UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RPX CORP., ERICSSON INC., AND TELEFONAKTIEBOLAGET LM ERICSSON,
Petitioner

v.

IRIDESCENT NETWORKS, INC. ("Iridescent"),
Patent Owner

Patent 8,036,119

PETITION FOR *INTER PARTES* REVIEW

Under 35 U.S.C. §§ 311-319

U.S. Patent No. 8,036,119

Claims 1-16

TABLE OF CONTENTS

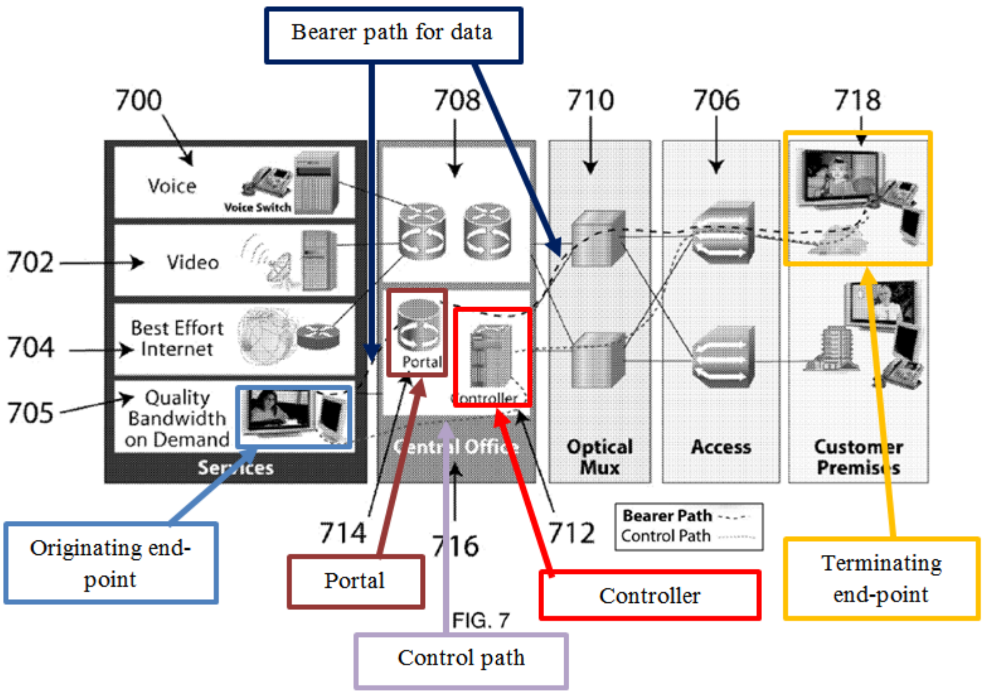
I. Introduction

U.S. Patent No. 8,036,119 ("the '119 Patent," ERIC-1001) is directed to a method for providing bandwidth on demand between an "originating" end-point and a "terminating" end-point. The '119 Patent's purported novelty is to separate control functions and packet transmission functions into two physically separate entities: (1) a "controller" that provides end-to-end quality assurance, and (2) a "portal" that handles packet transmission based on routing instructions from the controller. ERIC-1001, 1:19-22, 4:64-5:6; ERIC-1025, ¶56.

According to the '119 Patent, prior art systems were addressed to the core network only or to the access network only, and thus failed to provide quality assurance from originating end-point to terminating end-point. ERIC-1001, 2:6-3:2. That is, the prior art allegedly did not provide *end-to-end* quality assurance. *See id.*; ERIC-1025, ¶¶57-58.

To address these perceived shortcomings, the '119 Patent offers "an improved unique system and method of providing bandwidth on demand for an end user and/or enterprise" from "end to end." ERIC-1001, 4:46-48, 3:46-48. To do so, the '119 Patent purports to separate control processing from data transport to manage services end-to-end with a "controller" in charge of a physically separate "portal" for a connection between an "originating end-point" and a "terminating end-point." ERIC-1001, 4:64-5:6. A control path extends between the end-points and the controller and between the controller and the portal. A bearer path for data extends between the end-points. ERIC-1025, ¶¶59.

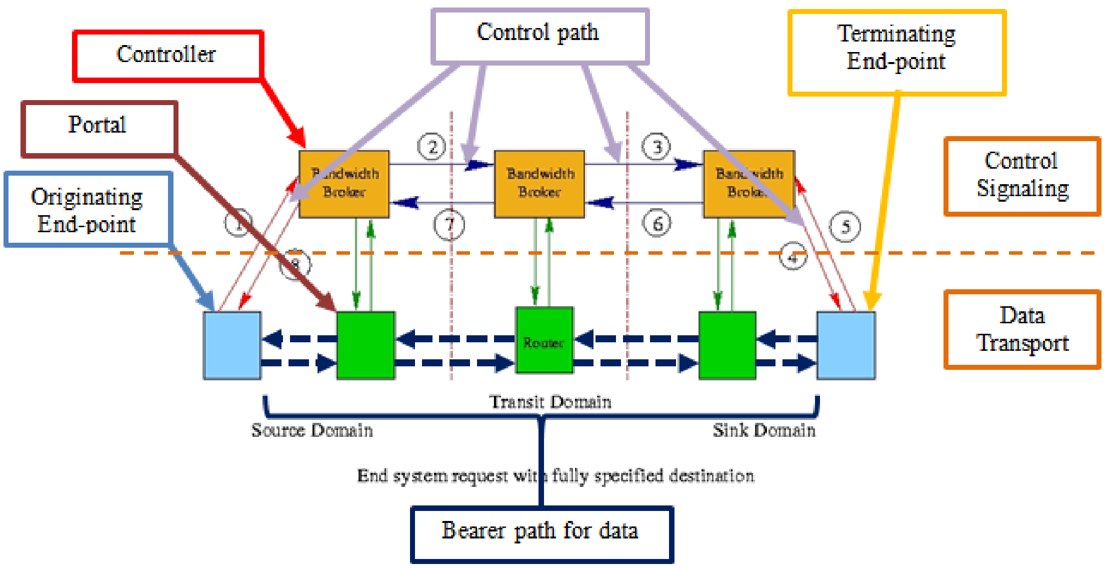
An example of this architecture is shown in FIG. 7:



ERIC-1001, FIG. 7 (annotated); ERIC-1025, ¶60.

However, the solution proposed by the ’119 Patent was not unique or new. Instead, well before the earliest alleged priority date of the ’119 Patent, others had already developed systems to provide end-to-end bandwidth assurance using a physically separate controller and portal platform. ERIC-1025, ¶61.

For example, QBone discloses an identical method for providing bandwidth on demand as the one disclosed by the ’119 Patent. *See* ERIC-1017, pp.3,4. Specifically, QBone discloses the separation of control functions from packet transmission functions into two physically separate entities: (1) a "bandwidth broker" ("BB," i.e., controller) that assures end-to-end bandwidth, and (2) a "router" (i.e., portal) that handles packet transmission based on routing instructions from the controller. An example of QBone's end-to-end architecture is illustrated in the figure below, reproduced from page 13 of QBone:



ERIC-1017, p.13 (modified and annotated); ERIC-1025, ¶¶62-63.

QBone provides the requested service on demand (e.g., reserving bandwidth when requested and taking down reservations after use). *Id.*, pp.8,20. QBone discloses the separation of control processing from data transport to manage services from end-to-end using the BB, which is disclosed as providing routing instructions to a physically separate portal called an access router for a connection extending between an originating end-point and a terminating end-point. ERIC-

1017, pp.5,13-15. Identical to the embodiment of FIG. 7 of the ’119 Patent, a control path extends between the end-points and the controller and between the controller and the portal, and a bearer path for data extends between the end-points. ERIC-1025, ¶64.

In an embodiment of the ’119 Patent, the controller receives a request from an end-point for an end-to-end connection having, inter alia, a requested amount of bandwidth. Likewise, QBone’s end-point requests from a BB a reserved connection (e.g., a dedicated bearer path set up by the BB) meeting a specified service level. In the ’119 Patent, the controller “dynamically provision[s] a dedicated path, including required route and bandwidth, on demand through the network.” ERIC-1001, 5:64-67. Consistently, QBone discloses reserving bandwidth along a specified required route. ERIC-1025, ¶65.

Further, identical to the preferred embodiment of Figure 10 of the ’119 Patent, which discloses that the controller may interact with MPLS routers to provision the route, the prior art discloses that a route providing end-to-end quality assurance can be made within a multi-protocol label switching (MPLS) system according to related disclosures in Surdila and Li. *See* ERIC-1017, pp.11,13-15,17; ERIC-1025, ¶¶66-67.

In summary, the evidence in this petition demonstrates that claims 1-16 of the ’119 Patent are unpatentable.

II. Mandatory Notices

Real party-in-interest: RPX Corporation, Ericsson Inc., and Telefonaktiebolaget LM Ericsson (collectively "Petitioner").

Related Matters: As of the filing date of this petition, the '119 Patent is involved in the following litigation, located in the Eastern District of Texas: *Iridescent Networks, Inc. v. AT&T Inc. et al.*, 6:16-CV-01003.

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III. Grounds for Standing

Petitioner certifies that the ’119 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review.

IV. Relief Requested

Petitioner asks that the Board review the accompanying prior art and analysis, institute a trial for *inter partes* review of claims 1-16 of the ’119 Patent, and cancel those claims as unpatentable.

V. The Reasons for the Requested Relief

A. Summary of the Related Technology and the ’119 Patent

The ’119 Patent relates to communications systems that provide guaranteed bandwidth on demand. ERIC-1001, 1:19-22. The ’119 Patent discloses a system “with a physically separated controller and managed portal platform.” *Id.*, 4:64-66. The controller handles control functions including admission control, path provisioning, and routing, while the portal handles packet data transmission. *Id.*, 4:64-5:6. FIG. 7 illustrates this:

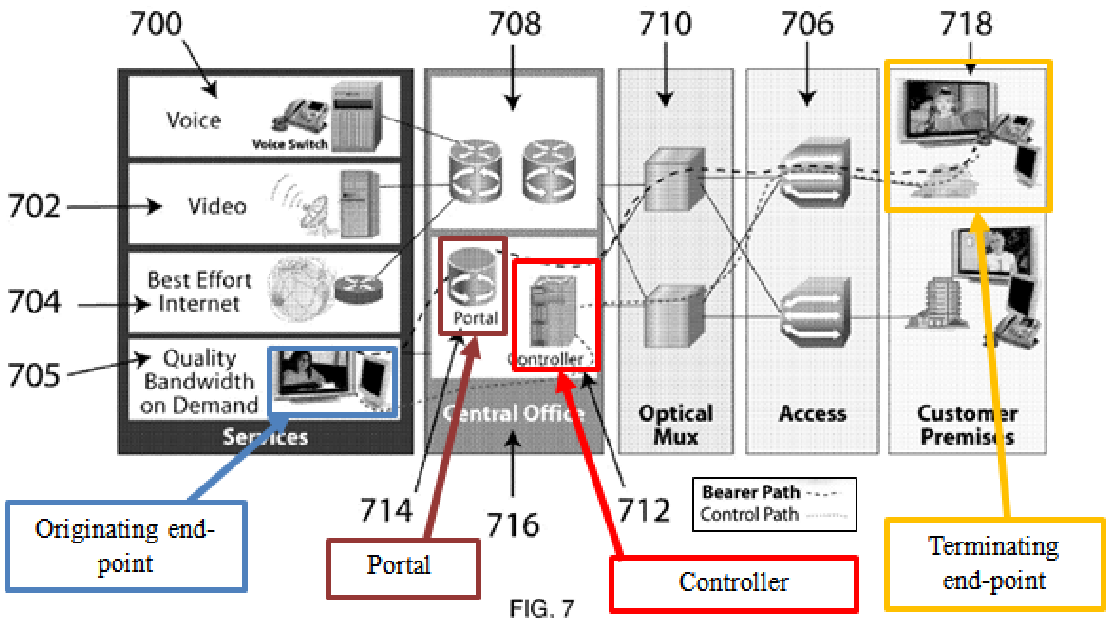


FIG. 7

Id., FIG. 7 (annotated); 4:29-30; ERIC-1025, ¶¶19-22.

The controller receives requests for high quality of service connections from an originating end-point. ERIC-1001, 5:27-29. The controller next determines if the user is authorized for the requested service. *Id.*, 5:52-55. After authorization, the controller "negotiates across the network with the terminating end-point(s) to set up the connection." *Id.*, 5:27-31; ERIC-1025, ¶¶23-24.

Specifically, the controller "dynamically provision[s] a dedicated path, including required route and bandwidth, on demand through the network." ERIC-1001, 5:64-67. With respect to the dedicated path, the portal "does not perform new routing on any packet"; it "only acts on the information provided by the Controller 900." *Id.*, 6:23-29; ERIC-1025, ¶¶25-27.

The '119 Patent envisioned that the control path from the controller to the terminating end-point could extend through another controller or be directly connected. *See, e.g.*, ERIC-1001, FIGs. 8 and 11, 7:11-15. The ’119 Patent relies on existing routers and mechanisms (such as IP/MPLS) to interconnect the controller and portal to each other and other platforms. ERIC-1001, 6:50-53; ERIC-1025, ¶¶28-32.

As discussed below in detail, the methods claimed in the ’119 Patent—providing bandwidth on demand end-to-end—were well-known to POSITAs before the earliest alleged priority date of the ’119 Patent. ERIC-1025, ¶¶33-35.

B. The Prosecution History

The ’119 Patent issued on October 11, 2011 from U.S. Patent Application No. 12/632,786, which is a continuation of U.S. Patent No. 7,639,612 (the ’612 Patent). ERIC-1025, ¶¶36-38.

In response to prior art rejections in the ’612 Patent, the Applicant argued that “much of the cited art is clearly directed to access networks and other connections that are not end-to-end.” ERIC-1004, p. 52. Applicant argued that its claimed invention “is directed to end-to-end connection management (i.e., between an originating end-point and a terminating end-point) with a controller that provides ‘end-to-end quality assurance.’” *Id.* After an Examiner’s Amendment, the claims were allowed. *Id.*, pp.25-26; ERIC-1025, ¶¶39-48.

As shown herein, however, the Examiner failed to appreciate all of the relevant art that would have been known to a POSITA as of the earliest alleged priority date of the ’119 Patent that taught “end-to-end connection management … with a controller that provides ‘end-to-end quality assurance’” with the features as claimed. *See* ERIC-1025, ¶49.

C. Identification of Challenges

Claims 1-16 of the ’119 Patent are challenged in this Petition.

1. Statutory Grounds for Challenges

The ’119 Patent claims priority to an application filed on May 2, 2007, both of which claim the benefit of a provisional application filed on May 2, 2006. The prior art presented herein pre-dates all of these filing dates.

