NOT FOR PUBLICATION

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

ALBERTA TELECOMMUNICATIONS RESEARCH CENTRE, d/b/a TR LABS, Plaintiff, v. AT&T CORPORATION, Defendant.	Civil Action No.: 09-3883 (PGS) MEMORANDUM & ORDER
ALBERTA TELECOMMUNICATIONS RESEARCH CENTRE, d/b/a TR LABS, Plaintiff, v. VERIZON SERVICES CORP., Defendant.	Civil Action No.: 10-1132 (PGS) MEMORANDUM & ORDER
VERIZON SERVICES CORP., Plaintiff, v. ALBERTA TELECOMMUNICATIONS RESEARCH CENTRE, d/b/a TR LABS, Defendant.	Civil Action No.: 11-1378 (PGS) MEMORANDUM & ORDER

SHERIDAN, U.S.D.J.

This matter comes before the Court on three separate claim construction proceedings in three separate cases: *Alberta Telecommunications Research Centre v. AT&T Corp.*, No. 09-3883 (PGS), *Alberta Telecommunications Research Centre v. Verizon Services Corp.*, No. 10-1132 (PGS), and

Verizon Services Corp. v. Alberta Telecommunications Research Centre, No. 11-1378 (PGS). These matters were consolidated for the limited purpose of claim construction by order of the Court dated August 3, 2011.

Alberta Telecommunications Research Centre, doing business as TR Labs, ("TR Labs") owns seven patents at issue in the consolidated cases: (1) U.S. Patent No. 4,956,835 titled "Method and Apparatus for Self-Restoring and Self-Provisioning Communication Networks," filed October 19, 1988 (the "'835 Patent"); (2) U.S. Patent No. 5,850,505 titled "Method for Preconfiguring a Network to Withstand Anticipated Failures," filed November 1, 1995 (the "'505 Patent"); (3) U.S. Patent No. 6,421,349 titled "Distributed Preconfiguration of Spare Capacity in Closed Paths for Network Restoration," filed July 11, 1997 (the "'349 Patent"); (4) U.S. Patent No. 6,377,543 titled "Path Restoration of Networks," filed October 20, 1997 (the "'543 Patent"); (5) U.S. Patent No. 6,404,734 titled "Scalable Network Restoration Device," filed October 6, 1998 (the "'734 Patent"); (6) U.S. Patent No. 6,914,880 titled "Protection of Routers in a Telecommunications Network," filed May 19, 1999 (the "'880 Patent"); and (7) U.S. Patent No. 7,260,059 titled "Evolution of a Telecommunications Network from Ring to Mesh Structure," filed June 28, 2002 (the "'059 Patent"). On Oct. 5, 2009, TR Labs filed a complaint against AT&T Corporation, ("AT&T"). [No. 09-3883, Docket Entry No. 1]. In their second amended complaint, TR Labs alleges that AT&T directly infringed the claims of the '835, '505, '734, '880, and '059 Patents by operating mesh telecommunications networks that are covered by such claims, in violation of 35 U.S.C. § 271. [No. 09-3883, Docket Entry No. 43]. On March 3, 2010, TR Labs filed a complaint against Verizon Services Corp. ("Verizon"). [No. 10-1132, Docket Entry No. 1]. In their amended complaint, TR Labs alleges that Verizon directly infringed the claims of the '349, '880, and '059 Patents by operating mesh telecommunications networks that are covered by such claims, in violation of 35 U.S.C. § 271. [No. 10-1132, Docket Entry No. 60]. On March 11, 2011, Verizon filed a complaint against TR Labs. [No. 11-1378, Docket Entry No. 1]. Verizon brought the action to resolve a conflict between TR Labs and Verizon regarding the '505 and '543 Patents, and to remove any barriers to Verizon's continued use of its mesh networks. *Id.*

All parties have filed the appropriate claim construction briefs, and a consolidated *Markman* hearing was held from November 28, 2011 through November 30, 2011.

I. STANDARDS FOR CLAIM CONSTRUCTION

There is a two-step analysis for determining patent infringement: "first, the court determines the meaning of the disputed claim terms, then the accused device is compared to the claims as construed to determine infringement." *Acumed LLC v. Stryker Corp.*, 483 F.3d 800, 804 (Fed. Cir. 2007) (citation omitted). When the court engages in claim construction to determine the meaning of disputed claim terms, it is decided as a matter of law. *Markman v. Westview Instruments*, 517 U.S. 370, 372 (1996). It is well established that "the construction of a patent, including terms of art within its claim, is exclusively within the province of the court." *Id.*

When construing claims, the court must focus on the claim language. As explained by the Federal Circuit:

> It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude. Attending this principle, a claim construction analysis must begin and remain centered on the claim language itself, for that is the language the patentee has chosen to particularly point out and distinctly claim the subject matter which the patentee regards as his invention.

Innova/Pure Water, Inc. v. Safari Water Filtration Sys., 381 F.3d 1111, 1115-16 (Fed. Cir. 2004) (citations omitted). When looking at the words of a claim, the words "are generally given their ordinary and customary meaning," which has been defined as "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005).

The Federal Circuit has counseled:

> It is the person of ordinary skill in the field of the invention through whose eyes the claims are construed. Such person is deemed to read the words used in the patent documents with an understanding of their meaning in the field, and to have knowledge of any special meaning usage in the field. The inventor's words that are used to describe the invention—the inventor's lexicography—must be understood and interpreted by the court as they would be understood and interpreted by a person in that field of technology. Thus the court starts the decision making process by reviewing the same resources as would that person, viz., the patent specification and prosecution history.

Id. at 1313 (quoting *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1477 (Fed. Cir. 1998)). Those resources, called intrinsic evidence, include the claim language, the specification, and the prosecution history. *See id.* at 1314.

However, when intrinsic evidence alone does not resolve the ambiguities in a disputed claim term, extrinsic evidence—evidence that is outside the patent and prosecution history—may also be used to construe a claim. *See id.* at 1317; *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582-83 (Fed. Cir. 1996). "[E]xtrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art" may be consulted; for example, expert testimony, dictionaries, and treatises. *Id.* at 1314. However, when a court relies on extrinsic evidence to construe a claim, the court should be guided by the principle that extrinsic evidence may never conflict with intrinsic evidence, because courts "have viewed extrinsic evidence in general as less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.* at 1319. Thus, a court should take care to "attach the appropriate weight to be assigned to those sources." *Id.* at 1322-24.

II. THE DISPUTED CLAIM TERMS- '835 PATENT

A. Claim 1

The parties are in dispute regarding several terms within claim 1. Claim 1 of the '835 Patent reads,

> 1. A method of restoring communications between a pair of nodes in a network having an arbitrary number of nodes and an arbitrary number of spans interconnecting said nodes, each said span having working circuits between nodes designated for transmitting actual communications traffic and spare circuits between nodes capable of, but not designated for, transmitting actual communications traffic, said method comprising the steps of:
>
> (a) establishing one or more independent communication paths between said pair of nodes through a series of spare circuits of spans interconnecting said pair of nodes and other interconnected nodes in said network, including the steps of:
> I. repeatedly transmitting restoration signals along logical spans of spare circuits departing said one node;
> ii. repeatedly retransmitting said restoration signals from said other interconnected nodes along logical spans of spare circuits departing said interconnected nodes; and
>
> iii. upon receipt of a restoration signal by said other node, transmitting a complement restoration signal from said other node along a path consisting of the same spare circuits along which said restoration signal was communicated to said other node; and
>
> (b) redirecting communications traffic intended for one or more failed

spans interconnecting said pair of nodes through one or more of said paths.
'835 Patent, col. 37, ll. 36-65 (emphasis added).

B. "Restoration signals"

TR Labs' proposed construction for this term is "signals to initiate the formation of an alternate communication path in the event of a span failure." AT&T's construction for this term is "signals, each of which is used both to search for and to initiate the formation of a potential restoration path (i.e., the 'independent communication path')." The only real distinction between these constructions is that AT&T's proposal requires that the restoration signal "search[es] for" an alternate path.

AT&T's argument is premised on a comprehensive interpretation of what the '835 Patent teaches. AT&T claims that the '835 Patent proposes a technique for network restoration after a failure that, unlike previous techniques, requires neither a centralized network operations center nor distributed databases containing knowledge of the network's topology. According to AT&T, this technique begins with the failure of a span between two nodes. Under this interpretation, once the span fails, the network switching device at the node that is transmitting the information (i.e., the "Sender Node") blindly floods the network in every direction with restoration signals as a means of finding a potential restoration path. AT&T believes that this process is at the very heart of the '835 Patent.

In support of their construction, AT&T notes that the specification describes that "each node has no knowledge of the topology of the network that it is in." '835 Patent, col. 7, ll. 2-4. Rather, AT&T argues, the method of the '835 Patent is to flood the network to find available restoration paths. '835 Patent, col. 9, ll. 56-68. AT&T argues that this position is supported by language in the

‘835 Patent stating that restoration is only possible if a restoration signal happens to reach the node at the other end of the failed span. ‘835 Patent, col. 9, ll. 64-68. Furthermore, AT&T claims that if the restoration path was known and there was no need to search, the node at the other end of the failure would not need to wait to receive a restoration signal before sending its own complement restoration signal.

TR Labs, instead of developing a broad vision of how this concept operates within the teachings of the Patent, zeroes in on the precise language of the ‘835 Patent. TR Labs points to the language of subpart (a) of the claim at issue, which speaks of "‘establishing’ one or more communication paths." ‘835 Patent, col. 37, ll. 45-46. According to TR Labs, this language underscores the distinction between "initiating" and "searching." TR Labs argues that, to both one of ordinary skill in the art and a lay person, the term "initiating" does not require a "search," and there is no mention of "searching" in the claim. Rouskas Decl., ¶ 7. In further support of this argument, TR Labs argues that "restoration signals" do not search because such signals would need to be read and interpreted in order to locate an alternate path, and "[c]laim 1 does not require reading and interpreting restoration signals, per se." Additionally, as TR Labs stated during the *Markman* hearing: "a signal by itself is incapable of searching. This is just an electronic signal that goes out, it doesn’t have eyes, it doesn’t have intelligence, it’s just a signal." T. 41, 14 through 17.

<u>Claim Construction</u>

The Court finds that AT&T’s proposed construction is correct. In general, the ‘835 Patent relates to "a method and apparatus for rapidly effecting, in a communications network, the restoration of communications between nodes whose interconnecting spans have failed . . . ." ‘835 Patent, col. 1, ll. 6-9. Importantly, "each node has no knowledge of the topology of the network that it is in." '835 Patent, col. 7, ll 2-4. The Patent teaches that communication between nodes is restored through the transmission and retransmission of restoration signals. *Id.*, col. 37, ll. 50-62. The Court finds that this process inherently involves a search function. If there was no need for the restoration signals to search for the node at the other end of the broken span—i.e., if the nodes knew the topology of the network—the end node would not have to wait to receive a restoration signal before sending its own signal. *See* '835 Patent, col. 37, ll. 50-62 ("[U]pon receipt of a restoration signal by said other node, transmitting a complement restoration signal . . . ."). As AT&T argued in their briefs, this search function is at the very heart of the Patent.

TR Labs' arguments, which focus on the precise wording of the claim without describing the bigger picture, never describes how the restoration signals can arrive at the end node without searching when they have no knowledge of the network topology. Additionally, TR Labs' argument that claim 1 does not require the interpretation of restoration signals is unavailing, as claim 1 explicitly requires the end node to interpret the restoration signal and transmit a complement restoration signal. *See* '835 Patent, col. 37, ll. 57-62. Finally, TR Labs' argument regarding the inability of an electronic signal to search in the absence of eyes and intelligence is seemingly false, especially when compared to how personal computers run searches all the time.

C. "Transmitting restoration signals along logical spans of spare circuits"/retransmitting said restoration signals . . . along logical spans of spare circuits"

Although there are two separate terms in dispute, the parties agree that the construction of one term determines the construction of the other. TR Labs proposes that the first term, "transmitting restoration signals along logical spans of spare circuits," be defined to mean "sending restoration signals over logical spans that consist of at least one spare circuit." Similarly, TR Labs proposes that the second term, "retransmitting said restoration signals . . . along logical spans of spare circuits," be defined to mean "retransmitting the restoration signals along logical spans of spare circuits." AT&T proposes that the first term be defined to mean "[f]or each restoration path to be established, sending restoration signals over all the logical spans having a spare circuit," and that the second term be defined to mean "[r]esending the same restoration signal received by a node over all of the logical spans having a spare circuit." The only meaningful difference between the proposed constructions of these terms is that AT&T's construction includes the concept that the restoration signals must be transmitted and retransmitted over all logical spans.

In support of their argument, AT&T points to numerous passages in the Patent that support the reading that the signals must be transmitted/retransmitted over all logical spans. AT&T points to the language in claim 1, which requires "establishing one or more independent communication paths . . . [by] repeatedly transmitting restoration signals along logical spans of spare circuits departing said one node." '835 Patent, col. 37, ll. 45-52 (emphasis added). AT&T argues that, since the phrases "logical spans" and "spare circuits" are plural, the claim requires multiple restoration signals. AT&T also refers to the specification requiring "each logical span departing from the SENDER site is flooded with signatures up to the minimum of either the number of circuit restorals needed or the number of spares available on the given span." '835 Patent, col. 20, ll. 31-35. Finally, AT&T identifies language in the specification that requires each downstream node to rebroadcast such signatures on multiple spans. '835 Patent, col. 23, ll. 47-62. According to AT&T, this language indicates that the '835 Patent describes a process by which "signatures flood [a] network until a signature reaches, if possible, the node on the other side of a failed span." AT&T finds further support in Figure 7 of the '835 Patent, which illustrates the flooding process. According to AT&T, Figure 7 of the '835 Patent is the preferred embodiment of the "forward flooding step of the present invention." '835 Patent, Figure 7; col. 5, ll. 29-30.

TR Labs argues that the term "all" does not appear in claim 1, and it would be improper to read the term "all" into the claim. TR Labs also points out that the specification teaches that the restoration signals are "transmitted along *one or more* transmitting links to the other nodes." '835 Patent, col. 3, ll. 16-17 (emphasis added)). Based on this language, TR Labs argues that the transmission of the restoration signal need not be along "all" logical spans. Rouskas Decl. ¶ 8.

TR Labs also advances a claim differentiation argument. The doctrine of claim differentiation is based on the "common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope." *Karlin Tech., Inc. v. Surgical Dynamics, Inc.* 177 F.3d 968, 972-73 (Fed. Cir. 1999) (citing *Comark Commc'ns Inc. v. Harris Corp*., 156 F.3d 1182 (Fed. Cir. 1998)). According to TR Labs, claim 3 of the '835 Patent requires that restoration signals be transmitted "along each logical span of spare circuits departing said one node." '835 Patent, col. 38, ll. 34-36. Based on the inclusion of this concept in claim 3, TR Labs argues that claim 1 does not require transmitting restoration signals along all of the logical spans departing the node. Additionally, TR Labs refutes AT&T's claim that figure 7 of the '835 Patent describes the preferred embodiment of the invention. TR Labs claims that, although figure 7 illustrates the transmission of restoration signals along all logical spans, the figure represents only one embodiment of the invention, not the preferred embodiment. In support of this argument, TR Labs notes that the specification passage refers only to "the present invention." '835 Patent, col.

5, ll. 30-31.

Claim Construction

The Court finds that AT&T's proposed construction is correct. The claim language refers to plural spans. '835 Patent, col. 37, ll. 45-52 . Additionally, the specification explicitly describes both transmission and retransmission to "each logical span." *Id.* col. 20, ll. 31-35; col. 23, ll. 55-56. This construction of the claim term does not conflict with TR Labs' argument that the specification only requires that signals be "transmitted along *one or more* transmitting links to the other nodes." '835 Patent, col. 3, ll. 16-17 (emphasis added). In those instances where there is only one logical span, restoration signals will be repeatedly sent on only that one span.

TR Labs' argument regarding claim differentiation is credible, but ultimately unpersuasive. TR Labs reads claim 3 to expand on the method taught in claim 1 by adding the requirement that the restoration signals be broadcast on all logical spans—precisely the concept that this Court reads into claim 1. Specifically, claim 3 teaches:

> A method as defined in claim 1, wherein said repeatedly transmitting step includes repeatedly transmitting said signals along each logical span of spare circuits departing said one node <u>up to the minimum of either the number of circuit restorations required or the number of spare circuits available to said one node</u>.

