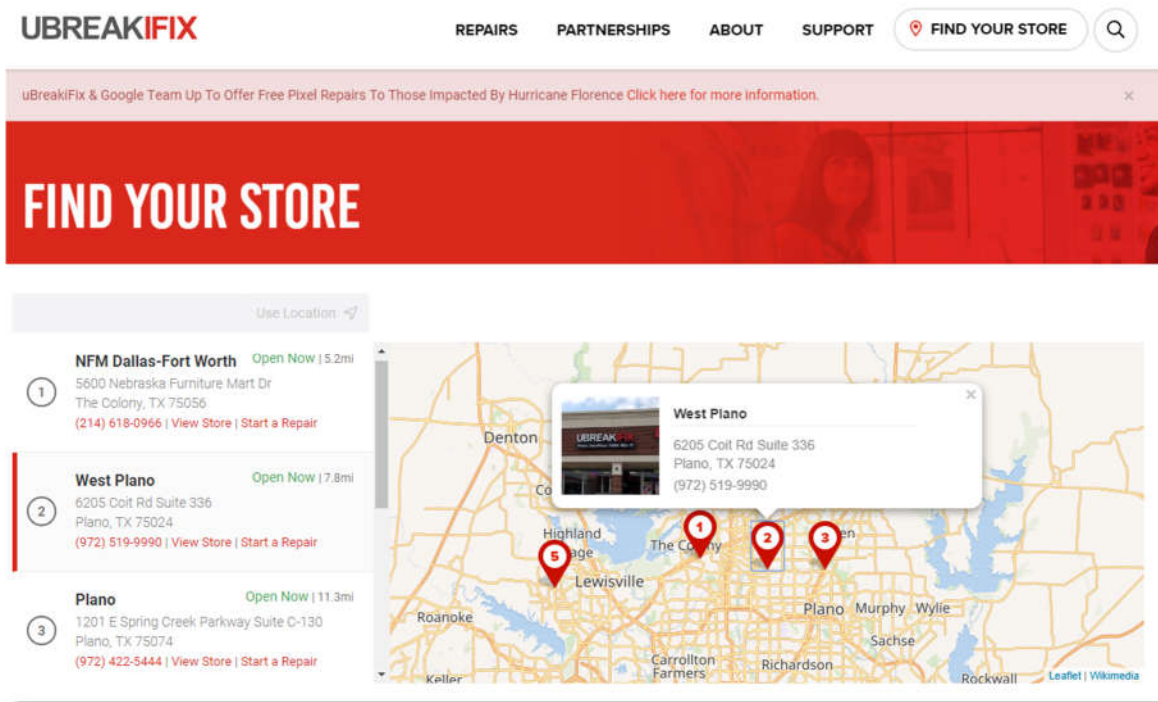
In US and Canada, replacement of parts or product service is made available for a minimum of three years after end of production for all phones through Google or its service providers.

Source: <https://support.google.com/store/answer/7182296?hl=en>

52. Google’s only authorized walk-in repair center, uBreakiFix, lists at least four facilities in this District



Source: <https://www.ubreakifix.com/google>



Source: <https://www.ubreakifix.com/google>

53. Google and uBreakiFix teamed up to offer free repairs to those impacted by Hurricane Florence.<sup>14</sup>

54. uBreakiFix has fixed geographical location. They are “regular” and “established” because they operate in a “steady, uniform, orderly, and methodical manner” and are sufficiently permanent. These stores are “of the defendant” because Google has contractual rights with uBreakiFix -- the only authorized walk-in repair centers in the United States. Google also ratifies these facilities through its advertising of them through its website.

55. Google’s also has a branded mail-in repair service that is contracted with a company called KMT Wireless, LLC dba Cynergy. Cynergy receives phones at its facility in Grapevine, TX.

<sup>14</sup> See <https://www.ubreakifix.com/blog/hurricane-florence>

United States	uBreakiFix <a href="#">☑</a>	Pixel, Pixel XL, Pixel 2, Pixel 2 XL	Walk-in	<ul style="list-style-type: none"> <li>• uBreakiFix <a href="#">☑</a></li> <li>• Phone: 1-877-320-2237</li> </ul>
	Puls <a href="#">☑</a>	Pixel, Pixel XL, Pixel 2, Pixel 2 XL	At home (Dial-in)	<ul style="list-style-type: none"> <li>• Puls <a href="#">☑</a></li> <li>• Phone: (855) 256-3709</li> </ul>
	Google <a href="#">☑</a>	Pixel, Pixel XL, Pixel 2, Pixel 2 XL	Mail-in	<ul style="list-style-type: none"> <li>• Google <a href="#">☑</a></li> <li>• Repair program currently expanding, option might not be available</li> </ul>

In US and Canada, replacement of parts or product service is made available for a minimum of three years after end of production for all phones through Google or its service providers.

Source: <https://support.google.com/store/answer/7182296?hl=en>

56. Google has operated and is currently operating its Google Maps Street View business and services in this District. For example, the image below shows the Google Maps Street View of the Eastern District of Texas courthouse in Marshall.



Source: <https://www.google.com/maps/@32.5447534,-94.3670371,3a,75y,170.99h,76.06t/data=!3m6!1e1!3m4!1smECZXIUFylR2yu5E-6wj2g!2e0!7i13312!8i6656>

Furthermore, in the lower right-hand corner of the Google Street View above, the image is credited to Google and states that it was captured in June 2016.



57. Google also operates a Street View car in and around this District in order to provide the Google Maps Street View service.<sup>15</sup>

58. In addition to the above Google Street View image, Google operates and continues to operate a fleet of Google Street View vehicles in this District, including in the counties of Houston, Trinity, Polk, Angelina, Anderson, VanZandt, Denton, and Collin, as shown below.

**WHERE WE'VE BEEN & WHERE WE'RE HEADED NEXT**

The blue areas on the map show where Google has collected Street View. Zoom in for greater detail, or browse this content with our websites and apps. The list shows where we're driving (or Trekking) next. Select a country to browse.

Because of factors outside our control (weather, road closures, etc), it is always possible that our cars may not be operating, or that slight changes may occur. Please also be aware that where the list specifies a particular city, this may include smaller cities and towns that are within driving distance.

Oregon	Clackamas County, Multnomah County, Washington County	June 2018 – October 2018
Pennsylvania	Delaware, Philadelphia, Bucks, Montgomery, Berks, Lancaster, York, Lebanon, Dauphin, Schuylkill, Lehigh, Northampton, Adams, Venango, Clarion, Jefferson, Indiana, Armstrong, Butler, Allegheny, Westmoreland	March 2018 – November 2018
Tennessee	Knox, Jefferson, Grainger, Union, Anderson, Rane, Loudon	March 2018 – October 2018
Texas	Houston, Trinity, Polk, Angelina, Anderson, Leon, Madison, Walker, Caldwell, Comal, Guadalupe, Hays, Travis, Williamson, Dallas, Ellis, Johnson, Hood, Tarrant, Rockwall, Rains, VanZandt, Denton, Collin, Hunt	January 2018 – December 2018
Virginia	New Kent, Sussex, Hanover, Caroline, Essex, King and Queen, Gloucester, York, King William	June 2018 –

Source: <https://www.google.com/streetview/understand/>

<sup>15</sup> See <https://www.google.com/streetview/understand/>



59. Google also has operated and currently operates its Google Express business and services in this District. Google Express allows residents of this District to shop – directly from Google’s website – for select products with companies that Google has contracted with.

### About Google Express

## Get your shopping done fast

#### Many top stores, one fast checkout.

Shop [Walmart](#), [Costco](#), [Target](#), and more—all in one place. Enter your info once, whether you’re checking out from one store or five. Need it again? A few quick taps is all it takes to reorder things you buy regularly.

#### A shopping list you’ll never forget.

Start a shopping list on Google Express and add to it or check things off from the website or app, wherever you are. Add items for later, share it with others, and shop from it with just a click. Check out these [step-by-step instructions](#).