Challenge #1: Claims 1-8 and 11 are obvious under 35 U.S.C. § 103 over “QBone Bandwidth Broker Architecture” (“QBone,” ERIC-1017) in view of U.S. Patent Publication No. 2002/0181462 to Surdila *et al.* (“Surdila,” ERIC-1014), further in view of the English translation of PCT Publication No. WO2005/101730 to Li *et al.* (“Li,” ERIC-1023).

QBone is a printed publication that was publicly available at least as early as December 5, 2002. QBone was discussed in Surdila, and incorporated by reference therein. ERIC-1014, ¶[0025]. QBone was filed at the Patent Office with the Surdila application on April 24, 2001. *See* ERIC-1015, pp.91-120 (extracted from

Surdila's file history and submitted herewith as ERIC-1017); *see also* ERIC-1016. QBone is self-authenticating under at least F.R.E. §§ 902(4), (11). Per 37 C.F.R. § 42.61(b), it is not necessary to certify Surdila's file history from the U.S. Patent Office records – therefore, QBone being merely a reproduction of that portion of Surdila's file history, does not require a certification.

On December 5, 2002, Surdila published from the U.S. Patent Office, which also granted access to Surdila's file history as of that date. As a result, QBone, as part of the file history of Surdila, was publicly available at least as early as December 5, 2002. ERIC-1025, ¶68. QBone was publicly accessible and could be located by a POSITA in a variety of ways, including directly searching the USPTO application database as well as by using the USPTO classification system to locate the Surdila reference. *Id.*, ¶69. This would lead a POSITA to the QBone reference. *Id.*

Accordingly, QBone was a printed document that could be accessed by the public at least as of December 5, 2002 and therefore publicly available as of that time. QBone is, therefore, prior art at least under (pre-AIA) 35 U.S.C. § 102(b). *See also* ERIC-1025, ¶70.

Surdila published on December 5, 2002, and for purposes of this Petition is prior art to the '119 Patent at least under (pre-AIA) 35 U.S.C. § 102(b).

Li was published October 27, 2005 in the Chinese language and thus is prior art to the ’119 Patent at least under (pre-AIA) 35 U.S.C. § 102(a). In compliance with 37 C.F.R. § 42.63(b), a copy of the Chinese-language document (ERIC-1026), an English translation (ERIC-1023), and an affidavit attesting to the accuracy of the translation (ERIC-1027) are provided.

Challenge #2: Claims 10 and 13-15 are obvious under 35 U.S.C. § 103 over QBone in view of Surdila and Li, further in view of U.S. Patent Publication No. 2002/0181495 to Requena *et al.* (“Requena,” ERIC-1018). Requena published on December 5, 2002, and therefore is prior art at least under (pre-AIA) 35 U.S.C. § 102(b).

Challenge #3: Claims 9 and 12 are obvious under 35 U.S.C. § 103 over QBone in view of Surdila and Li, further in view of U.S. Patent No. 6,487,170 to Chen *et al*. (“Chen,” ERIC-1019). Chen issued as a patent on November 26, 2002, and therefore is prior art at least under (pre-AIA) 35 U.S.C. § 102(b).

Challenge #4: Claim 16 is obvious under 35 U.S.C. § 103 over QBone in view of Surdila, Li, and Requena, further in view of U.S. Patent Publication No. 2003/0133552 to Pillai *et al*. (“Pillai,” ERIC-1011). Pillai published on July 17, 2003 and therefore is prior art at least under (pre-AIA) 35 U.S.C. § 102(b).

D. Reasons that Challenges are Not Redundant

Another petition is filed concurrently with this petition. The other petition relies on different prior art, combinations, arguments, and expert declaration testimony particular to the different prior art. The prior art combinations presented in this petition include "QBone," ERIC-1017, as the primary reference. QBone is a non-patent printed publication that Patent Owner may (wrongly) attack on authentication and public availability grounds.

In contrast, the other concurrently filed petition relies upon a different primary reference, namely U.S. Patent 6,563,793 to Golden, which qualifies under (pre-AIA) 35 U.S.C. § 102(b). In the other petition, Golden is used in combination with a patent publication (U.S. Pub. 2006/0133300 to Lee) that qualifies under (pre-AIA) 35 U.S.C. § 102(e) that Patent Owner may attempt to swear behind. Thus, the challenges in both petitions should be considered for claims 1-16. *See, e.g., NXP Semiconductors v. Inside Secure et al.*, IPR2016-00683, Paper 10 at 26 (declining to deny institution because the grounds are sufficiently distinguished with each other "at least because they are based on different prior art (e.g., prior art under § 102(a) vs. prior art under § 102(b)"); *Valeo N. Am., Inc. v. Magna Elecs., Inc.*, IPR2014-01208, Paper 13 at 15 (instituting both petitions where they presented different combinations of prior art and arguments).

E. Claim Construction

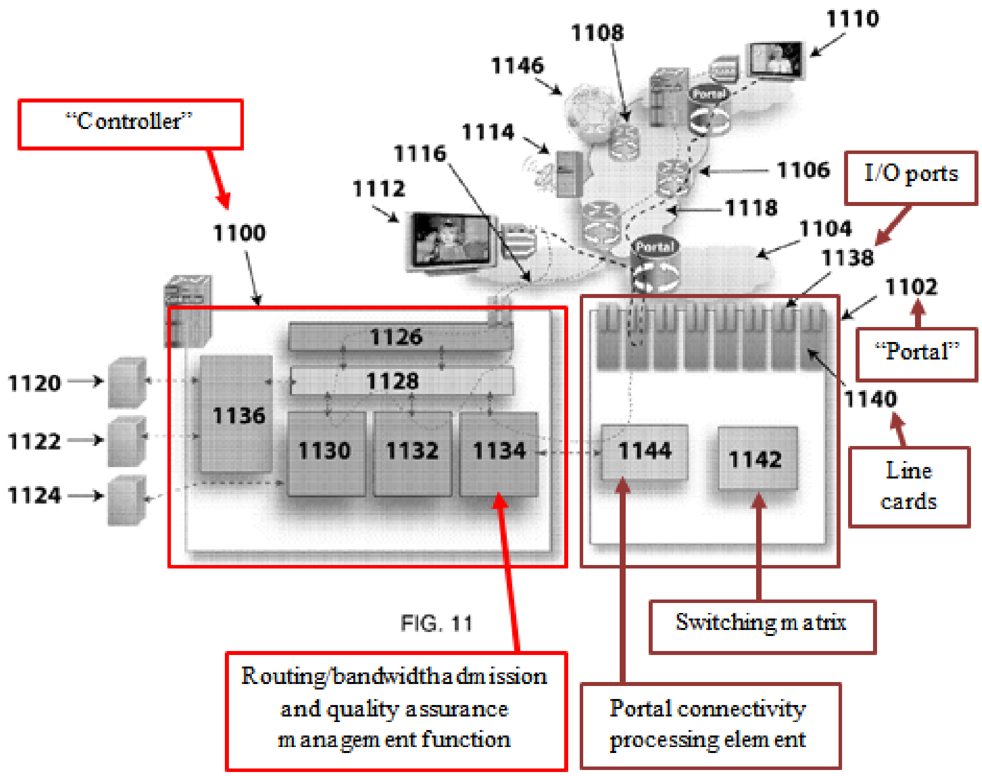
This petition presents claim construction consistent with the broadest reasonable interpretation (BRI) in light of the specification. *See* 37 C.F.R. § 42.100(b). Claim terms are construed only to the extent necessary to resolve the

IPR. *See Vivid Techs., Inc. v. Am.Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). Claim terms other than those below do not appear to require construction and are understood based on their plain and ordinary meaning.

1. "directing, by the controller, … [a portal] … to allocate local port resources of the portal"

This claim term is found and used similarly in claims 1 and 13.

Resources of the portal are illustrated in Fig. 11, reproduced and annotated below, and described as "[t]he Portal 1102 includes I/O ports 1138 on line cards 1140 for the bearer connections, a switching matrix 1142 and a portal connectivity processing element 1144." ERIC-1001, 7:24-26.



Id., FIG. 11 (annotated); ERIC-1025, ¶¶51-52.

As shown, the controller 1100 sends instructions from the "routing/admission and quality assurance management function 1134" element to the "portal connectivity processing element 1144" in the portal "necessary for the broadband services to be dynamically connected and managed for quality." ERIC-1001, 7:15-23. In discussing the operation of similar embodiments, the '119 Patent discloses that "[t]he Controller 800 directs its associated Portal platform 802 to allocate local port resources" (the only usage of that term in the body of the specification) and the portal "only accepts traffic on its ports when authorized by the Controller." *Id.*, 5:67-6:1 and 6:25-26; ERIC-1025, ¶53.

Thus, the '119 Patent discloses that in response to allocation instructions from the controller, elements included within the portal affect the routing, admission and quality of the connection determined by the controller. Moreover, as understood by a POSITA, the portal elements can be implemented as physical and/or logical elements. *Id.*, ¶54.

Therefore, in view of the above, under a BRI a POSITA would have construed the claim term "directing, by the controller, … [a portal] … to allocate local port resources of the portal" to include at least *sending an allocation instruction from the controller to the portal, where the allocation instruction results in the portal allocating physical and/or logical elements of the portal*. ERIC-1025, ¶¶51-55.

VI. Identification of How Claims are Unpatentable

A. Challenge #1: Claims 1-8 and 11 are obvious under 35 U.S.C. § 103 over QBone in view of Surdila and Li

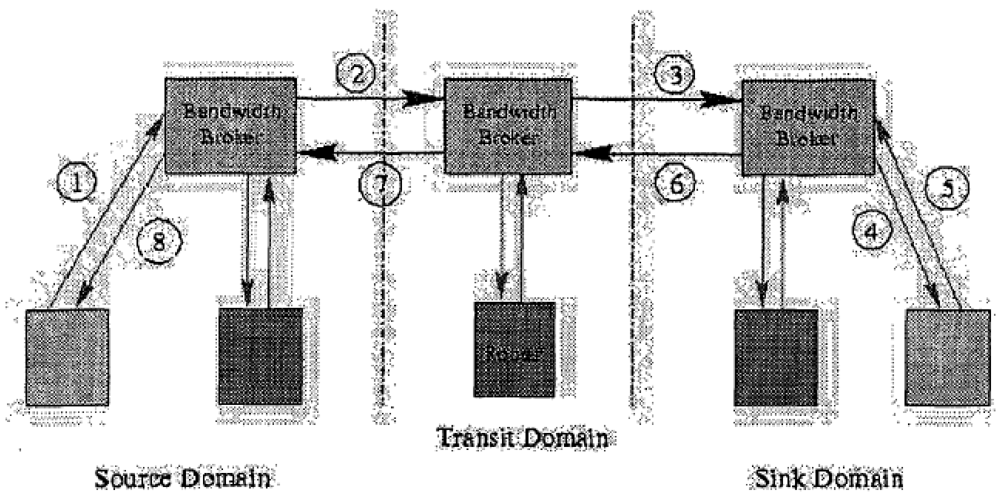
1. Summary of QBone

QBone describes a "Bandwidth Broker Architecture." ERIC-1017, Title. QBone's architecture is set forth as a flexible architecture to accommodate different combinations of network elements. *Id.*, p.2.; ERIC-1025, ¶76.

QBone enables the provision of "a service with quantitative, absolute bandwidth assurance" that extends "end-to-end." ERIC-1017, pp.3,4. "The service may be provided entirely within a domain, from domain-edge to domain-edge (within the same domain) or across a number of domains." *Id.*, p.3. To meet the service requirements, QBone teaches the use of a "bandwidth broker" ("BB") that receives resource allocation requests (RAR) from an originating end system in the same domain. *Id.*, p.5; ERIC-1025, ¶¶77-78.

The BB "responds … with a confirmation of service or denial of service … known as a Resource Allocation Answer (RAA)." ERIC-1017, p.5. The BB "alter[s] the router configurations at the access, at the inter-domain borders, and/or internally within the domain." *Id*. This is in order to "treat the traffic as specified in the [service level specification, SLS] until those packets leave the domain" through every domain from end system to end system. *Id.*, p.7. The RAA response reserves network resources. *See id.*, p.8; ERIC-1025, ¶79.

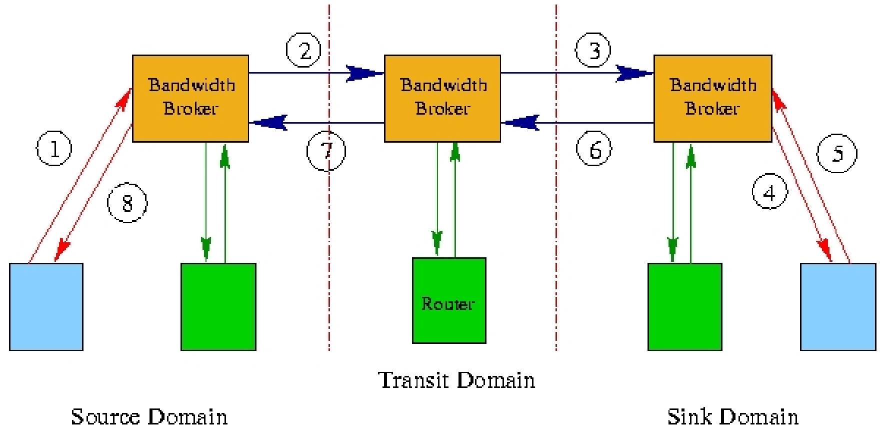
QBone teaches an end system that "initiates a request for service … to another end system" to result in a protocol that "works end-to-end." ERIC-1017, pp.10-12. QBone provides an example of the use case, reproduced from ERIC-1017 below:



End system request with fully specified destination

ERIC-1017, p.13 (best available copy); ERIC-1025, ¶80.

Because of the poor visual quality of the copy from Surdila's file history (ERIC-1015), a cleaner copy of the same figure, reproduced below, was obtained from a different QBone publication (ERIC-1024) and is used herein for clarity with citations to ERIC-1017. *Id.*, ¶¶81,83.



End system request with fully specified destination

ERIC-1024, p.11; ERIC-1025, ¶¶81-82.

Continuing the example, QBone's originating end system "sends an RAR to the bandwidth broker (1)," which specifies parameters including bits-per-second of bandwidth. ERIC-1017, pp.13,22,24. The BB authorizes the service, determines the "route through the domain to the egress router," and determines "[w]hether the flow … may be accepted for the specified service." ERIC-1017, p.13. The BB in the source domain sends a modified RAR to the adjacent BB of the next domain and on until the "bandwidth broker in the destination domain" is reached. *Id.*, pp.13-14; ERIC-1025, ¶¶84-85.

The BB in the destination domain (if only one domain, this is the originating domain's BB) makes additional decisions for its domain including authenticating the request, determining whether "the resources are available to support the flow," and "whether the flow may be accepted." ERIC-1017, p.14. In response, an RAA is propagated from the end system in the sink (destination) domain back to the originating domain. ERIC-1025, ¶86.

