IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT,	§	CIVIL ACTION NO. 6:20-cv-579
Plaintiff,	§	**JURY TRIAL DEMANDED**
v.	§	
GOOGLE LLC,	§	
Defendant.	§	

ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("Brazos" or "Plaintiff"), by and through its attorneys, files this Complaint for Patent Infringement against Google LLC ("Google") and alleges:

NATURE OF THE ACTION

1. This is a civil action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. §§ 1, *et seq.*, including §§ 271, 281, 284, and 285.

THE PARTIES

2. Brazos is a limited liability corporation organized and existing under the laws of Delaware, with its principal place of business at 605 Austin Avenue, Suite 6, Waco, Texas 76701.

3. On information and belief, Google is a Delaware corporation with a physical address at 500 West 2nd Street, Austin, Texas 78701.

JURISDICTION AND VENUE

4. This is an action for patent infringement which arises under the Patent Laws of the United States, in particular, 35 U.S.C. §§ 271, 281, 284, and 285.

5. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

6. This Court has specific and general personal jurisdiction over the defendant pursuant to due process and/or the Texas Long Arm Statute, because the defendant has committed acts giving rise to this action within Texas and within this judicial district. The Court's exercise of jurisdiction over the defendant would not offend traditional notions of fair play and substantial justice because the defendant has established minimum contacts with the forum. For example, on information and belief, the defendant has committed acts of infringement in this judicial district, by among other things, selling and offering for sale products that infringe the asserted patent, directly or through intermediaries, as alleged herein.

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. Google has offices in this District, has transacted business in this District, and has committed acts of direct and indirect infringement in this District. Google also has a regular and established place of business in this District, as set forth below.

8. Since 2007, Google has employed "hundreds" of employees in this District in Austin, Texas.[1] As of August 2018, Google had more than 800 employees in Austin.[2] By June of 2019, Google had more than 1,100 employees in Austin.[3] In January 2019, it was reported that Google "signed a lease for an entire 35-story tower that has started construction just east of the Central Library in downtown Austin."[4] Google's 35-story tower in Austin "will have 790,000

[1] 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/

[2] *See* https://www.statesman.com/news/20190131/source-google-to-occupy-35-story-office-tower-in-downtown-austin

[3] *See* https://www.bizjournals.com/austin/news/2019/06/14/google-confirms-austin-expansion-will-begin-moving.html

[4] *Id.*

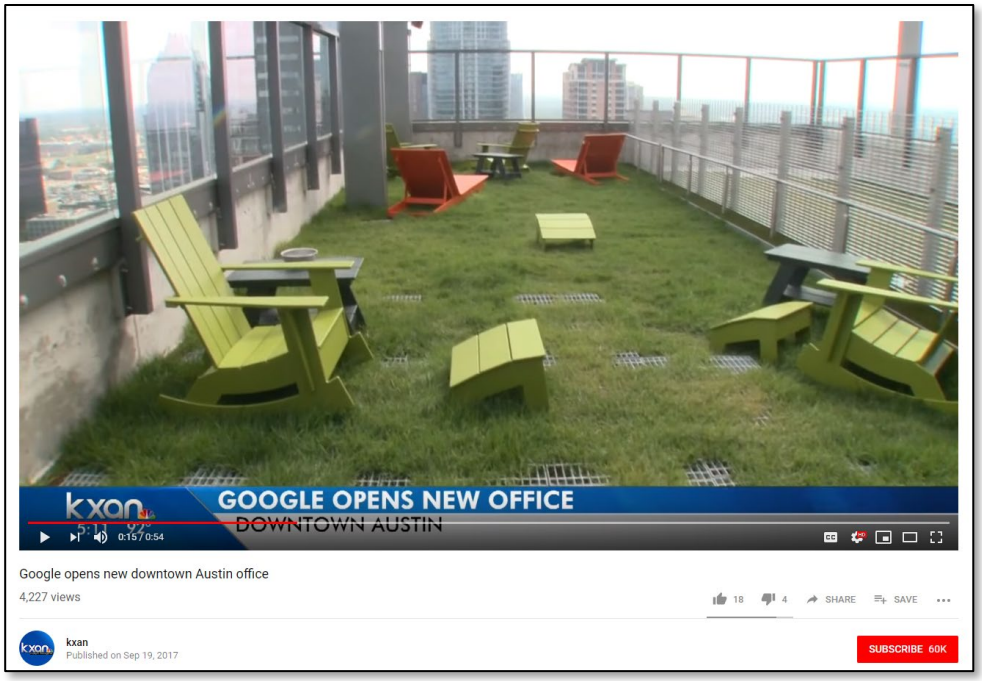
square feet of space, enough to potentially house about 5,000 people."[5]

Source: https://www.statesman.com/news/20190131/source-google-to-occupy-35-story-office-tower-in-downtown-austin

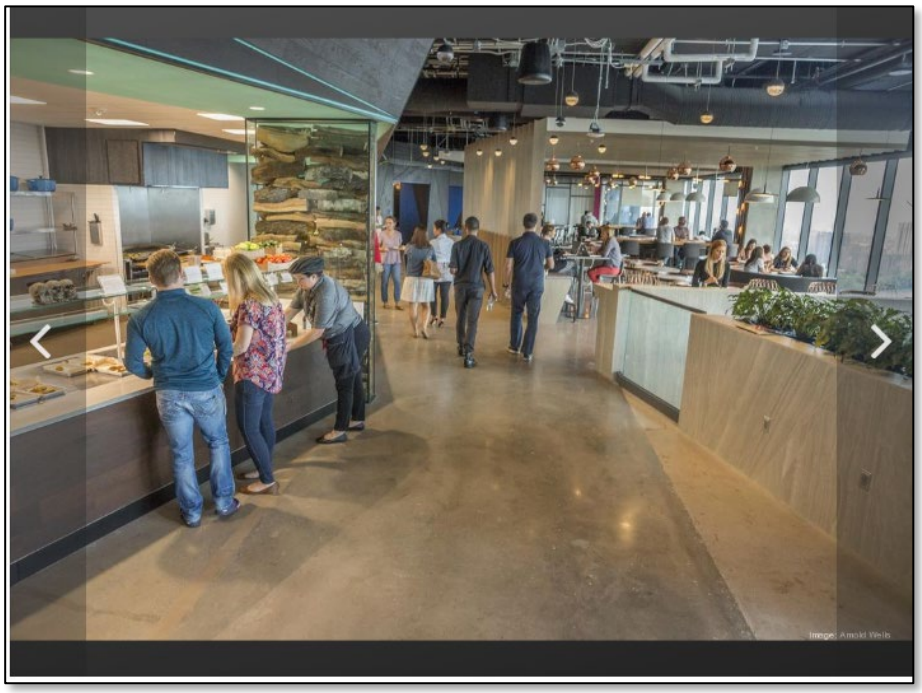
9. Articles report that Google's office in Austin would "would certainly be one of its most expansive offices in North America."[6]

10. Google has 300,000 square feet of office space in Austin, Texas, at 500 West 2nd Street.[7] Google also has offices on North MoPac Expressway,[8] University Park, and Austin's Children Museum.[9]

[5] *Id.*
[6] *See* https://9to5google.com/2019/01/31/google-signs-lease-austin-campus/
[7] *See* https://www.bizjournals.com/austin/news/2020/02/27/google-to-invest-10b-in-offices-and-data-centers.html
[8] *See* https://www.google.com/intl/en/about/locations/?region=north-america
[9] *See* http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/



Source: https://www.youtube.com/watch?v=RKA1RJYGOYQ



Source: https://www.bizjournals.com/austin/news/2019/10/28/inside-austins-coolest-offices.html#g/419929/15

11. Google has, as of June 2020, fifty (50) job postings for Austin, TX.[10]

12. Google's taxed appraised property values in Travis County (Austin) are approximately $1 billion.[11] Google's taxed appraised property values in in McLennan County (Waco) are approximately $75,000.[12] Google's taxed appraised property values in Bexar County (San Antonio) are approximately $50 million.[13] Google's taxed appraised property values in in El Paso are approximately $258,000.[14]

13. Operationally, 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).[15] As another example, Google gathers 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 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 recording everything a resident says within proximity of one of its products, such as Google

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10 https://careers.google.com/jobs/results/?company=Google&company=YouTube&hl=en&jlo=en-US&location=Austin,%20TX,%20USA

11 *See* http://propaccess.traviscad.org

12 *See* https://propaccess.trueautomation.com/clientdb/Property.aspx?cid=20&prop_id=378970

13 *See* https://bexar.acttax.com/act_webdev/bexar/showdetail2.jsp?can=000001265355,

14 *See* http://www.epcad.org/Search?Keywords=GOOGLE+INC&Year=2019

15 *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

Home.[16] 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."[17]

14. 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=zBnDWSvaQ1I (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).

15. 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).[18] One of Google's main businesses in this District is delivering information, including digital content such as movies, music, apps, and advertising.

16. Google describes itself as an "information company."[19] Its vision is "to provide

[16] *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.").
[17] *See* https://www.theguardian.com/commentisfree/2018/mar/28/all-the-data-facebook-google-has-on-you-privacy.
[18] 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.
[19] *See* "This Year's Founder's Letter" by Alphabet CEO, Sundar Pichai, https://blog.google/inside-google/alphabet/this-years-founders-letter/.

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."[20] Making information available to people wherever they are and as quickly as possible is critical to Google's business.

Google Global Cache (GGC)

17. 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."[21] To meet this goal, Google developed a content delivery network that it calls the Edge Network.

18. 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.[22] Studies show that YouTube alone is responsible for approximately 20% of all internet traffic.[23] 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 Waco-Temple-Bryan area channels such as KXXV, ABC (Channel 25); KBTX, CBS (Channel 3) or KWTX, CBS (Channel 10); KCEN NBC (Channel 5); and KCEN, Fox (Channel 6).[24] To verify a resident should receive such local channels, Google verifies a location of such resident.