'835 Patent, col. 38, ll. 33-38 (emphasis added). The Court reads claim 3 not to add the requirement that restoration signals be broadcast on all logical spans, but rather to identify the alternative minimums by which the number of restoration signals may be calculated. The first alternative calculates the number of restoration signals per each logical span by "the number of circuit restorations required." *Id.* at col. 38, ll. 36-37. This alternative is illustrated in the '835 Patent at figure 7. *Id.* at fig. 7. The second alternative requires the node to transmit signals along every spare circuit.[1] *Id.* at col. 38, ll. 37-38; *see also id.* at col. 20, ll. 36-40. Since this is not an instance where the Court's construction of one claim would render a second claim meaningless, *see, e.g., Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998), the doctrine of claim differentation does not apply.

D. "Repeatedly transmitting/repeatedly retransmitting"

As with the second disputed term, here the parties agree that the construction of one term fixes the construction of the second. TR Labs maintains that the terms "repeatedly transmitting" means "transmitting more than once from the originating node" and the term "repeatedly retransmitting" means "transmitting more than once from the intermediate nodes." AT&T contends that both "repeatedly transmitting" and "repeatedly retransmitting" mean "continually resending." The substantive difference between TR Labs' constructions and AT&T's constructions is that AT&T's constructions require continual sending and resending.

According to TR Labs, one of ordinary skill in the art would not understand the word "repeatedly" to require "continually." Rouskas Decl. ¶ 9. TR Labs also finds support from AT&T's own expert who testified that the ordinary meaning of the term "repeatedly" is "doing something more than once." Lanning T. 55, 16 through 18. TR Labs also claims that AT&T's definition excludes the possibility of restoration in instances where the sender node and the chooser node are in such close proximity that the connection is restored in the amount of time it takes the sender node to transmit two restoration signals. For these reasons, TR Labs argues that AT&T's construction is

[1] The parties agreed to define "circuit(s)" as a pair of communication links between nodes.

overbroad.

AT&T claims that the concept of "continually sending" restoration signals "is integral to the claimed signal flooding scheme." According to AT&T, the presence of restoration signals in the network alerts the tandem nodes of the need for a restoration path, and the absence of such signals indicates to the tandem nodes that a restoration path has been found. '835 Patent, col. 16, ll. 51-62; col. 25, ll. 41-57; Lanning Decl. ¶¶ 44-45. AT& T claims that this is true for both the sender node and the downstream tandem nodes, and thus applies to both transmission and retransmission.

Claim Construction

The Court finds that AT&T's proposed construction is correct. Merriam Webster defines "repeatedly" as "again and again." Merriam Webster Collegiate Dictionary 1055 (11th ed. 2005). Similarly, dictionary.com defines "repeatedly" as "done, made or said again and again." *Repeatedly Definition*, Dictionary.com, http://dictionary.reference.com/browse/repeatedly (last visited Feb. 1, 2012). These definitions comport with the Court's understanding of the term.

TR Labs argues that this term has a special meaning to a person of ordinary skill in the art. Rouskas Decl. ¶ 9. However, TR Lab's sole support, Dr. Rouskas, does not explain in his report what a personal of ordinary skill in the art would understand from the claims in light of the specification, or how a person of ordinary skill in the art would construe "repeatedly" in this Patent. Rouskas Decl. ¶ 9. As such testimony is unhelpful, it shall be disregarded. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1318 (Fed. Cir. 2005). Furthermore, in those cases where the ordinary meaning of a claim term is readily apparent even to lay persons, the ordinary meaning becomes the acquired meaning of the term. *Id.* at 1314.

E. “Complement restoration signal”

The core dispute between the parties on this term is whether the restoration path created by the complement restoration signal requires cross connections. AT&T claims that it does and argues that a “complement restoration signal” is “a responsive signal, the receipt of which by each of the nodes along a path causes those nodes along that path to make cross-connections[2] to thereby establish the restoration path.” TR Labs claims that it does not and argues that a “complement restoration signal” is “a responsive signal, the receipt of which by each of the nodes along a path causes those nodes along the path to make connections to thereby establish a restoration path.”

The crux of TR Labs’ argument is that the term “cross-connection” never appears in claim 1, while the terms “interconnected” and “interconnecting” consistently appear. *See* ‘835 Patent, col. 37, ll. 36-65; Lanning Dep. T. 35, 7 through 36, 6. TR Labs interprets this usage to mean that the named inventor intended a broader connectivity between nodes than mere cross-connections. In support of this position, TR Labs points to the named inventor’s use of the phrase “digital cross connect machine” in claim 67 and argues that the doctrine of claim differentiation requires that the terms “interconnected” and “interconnecting” have a different and greater scope. *Karlin Tech. Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999). Additionally, TR Labs cites to their expert’s declaration which states “[t]he terms . . . ‘interconnected’ and ‘interconnecting,’ . . . to one of ordinary skill in the art, would have a broader meaning than ‘cross-connection.’” Rouskas Decl. ¶ 10.

AT&T argues that the term “complement restoration signal” is defined in the specification

[2] The parties agree that the term “cross connections” means “a circuit connection in which a single incoming communication link is connected to a single outgoing communication link.”

and that this definition is controlling. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed . Cir. 1996). According to AT&T:

> [T]he specification describes that the effect of the 'complementary signature' is the 'possible operation of a specific DCS matrix crosspoint.' ['835 Patent, col. 10, ll. 27-43.] The specification also describes: "[w]hen the above complement signature situation arises, the TANDEM node in this invention then does all of the following . . . A matrix crosspoint pair is operated connecting (bi-directionally) the port where the complement-creating receive signature was received . . . .' ['835 Patent, col. 24, ll. 50-56.] Similarly, the specification adds that the signal causes the node to 'operate[] cross-point connections between the two uniquely identifiable ports involved.'" ['835 Patent, col. 25, ll. 3-5.] Forming these connections is how the restoration circuit is established.

AT&T claims that this language defines the restoration circuit. *See* '835 Patent, col. 10, ll. 46-50; *see also* Lanning Decl. ¶ 50. Additionally, AT&T identifies numerous passages in the specification that the inventive aspect of the 835 Patent is implemented in digital cross-connect switches ("DCS").[3] AT&T further avers that DCS' are only capable of cross connections. Lanning Decl. ¶

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3 In particular, AT&T cites to the following passages: "[T]he present invention pertains to a method, apparatus and distributed control protocol for the real-time reconfiguration of Digital Cross Connect Switches to achieve rerouting of traffic around failures in a telecommunications network . . . ." '835 Patent, col. 1, ll. 10-15 (emphasis added). "[T]he present invention provides an arrangement whereby the computation of network restoration plans are distributed among the Digital Crossconnect Switches (DCS) processors in a network . . . ."). *Id.* at col. 3, ll. 54-57 (emphasis added). "The present invention comprises a method and apparatus which is placed at the nodes of a communications network of the type in FIG. 1 in which DIGITAL CROSSCONNECT SWITCHES (DCS) machines are installed at each node of the network." *Id.* at col. 13, ll. 39-43 (emphasis added). "The present invention is primarily of value to manufacturers and telephone network operating companies as a realtime assistant to centralized network operations systems by permitting DCS machines to restore cable cuts . . . ." *Id.* at col. 4, ll. 37-41 (emphasis added). "Selfhealing is a property of a network, not a node, although the necessary elements for a Selfhealing network reside within the DCS machines in the nodes of the network. A network is endowed, in accordance with the present invention, with the property of Selfhealing by two elements: a Selfhealing logic controller in each DCS-3 machine and transparent signaling circuits . . . ." *Id.* at col. 6, ll. 28-35 (emphasis added). "Consequently this

19; *see also* Rouskas Dep. T. 71, 17 through 25. At oral argument, TR Labs agreed that DCS' perform cross-connections, although they denied that the '835 Patent requires the use of DCS'. Markman Hearing T. 52 ll. 13-15, Nov. 28, 2011 ("A cross-connection in its simplest terms is a connection made by a device called a DCS, a digital cross-connect.").

AT&T also directly refutes TR Labs' claim that the terms "interconnected" and "interconnecting" inform the type of connections required within a "complement restoration signal." According to AT&T, the phrases "interconnect" and "interconnecting" refer to the fact that the network has spans that extend between and thereby interconnect the nodes. AT&T finds support of this reading from both the claim language itself, '835 Patent, and the use of the phrase "interconnect" elsewhere in the Patent. '835 Patent; col. 37, ll. 36-41; col. 12, ll. 56-59 ("Such networks are comprised of an arbitrary large number of nodes . . . and an arbitrary large number of spans . . . interconnecting those nodes." (emphasis added)). AT&T argues then that interconnectivity is separate from the present issue—i.e., whether complement restoration signals require cross connections in order to traverse the nodes.

Claim Construction

The Court finds that AT&T's proposed construction is correct. The specification repeatedly states that the invention uses a DCS. '835 Patent, col. 1, ll. 10-15; col. 3, ll. 54-57; col. 4, ll. 37-41; col. 6, ll. 28-35; col. 11, ll. 9-14; col. 13, ll. 39-43. Specifically, the introduction of the '835 Patent states: "[T]he present invention pertains to a method, apparatus and distributed control protocol for the real-time reconfiguration of Digital Cross Connect Switches to achieve rerouting of traffic

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way this invention has necessarily proceeded was to focus on achieving the exact specification of rules for signature manipulation by Selfhealing DCS nodes using empirical methods to determine when the desired overall network behavior is achieved." *Id.* at col. 11, ll. 9-14 (emphasis added).

around failures in a telecommunications network . . . ." *Id.* at col. 1, ll. 10-15 (emphasis added). Based on this language, the Court finds that the patented invention requires a DCS. The parties agree that DCS' are only capable of cross-connections. *See* Lanning Decl. ¶ 19; Markman Tr., 52-54, Nov. 28, 2011. Thus, the Court finds that the term "complement restoration signal(s)" makes cross-connections as part of establishing the restoration path.

Additionally, TR Labs' argument that the inclusion of the terms "interconnected" and "interconnecting" in claim 1 broaden the scope of the Patent is unavailing. As AT&T stated in its response brief, these terms as used in claim 1 refer to the general connections that exist in a mesh network, not the connections that occur within the nodes. *See* '835 Patent, col. 37, ll. 36-39. Since these terms do not address the connections that occur within the nodes, even if they have a broader meaning than "cross-connection" to one of ordinary skill in the art, they do not affect the present dispute over "complement restoration signal(s)." *See* Rouskas Decl. ¶ 10.

III. THE DISPUTED CLAIM TERMS- '505 PATENT

A. "Finding a number of restoration routes"

The '505 Patent is directed to optimally preconfiguring the network by determining restoration routes when there are multiple span failures in the network. The term, "finding a number of restoration routes" is found within claim 1 and claim 12 of the '505 Patent. Claim 1 provides in relevant part that "(1) for each of at least two possible span failures, (a) finding a number of restoration routes that are available in case of the occurrence of each span failure, (b) determining the resources used by each restoration route, and (c) determining the amount of flow to be restored for each span failure." '505 Patent, col. 9, ll. 6-8. TR Labs proposes that "finding a number of restoration routes" means "identifying one or more restoration routes." Whereas AT&T and Verizon

("Defendants") argue that the disputed term means "identifying at least two restoration routes." The parties agreed that "restoration routes" is defined as "a set of spans that bypasses the failed span and connects the end nodes of the failed span." The parties disagree on the definition of "number" and whether "finding a number of restoration routes" means "one or more" or "at least two."

It is undisputed that the '505 Patent describes a method for establishing restoration routes before a span failure occurs by optimally preconfiguring the network. '505 Patent, col. 2, ll.7-8. Although preconfiguration of a network was known in the prior art, this Patent focuses on optimization of the pre-configured network where all possible span failures and the method for restoring those span failures are contemplated. '505 Patent, col. 1, ll. 13-22; col. 1, ll. 48-51. Both parties concede that the prior art addressed how to preconfigure networks when there was a single failure, and the inventive aspect of this Patent is a method to pre-configure a network when there are multiple failures. *Id. See also* '505 Patent, col. 1, ll. 63 - col. 2, ll. 4.

TR Labs argues that for "at least two" span failures, there could be one restoration route for the two possible span failures. TR Labs argues that "one" is a "number," and if the inventor intended for "a number of restoration routes" to mean "at least two" the inventor would have expressly required this limitation in the patent language.

Defendants argue that Claim 1 of the Patent explicitly requires finding plural "routes," and a plain reading of the patent language indicates that in this context "a number of" means more than one, contrary to what TR Labs proposes. '505 Patent, col. 9, ll. 6-8. Defendants contend that if the Patent was intended to cover only one restoration route, it would have been expressed in the claim language. Defendants also refer to the specification, which describes that

> [t]he constraint sets specify the set of failures being considered (that is, which spans are being considered), the network resources available for responding to those failures (the spare capacities of the spans that might be used as restoration paths), and *the choices available* in responding to each failure, such as *a variety of routing choices*. '505 Patent, col. 4, ll. 60-65 (emphasis added).

Based on this language, Defendants argue that the Patent expressly teaches about an optimization process that analyzes "the choices available" to determine "a variety of routing choices"in the event of multiple span failures.

In response, TR Labs relies on the '505 Patent's prosecution history when the invention was characterized as specifying "the single best compromise pattern of interconnection in advance." Lanning Decl. ¶ 65; Def. Ex. K. TR Labs argues that the language, "the single best" demonstrates the possibility of only one restoration route.

<u>Claim Construction</u>

Upon reviewing the patent's express language, the Court finds that "a number" means "at least two," as Defendants suggest. The Federal Circuit held in *Phillips* that the words comprising the claim language "are generally given their ordinary and customary meaning." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005). The claim language expressly refers to "routes" in the plural form. '505 Patent, col. 9, ll.6-8. The plural form of this term should be given effect and indicates that it requires more than one. *See Leggett & Platt, Inc. v. Hickory Springs Mfg. Co.*, 285 F.3d 1353, 1357 (Fed. Cir. 2002). Furthermore, when looking at the specification for context, the Patent refers to "a variety of routing choices," which indicates that an optimal preconfiguration requires at least two restoration routes when there are multiple span failures in a network. '505 Patent, col. 4, ll-60-65. Thus, the Court will adopt Defendants' construction for "finding a number of restoration routes" to mean "identifying at least two restoration routes."

B. "Flow f^p"

The term, "flow f^p," is found in claims 1, 3-9 and 12 of the '505 Patent. TR Labs proposes that "flow f^p" is "the volume of communication traffic to be restored along restoration route 'p,' where parameter 'p' is used to index the (possibly more than one) restoration routes." AT&T's proposed construction is that "flow f^p" means "flow computed by minimizing the following objective function,

$$\min \sum_{I=1}^{N_f} w_i ui$$

> where u_i is the unrestored flow for the ith failure given the preconfigured state of the network, wi is a weight which can be used to reflect the probability or cost of a given failure, and Nf is the number of failures being considered. The weights wi are selected by the operator, retrieved from memory, or may be input from another computer program. '505 Patent, col. 4, ll. 25-37.

subject to constraints." The constraint set formulas included within the Defendants' definition are set forth in the Patent at col. 6, ll.1-66 and col. 7, ll.1-17.

TR Labs argues that "flow f^p" is not limited to the formulas set out in the specific embodiment of the Patent as Defendants propose. As for the constraints, TR Labs argues that the language provides that they "may be used," and "may" suggests that applying the constraints is not required. '505 Patent Col.6, l.1. Additionally, TR Labs notes that "flow f^p" is found in independent claim 1 of the '505 Patent, but the constraints are set forth in dependent claims 4 through 9. Therefore, under the doctrine of claim differentiation, TR Labs argues that it is improper to read the limitations from the dependent claims into the independent claim. *See, e.g., Karlin Tech. Inc. v. Surgical Dynamics*, 177 F.3d 968, 971-72 (Fed Cir. 1999).