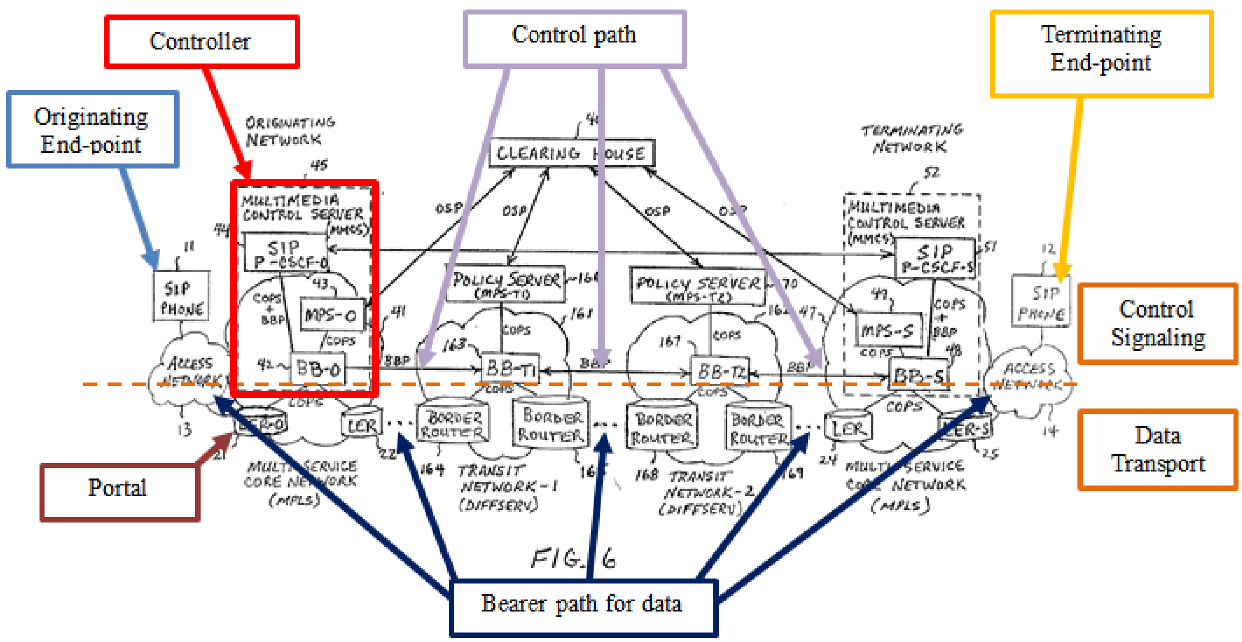
Upon receipt of the RAA, the originating BB completes resource allocation actions including "setting the marking functions for the flow in the access router serving the requesting end system." ERIC-1017, p.15. With that, a flow of packets from the originating end system uses the requested end-to-end quality of service ("QoS"). ERIC-1025, ¶87.

In use, the BB tracks both the reservations consuming resources as well as the availability of all resources in its domain. ERIC-1017, p.8. A "data repository … contains common information for all the bandwidth broker components." *Id.*, p.10. This information includes "[a]uthorization and authentication databases (for users and peers)." *Id.*; ERIC-1025, ¶¶88-89.

2. Summary of Surdila

Surdila teaches a "system and method of ensuring a requested Quality of Service (QoS) for a media flow." ERIC-1014, Abstract. Surdila provides "End-to-End (E2E) Quality of Service (QoS) across multiple Internet Protocol (IP) networks." *Id.*, ¶[0002]; ERIC-1025, ¶90.

Surdila recognized the importance of supporting E2E QoS for "real-time applications such as IP telephony, mixed voice/video calls, etc." ERIC-1014, ¶[0007]. Surdila noted the desirability that a requested QoS "be assured all the way to the recipient." *Id.* Surdila taught that different application types have different amounts of bandwidth required to "achieve certain levels of Quality of Service (QoS)." *Id.*, ¶¶[0006],[0007] (table of QoSs); ERIC-1025, ¶91. Surdila identifies QBone's architecture "for coordinating bandwidth requirements across multiple networks at the transport level." ERIC-1014, ¶[0025]. FIG. 6 in Surdila, as annotated by Dr. Reddy, provides an example diagram of QBone's "Phase 2 BB Architecture" according to Surdila's teachings.



ERIC-1014, FIG. 6 (annotated),¶[0020]; ERIC-1025, ¶¶92-93.

The BB for the originating network ("BB-O 42," a central controller) is included with other functions into a multimedia control server 45. ERIC-1014, FIG. 6, ¶[0041]. Surdila's originating end system (SIP Phone 11) engages in calls using the network with a terminating end system (SIP Phone 12). *See* ERIC-1014,

¶¶[0062],[0063]. The originating system 11 sends the SIP Invite message with a "proposed [SDP](QoS Assured)" in the request, and agreed Session Description Protocol (SDP) and codecs are reached between the end-points. *Id.*, ¶¶[0062],[0065]; ERIC-1025, ¶¶94-95.

Surdila teaches use of label edge routers (LERs) in the networks along the path (e.g., LER-O 21). *See* ERIC-1014, ¶[0034]. The LERs "function as edge routers that also insert a specific label in the data packets to identify a specific media flow at the entry to the network, and remove the label upon exiting the network. The Multi-Protocol Label Switching (MPLS) protocol then routes packets based on the labels inserted by the LERs rather than the IP addresses." *Id.*, ¶[0034]; ERIC-1025, ¶¶96-97.

3. Reasons to Combine QBone and Surdila

Surdila incorporates QBone in its entirety by reference. ERIC-1014, ¶[0025]. A copy of QBone was filed at the USPTO along with the filing of the Surdila application. A POSITA would have been expressly motivated, upon reading Surdila, to turn to QBone to further understand the architecture and teachings incorporated by reference. ERIC-1025, ¶¶98-100.

QBone teaches an access router serving a terminating end-point that has "marking functions for the flow" set in it by a BB. ERIC-1017, p.15. The "marking functions" are part of the "traffic conditioning specification (TCS)," which "specifies classifier rules and any corresponding traffic profiles and metering, marking, discarding, and/or shaping rules." *Id.*, p.7. The TCS is part of a "service level specification," SLS, which specifies an assured service end-to-end. *Id.* QBone's use of "marking functions" to assure end-to-end QoS is just one example of IP functions known to a POSITA for traffic control and other systems could utilize different techniques to accomplish similar control. A POSITA would understand the above to teach that the BB provides a required route to the router. ERIC-1025, ¶¶101-102. While QBone teaches providing marking functions for the flow, QBone does not explicitly explain that the "marking functions" require the network elements to use the determined path if routing parameters of the network elements change independent from the marking functions provided by the BB. A POSITA would have been motivated to turn to a mechanism to impose the path determined by the BB for a requesting flow. MPLS provides this benefit, which Surdila expressly contemplated as being used in the QBone architectural framework. *See* ERIC-1014, ¶[0034]. ERIC-1025, ¶¶103-104.

Further, Surdila builds upon the foundation of QBone's teachings. *See* ERIC-1014, ¶¶[0037]-[0039]. A POSITA would have been motivated, upon reading the disclosure of QBone, to combine it with the features of Surdila to have "proper control of network transport resources" for an application across networks as taught by Surdila. *See id.*, ¶[0039]. QBone specifically contemplated, welcomed, and encouraged further development of the QBone architecture. ERIC-1017, pp.1-2; ERIC-1025, ¶¶105-107.

Implementation of this combination would have been within the ability of a POSITA. Surdila is compatible with QBone, since it references the QBone architecture in its solution proposing "binding information." ERIC-1014, ¶¶[0039],[0076] (Phase 2 BB Architecture, "phase 2" terminology adopted from QBone, *see id.*, ¶[0037]); ERIC-1025, ¶108.

Accordingly, a POSITA would have been motivated to combine QBone's architecture teachings with Surdila's teachings of traffic-types and QoS levels. QBone expressly contemplated further development of ideas relating to the architecture, and Surdila built upon QBone by providing more details of how to apply QBone's concept across networks to obtain the E2E QoS taught by QBone. QBone's acknowledgment of further testing and development would have directed a POSITA to look for further developments improving system performance and find Surdila. Likewise, a POSITA reading Surdila would have been directed to look at QBone based on the identification and incorporation by reference of QBone. ERIC-1025, ¶109.

4. Summary of Li

Li focuses on ensuring quality of service (QoS) in networks that use MPLS switches. ERIC-1023, Abstract; p.7,¶1. Li taught centralized resource controllers

(CRCs) that "perform resource calculation and route selection, send[] route indications to the routers, allocat[e] resources and perform[] access control in the logical bearer network," among other functions. *Id.*, p.12,¶7. As part of allocation and routing determination, the CRC "distribut[es] MPLS label stacks that represent the routes to ingress PEs [provider edge routers]." *Id.*, p.13,¶4. The MPLS label stacks communicated from the CRC to the PEs instruct the PEs how to process traffic streams. *Id.*, p.23,¶5; p.24,¶1. The PE uses the MPLS label stack it received from a CRC in routing packets. ERIC-1025, ¶¶110-113.

5. Reasons to combine QBone, Surdila, and Li

Surdila teaches the use of MPLS edge routers that route based on labels. ERIC-1014, ¶[0034]. A POSITA would have understood that labels in at least a centralized implementation (such as in Surdila) would have been generated by the BB of Surdila and transmitted to the LERs for insertion into the packets. To the extent Surdila does not expressly disclose or teach the creation and distribution of MPLS labels by a BB, a POSITA would look to other MPLS systems for specific implementation details to achieve the benefits of labels. For example, Li discloses that a central MPLS controller (analogous to a BB) creates the labels and distributes them to an edge router for insertion into the packets. ERIC-1023, p.12,¶7, p.13,¶4; ERIC-1025, ¶¶114-119.

It would have been within the skill of a person having ordinary skill in the art to implement Li's centralized controller label generation and provision to edge routers teachings within QBone's architecture and Surdila's LER teachings. QBone already contemplated determining marking functions at the BB and providing those to the access router. Surdila taught that LERs inserted labels into packets and routed based on those labels rather than IP addresses. Li provides additional teachings regarding the generation of MPLS labels at a centralized controller, like the BB in QBone, to edge routers like the access routers according to Surdila's MPLS label teachings. The predictable result would be the centralized determination taught by QBone and Li, with the routing at the edge routers per the teachings of Surdila and Li. Thus, it would have an obvious design choice to utilize the MPLS label creation and forwarding of Li in the MPLS system of Surdila. *Id.*, ¶120.

6. Detailed Analysis of Challenge #1

The following analysis describes how QBone in view of Surdila renders obvious each and every element of at least claims 1-8 and 11 of the '119 Patent. *See* ERIC-1025, ¶¶121-267.

Claim 1 recites:

[1.0] ***A method for providing bandwidth on demand comprising:***

To the extent that the preamble is limiting (and not just stating an intended use), first QBone teaches a method for providing bandwidth, namely that the QBone Premium Service "is to provide a service with quantitative, absolute bandwidth assurance." ERIC-1017, p.3.

Second, QBone teaches end systems requesting reservations on demand. QBone teaches that the system supports reservations of bandwidth as "[a] reservation represents actually ***committed resources***." *Id.*, p.8. These reservations are obtained by "end systems" sending a "RAR to the bandwidth broker." *Id.*, p.13. The BB receives the RAR and "makes a number of decisions … including … [w]hether the requester is authorized for this service" and "the route through the domain to the egress router." *Id.*

Third, QBone teaches that bandwidth is requested as part of the reservation requests on demand. The RAR includes a requested bandwidth in its "Service Parameterization Object (SPO)" parameter, which identifies "***bits-per-second of bandwidth***." ERIC-1017, p.24. QBone teaches that the system supports taking down those reservations of bandwidth: "[e]ither of the endpoints of a QBone reservation may release the reservation." *Id.*, p.20.

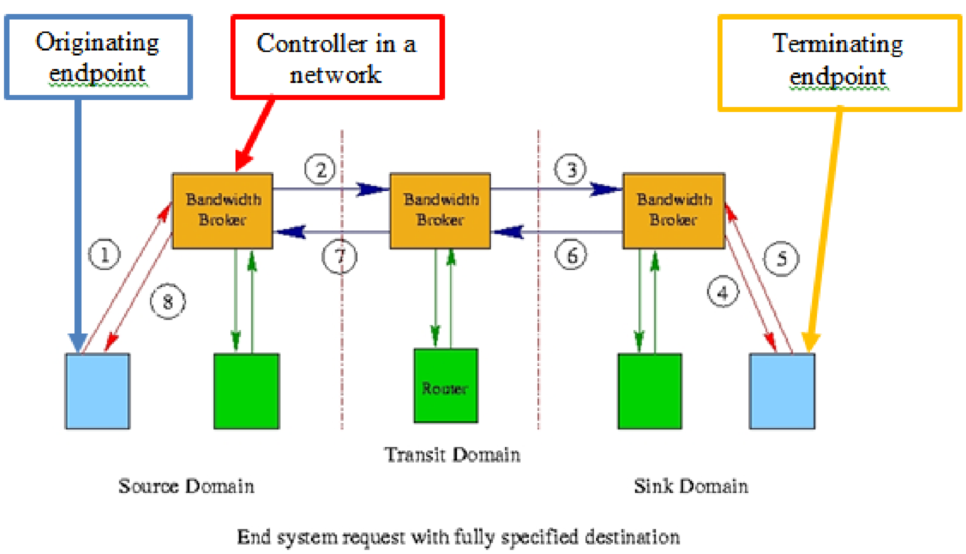
Thus, QBone teaches the features of claim element [1.0]. ERIC-1025, ¶¶121-126.

[1.1] ***receiving, by a controller positioned in a network, a request for a high quality of service connection supporting any one of a plurality***

of one-way and two-way traffic types between an originating end-point and a terminating end-point,

First, regarding the controller and end-points, QBone teaches a controller positioned in a network. QBone's BB is a controller, which performs multiple functions including receiving a request for a specified service and reserving bandwidth for that service along a path between two end-points. ERIC-1017, p.5. These functions are two examples of control by the BB. QBone teaches that the domain in which the BB is located is a "network." *Id.*, p.1; ERIC-1025, ¶¶127-129.

QBone further teaches originating and terminating end-points. QBone's "end system" that initiates a RAR is an "originating end-point": "***[a]n end system*** initiates a request for service … to ***another end system***." ERIC-1017, p.12. The recipient end system in QBone is a "terminating end-point." This is illustrated in the modified (color added) and annotated figure below:



ERIC-1017, p.13 (annotated); ERIC-1025, ¶130.

Second, as detailed below QBone in combination with Surdila teaches that the controller receives a request for "Video High Quality" that includes bandwidth of at least 2 Mbps in some examples, thus specifying a high QoS in accordance with the examples provided for "high QoS" applications in FIG. 3 of the '119 Patent. ERIC-1025, ¶¶131-132.