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[20] *See* http://panmore.com/google-vision-statement-mission-statement.
[21] *See* e.g., http://time.com/4311233/google-ceo-sundar-pichai-letter/.
[22] *See* https://www.theverge.com/2018/5/3/17317274/youtube-1-8-billion-logged-in-monthly-users-brandcast-2018
[23] *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/
[24] *See*, e.g. https://thestreamable.com/markets/waco-temple-bryan-tx.

19. 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."

20. Google Global Cache is recognized as "one of Google's most important pieces of infrastructure,"[25] 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 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.

21. 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.

22. Just like brick-and-mortar stores, Google's GGC servers independently determine

[25] *See* http://blog.speedchecker.xyz/2015/11/30/demystifying-google-global-cache/.

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.

23. 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.

24. 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.

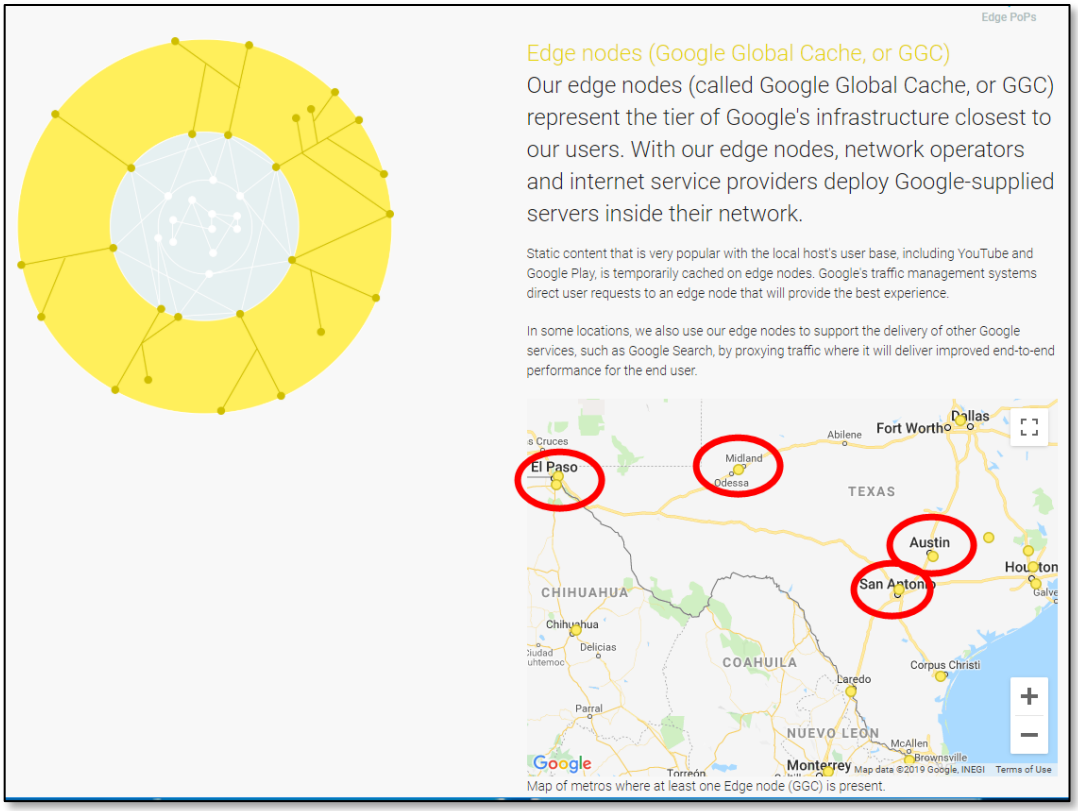
25. Google's GGC servers are housed in spaces in the District leased by Google. Google's GGC servers are housed in spaces leased by Google from Internet Service Providers (ISPs) whose networks have substantial traffic to Google and are interested in saving bandwidth. Hosting Google servers allows ISPs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

26. 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.

27. Multiple ISP hosted GGC servers are in this District. Google's website identifies Midland, El Paso, Austin, and San Antonio as GGC server locations. Each of these cities is located in this District.



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

28. The Office of Telecommunications Services for the University of Texas, for example, is an ISP that hosts two GGC servers in Austin, Texas.[26]

29. Google caches content on the GGC servers located in this District.

30. 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.

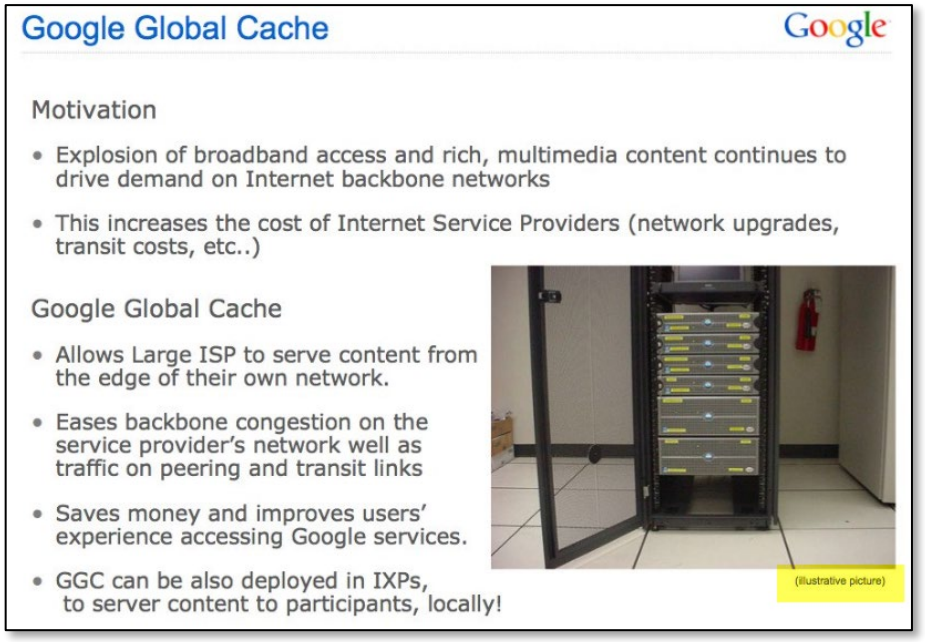
31. Google's GGC servers located in this District deliver cached content for the items in the preceding paragraph to residents in this District.

32. Google generates revenue (i) by delivering video advertising, (ii) from apps, and (iii) from digital content in the Google Play store.

[26] *See* https://it.utexas.edu/ots-caching-and-peering

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

34. The photograph below shows an "illustrative picture" of a Google GGC server.



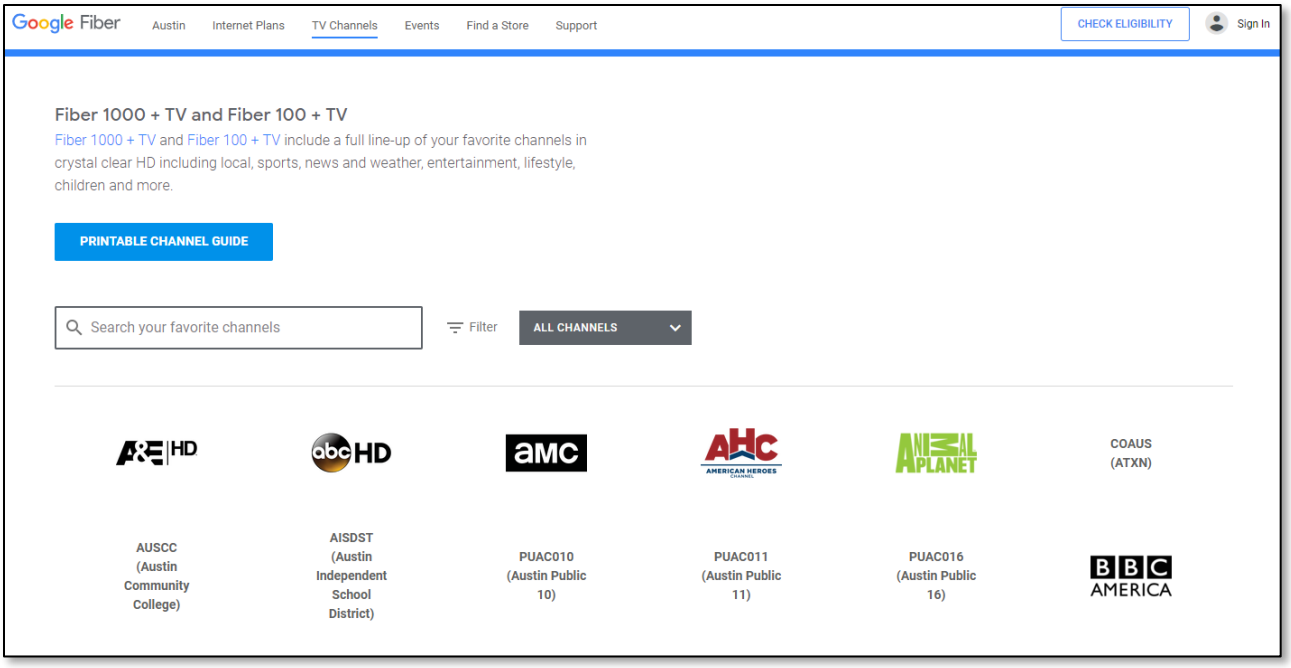
Source: https://www.wired.com/2010/03/google-traffic/

35. 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.