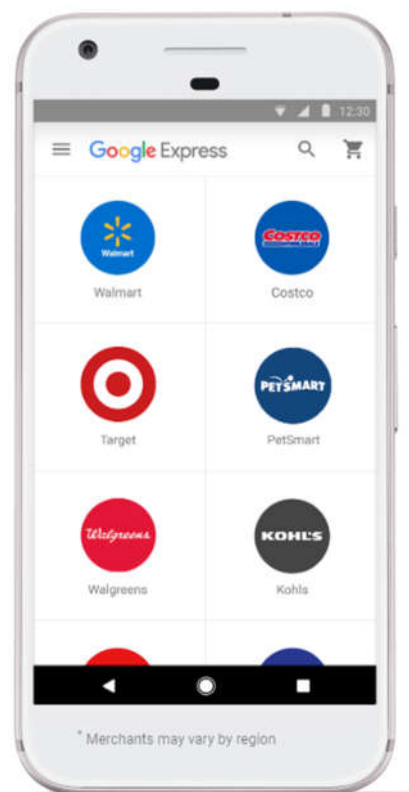
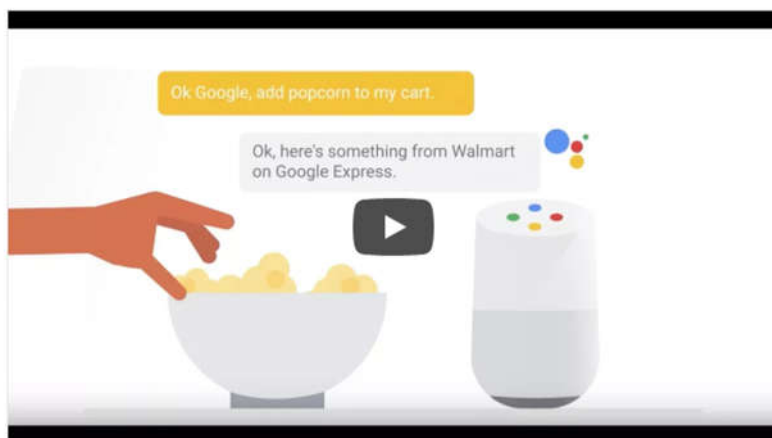
#### Free delivery, no membership.

Order the store minimum for free delivery—\$25 to \$35 in most cases. No memberships here.

#### Shop by voice, and app, and web.

When you think of something you need, you can shop for it on the app, the website, or with your Google Home device just by saying “OK Google, buy olive oil,” and [get help here](#).

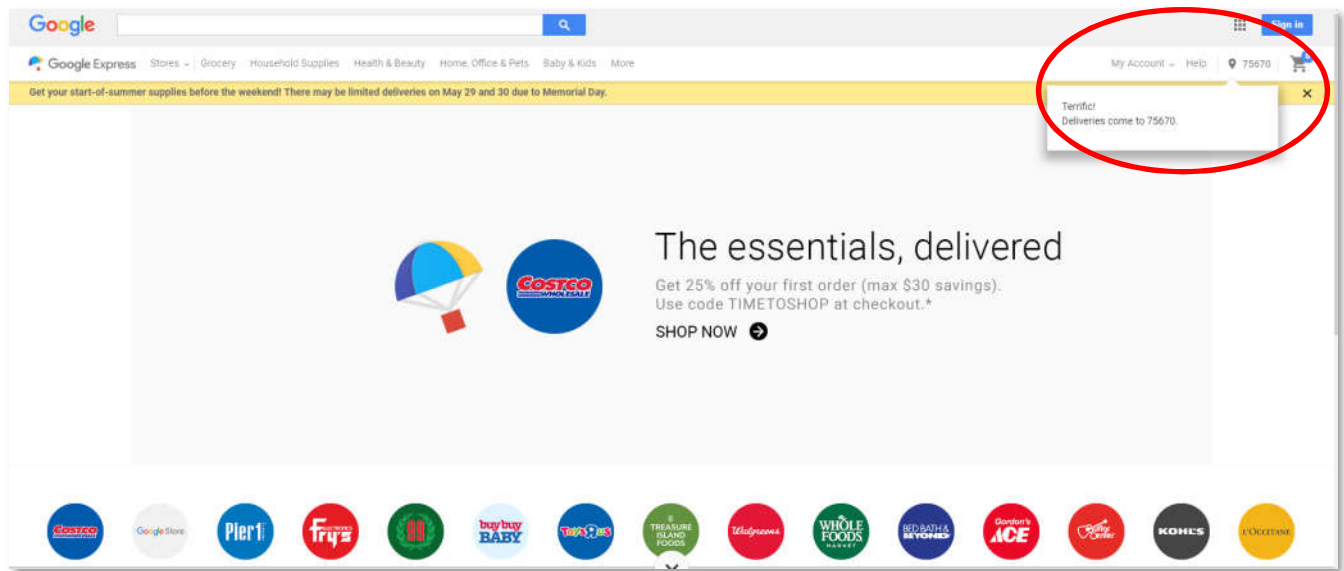
### How it works



Source: <https://express.google.com/u/0/about>

To verify which stores a user may shop, a resident enters his or her zip code and begins shopping at the Google contracted stores. The image below shows the Google Express website showing

that its business and services are available in this District.



Source: <https://www.google.com/express/>

60. Google provides its Google Express business and services to the residents of this District by advertising and inviting the residents of this District, then Defendant arranges for a delivery company to bring the goods and products purchased through the Google Express website to the residents of this District.<sup>16</sup> This service uses fixed geographical stores in this District. They are “regular” and “established” because they operate in a “steady, uniform, orderly, and methodical manner” and are sufficiently permanent. They are “of the defendant” because Google ratifies the stores (and select products of the stores) through its website. Only information provided by Google through its service can be purchased although the store may have other items for sale.

61. Google previously leased office space in this District for about 50 people through its Frisco, TX office.

62. Google also provides services to business and schools in this District including email services, word processing software, electronic file storage services, and video conferencing

<sup>16</sup> See <https://support.google.com/express/answer/4561693?hl=en>

services. Google brands such services as “G Suite” services. Non-limiting examples of such business and schools include the Frisco Independent School District, as shown below.<sup>17</sup>

**How do I login?**

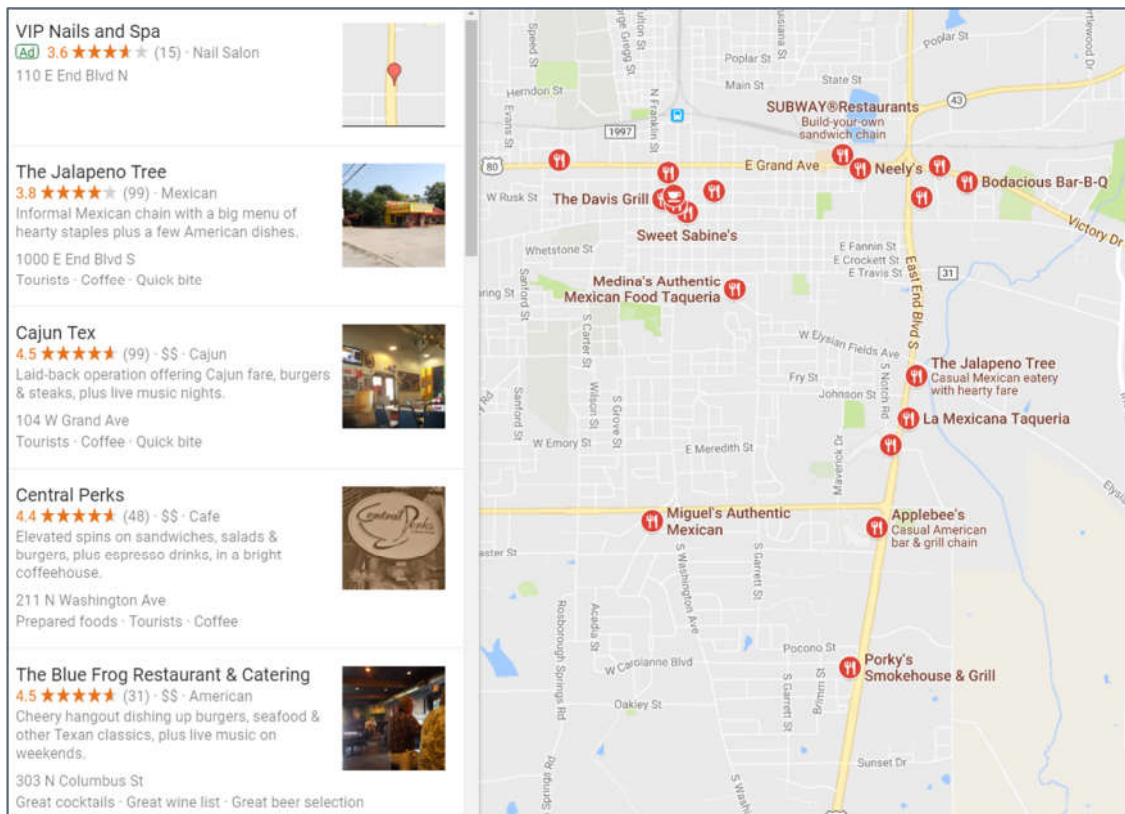
Each student in Fisd has a Google login. The username is their Frisco ISD email address, which is [firstname.lastname.###@k12.friscoisd.org](mailto:firstname.lastname.###@k12.friscoisd.org)

where the ### is the last three digits of their student id#. This address uses the full legal first name and full legal last name of the student, and does not recognize nicknames. All teachers have access to student gmail addresses and can help if you aren't sure what the username is.