According to the '119 Patent, "high quality bandwidth on demand services" that the embodiments provide include "video and gaming applications." ERIC-1001, 5:23-26. During prosecution of the '612 Patent, Patent Owner identified "the boxed set of applications on the left side of Fig. 3" as being "high QoS" applications. ERIC-1004, p.51. The applications identified in the box of FIG. 3 include video conferencing, file sharing, distance learning, SD video on demand, multi-player gaming, telemedicine, Realtime video, HD video multicasting, network hosted software, and video from studio. ERIC-1001, FIG. 3. FIG. 3 further provides well-known (admitted prior art) parameters for the examples of high QoS connections. *Id.*; ERIC-1004, pp.50-51; ERIC-1025, ¶133.

Claim terms are understood to encompass disclosed embodiments in the absence of clear disavowals of claim scope. *See, e.g.*, *Vitronics Corp. v. Conceptronics, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (a claim interpretation that excludes a preferred embodiment is rarely the right construction, if ever). Here, the recital in claim 1 should cover at least the aspects relating to the depiction of high QoS connections in FIG. 3, identified by the Patent Owner during prosecution, and the related description in the ’119 Patent. To that end, QBone in combination with Surdila provide examples of applications that receive a requested QoS, similar to those given in the ’119 Patent. ERIC-1025, ¶134.

Specifically, Surdila illustrates “high” QoS in a table reproduced below, which 1) expressly identifies an example “high” QoS application - “video high quality,” and 2) gives examples of applications requiring 2 Mbps data rates (compared to the approximately 1Mbps data rates illustrated in the bar chart and considered by Patent Owner in Figure 3 of the ’119 Patent for “high QoS”):

Application Performance Rating Table

Data Rates (kbps) Applications	9.6	14.4	32	64	128	384	2000
	Application Performance Rating						
Voice, SMS	E	E	E	E	E	E	E
E-mail	P	F	E	E	E	E	E
Internet Web Access	P	P	F	F	E	E	E
Database Access	P	P	F	E	E	E	E
Synchronization	E	E	E	E	E	E	E
Document Transfer	P	P	F	E	E	E	E
Location Services	F	E	E	E	E	E	E
Still Image Transfer	P	F	E	E	E	E	E
Video Lower Quality	P	F	F	E	E	E	E
Video High Quality	P	P	P	F	F	E	E

Excellent (E) Fair (F) Poor (P)

ERIC-1014, ¶[0007] (annotated); ERIC-1025, ¶135.

Surdila's data rate (in kilobits per second) constitutes a bandwidth that varies from "excellent" high quality service to "fair" or "poor" for the different application demands. Both the '119 Patent and Surdila refer to providing "high quality" services end-to-end and, similar to the '119 disclosure of approximately 1 Mbps for high quality "Video Conferencing," Surdila discloses 2 Mbps bandwidth for "Video High Quality," which is assured from end-to-end. ERIC-1014, ¶[0039] and FIG. 4A. The "Video High Quality" application is listed at the bottom of the "Application Performance Rating Table" reproduced above. ERIC-1025, ¶136.

QBone teaches that the high QoS request is in the RAR for "end-to-end" QoS assurances: "[t]he end system ***sends an RAR to the bandwidth broker*** … [including] ***parameters of the service***." ERIC-1017, pp.1,13. This "service" is for a QoS: "[a] bandwidth broker (BB) manages network resources ***for IP QoS [quality of service] services supported in the network and used by customers of the network services***." ERIC-1017, p.26. Surdila's 2 Mbps for "Video High Quality" is an example of the bandwidth parameter specified by QBone's SPO (in a RAR) which identifies "***bits-per-second of bandwidth***." ERIC-1017, p.24; ERIC-1014, ¶[0039], FIG. 4A. ERIC-1025, ¶¶137-138.

Further, a POSITA would have known that a QoS connection, such as those requested per the teachings of QBone and Surdila, would have several other parameters associated with it in addition to bandwidth, including in certain applications latency and packet loss. For example, QBone teaches that "marking functions" for flows through the access router are part of the "traffic conditioning specification (TCS)," which "specifies classifier rules and any corresponding traffic profiles and metering, marking, discarding, and/or shaping rules." ERIC-1017, p.7; ERIC-1025, ¶139.

The TCS is part of a "service level specification," SLS, which specifies an assured service end-to-end. ERIC-1017, p.7. The TCS, in particular, specifies "[d]etailed service performance parameters such as expected throughput, drop probability, [and] latency." *Id.* These specified "service performance parameters" such as "drop probability," which corresponds to packet loss, and "latency" are further examples of the parameters that a requested QoS connection would have in certain applications. ERIC-1025, ¶140.

Third, QBone teaches that the QoS connection is a connection that assures at least a bandwidth parameter of the connection from end-to-end. With respect to the assured bandwidth parameter, the parameter is based on the requirements of the application. In particular, the BB handles different services, which requires parameter specification: "there must be some specification of what the input is. ***Exactly what must be specified is dependent on the service being requested***." ERIC-1017, pp.3,4. A POSITA would have appreciated that the specified parameter is based on the requirements of the application. This is a "high" QoS, which service QBone teaches is provided from "end-to-end." *See* ERIC-1017, p.4; ERIC-1025, ¶¶141-142.

According to QBone, "stricter service requires more specification … whereas a service with fewer guarantees requires much less specification (or none, e.g. Best-effort)." ERIC-1017, p.4. A POSITA would have appreciated that a requested "stricter" service could constitute a request for a "high" QoS including, for example, 2Mb/s of Surdila's Video High Quality application (i.e., the service being requested). ERIC-1025, ¶143.

Surdila likewise teaches that the bandwidth parameter is assured based on the requirements of the application, namely supporting end-to-end QoS for "***real-time applications such as IP telephony, mixed voice/video calls, etc. over the IP infrastructure***," where the QoS is "assured all the way to the recipient." ERIC-1014, ¶[0007]; ERIC-1025, ¶¶144-145.

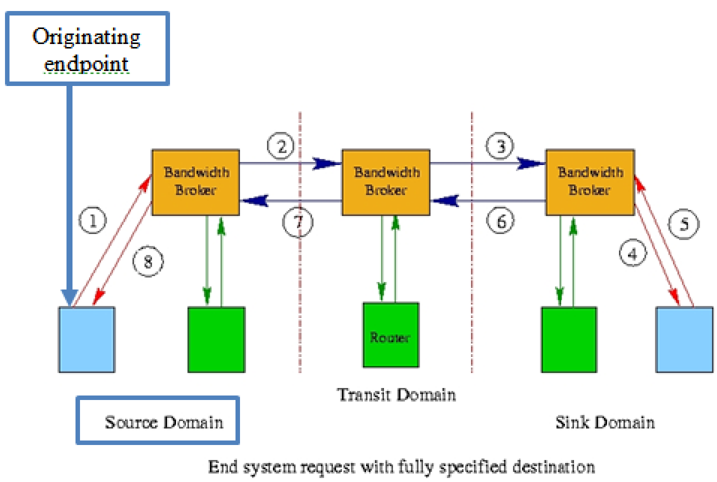
Fourth, QBone teaches that the QoS connection supports a plurality of traffic types including one-way traffic. ERIC-1017, pp.3,8. Surdila further teaches requests for bidirectional traffic: "the … Resource Allocation Request (RAR) message … ***indicat[es] a bidirectional session***." ERIC-1014, ¶[0080]; ERIC-1025, ¶¶146-147.

Fifth, with the requested "high" QoS, QBone further teaches that the traffic is between the originating end-point and the terminating end-point with service requested end-to-end. ERIC-1017, p.12; *see also id*, p.15; ERIC-1025, ¶148.

Thus, QBone and Surdila teach the features of claim element [1.1]. ERIC-1025, ¶149.

[1.2] ***wherein the request comes from the originating end-point and includes at least one of a requested amount of bandwidth and a codec;***

First, QBone teaches that the request (RAR) comes from the originating end-point. ERIC-1017, p.12. The RAR is from the "end system" in the "source domain," as illustrated in the annotated figure from QBone below. The "source" domain is the originating domain in QBone, in which QBone teaches that the "end system" initiates the RAR. *See id.*, p.13.



Id. (modified and annotated); ERIC-1025, ¶¶150-152.

Second, QBone teaches that the request includes a requested amount of bandwidth, as specified in a RAR. ERIC-1017, p.13 (the RAR includes parameters of the service); pp.21-22 (the RAR includes the SPO). Bandwidth is one of those parameters and is described by the "SPO": "[t]he … SPO … may be a simple parameter (e.g. ***bits-per-second of bandwidth***)." *Id.*, p.24. The "bits-per-second of bandwidth" is, as part of the RAR, a requested amount of bandwidth included in the request. Accordingly, by teaching a request that includes a desired bandwidth from the originating end-point to the BB, QBone teaches the limitation for "at least one of a requested amount of bandwidth …". ERIC-1025, ¶¶153-154.

Third, to the extent the limitation also requires a codec, the combination of QBone and Surdila teaches that the request also includes a requested codec. In particular, Surdila teaches that requests involve a SIP message using end-to-end QoS. *See* ERIC-1014, ¶[0061]. An "end user" sends a SIP Invite message that includes a "Proposed Session Description (SDP)(QoS Assured)." *Id.*, ¶[0062]. As would have been recognized by a POSITA, an SDP offer has multiple parameters including at times both bandwidth ***and*** a desired codec (i.e., in the same request). ERIC-1025, ¶¶155-156.

As would have been recognized by a POSITA based on the above teachings, Surdila's SIP message including an SDP offer (an example of what may be included with a RAR sent from an "end system" in QBone) would include, in addition to the bits-per-second of bandwidth, one or more codecs that the end system is able and willing to support for the session. ERIC-1025, ¶157.

Thus, QBone and Surdila teach examples of the features of claim element [1.2]. ERIC-1025, ¶158.

[1.3] ***determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the codec***

First, QBone teaches that the BB determines, in response to a RAR from the originating end-point, "***[w]hether the requester is authorized for this service***." ERIC-1017, p.13; ERIC-1025, ¶¶159-160.

Second, QBone teaches that the requested service specified in the RAR includes a requested amount of bandwidth. *See* analysis of claim element [1.2]; ERIC-1017, pp.13,22,24. It would have been understood by a POSITA that authorization as in QBone could be done based on a number of factors, including bandwidth. Thus, the BB that determines whether the end system is authorized for the service identified in the RAR, where the RAR includes a requested amount of bandwidth, provides an example of determining whether the originating end-point is authorized to use the amount of bandwidth in the request. ERIC-1025, ¶¶161-162.

Third, as a further example related to a codec, Surdila teaches authorization. According to Surdila, the originating end-point sends a SIP Invite message (an example of what may be included for a request) that "includes … Proposed Session

Description (SDP)(QoS Assured).” ERIC-1014, ¶[0062]. As noted above in [1.2], a POSITA would have recognized that a SIP Invite was known to include one or more codecs for the requested session. After a response, Surdila teaches that “***[a]t this point, the UE-A is authenticated and the call is authorized***.” ERIC-1014, ¶[0063]; ERIC-1025, ¶163.

Surdila therefore teaches authorizing a request that includes codec(s) identified in the “Proposed SDP.” It would have been obvious to authorize a request using the requested bandwidth or the codec in view of Surdila’s teachings, since both would be available to the BB. ERIC-1025, ¶164.

Thus, QBone and Surdila teach the features of claim element [1.3]. ERIC-1025, ¶165.

[1.4] ***and whether the terminating end-point can be reached by the controller;***

First, QBone teaches that the originating domain BB that originally receives the RAR makes several determinations about authorization for the service, route to reserve, and acceptance of the flow. *See* ERIC-1017, p.13. A modified RAR is sent to the next BB until the “bandwidth broker in the destination domain” is reached. *Id.*, pp.13-15; ERIC-1025, ¶¶166-167.

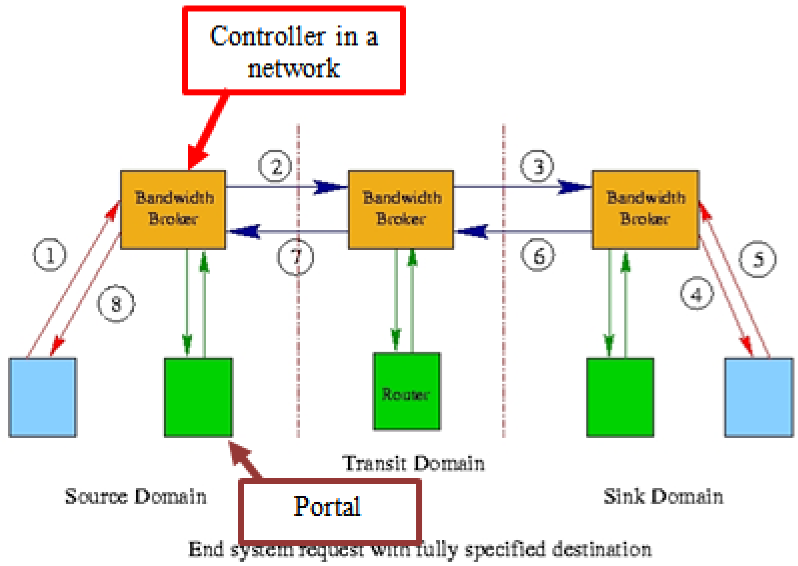
The BB of the destination domain “[a]uthenticate[s] that the request is indeed from a peer bandwidth broker,” and determines “the intra-domain route from the ingress router to the end system and … whether the resources are available to support the flow," "that the requested resources fall within any possible SLS with the end system," and "whether the flow may be accepted." ERIC-1017, p.14. The destination domain BB then "sends the RAR to the end system with appropriate changes (4)." *Id*.; ERIC-1025, ¶168.

Second, the terminating end-point "makes the determination whether it can receive the flow. This is signalled with an RAA [resource allocation answer]" back to the originating domain's BB. ERIC-1017, p.14. Then, "[w]hen the bandwidth broker of the originating domain receives the RAA (7) and authenticates it, the bandwidth broker completes any resource allocation actions within the domain." ERIC-1017, p.15; ERIC-1025, ¶169.

Thus, QBone teaches the features of claim element [1.4]. ERIC-1025, ¶170.

[1.5] ***directing, by the controller, a portal that is positioned in the network and physically separate from the controller to allocate local port resources of the portal for the connection;***

First, QBone teaches a portal in the network that is physically separate from the controller, as illustrated in the figure reproduced below:



ERIC-1017, p. 13 (modified and annotated); ERIC-1025, ¶¶171-172.

Routers within the domain include an access router (also called ingress routers); as illustrated in the figure from page 13, the access router is physically separate from the controller in the network. ERIC-1025, ¶173.