Google's Communication Services

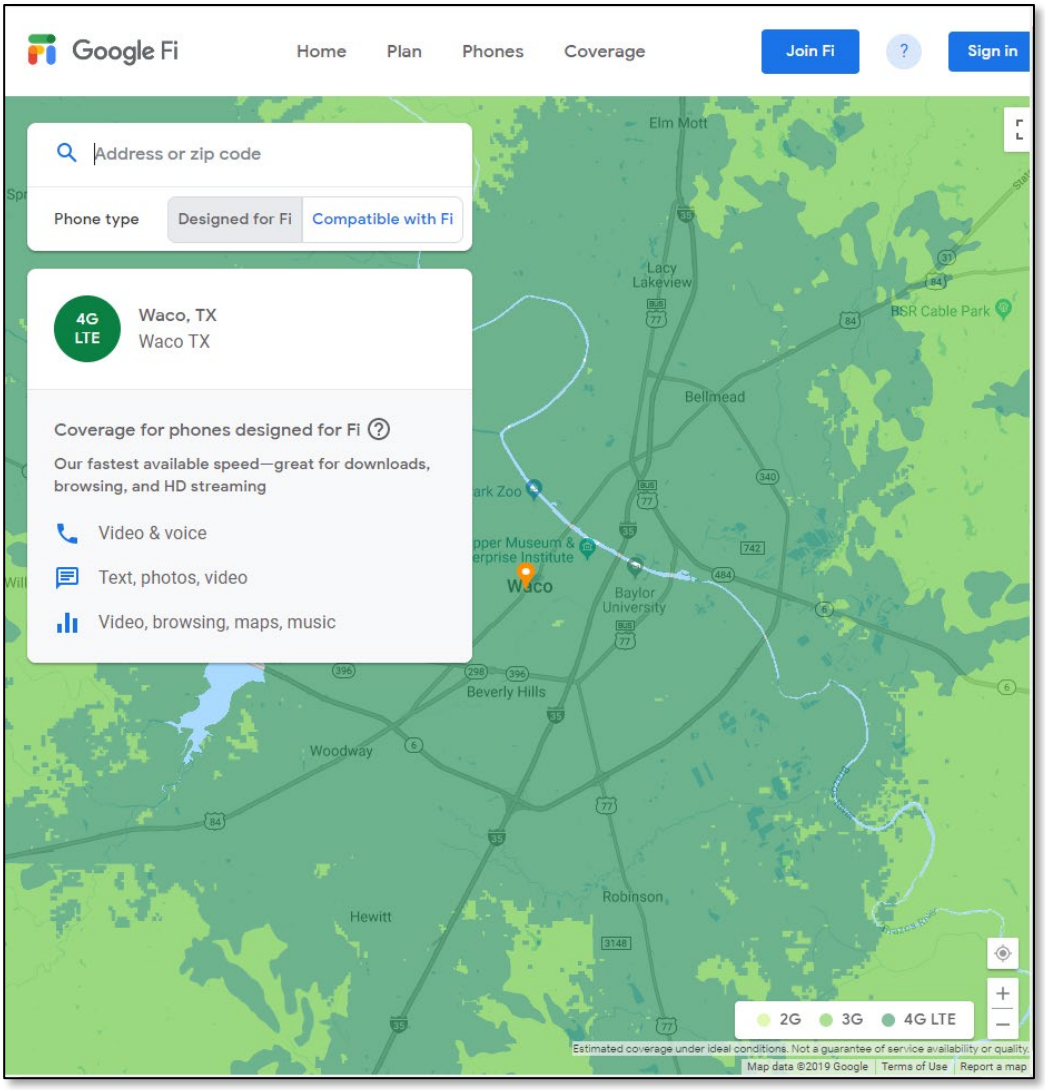
36. Google provides both data and television services to both San Antonio and Austin.[27]

[27] https://fiber.google.com/ourcities/



Google's Cell Phone Service (aka Google Fi)

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



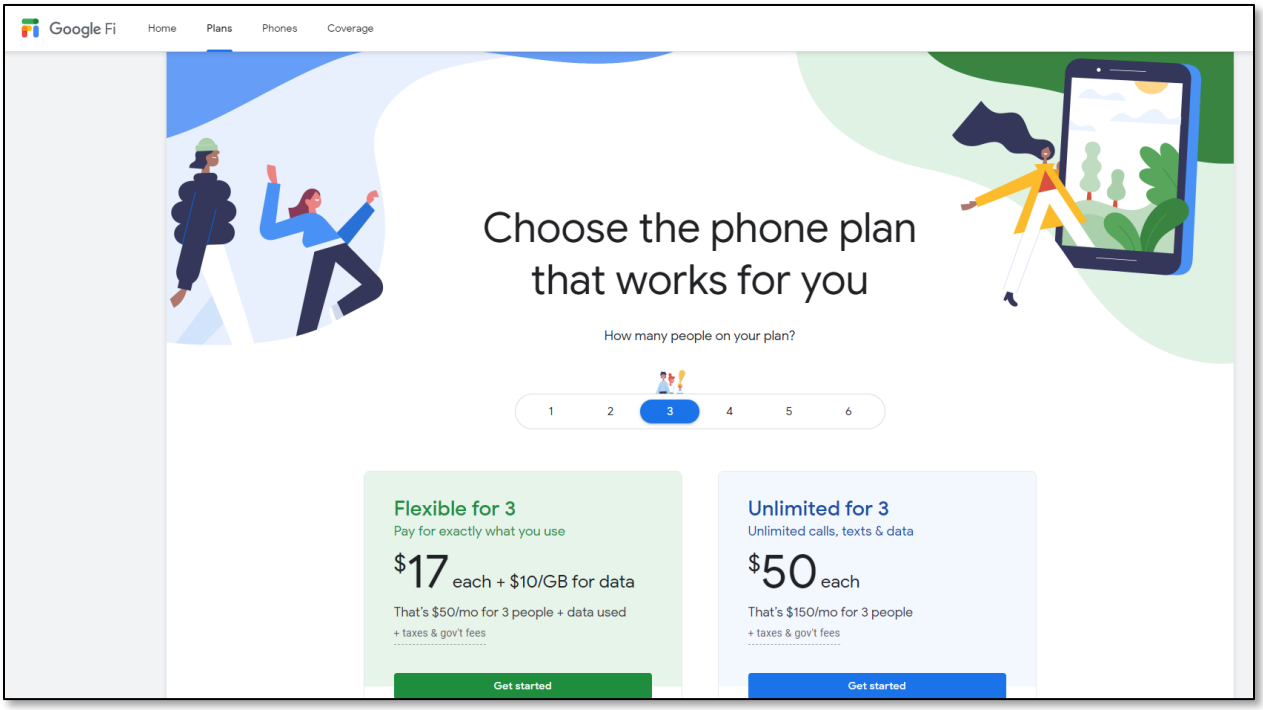
Source: https://fi.google.com/coverage?q=Waco,%20tx

38. 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.

39. With this coverage lookup service, Google advertises its ability to provide cell coverage in this District and its selected cell towers in and near this District to provide the

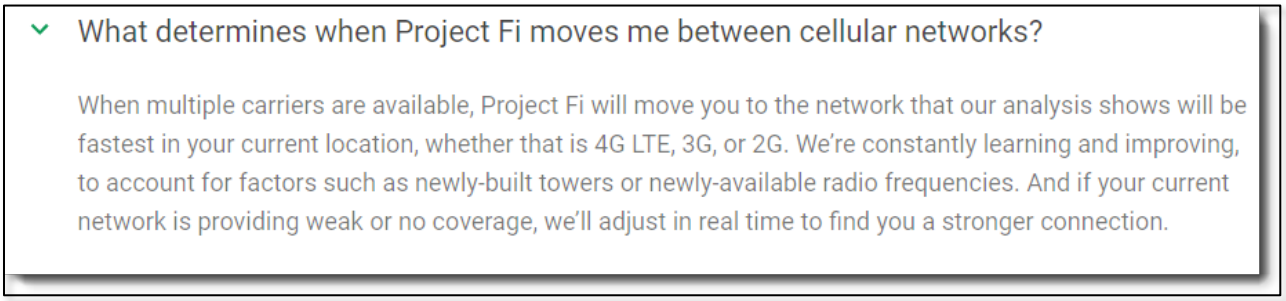
advertised coverage (e.g., 2G, 3G, or 4GLTE) depending on the location in the District. See https://fi.google.com/coverage?. Google is not indifferent to the location of its cell towers. It "established" and "ratified" their geographic placement to achieve specific business purposes.

40. Residents of this District also directly contract with and are billed by Google for these services as their telecommunications provider.



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

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



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

COUNT ONE - INFRINGEMENT OF U.S. PATENT NO. 8,640,180

42. Brazos re-alleges and incorporates by reference the preceding paragraphs of this Complaint.

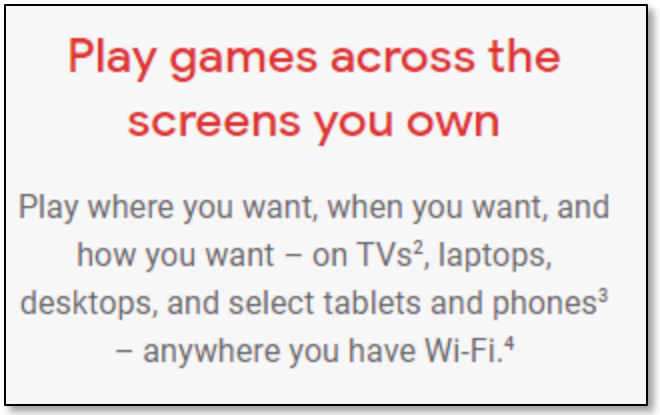
43. On January 28, 2014, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,640,180 ("the '180 Patent"), entitled "Apparatus and method for client-side compositing of video streams." A true and correct copy of the '180 Patent is attached as Exhibit A to this Complaint.

44. Brazos is the owner of all rights, title, and interest in and to the '180 Patent, including the right to assert all causes of action arising under the '180 Patent and the right to any remedies for the infringement of the '180 Patent.

45. Google makes, uses, sells, offers for sale, imports, and/or distributes in the United States, including within this judicial district, products such as, but not limited to, those that use client-side compositing of video streams by demultiplexing different substreams (collectively, the "Accused Products").