The password will most likely be the student birth date in 8 digits MMDDYYYY.

Source: <http://schools.friscoisd.org/ms/vandeventer/site/resources/accessing-google-applications>

63. Google also provides advertising services to businesses in this District, including soliciting reviews of patrons that have visited a business in the Eastern District of Texas, as shown below.

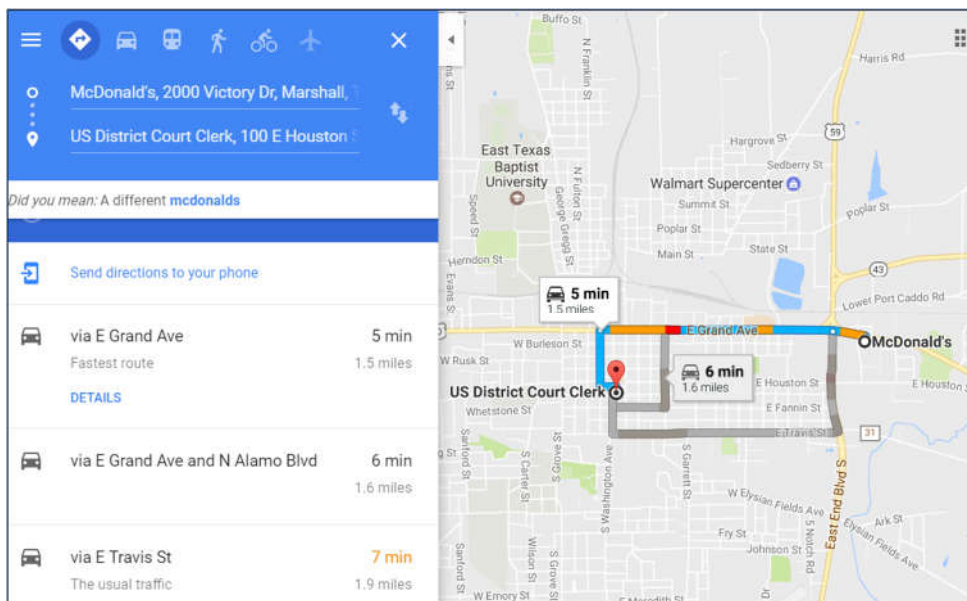


<sup>17</sup> See <http://schools.friscoisd.org/ms/vandeventer/site/resources/accessing-google-applications>



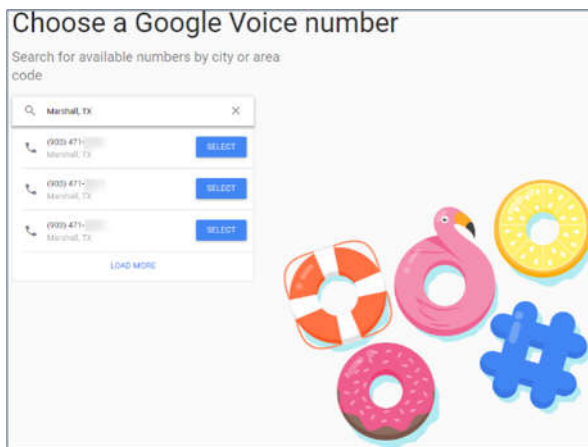
Source: product testing through [www.maps.google.com](http://www.maps.google.com)

64. Google also monitors traffic conditions in this District. For example, traffic conditions between a McDonalds and the Federal Courthouse in Marshall, as shown below.



Source: Product testing at [www.maps.google.com](http://www.maps.google.com)

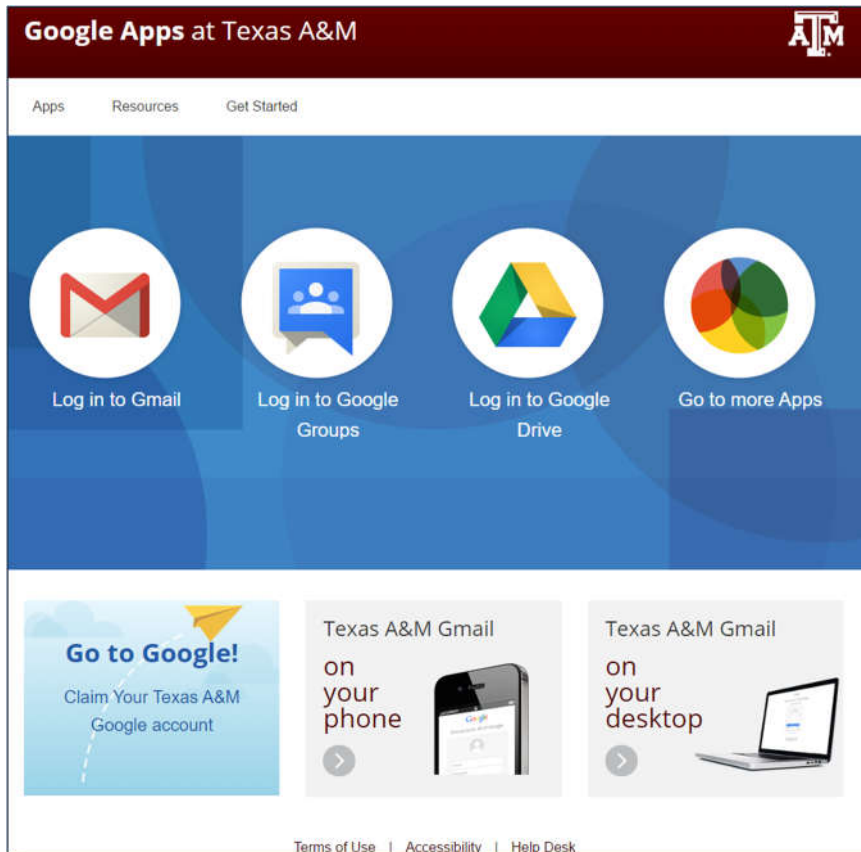
65. Separate and apart from its Google Fi mobile service, Google also provides telephone services to residents in this District through a product it calls Google Voice.<sup>18</sup> A user of Google voice can select local numbers, for example, in Marshall, TX.



<sup>18</sup> See <http://www.wikihow.com/Get-a-Google-Voice-Phone-Number>

Source: Product testing at <https://voice.google.com/signup>

66. Google provides Software-as-a-Service applications, including email and server space, to Texas public universities. Non-limiting examples of such universities are Texas A&M University (which has facilities in this District) and Texas A&M Commerce (located in this District), as shown below.