Second, QBone teaches the provision of "router configuration parameters" from the BB to the access router. In particular, the BB communicates the router configuration parameters "for QoS operation" to the access router (an example of a "portal"). ERIC-1017, p.9. In particular, the RAR, per QBone, has "certain side effects … such as altering the router configurations at the access [router]." *Id.*, p.5. Providing the router configuration parameters includes "***setting the marking functions for the flow in the access router serving the requesting end system (indicated by the green arrows in the figure)***." ERIC-1017, p.15. The access router therefore receives instructions from the BB to allocate local resources for a requested QoS connection, namely the alterations to any one or more router configurations. ERIC-1025, ¶174.

Third, a POSITA would have appreciated that QBone's access router has port resources impacted by alterations to router configurations, and that QBone's setting of marking functions for the access router corresponds to port resource allocation directed by the BB (i.e., by setting the marking functions). Indeed, the "QBone Premium Service" specifies "peakRate" (bytes per second) and jitter (microseconds) are parameters included in a definition of a reservation. ERIC-1017, p.24. Per QBone, the BB implements traffic conditioning mechanisms to "configur[e] the routers at the edges (and internal to) its domain with the set of parameters for the PHB mechanisms and the traffic conditioning mechanisms." *Id.*, p.5. QBone therefore teaches that the BB configures an access router with parameters that the router then uses to handle packets on its ports (e.g., bandwidth usage, specific queue usage, dropping, etc.). ERIC-1025, ¶¶175-176.

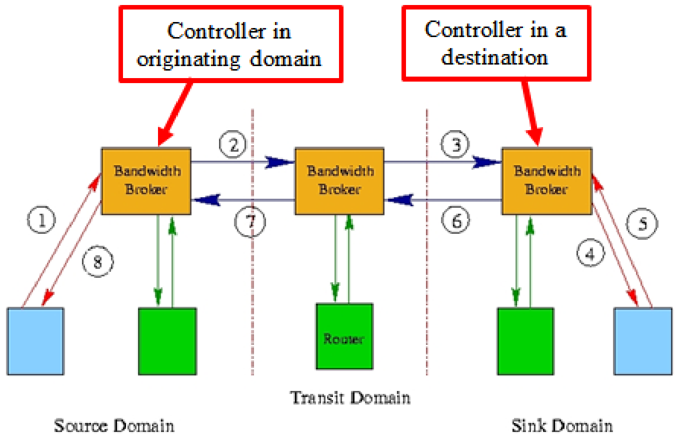
Still further, Surdila teaches that "the resources required to meet the requested QoS are then reserved in the originating network." ERIC-1014, ¶[0009]. To accomplish the reservation at the routers (portals), the BB "instruct[s] specific routers in its network to install specific policies for treating payload flows." *Id.*, ¶[0032]. For MPLS routers, the policy instructions provided by the BB include instruction to store labels, such as those provided by Li as discussed in section 1.7, in memory so the routers can "insert a specific label in the data packets to identify a specific media flow at the entry of the network." *Id.*, ¶[0034]; ERIC-1025, ¶177.

This reservation of resources for an access router includes reservations with respect to flow and filters. These are examples of resources required to meet the requested QoS in the originating network. The setting of marking functions and installation of policies by the BB and the traffic conditioning mechanisms, as in QBone, encompass resources (i.e., bandwidth, queues, port usage) that affect usage of at least one port of QBone's access router, and therefore teaches the allocation of local port resources specifically for the requested reserved connection. ERIC-1025, ¶178.

Therefore, QBone in combination with Surdila and Li teaches "directing, by the controller, … [a portal] to allocate local port resources of the portal" that includes at least *sending an allocation instruction from the controller to the portal, where the allocation instruction results in the portal allocating physical and/or logical elements of the portal*. Thus, the combination teaches the features of claim element [1.5]. ERIC-1025, ¶¶179-180.

[1.6] ***negotiating, by the controller, to reserve far-end resources for the terminating end-point; and***

First, QBone teaches (in a multi-domain scenario) a BB in the originating (source) domain (the "controller") and a BB in the destination (sink) domain. This is illustrated and annotated in the figure from QBone below:



End system request with fully specified destination

ERIC-1017, p. 13 (modified and annotated); ERIC-1025, ¶¶181-182.

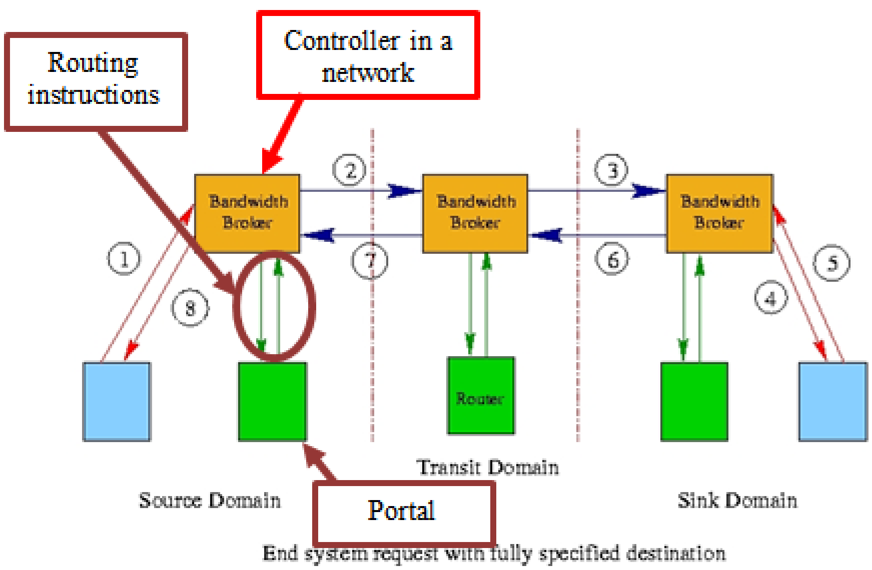
Second, QBone teaches that the BB in the originating domain sends the RAR along the control path to the destination domain for reservation of resources at the destination domain (that is, resources at the far end of the connection) for the terminating end system. *See* ERIC-1017, pp.14-15; *see also* analysis of claim element [1.4] (QBone's control signaling functions determining whether resources are available as requested). ERIC-1025, ¶183.

The terminating end system responds to the RAR with an RAA to the BB in the destination domain. The RAA "contains … ***parameters for the flow which the end system is willing to accept***." ERIC-1017, p.14. The BB in the destination domain further configures traffic conditioners in the destination domain (at the ingress router). *Id.*, p. 14; ERIC-1025, ¶184.

Thus, QBone teaches the features of claim element [1.6]. ERIC-1025, ¶185.

[1.7] ***providing, by the controller to the portal, routing instructions for traffic corresponding to the connection so that the traffic is directed by the portal based only on the routing instructions provided by the controller,***

First, QBone teaches that the BB provides instructions to the access router in the originating domain by setting the marking functions, based on the BB deciding "[t]he route through the domain to the egress router," which route would include the access router. ERIC-1017, pp.13,15 (green arrows in the figure).



ERIC-1017, p.13 (modified and annotated); ERIC-1025, ¶¶186-187.

The "setting the marking functions" from the BB in the originating domain shows the provision of instructions for traffic corresponding to the requested connection. ERIC-1025, ¶188.

Second, to the extent that QBone's "marking functions" are not expressly described as "routing instructions," Surdila expressly teaches an implementation of MPLS labels as "routing instructions" in a router (which Surdila refers to as a "Label Edge Router" (or LER)). Per Surdila, "***[t]he LERs function as edge routers that also insert a specific label in the data packets***." ERIC-1014, ¶[0034]. The routing of packets based on the labels inserted by the LERs begins with the LERs themselves (and, therefore, the access router of QBone). ERIC-1025, ¶¶189-190.

An access router in QBone that receives instruction from a BB regarding "marking functions," as expanded and modified by Surdila, would "***route[] packets based on the labels inserted by the LERs rather than the IP addresses***." ERIC-1014, ¶[0034]. It would have been obvious to a POSITA to include MPLS labels as "routing instructions" in the system of QBone. A POSITA would have appreciated that the access router in QBone, with the MPLS labels taught by Surdila, directs traffic for the flow based only on the routing instructions (MPLS labels) instead of IP addresses. *Id.* A premise of MPLS labels is to allow a router to route traffic based on the label-switched routing instructions instead of the information in its regular routing table. *Id.*; ERIC-1025, ¶190.

Third, to the extent that QBone in combination with Surdila does not explicitly state that the MPLS labels in Surdila are generated at the BB and provided from the BB to the access router (LER in Surdila), Li provides such teachings. ERIC-1025, ¶191.

In particular, Li teaches a centralized resource controller that determines resource allocation and routing between sites, including "distributing MPLS label stacks that represent the routes to ingress PEs [provider edge routers, i.e. LERs in Surdila]." ERIC-1023, p.17,¶2. Li's MPLS label stacks correspond to Surdila's "labels" and hence the "routing instructions." A PE that received the MPLS label stack "encapsulates the packet/frame with ***the label stack indicated by VPN-CRC***," and "performs forwarding along the route determined in the label stack." *Id.*, p.19,¶3, p.22,¶4; ERIC-1025, ¶192.

Accordingly, QBone as modified by Surdila and Li teaches a BB that determines a route through the network and generates MPLS label stacks sent to edge routers (per Li). Further, the access router in QBone modified by the teachings of Surdila and Li result in an access router that receives MPLS label stacks and routes based on those labels, instead of IP addresses. A POSITA would have appreciated therefrom that QBone's access router thereby directs traffic for the flow based only on the routing instructions (the MPLS labels) received from the BB. ERIC-1025, ¶193.

Thus, QBone, Surdila, and Li teach the features of claim element [1.7]. ERIC-1025, ¶194.

[1.8] ***wherein the portal does not perform any independent routing on the traffic,***

QBone teaches that traffic for a requested QoS from end-to-end is treated per the request: "[i]t is the responsibility of the service-providing domain … ***to treat the traffic as specified*** in the SLS until those packets leave the domain." ERIC-1017, p.7; ERIC-1025, ¶¶195-196.

QBone's access router is configured by the routing instructions (MPLS labels) it receives (e.g., the "setting the marking functions") from the BB (per Li's teachings of MPLS label stacks) so that traffic is routed according to the labels inserted (per Surdila's teachings), instead of according to the IP addresses of the traffic's packets. ERIC-1014, ¶[0034]; ERIC-1025, ¶197.

As would have been recognized by a POSITA, Surdila's teaching that the MPLS protocol routes packets based on the labels inserted by the LERs starts with the LERs themselves. Accordingly, the access router in QBone, whose marking functions are set by the BB with labels centrally generated and distributed as taught by Li, routes packets based on the labels according to the marking functions set as taught by Surdila. ERIC-1025, ¶198.

Thus, QBone, Surdila, and Li teach the features of claim element [1.8]. ERIC-1025, ¶199.

[1.9] ***and wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer***

path that includes a required route supported by the portal and dynamically provisioned by the controller,

First, QBone teaches reserving the connection in each domain from beginning to end, resulting in a dedicated bearer path. In the originating domain, "[its] bandwidth broker [determines] … ***The route through the domain to the egress router.***" ERIC-1017, p.13. In the transit domain (in each transit domain), "[its] bandwidth broker … ***determine[s] the intra-domain route***." *Id.*, p.14. In the destination domain, "[its BB] … ***Determine[s] the intra-domain route from the ingress router to the end system*** and decides whether the resources are available to support the flow." ERIC-1017, p.14; ERIC-1025, ¶¶200-202.

Accordingly, each domain has a route determined in response to the RAR from the originating end-point. These routes, together, constitute a dedicated bearer path, and thus an end-to-end connection, which QBone itself states as its purpose. *See* ERIC-1017, p.4 ("[t]he concept of service ***is end-to-end***"), p.11 ("the protocol works end-to-end"). QBone's BB is thus responsible for provisioning the end-to-end dedicated bearer path for the connection, including a required route. ERIC-1025, ¶202.

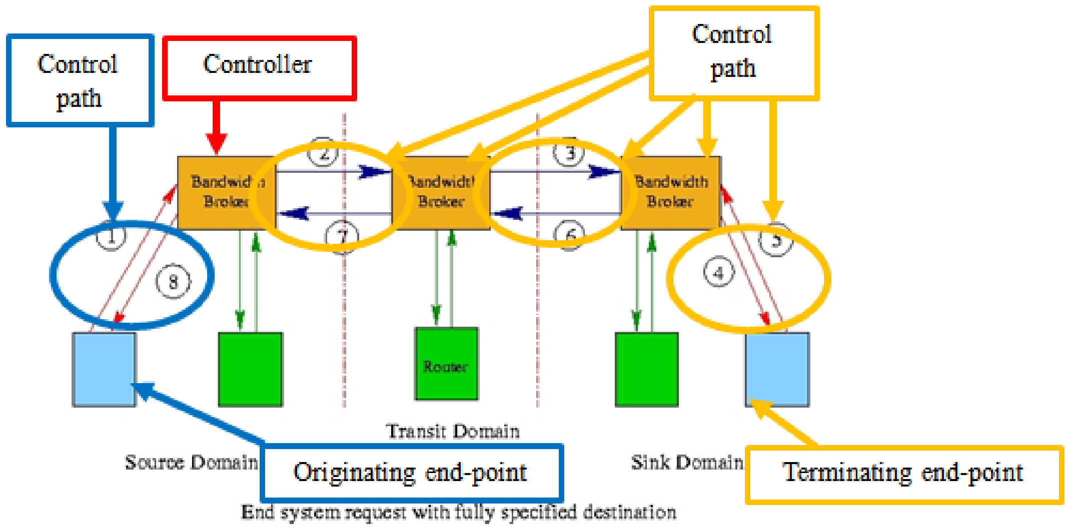
Second, regarding the required route, QBone teaches that this dedicated bearer path includes a required route determined by the BB through the originating domain. ERIC-1017, p.13. QBone's required route is supported by the access router ("portal"), since the access router is set for the requested connection such that the route traverses the access router. ERIC-1017, p.15. Thus, the determined route is one that is supported by the portal. ERIC-1025, ¶¶203-204.

Third, QBone teaches that the end-to-end connection and/or route is dynamically provisioned by the BB since the BB completes resource allocation in response to the RAR and RAA (and the connection and/or route is taken down in response to a reservation release). ERIC-1017, pp.15,20. Accordingly, QBone operates to reserve a dedicated bearer path including a required route for the end-to-end connection in response to a RAR, which a POSITA would have appreciated is a dynamic provisioning (i.e., provided in response to a request for a high QoS connection). ERIC-1025, ¶205.

Thus, QBone and Surdila teach the features of claim element [1.9]. ERIC-1025, ¶206.

