IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

INTEL CORPORATION,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 00-796-RRM
	)	
BROADCOM CORPORATION,	)	
	)	
Defendant.	)	

MEMORANDUM OPINION

J. Andrew Huffman, Esquire, Fish & Richardson P.C., Wilmington, Delaware; John E. Gartman, Esquire and Juanita Brooks, Esquire, Fish & Richardson P.C., San Diego, California; counsel for plaintiff.

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Wilmington, Delaware
November 6, 2001

McKELVIE, District Judge

This is a patent case. Plaintiff Intel Corporation is a Delaware corporation with its principal place of business in Santa Clara, California. Intel owns U.S. Patent Nos. 4,823,201 (the '201 patent); 4,975,830 (the '830 patent); 5,894,410 (the '410 patent); 5,079,630 (the '630 patent); and 5,134,478 (the '478 patent). Defendant Broadcom Corporation is a California corporation with its principal place of business in Irvine, California.

On August 30, 2000, Intel filed its complaint in this case alleging that Broadcom is infringing, inducing infringement, or committing acts of contributory infringement of one or more claims of the '201 patent, the '830 patent, the '410 patent, the '630 patent, and the '478 patent.

On October 10, 2000, Broadcom moved to dismiss Intel's complaint or, in the alternative, to transfer the action to the United States District Court for the Northern District of California. After eleven months of discovery, the court heard oral argument on Broadcom's motion on September 24, 2001. In a memorandum opinion dated October 9, 2001, the court denied Broadcom's motion.

On September 24, 2001, the court also heard oral argument in accordance with Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996), to construe the claims of the five patents. The claim construction issues for each of the five patents are now fully briefed by the parties.

In order to simplify the issues before the jury and to shorten the length of the jury trial, the court required that the trial proceed in two parts. The first trial will be a three week jury trial on the ’201 and the ’830 patents. A subsequent trial will cover the remaining three of the five patents.

This is the first of two memorandum opinions that will set forth the court’s claim construction of asserted claims of the ’201 and ’830 patents. This opinion will consider the asserted claims of the ’830 patent.

I. FACTUAL AND PROCEDURAL BACKGROUND

The court draws the following facts from the claim construction hearing, the parties briefs, documents submitted by the parties, and the prosecution history of the ’830 patent.

A. The Patented Technology

The problem that the inventors of the ’830 patent sought to solve was how to accommodate a constantly expanding computer network in which new higher performance devices that are continually added in order to provide more complex features must still be compatible with older devices on the network. The invention of the ’830 patent was driven by the desire to allow these new devices to be introduced to the network, while still ensuring that the new devices would be compatible with older devices that remain connected to the network. Using the patented invention, all of the devices on the network are able to communicate with each other and any specific communication

that is sent between devices will use the optimal data transmission methods.

The'830 patent involves a communication system, such as a computer network, in which devices on the network (called nodes) can dynamically choose between multiple formats (e.g. various transmission characteristics including transmission speeds, encoding protocols, compression protocols, and encryption protocols) by which to transmit and receive data to and from one another over a common communication medium. To send and receive data from each other, devices must use compatible transmission protocols. These protocols are special sets of rules that end points in a telecommunication connection use when they communicate. Two devices that use compatible transmission rules to transmit information to each other can be said to be speaking the same language. Using the invention, a device on the network that seeks to transmit information can dynamically determine all of the formats by which it can communicate with a device that it wishes to send information to; the optimal format that is supported by both devices is then selected and used to transmit information.

The following example seeks to illustrate how this invention can be used to solve the problem of keeping devices on an ever-expanding network interoperable. One easily understandable transmission characteristic that may be captured in a format is the rate at which data is transmitted. For example, assume that older devices on the network were limited to a format that supports a maximum transmission speed of 10 Mbps, while newer devices support both a lower speed of 10 Mbps and a maximum transmission speed of

100 Mbps. Using the invention, two 100 Mbps devices that wanted to exchange information could each determine that the other device was indeed a 100 Mbps device and determine to transmit or receive data using the 100 Mbps transmission speed. The invention also allows a 100 Mbps device that wants to transfer information to a 10 Mbps device to determine that the receiving device is a 10 Mbps device and accordingly to select the transmission speed that is supported by the receiving device.

The invention, as described by the patent, works as follows. Each device on the network includes in its memory a list of its own transfer formats and the transfer formats that are supported by every other device on the network. These format sets are represented in memory by strings of bits. When a device needs to transmit information to another device, it searches its memory for the supported format set of the destination device. If no format set is located for the device to which it wishes to send information, the transmitting device performs an inquiry dialog with the other device to learn and store the other devices supported format set. Then, using algorithms that are applied through circuitry and software, it selects the optimal format which is mutually compatible with itself and the destination device.

B. The Accused Devices

Intel has accused Broadcom's Ethernet products of infringing the '830 patent. Ethernet, which is specified in the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standard for Ethernet Local Area Networks, is the most widely-installed local area

network (LAN) technology. A LAN is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area.

An Ethernet LAN may use either (i) a pair of stations linked with a single cable, or (ii) multiple stations that are each connected by an individual cable to a connection, or "port," on an Ethernet repeater. See C. Spurgeon, Ethernet: the Definitive Guide 29 (2000). In the second case, by using the repeater, all the cables can operate together "as a single shared Ethernet channel." Id. at 33. Additionally, switching hubs, devices which can connect one or more Ethernet LANs, are often used to create more extended network systems. When a switch connects two Ethernet networks, "each port of a switching hub provides a connection to an Ethernet media system that functions as an entirely separate Ethernet LAN." Id. at 32-33. Switching hubs may also be used to connect individual local stations. In that configuration, each of the local stations is connected directly to a port in the switch by a dedicated Ethernet link. Id. at 33-34.

A key feature of Ethernet systems, for the purposes of this dispute, is the "auto-negotiation" feature. The auto-negotiation process allows Ethernet equipment to be automatically configured on power-up, relieving the installer of the new networked device of the need to determine the proper speed and configuration. Id. at 85. When a device is turned on, the auto-negotiation feature, if enabled, sets the correct speed and other features that will be used by a local device, such as a personal computer, and

whatever device is connected to the other end of its cable segment for as long as the Ethernet LAN is powered up. Id. at 86. The device at the opposite end of the link from the local device is called a "link partner." Id. at 87. A computer's link partner is thus another computer, the port in a repeater, or the port in a switching hub, to which the computer is connected by a cable or "link segment." Id. It is the only device with which a local computer auto-negotiates. In sum, "[a]uto-negotiation makes it possible for Ethernet stations to exchange information about their capabilities over a link segment. This, in turn, allows the stations to perform automatic configuration to achieve the best possible mode of operation over a link." Id. at 86.

C. Procedural History of the '830 Patent

The prosecution history of the '830 patent is short and straightforward. On December 5, 1988, the inventors filed the original application with the Patent and Trademark Office. As originally filed, the application was titled "Computer Communication System Having Supplemental Formats" and had forty-five claims. In response to the application, there was a single Office Action. In the Office Action, dated December 20, 1988, all of the claims (claims 1-45) were rejected under 35 U.S.C. § 112[1] as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention.

[1]Section 112, paragraph 2 states: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112 ¶ 2.

The Examiner's rejection under § 112 related to three concerns. First, many of the claims recited that particular elements were "adapted to" do something, and the Examiner felt that this phrase was indefinite. Second, a number of terms within the claims lacked a proper antecedent basis; in other words, the claims recited "the widget" or "said widget" before ever introducing the term "widget" at some earlier point in the application. As noted in the Manual of Patent Examining Procedure (the "MPEP"), "a claim which refers to 'said aluminum lever,' but recites only 'a lever' earlier in the claim, is indefinite because it is uncertain as to the lever to which reference is made." MPEP § 2173.05. Third, the "means-plus-function" clause that discloses the "transfer format selection means," was not connected to any other apparatus elements in the claim. To remedy this, the Examiner suggested using the words "connected" or "coupled" to tie the elements together to form a definite configuration.