Defendants argue that "flow f^p" refers to the optimum state of preconfiguration, which is determined by computing the specific algorithm disclosed in the specification. '505 Patent, col. 4, ll. 25-37. Defendants argue that the Patent only discloses one formula that is used by the optimization engine that computes the value of f^p to minimize total unrestored flow for all possible span failures. *Id.* Furthermore, Defendants argue that the formula takes into consideration the spans that may fail, the available spare links, and how disrupted traffic is to be redirected to the restoration routes through the constraint sets. Defendants contend that TR Labs' proposed construction includes duplicative language that essentially attributes no meaning to "f^p".

Claim Construction

Both parties concede that "flow f^p" is a unique concept to the '505 Patent, and a person of ordinary skill in the art would not know how to define this concept. Accordingly, the Patent must describe this term. Figure 1A provides a graphic representation of "flow f^p" wherein constants and constraints are placed into optimization engine 26. The output is presumably "flow f^p." The Court agrees with the Defendants' proposed construction that "flow f^p" must be defined as the formula included in the specification as "flow computed by minimizing the following objective function

$$\min \sum_{I=1}^{N_f} w_i ui$$

> where u_i is the unrestored flow for the ith failure given the preconfigured state of the network, wi is a weight which can be used to reflect the probability or cost of a given failure, and Nf is the

> number of failures being considered. The weights wi are selected by the operator, retrieved from memory, or may be input from another computer program. '505 Patent, col. 4, ll. 25-37.

subject to constraints." The constraint set formulas are to be included in the as set forth in the Patent at col. 6, ll.1-66 and col. 7, ll.1-17. The specification provides in the preferred embodiment that

> the constraint sets specify the set of failures being considered (that is, which spans are being considered), the network resources available for responding to those failures (the spare capacities of the spans that might be used as restoration paths), and the choices available in responding to each failure, such as a variety of routing choices." '505 Patent, col. 4, ll. 60-65.

The specification further provides how the constraints are defined within the concept of "flow f^p" :"[t]he constraints are defined in terms of flow, which in the context of a communications network represents the movement of signal units." *Id.* at col. 4, ll. 65 - col. 5, ll. 1. Additionally, the specification describes how the constraint sets are used to determine the inputs of variables and constants into the optimization engine to achieve the desired, optimal solution output. *Id.* at col. 5, ll. 8-57. The Court finds that the language "[s]even constraint sets may be used..."does not indicate that these constraint sets are optional as TR Labs argues, but establishes that a person of ordinary skill in the art should apply one of seven constraint sets, as one constraint set may be preferred over another depending on the network. Under this interpretation, "may" means that not all seven constraint sets are applied when calculating "flow f^p", and does not suggest that these constraint sets are optional. Otherwise any formula used for optimal preconfiguration would be too broad of a concept to be patentable.

IV. THE DISPUTED CLAIM TERMS- '734 PATENT

A. "Preconfigured cycle(s) of spare capacity"

The ‘734 Patent describes a specialized “nodal switching device” designed for network restoration under a p-cycle concept prior to a network failure. ‘734 Patent, col. 1, ll. 49-55. The first term in dispute is a concept that is central to this Patent, "preconfigured cycle(s) of spare capacity,” which is asserted in claims 5, 6, 11 and 14. TR Labs' proposed construction is "a closed-circuit that forms a loop of spare capacity with the closed-circuit being connected through its constituent nodes prior to a failure." AT&T’s proposed construction is "closed-circuits, each of which forms a loop of links of spare capacity cross-connected (as defined) through its constituent nodes prior to a failure." The only difference between the two constructions is that AT&T requires that the circuit formed as a closed loop is to be "cross-connected" whereas TR Labs argues that it is not a cross-connection, but simply a connection.

TR Labs primarily argues that the Patent identifies a digital cross-connect switch ("DCS") as one such example of a nodal switching device, and therefore a DCS does not apply in every case. '734 Patent, col. 1, ll. 37-38. TR Labs also argues that it would be improper to read an example used in the specification into the claims. *See Martek Biosciences*, 579 F.3d at 1381 (Fed. Cir. 2009); *Liebel-Flarsheim*, 358 F.3d 898, 906 (Fed. Cir. 2004).

In support of AT&T's construction that there is a cross-connection, AT&T relies on several passages in the specification, which describes that the nodal switching device makes connections between spare ports. '734 Patent, col. 3 ll. 19-21, 53-55; col. 4 ll. 67 - col. 5 ll. 5. AT&T argues that these connections are made through the nodal switching device between the spare ports, and that connections made through a circuit-switching device are cross-connections. Lanning Decl. ¶¶ 111, 114-118. AT&T defines "cross-connection" by referencing the '505 Patent. AT&T notes that the '505 Patent describes the distinction between physical connections of equipment (i.e. a fiber optic cable to a piece of switching equipment) and the cross-connections made inside the switching equipment between individual links to allow traffic to flow between links through the nodes. Lanning Decl. ¶¶ 25-26.

AT&T further asserts that the '734 Patent discloses that the nodal switching device is especially adapted for performing the restoration method described in the '349 Patent. AT&T summarizes the '349 Patent as disclosing a restoration method implemented prior to a failure in the network when spare links are cross-connected to form communication circuits in the form of closed loops. AT&T argues that the '734 Patent coined the term "p-cycle," short for "preconfigured cycle of spare capacity" to describe the communication circuits that are formed as closed loops. Additionally, AT&T references the prosecution history for the '734 Patent when the applicants submitted the master thesis of one of the inventors for the '734 and '349 patents. *See* Tarnay Decl., Ex. P Amend. (Dec. 3, 2001) p. 6; Demetrios Stamatelakis, Figure 2.1 p. 18. *Theory and Algorithms for Preconfiguration of Spare Capacity in Mesh Restorable Networks*. The thesis demonstrated that spare links are cross-connected through the node to create communication circuits in the form of closed loops. *Id.*

TR Labs contends that AT&T's argument that the '734 Patent implements the '349 patent's network restoration method is improper. TR Labs cites to the Abstract of the '734 Patent, which provides that "[n]etwork level deployment and configuration of the devices requires that they be arranged in p-cycles according to the theory in our prior papers (1, 2, and 3)." ‘734 Patent, Abstract. TR Labs argues that "network level deployment" as described in the '734 Patent is unrelated to the node specific operations of a network as described in the '349 Patent. Rouskas Decl. ¶ 6. Additionally, TR Labs notes that all three claims of the '349 Patent are directed to use a DCS; however, the background of the invention for the '734 Patent specifies that the specialized nodal switching device is not a DCS nor an ADM. '734 Patent, col. 1, ll. 37-45; *see also* col. 5, ll. 40-43. TR Labs also contends that the term "cross-connection" is not used in the claims for the '734 Patent, unlike the claims of the '349 Patent, which contemplates the use of a DCS and cross-connections.

AT&T counters that the '734 Patent only describes circuit switched devices (not a packet switched device) that form circuit cross-connections, such as the ADM, the specialized nodal switching device, and a DCS. AT&T argues that cross-connections are established in networking switching equipment to enable communication to flow between the links. AT&T contends that TR Labs is trying to over extend the reach of the '734 Patent by suggesting that this Patent is not limited to a circuit switched network, but could also apply to a packet switched network. AT&T argues that circuit switched networks form circuits whereas packet switched networks is a "dynamic process" that "does not rely on a static connection" and does not form circuit cross-connections. Lanning Decl. ¶ 21, *see also* ¶¶ 19-20, 27-28, 156.

Claim Construction

The construction of this term is central to the '734 Patent, as the Abstract provides that the inventive aspect of this Patent is a specialized nodal switching device "that is designed for deployment under the p-cycle concept." '734 Patent, Abstract. The Court adopts AT&T's construction for this term as requiring cross-connections. The specification and the prosecution history provide sufficient support that these spare links are cross-connected through the nodal switching device to form closed circuits. The inventive aspect of the specialized nodal switching device is that it is not a DCS nor an ADM, but it operates in the same manner, with enhanced functionality (as later discussed in the construction of other disputed terms), by making cross-connections between spare links through the nodal switching device to form a closed circuit of spare capacity.

B. "Straddling span" / "Straddling path"

The terms "straddling span" and "straddling path" are also in dispute, and these terms are found in claims 1, 3-5, 7-10, 12 and 14. TR Labs proposes two different constructions for these terms. TR Labs construed "straddling span" to mean "a span located outside a ring, and both ends of the span are terminated by nodes located on the ring." As for "straddling path," TR Labs construed this term to mean "a path comprising one or more spans located outside a preconfigured cycle of spare capacity and both ends of the path are terminated by nodal devices located on the preconfigured cycle." AT&T proposes that these two terms have the same meaning and has proposed a single construction so that "straddling span" and "straddling path" are construed to mean "a communication span that has only working capacity and that extends between two nodes on a preconfigured cycle of spare capacity (as that term is defined) but is not part of the preconfigured cycle of spare capacity." The parties are in dispute as to whether (1) there is only working capacity between the nodes terminating the straddling span, and (2) the "straddling span" has a separate definition from "straddling path."

TR Labs argues that the specification does not preclude interfaces with spare ports from connecting to the straddling span. Rouskas Decl. ¶ 25. TR Labs concedes that claim 1 requires that there be a "third network interface with third and fourth working ports, the third interface connecting to the straddling span." '734 Patent, col. 6, ll.29-31. TR Labs argues that a straddling span having only working capacity is a limitation described in claims 4, 8, and 12 of the '734 Patent. TR Labs argues that under the doctrine of claim differentiation it would be improper to apply the requirement that the straddling span only connect to interfaces with working ports into all of the claims. *See, e.g. Karlin Tech., Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999). TR Labs has further objected to the straddling span only having working capacity because it excludes the possibility of a third network interface that has a fifth and sixth port that of spare capacity.

TR Labs argues that the term “straddling path” is expressly required in claims 5-14. '734 Patent, col. 7 l. 6 - col. 8, l. 36. As an example, TR Labs cites to dependent claim 7, which specifies that "the straddling path comprises a single span." '734 Patent, col. 7, ll. 32-33. From this claim language, TR Labs concludes that a "straddling path" in the remaining claims would be the collection of one or more spans. Rouskas Decl. ¶ 26. Thus, TR Labs argues that "straddling path" cannot mean "straddling span" as AT&T suggests.

AT&T argues that the term "straddling span" is not a term with a generally recognized meaning in the art, and must be defined within the ‘734 Patent. Lanning Decl. ¶ 119. AT&T refers to claim 1, which requires a straddling span to only connect to working ports, not spare ports. AT&T argues that this claim language is supported by the specification, which discloses that the straddling span has only working capacity, and no spare capacity. *See, e.g.,* '734 Patent, Figure 3; Abstract; col. 1, ll. 59-61; col. 2, ll. 43-46; col. 2, ll. 60-67; col. 3, ll. 26-28; col. 4, ll. 21-24; col. 5, ll. 16-26; col. 5, ll. 50-57. In contrast, AT&T notes that nowhere in the specification is there a disclosure of a "straddling span" with spare capacity. Tarnay Decl., Ex. AA, Rouskas Dep. at 147:14-21.

AT&T also argues that a straddling span requires the presence of a p-cycle as all references to a straddling span in the specification require the straddling span to extend between two nodal switching devices that are on the p-cycle. *See, e.g.,* '734 Patent, col. 1, ll. 49-67; col. 2, ll. 29-50; col. 3, ll. 33-42; col. 3, l. 63 - col. 4, l. 9; col. 5, ll. 40-57. However, AT&T notes that the straddling span itself is not on the p-cycle. AT&T contends that TR Labs' construction only refers to a "ring" and is not clear as to whether this "ring" is a p-cycle, as required by the claims and specification.

As for the term, "straddling path," AT&T argues that this term has the same meaning as "straddling span." AT&T argues that "straddling path," like "straddling span," is a term that does not have a generally recognized meaning in the art. Lanning Decl. ¶ 125. In support of a single construction for both terms, AT&T argues that different terms in separate claims may be construed the same if the written description and the prosecution history allows for such an interpretation. *Nystrom v. Trex Co., Inc.*, 424 F.3d 1136, 1143 (Fed. Cir. 2005). AT&T relies on the fact that the term, "straddling path" was added to claim 5 during the prosecution of the Patent and does not appear anywhere else in the specification. AT&T argues that the straddling path, as described in claim 5, operates in the same manner as a straddling span, and that claim 8, which depends on claim 5, refers back to the "straddling span." Thus, AT&T argues that these two terms are used interchangeably and have the same meaning.

Claim construction

The Court adopts AT&T's construction for "straddling span" so that the term is construed to mean "a communication span that has only working capacity and that extends between two nodes on a preconfigured cycle of spare capacity (as that term is defined) but is not part of the preconfigured cycle of spare capacity." This construction is more precise than TR Labs' construction as it describes how the "straddling span" connects to the p-cycle. The claimed invention of the '734 Patent is a specialized nodal switching device that is "suited to the p-cycle restoration concept." ‘734 Patent, col. 1, l. 51. Thus, the term should be described with reference to the p-cycle concept rather than a "ring" as TR Labs suggests. The Court also finds that the specification discloses that the "straddling span" only has working capacity. *See, e.g.,* '734 Patent, Figure 3; Abstract; col. 1, ll. 59-61; col. 2, ll. 43-46; col. 2, ll. 60-67; col. 3, ll. 26-28; col. 4, ll. 21-24; col. 5, ll. 16-26; col. 5, ll. 50-57. The Court finds that TR Labs’ proposition that there may be a fifth and sixth port of spare capacity is too speculative because there is no mention of a possible fifth or sixth port in the specification.

As for “straddling path,” the Court adopts TR Labs' construction as "a path comprising one or more spans located outside a preconfigured cycle of spare capacity and both ends of the path are terminated by nodal devices located on the preconfigured cycle." The Court rejects AT&T’s argument that "straddling span" and "straddling path" have the same meaning. The term "straddling path" is not only used in claim 5, but applies to claims 5-14. The Court agrees with TR Labs' conclusion that a "straddling path" in the remaining claims would be the collection of one or more spans.

C. "The nodal switching device forming/incorporating/comprising an add-drop multiplexer"

The disputed term, "the nodal switching device forming/incorporating/comprising an add-drop multiplexer" is within claims 1, 5, 10, and 12. TR Labs' proposed construction for this term is "the connection device at the node (defined above) is an add-drop multiplexer." AT&T’s proposed construction for this term is "an add-drop multiplexer switching device that automatically responds to a failure in a straddling span (as defined)." The primary distinction between the two constructions is whether the nodal switching device automatically responds to a failure in the straddling span, as AT&T suggests.

TR Labs argues that its construction follows the language of claim 1 of the '734 Patent, which provides that "the nodal switching device forming an add-drop multiplexer and the nodal switching device comprising . . ." '734 Patent, col. 6, ll. 21-23.

AT&T argues that the specification discloses that the specialized nodal switching device is configured to automatically respond to various failures in the network. '734 Patent, col. 3, ll. 15-32. AT&T argues that the specialized nodal switching device is unique because it is configured to automatically respond to a failure, unlike a conventional add-drop multiplexer ("ADM"), by making cross-connections to route the data intended for the straddling span onto the p-cycle. ‘734 Patent, col. 3, ll. 15-32; col. 3, ll. 51-63; col. 4, ll. 21-28; col. 4, ll. 42-49. AT&T references the specification, which describes that the specialized nodal switching device has four basic functions:

> 1. No failures: Connect all working ports to/from the local working demand input/output ports (or internal add-drop multiplex tributary selector). Also, connect spare (east) to/from spare (west) to support failures on spans at other nodes and support ADM cooperation.
>
> 2. Failure of east cable span: Connect working (east) to/from spare (west).
>
> 3. Failure of west cable span: Connect working (west) to/from spare (east).
>
> 4. Failure of 'south' cable span: Connect working (south A) to/from spare (west) AND connect working (South B) to/from spare (east). ‘734 Patent, col. 3, ll. 15-28.

AT&T argues that the fourth function is what sets the device apart from a conventional ADM, and therefore it should be included in the construction of this term. Rouskas Decl. ¶ 31. In comparison, AT&T contends that TR Labs' construction is broad enough to encompass only a conventional ADM, which has been established in the prior art and therefore should be rejected.