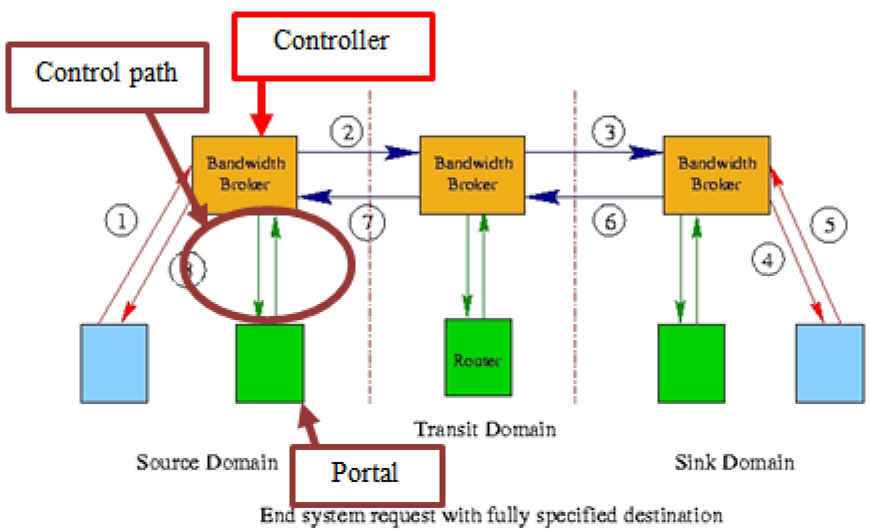
[1.10] ***and wherein control paths for the connection are supported only between each of the originating and terminating end-points and the controller and between the portal and the controller.***

First, QBone teaches that control paths (paths 1 and 8) are supported only between the originating end-point and the BB in the originating domain, as shown in the annotated figure from QBone below. As further shown in the same annotated figure below, QBone also teaches that control paths for RAR (paths 2, 3, 4) and RAA (paths 5, 6, 7) are supported only between the BB and the terminating end-point:



ERIC-1017, p.13 (modified and annotated); ERIC-1025, ¶¶207-210.

Second, QBone teaches the control path to the access router in the originating domain is a different control path, and is only between the BB and the access router:



ERIC-1017, p.13 (modified and annotated); ERIC-1025, ¶211.

Thus, QBone teaches the features of claim element [1.10]. ERIC-1025,

¶¶212-213.

<u>Claim 2</u> depends on claim 1 and further recites:

[2.1] ***wherein the controller is associated with a single class of service and wherein a service type of the request identifies the request as being of the single class of service and the request is routed to the controller based on the service type.***

The QBone architecture provides two classes of service: 1) best effort service; and 2) QBone Premium Service (QPS) that provides "a service with quantitative, absolute bandwidth assurance." ERIC-1017, pp.3-4. QBone's BB handles QPS, and is therefore "associated with" the QPS single class of service. ERIC-1025, ¶¶214-217.

QBone in combination with Surdila teaches that the request includes a service type, identified in Surdila as the "QoS parameter" that identifies the service type for a session. ERIC-1014, ¶[0062]. Thus, QBone teaches that the QPS with quantitative, absolute bandwidth assurance is requested by end systems, such as identified in a RAR, and Surdila teaches that the request is identified by a QoS Assured parameter. ERIC-1025, ¶¶218-219.

QBone's QoS connection requests are routed to the controller based on the Premium Service type as modified by Surdila's QoS Assured parameter. *See* ERIC-1017, p.13; ERIC-1014, ¶[0062]. When the end system's RAR includes the QoS Assured SDP according to Surdila's teachings, it is routed to the BB. On the other hand, nothing is requested of the BB for best effort service, and therefore a request is not routed to the BB. ERIC-1025, ¶¶220-221.

Thus, QBone and Surdila teach the features of claim element [2.1]. ERIC-1025, ¶222.

Claim 3 depends on claim 1 and further recites:

[3.1] ***wherein the request is received by the controller based on signaling from a user to the controller.***

QBone teaches that the BB receives the request from a user via the end-system which may be "manual (e.g. via a web interface)". ERIC-1017, pp.9,12. "***The end system sends an RAR to the bandwidth broker (1)***." *Id.*, p.13. Thus, a user's activation of QBone's end system that sends the RAR to the BB teaches the features of claim element [3.1]. ERIC-1025, ¶¶223-228.

Claim 4 depends from claim 3 and further recites:

[4.1] ***wherein the request is received from the user via one of a directory request, an Internet Protocol address, and a web page.***

QBone teaches that a user's RAR reaches the BB via a web page, namely "***an interface provided for resource allocation requests*** … ***These requests may be manual (e.g. via a web interface)***." ERIC-1017, p.9. Thus, QBone's end-system sending the request via a web interface teaches the features of claim element [4.1]. ERIC-1025, ¶¶229-232.

Claim 5 depends from claim 1 and further recites:

[5.1] ***identifying, by the controller, billing information of a user corresponding to the request for a high quality of service connection; and***

QBone teaches that the BB monitors the use of resources (i.e., "identifying"). ERIC-1017, p.8; ERIC-1025, ¶¶233-236. Moreover, QBone teaches that a requested QPS is also referred to as a "Virtual Leased Line." ERIC-1017, p.27. The designation of a leased line suggests to a POSITA that, as was common practice in the industry, a customer would be billed (e.g., for the leased line). A POSITA would have also been motivated to use the monitoring information to bill for requested service, such as the QPS, as a matter of ordinary design choice, commercial and/or market forces, and common sense. ERIC-1025, ¶237.

It would have been obvious to a POSITA that "the actual resource use" monitored is a type of "billing information" as a basis of user bills. This is further shown in Surdila, which teaches with respect to reserved resources that a "customer … will be charged only for the time the reservation is active." ERIC-1014, ¶[0078]. Thus, a POSITA would understand that Surdila is associating usage time with a specific customer so the customer can be charged for the usage. Such billing is implemented in a clearinghouse used for accounting (i.e., billing-related) functions. ERIC-1014, ¶[0040]; ERIC-1025, ¶¶238-240.

Incorporating Surdila's clearinghouse teachings would have been the combination of known elements (the clearinghouse server for accounting functions and the BB), according to known methods, to achieve a predictable result, since Surdila already taught collecting different functions into a single server entity, such as QBone's BB. ERIC-1025, ¶240.

Thus, QBone and Surdila teach the features of claim element [5.1]. ERIC-1025, ¶241.

[5.2] ***charging the user for the connection.***

Surdila teaches that "***the customer*** … ***will be charged only for the time the reservation is active***." ERIC-1014, ¶[0078]. It would have been obvious to a POSITA, based on this teaching in combination with QBone's monitoring of resources, that charging for the use (of the requested connection) occurs to compensate the network provider for the communication service utilized. ERIC-1025, ¶¶242-245.

<u>Claim 6</u> depends from claim 5 and further recites:

[6.1] ***wherein the charging may be based on at least one of a service type, an elapsed period of time, a codec type, and an amount of bandwidth used.***

Surdila teaches charging for time the reservation is active (i.e., an elapsed period of time). ERIC-1014, ¶[0078]. The reservation can include a requested service type, codec and amount of bandwidth. *See* ERIC-1014, ¶¶[0062],[0065]; ERIC-1017, p.24; ERIC-1025, ¶¶246-249.

Thus, because QBone in combination with Surdila teaches charging for the time the reservation is active, the combination teaches the features of claim element [6.1]. ERIC-1025, ¶250.

Claim 7 depends from claim 1 and further recites:

[7.1] ***wherein determining whether the originating end-point is authorized is based on information in a subscriber database.***

QBone teaches the use of a "Data Repository … [that] includes … ***Authorization and authentication databases (for users and peers)***." ERIC-1017, p.10; ERIC-1025, ¶¶251-253.

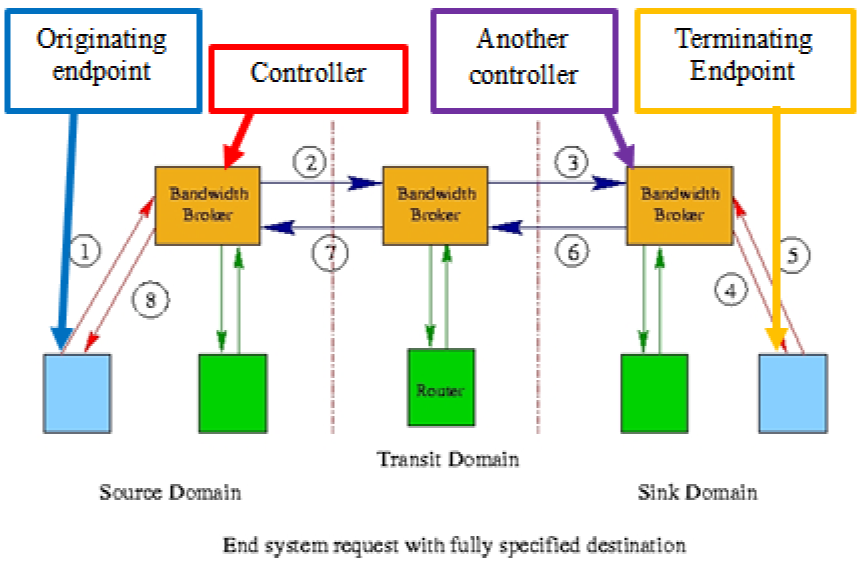
The "authorization and authentication databases" in QBone are examples of "a subscriber database." The QBone databases are used for determining "whether the requester [originating end-point] is authorized for this service," which as noted with respect to claim element [1.2] relies upon a RAR that identifies a requested amount of bandwidth or a codec. *See* ERIC-1017, p.13; ERIC-1025, ¶254.

Thus, QBone's authorization and authentication databases, for users and peers and used to determine whether the requester is authorized for the requested service, teaches the features of claim element [7.1]. ERIC-1025, ¶255.

Claim 8 depends from claim 1 and further recites:

[8.1] ***wherein the negotiating, by the controller, to reserve far-end resources on the terminating end-point includes negotiating with another controller associated with the terminating end-point.***

QBone teaches negotiating between controllers in respective domains. After receiving a RAR from an originating domain BB, the destination domain BB determines a route in the destination domain to the terminating end-point (and whether the resources are available). ERIC-1017, p.14. This is illustrated in the figure from QBone:



Id., p.13 (modified and annotated); ERIC-1025, ¶¶256-258.

Accordingly, the originating domain BB negotiates with the destination domain BB, which itself is associated with the terminating end-point because it determines a route to the terminating end-point. *See* ERIC-1017, p.14; ERIC-1025, ¶¶259-260.

Thus, QBone teaches the features of claim element [8.1]. ERIC-1025, ¶261.

<u>Claim 11</u> depends from claim 1 and further recites:

[11.1] ***wherein the connection is a point-to-point connection between only the originating and terminating end-points.***

The term "point-to-point connection" is understood to be a connection between a single originating end-point and a single terminating end-point, as compared to the "point-to-multipoint connection" set forth in claim 12. ERIC-1025, ¶¶262-263.

QBone teaches that the BB determines "[t]he route through the domain to the egress router." ERIC-1017, p.13. Each transit domain has a BB that determines "the intra-domain route." *Id.*, p.14. The destination domain BB determines "the intra-domain route from the ingress router to the end system." *Id.* Thus, each domain has a specific determined "intra-domain route." A POSITA would have recognized that this route through each domain is a point-to-point connection between the originating and destination end systems. ERIC-1025, ¶264. Further, QBone teaches establishing a tunnel between the end-points in the originating and destination domains. ERIC-1017, p.15. ERIC-1025, ¶¶265-266.

Thus, QBone teaches the features of claim element [11.1]. ERIC-1025, ¶267.

B. Challenge #2: Claims 10 and 13-15 are obvious under 35 U.S.C. § 103 over QBone in view of Surdila, Li and Requena

1. Summary of Requena

Requena teaches the negotiation of a video or audio codec to be used for a SIP session between two endpoints. *See* ERIC-1018, ¶[0007]. A SIP Invite is sent from a first endpoint ("UE1") with an SDP message body. *Id.*, ¶¶[0008],[0059]. The SDP body "contains a list (set) of codecs that the UE1 is able and willing to support for the session." *Id.*, ¶[0009]. Negotiation results in the destination UE2 also identifying the codecs it "is able and willing to support for the session." *Id.*; ERIC-1025, ¶¶268-269.

Requena teaches that a result is identification of "which of the codecs both the UE1 and all the network entities support" for a session. ERIC-1018, ¶[0103]. This results in using the same codec for the session "for both directions that is from UE1 to UE2 and vice versa." *Id.*, ¶[0114]. Requena teaches its applicability for video or audio data streams. *Id.*, ¶[0007]; ERIC-1025, ¶270.

2. Reasons to Combine QBone, Surdila, Li and Requena

First, Surdila teaches the use of SIP messaging to communicate. ERIC-1014, ¶[0034]. As part of that SIP messaging, Surdila contemplates codecs being agreed upon between the endpoints, since a SIP response includes "***the Agreed SDP and codecs***." ERIC-1014, ¶¶[0064],[0065]; ERIC-1025, ¶¶271-273.

Surdila does not explicitly describe how the end-points reach agreement on codecs, or their subsequent use. It was well-known that SIP negotiation involving codecs would have included agreeing upon a common codec(s) where included, and that the same agreed codec would have been be used across the connection. A POSITA would have been motivated to look at the well-known techniques for codec negotiation and use in the context of the BB negotiation of QBone and Surdila, of which Requena is an example. ERIC-1025, ¶274.

Requena provides details on how to arrive upon one or more agreed codecs between endpoints in a SIP environment. Both UEs in Requena identify a list of codecs that they are respectively able and willing to support for the session. ERIC-1018, ¶[0009]. Requena gives an example where a codec actually used for transmission is the same in both directions between endpoints. *Id.*, ¶[0114]. Using the teachings of Requena with the teachings of Surdila provides the advantage of supporting a bandwidth usage of a given codec, as well as supporting the indication of a particular bit rate for codecs that support multiple bit rates. *Id.*, ¶¶[0011],[0021]. Further, a POSITA would have been motivated to make the combination for other advantages, including reduction of computational overhead with a common codec, reduction of end-to-end latency due at least to the computational overhead reduction, and/or adding route flexibility to bypass any nodes that would have otherwise been responsible for codec conversion. ERIC-1025, ¶¶275-276.

Implementing the teachings of Requena with Surdila's SIP messaging, and particularly the BB framework of QBone, would have been within the skill of a POSITA. Surdila already relied upon SIP messaging to facilitate operations from the teachings of QBone. Requena expands upon the SIP messaging, with the BB according to QBone and Surdila, with respect to codecs. Such a combination would have yielded the predictable result of the endpoints reaching agreed codecs, via QBone/Surdila's BB, by the negotiation teachings in Requena resulting in the same codec usage across the connection. ERIC-1025, ¶277.

3. Detailed Analysis of Challenge #2

The following analysis describes how QBone in view of Surdila and Li, further in view of Requena, renders obvious each and every element of at least claims 10 and 13-15 of the '119 Patent. *See* ERIC-1025, ¶¶278-320.