In their response, the inventors requested reconsideration of or fixed each problem raised by the Examiner. No claims were added or removed. First, they noted that the phrase "is adapted to" does not make a claim indefinite and attached pages from several issued patents to show that the phrase is commonly used to claim inventions. As to the antecedent basis problem, the inventors made corrections to a number of claims to give an antecedent basis to certain elements, mostly by replacing the terms "the" or "said" with the term "a" for the first occurrence of each term in a claim. With respect to the "means-plus-function" problem, the inventors stated that for means-plus-function claims: "It is

well established that the elements of a claim can be properly related to each other by relating the elements structurally or by relating the elements functionally." The inventors argued that because the "transfer format selection means" "selects a format for the transfer of data from said source [device] to said destination [device]," it is functionally related to the other claim elements in a way that is sufficient to satisfy the requirements of § 112.

The Examiner accepted the inventors' arguments and changes and allowed all of the claims to issue without further comment.

II. DISCUSSION

A. Basic Principles of Claim Construction

Patent claim interpretation is an issue that lies exclusively within the province of the court. Markman, 517 U.S. at 372. In interpreting patent claims, courts must focus primarily on "intrinsic evidence of record," which is comprised of the claims themselves, the patent specification (also known as the written description), and the prosecution history of the patent. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996). The intrinsic evidence "the most significant source of the legally operative meaning of disputed claim language." Id.

The starting point for any claim construction is the words of the claims themselves. Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305 (Fed. Cir. 1999) (citing Vitronics, 90 F.3d at 1582). The words of the claims are generally given their ordinary

and accustomed meaning. Vitronics, 90 F.3d at 1582. In addition, descriptive claim terms that stand unmodified (such as a noun, where no limiting adjective is recited) should be given their full scope and should not be limited to a particular subset of the general term. See, e.g., Virginia Panel Corp. v. MAC Panel Co., 133 F.3d 860, 865-66 (Fed. Cir. 1997) (unmodified term "reciprocating" not limited to linear reciprocation); see also Johnson Worldwide Assocs. v. Zebco Corp., 175 F.3d 985, 989 (Fed. Cir. 1999) (collecting cases).

Technical claim terms are generally interpreted as they ordinarily would be understood by those working in the field of the invention. Vitronics, 90 F.3d at 1582 (citing Hoechst Celanese Corp. v. BP Chems. Ltd., 78 F.3d 1575, 1578 (Fed. Cir. 1996)). However, a patentee may also "choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history." Id.

If the claim language is clear on its face, the court reviews the specification and prosecution history only for the limited purpose of determining whether the patentees used terms in the claims in accordance with their ordinary meaning or whether they deviated from the clear meaning of the claim. See Interactive Gift Express, Inc. v. CompuServe Inc., 231 F.3d 859, 865 (Fed. Cir. 2000). Such deviation may occur if the patentees have chosen to use a term in a manner other than its ordinary meaning, where the claim terms lack clarity to the degree that it is impossible to ascertain the scope of the

claim from the claim terms alone, or where the patentees have relinquished certain claim coverage during the prosecution of the patent by amending their claims or arguing to distinguish a prior art reference. Id.

Claims should be interpreted consistently with the specification, which provides context for the proper construction of claims because it explains the nature of the patentee's invention. Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1242, 1250 (Fed. Cir. 1998). However, when considering the patent specification to construe claim terms, the court must take care to avoid reading "limitations appearing in the specification . . . into [the] claims." Intervet Am., Inc. v. Kee-Vet Lab., Inc., 887 F.2d 1050, 1053 (Fed. Cir. 1989).

Extrinsic evidence may always be consulted to assist in the understanding of the underlying technology. Interactive Gift, 231 F.3d at 865. Otherwise its use should be limited to situations where the analysis of the intrinsic record leaves the claims unclear. See Spectrum Int'l, Inc. v. Sterilite Corp., 164 F.3d 1372, 1378 (Fed. Cir. 1998). If the proper interpretation of the claim is not clear from the intrinsic record, the court may rely on extrinsic evidence such as expert testimony, inventor testimony, technical treatises, or articles. Vitronics Corp., 90 F.3d at 1584. Such extrinsic evidence "may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. . . ." Id. Dictionaries, however, are a special form of extrinsic evidence that may be considered along with the intrinsic evidence in

determining a claims ordinary meaning. Interactive Gift, 231 F.3d at 866.

Certain types of claims, which are drafted in functional terms, are treated specially for claim construction. When a patent claim contains so called "means-plus-function" elements, which recite a function to be performed, rather than a definite structure, material, or acts for performing that function, § 112 of Title 35 states that such elements are "construed to cover the corresponding structure, material, or acts described in the specification and the equivalents thereof." 35 U.S.C. § 112. Therefore, in construing a mean-plus-function element, the court must identify both the claimed function and the structure, material, or acts necessary to carry out that function. See Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1258 (Fed. Cir. 1999); WMS Gaming, Inc. v. International Game Tech., 184 F.3d 1339, 1347 (Fed. Cir. 1999).

Typically, the relevant function is recited in the claim after the prepositional link "for," which ties the means to the function. See Rodime PLC v. Seagate Tech., Inc., 174 F.3d 1294, 1303 (Fed. Cir. 1999); see also Micro Chem, Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1258 (Fed. Cir. 1999) (§ 112 "does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim."). However, a court may also look to the specification in construing the function. See Serrano v. Telular Corp., 111 F.3d 1578, 1582 (Fed. Cir. 1997) (finding that specification required a broader description of the function than the words of the claims).

"The 'means' term in a means- plus-function limitation is essentially a generic

reference for the corresponding structure disclosed in the specification." Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus. Inc., 145 F.3d 1303, 1308 (Fed. Cir. 1998). "A determination of corresponding structure, therefore, is a determination of the meaning of the 'means' term in the claim and is thus also a matter of claim construction." Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1211 (Fed. Cir. 1998).

B. Intel's Position

According to a portion of the abstract of the '830 patent, the patent, in essence, discloses and claims the following:

> A computer communications system including a communication medium, a plurality of nodes [i.e. devices] coupled to the communication medium, and a transfer format selection means for selecting a format for the transfer of data between nodes.

The node, or device, that is sending the data, which is referred to in the patent claims as the source node, uses the transfer format selection means described above to select a transfer format to use to send information to the node that is receiving data, which is referred to as the destination node.

Intel argues that, if the patent claims are given the proper meaning that was bargained for by the inventors, the accused Ethernet devices are covered by the claims of the '830 patent. While the court will not discuss every detail of Intel's argument on claim construction in this section, for the purpose of giving a sense of Intel's position, it will set forth Intel's proposed construction of some of the key claim language. The following

section will set forth some of Broadcom's key claim construction arguments.

Neither of these two sections is intended to be exhaustive. Nor will the court improperly consider the accused devices in construing the scope of the claims. See Scripps Clinic & Research Foundation v. Genentech, Inc., 927 F.2d 1565, 1580 (Fed. Cir. 1991) (claim terms should be construed independent of the accused product, in light of the specification and the file history"). Rather, these sections are intended to give the claim construction some "big-picture" context.

Intel claims that the automatic negotiation feature of the Ethernet devices falls within the bounds of the dynamic transfer format selection that is described in the patent claims. In support of this reading, Intel first contends that the patent's reference to "communication medium" broadly covers a piece or collection of pieces of coaxial cable, telephone wire, optical fiber, or other medium and is not limited to a medium that is shared or switched. As understood by Intel, a "communication medium" includes both the daisy chain network architecture, where each device is connected to a common cable and thus "hears" every other device, and the star network architecture used in Ethernet LANs, where one device having multiple ports (such as a repeater or hub switch) is at the center and selectively transmits the data it receives to other nodes through several cables extending out from it. Similarly, Intel next contends that the claim language referring to "transfer of data" between nodes is not limited to any particular method of data communication and is, therefore, broad enough to cover the accused Ethernet devices.