Claim Construction

The Court adopts AT&T's construction for this term as "an add-drop multiplexer switching device that automatically responds to a failure in a straddling span (as defined)." The '734 Patent describes a special nodal switching device, which is not like an ADM, nor a DCS, but is capable of performing a unique function of automatically responding to failures on straddling spans. This unique function should be included in the construction to distinguish the special nodal switching device claimed in this Patent from a conventional ADM. This unique function is disclosed in the specification, which provides that "[n]odal switching device 10A is able to restore any shared physical failure in this set of [straddling] spans, unlike conventional network restoration systems, as it is able to restore the failure of a pair of oc-n line signals on this type of span." '734 Patent, col. 4, ll. 21-28. *See also* col. 3, ll. 15-32; col. 3, ll. 51-63; col. 4, ll. 21-28; col. 4, ll. 42-49. In contrast, TR Labs' construction is too broad because it does not identify how this nodal switching device is set apart from a conventional ADM, and is therefore rejected.

D. "Spare Port"

"Spare port" is a disputed term found in claims 1, 3, 5 and 10-13. TR Labs' proposed construction for this term is "the component of a first or second network interface (as defined) capable of, but not designated for, receiving or transmitting actual communications traffic under normal conditions (i.e. no failures), and available for restoring actual communications traffic in the event of a failure." AT&T's proposed construction is "an access point to the preconfigured cycle of spare capacity (as defined), which is reserved for redirecting traffic in the event of a failure on the straddling span (as defined) and in the event of a failure of a span connected to the first or second interfaces (as those terms are defined)." The issue here is whether spare ports are capable of carrying communications traffic even when there is no failure.

TR Labs first refers to Figure 1 of the '734 Patent in support of its construction. TR Labs notes that the specification describes elements 12 in Figure 1 as “line-oriented interfaces." '734 Patent, Figure 1; col. 2, ll. 51-52. TR Labs argues that one of ordinary skill in the art would identify elements 12 as the first and second network interfaces, and S1 and S2 are the spare ports associated with those interfaces. Rouskas Decl. ¶ 30. TR Labs then refers to the four basic functions of the nodal switching device described in the specification as follows:

> 1. No failures: Connect all working ports to/from the local working demand input/output ports (or internal add-drop multiplex tributary selector). Also, connect spare (east) to/from spare (west) to support failures on spans at other nodes and support ADM cooperation.
>
> 2. Failure of east cable span: Connect working (east) to/from spare (west).
>
> 3. Failure of west cable span: Connect working (west) to/from spare (east).
>
> 4. Failure of 'south' cable span: Connect working (south A) to/from spare (west) AND connect working (South B) to/from spare (east). ‘734 Patent, col. 3, ll. 15-28.

TR Labs argues that these four functions describes how traffic is routed to/from working ports from/to spare ports in the event of a span failure. Rouskas Decl. ¶ 31. TR Labs contends that AT&T’s construction is too restrictive because it limits a "spare port" to restoring traffic only in the event of a failure on the straddling ("south") span, instead of any span as TR Labs suggests. TR Labs contends that the construction of this term does not require reference to a p-cycle as AT&T suggests.

AT&T relies on Figure 3 of the '734 Patent in support of its construction. AT&T argues that Figure 3 illustrates two special nodal switching devices, 10A and 10B, in a ring configuration with spans that vertically "straddle" the ring. This configuration also demonstrates that there are working ports and spare ports that are reserved for redirecting traffic in the event of failure. Lanning Decl. ¶ 105. While TR Labs' construction suggests that spare ports are capable of carrying communications traffic when there is no failure in the network, AT&T argues that the '734 Patent does not disclose any use of the spare port except when there is a failure in the network. '734 Patent, col. 3, ll. 15-32; col. 3, ll. 51-63; col. 4, ll. 32-62, col. 5, ll. 10-15; Figures 4-6; Lanning Decl. ¶¶ 104-06. AT&T argues that the spare port is held in reserve for one of two different failures: the straddling span or the working span on the ring. '734 Patent, col. 3, ll. 15-32; col. 3, ll. 51-63; col. 4, ll. 16-52; Figures 3-6; Lanning Decl. ¶¶ 104-05. AT&T argues that the specification describes three failure modes, (2)-(4), which result in the spare port being used for restoring traffic. '734 Patent, col. 3, ll. 15-28. Accordingly, the specification clarifies that a failure may occur on the first or second network interface, modes (2)-(3), or the straddling span, mode (4). *Id.* AT&T notes that TR Labs referenced the same section of the specification in support of its construction, but developed an overly broad construction that would allow restoration of a span failure anywhere in the network.

Claim Construction

The Court will adopt AT&T's proposed construction for a "spare port" as "an access point to the preconfigured cycle of spare capacity (as defined), which is reserved for redirecting traffic in the event of a failure on the straddling span (as defined) **OR** in the event of a failure of a span connected to the first or second interfaces (as those terms are defined)," The Court slightly modified the construction from "and" to "or." The specification expressly describes three scenarios when the nodal switching device encounters failures in the network. '734 Patent, col. 3, ll. 15-28. TR Labs did not offer adequate support to demonstrate that spare ports are used to carry communications traffic even in the absence of a failure. Additionally, AT&T's construction that these spare ports are "an access point to the p-cycle" is consistent with the purpose of this Patent, which "is to protect the unique and unobvious structure of a fixed-capacity nodal device suited to the p-cycle restoration concept." '734 Patent, col. 1, ll. 49-52.

V. THE DISPUTE CLAIM TERMS- '059 PATENT

The '059 Patent is a method for converting a ring network to a mesh network to increase overall network capacity while minimizing cost of conversion. The method is focused on optimizing the selection of ring network nodes that are converted into mesh nodes. '059 Patent, col.1, ll. 51-65.

A. "Cross-Connection"/ "Cross-connected"

The parties have agreed to a uniform definition of "cross-connection" and "cross-connected" to apply, when necessary, to all the patents. The agreed definition for "cross-connection" is "a circuit connection in which a single incoming communication link is connected to a single outgoing communication link." The agreed definition for "cross-connected" is "connected by a circuit connection in which a single incoming communication link is connected to a single outgoing communication link." However, the parties are in dispute as to whether the type of connections described in the '059 Patent are actually cross-connections.

TR Labs argues that the term "cross-connect" is only found in claim 4 of the '059 Patent, and the term should not be a limitation on the other claims where the term is not present. *See*

CollegeNet, Inc. v. ApplyYourself, Inc., 418 F.3d 1225, 1231 (Fed. Cir. 2005).

AT&T and Verizon ("Defendants"), argue that the term "connection" used throughout the '059 Patent means "cross-connections" and is fundamental to the claimed invention of the Patent. Defendants argue that the term "cross-connect" is mentioned throughout the specification and the prosecution history. '059 Patent, Figure 2 (element 16); col. 1, ll. 66 - col. 2, l. 3; col. 3, ll.5-9, col. 4 ll. 38-45; col. 4, ll. 51-60; col. 4, l. 64 - col. 5, l. 5; col. 5, ll. 19-25; col. 6, ll. 56-58; col. 7, ll. 10-17. *See also*, Ex. J, Provisional App. No. 60/301,120 at p.4 ("convert ring capacity to mesh capacity by converting ADM's to Cross-connects ('Ring Mining' Strategy))." Accordingly, Defendants argue that "cross-connections" should be incorporated into the construction of terms within the '059 Patent. Consistent with the agreed definition of "cross-connection" in which "a single incoming communication link is connected to a single outgoing communication link," Defendants argue that such a cross-connection is demonstrated between nodes A-B-C-D in Figure 1 of the '059 Patent. '059 Patent, Figure 1.

In response, TR Labs contends that the "cross-connect" limitation described in Claim 4 is not a limitation in any other claim of the '059 Patent. TR Labs argues that the other patent claims are broader and utilize other embodiments in the specification without reference to the "mesh cross-connect" limitation expressed in claim 4.

In response, Defendants note that TR Labs does not cite to any intrinsic evidence nor any testimony of their expert, Dr. Rouskas, to support the argument that cross-connections are only limited to claim 4.

<u>Claim Construction</u>

The Court finds that "cross-connections" are made throughout the '059 Patent, as Defendants suggest. The specification provides adequate support that the method used to convert ring networks into mesh networks uses cross-connections. *See* '059 Patent, Figure 2 (element 16); col. 1, ll. 66 - col. 2, l. 3; col. 3, ll.5-9, col. 4 ll. 38-45; col. 4, ll. 51-60; col. 4, l. 64 - col. 5, l. 5; col. 5, ll. 19-25; col. 6, ll. 56-58; col. 7, ll. 10-17. The Patent teaches that the purpose of this conversion is to make a more efficient use of the protection links in a ring network available as working links to carry traffic in a mesh network. The specification confirms "that accessed ring capacity is being cross-connected for mesh routing and restoration efficiencies." '059 Patent, col. 6, ll. 57-58; col. 11, ll. 48-50. Accordingly, the Court will assess whether cross-connections are to be included in the claim construction of terms in dispute in the '059 Patent.

B. "Protection organized into rings of connected protection links"

This disputed term is within claim 1 of the '059 Patent, which provides in relevant part that "the telecommunications network initially has protection organized in rings of connected protection links." TR Labs' proposed construction for this term is "protection links that are connected to each other through nodes to form circuits configured as closed loops." Defendants' proposed construction is "protection links (as that term is defined) that are cross-connected (as defined) to each other through nodes to form circuits configured as closed loops." The parties agree that "protection links" is defined as "communication links reserved for redirecting traffic in the event of a failure in the network." The only distinction between the parties' constructions is whether the protection links are cross-connected to form circuits configured as closed loops.

TR Labs argues that Defendants' use of the "cross-connection" limitation in the definition is an unduly narrow construction that excludes the possibility of packet connections by only allowing circuit connections. TR Labs also argues that under the doctrine of claim differentiation it is improper to read a limitation from one claim into another claim that omits the limitation. *See, e.g. Karlin Tech., Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999).

Defendants argue that claim 1 describes the starting point for conversion by stating that the network initially has "protection organized in rings of connected protection links." Specifically, claim 1 describes a method where these initial connections between the protection links are made inside the network, and are later broken and reconnected within the network switching equipment itself. Defendants argue that these connections are cross-connections as it does not affect any physical connections of the fiber cables to the networking switching equipment. *See* Lanning Decl. ¶ 155.

Defendants contend that TR Labs' own construction concedes that circuits are configured as a closed loops whereas packet connections do not form circuits. *See, e.g.*, Lanning Decl. ¶¶ 19-21; 27-28; 156. Furthermore, the Patent discloses that initially the network operates as a ring with ADMs as the network switching device, and ADMs are a type of circuit switching network device and not a packet switching network device. Lanning Decl. ¶ 19. Therefore, Defendants argue that there is nothing in the Patent to support a claim construction that would extend to packet switched networks. As to claim differentiation, Defendants contend that the term "connected" in claim 1 and "mesh cross-connect" in claim 4 are two unrelated terms. Defendants argue that claim 1 describes the type of internal connection made between the protection links through each of the nodes and claim 4 describes a type of network switching equipment, specifically a digital cross-connect switch. Tarnay Decl. Ex. AA, Rouskas Dep. at 174:2-14.

Claim Construction

The Court adopts the Defendants' construction of this term. TR Labs has offered a broad construction by using "connect" in the definition without describing whether it is a physical or internal connection. TR Labs' attempt to broaden the scope of the Patent to include both circuit connections and packet connections is without merit as TR Labs offered no intrinsic evidence in support of this broad construction. Furthermore, the parties have agreed that "cross-connection" and "cross-connected" involve circuit connections. TR Labs conceded that this term forms circuits configured as closed loops. Therefore, the connection necessary to form these circuits configured as closed loops is a cross-connection. The Court also relies on TR Labs' own expert who testified that the "mesh cross-connect" described in claim 4 of the '059 Patent refers to a network switching device such as a digital cross-connect switch and not a cross-connection being made through the nodes. Accordingly, there is no violation of the doctrine of claim differentiation when the connection described in claim 1 is unrelated to the mesh cross-connect described in claim 4.

C. "Breaking connections between protection links at the selected ring nodes"

The next term in dispute is "breaking connections between protection links at the selected ring nodes," which is found in claim 1 of the '059 Patent. TR Labs' proposed construction for this term is "disconnecting protection links at the selected ring nodes such that protection links are no longer connected to each other through these nodes to form circuits configured as closed loops." Defendants proposed construction is "breaking cross-connections (as defined) at the selected ring nodes (as defined) to remove any ring network that included the selected ring nodes. Where ring network means a group of nodes where each node is cross-connected (as defined) to exactly two other nodes to form a network configured as a closed loop."

TR Labs argues that the summary of the invention is consistent with its definition for this term, which provides that "the method comprising the steps of breaking a connection between protection links at a node within a ring; and connecting the protection links into a mesh network of protection links, thereby converting the node from a ring node to a mesh node." '059 Patent, col. 1, ll. 56-60. TR Labs argues that the converted ring node is no longer a part of a circuit configured to form a closed loop. Rouskas Decl. ¶ 34. TR Labs also cites to the preferred embodiment of the specification, which provides that "[i]n ring mining, the ring nodes B and C [illustrated in Figure1] are converted to mesh nodes . . . .To accomplish this, the protection links at a node are broken and connected into a mesh of protection links." '059 Patent, col. 3, ll. 54-59. Again, TR Labs notes that the converted node is removed from a closed loop. TR Labs also contends that the Defendants' use of "cross-connection" is an improper limitation to apply to claims other than claim 4 where the term appears. *Karlin Tech., Inc. v. Surgical Dynamics, Inc.* 177 F.3d 968, 971-73 (Fed. Cir. 1999).

Defendants argue that conversion of a ring to a mesh network requires removal of the ring network, and the prosecution history supports this construction. Lanning Decl. ¶¶ 165-68. Defendants cite to the prosecution history where the applicants distinguished the patent application from the prior art reference, "Sharma":

> A thorough review of Sharma demonstrates that the disclosure of Sharma is not relevant to the claimed invention. Nothing in Sharma teaches conversion of a ring network into a mesh network. In Sharma, all of the rings remain as rings . . . Thus, Sharma is directed to how the signals propagate around the ring, but the ring is not removed." Tarnay Decl., Ex. H at Amend. A (Oct. 24, 2006) at p.3.

Accordingly, Defendants argue that removal of the ring network is how the USPTO and the inventor understood the Patent at the time of prosecution. *See Lemelson v. General Mills, Inc.*, 968 F.2d 1202, 1206 (Fed. Cir. 1992). Furthermore, Defendants argue that the claims cannot be construed one way to obtain a patent, and construed in a different way against alleged infringers. *Chimie v. PPG Indus*., 402 F.3d 1371, 1384 (Fed. Cir. 2005).

In response, TR Labs contends that Defendants' construction involving removal of the ring network is unclear. First, TR Labs refers to the claim language, which focuses on "selected ring nodes," and argues that the Patent does not support removal of an entire network. '059 Patent, col. 12, l.8. TR Labs cites to claim 6, which provides "re-using selected ones of plural add-drop multiplexers within the ring." '059 Patent, col. 12, ll.28-30. TR Labs also relies on Mr. Lanning who testified that in this context "re-using" means "reusing ADM's in their original form." Lanning Dep. at 176:4-7. Additionally, TR Labs refers to the specification that describes how "the ring mining approach may be used to select at which nodes to break into rings, where to add new capacity, which ADMs to re-use and which segments of ring capacity to abandon to avoid conversion costs." '059 Patent, col. 9, ll. 14-18. TR Labs concludes that the Patent teaches that not all of the nodes within a ring are selected for conversion, and it is cost effective to re-use rather than remove the ADMs of the ring network.

TR Labs also contends that the Defendants misconstrued the prosecution history. TR Labs argues that none of the nodes in Sharma were converted from ring nodes to mesh nodes. TR Labs further notes that if a single node were converted from ring to mesh then that would distinguish this Patent from Sharma where no nodes were converted. TR Labs concludes that the '059 Patent contemplates that not all nodes will be converted, contrary to Defendants' proposed construction.

<u>Claim Construction</u>

The Court will adopt TR Labs' construction, but will modify to include the cross-connection limitation. The term, "breaking connections between protection links at the selected ring nodes" will be construed as "disconnecting protection links at the selected ring nodes such that protection links are no longer cross-connected to each other through these nodes to form circuits configured as closed loops." As discussed above, the Court determined that the term "protection organized in rings of connected protection links" is construed to mean "protection links (as that term is defined) that are cross-connected (as defined) to each other through nodes to form circuits configured as closed loops." Therefore, it follows that this term also requires disconnecting the cross-connections between the protection links.