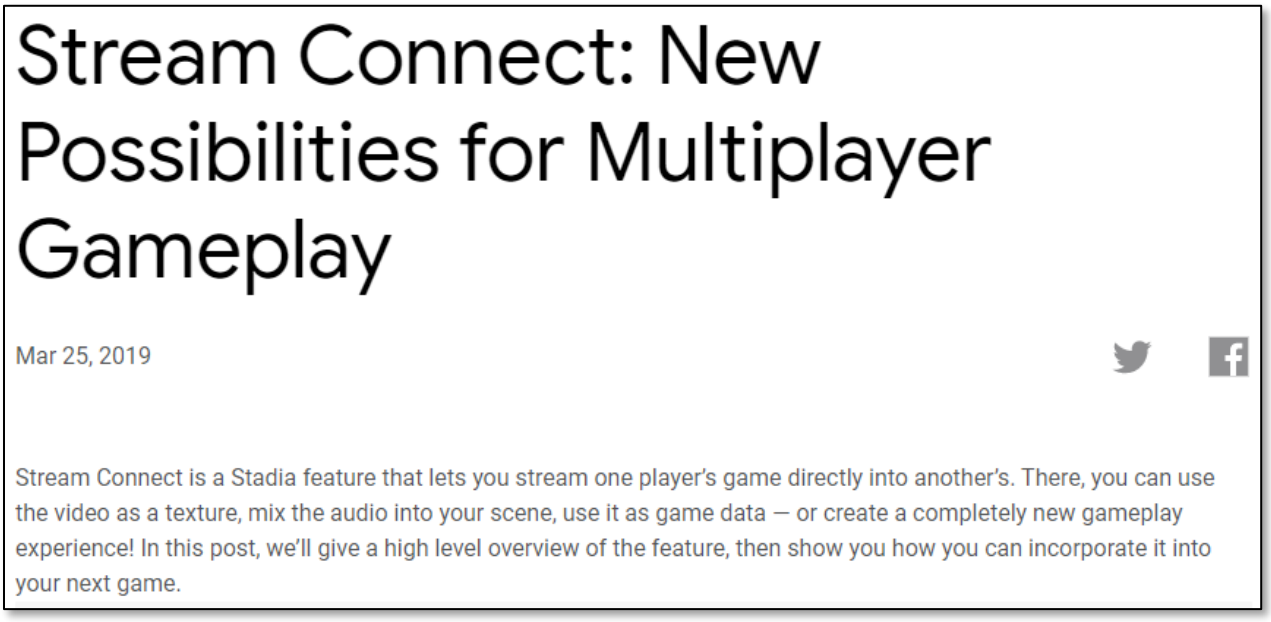
46. The Accused Products include, but are not limited, to Stadia.

47. Google provides a cloud gaming service called Stadia. This service allows users to play games virtually using a variety of devices such as TVs, laptops, desktops, tablets, and phones with Wi-Fi connectivity.



Source: https://stadia.google.com/

48. Google Stadia provides a feature called "Stream Connect." Stream Connect allows streaming of other players' game directly on a user's device screen.



Source: https://stadia.dev/intl/en/blog/stream-connect:new-possibilities-for-multiplayer-gameplay/

49. When a player uses the Stream Connect feature, the playing device (or client-device) receives audio and video streams (or media streams) from other players. The user's playing device provides incorporating (or compositing) of these streams.

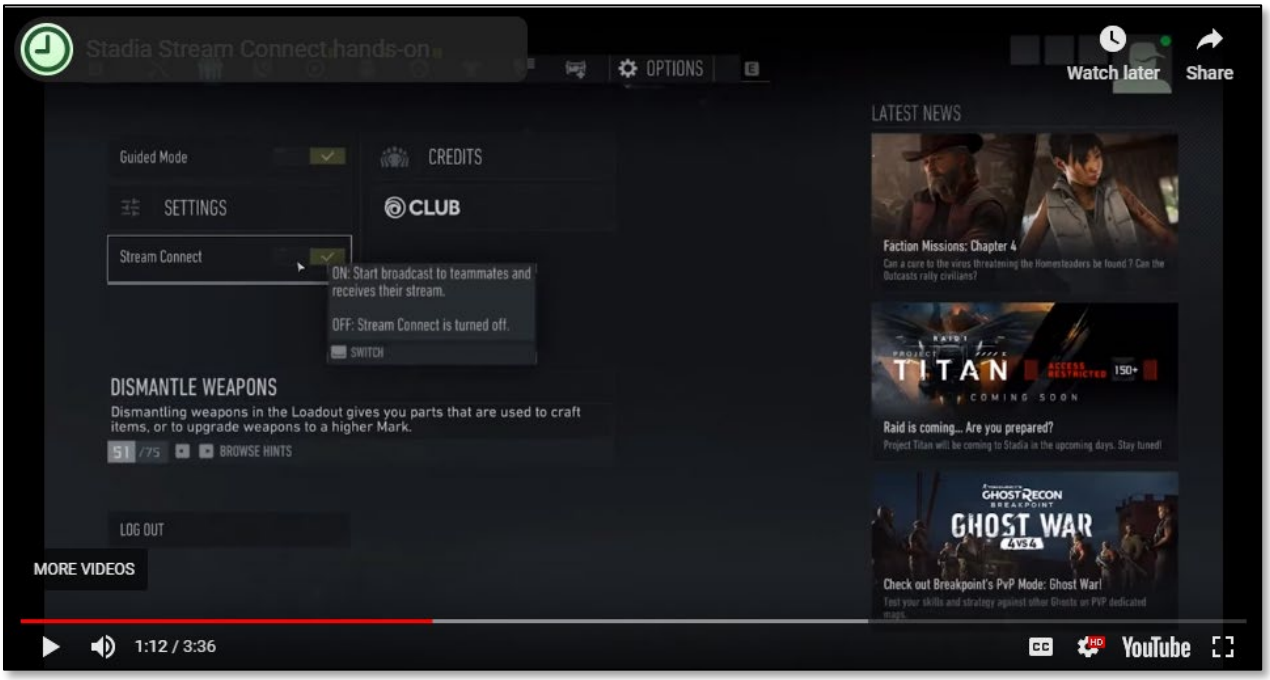
> When you play a game on Stadia, we stream video and audio from our computer to yours. Stream Connect allows you to send a copy of those streams from one player to another, where it gets incorporated directly into the game. In our keynote, we showed you three example uses of the feature:
>
> - Couch-based split-screen — Showing multiple players' game content on a single screen.
> - Co-op squad view — incorporating all teammates' views into each player's perspective, without the processing cost of multiple scene renders.
> - Asymmetric multiplayer roles, i.e., "the coordinator view" — Showing how one player can not only view, but also impact others using Stream Connect.
> - The Night Forest demo was designed to make use of a coordinator view. In it, a scientific team on a distant planet has discovered an infectious outbreak in the forest. They rush to the scene and get to work.

Source: https://stadia.dev/intl/en/blog/stream-connect:new-possibilities-for-multiplayer-gameplay/

> What's even cooler about this is that you don't need to re-render the scenes for the Coordinator. Stream Connect leverages Stadia's powerful video compression and streaming platform to deliver the frames from one player to another, almost instantly.
>
> In our demo, we applied those frames as a texture to screen objects, but that's just the beginning — and we can't wait to see what your designers do with this unique and powerful feature. Some ideas to get your brainstorm started:

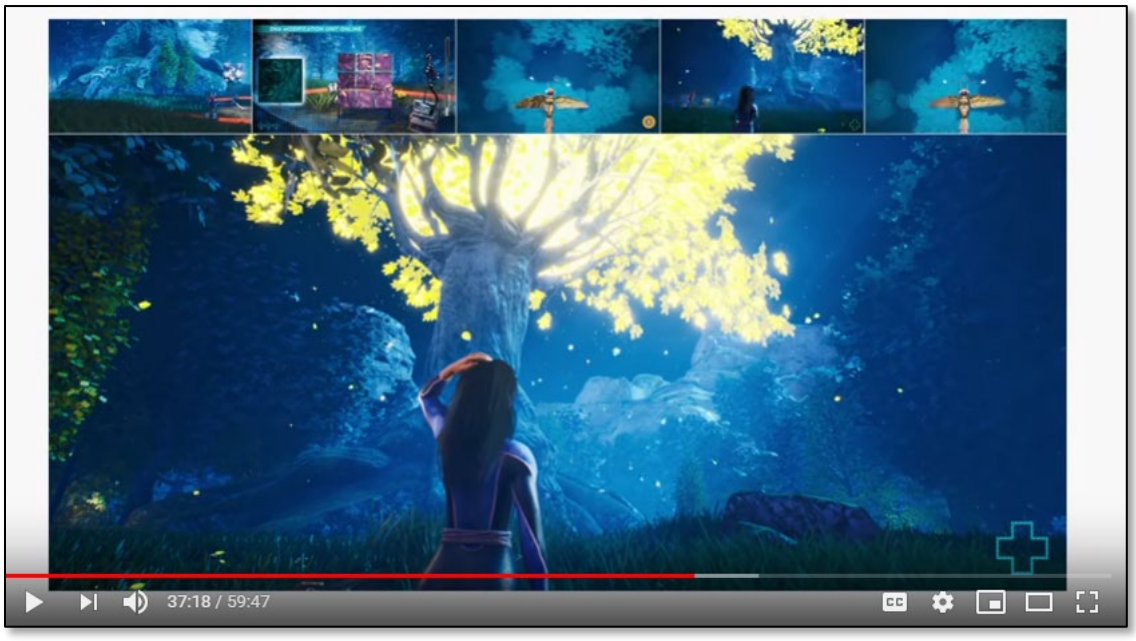
Source: https://stadia.dev/intl/en/blog/stream-connect:new-possibilities-for-multiplayer-gameplay/