Intel also contends that "source nodes" and "destination nodes," as used in the patent claims, cover any networked device that can transmit or receive data, including intermediary nodes used in Ethernet channels such as repeaters or hubs that are not the original source or final destination of the data to be transmitted. Last, Intel contends that the "transfer format selection means" covers any circuitry or software that performs the selecting function described in the patent by using a bit-string, an inquiry process, and a selection algorithm.

C. Broadcom's Position

Broadcom argues that the claim construction that Intel seeks is improperly broad and that the '830 patent does not cover the accused Ethernet devices. In support of this position, Broadcom principally focuses its arguments in the following areas.

First, Broadcom argues that the "communications medium," as disclosed in the patent, is limited to a shared physical medium, such as a single cable, that is shared by all of the nodes and therefore does not cover separate links between pairs of nodes that are used in the Ethernet LANs that use switching hubs. Second, Broadcom argues that the invention of the '830 patent is directed to dynamic format selection that occurs during the operation of the network, and therefore should not extend to cover the Ethernet auto-negotiation process that is used to configure devices when those devices are initially added to the network.

More specifically, according to Broadcom, the '830 patent's transfer selection

means covers a system where a source node selects from its memory a format of stored format sets for all other nodes, and does not cover a system where two nodes exchange information using a code word signal to automatically negotiate a format. Broadcom, based on its contention that a switching hub cannot be a "source node" or "destination node" because it is only an information intermediary, also argues that the accused Ethernet Devices do not select a format for the transfer of data to a selected destination node, as contemplated by the patent, because an Ethernet device is only capable of transmitting data to its link partner using the format that was set during auto-negotiation with that device.

D. The Court's Findings

Intel is asserting four of the forty-five claims of the '830 patent. The claims at issue are: (i) claim 1, an independent claim directed at a "communication system;" (ii) claim 7, which is dependent on claims 6, 2, and 1, and adds the requirement that the bit positions of the bit strings referred to in claim 1 represent transfer formats; (iii) claim 15, an independent claim directed at a "network interface;" and (iv) claim 18, which is dependent on claim 15 and also adds the requirement that the bit positions of the bit strings referred to in claim 15 represent transfer formats. The court will construe the language of each claim in turn.

1. Construction of Claim 1

Claim 1 of the '830 patent recites:

1. A computer communication system for transferring data between a plurality of nodes comprising:

(a) a communication medium;

(b) a plurality of nodes coupled to said communication medium for the transfer of data between said nodes; wherein said transfer of data is a transfer of data from a source node selected from said nodes to a destination node selected from said node, and

(c) transfer format selection means for selecting a format for the transfer of data from said source node to said destination node;

wherein said plurality of nodes is comprised of at least one default node and at least two supplemented nodes;

wherein each of said nodes has a format set comprised of one or more formats;

wherein said formats are defined in terms of data architecture;

wherein said data architecture is defined in terms of at least one member of a group consisting of encoding, compression, and protocol;

wherein each of said format sets includes at least one default format;

wherein said at least one default format is included in the format sets of each of said nodes;

wherein the format set of each of said supplemented nodes includes at least one supplemental format in addition to said at least one default format;

wherein said transfer selection means is adapted to select a format which is common to the format sets of the source node and destination node and which is compatible with said communication medium.

Col. 11:23-55.

a. "communication medium"

The parties dispute the meaning of the term "communication medium." Intel's proposed construction for the term "communication medium" is the collection of connections (generally, links between nodes) over which negotiation signals and other data in a communications system may be transmitted. According to Intel, the term is not limited to any specific type or arrangement of a communication medium. Intel claims that is proposed construction adopts the common technical meaning of the term, see, e.g., IEEE Standard Dictionary of Electrical and Electronics Terms 581 (4th Ed. 1988) (defining medium as "a vehicle capable of transferring data"), and "communication medium" is a term whose definition is clear on its face.

Broadcom claims the term "communication medium," as used in the claim, is a shared physical medium, such as a wire or a cable, over which data is transferred. In support of its reading, Broadcom points to language in the specification explaining that a "communication medium can be cable, fiber optics, radio channel or other medium of communication shared by the nodes." Col. 1:14-16.

Before construing this claim element, the court makes the following preliminary observations. First, the claim language itself, which is clear on its face, does not contain the word "shared" and does not seem to limit the term communication medium to a single shared link. Next, while the claim language should be interpreted in a manner that is consistent with the specification, it is improper to import limitations from the

specification onto the claims. Intervet, 887 F.2d at 1053. Moreover, the Federal Circuit has repeatedly stated that it is improper to add a limiting adjective or adverb before a term that stands unmodified in the claim. See, e.g., Micro Chem., Inc. v. Great Plains Chem., Inc., 194 F.3d 1250, 1258 (Fed. Cir. 1999) (refusing to limit the term "weighing" from the claim to sequential and cumulative weighing); Johnson Wordwide Assocs. v. Zebco Corp., 175 F.3d 985, 989 (Fed. Cir. 1999) (collecting cases); Virginia Panel Corp. v. Mac Panel Co., 133 F.3d 860, 865-66 (Fed. Cir. 1997) (holding that term "reciprocating slide plates" could cover rotational reciprocation in addition to linear reciprocation, even though embodiment in patent was linear).

Claim 1 indicates the communication medium is the vehicle by which data is transferred between nodes on a network. The particular embodiment that is shown in Figure 1 consists of five conductive cables (labeled 1) over which electrical signals travel. The specification of the '830 patent demonstrates that links other than the cables shown in Figure 1 were contemplated by the inventors. Indeed, as noted by Broadcom, the specification states that "[t]he communication medium can be cable, fiber optics, radio channel or other medium of communication shared by the nodes." Col. 1:14-16. Rather than limiting the definition of communication medium, as Broadcom argues, that phrase indicates that the definition of communication medium was intended to be broader than the preferred embodiment shown in Figure 1. As used in that sentence, the term communication medium is not limited to a "shared" communication medium in the sense

that it must be a single cable or wire link that connects all of the nodes such that every transmission placed on the medium by one node is available to all other nodes simultaneously. The plain meaning of "shared" is not limiting. The word "shared" only indicates any communication medium that is covered is used to connect each node to the system. The fact that the patent expressly includes bridges and gateways as nodes supports this conclusion.

In sum, the court declines to adopt Broadcom's limiting construction. Therefore, the court finds, a communication medium is a collection of connections (generally links between nodes) in a communication system over which information may be transmitted.

b. "node"

The parties dispute the meaning of the term "node." Intel's proposed construction for the term "node" is a data processing device that can communicate on a communication system, and, by definition, includes, but is not limited to, devices such as a computer, a file server, a gateway, a co-processor, a modem server, memory, or a printer. In support of its construction, Intel points to the written description, which states:

> As used herein, a "node" is a computer, file server, bridge, gateway, co-processor, modem server, memory, printer or other data processing device ("DPD") coupled to the communication medium though an interface. Col. 1:9-13.

Broadcom argues that the definition of the term "node," should include the limiting language in the written description that requires the node to be a device that is "coupled to the communication medium through an interface." The term coupled is a

term of art in patent parlance that means electrically (or otherwise) connected to allow the transfer of signals.

It is clear from the specification's language above, in which the inventors expressly define the term "node" as used in the patent, that the inventors have chosen to be their own lexicographer with respect to this term and have stated their special definition of the term in the patent specification. Vitronics, 90 F.3d at 1582. The court therefore adopts the meaning of node from the specification. A "node" is a computer, file server, bridge, gateway, co-processor, modem server, memory, printer or other data processing device ("DPD") coupled to the communication medium though an interface. The parties, however, dispute whether the phrase "coupled to the communication medium through an interface" modifies and thus limits each term in the list above and hence modifies the definition of "node" itself or only modifies the term "other data processing device," the last term in the list above.