Claim 10 depends from claim 1 and further recites:

[10.1] ***wherein the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating a video codec for use with the connection to avoid video codec conversion between the originating and terminating end-points.***

QBone in combination with Surdila teaches negotiation by the BB with other entities at the terminating side, *see* [1.6], as well as that the information in the request includes a SIP message with codec parameters, *see* [1.2]. ERIC-1025, ¶¶278-280.

As would have been recognized by a POSITA, the SIP message with codecs taught by Surdila in some examples included a list of codecs. Surdila describes the SIP response message as including "the Agreed SDP and codecs [plural]." ERIC-1014, ¶[0065]. Accordingly, Surdila expressly teaches to a POSITA that the originating end-point provides a list of potential codecs it supports and the terminating end-point responds with a list of agreed codecs. A POSITA would understand this message exchange to be a negotiation to agree on a common codec that both end-points can use to avoid the need for codec conversion. ERIC-1025, ¶281.

Confirming the understanding that a POSITA would have of this message exchange as a negotiation to avoid codec conversion, Requena teaches agreeing on common codecs and using the same one between end-points. According to Requena, the SIP message from the originating end-point and the SIP response message from the terminating end-point both include a list of codecs that each supports. ERIC-1018, ¶[0009]; ERIC-1025, ¶282.

Surdila teaches that the originating and terminating end-points arrive at agreed-upon codecs as a result of the negotiation. ERIC-1014, ¶[0065]; ERIC-1025, ¶284. It would have been obvious to a POSITA, reading Surdila's statement about the "agreed … codecs," that this would in some examples include the same codec for both originating and terminating end-points to avoid codec conversions.

Requena teaches that using the same codecs to avoid conversion was well known when discussing codecs that all the elements support. ERIC-1018, ¶¶[0103]-[0104],[0114]; ERIC-1025, ¶¶284-285.

QBone teaches that the BB negotiates resources along the path to the destination end-point, including with the terminating end-point. ERIC-1017, pp.14,15. The codecs are a type of resource that the BB would negotiate, so that the codecs are agreed upon between end-points as taught by Surdila. ERIC-1025, ¶286. Involving the BB in the negotiation would have been obvious to ensure that the negotiated codec is authorized, and to ensure users are billed appropriately for their codec use. *Id.*

Surdila teaches that video applications, including video and video calls, use Surdila's E2E QoS assurances. ERIC-1014, ¶¶[0006]-[0007]. It would have been obvious to a POSITA that Surdila's video or video calls would have video codecs to support their operation. This is further taught by Requena. ERIC-1018, ¶[0007] (discussing codecs for audio and video streams); ERIC-1025, ¶¶287-288.

Thus, QBone, Surdila, and Requena teach the features of claim element [10.1]. ERIC-1025, ¶289.

Claim 13 recites:

[13.0] ***A method for providing bandwidth on demand comprising:***

See the analysis of claim element [1.0]. ERIC-1025, ¶290.

[13.1] ***receiving, by a controller positioned in a network, a request for a high quality of service connection between an originating end-point and a terminating end-point,***

See the analysis of claim element [1.1]. ERIC-1025, ¶291.

[13.2] ***wherein the request includes at least one of a requested amount of bandwidth and a video codec;***

See the analysis of claim element [1.2]. ERIC-1025, ¶292.

[13.3] ***determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the video codec;***

See the analysis of claim element [1.3]. ERIC-1025, ¶293.

[13.4] ***communicating, by the controller, with the originating and terminating end-points to ensure that the connection is free from video codec conversion;***

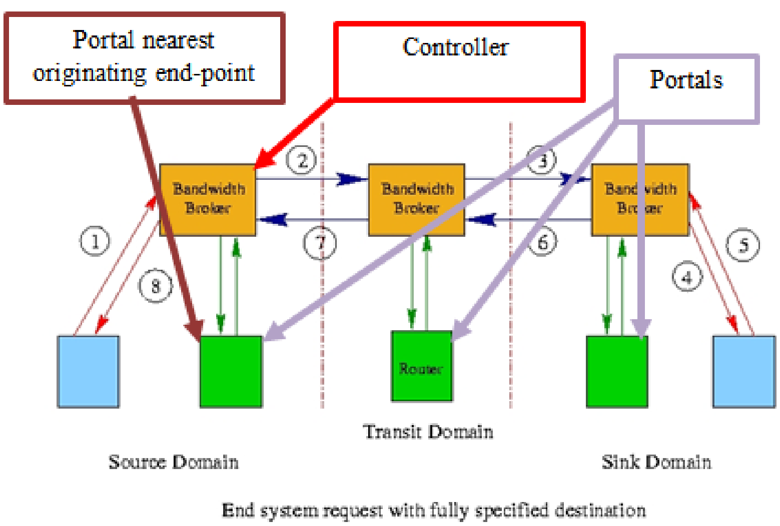
"[N]egotiating" as shown in claim element [10.1] is understood to include "communicating" by the controller with the originating and terminating end-points per claim element [13.4]. ERIC-1025, ¶¶294-295. Moreover, establishing a "connection to avoid video codec conversion" as disclosed in Requena and discussed in element [10.1] also satisfies "to ensure that the connection is free from video codec conversion." See the analysis of claim element [10.1].

[13.5] ***directing, by the controller, one of a plurality of portals that is positioned in the network nearest to the originating end-point and physically separate from the controller to allocate local port resources of the portal for the connection; and***

See analysis at claim element [1.5] (with respect to a single portal). QBone in combination with Surdila also teaches a controller directing one of a plurality of portals nearest to the originating end-point to allocate local port resources for the connection. ERIC-1025, ¶¶296-297.

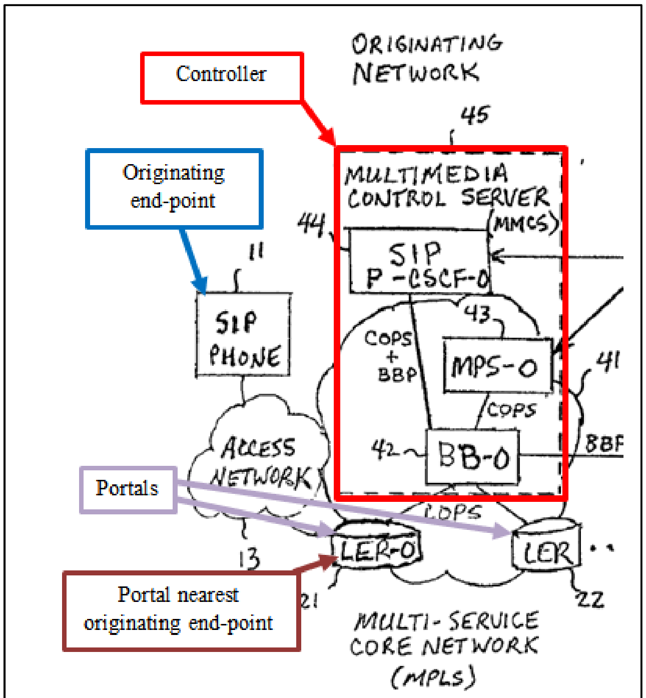
QBone teaches multiple routers, with the one nearest the originating end-point receiving the allocation direction from the originating domain's BB (controller). The multiple routers include at least an ingress router (e.g., an access router) and an egress router in the originating domain. ERIC-1017, p.7; *see also* p.10; ERIC-1025, ¶298.

The access router in QBone's originating domain is nearest the originating end-point, since it is the first to interface with the originating end-point. *See* ERIC-1017, p.22. The access router in QBone receives direction to set the marking functions. ERIC-1017, p.15 (setting the marking functions). This is further illustrated below:



ERIC-1017, p. 13 (modified and annotated); ERIC-1025, ¶¶299-300.

Surdila further teaches directing a portal from among a plurality of portals to allocate local port resources (the ingress LER-O 21). ERIC-1014, ¶¶[0036],[0081]. This is illustrated in part of FIG. 6 reproduced below:



Surdila, FIG. 6 (a section thereof, annotated).

ERIC-1014, FIG. 6 (annotated portion thereof); ERIC-1025, ¶301.

As would have been known by a POSITA, the determination of a router that is "nearest" would have been based on cost metrics, including number of hops or physical distance as two exemplary parameters. Under either, the access router taught by QBone or the LER-O taught by Surdila would qualify as a "nearest" router. ERIC-1025, ¶302.

As a result of the setting of marking functions in QBone in the access router (a portal nearest the originating end-point), and the policy instructions and binding information in Surdila, local port resources of the router are allocated for the requested QoS connection, such as buffers, bandwidth, and queues. *See* ERIC-1020, ¶[0006]; ERIC-1025, ¶303.

Thus, QBone and Surdila teach the features of claim element [13.5]. ERIC-1025, ¶304.

[13.6] ***sending, by the controller to the portal, routing instructions for the connection, wherein traffic for the connection is routed by the portal based only on the routing instructions,***

See analysis at claim element [1.7]. QBone, Surdila and Li in combination teaches "providing," and therefore also teaches "sending" as a method of providing routing instructions. ERIC-1025, ¶305.

Further, since the combination teaches that the routing instructions are "corresponding to" the connection, *see* analysis of claim element [1.7], the same aspects teach "traffic for the connection." ERIC-1025, ¶306.

The access router in QBone, as expanded and modified by Surdila's teaching, would route packets based on the labels (routing instructions) provided by the BB (as understood from Li) instead of IP addresses. *See* analysis of claim element [1.7]; ERIC-1025, ¶307.

This teaches that the traffic for the requested QoS connection is routed by the access router of QBone based only on the routing instructions it receives. ERIC-1025, ¶308.

[13.7] ***and wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer path that includes a required route supported by the portal and dynamically provisioned by the controller,***

See analysis of claim element [1.9]. ERIC-1025, ¶309.

[13.8] ***and wherein control paths for the connection are supported between each of the originating and terminating end-points and the controller and between the portal and the controller.***

See analysis of claim element [1.10]. Because QBone's control paths are supported "only" between the originating and terminating end-points and the controller and between the portal and the controller, QBone also teaches that the control paths for the connection are supported generally between each of the originating and terminating end-points and the controller and between the portal and the controller. ERIC-1025, ¶310.

<u>Claim 14</u> depends from claim 13 and further recites:

[14.1] ***further comprising negotiating, by the controller, to reserve far-end resources on the terminating end-point.***

See analysis of claim elements [1.6] and [10.1], above.

QBone in combination with Surdila teaches a SIP call to establish an assured QoS end-to-end. ERIC-1014, ¶[0062]. Requena teaches that the SIP invite's SDP body includes a list of supported codecs. ERIC-1018, ¶[0009]; ERIC-1025, ¶¶311-314.

Surdila teaches that the originating and terminating end-points arrive at agreed-upon codecs, such as the same codec for both originating and terminating end-points. ERIC-1025, ¶315.

The determining of the agreed codec(s) in the terminating endpoint is an example of resources reserved on the terminating endpoint in QBone as modified by Surdila and Requena. For example, QBone teaches that the RAR reaches the terminating endpoint, which responds with the RAA if the end system can receive the flow. ERIC-1017, p.14; ERIC-1025, ¶316.

The selection of codec at a device, such as a terminating end-point, itself impacts multiple resources including processor resources, bandwidth resources, and memory resources for execution of that confirmed codec. ERIC-1025, ¶317.

Thus, QBone and Surdila teach the features of claim element [14.1]. ERIC-1025, ¶318.

Claim 15 depends from claim 14 and further recites:

[15.1] ***wherein the negotiating is performed with one of another controller associated with the terminating end-point or directly with the terminating end-point.***

See analysis of claim element [8.1] (showing that QBone teaches that the negotiating is performed with another controller associated with the terminating end-point). ERIC-1025, ¶¶319-320.

C. Challenge #3: Claims 9 and 12 are obvious under 35 U.S.C. § 103 over QBone in view of Surdila and Li, further in view of Chen

1. Summary of Chen

Chen teaches a "centralized bandwidth broker" that "has control over the entire domain and centrally handles bandwidth allocation requests." ERIC-1019, 2:33-35. This includes the centralized BB receiving a request for "a particular level of service" from a sender device to a receiver device. ERIC-1019, 2:38-48; ERIC-1025, ¶¶321-322.

2. Reasons to Combine QBone, Surdila, Li and Chen

QBone teaches that the BB in the originating domain receives the connection request and is the entity that works with the terminating end-point to reserve resources at the far end. ERIC-1025, ¶¶323-324.

A POSITA would have appreciated that there may be one or many domains vis-à-vis the originating and terminating end-points. Thus, in some situations QBone contemplates the originating and terminating end-points being part of the same domain. A POSITA would have been motivated, from the teachings of QBone, to look at the different implementation details of the BB architecture in different domain combinations, including a single domain. ERIC-1025, ¶325.

Chen provides an example of a single domain network and teaches an approach for admission control using a centralized BB that has control over the entire domain between end-points. ERIC-1019, 2:31-35. The combination of Chen and QBone would have been obvious because it provides details of the example case of originating and terminating end-points on the same domain that QBone already acknowledged. Further, as Chen discloses, BB's were utilized to support multicast sessions. ERIC-1019, 3:36-53, 5:50-6:40; ERIC-1025, ¶326.

It would have been within the skill of a POSITA to combine the teachings of Chen regarding a single domain between end-points because it is a simple use case of the teachings of QBone. This would have been nothing more than the combination of prior art elements according to known methods to yield the predictable result of QBone's end-to-end reservations with Chen's simplified, single-domain use case. ERIC-1025, ¶327.

The resulting combination would benefit from QBone's guaranteed QoS in a single domain network. Similarly, the desirability of multicast communication sessions was well known and an implementation as taught by Chen would have yielded known benefits. *Id*.

3. Detailed Analysis of Challenge #3

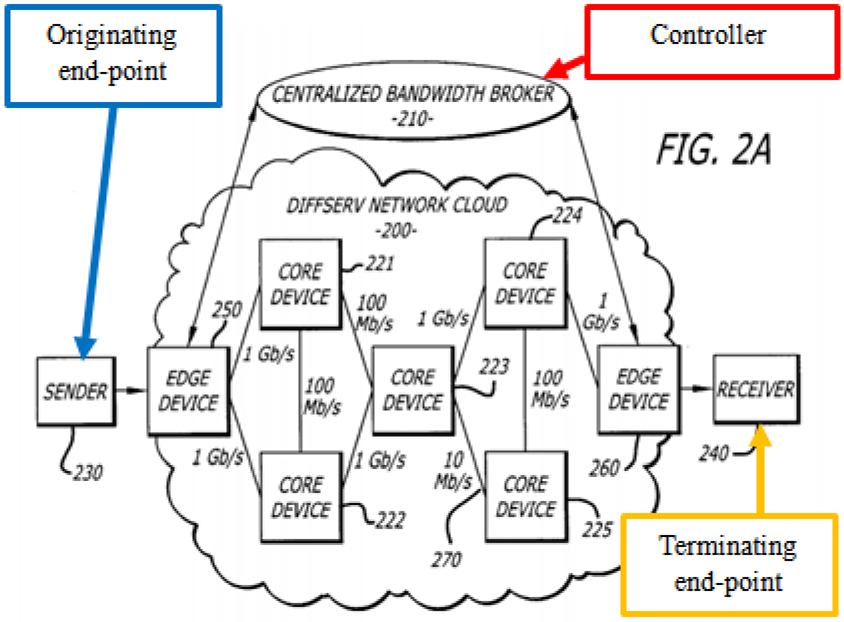
The following analysis describes how QBone in view of Surdila, Li and Chen renders obvious each and every element of at least claims 9 and 12 of the '119 Patent. *See* ERIC-1025, ¶¶328-346.