50. A player can enable Stream Connect from game settings to start receiving media streams of other players.

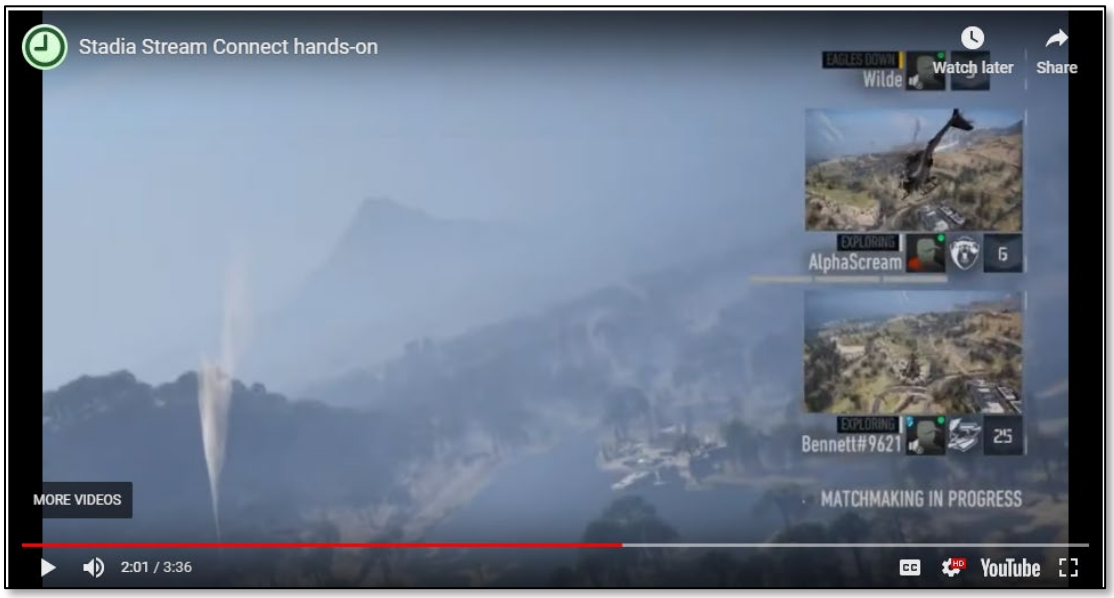


Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/

51. The below figures show incorporation (or compositing) of media streams of other players on a user's screen.

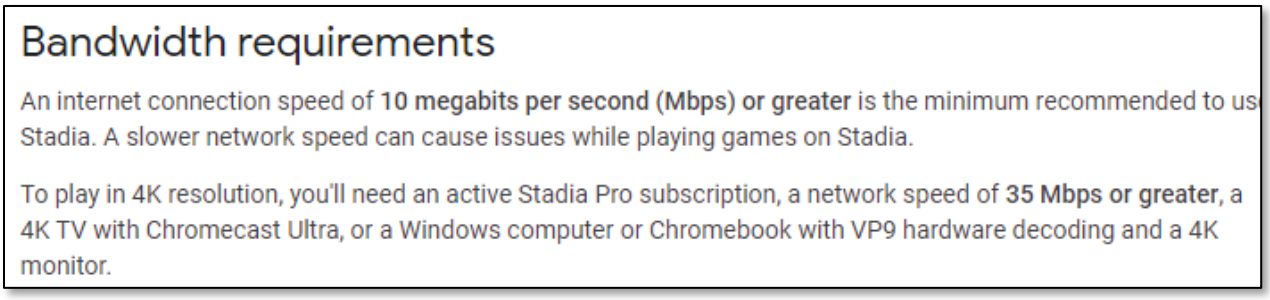


Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM



Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/

52. Google leverages the use of VP9 codec to optimize the live encoding for streaming of media on a video display device. The displaying of multiple screens on a single video display device involves compositing of media streams by the video display device.

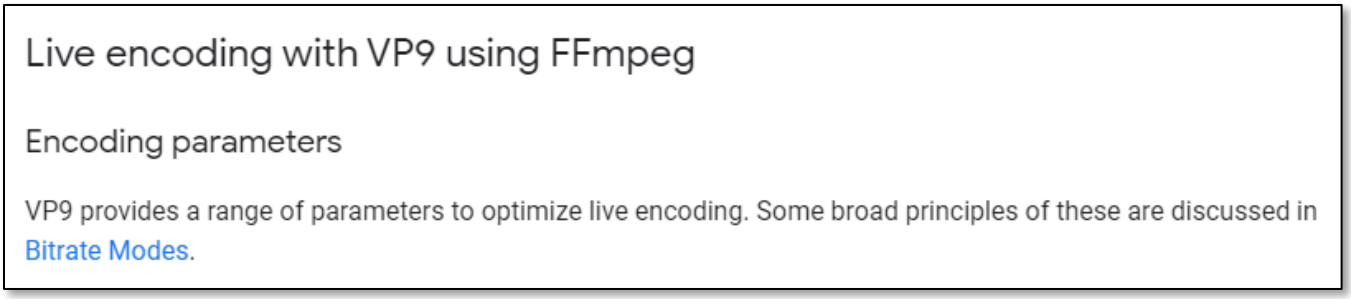


Bandwidth requirements

An internet connection speed of **10 megabits per second (Mbps) or greater** is the minimum recommended to us Stadia. A slower network speed can cause issues while playing games on Stadia.

To play in 4K resolution, you'll need an active Stadia Pro subscription, a network speed of **35 Mbps or greater**, a 4K TV with Chromecast Ultra, or a Windows computer or Chromebook with VP9 hardware decoding and a 4K monitor.

Source: https://support.google.com/stadia/answer/9607891?hl=en

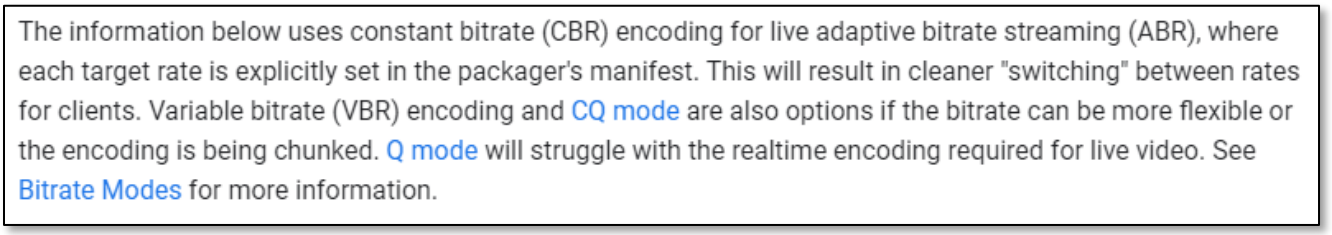


Live encoding with VP9 using FFmpeg

Encoding parameters

VP9 provides a range of parameters to optimize live encoding. Some broad principles of these are discussed in Bitrate Modes.

Source: https://developers.google.com/media/vp9/live-encoding



The information below uses constant bitrate (CBR) encoding for live adaptive bitrate streaming (ABR), where each target rate is explicitly set in the packager's manifest. This will result in cleaner "switching" between rates for clients. Variable bitrate (VBR) encoding and CQ mode are also options if the bitrate can be more flexible or the encoding is being chunked. Q mode will struggle with the realtime encoding required for live video. See Bitrate Modes for more information.

Source: https://developers.google.com/media/vp9/live-encoding

53. Using Google Stadia's Stream connect feature, players can use the video as a texture, mix the audio into their scene, use it as game data — or create a completely new gameplay experience. This feature allows players to receive audio and video streams from other players via Google servers (i.e. remote servers) to their device. Since the streaming involves displaying video

with the graphical content of the game, mixing audios, the multiplexed stream contains the audio/visual substreams.

> When you play a game on Stadia, we stream video and audio from our computer to yours. Stream Connect allows you to send a copy of those streams from one player to another, where it gets incorporated directly into the game. In our keynote, we showed you three example uses of the feature:
>
> - Couch-based split-screen — Showing multiple players' game content on a single screen.
> - Co-op squad view — incorporating all teammates' views into each player's perspective, without the processing cost of multiple scene renders.
> - Asymmetric multiplayer roles, i.e., "the coordinator view" — Showing how one player can not only view, but also impact others using Stream Connect.
> - The Night Forest demo was designed to make use of a coordinator view. In it, a scientific team on a distant planet has discovered an infectious outbreak in the forest. They rush to the scene and get to work.

Source: https://stadia.dev/intl/en/blog/stream-connect:new-possibilities-for-multiplayer-gameplay/

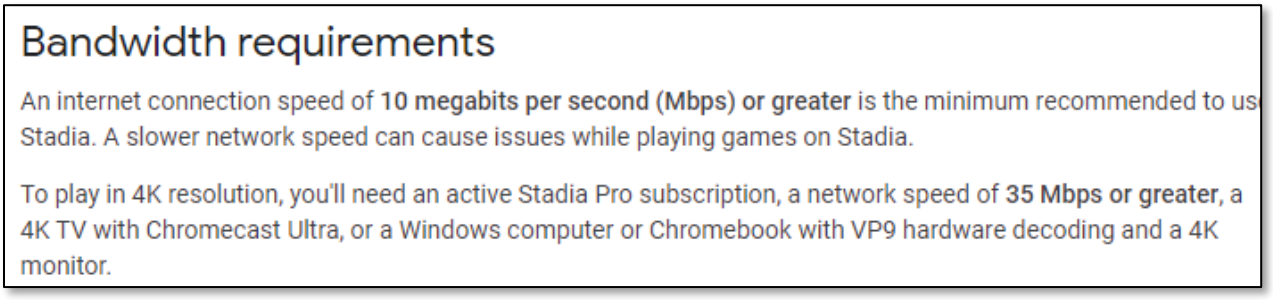
54. The multiplexed stream received by a player streaming other users' game, includes substreams. The streaming data includes description of data (or descriptor substream). For example, such data includes the number of media streams (up to three for the game *Ghost Recon*), supported video format (e.g. VP9).

> **What makes it different from traditional split screen?**
>
> As seen in its on-stage demo, Stream Connect is like split-screen unshackled. Players will be able to pull up individual streams of others on their squad on demand, and they will be able to use any surface on the screen to do so. The demo showed an example of two mini streaming windows opened up on either top corner of the main screen. Hoffman-John said, "We've shown you three views, but we could keep going. We can keep adding streams and shape how they're shown to the player."

