

PETITIONERS' TRIAL HEARING DEMONSTRATIVES

CISCO SYSTEMS, INC.
Petitioner,
v.
UMBRA TECHNOLOGIES LTD
Patent Owner.

Inter Partes Review No.: IPR2024-00497
U.S. Patent No. 10,630,505

TRIAL HEARING
JUNE 4, 2025

DUANE MORRIS, LLP

Overview of Grounds

Ground	Basis	Cited Art	'505 Claims
1	103	Hankins, alone, or in view of Munger	1, 2, 4-12, 14-20
2	103	Hankins, alone or in view of Munger, in further view of Treuhaft	3, 13

Overview of Dispute

Dispute	Basis	Claims
1	<i>end-to-end tunnels</i>	1-20

Overview of the Prior Art

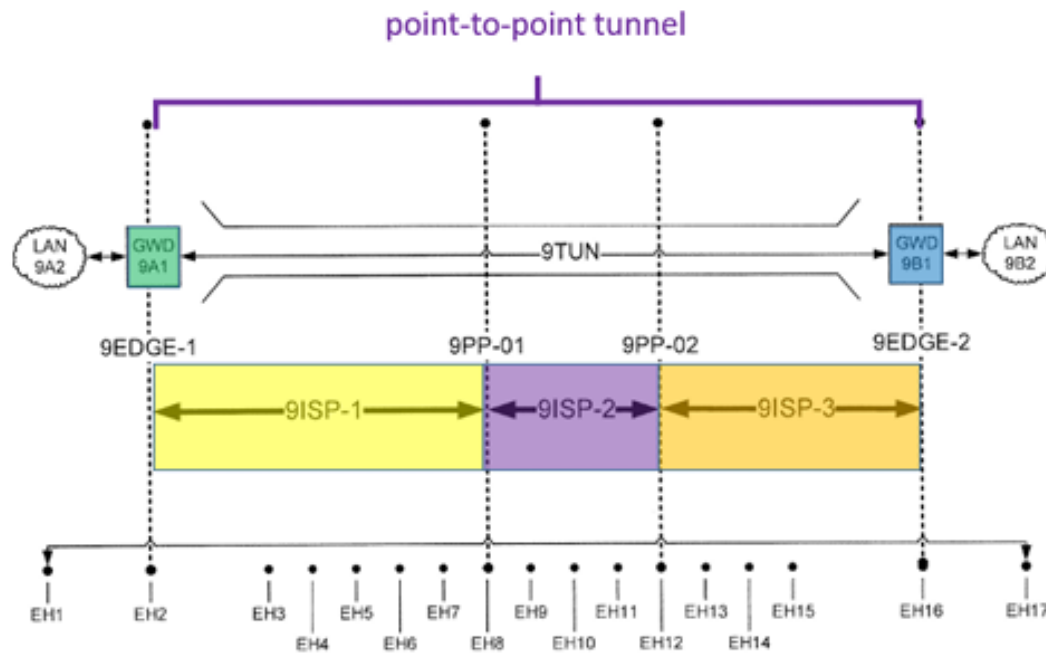


Figure # 9

EX-1001 FIG. 9 (annotated).

Problems with the Prior Art

- “little to no control over the routes between the two points as they rely on the policy of various middle players on the internet who carry their traffic over their network(s) and peer to other carriers and or network operators.” EX-1001 2:48-57.
- “limited control over routing and quality of service of the total connection. Consequently, it was difficult for point-to-point tunnels to maintain a high quality, stable connection over distance, especially when there are portions of traffic transiting third party networks.” EX-1001 13:14-21.
- The '505 Patent's proposed solution was a global virtual network (GVN) of endpoint devices and access point servers with a centralized control server for automatically monitoring and controlling the routing of communications between endpoint devices using tunnels. EX-1001 3:11-62.