Source: <http://google.tamu.edu/>

```
Welcome Lions to your new LeoMail 2.0 found in your myLEO homepage located
at myLEO.tamu-commerce.edu.
We hope you take some time to look through your new student email. As a
reminder the new email is a gmail platform and share many features that a
regular gmail account has.

In addition to email, you will have the ability to build your own contacts
list and use the built in calendar for planning and organizing.
The most asked question has revolved around the ability to sync this email
account with your mobile or smart phone device. The answer is ^yes^2. The
Portal Implementation Team is working on getting both the email and your NEW
myLEO account connected in an application that will be available in June.
```

Source: <http://mailman.tamuc.edu/pipermail/students/2012-May/004325.html>

Other Google Presence in the State

67. Google also has pervasive connection to the state of Texas through multiple commercial activities.

68. Google has purchased land in Midlothian, TX where it plans to build a half-a-billion-dollar data center.<sup>19</sup>

69. Since 2007, Google has employed “hundreds” of employees in Texas, including in Austin, Texas.<sup>20</sup>

70. Google has at least one current office located in Austin, on North MoPac Expressway,<sup>21</sup> and additional office locations at University Park and Austin’s Children Museum.<sup>22</sup>

71. Google has leased over 200,000 square feet of office space in Austin, Texas, at 500 West 2nd Street.<sup>23</sup>

72. Google has, as of September 2018, job postings for Addison, TX; Dallas, TX; Midlothian, TX; and Austin, TX (38 postings) including positions such as:<sup>24</sup>

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<sup>19</sup> See <https://www.datacenterknowledge.com/google-alphabet/google-buys-property-build-data-center-near-dallas>

<sup>20</sup> According to Gerardo Interiano, Google's public affairs and government relations manager, in a statement. See <http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/>

<sup>21</sup> See <https://www.google.com/intl/en/about/locations/?region=north-america>

<sup>22</sup> See <http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/>

<sup>23</sup> See <http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/>

<sup>24</sup> See <https://careers.google.com/jobs#t=sq&q=j&li=20&l=false&jl=32.7766642%3A-96.79698789999998%3ADallas%2C+TX%2C+USA%3AUS%3A%3A25.77719109274963%3ALOCALITY&jld=20&&jcoid=7c8c6665-81cf-4e11-8fc9-ec1d6a69120c&jcoid=e43afd0d-d215-45db-a154-5386c9036525&> and <https://careers.google.com/jobs#t=sq&q=j&li=20&l=false&jlo=en-US&jcoid=7c8c6665-81cf-4e11-8fc9-ec1d6a69120c&jcoid=e43afd0d-d215-45db-a154-5386c9036525&jl=30.267153%3A->



Oldham County, Texas.<sup>26</sup>

76. Google has massively scanned books from Texas public universities.



Source: <https://www.lib.utexas.edu/google/faqs.html>

77. Google provides the State of Texas with aerial imagery.<sup>27</sup>

78. Google acquired Waze in 2013,<sup>28</sup> and Google's Waze traffic app partners with cities and business in Texas, non-limiting examples include the Waze partnership with the city of Fort Worth to provide constant traffic data to the city.<sup>29</sup> Another non-limiting example includes the Waze partnership with the Genesis Group in Tyler, to decrease emergency response times.<sup>30</sup>

### **COUNT I**

(INFRINGEMENT OF U.S. PATENT NO. 9,141,489)

79. Uniloc incorporates the preceding paragraphs above by reference.

80. U.S. Patent No. 9,141,489 ("the '489 Patent"), entitled FAILOVER PROCEDURE FOR SERVER SYSTEM issued on September 22, 2015. The '489 lists Craig Stephen Etchegoyen as the inventor. A true and correct copy of the '489 Patent is attached as Exhibit A hereto.

81. Pursuant to 35 U.S.C. § 282, the '489 Patent is presumed valid. More than 135

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<sup>26</sup> See <https://www.chooseenergy.com/blog/energy-news/google-invests-200m-in-west-texas-wind-farm/>

<sup>27</sup> See <http://www.bisconsultants.com/affordable-imagery-for-texas-government-entities-from-google/>

<sup>28</sup> See <https://techcrunch.com/2013/06/11/its-official-google-buys-waze-giving-a-social-data-boost-to-its-location-and-mapping-business/>

<sup>29</sup> See <http://dfw.cbslocal.com/2016/12/14/forth-worth-partners-with-waze-traffic-app/>

<sup>30</sup> See <https://genesispulse.com/2015/10/06/the-genesis-group-joins-waze-connected-citizens-program/>

references were considered in '489 Patent's examination, including references from Digital Equipment Corporation, AT&T, Lucent, Intel, Microsoft, IBM, Canon, California Institute of Technology, Texas Instruments, Alcatel, Northrop Grumman, Hitachi, Citibank, Comcast, Siemens, and Cisco. Additionally, more than 30 references have cited the '489 Patent, including references from Oracle, IBM, Huawei, Microsoft, Amazon, Verizon, Genband, Dell, and Uber.

82. The '489 Patent describes inventive features that are not well-understood, routine, and conventional.

83. Google makes, uses, offers for sale, sells and/or imports into the United States mobile phones under the trade name "Google Cloud Platform" (GCP). The GCP is a suite of cloud computing service. that provides a series of modular cloud services including computing, data storage, and data analytics. The GCP provides infrastructure as a service (IaaS) through the Google Compute Engine. The Google Compute Engine is built on the same global infrastructure that runs Google's search engine. The Google Compute Engine service provides mitigation against unexpected network failures. The Google Compute Engine workflow supports load-balancing in integration with health checks. This load balancing helps the GCP provide robust services by distributing the traffic to multiple regions/zones in an effective manner based on the health status of various servers/instances. Google's Load Balancer in the GCP provides the health check mechanism to determine the health of the linked virtual machines or backends and switches the traffic to another healthy virtual machine whenever any fault occurs in the back end. Collectively, such a system is referred to as the "Accused Infringing Devices."

84. The Google Compute Engine delivers virtual machines running in Google data centers throughout the world. The Compute Engine service provides mitigation against unexpected network failures by its feature of load balancing. Such load balancing involves the health checking of the virtual machines. This load balancing is one of the robust features of Google's Compute



Engine that distributes traffic to multiple regions in an effective manner for better network performance.

### GCP resources

GCP consists of a set of physical assets, such as computers and hard disk drives, and virtual resources, such as virtual machines (VMs), that are contained in [Google's data centers](#) around the globe. Each data center location is in a global *region*. Regions include Central US, Western Europe, and East Asia. Each region is a collection of *zones*, which are isolated from each other within the region. Each zone is identified by a name that combines a letter identifier with the name of the region. For example, zone *a* in the East Asia region is named *asia-east1-a*.

This distribution of resources provides several benefits, including redundancy in case of failure and reduced latency by locating resources closer to clients. This distribution also introduces some rules about how resources can be used together.

Source: <https://cloud.google.com/docs/overview>

GCP's unmanaged compute service is Google Compute Engine. You can think of Compute Engine as providing an *infrastructure as a service* (IaaS), because the system provides a robust computing infrastructure, but you must choose and configure the platform components that you want to use. With Compute Engine, it's your responsibility to configure, administer, and monitor the systems. Google will ensure that resources are available, reliable, and ready for you to use, but it's up to you to provision and manage them. The advantage, here, is that you have complete control of the systems and unlimited flexibility.

When you build on Compute Engine, you can:

- Use virtual machines (VMs), called *instances*, to build your application, much like you would if you had your own hardware infrastructure. You can choose from a variety of instance types to customize your configuration to meet your needs and your budget.
- Choose which global *regions and zones* to deploy your resources in, giving you control over where your data is stored and used.
- Choose which operating systems, development stacks, languages, frameworks, services, and other software technologies you prefer.
- Create instances from public or private *images*.
- Use GCP storage technologies or any third-party technologies you prefer.
- Use [Google Cloud Launcher](#) to quickly deploy pre-configured software packages. For example, you can deploy a LAMP or MEAN stack with just a few clicks.
- Create *instance groups* to more easily manage multiple instances together.
- Use [autoscaling with an instance group](#) to automatically add and remove capacity.

Source: <https://cloud.google.com/docs/overview/cloud-platform-services>


85. GCP implements load balancers that help to balance the traffic in the network. Such load balancers direct traffic to another virtual machine (VM) or instance when failure occurs in one

VM or instance. Such is a failover process.

### Tips for designing robust systems

To help mitigate instance failures, you should design your application on the Google Compute Engine service to be robust against failures, network interruptions, and unexpected disasters. A robust system should be able to gracefully handle failures, including redirecting traffic from a downed instance to a live instance or automating tasks on reboot.

Source: <https://cloud.google.com/compute/docs/tutorials/robustsystems#distribute>



**Global Load Balancing with Single Anycast IP**

With Cloud Load Balancing, a single anycast IP front-ends all your backend instances in regions around the world. It provides cross-region load balancing including automatic multi-region failover which gently moves traffic in fractions if backends become unhealthy. In contrast to DNS-based Global Load Balancing solutions, Cloud Load Balancing reacts instantaneously to changes in users, traffic, network, backend health and other related conditions.

Source: <https://cloud.google.com/load-balancing>

86. A client can deploy web services like MySQL on CGP. Google Cloud SQL provides failover to mitigate the traffic and failures. GCP provides the mechanism to route the traffic to a standby instance, i.e., redundant instance when failure occurs in primary instance.