The more natural reading of the phrase is to read the phrase "coupled to the communication medium through an interface" as modifying the definition of the term "node" itself. This reading is consistent with the use of the term "node," throughout the specification. For example, when referring to the algorithms that it discloses regarding the selection, the specification states that "the selection can be executed by the node's interface circuitry or software." Col. 5:33-35. This reading is also consistent with the

ordinary meaning of the term node.[2] Therefore, the court finds that the term "node" is any data processing device, including, but not limited to, a computer, a file server, a bridge, a gateway, a co-processor, modem server, memory, or printer, that includes a network interface, through which it is coupled to the communication medium.

For the sake of clarity, it should be noted that the term "node" is used in a phrase in the claim that recites "a plurality of nodes coupled to said communication medium for a transfer of data between said nodes." Reading the phrase as a whole, one could argue that being coupled to the communication medium is not part of the intrinsic meaning of "node," because if it were, the use as "coupled to said communication medium" as a modifier in the claim, arguably would be redundant. Therefore, the court holds that while a node must be a device that includes a network interface, it does not as part of its own definition have to be coupled, or electronically connected, to the communication medium.

c. "a plurality"

The parties do not appear to dispute the meaning of the term "plurality." Intel claims that a plurality means at least two. While Broadcom agrees that the plain meaning of plurality means at least two, Broadcom claims that the term plurality is later modified by the succeeding claim element "wherein said plurality of nodes is comprised of at least

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[2]For example, Computer Networking Essentials 672 (2001) (Cisco Press), defines "node" as "[a]n endpoint of a network connection or a junction common to two or more lines in a network. Nodes can be processors, controllers, or workstations . . . Node is sometimes used generically to refer to any entity that can access a network, and it is frequently used interchangeably with 'device.'"

one default node and at least two supplemented nodes" to require at least three nodes.

The court finds that both parties are correct. The term "plurality," standing alone, means at least two. However, the plurality of nodes referred to in the claims is limited by the wherein clause that describes that the plurality must be "comprised of" at least one default node and at least two supplemented nodes.[3] The term "comprising" is a "term of art which means that the claimed elements are essential, but other elements may be added and still form a construct within the scope of the claim. Genentech v. Chiron, 112 F.3d 495, 501 (Fed. Cir. 1997). Therefore, as used in claim 1, the term "plurality" requires at least three nodes.

d. "transfer of data"

The parties agree that the term "transfer" means to transmit something from one node to another. See Modern Dictionary of Electronics, 6th Ed. (1997) at p. 1053. However, the parties dispute the meaning of the term "data" as used in the phrase "transfer of data." The term is not explicitly defined in the patent.

Intel proposes that data should be construed to mean anything passed between nodes that conveys meaning, and includes information defining the format set that is sent from one node to another in addition to other data that may later be sent between the nodes. In support of its proposed construction, Intel argues that the term "data" is used

[3]The parties dispute the meaning of the terms "default node" and "supplemented node." The court's construction of these terms is discussed, infra, in section II.D.1.j.

throughout the specification in a variety of ways that indicate the term is to have its broad, ordinary meaning.

Broadcom asserts that Intel's proposed construction of the term "data" is overbroad in two ways. Broadcom first argues that the term "data," as used in the patent, should be limited to basic elements of information that are organized into a frame that identifies the source and destination of the information. A frame is a packet of information that includes the data to be transmitted, an identification of the node that is transmitting the data, and an identification of the node that is the intended recipient of the data. In addition to arguing that data must be information that is sent in frames, Broadcom also draws a distinction between substantive information, which it calls "data," and certain setup information that is transmitted between nodes, which despite the fact that it conveys meaning, is not "data," according to Broadcom.

(i) does "data" need to be transmitted in frames?

Broadcom supports their argument as to why the meaning "data" includes frames by relying on the declaration of their expert, Dr. Tobagi. In his declaration, Tobagi asserts that "[a] person of ordinary skill in the field of the invention would understand that a "transfer of data" over a communication medium means that the data is transmitted in 'frames' because that is the way that data is transmitted over a computer communication system." Tobagi Decl. at ¶ 7. Broadcom finds support for this definition in the specification, noting that every embodiment of the invention that is shown and

described in the specification transfers data in frames, which include the addresses of the node that initiated the transfer of data and the address of the node to which the data is intended to be sent.

Broadcom also argues that this definition of data is compelled by the patent's definition of the term "format," which is defined in the specification as "the convention used for data transmission which defines frame organization and content." Col. 3:20-21. Broadcom argues that if the data is not required to be transmitted in frames, this definition of format would be rendered meaningless.

Intel argues that the limitation that Broadcom seeks is unsupported by the claim language and asserts that nothing in the '830 patent requires that data must be transferred in frames. Intel also points out that Dr. Tobagi's statement that the claim language must be limited in this way because networks have to transfer data in frames having source and destination identifiers may itself be too broad. Intel notes that Dr. Tobagi's own book, "Advances in Local Area Networks," which is relevant to how one of ordinary skill would construe the patent claims because it was published one year before the '830 patent was filed, see Schering Corp v. Amgen Inc., 222 F.3d 1347, 1353 (Fed. Cir. 2000), recognized that only "some of the information [in local area networks] is sent in packets containing a destination address." Advances in Local Area Networks (Karl Kummerle, Fouad A. Tobagi, and John O. Limb eds. 1987).

The court finds that the definition of "data" does not require that data is

specifically transferred in frames. The ordinary meaning of the term "data," as understood by those with ordinary skill in the art at the time the patent was filed, did not include this limitation. As Broadcom itself noted in its Opening Brief, "[t]he ordinary meaning of the term 'data' is basic elements of information which can be processed or produced by a computer." Broadcom's Opening Br. 10. No ambiguity in the claims requires the court to resort to the specification to understand the claim language.

Moreover, even when examining the specification, nothing in the specification indicates that the ordinary meaning of the term "data" should be limited in the manner urged by Broadcom. Broadcom's argument that the use of frames is compelled by the patent specification's definition of the term "format" is unavailing. First, Broadcom misquotes the specification. The specification defines "protocol," and not "format," as "the convention used for data transmission which defines frame organization and content. . . ." Col. 3:20-23. The term "format" is used in the claim language. The term "protocol" is not. According to the specification, "format" is defined in terms of data rate and/or data architecture, which includes "one or more of" a set of data transmission characteristics that includes encoding, encryption, compression, and protocol. Moreover, the patent specification makes it clear throughout that the diagrams of data frames are only examples of embodiments that could be formed based on the claims. Therefore, Broadcom's argument that the specification's definition of protocol does not require that the term "data" is transmitted using frames.

(ii) Is certain setup information excluded from the definition of "data"?

Aside from the definition that includes a requirement that "data" is transmitted using frames, which has been rejected by the court above, Broadcom has not presented to the court a more limited construction that reflects its view that Intel's proposed construction is overbroad. However, Broadcom argues that Intel is wrong in claiming that data is "any thing passed between nodes that conveys meaning," because certain information that is passed between nodes conveys meaning, but is not, in Broadcom's estimation, encompassed by the term "data." In support of this argument, Broadcom refers to the description of the "inquiry dialog" in the patent specification, which describes frames that are passed between the nodes which convey meaning, but are not referred to in the patent as "data."