Pet. Rep. 7-8

Overview of the '505 Patent

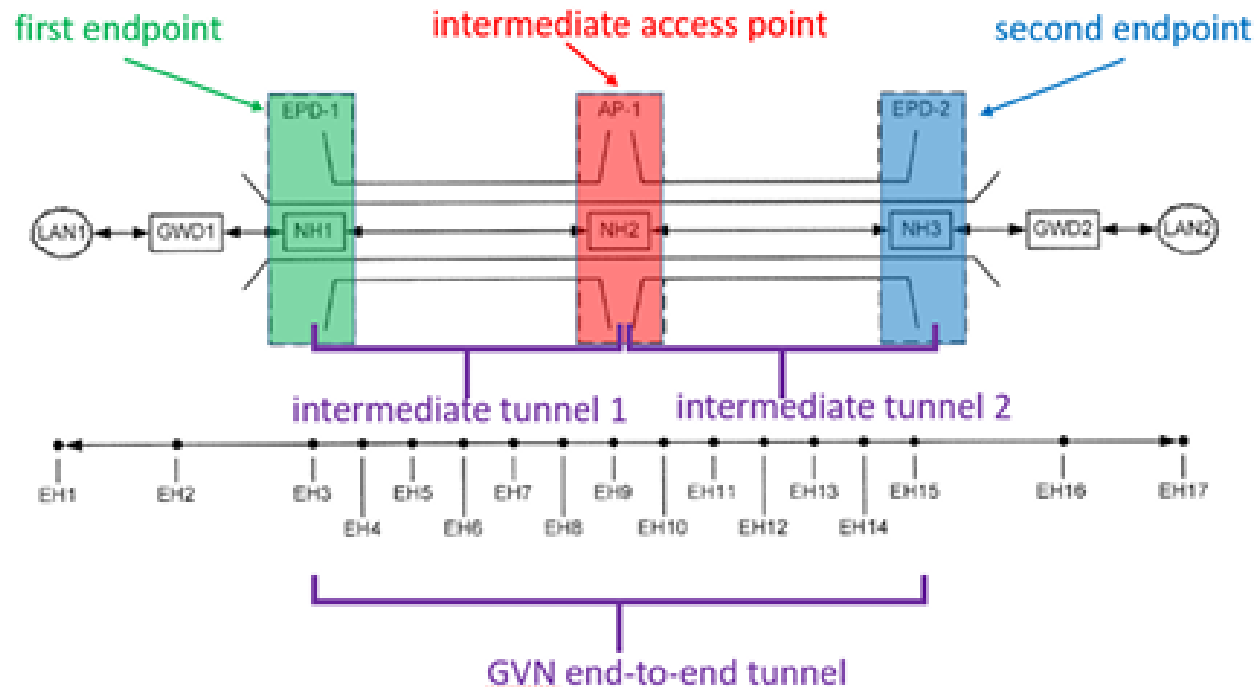


Figure # 33

EX-1004 FIG 33; EX-1012 ¶5.

Overview of the '505 Patent

- The '505 patent expressly states that FIG 33 “illustrates an end-to-end GVN tunnel(s) between edges of two LANs via one SRV_AP.” EX-1001 33:9-11.
- There is “one tunnel between EPD-1 and AP-1” (intermediate tunnel 1), “joined to a second tunnel between AP-1 and EPD-2” (intermediate tunnel 2) which together form the GVN “tunnel that extends over the entirety of the transit” from one endpoint to the other. EX-1001 33:7-19.
- The “joining of tunnels at AP hops” is “viewed as a single tunnel by client devices within LAN1 and LAN2.” EX-1001 34: 1-7