### How to Set Up MySQL on Google Compute Engine

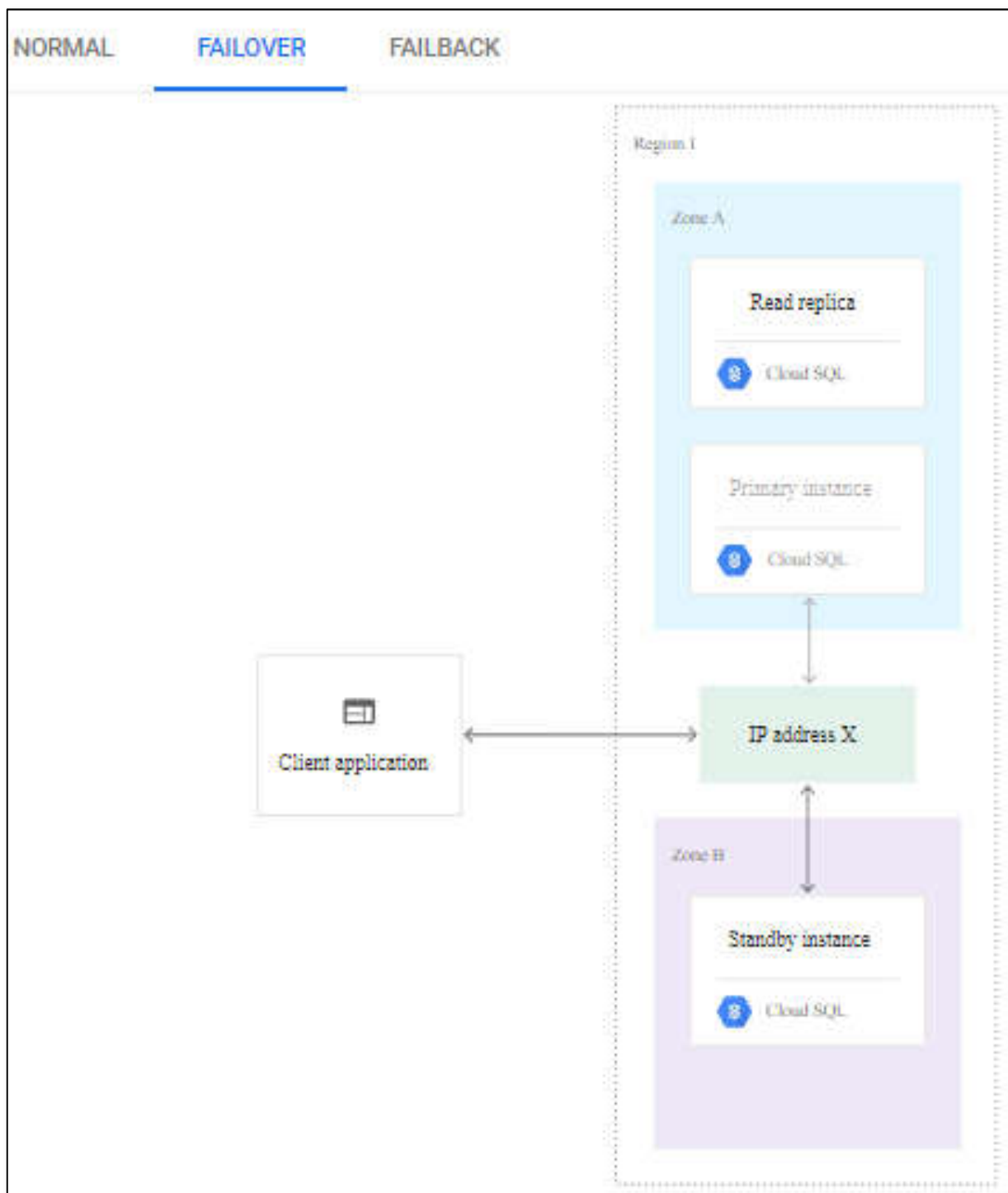
SEND FEEDBACK

You have several options for deploying MySQL as part of your Google Cloud Platform project. You can use Google Cloud SQL, Google Cloud Platform Marketplace, or manually install MySQL on Google Compute Engine.

Google Cloud SQL offers MySQL as a web service. You can use Google Cloud SQL to host your MySQL database in Google's cloud, and let Google Cloud Platform handle administrative duties like replication, patch management, and database management.

Source: <https://cloud.google.com/solutions/setup-mysql>






Source: <https://cloud.google.com/sql/docs/postgres/high-availability#applications-and-instances>

87. The Google Cloud Load Balancer (GCLB) is a software defined globally distributed load balancing service. The Google Compute Engine utilizes the load balancing feature

to maintain robustness. Google cloud load balancing provides HTTP(S) Load Balancing, TCP/SSL Load Balancing, SSL proxy load balancing, High Fidelity Health Checks, and the like. Such load balancing feature directs the traffic to multiple healthy instances across the same or multiple regions/zones.

88. The load balancer acts as the routing device and routes the traffic to the healthy instance (i.e., first server). The health checker in the Load balancer periodically monitors the health or the status of instances/backend.




**Global Load Balancing with Single Anycast IP**

With Cloud Load Balancing, a single anycast IP front-ends all your backend instances in regions around the world. It provides cross-region load balancing including automatic multi-region failover which gently moves traffic in fractions if backends become unhealthy. In contrast to DNS-based Global Load Balancing solutions, Cloud Load Balancing reacts instantaneously to changes in users, traffic, network, backend health and other related conditions.

**Software-Defined Load Balancing**

Cloud Load Balancing is a fully distributed, software-defined, managed service for all your traffic. It is not an instance or device based solution, so you won't be locked into physical load balancing infrastructure or face the HA, scale and management challenges inherent in instance based LBs. You can apply Cloud Load Balancing to all of your traffic: HTTP(S), TCP/SSL, and UDP. You can also terminate your SSL traffic with HTTPS Load Balancing and SSL proxy.



The diagram illustrates a software-defined load balancer. On the left, a stack of three blue boxes represents supported traffic types: HTTP(S), TCP/SSL, and UDP. On the right, a stack of three server instances is shown, each with a green status indicator. A horizontal line with a central triangle underneath represents the load balancer's interface, connecting the traffic types to the server instances.

Source: <https://cloud.google.com/load-balancing/>

## High Fidelity Health Checks

Health checks ensure that new connections are only load balanced to healthy backends that are up and ready to receive them. High fidelity health checks ensure that the probes mimic actual traffic to backends.

Source: <https://cloud.google.com/load-balancing/>

89. The load balancer provides a request string to the backend and expects a response string in order to check the health status of the backend. The responses from probes for health checks using SSL and TCP protocols are successful only if GCP is able to successfully complete an SSL or TCP handshake.

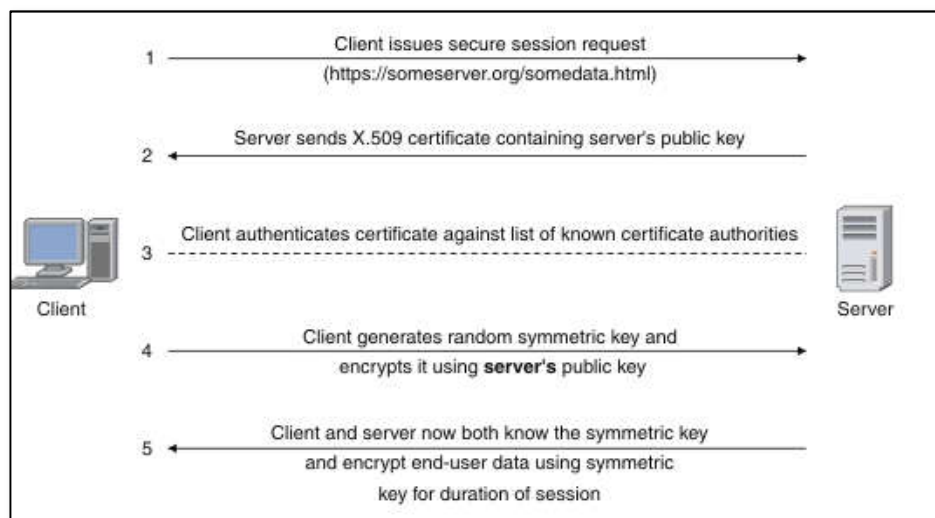
### Success criteria for SSL and TCP

By default, responses from probes for health checks using SSL and TCP protocols are successful only if GCP is able to successfully complete a SSL or TCP handshake to establish a session before the [probe timeout](#).