Defendants' construction involving removal of the ring is not supported by the specification. As TR Labs referenced, claim 6 provides "re-using selected ones of plural add-drop multiplexers within the ring," and the specification further contemplates "which ADMs to re-use and which segments of ring capacity to abandon to avoid conversion costs." '059 Patent, col. 12, ll. 29-30; col. 9, ll. 17-18. Considering the purpose of the'059 Patent is a method of how to optimally convert a ring to a mesh network in a cost efficient manner, it would not be cost-efficient to entirely remove or abandon existing ring architecture when the Patent teaches that the ADM architecture can be re-used. The specification expressly supports this proposition as "[r]e-used ADMs are those that play a cost-effective role in a chain of the resulting logical mesh." '059 Patent, col. 11, ll. 50-51. The summary of the invention also states that

> selected ones of plural add-drop multiplexers from the pre-existing rings may be re-used within the target mesh (or p-cycle) architectures and selected segments of ring capacity in the telecommunications network may be abandoned, salvaged, or left for future use should there be unexpected shifts in the demand patterns. '059 Patent, col. 2, ll. 12-17.

Thus, the Patent does not teach about removal of the ring, and not all nodes may be selected for conversion from a ring node to a mesh node.

D. "Connecting the protection links into a mesh network of links of spare capacity"

The disputed term, "connecting the protection links into a mesh network of links of spare capacity" also falls within claim 1 of the '059 Patent. TR Labs argues that this term should be construed as "forming the links intended to protect against link or node failure in a configuration whereby the nodes terminating such links are mesh nodes (defined above)." Defendants's proposed construction is "making cross-connections (as defined) at the selected ring nodes (as that term is defined) to cross-connect the protection links (as that term is defined) into a mesh network (as that term is defined) of links of spare capacity."

TR Labs argues that the specification overwhelmingly supports its construction, which requires "forming the links intended to protect against link or node failure." TR Labs argues that one skilled in the art would understand this term to mean protection against link or node failure, especially since the summary of the invention states that the claimed method is to protect "against failure of a span or node in the telecommunications network." '059 Patent, col. 1, ll. 52-53; Rouskas Decl. ¶ 35. TR Labs rejects Defendants' use of cross-connection for this term for claim differentiation reasons previously argued above.

Defendants argue that claim 1 culminates with this step of "connecting the protection links into a mesh network of links of spare capacity." Defendants argue that "connecting" refers to "cross-connecting" because the disconnecting and connecting are internal switching operations within the network switching devices as previously discussed for the term "protection organized in rings of connected protection links." Defendants also argue that their construction includes where the connections are made, which is at the selected ring nodes. Defendants rely on the claim language, which requires "converting each of the selected ring nodes from a ring node to a mesh node." '059

Patent, col. 12, ll. 10-11. Defendants conclude that the cross-connections between protection links must be broken at the selected ring nodes and new cross-connections must be made at the selected nodes.

Defendants contend that TR Labs' construction is too broad because "forming the links" presumably encompasses a situation in which new wires or cables were added to the network, which is not relevant to this Patent. Defendants argue that claim 1 requires cross-connecting the existing protection links where those connections were broken in the previous step. Defendants contend that TR Labs' construction completely ignores the concept of "connecting" which they argue is central to the term.

In response, TR Labs argues that its construction, "nodes terminating such links are mesh nodes," specifies that the connections are made at selected, converted nodes. To dispute Defendants' construction of "connecting existing protection links," TR Labs refers to claim 5 of the '059 Patent, which calls for "adding capacity on a span of the telecommunications network to increase the demand served." '059 Patent, col. 12, ll. 25-26. TR Labs also cites to the specification that supports the claim language of "adding capacity": "which nodes to break into rings, where to add new capacity . . ." '059 Patent, col. 9, ll. 16-18. TR Labs argues that such an addition of capacity could not be formed from connecting existing protection links. Rouskas Decl. ¶ 8. TR Labs also reiterates the claim differentiation argument to contest Defendants' use of "cross-connection" to define this term.

In response, Defendants emphasize that the claim language describes this term as the step for connecting the existing, broken protection links into a mesh network that converts ring nodes into mesh nodes. Defendants contend that TR Labs' construction is vague because it does not address connecting the protection links into a mesh network as required by the claim. Finally, Defendants contend that TR Labs' use of "intended" in its construction is improper because method claims require that the steps actually be performed. *See Joy Techs., Inc. v. Flakt, Inc.*, 6 F.3d 770, 773 (Fed. Cir. 1993).

Claim Construction

The Court will adopt Defendants' construction for this term. TR Labs' construction is too ambiguous because "forming the links" does not refer to the protection links that were broken in the previous step. The focus of this term is on the connections made between the existing protection links that are cross-connected into a mesh network of links of spare capacity. TR Labs' construction completely ignores the connecting requirement for this claim, and therefore will be rejected.

E. "Ring node" and "Mesh node"

TR Labs' construction for "ring node" is "a node with at least one add-drop multiplexer (ADM), each ADM connecting the node to a separate ring of nodes with its own working and protection links." As for "mesh node" TR Labs' construction for this term is "a node with three or more network interfaces such that protection links at the node may potentially be accessed by any working link on any network interface." Whereas, Defendants' proposed construction for "ring node" is "a node in a group of nodes that have protection links (as defined) cross-connected (as defined) within the nodes to form a circuit configured as a closed loop." AT&T's "mesh node" construction is "a node in a group of nodes that have protection links (as defined) cross-connected within the nodes to form a circuit configured as a mesh."

TR Labs argues that the distinction between a "ring node" and a "mesh node" is central to the invention of the '059 Patent. TR Labs relies on Figure 1 of the '059 Patent, which depicts Nodes A and D as ring nodes connected to two separate rings, A-B-C and B-C-D, each having working and protection links. Nodes B and C are also ring nodes, and there are 2 separate ADMs to connect rings A-B-C and B-C-D, and span BC includes protection links for both rings. Figure 1 further describes that nodes B and C can be converted into mesh nodes as they have three network interfaces to communicate with protection links that can be accessed by both rings through "ring mining" as described in the Patent. '059 Patent, Figure 1; col. 3, ll. 48-54; Rouskas Decl. ¶ 37. TR Labs contends that AT&T's construction is improper because it limits these terms to "cross-connected" nodes and excludes other network reconfigurations, such as packet switched networks.

AT&T argues that its constructions focus on the cross-connections that define these terms. AT&T relies on claim 1 of the '059 Patent, which describes a ring network and requires the protection links to be "connected." '059 Patent, col. 11, l. 58- col. 12, l. 11. AT&T argues that the parties agree that protection links are connected to each other through the nodes to form circuits configured as closed loops. Tarnay Decl. Ex. F, p. 3. AT&T concludes that the nodes through which protection links are cross-connected to form circuits configured as closed loops are "ring nodes." AT&T contends that TR Labs' construction is ambiguous because it does not explain whether working or spare links are connected or how they are connected (i.e. cross-connections), and how the terms fit into the method of claim 1. As for "mesh node," AT&T argues that its construction is taken directly from claim 1 whereas TR Labs' definition ignores the cross-connections that define a mesh node and only suggests that mesh nodes have three or more interfaces. AT&T argues that claim 1 instructs that the pre-existing connections between the protection links are broken to make new cross-connections into a mesh network of links of spare capacity. AT&T also contends that TR Labs' definition of "mesh node" as requiring three or more network interfaces is redundant because the specification provides that "[i]t has been found that all the conversions are at geographic sites with degree of 3 or more." '059 Patent, col. 6, ll. 55-56; *see also* '059, col. 11, ll. 46-48.

In response, TR Labs argues that the specification expressly provides that a node refers to the equipment with the node, such as an ADM, which supports TR Labs' construction that focuses on the ADM equipment in the ring. *See* '059 Patent, col. 3, ll. 59-61; col. 4, ll. 38-40; col. 5, ll. 19-20.

AT&T reiterates that TR Labs' construction does not make an adequate distinction between a ring node and a mesh node, because it ignores the connections that define these nodes. Furthermore, AT&T argues that TR Labs' construction that "the protection links . . . may potentially be accessed" is improper in a method claim, because method claims must describe how the steps are to actually be performed. *See Joy Techs.*, 6 F.3d at 773.

Claim Construction

The Court finds that AT&T's construction for "ring node" and "mesh node" are supported by the specification as they address a fundamental aspect of the '059 Patent, which describes that the protection links of the ring network are broken and are connected into a mesh network of links of spare capacity. The Court finds that the "connections" described in claim 1 are cross-connections, as AT&T suggests, and should not be extended to other network systems, like packet switched networks as TR Labs argued. The purpose of the '059 Patent is a method for how to optimally update an outdated system of ring networks so it would not be logical to extend this method to a more sophisticated network such as a packet switched network.

F. "Mesh network"

The disputed term "mesh network" appears throughout claim 1 and claim 4. TR Labs' proposed construction for "mesh network" is "[a] group of nodes connected to form a network of arbitrary topology." AT&T's proposed construction is "a group of nodes cross-connected (as defined) to form a network configured as a mesh."

TR Labs argues that "arbitrary topology" is intended to distinguish a mesh network from a ring network, since a ring network allows for the transmission of traffic in only two directions- either clockwise or counter-clockwise- around the ring. Rouskas Decl. ¶ 39. However, a mesh topology allows for transmission of traffic in different directions across a larger number of routes, depending on the network designer. *Id.* In support of its construction, TR Labs relies on Figure 3, which illustrates that the "k" is a variable number of physically disjoint straddling spans present in the network. ‘059 Patent, Figure 3. TR Labs notes that "k" is a variable rather than a constant, which indicates that the topology is arbitrary. TR Labs contends that AT&T's construction is improper because it seeks to impose the cross-connection limitation into all of the claims, in violation of the doctrine of claim differentiation. *See, e.g., Karlin Tech.,* 177 F.3d at 971-72 (Fed. Cir. 1999). Additionally, TR Labs argues that one skilled in the art would understand a network to "operate" as a mesh network rather than be "configured" as a mesh network.

AT&T argues that its construction is based on the method expressed in claim 1, which requires "breaking connections between protection links" and then "connecting the protection links into a mesh network." '059 Patent, col. 12, ll. 7-9. AT&T argues that the claim dictates that it is the manner in which the links are cross-connected that identifies the mesh network resulting from the claimed conversion. AT&T contends that TR Labs’ construction introduces an "arbitrary topology" concept that is not found in the '059 Patent.

Claim Construction

The Court finds that "mesh network" does not require a construction, because the plain and ordinary meaning of the term is adequate. AT&T attempts to reiterate the concept of cross-connections, which is not necessary for a jury to understand a mesh network. Furthermore, TR Labs' construction of "arbitrary topology" introduces a new concept not discussed within the '059 Patent. The dictionary defines "mesh" as "an interlocking or intertwining arrangement or construction: network " Merriam Webster Collegiate Dictionary 744 (9th ed. 1985). Accordingly, this term is commonly understood by a layperson, and not just one skilled in the art.

G. "Links of spare capacity"

"Links of spare capacity" is a term in dispute within claim 1 of the '059 Patent. TR Labs' proposed construction for this term is "communications links with capacity reserved for redirecting traffic in the event of a network failure." Defendants' proposed construction is "links that are reserved for carrying traffic only in the event of failure in the telecommunications network." The primary dispute between these two constructions is whether these "links of spare capacity" only carry working traffic in the event of failure, as Defendants suggest, or that these spare links carry traffic even where there is no failure in the network, as TR Labs suggests.

TR Labs argues that the specification expressly describes an embodiment wherein the links of spare capacity of the mesh network are used to carry extra traffic, i.e. working traffic of low priority, even when there is no failure in the network. However, this low priority traffic can be "bumped off" to protect higher priority working channels in the event of a network failure. The Patent teaches that the Bi-Directional Line Switched Ring Add-Drop Multiplexer ("BLSR ADM") permits this extra traffic feature on protection links:

> A BLSR-type-ADM ring may also be converted to a mesh having pre-configured cycles of spare capacity . . . In a BLSR type ring this may be achieved using the "extra traffic" input feature of BLSR ring systems. "Extra traffic" is normally a feature that allows the network operator to transport any other lower-priority traffic (in compatible format for the rings line-rate signal) over the ring's protection channel. Extra traffic will be bumped off if the ring switches to protect its own working channels. '059 Patent, col. 7, ll. 10-11; ll. 17-24.

Defendants argue that its construction is consistent with the specification. Defendants rely on the Patent's definition of a "link" as "a single managed unit of capacity, and may also be referred to as a channel." '059 Patent, col. 3, ll. 42-43. Defendants argue that because the link is described as “a single managed unit,” then it follows that the entire link must be reserved for carrying traffic in the event of a failure in the network. Defendants argue that TR Labs' own expert agreed that the links described in the '059 Patent must be managed as a whole, so that either all of the capacity on the link is accessed or none is accessed. Ex. I, Rouskas Dep. at 38:9-18. Defendants also rely on the '059 Patent’s prosecution history where the applicants distinguished the patent application from the prior art on the basis that it deals with "overall network configurations and not with modification of ‘the characteristics of the links’ such as ‘bandwidth, number of channels, modulation scheme, format, and protocol.’" Def. Ex. N, '059 Response to Office Action, (Oct. 24, 2006) at 4. From this statement, Defendants conclude that the applicants chose to focus on the link as a whole, and the applicants cannot define terms in one manner to obtain the patent, and later broaden the definition of those terms once the patent issues. *See Chimie v. PPG Indus.,* 402 F.3d 1371, 1384 (Fed. Cir. 2005).

In response, TR Labs contends that the Defendants mischaracterized the prosecution history of the '059 Patent. TR Labs argues that during the prosecution, the applicants for the '059 Patent established that this Patent was directed towards the conversion of ring networks to mesh networks "as opposed to modification of the characteristics of the links" in the prior art. TR Labs further notes that the applicants stated, "[n]othing in Sharma [the prior art] teaches conversion of a ring network into a mesh." Def. Ex. N, '059 Response to Office Action, (Oct. 24, 2006) at 4.

Claim Construction

TR Labs' construction for this term will be adopted. The specification expressly describes an embodiment where a type of an ADM device, the BLSR-ADM, permits links of spare capacity to carry some low priority traffic when there is no failure in the network. '059 Patent, col. 7, ll. 10-11; ll. 17-24. TR Labs' use of "capacity reserved" describes that these links may carry low priority traffic until there is a failure in the network, at which point these spare links will entirely be used to re-route traffic around the failure. TR Labs' definition is not inconsistent with the Defendants' assertion that links are a "single managed unit of capacity." The Patent teaches in one embodiment that these spare links are not always idle prior to a failure in the network, but in the event of a failure, these spare links "bump off" the low priority traffic so that the entire spare link routes traffic around the failure and protects its working links.

H. "Cycle(s) of connected links of spare capacity"

The disputed term, "cycle(s) of connected links of spare capacity" is found in claim 2 of the '059 Patent, which provides that "[t]he method of Claim 1 in which the mesh network is configured into cycles of connected links of spare capacity in readiness for span failure." '059 Patent, col. 12, ll. 12-14. TR Labs' proposed construction for this term is "communications circuits, each of which is made up of connected links of spare capacity that form a closed loop in the network." Defendants' proposed construction is "communication circuits, each of which is made up of cross-connected (as defined) links of spare capacity that form a closed loop in the network prior to a failure." The parties disagree over whether the links of spare capacity are cross-connected, and when the closed loop must be formed, either prior to a failure or at any time.

TR Labs argues that the specification gives examples of such cycles or closed loops, such as the outer perimeter demonstrated in Figure 1. '059 Patent, Figure 1. TR Labs argues that there is a communications circuit on the outer ring, or closed loop, comprising nodes A-B-C-D that provides spare capacity for straddling span BC. '059 Patent, Figure 1; col. 7, ll. 32-41; Rouskas Decl.¶ 42. TR Labs contends that Defendants seek to impose the cross-connections limitation into all of the claims of the Patent, contrary to the doctrine of claim differentiation. *See, e.g., Karlin Tech.,* 177 F.3d at 971-72 (Fed. Cir. 1999).