Source: https://www.androidcentral.com/what-stream-connect-stadia

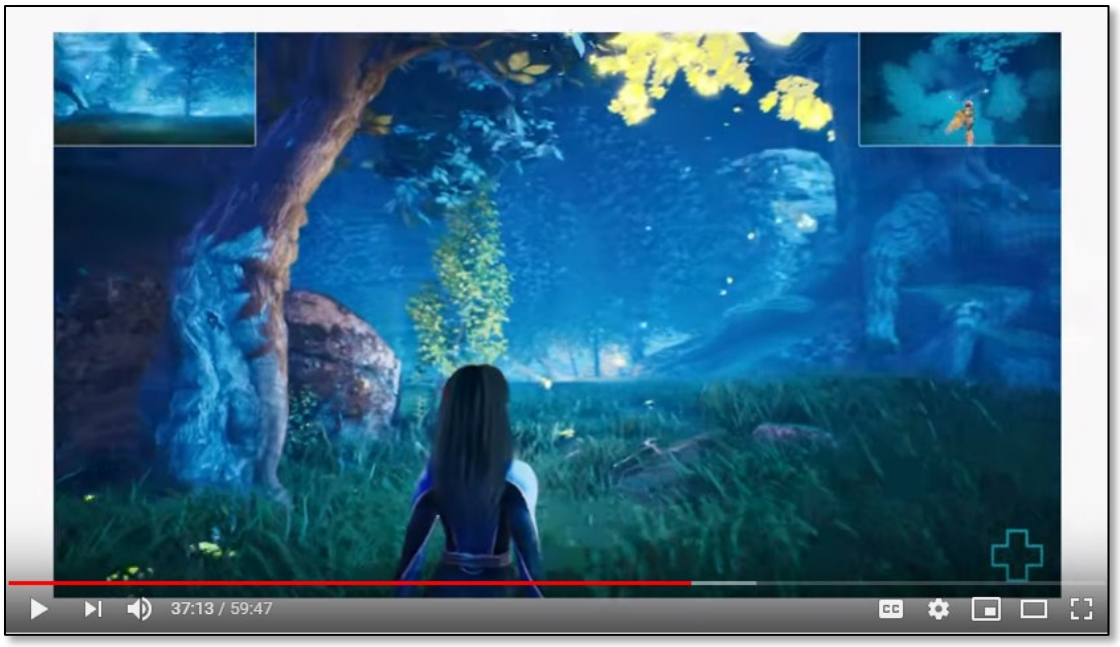
> For those wondering, Stream Connect works by giving you a live game feed of your fellow co-op players. It's very similar to local split-screen co-op in that you retain your main game view but can have up to three extra on-screen views of your friends and random online players visible at all times. This is enabled in *Ghost Recon: Wildlands* from the get-go. That means the first time you jump into a cooperative game, you'll instantly have a feed of the other players on your screen.

Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/

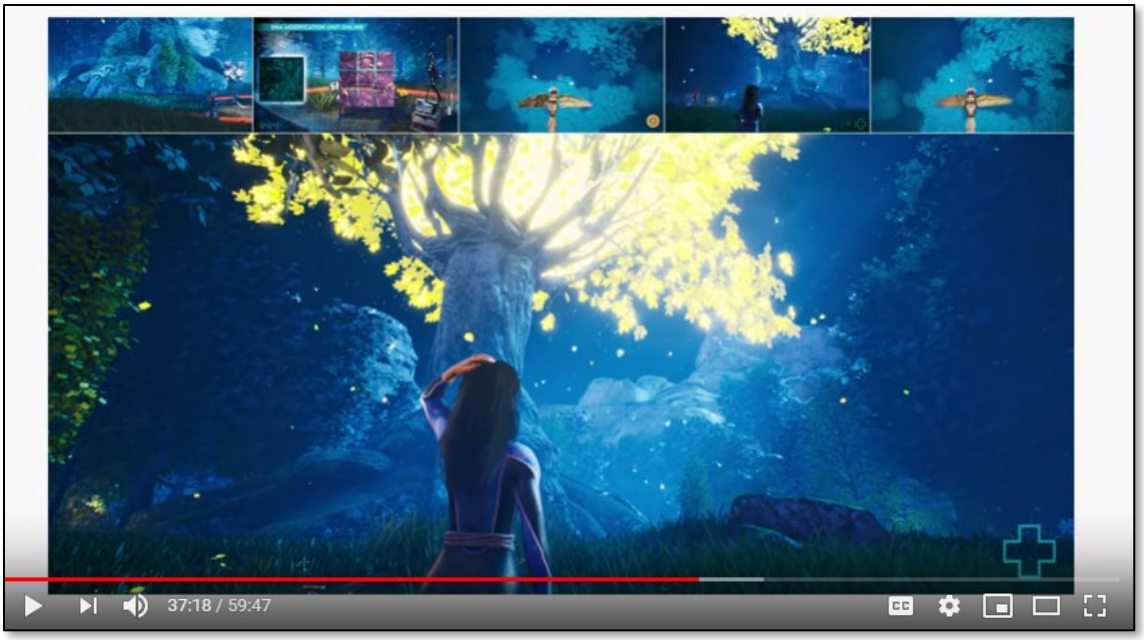


Source: https://support.google.com/stadia/answer/9607891?hl=en

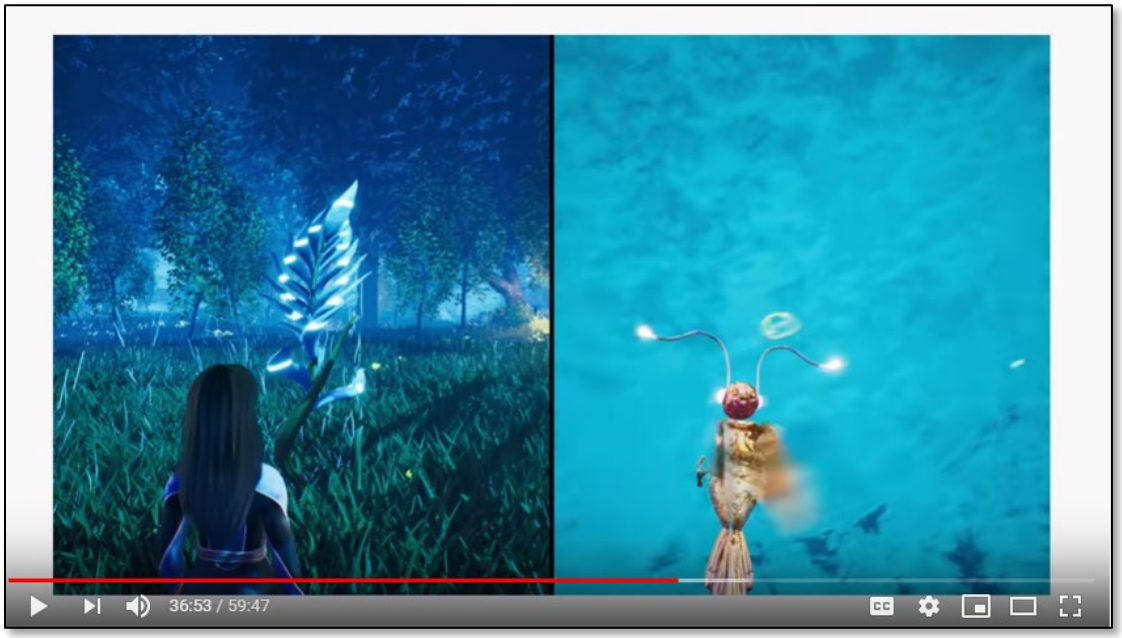
55. The streaming data received by a user for other players includes one or more audio/video streams (i.e. media substreams). The user device receiving these media substreams displays them on device's screen. The streaming data includes instructions for the composition of media streams (i.e. compositing – instruction substream). The instructions determine composition of media streams on the user screen, e.g. the screen area where the other player's stream is to be incorporated.



Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM

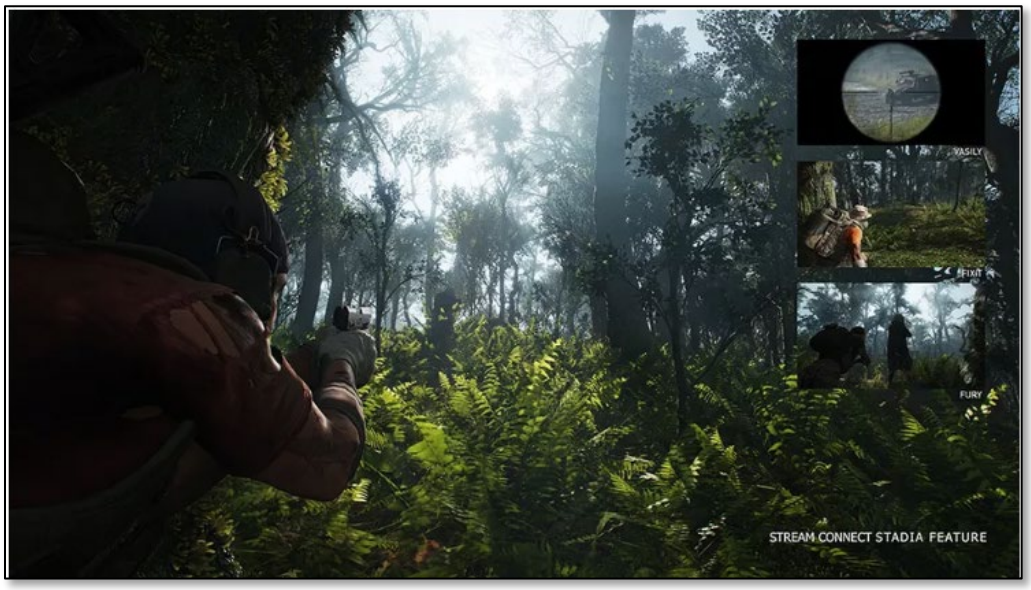


Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM



Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM

Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/



Source: https://www.theverge.com/2019/12/17/21026448/google-stadia-borderlands-3-ghost-recon-breakpoint-stream-connect-dragon-ball-promise

56. Google Stadia demultiplexes streaming data stream received from other players into different substreams. For example, streaming data includes its description information (e.g. descriptor substream) such as number of media streams, supported video format (e.g. VP9), and

streaming protocol. Such information allows demultiplexing of multiplexed streaming data received on the user's device.