Optionally, in addition to completing a handshake, you can provide a request string and an expected response string, each up to 1,024 ASCII (single byte) characters in length. When an expected response string is configured, GCP considers a probe successful only if the SSL or TCP handshake completes **and** the response string returned **exactly matches** the expected response string. The following combinations of request and response flags are available for health checks using the SSL and TCP protocols:

Source: <https://cloud.google.com/load-balancing/docs/health-check-concepts>

90. During the SSL handshake, the client sends a request to the server for a secure session. The server responds by sending its X.509 (i.e., SSL certificate) digital certificate to the client. The client receives the server's X.509 digital certificate. The X.509 digital certificates includes the digital signature. The client authenticates the server, using a list of known certificate authorities. The client generates a random symmetric key and encrypts it using server's public key. The client and server now both know the symmetric key and can use the SSL encryption process to encrypt and decrypt the information contained in the client request and the server response.

**Source:**

[https://www.ibm.com/support/knowledgecenter/en/SSZHF9\\_9.2.0/securing/topics/sslauth.html](https://www.ibm.com/support/knowledgecenter/en/SSZHF9_9.2.0/securing/topics/sslauth.html)

### What does it include?

An X.509 certificate will always come with the following:

- A DN, or distinguished name, used to verify the identity of the user.
- A public key to tie to that user
- Information about the version of X.509 used by the certificate
- A serial number
- An issuer DN linking to the original purchaser of the certificate
- A digital signature
- Details about the certificate's algorithm
- Optional extensions for enhanced security

**Source:** <https://www.sslauthority.com/x509-what-you-should-know>

91. In addition to completing handshake, while creating the health check, the load balancer operator can provide a request string and an expected response string, each up to 1,024 ASCII (single byte) characters in length. When an expected response string is configured, GCP considers a probe successful only if the SSL or TCP handshake completes and the response string returned exactly matches the expected response string.

By default, responses from probes for health checks using SSL and TCP protocols are successful only if GCP is able to successfully complete a SSL or TCP handshake to establish a session before the [probe timeout](#).

Optionally, in addition to completing a handshake, you can provide a request string and an expected response string, each up to 1,024 ASCII (single byte) characters in length. When an expected response string is configured, GCP considers a probe successful only if the SSL or TCP handshake completes **and** the response string returned **exactly matches** the expected response string. The following combinations of request and response flags are available for health checks using the SSL and TCP protocols:

Configuration flags	Behavior
Neither request nor response specified Neither flag specified: <code>--request</code> , <code>--response</code>	GCP considers the probe successful if the TCP or SSL session is established before the probe timeout.
Both request and response specified Both flags specified: <code>--request</code> , <code>--response</code>	GCP sends your configured request string and waits for the expected response string. The probe is successful if the TCP or SSL session is established and the response string returned <b>exactly matches</b> the expected response string before the probe timeout.
Only response specified Flags specified: only <code>--response</code>	GCP waits for the expected response string. The probe is successful if the TCP or SSL session is established and the response string returned <b>exactly matches</b> the expected response string before the probe timeout. You should only use <code>--response</code> by itself if your VMs being load balanced would automatically send a response string as part of the handshake.
Only request specified Flags specified: only <code>--request</code>	GCP sends your configured request string. The probe is successful if a TCP or SSL session is established before the probe timeout. The response, if any, is not checked.

Source: <https://cloud.google.com/load-balancing/docs/health-check-concepts>

92. In addition to completing handshake, while creating the health check, the load balancer operator can provide a request string and an expected response string, each up to 1,024 ASCII (single byte) characters in length. When an expected response string is configured, GCP considers a probe successful only if the SSL or TCP handshake completes and the response string returned exactly matches the expected response string.

93. The health checker sends the health check request to the virtual machine(VM) / backend. The VM/backend responds to the health check request by sending the health check response on a periodic basis. Based on the number of sequential successful or failed responses, GCP determines the health of the VM/backend.



## Overview

GCP provides health check systems that connect to virtual machine (VM) instances on a configurable, periodic basis. Each connection attempt is called a *probe*. GCP records the success or failure of each probe.

Health checks and load balancers work together. Based on a configurable number of sequential successful or failed probes, GCP computes an overall health state for each VM in the load balancer. VMs that respond successfully for the configured number of times are considered *healthy*. VMs that fail to respond successfully for a separate number of times are *unhealthy*.

GCP uses the overall health state of each VM to determine its eligibility for receiving new requests. In addition to being able to configure probe frequency and health state thresholds, you can configure the criteria that define a successful probe. This document describes [how health checks work](#) in detail.

**Source:** <https://cloud.google.com/load-balancing/docs/health-check-concepts>

94. During the health check creation, operator sets the time interval (i.e., --timeout (predetermined time)) to validate the health check response. If health checker doesn't receive the response from VM or instance within this time interval from the valid VM, the probe is considered as failure (i.e., status message is invalid). If the health checker gets a number of times an invalid or failed response, it means the instance is unhealthy.

The following flags are common to all health checks, regardless of protocol:

```
gcloud compute health-checks create [PROTOCOL] [HEALTH_CHECK_NAME] \
  --description=[DESCRIPTION] \
  --check-interval=[CHECK_INTERVAL] \
  --timeout=[TIMEOUT] \
  --healthy-threshold=[HEALTHY_THRESHOLD] \
  --unhealthy-threshold=[UNHEALTHY_THRESHOLD] \
  ...additional flags
```

Where:

- [PROTOCOL] defines the protocol used for the health check. Valid options are `http`, `https`, `http2`, `ssl`, and `tcp`.
- [HEALTH\_CHECK\_NAME] is the name of the health check. Within a given project, each health check must have a unique name.
- [DESCRIPTION] is an optional description.
- [CHECK\_INTERVAL] is the amount of time from the start of one health check connection to the start of the next one. Units are seconds. If omitted, GCP uses a value of 5s (5 seconds).
- [TIMEOUT] is the amount of time that GCP will wait for a response to a probe. The value of [TIMEOUT] must be less than or equal to the [CHECK\_INTERVAL]. Units are seconds. If omitted, GCP uses a value of 5s (5 seconds).
- [HEALTHY\_THRESHOLD] and [UNHEALTHY\_THRESHOLD] specify the number of sequential probes that must succeed or fail in order for the VM instance to be considered healthy or unhealthy. If either is omitted, GCP uses a default threshold of 2.
- ...additional flags are other flags for specifying ports and options specific to the [PROTOCOL]. These flags are discussed in the following sections.

Source: <https://cloud.google.com/load-balancing/docs/health-checks>

## Overview

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Health checks and load balancers work together. Based on a configurable number of sequential successful or failed probes, GCP computes an overall health state for each VM in the load balancer. VMs that respond successfully for the configured number of times are considered *healthy*. VMs that fail to respond successfully for a separate number of times are *unhealthy*.

GCP uses the overall health state of each VM to determine its eligibility for receiving new requests. In addition to being able to configure probe frequency and health state thresholds, you can configure the criteria that define a successful probe. This document describes [how health checks work](#) in detail.

Source: <https://cloud.google.com/load-balancing/docs/health-check-concepts>

95. After a successful establishment of the SSL/TCP session, GCP sends the health check probe requests, and the server responds with the health check response.

96. The probe is successful if the TCP or SSL session is established and the response

string returned exactly matches the expected response string before the probe timeout.

By default, responses from probes for health checks using SSL and TCP protocols are successful only if GCP is able to successfully complete a SSL or TCP handshake to establish a session before the [probe timeout](#).

Optionally, in addition to completing a handshake, you can provide a request string and an expected response string, each up to 1,024 ASCII (single byte) characters in length. When an expected response string is configured, GCP considers a probe successful only if the SSL or TCP handshake completes **and** the response string returned **exactly matches** the expected response string. The following combinations of request and response flags are available for health checks using the SSL and TCP protocols:

Configuration flags	Behavior
Neither request nor response specified Neither flag specified: <code>--request</code> , <code>--response</code>	GCP considers the probe successful if the TCP or SSL session is established before the probe timeout.
Both request and response specified Both flags specified: <code>--request</code> , <code>--response</code>	GCP sends your configured request string and waits for the expected response string. The probe is successful if the TCP or SSL session is established and the response string returned exactly matches the expected response string before the probe timeout.
Only response specified Flags specified: only <code>--response</code>	GCP waits for the expected response string. The probe is successful if the TCP or SSL session is established and the response string returned exactly matches the expected response string before the probe timeout. You should only use <code>--response</code> by itself if your VMs being load balanced would automatically send a response string as part of the handshake.
Only request specified Flags specified: only <code>--request</code>	GCP sends your configured request string. The probe is successful if a TCP or SSL session is established before the probe timeout. The response, if any, is not checked.