Overview of the '505 Patent

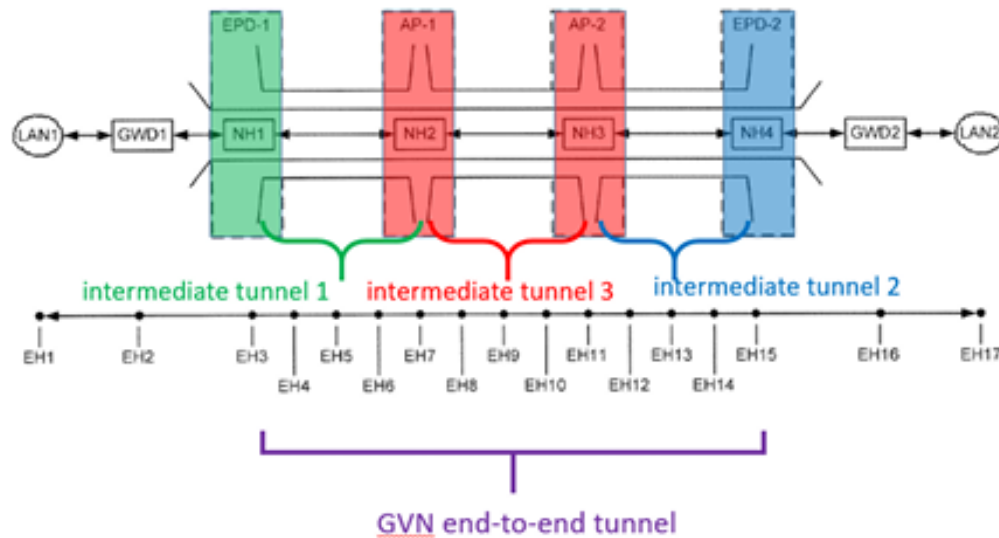


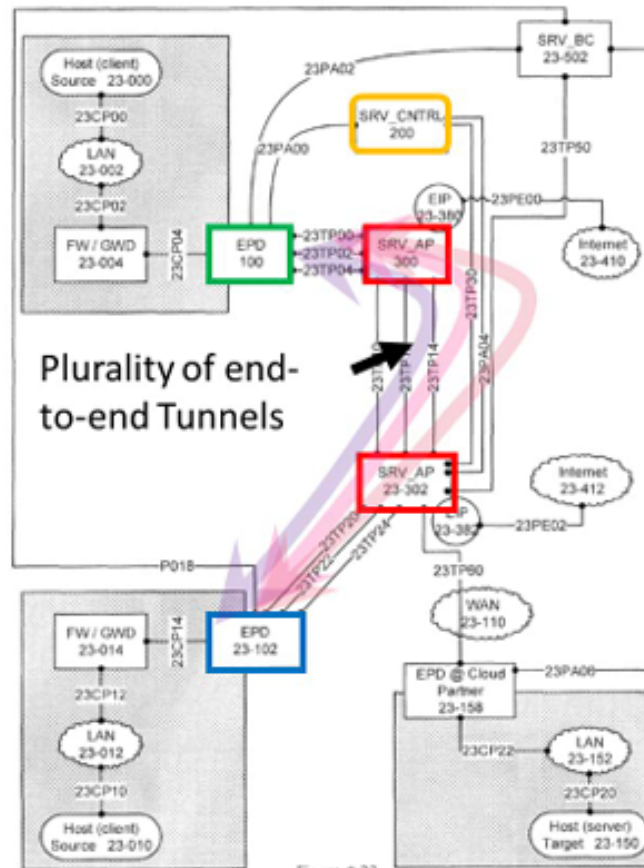
Figure # 34

EX-1004 FIG. 34; EX-1012 ¶7.

Overview of the '505 Patent

- FIG. 34 “illustrates an end-to-end GVN tunnel(s) between edges of two LANs via two (or possibly more) SRV_Aps.” EX-1001 33:24-26; EX-1012 ¶8.
- “Systems and methods for connecting devices via a virtual global network are disclosed. In one embodiment the network system may comprise a first device in communication with a first endpoint device and a second device in communication with a second endpoint device. The first and second devices may be connected with a communication path. The communication path may comprise one or more intermediate tunnels connecting each endpoint device to one or more intermediate access point servers and one or more control servers.” EX-1001 Abstract; EX-1012 ¶9.