The inquiry dialog is initiated by the source node when the source node cannot find the format set for the selected destination node in its cache of format sets. Col. 5: 15-22; 5:62-64. "The source node transmits an SFInq frame (Supplemental Format Inquiry frame) to the destination node." Col. 5:64-65. Broadcom notes that the SFInq frame, which is illustrated in Figure 12, does not include any "data." Rather, it includes "two or more flags, destination node address, source node address, type field, FCS, flag and abort. The type field indicates that the frame is an SFInq frame." Col. 7:30-32. In contrast, Broadcom notes, the response to the SFInq frame, sent by the destination node, is a "SFResp frame" that does include data. The SFResp frame includes "two or more

flags, source node address, destination node address, type field, **data**, FCS, flag and abort." Col. 7:35-36 (emphasis added). The "data" is the destination node's format set: it is the "[d]ata specificying dest. node format Set (FsetEff)" shown in the illustration of the response frame in Figure 13. Therefore, Broadcom concludes that Intel's construction of "data" is overbroad because it includes information such as the SFInq frame sent by the source node to request the destination node's format set, which conveys meaning, but Broadcom claims is nonetheless not data.

In response, Intel claims that the frames shown in Figures 9 - 13 derive their organization from the fact that they had to be compatible with the Apple Computer's Appletalk networking system, which was the "default format" of the preferred embodiment. Intel claims that these examples should not be construed to limit the claim language, especially when the patent explicitly indicates that the invention can be implemented in many different environments. See Col 1: 16-23.; Col. 9:19-20.

While "[t]he descriptive part of the specification aids in ascertaining the scope and meaning of the claims inasmuch as the words of the claims must be based upon the description," what is claimed should not be restricted to the examples given in the specification. Specialty Composites v. Cabot Corp., 845 F.2d 981, 987 (Fed. Cir. 1988). As noted by the Federal Circuit: "Where a specification does not require a limitation, that limitation should not be read from the specification into the claims." Id.; see also Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1303 (Fed. Cir. 1997).

As acknowledged by the parties, the ordinary meaning of the term "data" is quite broad. Moreover, it seems that the term "data" is used throughout the patent in a number of different ways. For example, in one section of the specification, the term "data" refers to a field within a frame, as indicated in Figure 11 and Figure 13. Col. 7:37-39. However, in another section of the specification, the term "data" refers to the entire frame that is sent from the source node to the destination node. Col. 5:55-61. At yet another point in the specification, the term "data" seems to refer to information generally. Col. 2: 46:52.

It is improper to pick one of those uses and limit the claim to that one definition. Rather, the court's task is to construe the meaning of the term "transfer of data" as it is used in elements (b) and (c) of claim 1, which recite:

> (b) a plurality of nodes coupled to said communication medium for the transfer of data between said nodes; wherein said transfer of data is a transfer of data from a source node selected from said nodes to a destination node selected from said node, and
>
> (c) transfer format selection means for selecting a format for the transfer of data from said source node to said destination node;

Broadcom asserts that it is not unusual, in the field of communications systems, to distinguish between "data" and other information such as setup information. However, the court disagrees. Nothing indicates that this distinction was adopted in the '830 patent.

While other elements of claim 1 are limited by a number of wherein clauses that follow, the term "data" is not so circumscribed. The unmodified use of the term "data" in

the claims themselves indicates that the claim drafter did not intend to vary from the term's broad ordinary meaning. The term "data" in claim elements (b) and (c) encompasses any information that is sent between nodes. Accordingly, the court finds that, in light of the claim language and specification, the term "data" means any thing passed between nodes that conveys meaning.

e. "source node" and "destination node"

(i) does the meaning of source node and destination node include intermediate nodes?

The parties dispute the meaning of the terms "source node" and "destination node." According to Intel, a "source node" is a node that has the capacity to transmit data, whether it is the original creator of the data that is first transmitting the data or is another node (i.e. an intermediate node) that is transmitting the data. A "destination node" is a node that has the capacity to receive data, whether it is the ultimate recipient of the data, or is another node (i.e. an intermediate node) that is receiving the data. In support of this construction, Intel argues that for these terms the '830 inventors were their own lexicographers. When the terms "source node" and "destination node" were first introduced in the patent specification, the specification identified what those terms meant:

> Data is transferable from one node (the "source node") to another node (the "destination node") over the communication medium (e.g. cable 1). Typically, but not necessarily in every case, each node is capable of functioning as a source node (i.e. has the capability to transmit data) and as a destination node (i.e. has the capability to receive data).

Col. 2:46-52. In the above section, in contrast to the non-exhaustive example of a communication medium, indicated by "e.g.," the inventors indicated the definitional nature of their references regarding the nodes by using "i.e.," an abbreviation for the Latin term *id est*, which means "that is" or "that is to say." See Black's Law Dictionary (6th ed. 1990). Intel, thus, contends that by linking the terms to the phrases in parentheses with the term "i.e." the inventors were stating that each phrase in parentheses was another way to express the terms "source node" and "destination node." The definitions that they gave to those respective terms are, "[a node that] has the capability to transmit data" and "[a node] that has the capability to receive data." This meaning is consistent with the language of claim 1, which recites that the data is to be transmitted from a source node, a node capable of transmitting data, to a destination node, a node capable of receiving data.

Broadcom argues that the terms "source node" and "destination node" are not explicitly defined in the specification because the statement referred to by Intel merely states that to *function* as a source node, a node must be able to transmit data and to *function* as a destination node, a node must be able to receive data. Broadcom, thus, contends that in the context of this patent, a person of ordinary skill in the art would understand that the plain meaning of the term "source node" as a device that initiates the transfer of data. Broadcom similarly contends that the plain meaning of the term "destination node" is a device that is the intended recipient of the data.

When the inventors explicitly state the meaning that they are assigning to certain

claim terms, the court should give that meaning to those terms. See Renishaw, 158 F.3d at 1249 ("[T]he definition selected by the patent applicant controls"). Broadcom's reading of the "i.e." language above is strained. The specification does not describe certain nodes that function as source nodes or destination nodes, but are nonetheless not source nodes or destination nodes. Nothing in the patent indicates that the inventors intended to adopt the narrower meaning that Broadcom seeks, which requires the source node to be the original source of the data to be transmitted and the destination node to be the ultimate destination of the transmitted data. Rather, the patent provides, as specific examples of nodes, devices such as bridges and gateways that would rarely, if ever, be the original source of the data or the ultimate destination of data, but would instead act as intermediate nodes. Nowhere in the specification does the patent indicate that such nodes could not function as source or destination nodes. Rather, the specification states that "[d]ata is transferable from one node (the "source node") to another node (the "destination node") and pointed out that a single node can be both a "source node" and a "destination node" if it is both capable of sending and receiving data.

Therefore, the court finds that the meaning of the term "source node" is a "node," as defined above, that has the capability to transmit data. A "destination node" is a "node," as defined above, that has the capability of receiving data.

(ii) Are the meanings of source node and destination node limited to include network addresses or to store information about its own data transfer format capabilities and the data transfer format capabilities of

other nodes coupled to the network?

Broadcom further submits that the meanings of the terms "source node" and "destination node," as used in the claims, are limited in a number of ways. First, each "source node" is required to store information about its own data transfer format capability (or capabilities), as well as the data transfer format capability (or capabilities) of the other nodes coupled to the network. Second, each "source node" and each "destination node" must have a network identification or address to permit a source node to select a destination node to which it wishes to transfer data.

With respect the Broadcom's argument that each "source node" must have the capability to store information about its format sets and the format sets of other nodes coupled to the network, Intel argues that Broadcom's argument finds no support in the claim language. Rather, Intel notes the "cache" element is not brought into the claims until dependent claim 2, which claims:

> A computer communication system in accordance with claim 1 wherein said transfer format selection means is comprised of a source node cache for node format sets and a destination node cache for node format sets; and wherein transfer format selection is made by the source node by searching for the destination node format set in said source node cache and by selecting a format which is included in said destination node format set and the source node format set.

Col. 11: 56-64.

The court finds that although the examples in the specification support Broadcom's contention that each "source node" must have the capability of storing such

information in its cache, or memory, see Col. 4:59 - 5:11, claim 1 cannot be so limited. In interpreting claims, it is improper for courts to read into an independent claim a limitation that is explicitly set forth in another claim. D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 1574 (Fed. Cir. 1985). Rather, each claim of a patent constitutes a separate invention and gives rise to separate rights. Jones v. Hardy, 727 F.2d 1524, 1528 (Fed. Cir. 1984). This concept, known as claim differentiation states that claims should be presumed to cover different inventions.