Source: <https://cloud.google.com/load-balancing/docs/health-check-concepts>

97. A non-limiting example of health check operations can be seen with reference to Google Cloud SQL instances. A Cloud SQL instance configured for high availability is called a regional instance. Such an instance is located in a primary and secondary zone within a configured region. Within a regional instance, the configuration is made up of a primary instance (master) and a standby instance.

98. A primary instance sends a heartbeat signal to the system database periodically. When the primary instance doesn't respond with a proper heartbeat signal in sixty (60) seconds, failover initiates.



The following process occurs:

1. The primary instance or zone fails.

Each second, the primary instance writes to a system database as a heartbeat signal. If multiple heartbeats aren't detected, failover is initiated. This occurs if the primary instance is unresponsive for approximately 60 seconds or the zone containing the primary instance experiences an outage.

2. The standby instance now serves data upon reconnection.

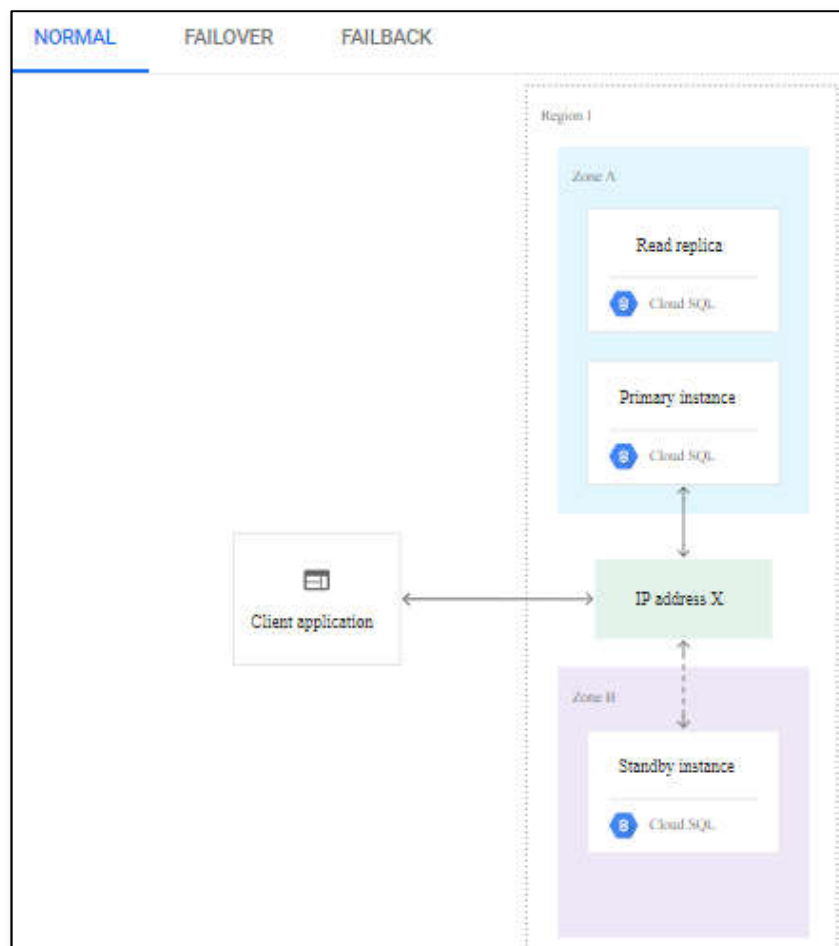
Through a shared static IP address with the primary instance, the standby instance now serves data from the secondary zone.

3. Read replicas continue to serve data from a healthy zone.

Source: <https://cloud.google.com/sql/docs/postgres/high-availability#applications-and-instances>

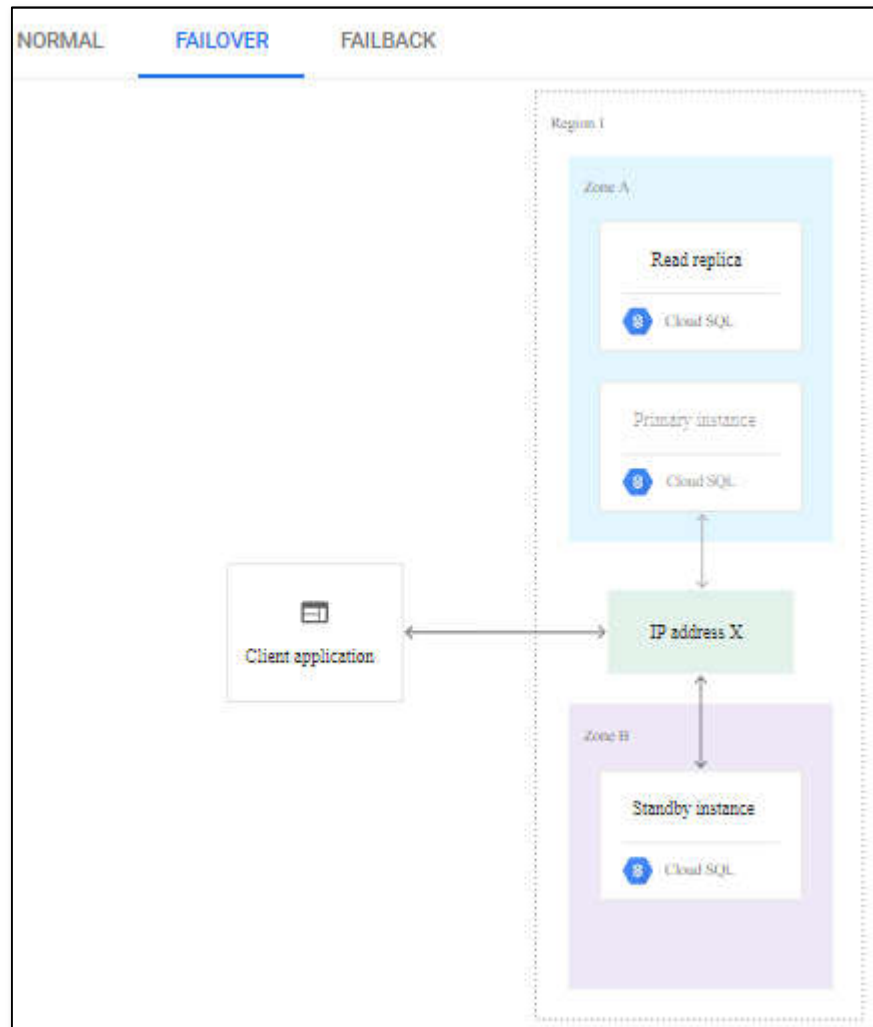
99. The system presumes a healthy instance when proper heartbeat signals are received.

This allows traffic to normally be routed from the client application to the primary server.



Source: <https://cloud.google.com/sql/docs/postgres/high-availability#applications-and-instances>

100. When the routing device/database doesn't get the heartbeat signal from the primary server, it declares the primary server as unhealthy and routes the traffic to the standby instance or redundant instance.



Source: <https://cloud.google.com/sql/docs/postgres/high-availability#applications-and-instances>

101. These health checks are also implemented on a group of the instances. A group of instances receiving traffic from the forwarding rules is called a target pool. Each target pool has one health check.

A Target Pool resource defines a group of instances that receive incoming traffic from forwarding rules. When a forwarding rule directs traffic to a target pool, Google Cloud Load Balancing picks an instance from these target pools based on a hash of the source IP and port and the destination IP and port. See the [Load distribution algorithm](#) for more information about how traffic is distributed to instances.

★ **Note:** If you intend your target pool to contain a single virtual machine instance, you should consider using the [Protocol Forwarding](#) feature instead.