Overview of the '505 Patent

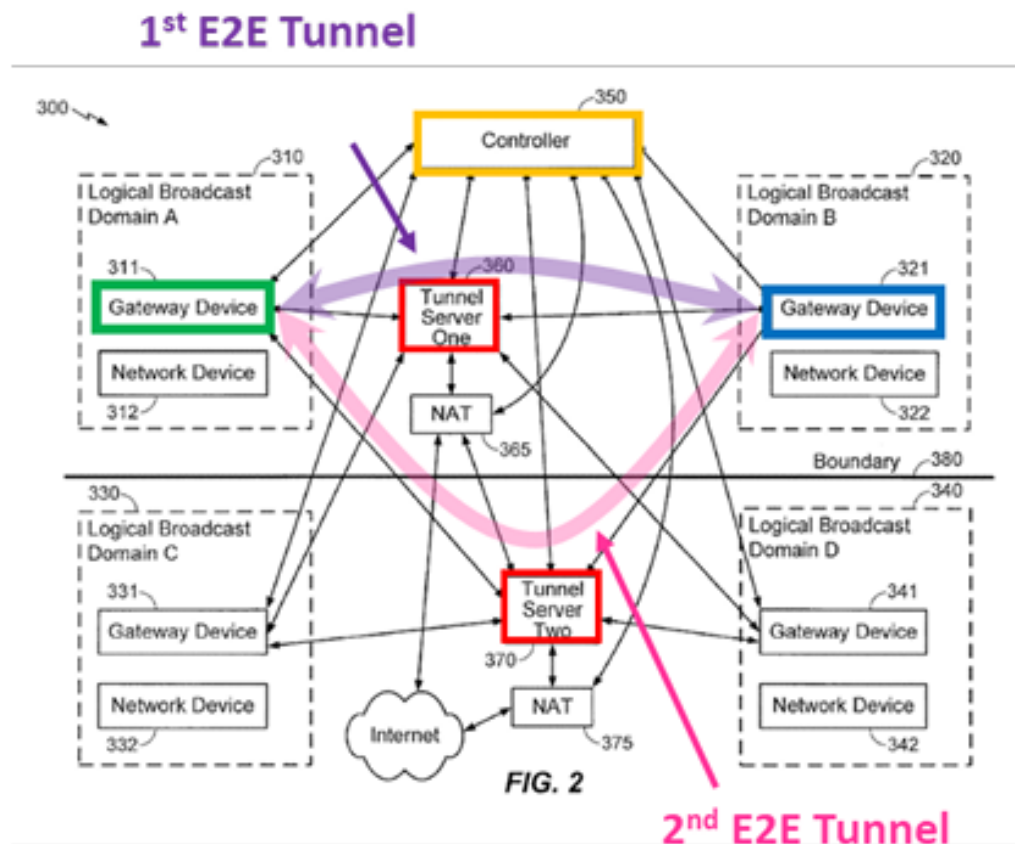


EX-1001 Fig. 23; EX-1003 ¶ 28.

Claim 1

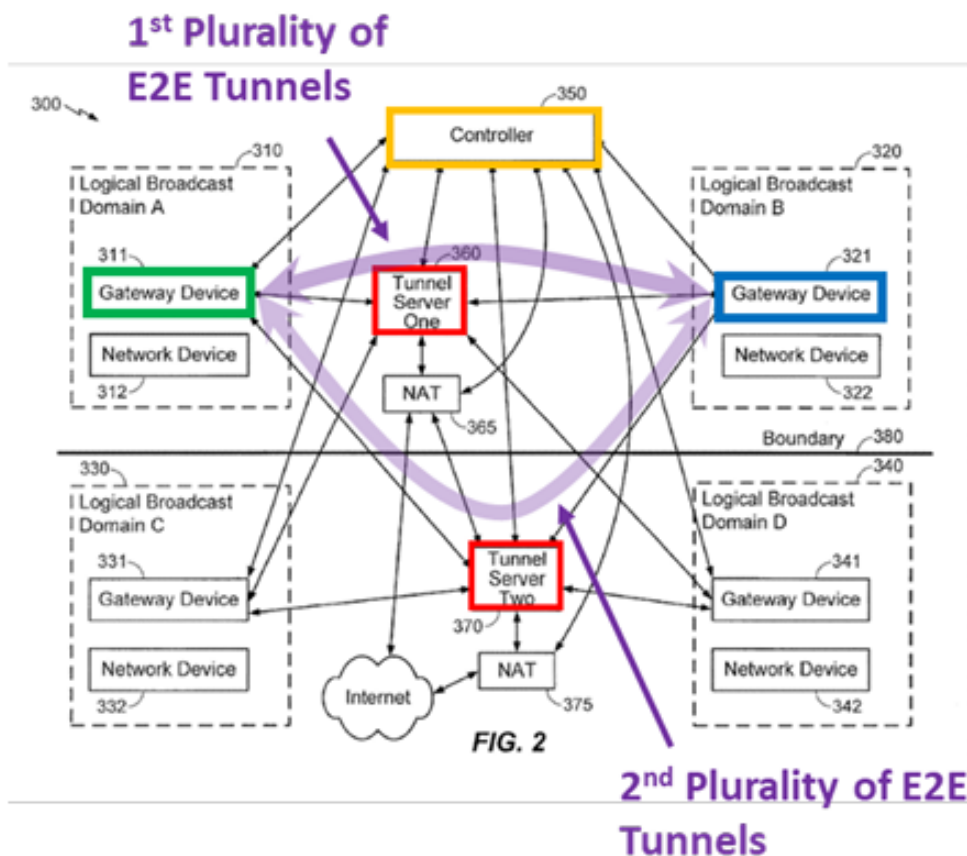
1. A network system comprising:
 - a first device;
 - a second device; and
 - a plurality of intermediate access point servers that form a plurality of *end-to-end tunnels* connecting the first device and the second device; and
 - a control server, wherein the control server receives information from at least one of the plurality of intermediate access point servers, andwherein the control server selects one of the plurality of *end-to-end tunnels* for communication between the first and second devices based on the information.