In one example given, which appears to be an implementation of the more narrow claim 2, the format capability (or capabilities) of the destination node must be stored because that is what the source node's transfer format selection means uses to select the proper data transfer format. The specification notes that, in this particular embodiment, when the cache of a given node is incomplete and does not contain an entry for the destination node's formats, an inquiry dialog must be initiated, in which the source node cache determines the destination node supported transfer formats and updates its cache with the format set of the destination node. However, because "cache" is the only element that is added in dependent claim 2, under the doctrine of claim differentiation, the court rejects Broadcom's proposed limitation on claim 1. See Beachcombers Int'l v. Wildewood Creative Prods., 31 F.3d 1154, 1162 (Fed. Cir. 1994).

If the court were to adopt Broadcom's proposed construction, claim 2 and other claims, such as claim 7, that are dependent on claim 2 would be rendered superfluous.

See id. Therefore the court declines to adopt a construction that so limits the source node's "transfer format selection means" as disclosed in claim 1.

Second, as noted above, the '830 patent does not indicate that only nodes called out by particular fields in a frame can be "source nodes" and "destination nodes." The examples cited by Broadcom for the proposition that the source node address and the destination node address are always included in a frame data transmission between the source and destination nodes, see Fig. 9-13, are only examples of the preferred embodiment, Appletalk. Specialty Composites, 845 F.2d at 987. The broad claim language and express language of the specification indicate that the invention is not to be limited to that particular system or a system that uses the same data types as that system. Karlin Tech., Inc. v. Surgical Dynamics, Inc., 177 F.3d 968, 973 (Fed. Cir. 1999) (stating that "[t]he general rule, of course, is that the claims of a patent are not limited to the preferred embodiment, unless by their own language"). Therefore, the court finds that the definition of "source node" and "destination node," like the definition of "data" is not limited to require a "source node address" or "destination node address." Naturally, the transfer format selection means element must have some ability to identify the supported format sets that are compatible with the destination node in order to allow it to select a data transfer format that is compatible with the destination node. However, this ability to identify is not limited to implementations that use an addressing scheme with specific "source addresses" and "destination addresses" that are transmitted in frames. Moreover,

it is part of the function and corresponding structure of the transfer format selection means, and not a limitation on the definition of "source node" or "destination node."

In sum, the court finds that a "source node is a "node" that has the capability to transmit data. A "destination node" is a node that has the capability to receive data.

f. "destination node selected from said nodes"

The parties dispute the meaning of the phrase "destination node selected from said nodes" and argue over whether or not it limits the definition of source node. The element in full states:

> a plurality of nodes coupled to said communication medium for a transfer of data between said [plurality of] nodes; wherein said transfer of data is a transfer of data from a source node selected from said nodes to a destination node selected from said nodes.

Relying on its abbreviated quotation of the claim element, Broadcom, in its opening brief, contends that the language of the claim element requires that there be "a transfer of data from a source node . . . to a destination node *selected* from said nodes." Broadcom argues that based on the quoted claim language, the source node must be the entity that "selects" the destination node. Intel contends, however, that if the claim is read in full, it is clear that no structure in the patent "selects" the source node; rather, Intel argues, by stating that both the source node and destination node are "selected from said nodes," the claim merely indicates that both the source node and the destination node must be one of the plurality of nodes. Intel concludes that the only limitation that arises

from this language on the meaning of source and destination node is that both must be one of the plurality of nodes that is referred to earlier in the claim.

The court finds Intel's reading of the plain language of the claim to be persuasive. The "selected from said nodes" phrase that modified both the source node and the destination node simply requires the source node and the destination node are each one of the plurality of nodes that is earlier references in the claim.

g. "format"

The parties dispute the meaning of the term "format." Intel argues that the term "format," as defined in the claims and specification, is a form in which data is transmitted between nodes according to its encoding, protocol, encryption, and compression. Therefore, Intel submits that one format is different from another format if it uses different encoding, protocol, encryption, or compression, or any different combination thereof. However, one format is not different from another format if they both use the same encoding, protocol, encryption, and compression, but differ only in transmission rates.

While agreeing that the asserted claims expressly limit the format to a format "defined in terms of data architecture," Broadcom argues that Intel's construction the term "format" combines additional claim limitations that appear only in the asserted claims. Specifically, Broadcom argues that the Intel's construction combines the term "format" with two separate claim elements - "wherein said formats are defined in terms of

data architecture" and "wherein said data architecture is defined in terms of at least one member of a group consisting of encoding, encryption, compression, and protocol." According to Broadcom, the term "format," standing alone, must have a broader meaning, because it cannot include limitations that are recited only in some of the claims.

The court finds that the specification defines each of the terms relating to the definition of format. The term "format" is a data transmission characteristic that is defined in terms of "data architecture" and/or the "rate of data transmission." The "rate of data transmission" is defined in the specification as "the rate at which data bits are transmitted from source node to destination node." "Data architecture" is defined in the specification "by one or more of the following data transmission characteristics: encoding, encryption, compression, and protocol."

The phrase "wherein said formats are defined in terms of data architecture" qualifies the term format, as used in claim 1, and limits it to formats that are defined in terms of "data architecture." This means that the formats referred to in claim 1 are not defined in terms of the "rate of data transmission," but are limited to being defined in terms of "data architecture."

The phrase "wherein said data architecture is defined in terms of at least one member of a group consisting of encoding, encryption, compression, and protocol," limits the "data architecture," as used in the "format" of claim 1, to a one or more members of this group of four specific types of data architecture. Each term is defined in the

specification, and each term is well-known to persons of ordinary skill in the art. The court adopts each of the meanings of the four types of data architecture, as they are set forth in the specification. "Encoding" is the waveform pattern or other waveform representation of data bits used for transmission of data on the communication medium. "Encryption" is the organization and arrangement of data into a nonintelligible form for transmission. "Compression" is the representation of data in a shorter form which requires fewer bits to represent the data. "Protocol" is the convention used for data transmission which defines frame organization and content including command codes for the protocol handler of the destination node.

h. "transfer format selection means for selecting a format for the transfer of data from said source node to said destination node"

The parties dispute the meaning of the phrase "transfer format selection means for selecting a format for the transfer of data from said source node to said destination node." The meaning of this claim element is one of the most vigorously disputed terms in the '830 patent. The parties agree that this claim element is written in the means-plus-function language of 35 U.S.C. § 112. Therefore, the court will construe the phrase to determine both the claimed function and the structure that is disclosed in the specification that corresponds to that function. Chiuminatta,145 F.3d at 1308.

(i) what is the claimed function?

When determining the claimed function in a means-plus-function element, the function is often simply found in the phrase that follows the word "for." Here, the

element recites: "transfer format selection means for *selecting a format for the transfer of data from said source node to said destination node*."

In this case, however, each of the asserted claims in the '830 patent also contains the following phrase: "wherein said transfer format selection means is adapted to select a format which is common to the format sets of the source node and destination node and which is compatible with said communication medium." This phrase further describes the function of the transfer format selection means and is reenforced by the specification which repeatedly describes the dynamic selection of compatible formats between nodes as the purpose of the invention. For example, the specification states that "[t]ransfer format selection means in the form of circuitry and software provides for the selection of a data transfer format which is included in the source node format set and the destination node format set and is compatible with the communication medium." Col. 1:53-57. The prosecution history supports reading this limiting wherein phrase as part of the claimed function. In response to the Examiner's rejection of the claim during prosecution as indefinite under 35 U.S.C. § 112, the applicants argued that the transfer format selection means was not indefinite because its functional relationship to the other apparatus elements of the claims was further specified in the wherein phrase recited above.