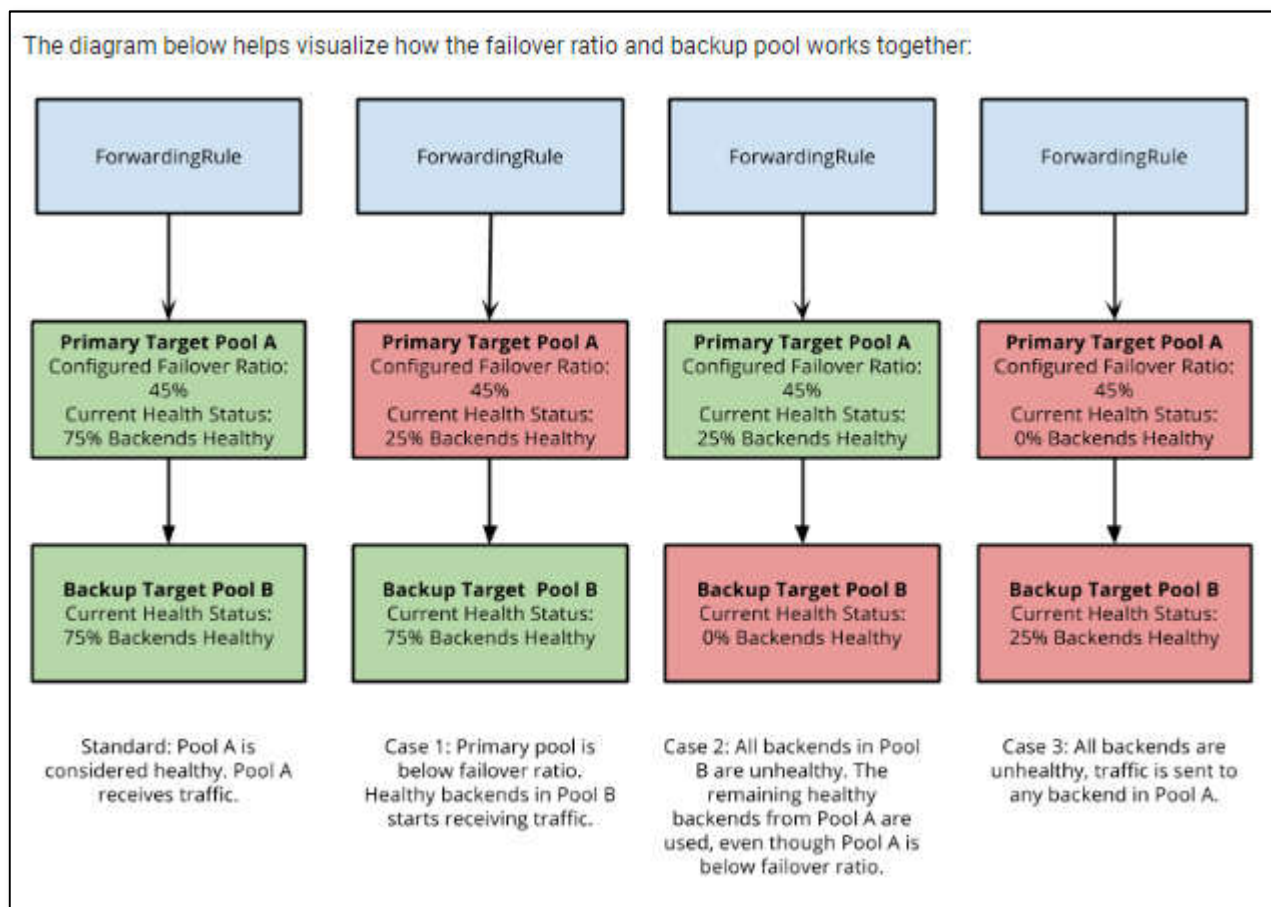
Target pools can only be used with forwarding rules that handle TCP and UDP traffic. You must create a target pool before you can use it with a forwarding rule. Each project can have up to 50 target pools. A target pool can have only one health check. Network load balancing only supports [httpHealthChecks](#).

**Source:** <https://cloud.google.com/load-balancing/docs/target-pools>

102. The health checker send the health of the target pools. If the ratio of healthy virtual machines in a primary target pool falls below the failover ratio, Google Cloud Load Balancing sends traffic to the backup pool. The failover ratio determines when the target pool is declared unhealthy. For example, a float of between 0.0 and 1.0 prescribes when a target pool is declared unhealthy. More particularly, if the value is set to 0.1, then this target pool is declared unhealthy if the number of healthy instances is below 0.1 (10%).

1. If a primary target pool is declared unhealthy (falls below the failover ratio), traffic will be sent to healthy instances in the backup pool.
2. If the primary target pool is declared unhealthy, but there are no remaining healthy instances in the backup pool, traffic is sent to the remaining healthy instances in the primary pool.
3. If the primary pool is unhealthy and there are no remaining healthy instances in either pools, traffic will be sent to all instances in the primary pool so as to not drop traffic.
4. If the primary pool doesn't contain any instances, and none of the instances in the backup pool are healthy, traffic will be sent to all instances in the backup pool so as to not drop any traffic.

**Source:** <https://cloud.google.com/load-balancing/docs/target-pools>



Source: <https://cloud.google.com/load-balancing/docs/target-pools>

103. Google has directly infringed and continues to directly infringe one or more claims of the '489 Patent in the United States during the pendency of the '489 Patent, including at least claim 1 literally and/or under the doctrine of equivalents, by or through making, using, offering for sale and/or selling the Accused Infringing Devices that operate as described above.

104. In addition, should the Accused Infringing Devices be found to not literally infringe claims of the '489 Patent, use of the devices would nevertheless infringe one or more claims of the '489 Patent. More specifically, the devices perform substantially the same function (providing redundant servers with failover capability) in substantially the same way (Via designating a primary server and a secondary server, and performing periodic health checks for each server, and comparing the health check messages to a designated string) to yield substantially the same result

((switching from a primary server to a secondary server if the health check message does not match the designated string). Google would thus be liable for direct infringement under the doctrine of equivalents.

105. Google has indirectly infringed and continues to indirectly infringe at least claim 1 of the '489 Patent in this judicial district and elsewhere in the United States by, among other things, actively inducing the using, offering for sale or selling the Accused Infringing Devices. Google's customers who use such devices in accordance with Google's instructions directly infringe one or more of claims of the '489 Patent in violation of 35 U.S.C. § 271. Google directly and/or indirectly intentionally instructs its customers to infringe through training videos, demonstrations, brochures, installation and/or user guides such as those located at one or more of the following:

- <https://cloud.google.com/docs/overview/>
- <https://cloud.google.com/docs/overview/cloud-platform-services>
- <https://cloud.google.com/compute/docs/tutorials/robustsystems#distribute>
- <https://cloud.google.com/load-balancing/>
- <https://cloud.google.com/solutions/setup-mysql>
- <https://cloud.google.com/sql/docs/postgres/high-availability#applications-and-instances>
- <https://cloud.google.com/load-balancing/docs/health-check-concepts>
- <https://www.sslauthority.com/x509-what-you-should-know/>
- <https://cloud.google.com/load-balancing/docs/health-checks>
- <https://cloud.google.com/load-balancing/docs/target-pools>

106. Google has indirectly infringed and continues to indirectly infringe at least claim 1 of the '489 Patent by, among other things, contributing to the direct infringement by others including, without limitation customers using the Accused Infringing Devices, by making, offering to sell, selling and/or importing into the United States, a component of a patented machine, manufacture or combination, or an apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in infringing the '489 Patent and not a staple article or commodity of commerce suitable for substantial non-infringing use.

107. Google will have been on notice of the '489 Patent since, at the latest, the service of this complaint upon Google. By the time of trial, Google will have known and intended (since receiving such notice) that its continued actions would actively induce and contribute to the infringement of one or more of claims of the '489 Patent.

108. Google may have infringed the '489 Patent through other devices, systems, and software utilizing the same or reasonably similar functionality as described above. Uniloc reserves the right to discover and pursue all such additional infringing software and devices.

109. Uniloc has been damaged by Google's infringement of the '489 Patent.

#### **PRAYER FOR RELIEF**

Uniloc requests that the Court enter judgment against Google as follows:

- (A) declaring that Google has infringed the '489 Patent;
- (B) awarding Uniloc its damages suffered as a result of Google's infringement of the '489 Patent pursuant to 35 U.S.C. § 284;
- (C) awarding Uniloc its costs, attorneys' fees, expenses and interest; and granting Uniloc such further relief as the Court may deem just and proper.

#### **DEMAND FOR JURY TRIAL**

Uniloc hereby demands trial by jury on all issues so triable pursuant to Fed. R. Civ. P. 38.



Dated: November 17, 2018

Respectfully submitted,

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