Overview of Hankins (1st)



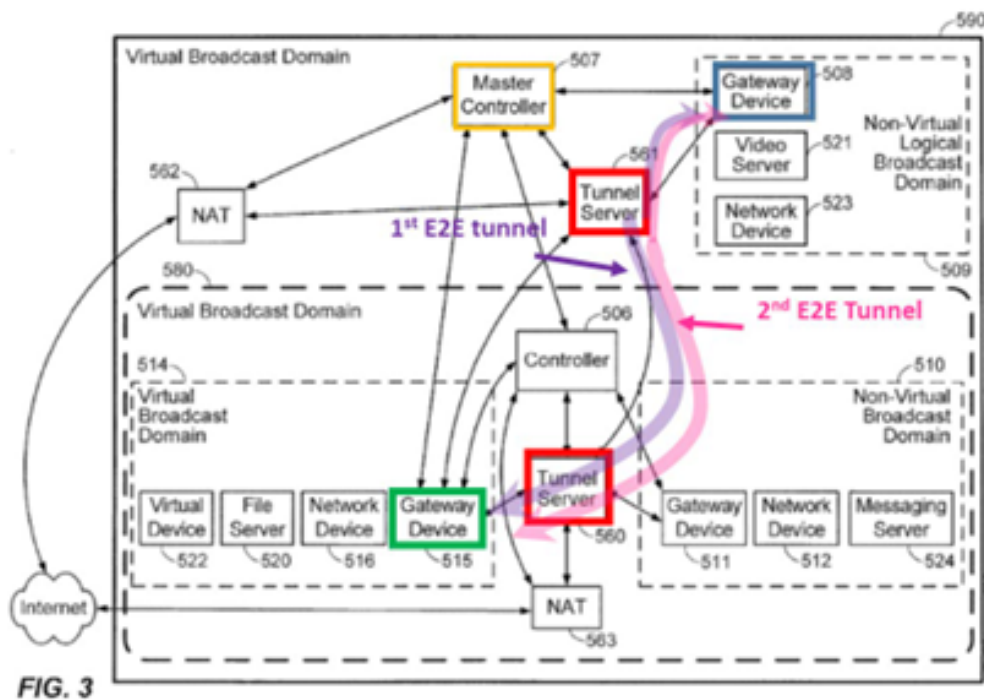
EX-1004 Fig. 2; EX-1003 ¶32.

Overview of Hankins (2nd)



EX-1004 FIG. 2 ; EX-1003 ¶90.

Overview of Hankins (3rd)



EX-1004 FIG. 3; EX-1003 ¶87.