Thus, the court finds that the claimed function of the transfer format selection means element as modified by the limiting wherein clause is selecting a format for the transfer of data from a source node to a destination node, which is common to the format

sets of the source node and the destination node and which is compatible with said communication medium.

(ii) what is the claimed structure?

Section 12, ¶ 6 of Title 35, the statutory provision that sets forth the rules for means-plus-function claims, allows claim drafters to use means expressions without recitation of all the possible means that might be used in a claimed apparatus. However, "the price that must be paid for use of that convenience is the limitation of the claim to the means specified in the written description and equivalents thereof." See O.I. Corp. v. Tekmar Co. Inc., 115 F.3d 1576, 1583 (Fed. Cir. 1997); see also B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1424 (Fed. Cir. 1997); Serrano v. Telular Corp., 111 F.3d 1578, 1583 (Fed. Cir. 1997).

Section 112, ¶ 6 provides that:

> An element in a claim for a combination may be expressed as a means or a step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. § 112, ¶ 6. In interpreting section 112, ¶ 6, the Federal Circuit has explained that where the claim at issue is a process claim that recites a combination of steps (i.e., a step-plus-function claim) the claim covers corresponding functional "acts" that are recited in the patent. O.I. Corp., 115 F.3d at 1582-83. However, where the claim at issue is an apparatus claim that recites a combination of elements (i.e., a means-plus-function claim),

as the claim here, the claim covers corresponding "structure and material." Id. ("structure and material go with means, acts go with steps").

The parties dispute what is included in the claimed structure of the transfer format selection means. In its briefs, Intel claims that the language of this claim element covers hardware, software, or a combination of the two for selecting a format for the transfer of data from a source node to a destination node, having the following characteristics:

> (i) A string of bits, wherein each bit position represents the ability (by being set to "1") or inability (by being set to "0") of a node to communicate using the format represented by the corresponding bit position.
>
> (ii) A process by which the first node obtains the bit-string that indicates the supported formats of the second node by sending an inquiry to the second node and receives a response that contains the bit-string.
>
> (iii) A selection, from the formats that are common between the format sets of the two nodes, of a format for the transmission of data. This selection is executed by the node's interface circuitry or its software, or a combination of both.

Intel contends that these three characteristics are components of a process or algorithm, and that the disclosed algorithm constitutes a structure.

As a preliminary matter, it should be noted that with respect to the first two components of Intel's purported structure of the transfer format selection means, Broadcom makes arguments, under the theory of claim differentiation, that the structure urged by Intel cannot be correct. For example, Broadcom states that the use of a bit string to represent each format set is recited in dependent claim 6, that depends on claim 2, that in turn depends on claim 1, which recites the transfer format selection means. According

to the theory of claim differentiation, each claim is presumed to disclose a separate invention. Jones, 727 F.2d at 1528. Broadcom asserts that if the transfer format selection means recited in claim 1 includes a bit string, the scope of claim 1 would encompass the dependent claims and would render claim 6 superfluous. Similarly, Broadcom points out that the use of inquiry dialog is disclosed in dependent claim 3, which depends on claim 1. Broadcom reasons that because claim 3 adds additional "means . . . to conduct an inquiry dialog" to the transfer selection means of claim 1, the transfer format selection means of claim 1 does not and cannot include the inquiry dialog.

In opposition to Broadcom's claim differentiation arguments, Intel argues that the theory of claim differentiation has limited application when dealing with means-plus-function elements. Intel points to Federal Circuit authority that indicates that under § 112, ¶ 6, claim differentiation cannot be used to broaden a means-plus-function element beyond the structure in the specification, even if the dependent claim recites the same exact structure. See Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc., 248 F.3d 1303, 1313 (Fed. Cir. 2001) (citing Laitram Corp. v. Rexnord, Inc., 939 F.2d 1533, 1538 (Fed. Cir. 1991)); see also Globetrotter Software, Inc. v. Elan Computer Group, Inc., 236 F.3d 1363, 1369 (Fed. Cir. 1997). These opinions reason that even if the structure contained in an independent claim is recited explicitly in a dependent claim, the two claims will have differing scope, because the independent claim literally covers the structure described in the specification and equivalents thereof, while the dependent claim

does not literally cover equivalents. Laitram Corp., 939 F.2d at 1538. Rather, § 112, ¶ 6, instructs a court to review the specification and prosecution history to determine the claimed structure.

In light of this authority, the court will not base its claim construction relating to the underlying structure of the transfer format selection means on the theory of claim differentiation. Rather, the court will review the specification as a whole to determine what structure is disclosed.

According to Broadcom, the three "characteristics" referred to by Intel do not define the structure, whether in the form of hardware, software, or an associated algorithm, that is required to perform the recited function. Broadcom asserts that these characteristics identify a series of "acts" or "steps" but do not identify any "structure," as required by section 112, ¶ 6. In essence, Broadcom contends that a means-plus-function cannot broadly define its means in terms of functional processes, because the coverage of such a claim would reach any structure that could be designed to perform the disclosed function, a result not intended by section 112, ¶ 6; rather, a means-plus-function claim is limited to its specific disclosed structure. Broadcom, thus, argues that the patent fails to disclose any specific corresponding structure that performs the claimed function of the "transfer format selection means."

Because the issue of invalidity is not presently before the court and Broadcom is not now seeking a ruling that the claims are invalid for indefiniteness, see Budde v.

Harley-Davidson, Inc., 250 F.3d 1369, 1376 (Fed. Cir. 2001), Broadcom submits that the for the purposes of claim construction, "transfer format selection means" must be construed to cover the only "structure" that is disclosed by the patent: "any circuitry or any software" that is capable of performing the claimed function as defined above.

In determining the associated structure of a means-plus-function claim, the court must read the specification as a whole. Serrano, 111 F.3d at 1583. Broadcom correctly states that passages of the patent that refer to the transfer format selection means state that it may be implemented using "circuitry and software." In fact, according to the specification, the patent "disclosure does not include specific circuitry and computer programs for the implementation of the [the transfer format selection means]."

Intel, however, relies on the Federal Circuit's proposition in WMS Gaming Inc. v. International Game Tech., 184 F.3d 1339, 1349 (Fed. Cir. 1999), that for computer implemented inventions that correspond to means-plus-function elements, the structure is the circuitry or software programmed to perform the algorithm (or formula) described in the patent that is used to perform the function. Therefore, the patent specification need not disclose specific circuitry or software; rather, the patent must disclose a specific algorithm for performing the stated function with which software or circuitry can be programmed or configured. Intel points out that language in the specification explains that the disclosure did not include specific circuitry and computer programs for the last component of their three-component structure, because the circuitry and software to

perform that sub-function "are well within the knowledge and skill of persons of ordinary skill in the art and means to accomplish the above described functions and objectives are known in the art." Col. 10:44-47; Col. 11:3-11.

The parties' positions reveal a tension in the law between the paragraphs within § 112. See Atmel Corp. v. Information Storage Devices, Inc., 198 F.3d 1374, 1381 (Fed. Cir. 1999). Section 112, ¶ 1 requires that the disclosure in the patent specification be sufficient such that one skilled in the art will know and understand how to make or use the invention. 35 U.S.C. § 112, ¶ 1. Section 112, ¶ 2 requires claims that particularly and distinctly indicate the subject matter that the inventor regards as his or her claimed invention. 35 U.S.C. § 112, ¶ 2. Section 112, ¶ 6, the means-plus-function provision, also focuses on claim language, but directs one to the patent specification for its meaning. 35 U.S.C. § 112, ¶ 6.