Claim 9 depends from claim 1 and further recites:

[9.1] ***wherein the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating directly with the terminating end-point.***

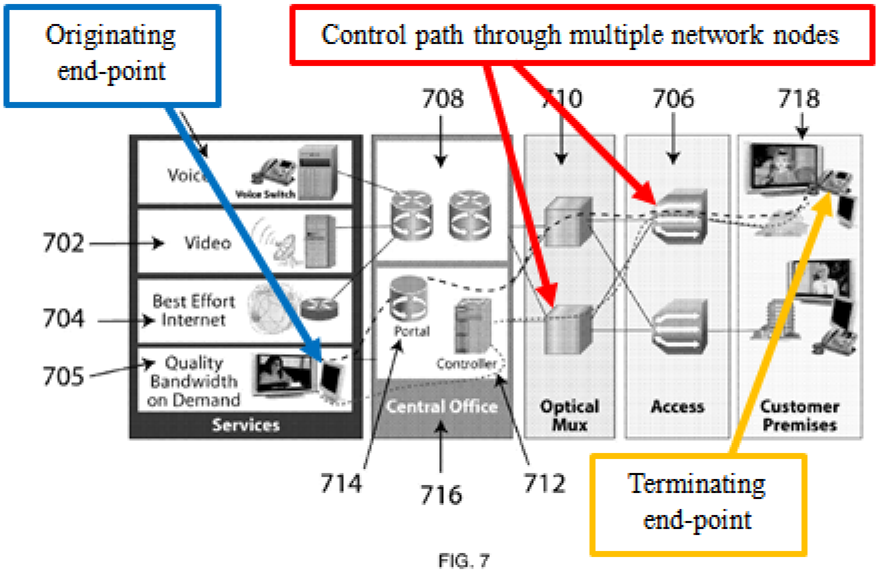
QBone teaches sending a request for service to a BB. ERIC-1017, pp.12,13. QBone's BB in the originating domain makes a number of determinations including a route through the domain. *Id.*, p.13; ERIC-1025, ¶¶328-331. QBone teaches that a terminating end-point ("traffic sink") is sometimes in the same domain as the originating end-point. ERIC-1017, pp.3,7. Surdila further teaches the negotiation of codecs so that the UEs reach agreed codecs. *See* ERIC-1014, ¶[0065]. In QBone's examples where the terminating end-point is in the same domain as the originating end-point, codecs are also negotiated as taught by Surdila. Further, in that example, the same controller in QBone would directly negotiate with both end-points. ERIC-1025, ¶¶332-333.

Chen further teaches both end-points being part of the same domain under a shared BB. ERIC-1019, 2:31-48. This centralized control of the end system in the same domain is further illustrated by Chen's FIG. 2A, annotated below.



ERIC-1019, FIG. 2A (annotated); ERIC-1025, ¶334.

Thus, Chen teaches that it was known for a BB to serve end-points that are both of the same domain and managed by the same BB, affirming the understanding a POSITA would have had from QBone. QBone's BB determines whether the resources are available to support the flow including the route to the terminating end-point within the same domain of a BB. QBone as modified by Surdila also teaches codecs being negotiated between end-points. Similar to the '119 Patent, Chen (as shown in the figure above) includes a network node (edge device 260) between the centralized BB and the terminating end-point through which the negotiations occur. This is shown in FIG. 7 of the '119 Patent. *See* ERIC-1019, FIG. 2A.



ERIC-1001, FIG. 7 (annotated); ERIC-1025, ¶¶335-337.

Therefore, as shown in the '119 Patent, "direct" negotiation occurs through one or more intervening network nodes to the terminating end-point. ERIC-1001, 5:27-31; ERIC-1025, ¶¶338-339.

Thus, QBone, Surdila, and Chen teach the features of claim element [9.1]. ERIC-1025, ¶340.

Claim 12 depends from claim 1 and further recites:

[12.1] ***wherein the connection is a point-to-multipoint connection between one of the originating and terminating end-points and the other of the originating and terminating end-points and at least one other end-point.***

QBone teaches achieving "end-to-end QoS assurances" in a BB architecture. To the extent that QBone does not expressly state whether the end-to-end QoS assurance may be from point to multiple points, such would have been obvious to a POSITA. ERIC-1025, ¶¶341-343.

Point-to-multipoint connections were well known. For example, Chen teaches that multicast sessions for centralized BB architectures were known. ERIC-1019, 2:57-58; ERIC-1025, ¶344-345.

Thus, QBone and Chen teach the features of claim element [12.1]. ERIC-1025, ¶346.

D. Challenge #4: Claim 16 is obvious under 35 U.S.C. § 103 over QBone in view of Surdila, Li and Requena, further in view of Pillai

1. Summary of Pillai

Pillai teaches user configurable platforms adaptable for use with "a variety of separate and distinct support systems." ERIC-1011, ¶[0044]. This includes supporting billing for voice and data services, including "prepaid integrated voice and data services." *Id.*, ¶[0071]; ERIC-1025, ¶¶347-348.

Pillai teaches a "separate control element, a Real-Time Universal Resource Consumption Monitor (RURCM) 300" that tracks "ongoing usage [o]f system resources," and which "applies prepaid service definitions to effectively regulate network usage." ERIC-1011, ¶[0087]. Pillai teaches that the RURCM 300 maintains connections with network elements that "regulate the user's ongoing calls/sessions." *Id.*, ¶[0088]; ERIC-1025, ¶349.

The RURCM 300 periodically polls the network elements (e.g., switches/routers) or receives updates after triggering by a threshold. ERIC-1011, ¶[0088]. The RURCM 300 compares the usage "against the authorized limits specified by the pre-paid policy." *Id.*, ¶[0089]. The RURCM 300 uses this information to decide whether to terminate a connection. *Id.*, ¶[0093]. Based on the result of a determination to terminate the connection, the RURCM 300 instructs an appropriate switch to terminate the session. *Id.*; ERIC-1025, ¶350.

2. Reasons to Combine QBone, Surdila, Li, Requena, and Pillai

QBone as well as Surdila contemplated their control systems performing various AAA functions. *See* ERIC-1017, p.2, ERIC-1014, ¶[0040]; ERIC-1025, ¶¶351-352.

QBone and Surdila do not explicitly state all the different AAA functions that the BB performs, or all that may be done with the resource usage tracked and monitored in QBone. From this, a POSITA would have been motivated to look at different known techniques available for using tracked and monitored usage information. ERIC-1025, ¶353.

Pillai provides examples of certain uses of monitoring/tracking usage data and functions based on that information implementable by a controller. Pillai contemplates particular ways in which to "support combined and integrated billing and rating for … data services in a distributed wireless architecture; to support prepaid integrated … data services in cellular network architectures.” ERIC-1011, ¶[0071]; ERIC-1025, ¶¶354-355.

Using these teachings from Pillai with the BB in QBone provides the advantage of managing prepaid services (ERIC-1011, ¶[0087]) as well as “ensuring that the customer only has access to whatever was specified in the prepaid contract.” *Id.*, ¶[0093]. Market forces dictate that service providers be compensated for usage of their communication networks such that implementation of the billing and access teachings of Pillai are readily combinable with the tracked/monitored usage data already collected by QBone’s BB. ERIC-1025, ¶356.

To the extent that any modifications would have been needed to the BB teachings of QBone to accommodate the teachings of Pillai, they would have been within the level of a POSITA. QBone left open what would be done with tracked usage, and Pillai teaches ways to take advantage of those functions that the BB can implement. ERIC-1025, ¶¶357-358.

3. Detailed Analysis of Challenge #4

The following analysis describes how QBone in view of Surdila, Li and Requena, further in view of Pillai, renders obvious each and every element of at least claim 16 of the ’119 Patent. *See* ERIC-1025, ¶¶359-374.

<u>Claim 16</u> depends from claim 13 and further recites:

[16.1] ***receiving, by the controller, a notification from the portal that traffic on the connection has exceeded an authorized limit; and***

QBone teaches a controller (the BB). *See* analysis of claim elements [13.1] and [1.1]. ERIC-1025, ¶¶359-361. QBone further teaches that the BB tracks the use of resources. ERIC-1017, p.8; ERIC-1025, ¶362. Surdila teaches that the AAA server in Surdila is a centralized entity that maintains tracked data, such as the data tracked as taught by QBone. ERIC-1014, ¶[0040]; ERIC-1025, ¶363.

To the extent that QBone in combination with Surdila and Requena does not explicitly teach what the BB does with the tracked data, and particularly that a tracked usage notification corresponds to traffic on a connection exceeding an authorized limit, Pillai teaches these limitations. ERIC-1025, ¶364.

Pillai teaches a controller that is separate from other network elements in the form of its RURCM 300. ERIC-1011, ¶[0087]. In Pillai, a switch monitors traffic and notifies the RURCM 300 when usage exceeds an authorized limit. The MSC (mobile switching center) or PDSN (packet data serving node) are network elements "***which regulate the user's ongoing calls/sessions***." *Id.*, ¶ [0088]. "The RURCM agent 300 … [maintains] real-time active connections with the network elements" and obtains usage statistics. *Id.*; ERIC-1025, ¶¶365-366.

Pillai teaches that the RURCM 300 compares the "usage" "against the authorized limits specified by the pre-paid policy." ERIC-1011, ¶[0089]. QBone's BB and routers modified by the teachings in Pillai result in a controller that monitors specific usage with notification of that usage exceeding a limit. This is an example of the tracking and monitoring done in QBone, and an example of functions performed by the multimedia control server of Surdila. ERIC-1025, ¶¶367-368.

Thus, QBone, Surdila, and Pillai teach the features of claim element [16.1]. ERIC-1025, ¶369.

[16.2] ***instructing the portal, by the controller, whether to terminate or allow the connection to continue.***

QBone teaches tracking resource usage information. *See* analysis of claim element [16.1]. ERIC-1025, ¶¶370-371.

To the extent that QBone does not teach particular details about what the tracking is used for, Pillai teaches a control element that determines whether to terminate the connection based on the data tracked and sent to the separate control element: "***the RURCM 300 decides at what point one or more of the ongoing sessions/connections should be terminated***." ERIC-1011, ¶[0093]; ERIC-1025, ¶372.

Pillai teaches conveying the determination to the switch ("portal"): "[a]fter making this decision, the RURCM 300 instructs the appropriate network switch … to terminate the ongoing call/session, thereby ensuring that the customer only has access to whatever was specified in the prepaid contract." ERIC-1011, ¶[0093]; ERIC-1025, ¶373.

Thus, QBone, Surdila, and Pillai teach the features of claim element [16.2]. ERIC-1025, ¶374.

VII. Conclusion

For the reasons set forth above, Petitioner asks that the Patent Office order an *inter partes* review trial and then proceed to cancel claims 1-16 as unpatentable in view of the grounds set forth above. The undersigned further authorizes payment for any additional fees that may be due in connection with this Petition to be charged to Deposit Account No. 08-1394.

Respectfully submitted,

Dated: June 22, 2017

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Petitioner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this petition, that the number of words in this paper is less than 14,000. Pursuant to 37 C.F.R. §42.24(d), this word count excludes the table of contents, mandatory notices under §42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

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ERICSSON'S EXHIBIT LIST

ERIC-1001	U.S. Pat. No. 8,036,119
ERIC-1002	File History of U.S. Pat. No. 8,036,119
ERIC-1003	U.S. Pat. No. 7,639,612
ERIC-1004	File History of U.S. Pat. No. 7,639,612
ERIC-1005	RESERVED
ERIC-1006	Curriculum Vitae of Dr. Narasimha Reddy
ERIC-1007	RESERVED
ERIC-1008	RESERVED
ERIC-1009	RESERVED
ERIC-1010	RESERVED
ERIC-1011	U.S. Pat. Pub. No. 2003/0133552 (Pillai)
ERIC-1012	RESERVED
ERIC-1013	RESERVED
ERIC-1014	U.S. Pat. Pub. No. 2002/0181462 (Surdila)
ERIC-1015	File History of U.S. Pat. Pub. No. 2002/0181462 (of Surdila)
ERIC-1016	Payment Receipt for Certified Copy of File History of Surdila
ERIC-1017	"QBone Bandwidth Broker Architecture" (QBone, from Surdila's File History)
ERIC-1018	U.S. Pat. Pub. No. 2002/0181495 (Requena)
ERIC-1019	U.S. Pat. No. 6,487,170 (Chen)
ERIC-1020	U.S. Pat. Pub. No. 2005/0135243 (Lee)
ERIC-1021	U.S. Pat. Pub. No. 2007/0201366 (Liu)
ERIC-1022	RESERVED
ERIC-1023	English Translation of PCT Pub. WO2005/101730 (Li)
ERIC-1024	"QBone Bandwidth Broker Architecture" (QBone, color copy)
ERIC-1025	Declaration of Dr. Narasimha Reddy
ERIC-1026	PCT Pub. WO2005/101730 (Chinese)

ERIC-1027	Declaration of Xie Yun Fei attesting to translation of WO2005/101730
ERIC-1028	U.S. Pat. No. 7,650,637 (US Patent for Li, from national phase entry of WO2005/101730)
ERIC-1029	RESERVED

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent of: McEwen	§	Petition for *Inter Partes* Review
	§	
U.S. Patent No. 8,036,119	§	Attorney Docket No.: 51167.11
	§	
Issued: October 11, 2011	§	Customer No.: 27683
	§	
Title:	§	Real Party in Interest:
SYSTEM AND METHOD OF	§	RPX Corp., Ericsson Inc. and
PROVIDING BANDWIDTH ON	§	Telefonaktiebolaget LM Ericsson
DEMAND	§	
	§	
	§	

CERTIFICATE OF SERVICE

The undersigned certifies, in accordance with 37 C.F.R. § 42.205, that service was made on the Patent Owner as detailed below.

Date of service	June 22, 2017
Manner of service	FEDERAL EXPRESS
Documents served	Petition for *Inter Partes* Review Petitioner's Exhibit List Exhibits ERIC-1001-ERIC-1004, ERIC-1006, ERIC-1011, ERIC-1014-ERIC-1021, ERIC-1023-ERIC-1028
Persons served	Kathy McEwen 7809 La Guardia Drive Plano, TX 75025

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