Dispute: *end-to-end tunnels*

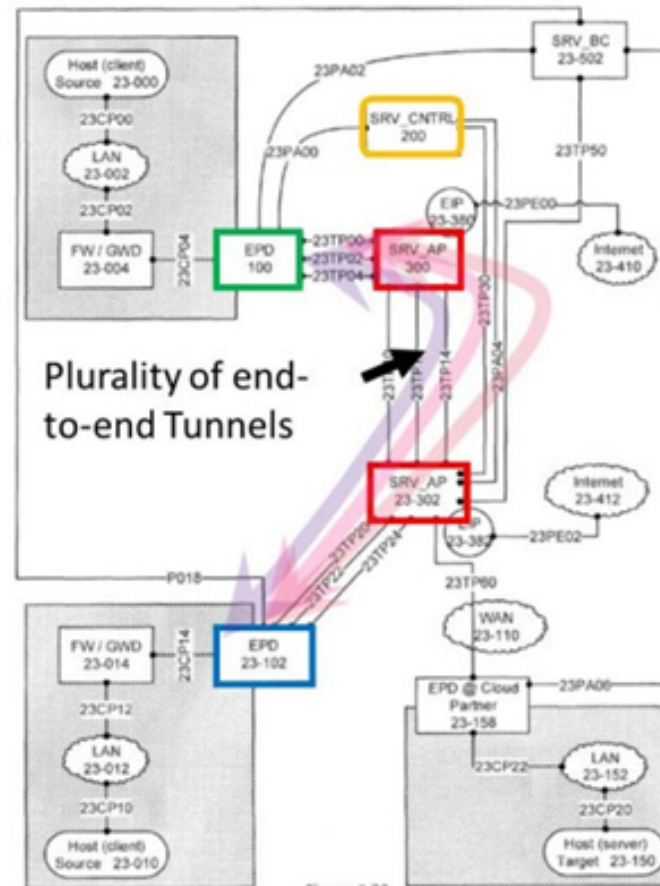
Claim 1

1. A network system comprising:
 - a first device;
 - a second device; and
 - a plurality of intermediate access point servers that form a plurality of *end-to-end tunnels* connecting the first device and the second device; and
 - a control server, wherein the control server receives information from at least one of the plurality of intermediate access point servers, andwherein the control server selects one of the plurality of *end-to-end tunnels* for communication between the first and second devices based on the information.

There is no factual support for the POR's argument that a single end-to-end tunnel cannot include multiple tunnels joined together at intermediate points.

- Each of FIGs. 23, 33 and 34 illustrate that a single end-to-end tunnel may be formed by joining multiple intermediate tunnels. The '505 Patent expressly states that joined tunnels appear as a single tunnel:
 - “While FIGS. 33, 34 and 35 all illustrate the **joining of tunnels** at AP hops, **this is viewed as a single tunnel** by client devices within LAN1 and LAN2. This singular tunnel represents the neutral Third Layer of the GVN within which it is possible to run all traffic that would normally transit over the internet, including TCP, UDP, and other protocols, plus other tunnels such as IPSec, OpenVPN, PPTP, or other.” EX-1001 34:1-7; EX-1012 ¶10. Pet. Rep. 14

The '505 Patent discloses a plurality of intermediate tunnels make up an end-to-end tunnel



EX-1001 Fig. 23; EX-1012 ¶12.

The '505 Patent discloses a plurality of intermediate tunnels make up an end-to-end tunnel

- Abstract: “The communication path may comprise one or more intermediate tunnels connecting each endpoint device to one or more intermediate access point servers and one or more control servers.” EX-1001 Abstract; EX-1012 ¶13.
- FIG. 23 illustrates that multiple intermediate tunnels between two devices such as 23TP00, 23TP02, 23TP04 or 23TP10, 23TP12, 23TP14 or 23TP20, 23TP22, 23TP24 can either offer a single communication path by sending traffic down one tunnel, or two or more tunnels can be aggregated together where two or more tunnels can carry traffic as if they are one tunnel. EX-1001 24:33-39.

The 505 Patent discloses a plurality of intermediate tunnels make up an end-to-end tunnel

- FIG. 17 shows endpoint devices connected through multiple concurrent tunnels:
 - End point devices (EPD) 17-100 through 17-110 will connect with one or more multiple SRV_AP servers through one or more multiple concurrent tunnels.

EX-1001 20:17-20; EX-1012 ¶14.

The 505 Patent discloses a plurality of intermediate tunnels make up an end-to-end tunnel

- FIG. 19 shows multiple tunnels connecting endpoint devices with multiple intermediate access points:

End point devices (EPD) such as 19-100 through 19-128 gateway will connect with the most appropriate SRV_AP server relative to their location, their network connectivity, its peering and other relevant factors. These factors are constantly changing and therefore multiple tunnels to multiple SRV_AP servers are maintained by an EPD at all times. Each EPD connects with various (one or more) SRV_AP servers simultaneously.

EX-1001 21:18-25; EX-1012 ¶15.

The 505 Patent does not require end-to-end tunnels to carry encapsulated traffic

- The '505 Patent only uses the word encapsulation once, when describing that IPv4 traffic can be encapsulated for an IPv6 tunnel. EX-1001 39:27-31.
- None of the figures illustrating end-to-end tunnels discussed above include any discussion of encapsulation.
- That a tunnel can carry encapsulated traffic is no justification for construing an end-to-end tunnel to require encapsulated traffic.