Defendants argue that the connections made between the protection links should be consistently construed as "cross-connections" throughout the Patent. As for timing, Defendants argue that the claim language expressly provides that closed loops are formed prior to a failure in order to be "in readiness for span failure." '059 Patent, col. 12, l. 14; Lanning Decl. ¶¶ 174-75.

Claim Construction

Defendants' proposed construction for this term is adopted. The Court has determined that cross-connections are made between the broken protection links, which is consistent across all the claims in the Patent. As for when the closed loops are configured, the specification language indicates that they are prior to a failure in the network to be "in readiness for span failure."

I. "Adding a straddling span interface"

The disputed term, "adding a straddling span interface" is found in claim 3 of the '059 Patent, which provides "the method of Claim 2 further comprising the step of adding a straddling span interface at the node for re-routing failed working channels onto the broken connection links upon failure of the working channels." '059 Patent, col. 12, ll. 15-18. TR Labs' proposed construction for this term is "adding a connection between two nodes of a cycle wherein that connection is not part of the cycle." Defendants' proposed construction is "attaching a device to the extra traffic ports of an Add Drop Multiplexer to break the cross-connection (as defined) between the protection links (as defined above) of the node and cross-connect the protect links into a mesh network (as that term is defined)."

TR Labs' primary contention with Defendants' construction is that it seeks to impose a cross-connection into the term's definition when "cross-connection" only appears in claim 4. TR Labs relies on Figure 2 of the '059 Patent, which demonstrates that the links of spare capacity are illustrated as the protection links at 14W and 14E, and the added connections outside the cycle between the depicted node and another node are at 15W and 15E. '059 Patent, Figure 2. TR Labs argues that the added connections are not part of the cycle of connected links of spare capacity. Rouskas Decl.¶ 43.

Defendants argue that "straddling span interface" has no recognized meaning in the art, and is a coined term defined within the specification as a particular hardware device. Lanning Decl. ¶ 185. Defendants argue that the specification describes the SSIU 22 as a device that can be attached to an ADM to convert the ADM to be used in a mesh network. The specification provides,

> This type of conversion operation can be achieved with maximal re-use of the existing ADMs by addition of the straddling span interface (SSIU) at the ring ADMs at locations B and C in Figure 1. Figure 3 shows a generic ADM or OADM 20 as part of a ring configuration, that has been coupled to a straddling span interface (SSIU) 22 that supports p-cycle networking access to the prior

conventional ring. '059 Patent, col. 7, ll. 49-56.

The specification also describes how the SSIU changes the connections of the protection links by adding a third network interface, and how the SSIU can access the p-cycle in the event of a failure in the network. '059 Patent, col. 8, ll. 42-52; Figures 3, 4.

In response, TR Labs argues that Defendants' construction would exclude a specific embodiment described in the specification, which permits removal of the ADM entirely. The specification provides that "simple removal of the ADM for salvage is another option for ring to mesh evolution. . . The option of accessing existing ADM line capacity as in Figure 2, or simply removing the ADM are both options under this concept." '059 Patent, col. 5, ll. 2-3, 5-7. Furthermore, TR Labs argues that under the doctrine of claim differentiation, claim 4 requires "accessing an extra traffic feature of an add-drop multiplexer at a node," but this is not a requirement for claim 3 where the term, "adding a straddling span interface" appears.

In response, Defendants' argue that TR Labs' focus on Figure 2 is misplaced because it has no relation to the straddling span interface. Defendants refer to the specification that describes Figure 2 as an ADM "with the protection channels 14E, 14W connected to a conventional mesh cross-connect." '059 Patent, col. 4, ll. 54-55. Defendants also cite to Dr. Rouskas who explained that a "mesh cross-connect" could be a digital cross-connect device. Tarnay Decl., Ex. AA, Rouskas Dep. at 174:6-18. Defendants conclude that Figure 2 and 3 represent how traffic can access the protection links of an ADM using different hardware options. Moreover, Defendants argue that the straddling span interface is a unique device that works with ADMs, and the Patent does not suggest that it is used with other types of network devices. *See* '059 Patent, col. 8, ll. 42-28; Figure 4.

Claim Construction

The Court adopts Defendants' construction of this term as it identifies that the "straddling span interface" is a device that enhances the performance of ADMs to operate within a mesh network. The Defendants have demonstrated that regardless of whether an ADM can be removed entirely during a ring to mesh network conversion, the straddling span interface device is suited for the ADM as described in the specification and illustrated in Figure 3. '059 Patent, Figure 3; col. 7, ll. 49-56. In comparison, TR Labs' definition is too broad and does not adequately describe how the straddling span accesses the ring's pre-existing protection links to re-route working traffic within a mesh network.

J. "Broken connection links"

The final term in dispute within the '059 Patent is "broken connection links," which is found in dependent claim 3, which provides that "the method of Claim 2 further comprising the step of adding a straddling span interface at the node for re-routing failed working channels onto the broken connection links upon failure of the working channels." '059 Patent, col. 12, ll. 15-18. TR Labs argues that this term should be construed as "connection links that used to be connected with the failed links." Defendants' proposed construction is "protection links (as defined) that are disconnected."

TR Labs relies on claim 1, from which claim 3 depends, which requires "breaking connections between protection links." '059 Patent, col. 12, ll. 7-8. TR Labs argues that it is the connections between the protection links that are broken, and not the protection links themselves. Rouskas Supp. Decl. ¶ 7.

Defendants assert that the method of claim 1 is performed in a sequence of steps. First, the network has "protection organized in rings of connected protection links." '059 Patent, col. 11, ll. 61-62. Second, the "connections between protection links" are broken. *Id.* at col. 12, ll. 7-8. Third, "connecting the protection links into a mesh network of links of spare capacity." *Id.* at col. 12, ll. 9-10. Claim 2 then describes protection links as "cycles of connected links of spare capacity." *Id.* at col. 12, l. 13. Defendants also look to claim 3, which requires re-routing traffic over the protection links upon failure of the working channels. '059 Patent, col. 12, ll. 15-18. Additionally, Defendants argue that the straddling span interface ("SSIU") is the subject of claim 3, and the SSIU deals with protection channels/links. The specification provides that the SSIU does "nothing except maintain the continuity of the protection channel." *Id.* at col. 8, ll. 37-40. Defendants further argue that the specification describes the purpose of the SSIU is to route traffic "into the ring protection channels" in the event of a failure of the working channels. '059 Patent, col. 8, ll. 42-52. According to the intrinsic support above, Defendants argue that the specification clarifies that "connection links" are "protection links."

Defendants also contend that "broken" means disconnected, because the process of converting ring nodes to mesh nodes involves disconnecting and reconnecting protection links. Defendants refer to claim 1, which describes this process as "breaking connections between protection links" and "connecting the protection links into a mesh network." '059 Patent, col. 12, ll. 7-8. Thereafter, claim 2 describes that once the links are reconnected, the links are referred to as "connected links of spare capacity." Accordingly, Defendants argue that " broken connection links" are disconnected protection links. Defendants contend that TR Labs' construction introduces an undefined term, "failed links" and provides no insight as to what the term means.

In response, TR Labs argues that "connection links" and "protection links" are two separate claim limitations. TR Labs contends that Defendants construction of connection links to mean protection links violates the rule that different words in different claims have different meanings. *Comark Comm'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998). TR Labs also notes that Defendants' construction leads to an absurd result of re-routing traffic from failed working channels onto "protection links that were disconnected" upon failure of the working channels. Disconnected links indicate that these links are incapable of carrying traffic. Thus, TR Labs argues that its construction is supported by the method described in claim 1 where protection is initially "organized in rings of connected protection links" and thereafter "breaking connections between protection links" demonstrates that it's the connection that is broken and not the protection link itself.

In response, Defendants argue that TR Labs' construction is too broad because any link can be claimed as a "broken connection link" even though the specification clarifies that it is a protection link. Defendants again defer to the method of claim 1 to describe how protection links are initially connected, then disconnected, and subsequently reconnected as "connected links of spare capacity." '059 Patent, col. 12, l. 13. Defendants conclude that the links that have not yet been reconnected are still protection links.

Claim Construction

The Court will adopt neither construction and will construe the term "broken connection links" as "the connection between protection links are disconnected and then reconnected into connected links of spare capacity." The Court agrees with Defendants that claim 1 describes a method for how these protection links are connected, broken and reconnected to form "connected links of spare capacity." Therefore, "connection links" are "protection links." Disconnected is also preferred over "failed" so as to not confuse broken links with failed working channels discussed in the claim language. Disconnected also indicates that these links are capable of being reconnected in the manner describe in claim 1 as well as claim 2 and 3.

VI. THE DISPUTED CLAIM TERMS - ’880 PATENT

A. “Preconfigured cycle”

The parties dispute the term, “preconfigured cycle,” as said term appears in claims 1, 4, and 10 of the ’880 Patent. TR Labs proposes that “preconfigured cycle” means “[a] set of router table entries, set up before a router failure, which form a virtually connected circuit of three or more nodes beginning and ending at the same node in the network.” Defendants, AT&T and Verizon, propose that the term “preconfigured cycle” means “a virtual circuit, set up before a router failure, that begins and ends at the same router and that includes all the routers logically adjacent to a specific router.”

TR Labs argue that the phrase “a set of router table entries . . . which form a virtually connected circuit” is preferable to “a virtual circuit” for three reasons. First, TR Labs cites a section of the specification of the ’880 Patent, which states: “According to an aspect of the invention, there is provided a method of configuring a node in an IP network by creating a set of router table entries which form a set of virtually preconfigured cyclical routes, or p-cycles, within the IP network.” ’880 Patent, col. 1, ll. 45-49 (emphasis added). Based on this language, TR Labs asserts that the preconfigured cycle is, essentially, a table of router entries. Second, TR Labs cites Dr. Rouskas for the proposition that the term “virtual circuit” is a well-understood term of art which does not appear in the ’880 Patent. Rouskas Suppl. Decl. ¶ 2. Thus, according to TR Labs, to construe an essential term in this Patent as a “virtual circuit” would cause confusion. Third, TR Labs notes that in an earlier Markman brief, the AT&T defendants construed the term “preconfigured cycle” as “a set of router table entries,” (*see* Docket Entry No. 65 at 93), but subsequently amended their position.

Separately, TR Labs faults Defendants' construction for omitting the phrase "three or more nodes." According to TR Labs, to one of ordinary skill in the art, a cycle would have at least three nodes. Rouskas Decl. ¶ 45. Finally, TR Labs faults Defendants' construction for requiring that the preconfigured cycle include "all the routers logically adjacent to the specific router." In support of this point, TR Labs notes that the express language of the '880 Patent requires that the preconfigured cycle include "all nodes . . . that are directly connected to the specific node." '880 Patent, col. 5, l. 66 - col. 6, l. 4 (emphasis added). TR Labs also notes that the claimed "direct connection" is clearly illustrated in Figures 1 through 4 of the '880 Patent. '880 Patent, Figures 1-4.

Defendants challenge TR Labs' argument that the phrase "a set of router table entries" is preferable to "virtual circuit." According to Defendants, the "preconfigured cycle" refers to the path that is programmed into the system, not the individual signposts that direct data packets along the path. To make this point, Defendants analogize to a GPS system. Defendants claim that "a virtual circuit is like a pre-stored route in a GPS system," while the "set of router table entries" are the directions as opposed to the route. Separately, Defendants claim that the phrase "logically adjacent" is fundamental to the claimed technology. To support this position, they cite to the '880 Patent: "Two properties are required for a node to be protected by a p-cycle. The p-cycle must cover all adjacent nodes (to ensure routes between the protected node and adjacent neighbors)." '880 Patent, col. 5, ll. 22-25 (emphasis added).

Claim Construction

The Court adopts the following definition for "preconfigured cycle": "a virtual circuit, created as a set of router table entries that are set up before a router failure, that begins and ends at the same router and that includes all the routers directly connected to a specific router." In arriving at this definition, the Court relied heavily on the specification, which refers to both "a set of router table entries" and "virtually preconfigured cyclical routes." '880 Patent, col. 1, ll. 45-52. In response to TR Labs' argument that "virtual circuit" is a completely separate term of art, the Court notes that (1) TR Labs' own proposal already described the "preconfigured cycle" as a "virtually connected circuit," (2) the '880 Patent uses the term "virtual circuit," stating "a p-cycle can only be formed as a virtual circuit within a packet switched IP network," ('880 Patent, col. 3, ll. 44-45 (emphasis added)), and (3) the declaration of Dr. Rouskas, upon which TR Labs relies, provides no citation to any additional material. Rouskas Suppl. Decl. at ¶ 2. In response to the Defendants' argument that the nodes are "logically adjacent to a specific router," the Court notes (1) the Patent makes clear that the phrase "logically adjacent" is synonymous with the phrase "directly connected," (*see* '880 Patent, col. 2, 49-50); and (2) the phrase "logically adjacent" could create confusion as certain nodes that are adjacent to a specific router and that would be logical candidates for the p-cycle are not necessary part of the p-cycle. (*See, e.g.*, '880 Patent, Figure 1C (router no. 8 is not part of the p-cycle)), Figure 1E (router no. 10 is not part of the p-cycle)). In response to TR Labs' argument that a cycle requires "three or more nodes," the Court notes that this requirement, proposed by Dr. Rouskas, has no clear support within the Patent itself.

B. "Identifying the plural nodes of the preconfigured cycle"

The parties dispute the term "identifying the plural nodes of the preconfigured cycle," as said term appears in claims 1 and 4 of the '880 Patent. TR Labs proposes that the term means "[p]roviding sufficient information to route or switch packets along the preconfigured cycle." Defendants propose that the term means "[d]efining which nodes belong to the preconfigured cycle."

TR Labs' argument hinges on the following declaration from Dr. Rouskas:

> The specification of the '880 patent teaches that the router table has an 'an entry identifying a cycle of routers.' '880 Patent, col. 1, line 59 (emphasis added). To one of skill in the art, this teaching would not be limited to an identification of all of the individual nodes in the cycle, as opposed to the cycle itself. Rather, as per the purpose of the claimed invention, *i.e.*, to re-route traffic around a preconfigured cycle in the event of a node failure, the identification need only be sufficient to allow packets to be routed or switched onto the correct preconfigured cycle in the event of such failure. Rouskas Decl. ¶ 46.

While this language is somewhat opaque, it seems to indicate that, within the claimed invention, it is sufficient for each router in a preconfigured cycle to include only the location of the next node in the cycle.

Defendants refute this reading of the Patent and cite directly to the claim language itself: "each of the plural nodes in the preconfigured cycle comprising a router table, each router table identifying the plural nodes of the preconfigured cycle." '880 Patent, col. 6, ll. 5-7. As Defendants point out, this language refers to a single node identifying all of the nodes in the preconfigured cycle.

Claim Construction

The Court adopts the Defendants' definition for "identifying the plural nodes of the preconfigured cycle." While it does make some sense that an invention such as the one claimed by the '880 Patent could be developed to include one discrete router table entry at each router along a preconfigured cycle, the plain language of the Patent clearly teaches that each router table at each node includes the path of an entire preconfigured cycle.

C. "ID field that identifies the preconfigured cycle of the nodes"

The parties dispute the term "ID field that identifies the preconfigured cycle of the nodes," as said term appears in claims 1 and 4 of the '880 Patent. TR Labs proposes that the term means "[d]ata that provides sufficient information to route or switch the packets along the preconfigured cycle." Defendants propose that the term means "[a] field that contains data that uniquely identifies the entirety of one and only one specific preconfigured cycle of nodes."

TR Labs bases their proposed construction of this term on the same argument as the previous term. Essentially, TR Labs contends that the re-routed data packets each contain an ID field, and that ID field identifies the location of one or more nodes in the preconfigured cycle. TR Labs also argues that, while the ID field "identifies the p-cycle on which the packet belongs," it does so through "the label of the p-cycle," not the entirety of the p-cycle. *See* '880 Patent, col. 4, ll. 24-30.