> For those wondering, Stream Connect works by giving you a live game feed of your fellow co-op players. It's very similar to local split-screen co-op in that you retain your main game view but can have up to three extra on-screen views of your friends and random online players visible at all times. This is enabled in *Ghost Recon: Wildlands* from the get-go. That means the first time you jump into a cooperative game, you'll instantly have a feed of the other players on your screen.

Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/

Bandwidth requirements

An internet connection speed of **10 megabits per second (Mbps) or greater** is the minimum recommended to us Stadia. A slower network speed can cause issues while playing games on Stadia.

To play in 4K resolution, you'll need an active Stadia Pro subscription, a network speed of **35 Mbps or greater**, a 4K TV with Chromecast Ultra, or a Windows computer or Chromebook with VP9 hardware decoding and a 4K monitor.

Source: https://support.google.com/stadia/answer/9607891?hl=en

57. Google Stadia relies on multiple technologies and protocol stacks to provide the cloud gaming system to the user. Google Stadia uses WebRTC, QUIC, and many other protocols.

IEEE SPECTRUM Engineering Topics Special Reports Blogs Multimedia The Magazine

One of the protocols used by Stadia, called WebRTC, arose from an open-source project supported by Google, Mozilla, and Opera. WebRTC allows software developers to build real-time video and audio communication into web browsers such as Google Chrome and apps such as Google Hangouts and Duo.

"Our vision is to have Stadia available on all devices that stream YouTube—a truly platform-agnostic service."

—Majd Bakar, VP of Engineering

Stadia will also rely upon Google's QUIC (Quick UDP Internet Connections) protocol that has reduced connection times and minimized delays in transmission in comparison with the older TCP protocol. Google's Chrome browser and various apps already use QUIC for more efficient data transmission. But the protocol's capability to deliver data with less latency can also make a big difference for online gaming experiences that require players to make split-second decisions.

Source: https://spectrum.ieee.org/tech-talk/telecom/internet/how-the-youtube-era-made-cloud-gaming-possible

58. Further, the QUIC protocol is designed with multiplexing operations as the basic block. The gaming cloud server multiplexes the various data streams and sends it to the client device which demultiplexes the stream.

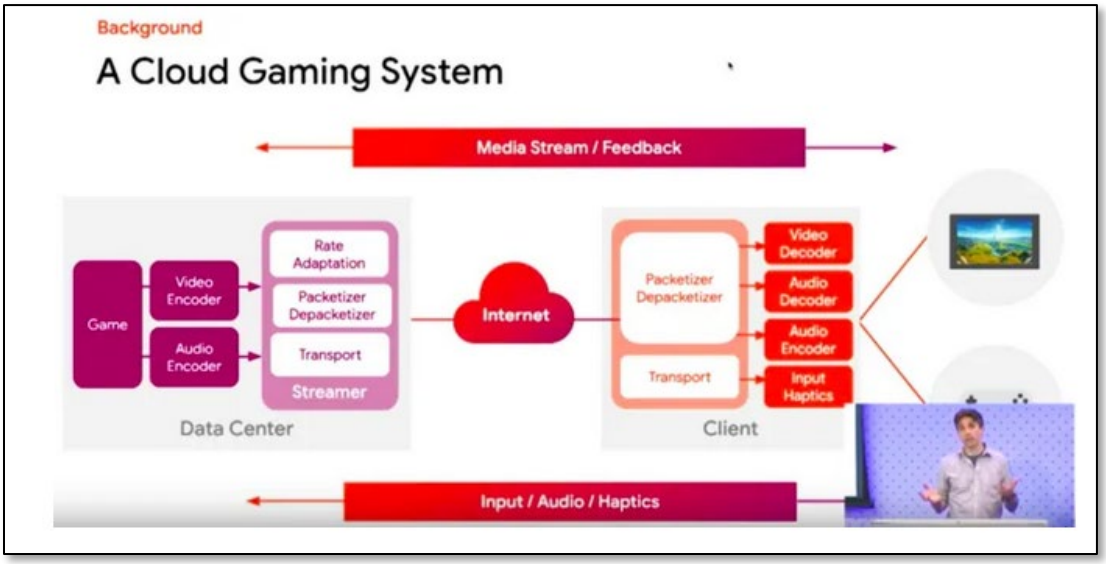
Multiplexing

One of the larger issues with HTTP2 on top of TCP is the issue of head-of-line blocking. The application sees a TCP connection as a stream of bytes. When a TCP packet is lost, no streams on that HTTP2 connection can make forward progress until the packet is retransmitted and received by the far side - not even when the packets with data for these streams have arrived and are waiting in a buffer.

Because QUIC is designed from the ground up for multiplexed operation, lost packets carrying data for an individual stream generally[1] only impact that specific stream. Each stream frame can be immediately dispatched to that stream on arrival, so streams without loss can continue to be reassembled and make forward progress in the application.

Source: https://docs.google.com/document/d/1gY9-YNDNAB1eip-RTPbqphgySwSNSDHLq9D5Bty4FSU/edit,

59. The multiplexed streams received by the client device is demultiplexed into various substreams and is further transmitted to the decoders to decode the video and audio data from the streams.



Source: http://webrtcbydralex.com/index.php/2020/01/21/webrtc-in-google-stadia-redefining-

realtime-streaming-at-scale/

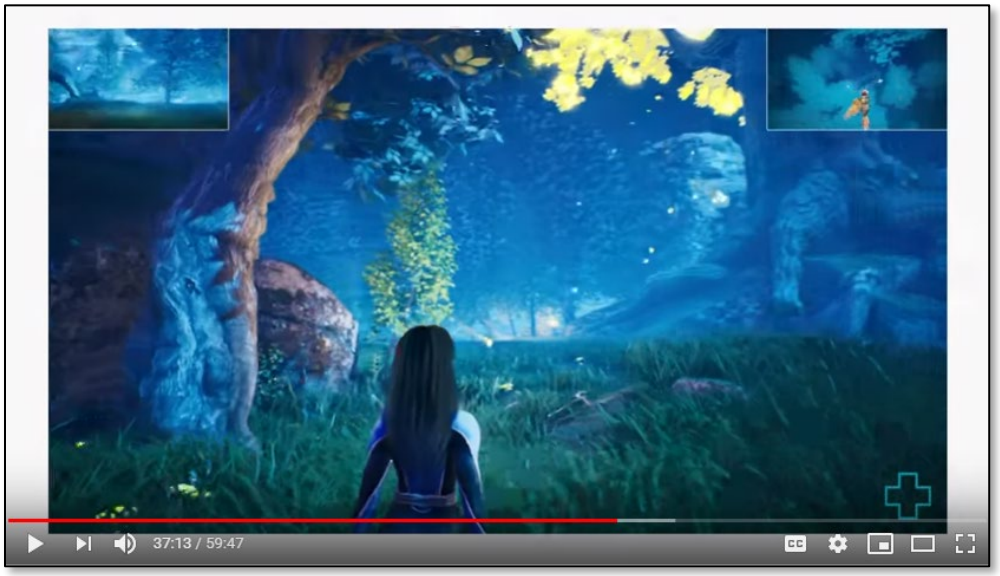
60. The streaming data from other players' games received on a user's device includes audio/video substreams. The streaming data includes instructions for composition (i.e. compositing – instruction substream) of received audio/video substreams.

61. For example, the streaming data includes instructions to incorporate (or composite) the audio/video substreams on a specific area of a user device's screen.

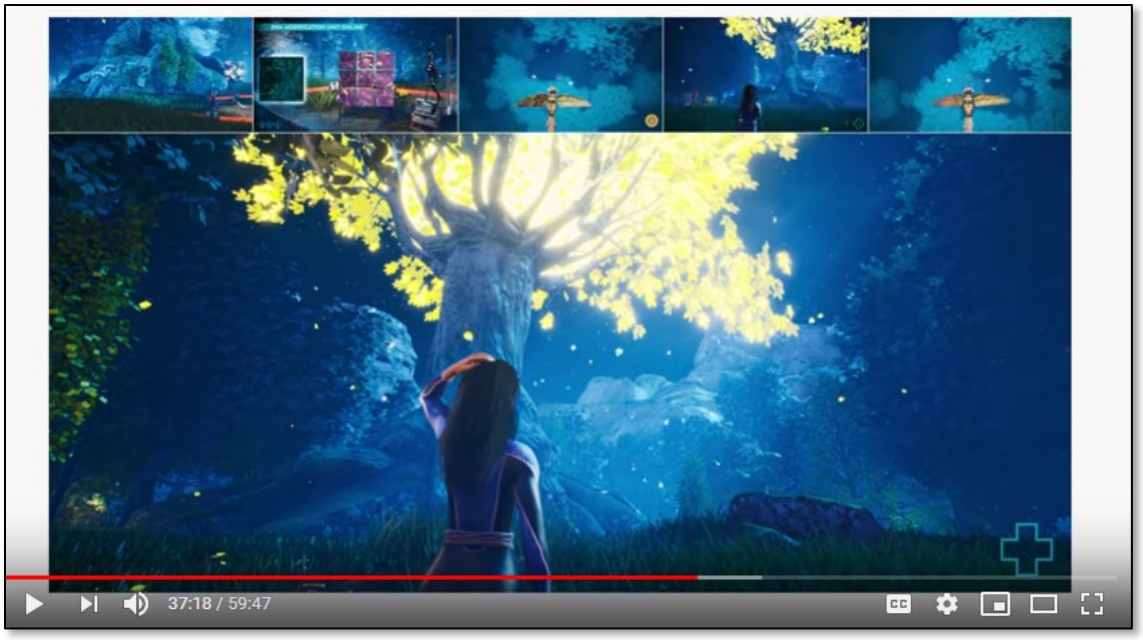
> **What makes it different from traditional split screen?**
>
> As seen in its on-stage demo, Stream Connect is like split-screen unshackled. Players will be able to pull up individual streams of others on their squad on demand, and they will be able to use any surface on the screen to do so. The demo showed an example of two mini streaming windows opened up on either top corner of the main screen. Hoffman-John said, "We've shown you three views, but we could keep going. We can keep adding streams and shape how they're shown to the player."