The '505 Patent does not require end-to-end tunnels to span in an “uninterrupted fashion” between endpoints

- The '505 Patent does not use the word “uninterrupted”, and the POR does not explain what “uninterrupted fashion” means. POR 10, 13.
- For example, in describing FIG. 33, the GVN tunnel is not described as uninterrupted, but instead is described as having seven hops from LAN1 to LAN2. EX-1001 33:15-24. The POR does not address whether a “hop” is an interruption in the tunnel.
- Moreover, the '505 Patent describes that intermediate access points in a GVN can perform processing of traffic which is inconsistent with the POR's argument that a tunnel spans an intermediate access point “uninterrupted.”
 - domain name system (DNS) lookup
 - caching of content
 - smart routing
 - firewall services.

EX-1001 4:9-40.

The POR Mischaracterizes the Prosecution History to argue that a tunnel requires encapsulation

- Claim 1 originally recited:
 1. A network system comprising:
 - a first device in communication with a first endpoint device
 - a second device in communication with a second endpoint device;
 - a communication path connecting the first device and the second device

further comprising one or more intermediate tunnels connecting each endpoint to one or more intermediate access point servers and one or more control servers.
- Examiner rejected Claim 1 as anticipated by Chen
- Chen didn't use the word "tunnel"
- Examiner asserted that Chen's disclosure of encapsulated communications over VPN constitute the recited "intermediate tunnel." EX-1002 165

Pet. Rep. 18

The POR Mischaracterizes the Prosecution History

- PO argued that encapsulation of communication under a VPN did not correspond to an intermediate tunnel.
- PO argued that even if Chen did disclose encapsulation of communication under a VPN, Chen **failed** to disclose:
 - (1) the use of the VPN protocol to encapsulate communications between pairs of Smart Devices, and
 - (2) that the Private Cloud Server joins multiple VPN links to provide end-to-end encapsulation and consequently the VPN links would not form a plurality of “end-to-end” tunnels.

EX-1002 150-

151

Pet. Rep. 18

The POR Mischaracterizes the Prosecution History

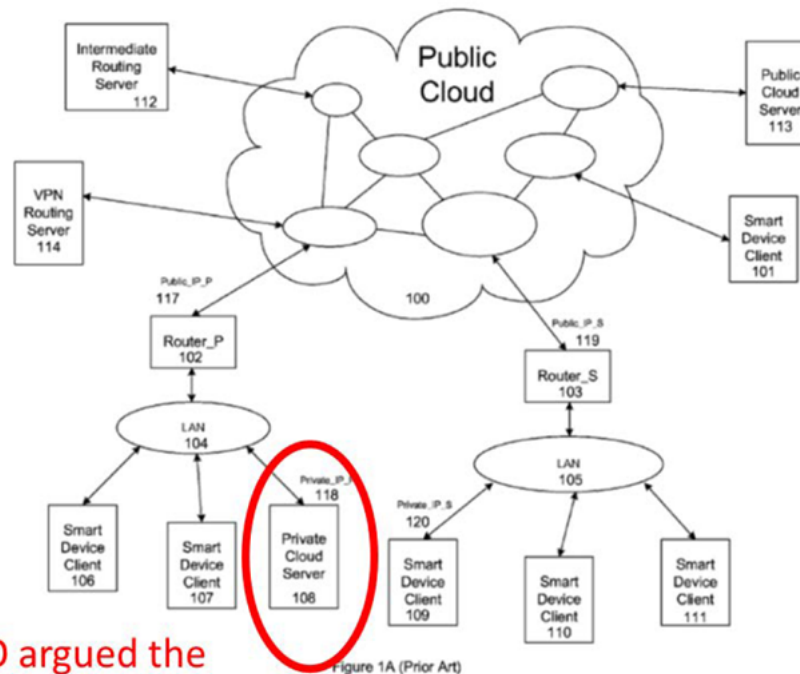
1. (Currently amended) A network system ~~for connecting devices via a global virtual network,~~ comprising:
 - a first device ~~in communication with a first endpoint device;~~
 - a second device ~~in communication with a second endpoint device;~~ and
 - a ~~communication path~~ plurality of intermediate access point servers that form a plurality of end-to-end tunnels connecting the first device and the second end-point device; and
 - a control server, wherein the control server receives information from at least one of the plurality of intermediate access point servers, and wherein the control server selects one of the plurality of end-to-end tunnels for communication between the first and second devices based on the information

~~further comprising one or more intermediate tunnels connecting each endpoint device to one or more intermediate access pointer servers and one or more control servers.~~

EX-1002 145

Pet. 13; Pet. Rep. 19

Chen



PO argued the
Cloud Server 108
does not join
VPN links

EX-1006 FIG. 1A (annotated).