In response, Defendants argue that the location of a single node would be insufficient and the ID field on each data packet identifies the location of every node in the preconfigured cycle. Defendants base this construction on their interpretation of the claim language itself, noting that the claim refers to 'a single ID field' and 'the entire cycle of nodes.' Defendants also cite to the declaration of Mark Lanning. In pertinent part, Mr. Lanning states that '[t]he '880 Patent describes the structure of a p-cycle packet and discuss the ID field: "The p-cycle ID field 50 contains the ID p-cycle on which the packet belongs.'" Lanning Decl. ¶ 137 (citing '880 Patent, col. 4, ll. 25-26). Mr. Lanning also discusses a procedural safeguard in the Patent that prevents a packet from looping around a p-cycle. *Id.* According to the Patent,

> to safeguard . . . an additional check can be introduced where each router checks if it had originally introduced the packet to the p-cycle so it can dispose of the packet if it was. This check prevents a packet from continually looping around the p-cycle. Note that this check would imply the presence of a filed in a p-cycle packet which would contain the ID of the router which introduced the packet into the p-cycle.

’880 Patent, col. 4, ll. 51-60. According to Mr. Lanning, this disclosure would teach a person of ordinary skill in th art that the ID field must identify the entirety of the preconfigured cycle. Lanning Decl. ¶ 37.

Claim Construction

The Court adopts the following definition for this term: “a field that contains data that uniquely identifies the one and only specific preconfigured cycle of nodes.” This definition is essentially the same as the construction offered by the Defendants, except the words “entirety of” are removed. The Court bases this reading on the following language from the Patent’s specification: “[t]he router then accesses the label of the p-[c]ycle that was dedicated to protecting the failed router and inserts the p-cycle packet into the p-cycle.” ‘880 Patent, col. 4, 24-30. This language leads the Court to believe that there is a label for each p-cycle that allows for identification. Additionally, Defendants fail to identify any language that actually requires the ID field to contain the entire cycle of nodes. Thus, there is no need for the ID field to list “the entirety of” a given p-cycle in order to identify the “one and only specific preconfigured cycle.”

D. Path Cost Field

The parties dispute the term “path cost field” as said term appears in claims 1 and 4 of the ’880 Patent. TR Labs proposes that the term means “[d]ata that reflects the direct and/or indirect costs and/or benefits of transmitting telecommunication traffic along a path.” Defendants propose that the term means “[a] field in ‘a preconfigured cycle packet’ that contains a fixed value representing the cost to a destination from a particular router, where ‘preconfigured cycle packet’ is a packet that carries the original packet over the preconfigured cycle.”

TR Labs reaches its proposed construction by construing each word in the above definition individually. Notably, TR Labs construes the term "cost" as follows:

> [T]he term 'cost' in the telecommunications field is not limited to monetary expenditures. [Rouskas Decl. ¶ 47; *see also* Lanning Dep at T. 131, 24 through T. 132, 11]. Rather, this term includes all measures of value associated with the transmission of telecommunications traffic. [Rouskas Decl. ¶ 47]. Those of skill in the art involved in measuring the costs associated with the operation of a telecommunications network employ a variety of metrics to measure such costs beyond the distance to destination.
> Rouskas Suppl. Decl. ¶ 4.

TR Labs further argues that defining the term "path cost field" as "a fixed value representing the distance to a destination from a particular router," would be "contrary to the plain meaning of the term 'cost,' which AT&T's expert Mr. Lanning acknowledged 'can be many different things,' including money, time, and opportunity." *Id.* (citing Lanning Dep. T. 131, 24 through T. 132, 11).

Defendants argue that TR Labs' construction neither captures the specific meaning of "path cost field," nor does it provide any assistance to the jury in helping to understand the meaning of this coined term. In reaching their construction, Defendants rely on the specification of the '880 Patent. According to the specification, if a router cannot send a packet through a port because of a failure at a second router, the first router "encapsulates the original IP packet within a p-cycle packet and sets the path cost field within the p-cycle packet to equal the cost of the path the packet would have taken had the router failure not occurred." '880 Patent, col. 4, ll. 17-22. After encapsulation, the preconfigured cycle packet moves from router to router along the preconfigured cycle. *See* '880 Patent, col. 4, ll. 27-29. When the packet arrives at each router on the preconfigured cycle, the router compares the numerical value stored in the path cost field of the packet to the cost to route the packet from its current location to the destination. *See* 880 Patent, col. 4, ll. 32-47; Figures 3A-3C.

According to Defendants, "this comparison is done in order to determine if the packet is at a point on the preconfigured cycle where it is now 'closer' to its destination in terms of cost, than the point at which the packet entered the preconfigured cycle."

Claim Construction

The Court adopts Defendants' proposed construction of this term. Essentially, Defendants relied on the specification to explain what this term means in context. The Court agrees with the Defendants' reading of the specification on this issue. Conversely, TR Labs attempted to view each word in a vacuum, thereby generating a very broad definition. Additionally, TR Labs' citation to AT&T's expert for the proposition that the word "cost" can mean many different things, "including money, time and opportunity," was unhelpful. The Court finds that TR Labs' proposed construction was so broad as to provide no assistance to the jury in helping them understand the meaning of this coined term.

VII. THE DISPUTED CLAIM TERMS- '543 AND '349 PATENTS

A. "Digital cross-connect switch"

The parties are in dispute regarding the term, "digital cross-connect switch," ("DCS") as used in claim 1 of the '349 Patent and claim 1 of the '543 Patent. TR Labs' proposes that DCS should be defined as "a conventional digital cross-connect switch (DCS) for making and breaking connections." Verizon argues that DCS should be defined as "a digital switch in which all traffic from a specific input (link) is sent to a specific output (link)."[4]

Verizon argues that its proposed construction defines what a DCS is and how it functions.

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[4] Verizon is willing to modify its proposed construction by clarifying "input link" and "output link."

Specifically, Verizon argues that a digital switch allows all traffic from a specific input (link) to be cross-connected to only one output link, and these links are connected by a DCS. By connecting the links in this way, Verizon argues that a circuit (also referred to as a "closed path") is formed through the DCS in advance of any communication (traffic) flow. Verizon argues that their definition captures the concept that a circuit is formed. In support of this argument, Verizon refers to Figure 1A of the '349 Patent that illustrates a circuit is formed when L12 and L24 are connected through the DCS C412. Verizon further contends that TR Labs' definition is redundant to the language already contained in the claim.

TR Labs contends that Verizon's construction requires the limitation that "all traffic from a specific input is sent to a specific output"; however, TR Labs argues that a span terminating at a node may have multiple links, and a specific input may be directed to one of multiple outputs. TR Labs' construction uses language directly from the Patent": "[e]ach node N in the networks shown in the figures incorporates a conventional digital cross-connect switch (DCS) for making and breaking connections in adjacent spans meeting at the node." '543 Patent, col. 6, ll. 46-47. TR Labs also identifies examples in the Patent where "conventional" DCS devices are discussed. '543 Patent, col. 6, ll. 51-53. TR Labs contends that Verizon's definition confuses a "conventional DCS" with the circuit formed through the DCS, and agrees that a circuit will have only one incoming link connected to one outgoing link. However, TR Labs argues that a DCS is capable of cross-connecting traffic from selected incoming links to any one of multiple selected outgoing links to create a circuit. To illustrate this point, TR Labs refers to Figure 8C of the '349 Patent, which shows that traffic from a specific input may be directed to three possible output connections, and Figure 1A and 1B of the '349 Patent. '349 Patent, Figures 1A, 1B, 8C.

Claim Construction

The specifications for the '349 and the '543 Patent describe the function of a DCS in identical language: [e]ach node N in the networks shown in the figures incorporates a conventional digital cross-connect switch (DCS) for making and breaking connections, between links [] in adjacent spans meeting at the node." '349 Patent col. 7 ll. 28-31; '543 Patent, col. 6, ll. 45-48. The Court finds that neither definition accurately defines a DCS, instead the Court will adopt TR Lab's explanation of how a DCS functions as the proper construction. Thus, a "digital cross-connection" is construed as "a digital cross-connect switch that cross-connects traffic from a selected incoming link to only one of multiple selected outgoing links." This definition captures the concept that traffic from a specific input is capable of being directed to one of multiple outputs as illustrated in Figure 8C of the '349 Patent.

B. "Span path(s)"

The next term in dispute is "span path(s)," which is described in identical language in both the '349 and the '543 Patents. Claim 1 of each Patent describes a "span path" as "each node having a digital cross-connect switch for making and breaking connections between links in adjacent spans forming span paths through the node. . ." '543 Patent, col. 54, ll. 21-24 (Claim 1); '349 Patent, col. 45, ll.5-8. TR Labs proposes that "span path(s)" should be construed as "one and only one path through a node formed by connecting links in adjacent spans meeting at the node." Verizon proposes that "spans path(s)" are "fixed path(s) through which data travels between spans interconnecting two or more nodes."

Verizon argues that a span path is defined in the specification as a path through a node that is formed by a DCS and that connects adjacent spans. Verizon relies on the following language in the '349 Patent to conclude that a span path is a fixed path through which data travels between spans:

> A closed path is a set of successive nodes in a network interconnected by successive spans, in which each successive span includes at least one spare link and spare links in adjacent spans meeting at a node are connected by the DCS at the node to form a span path through the node. At each node in a closed path there is one and only one span path through the node that is connected within the closed path.
> '349 Patent, col. 7, ll. 54-61.

Verizon interprets "one and only one span path" to mean a "fixed path" through which data travels between spans interconnecting two or more nodes.

TR Labs argues that their construction is based on the specifications' definition of "span" and how the '349 and '543 Patents describe "span paths." TR Labs notes that the '349 and the '543 Patents teach that a "span" is "the set of all working and spare links in parallel between adjacent nodes." '349 Patent, col. 6, ll. 53-54; '543 Patent, col. 6, ll. 35-36. Furthermore, TR Labs refers to claim 1 of the '543 Patent, which provides "each node having a digital cross-connect switch for making and breaking connections between links in adjacent spans forming span paths through the node." '543 Patent, col. 54, ll. 21-24. TR Labs also refers to the '349 Patent which states that "[c]ross-connections between spare links in adjacent spans are made such that sets of successive nodes through which the adjacent spans form span paths form closed paths." '349 Patent, Abstract. From the specification language, TR Labs concludes that the proper construction for "span path" is "one and only one path through a node formed by connecting links in adjacent spans meeting at the node." TR Labs contends that Verizon's construction excludes the requirement that the span path run through a node. Without this requirement, TR Labs argues that Verizon's construction allows a span carrying traffic between two adjacent nodes to also be defined as a "span path." TR Labs also contends that the term "fixed" within Verizon's construction appears nowhere in the '349 Patent and the term "fixed" could have multiple meanings in this context.

In response, Verizon argues that its construction, "a fixed path through which data travels between spans" includes the requirement that the path runs through the node since the only thing between spans is a node. Verizon further clarifies that "fixed" captures the concept that circuits are established prior to a failure using digital cross-connect switches.

Claim Construction

The Court will adopt TR Labs' construction that a "span path" is "one and only one path through a node formed by connecting links in adjacent spans meeting at the node." The Court finds that TR Labs' definition is consistent with the specifications of the '349 and '543 Patents, because of the definition of "path," the requirement that "span paths" are formed through the node, and the '349 Patent expressly describes "one and only one" span path "through the node." '349 Patent, col. 7, ll. 60-61. In contrast, the Court finds that Verizon's construction is overly broad because the term "fixed" is not used in the Patents, and is subject to varying interpretations. The Court also finds that there is very little difference between the definition of "span" and Verizon's definition of "span path."

C. "Spare links"

The next term in dispute that is used consistently between the '349 and '543 Patent is "spare links." TR Labs proposes that "spare links" should be defined as "individual bidirectional digital signal carrier(s) between adjacent nodes that are reserved for carrying traffic in the event of a failure in a network." Whereas Verizon's proposed construction for "spare links" is "communication link(s) that are reserved for redirected traffic and that carry communications traffic only in the event of a failure in the network." The primary dispute between the two constructions is whether the spare links only carry communications traffic in the event of a failure, as Verizon proposes, or if spare links carry communications traffic even where there is no failure, as TR Labs proposes.

In support of its construction, Verizon refers to the specification to argue that spare links do not carry any data traffic until there is a failure in the network. In particular, Verizon refers to the '349 Patent, which describes "the first step in initiating the construction of a closed path" by using an "unoccupied spare link(s)." '349 Patent, col. 20, ll. 16; 28-30; 67. Furthermore, Verizon argues that the specification makes a distinction between working links and spare links. The '349 Patent states throughout the specification that each span has working links and spare links. '349 Patent, col. 1, l. 51; col. 2, ll.39-40; col. 6, ll.53-54. The '543 Patent also describes that each span contains working and spare links. '543 Patent, col. 2, ll. 65-66; col. 6, ll. 35-36; col. 56, ll. 30-31. Verizon provides an analogy of spare tires to "spare links" in that they are only used in the event of a failure. Verizon also relies on the summary of the invention in the '543 Patent:

> The research presented here is unique in that it is the first distributed dynamic path restoration algorithm which attempts to configure the surviving spare links of a path restorable network to restore failed working paths in a capacity efficient manner. '543 Patent, col. 2, ll. 55-59.

Verizon argues that this description of the inventive aspect of the Patent supports its construction that communications traffic is only directed to spare links in the event of failure of the working links.

TR Labs proposes that spare links carry traffic even absent a network failure. TR Labs argues that "traffic" is understood by one of ordinary skill in the art to mean the conveyance of messages or data. Rouskas Decl. ¶ 5. TR Labs applies this definition of "traffic" to "statelets" and contends that one of ordinary skill in the art would understand that a "statelet" is a message containing data, and the Patent teaches that spare links carry statelets before a failure occurs. Rouskas Decl. ¶ 6. Specifically, TR Labs refers to the '349 Patent that describes the "method of establishing a connected telecommunications route through a telecommunications network" by broadcasting a statelet from an originating node along successive spare links to successive intermediate nodes in the network commencing with at least one node adjacent to the originating node and connected to the originating node with a spare link. *See* '349 Patent, col. 4, ll. 32-36. TR Labs notes that this method is further described in claim 1 and 2 of the '349 Patent and claim 1 of the '543 Patent. TR Labs also cites to the '543 Patent, which provides that "[u]nder normal operating conditions when there are no failures a null statelet is placed on every working and spare link in a network." '543 Patent, col. 12, ll. 18-21. Thus, TR Labs concludes that spare links carry traffic even where there is no network failure.

In response, Verizon contends that statelets are non-communications traffic that is carried over spare links before a failure occurs. However, Verizon argues that its construction does not preclude this process because its definition specifies that spare links carry "communications traffic" in the event of a failure in the network.

Claim Construction

The Court does not adopt either construction, and proposes that "spare links" should be defined as "an individual bidirectional digital signal carrier that is reserved for (1) statelets and (2) redirected communications traffic only in the event of a failure in the network." The specification expressly defines a "link" in the definitions section in both the '349 Patent and the '543 Patent as "an individual bidirectional digital signal carrier between adjacent nodes at the DCS signal management level." '349 Patent, col. 6, ll. 48-50; '543 Patent, col. 6, ll. 30-32. As for the traffic carried on a link, Verizon and TR Labs each focused on one embodiment of "spare links" when both the '349 and the '543 Patent clearly describe two embodiments for spare links: (1) they carry statelets prior to the occurrence of a failure, and (2) they carry communications traffic in the event of a network failure. The Court's proposed construction incorporates this dual embodiment.

D. "Statelets"

"Statelets" is a term in dispute from the '543 Patent, but the term is also used throughout the '349 Patent. Verizon proposes that statelets should be construed as "an electronic message or information package that is formed of various information containing fields." Whereas TR Labs' proposed construction for statelets is "an electronic message or information package that is formed of various link state information fields." Both parties concede that the term "statelets" is a term coined by the inventor so the term must be defined in the specification. *See, e.g., Intervet Inc. v. Merial Ltd.*, 617 F.3d 1282, 1287 (Fed. Cir. 2010); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

Verizon argues that the specification expressly defines the term "statelet" and their proposed construction has adopted this exact definition. The '543 Patent provides: "A statelet is an electronic message or information package that is formed of various information containing fields." '543 Patent, col. 6, ll. 36-38. Because of this language, Verizon argues that its construction conforms with the inventor's own written definition of the term, which should govern the construction of that term. *Inventio AG v. Thyssenkrupp Elevator Americas Corp.*, 649 F.3d 1350, 1356-57 (Fed. Cir. 2011). Verizon contends that TR Labs' modification of this definition by adding "link state" to information fields is improper for several reasons. First, Verizon argues that "link state" is not found anywhere in the Patent, and second, "link state" may be confused with "link state protocols," which is known to one of ordinary skill in the art to mean something different than "various information containing fields" as defined in the Patent.