Source: https://www.androidcentral.com/what-stream-connect-stadia

62. The user's display device can incorporate received audio/video substreams from a different area of the screen such as top corners, top screen, or right screen.



Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM

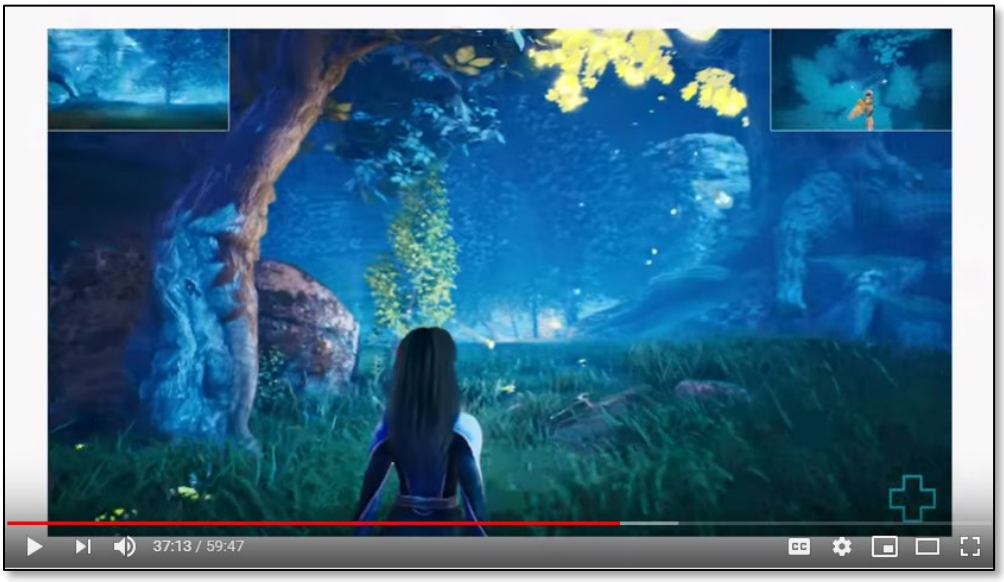


Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM

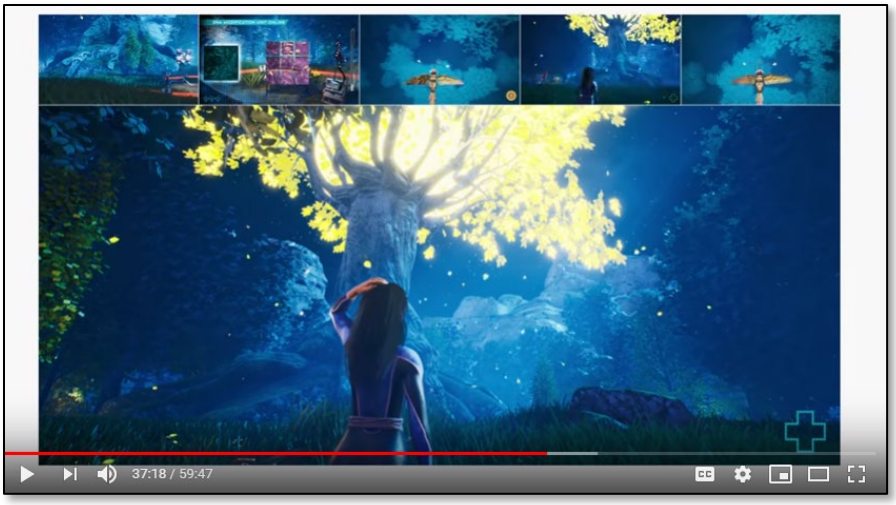
Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/

Source: https://www.theverge.com/2019/12/17/21026448/google-stadia-borderlands-3-ghost-recon-breakpoint-stream-connect-dragon-ball-promise

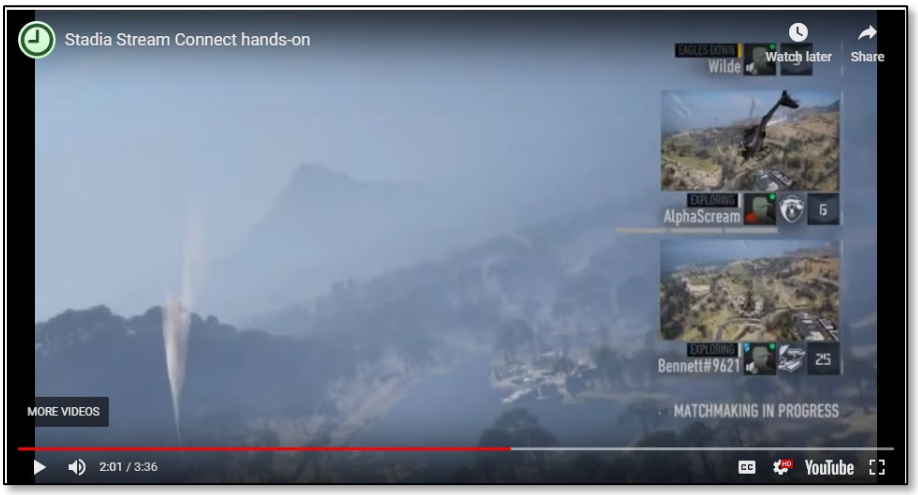
63. The user's device can display received audio/video substreams on specific areas of its screen in the form of on-screen display or picture-in-picture.



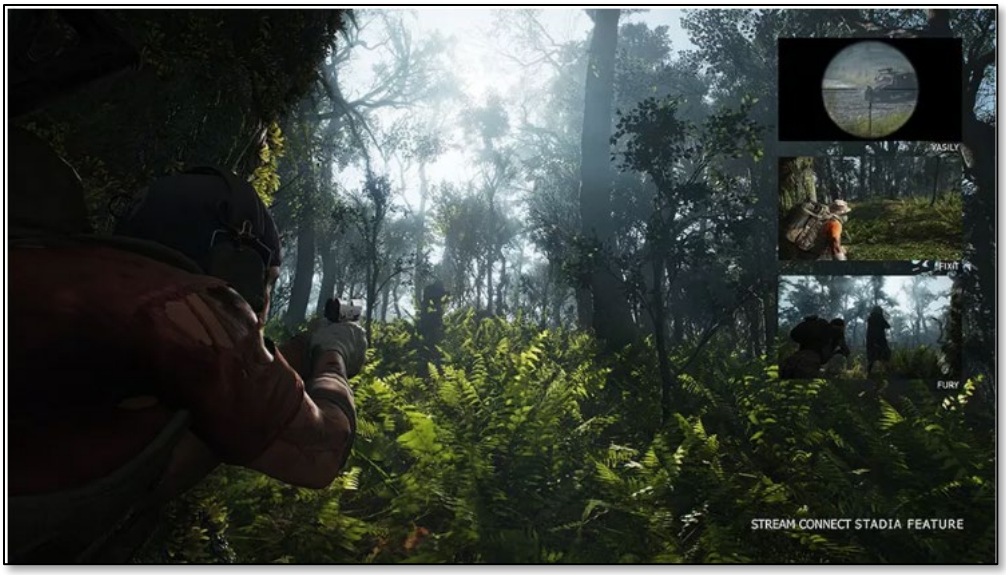
Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM



Source: https://www.youtube.com/watch?v=hl-Y1QVhmcM



Source: https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/



Source: https://www.theverge.com/2019/12/17/21026448/google-stadia-borderlands-3-ghost-recon-breakpoint-stream-connect-dragon-ball-promise

64. In view of preceding paragraphs, each and every element of at least claim 1 of the '180 Patent is found in the Accused Products.

65. Google continues to directly infringe at least one claim of the '180 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing, and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

66. Google has received notice and actual or constructive knowledge of the '180 Patent since at least the date of service of this Complaint.

67. Since at least the date of service of this Complaint, through its actions, Google has actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the '180 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and

other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- https://stadia.google.com/
- https://stadia.dev/intl/en/blog/stream-connect:new-possibilities-for-multiplayer-gameplay/
- https://9to5google.com/2019/12/19/stadia-stream-connect-hands-on/
- https://www.youtube.com/watch?v=hl-Y1QVhmcM
- https://support.google.com/stadia/answer/9607891?hl=en
- https://developers.google.com/media/vp9/live-encoding
- https://www.androidcentral.com/what-stream-connect-stadia
- https://www.theverge.com/2019/12/17/21026448/google-stadia-borderlands-3-ghost-recon-breakpoint-stream-connect-dragon-ball-promise
- https://spectrum.ieee.org/tech-talk/telecom/internet/how-the-youtube-era-made-cloud-gaming-possible
- https://docs.google.com/document/d/1gY9-YNDNAB1eip-RTPbqphgySwSNSDHLq9D5Bty4FSU/edit
- http://webrtcbydralex.com/index.php/2020/01/21/webrtc-in-google-stadia-redefining-realtime-streaming-at-scale/

68. Since at least the date of service of this Complaint, through its actions, Google has contributed to the infringement of the '180 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district, with knowledge that the Accused Products infringe the '180 Patent. The Accused Products are especially made or adapted for infringing the '180 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the '180 Patent.

JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

REQUEST FOR RELIEF

WHEREFORE, Brazos respectfully requests that the Court:

(A) Enter judgment that Google infringes one or more claims of the '180 Patent literally and/or under the doctrine of equivalents;

(B) Enter judgment that Google has induced infringement and continue to induce infringement of one or more claims of the '180 Patent;

(C) Enter judgment that Google has contributed to and continue to contribute to the infringement of one or more claims of the '180 Patent;

(D) Award Brazos damages, to be paid by Google in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for the infringement by Google of the '180 Patent through the date such judgment is entered in accordance with 35 U.S.C. § 284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. § 284;

(E) Declare this case exceptional pursuant to 35 U.S.C. § 285; and

(F) Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated: June 29, 2020

Respectfully submitted,

/s/ James L. Etheridge
James L. Etheridge
Texas State Bar No. 24059147
Ryan S. Loveless
Texas State Bar No. 24036997
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