Pet. 15

Background

Claim 2

2. The network system according to claim 1 , wherein at least one of the first device or the plurality of intermediate access point servers is configured to perform a domain name system lookup to locate the second device.

Claim 3

3. The network system according to claim 1 , wherein at least one of the first device or the plurality of intermediate access point servers is configured to perform a domain name system lookup from a cache to locate a second device.

Claim 4

4. The network system according to claim 1, wherein at least one of the plurality of intermediate access point servers is configured to cache content.

Claim 5

5. The network system according to claim 1, wherein at least one of the first device, the second device, or the plurality of intermediate access point servers is configured to perform smart routing .

Claim 6

6. The network system according to claim 5, wherein the smart routing is based on at least one of best bandwidth, lowest latency, fewest hops, or no packet loss.

Claim 7

7. The network system according to claim 5, wherein the smart routing is based on at least one of real-time statistics or historical statistics.

Claim 8

8. The network system according to claim 1, wherein at least one of the first device, the second device, or the plurality of intermediate access point servers is configured to perform firewall services.

Claim 9

9. The network system according to claim 8, wherein the first device provides firewall services between the first device and the plurality of intermediate access point servers.

Claim 10

10. The network system according to claim 8, wherein a first intermediate access point server among the plurality of intermediate access point servers provides firewall services between the first device and other intermediate access point servers among the plurality of intermediate access point servers or the second device.

Claim 11

11. A method comprising:

establishing, by one or more computer processors, a plurality of end-to-end tunnels between a first device and a second device, the plurality of end-to-end tunnels being configured to carry network traffic via a plurality of intermediate access point servers;

receiving, by the one or more computer processors, information from at least one of the plurality of intermediate access point servers; and

selecting, by the one or more computer processors, one of the plurality of end-to-end tunnels for communication between the first and second devices based on the information.

Claim 12

12. The method according to claim 11, further comprising configuring, by the one or more computer processors, at least one of the first device or the plurality of intermediate access point servers to perform a domain name system lookup to locate the second device .

Claim 13

13. The method according to claim 11, further comprising configuring, by the one or more computer processors, at least one of the first device or the plurality of intermediate access point servers to perform a domain name system lookup from a cache to locate the second.

Claim 14

14. A system comprising:

- a memory storing instructions; and

- one or more processors coupled to the memory, the one or more processors being configured to execute the instructions, the instructions causing the one or more processors to perform operations comprising:

 - establishing a plurality of end-to-end tunnels between a first device and a second device, the plurality of end-to-end tunnels being configured to carry network traffic via a plurality of intermediate access point servers;

 - receiving information from at least one of the intermediate access point servers; and

 - selecting one of the plurality of end-to-end tunnels for communication between the first and second devices based on the information

Claim 15

15. The system according to claim 14, wherein the operations further comprise configuring at least one of the first device, the second device, or the plurality of intermediate access point servers to perform smart routing .

Claim 16

16. The system according to claim 15, wherein the smart routing is based on at least one of best bandwidth, lowest latency, fewest hops, or no packet loss.

Claim 17

17. The system according to claim 15, wherein the smart routing is based on at least one of real-time statistics or historical statistics.

Claim 18

18. The system according to claim 14, wherein the operations further comprise configuring at least one of the first device, the second device, or the plurality of intermediate access point servers is configured to perform firewall services.

Claim 19

19. The system according to claim 18, wherein the first device provides firewall services between the first device and plurality of intermediate access point servers.

Claim 20

20. The system according to claim 18, wherein a first intermediate access point server among the plurality of intermediate access point servers provides firewall services work between the first device and other intermediate access point servers among the plurality of intermediate access point servers or the second device.