TR labs contends that its definition acknowledges that statelets contain "link state" information, meaning attributes associate with the link. TR Labs argues that Verizon's construction is too broad because it could include any type of electronic message. Rouskas Decl. ¶ 14. TR Labs relies on the specification where *Statelet Based Distributed Restoration of Networks*, is discussed:

> Interactions between nodes in transport networks can take place over a reserved data link using messages explicitly addressed to neighbouring nodes, or via state based signaling. State based signaling relies on a defined set of information attributes associated with a transmission link to communicate a change in an adjacent node's state vis-a-vis the connecting link. '543 Patent, col. 7, ll. 6-13.

TR Labs further references Figure 4 of the '543 Patent, which illustrates the "defined set of information attributes" as the Node ID, source, destination, index, return alarm bit, interference number, repeat count, reverse linking indicator, confirmation indicator, and mode. '543 Patent, Figure 4. TR Labs also contends that its proposed construction of "link state information," as opposed to Verizon's broad construction, makes the distinction that "[t]he fields of a statelet are not normally intended for general purpose communication." '543 Patent, col. 11, ll. 47-48.

Claim Construction

The Court adopts neither parties' construction and proposes that "statelet" be construed as "an electronic message or information package that is formed of a defined set of information attributes associated with a transmission link." Although Verizon's definition was adopted from the Patent, "various information containing fields" was too broad and would benefit from a narrow construction. However, TR Labs' proposed construction included a new term "link state," which was not found in the ‘543 Patent, and apparently may be confused with “link state protocols,” which has an entirely different meaning to one of ordinary skill in the art. Therefore, the Court adopted the language directly from the specification, which provides that there is “a defined set of information attributes associated with a transmission link” and the defined set of information attributes are listed in Figure 4 of the ‘543 Patent, which illustrates the structure of the statelet. ‘543 Patent, col. 7, ll. 6-13; Figure 4; col. 7, ll. 50-51.

E. “Successive spare links”

The term “successive spare links” is used in the ‘543 Patent is in dispute, and appears only in the claims, but is not defined in the specification. Verizon’s proposed construction for “successive spare links” is “spare links (as defined) that are directly connected to each other through a common node.” Whereas TR Labs’ proposed construction for the term is “spare links (as defined) in adjacent spans.”

Verizon explains that its construction is taken from the dictionary definition of successive, which has a standard meaning of “[f]ollowing in uninterrupted order; consecutive.” American Heritage College Dictionary 1356 (3d ed. 1997). Verizon coupled this definition with how “spare links” are described in the specification to conclude that “successive spare links” refers to spare links that follow each other. In support of this construction, Verizon relies on Figure 3B of the ‘543 Patent to demonstrate that successive spare links share a common node and within that common node there is a digital cross-connect switch to cross-connect spare links. ‘543 Patent, Figure 3B. Verizon also refers to the claim language that describes how statelets are broadcast “from plural source nodes along successive spare links to successive tandem nodes in the network.” ‘543 Patent, col. 54, ll. 28-30. Accordingly, Verizon concludes that because statelets are passing from spare link to spare link, then successive spare links must be directly connected to each other by the digital cross-connect switch in the common node. Verizon contends that TR Labs' construction is ambiguous and does not recognize that statelets move along directly connected spare links.

TR Labs argues that its construction of "adjacent spans" is consistent with the language used in the specification. TR Labs highlights that the definition of "span" includes the term "adjacent," specifically a "span" is "the set of all working and spare links in parallel between adjacent nodes." '543 Patent, col. 6, ll. 35-36. TR Labs also highlights that "adjacent" is used to describe that each node has a digital cross-connect switch "for making and breaking connections, between links in adjacent spans meeting at the node." '543 Patent, col. 6, ll. 45-48.

TR Labs contends that Verizon's construction is improper because it requires that spare links be "directly connected" when the links are not connected through the node at this stage. TR Labs argues that link connections occur on the final step of claim 1 as part of "creating a communications path through the nodes traversed by the statelet upon arrival of the statelet at the destination node." '543 Patent, col. 54, ll. 38-40; Rouskas Decl. ¶ 16. In comparison, TR Labs refers to the first step of claim 1, which describes the process of broadcasting statelets along successive spare links, meaning that at the broadcasting phase, no connections between successive spare links have been made yet because no communications path has been created. '543 Patent, col. 54, ll. 28-30; Rouskas Decl. ¶ 16. TR Labs contends that Verizon's construction assumes that successive spare links have been connected, which limits the broadcasting of statelets across adjacent spans. Rouskas Decl. ¶ 16.

In response, Verizon maintains that successive spare links must be directly connected otherwise a statelet could not be broadcast from spare link to spare link as established in claim 1.

Verizon also argues that the Patent teaches that a source node broadcasts statelets through existing paths in a network so that an alternative path can be found between a source and a destination. '543 Patent, col. 18, ll. 7-19; col. 25, ll. 59 - col. 26, ll. 5; col. 34, ll. 39-46; col. 36, ll. 58-61; col. 39, ll. 58- Col.40, ll. 4; col. 40, ll. 9-11.

Claim Construction

The Court finds that Verizon's construction can be modified so that "successive spare links" is defined as "spare links (as defined) that are connected to each other through a common node." TR Lab's construction of simply "adjacent spans" is too broad, especially considering the dictionary definition of adjacent is "close to or next to." The American Heritage Dictionary 22 (3d ed. 1992). However, the Court agrees with TR Labs that there is no direct connection between the successive spare links during the broadcasting statelets phase. The specification provides that "all nodes within a certain range of the source are alerted and develop an interacting mesh of rebroadcast patterns on each statelet family. The range of influence of the forward flooding phase is controlled by the repeat field of a statelet." '543 Patent, col. 25, ll. 62-66. Thus, the specification describes how statelets are broadcasted in a flooding pattern, and it is not until the last phase of claim 1 when connections are made between these spare links to form the alternative path. However, in order for the spare links to be successive, the Court agrees with Verizon that they must share a common node as the statelets "develop an interacting mesh of rebroadcast patterns." *Id.*

F. "Preferentially broadcasting from each tandem node . . ."

The disputed term "preferentially broadcasting from each tandem node . . ."is discussed in Claim 1 of the '543 Patent. Claim 1 describes the first step of the patented process of creating an alternate path after a span failure. The first step of this process involves broadcasting statelets across the network using successive spare links and successive tandem nodes. Once these statelets are broadcast across the network, the next step involves "preferentially broadcasting from each tandem node at which statelets arrive those statelets which, by comparison with other statelets competing to be broadcast at the tandem node, have traversed spans with higher spare capacity." '543 Patent, col. 54, ll. 31-35.

Verizon's proposed construction for this term is "from each tandem node at which statelets arrive, comparing statelets and re-transmitting statelets on a spare link (as defined) of each span terminating at the tandem node such that statelets that have traversed spans with higher spare capacity are re-transmitted first from the tandem node before statelets that have traversed spans with lower spare capacity." TR Labs' proposed construction for this term is "from each tandem node at which statelets arrive, comparing statelets and re-transmitting statelets on a spare link (as defined) of each span terminating at the tandem node such that statelets that have traversed spans with higher spare capacity are re-transmitted first from the tandem node before statelets that have traversed spans with lower spare capacity, which may or may not also be re-transmitted." The parties are primarily in dispute over the meaning of "preferentially." According to Verizon, "preferentially" means that statelets are broadcast in a sequential order. Whereas, TR Labs argues "preferentially" means that certain statelets (those that have traveled over spans with higher capacity) are broadcast and other statelets (those that have traveled over spans with lower capacity) may not be broadcast at all.

Verizon refers to the language in the preferred embodiment of the specification in support of its construction, which provides that statelets are "preferentially rebroadcast first at a node." '543 Patent, col. 9, ll. 7-12. Preferential broadcasting is further described as "[w]hen restoration statelets traversing spans with low interference numbers are preferentially rebroadcast first at a node." '543

Patent, col. 10, ll. 25-27. Verizon argues that the language "first" implies a sequential order and there are other statelets to be rebroadcast in order of interference number from lowest to highest. Specifically, statelets that have a low interference number, because it has traveled a span with high spare capacity, will be rebroadcast first, and those statelets with higher interference numbers, because they have traversed spans with low spare capacity, will also be rebroadcast in order of interference number. Verizon also refers to the Patent where it describes: "[t]he interference number of a statelet is the primary factor influencing the logic of tandem nodes when statelets are in contention for rebroadcast. As mentioned previously, the statelets with the lowest interference number is always rebroadcast first at a tandem node." '543 Patent, col. 14, ll. 12-16. Verizon concludes that "first" is used throughout the specification to describe the order for when statelets are to be rebroadcast by comparing the statelet's interference number. Verizon argues that its construction captures the concept of comparing statelets to determine the sequential order of broadcasting whereas TR Lab's construction suggests that statelets with a high interference number may never be rebroadcast.

TR Labs refers to the definition of "broadcasting" in the Patent in support of its construction that certain statelets may never be rebroadcast. The specification provides that "[a] broadcast of a statelet occurs when a statelet received by a node is re-transmitted by that node on a spare link of each span terminating at that node pursuant to a set of rules defining which of several statelets competing for broadcast will be broadcast." '543 Patent, col. 6, ll. 38-43. TR Labs argues that the language "will be broadcast" describes whether a statelet will ever be re-broadcast, not when a statelet is rebroadcast as Verizon suggests. Rouskas Decl. ¶ 18.

Claim Construction

The only difference between the two constructions is whether certain statelets with high interference numbers are ever re-broadcast. The Court finds that TR Labs' construction is preferred because it recognizes that there is an endpoint to the re-broadcast of statelets by using the language "may or may not also be re-transmitted." Verizon correctly noted that the use of "first" in the specification indicates that preferential broadcasting requires statelets with the lowest interference number to be rebroadcast first and those statelets with higher interference numbers to follow in order of lowest to highest, but at some point not every statelet will be re- broadcast. The specification describes the arrival of complement statelets, which completes the process of finding a restoration path, and in that process there is a "cancellation of all other statelets on that source-destination-index family." '543 Patent, col. 15, ll.16-18. This language indicates that once the complement statelet is sent and the confirmation phase of "creating a communications path through the nodes" is complete, some of the statelets with high interference numbers may never be broadcast. '543 Patent, col. 54, l. 39.

G. "Continuing to broadcast statelets from tandem nodes . . ."

The term "continuing to broadcast statelets from tandem nodes at least until a statelet arrives at a destination node" is also in dispute within claim 1 of the '543 Patent. Verizon's proposed construction for this term is "from each tandem node, continuing to re-transmit statelets on a spare link (as defined) of each span terminating at the tandem node such that statelets that have traversed spans with higher spare capacity are retransmitted from the tandem node before statelets that have traversed spans with lower spare capacity." TR Labs' proposed construction is "from each tandem node, continuing to re-transmit statelets on a spare link (as defined) of each span terminating at the tandem node such that statelets that have traversed spans with higher spare capacity are retransmitted from the tandem node before statelets that have traversed spans with lower spare capacity, which may or may not also be re-transmitted." The dispute over this term is the exact same issue raised in the construction of "preferentially broadcasting," which is whether certain statelets with lower spare capacity are ever re-transmitted.

Claim Construction

The Court finds that TR Lab's construction properly defines this term because it recognizes that there is a point when statelets that have traversed spans with lower spare capacity may never be re-transmitted as discussed above regarding the term "preferentially broadcasting." The claim language itself also indicates that there is an endpoint for tandem nodes to rebroadcast statelets, which is "at least until a statelet arrives at a destination node," towards "creating a communications path." '543 Patent, col. 54, ll. 36-37.

H. "Searching for and identifying a set of intermediate nodes"

The term "searching for and identifying a set of intermediate nodes" to form a closed path is disclosed only in the '349 Patent in claim 2 and claim 3. Verizon's proposed construction for this term is "a particular node, adjacent to the span being protected, sending messages and receiving messages in order to identify a set of intermediate nodes." TR Labs' proposed construction is "finding a collection of intermediate nodes."

Verizon argues that "searching for and identifying a set of intermediate nodes" is described in the specification as a process when the originating node initially broadcasts statelets to tandem nodes that "loops back" to the originating node so that the originating node can select from the set of tandem nodes a closed path for pre-configuration. '349 Patent, col. 13, ll. 22-30; Figure 9; col. 15, ll. 49-65; col. 18, ll. 31-34, 51-55. Verizon argues that its construction incorporates this process as described in the specification, and in comparison TR Labs' construction is ambiguous.

TR Labs' primary contention with Verizon's construction is that it violates the doctrine of claim differentiation. TR Labs' argues that Verizon's construction requires "sending messages and receiving messages" when that limitation only appears in claim 3 as "broadcasting statelets from successive nodes," and does not appear in claim 2. '349 Patent, col. 46, ll. 14. TR Labs contends that Verizon's construction improperly reads the limitation in claim 3- broadcasting statelets- into claim 2, in violation of the doctrine of claim differentiation. *Karlin Tech., Inc. v. Surgical Dynamics, Inc.* 177 F.3d 968, 972-73 (Fed. Cir. 1999). Additionally, TR Labs argues that one of ordinary skill in the art would understand "searching for and identifying" to mean "finding." Rouskas Decl. ¶ 10.

<u>Claim Construction</u>

The Court finds that Verizon's construction can be modified to "a particular node, adjacent to the span being protected, broadcasting and re-broadcasting statelets (as defined) in order to identify a set of intermediate nodes." The Patent teaches one process of how information is communicated through statelets across the network from tandem nodes to successive spare links to form span paths and ultimately a closed path prior to any network failure. The abstract to the '349 Patent expressly provides that "[a] method for finding and construction closed paths is described in which statelets are broadcast through the network. In a preferred method of implementation of the method, the statelet broadcast occurs not in response to a network failure, but across the entire network before any particular span failure . . ." '349 Patent, Abstract. This preferred method of broadcasting statelets to find a set of successive nodes to form a closed path is described throughout the specification. For example, "[a]ll statelet broadcasts originate at the originating node. To initiate statelet broadcast, the originating node places a single outgoing statelet on an available spare link on each span failing on the originating node. . . .After the statelet broadcast is initiated, the originating node waits and samples the incoming statelets arriving on its spare links. Each successful arrival of an incoming statelet represents a set of successive nodes capable of forming a closed path . . ." '349 Patent col. 18, ll. 31-34, 51-55. *See also* '349 Patent, col. 13, ll. 22-30; Figure 9; col. 15, ll. 49-65. Thus, "searching for and identifying a set of intermediate nodes" refers to this method of broadcasting and re-broadcasting statelets to find a set of intermediate nodes capable of forming a closed path, as discussed in claim 2 and claim 3.

As to claim differentiation, claim 3 is dependent on claim 2 and reiterates the process describe therein, but adds the limitation for when the statelets are to cease broadcasting. Specifically, the tandem nodes that are not capable of forming a closed path will prevent the statelets from being re-broadcast. This process is further described in the specification, which provides that

> The first step in initiating the construction of a closed path, is that the originating node cancels all outgoing statelets. This causes a termination of the statelet broadcasts as the originating node is the source of all statelet broadcasts within the network. In effect, although the statelet broadcasts would continue to fluctuate if left to proceed, the originating node brings the statelet broadcasts to a conclusion. '349 Patent, col. 20, ll. 5-11.

Thus, claim 2 and claim 3 both include the process of "searching for and identifying" through the broadcast of statelets, and claim 3 adds the limitation for when the broadcasting of these statelets is to cease.

ORDER

IT IS on this 10th day of August, 2012:

ORDERED that this Opinion sets forth the construction of the disputed terms within the ‘835 Patent, ‘505 Patent, ‘734 Patent, ‘059 Patent, ‘880 Patent, ‘543 Patent, and ‘349 Patent.

s/Peter G. Sheridan
PETER G. SHERIDAN, U.S.D.J.