It is well-settled that in order to determine whether an invention is properly enabled under § 112, ¶ 1 and particularly claimed under § 112, ¶ 2, one must view the disclosures taking into account whether one skilled in the art will know and understand what is claimed and how to make or use the invention. See § 112, ¶ 1 (providing that enablement requirement is satisfied if the patentee sets forth in the written description what one skilled in the art would need to know to make and use the claimed invention); Atmel Corp., 198 F.3d at 1382 (holding that for a mean-plus-function claim to meet the particularity requirement of § 112, ¶ 2, "the corresponding structure(s) of the function

must be disclosed in the written description in such a manner that one skilled in the art will know and understand what structure corresponds to the means limitation"). As stated earlier, the means-plus-function provision, § 112, ¶ 6, requires the inventor to disclose "structure . . . described in the specification and equivalents thereof." 35 U.S.C. § 112, ¶ 6.

But what if a part of the structure that corresponds to a means-plus-function element's function is well-known and well-understood by those skilled in the art? In that case, must all possible structures be disclosed, or may the patentee rely on the fact that the structure is known by one skilled in the art? This issue was addressed by the Federal Circuit in Atmel Corp. v. Information Storage Devices, Inc., 198 F.3d 1374 (Fed. Cir. 1999). In Atmel Corp, the Federal Circuit held that the proper inquiry under § 112, ¶ 6 "asks first whether structure is described in the specification, and, if so, whether one skilled in the art would identify the structure from the description." Atmel Corp., 198 F.3d at 1382. The court elaborated on this statement, stating:

> Fulfillment of the 112 tradeoff cannot be satisfied when there is a total omission of structure. There must be structure in the specification. This conclusion is not inconsistent with the fact that the knowledge of one skilled in the particular art may be used to understand what structure(s) the specification discloses . . . because such resources may only be employed in relation to structure that is disclosed in the specification. . . . All that one needs to do in order to obtain the benefit of [the means-plus-function] claiming device is to recite some structure corresponding to the means in the specification, so that one can readily ascertain what the claim means . . . .

Id. at 1382.

Thus, the proper inquiry is not whether the structure that corresponds to the claimed function is well-known in the art, but whether the patent discloses a sufficient structure or, in this case, a sufficient algorithm with which one skilled in the art could program a computer or configure a circuit to perform the claimed function. See WMS Gaming Inc., 184 F.3d at 1349 ("In a means-plus-function claim in which the disclosed structure is a computer, or microprocessor programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm").

As more fully set forth above, Intel argues that the patent specification describes a process having the following components: (i) a bit string that represents a format set; (ii) a process of conducting an inquiry dialog; and (iii) "[a] selection of a format . . . for the transfer of data." Intel argues that these components together defines a specific algorithm for performing the function of selecting a common format, as required to program a "special purpose computer." WMS Gaming Inc., 184 F.3d at 1349. The court finds that the first two components of the corresponding structure are well-defined in the patent specification. However, with respect to the third element, which seems to re-recite the claimed function, the inquiry is more difficult. The inventors did not extensively disclose specific algorithms for comparing bit strings to determine what transfer formats are common between the source and destination node, nor did they extensively disclose

specific algorithms for selecting from the common transfer formats, a single format to use. Rather, the inventors stated in the specification that these algorithms are well-known in the art and intended that they could be applied in a flexible manner and "adapt[ed] . . . for various applications without departing from its generic concept," depending on the objectives of the particular application. Col. 11:12-16.

First, the bit string that is disclosed is not literally part of the algorithm of the transfer format selection means, whose function is to select a common format to transfer information between the source and destination node. Rather, the bit string, which represents the supported format sets of each node, is used by the transfer format selection means to perform its function. See O.I. Corp., 115 F.3d at 1580. Although the bit string that represents formats literally is not part of an algorithm, it is an input to an algorithm that uses information from the bit strings to select a common transfer format. The only means for conveying information about format sets that is disclosed in the patent is the use of bit strings, where bit positions represent entire or parts of format sets. See Col. 3:64-5:10. The court, thus, finds that because the bit string is "an essential part of the structure required to perform the function," that it is part of the corresponding structure. Globetrotter Software, 236 F.3d at 1368 (Fed. Cir. 1997).

The second purported component of the transfer format selection means is the "process" (or algorithm) for sending an inquiry dialog and obtaining the destination node's format set. Intel claims that this process, as disclosed in Figures 4-6 and the

associated text in the specification, is a "an essential component and is necessary to perform the recited function." The inquiry dialog, however, is not a complete description of the process of obtaining the format set of the destination node. According to the specification, the inquiry dialog is only used if the source node does not already "know" the supported format set of the destination node. See Col. 5:15-25. In the embodiment described, "each node stores in memory (or a memory to which it has access)" its own format set and the format sets of other nodes on the network. Col. 4:38-40. The flow-chart algorithm provided for in Figure 4 describes the process that the source node uses. First, it searches its memory for the bit string representation of the destination node's format set. If the format set for the destination node is not found in memory, it then performs an inquiry dialog with the destination node. In response to this inquiry, the destination node sends back to the source node (using the default format) a bit string representation of its format set. The algorithm for the inquiry dialog is described in Figure 6 and in the associated text in Col. 5:62-6:9 of the specification. Figure 5, then describes the algorithm that is used to send the data using the chosen format set. Thus, the second component for the structure of the format selection means are the algorithms that are described above for searching for the bit string representation of the format set of the destination node, by first searching memory that is available to the source node, and then, if that search fails to find the format set, by conducting an inquiry dialog with the destination node. These algorithms for obtaining the bit string representation of the

format set of the destination node, together with the bit string representation of the format set of the destination node itself, form the centerpiece of the invention of the ’830 patent. As the specification notes: “the interface circuitry and interface software execute the algorithms described earlier for transmitting and receiving data and provide the format selection means.” Col. 10:44-47. Accordingly, the court finds that the second part of the structure is hardware or software that is configured or programmed to perform the algorithms shown in Figures 4-6.

Once the source node has the supported format set of the destination node, which is represented by a bit string, as noted above, it must choose a common format with which to transmit the data. Thus, the third and final component that defines the transfer format selection means, according to Intel, is the “a selection, from the formats that are common between the format sets of the two nodes, of a format for the transmission of data.”

Intel argues that this component is “a comparison . . . of the string of bits in the two [bit strings], resulting in a selection.” In support of this argument, Intel points to the chart in the specification that shows how bit strings can represent the supported format sets of different nodes. This chart and the associated text describe the structure of the bit string: bit positions are used to represent which formats are supported. Nowhere in the specification or associated figures does the ’830 patent disclose a detailed flow-chart or formula that could be programmed to make this selection once the bit string representing the format set of the destination node is obtained. Rather, the function of choosing a

common transfer format simply is represented in Figure 4, by a box that is labeled by the function "Choose (FsetEff)," where FsetEff is the bit string representing the destination node's supported format set. The associated text states that after the bit string representing the format set of the destination node is obtained, "then a format . . . is chosen from among the [common] formats of the destination node's FsetEff." Col. 5:23-25. Although the patent does not refer to any specific examples of how to implement such a function, the patent states that "the means to accomplish the above-described functions and objectives are known in the art." Col. 11:10-11.

Thus, neither the specification nor the figures explains exactly how this choice is made or how the common formats are identified. Rather, the specification states only that the "available formats" from which the format set is chosen from are "those formats which are common to (i.e. included in) the source node format set and the destination node format set." Col. 5:25-28. For the purposes of enablement or definiteness, it may be clear to one skilled in the art, as claimed by Intel, once the bit string representation of the destination node's format set is obtained by the source node, how to program software or configure hardware to compare the each bit position of the bit string representation of the destination node's format set to corresponding position of the bit string representation of the source node's format set to determine the format or formats that are common between the two nodes.

For the current purpose of technically construing the corresponding structure under

§ 112, ¶ 6, before turning to the inquiry of whether those with ordinary skill in the art would identify the structure from the description, the first inquiry must be "whether structure is described in the specification." Atmel, 198 F.3d at 1381. The court finds that the structure identified in the specification that corresponds with the final step of choosing a common format is the "Choose (FSetEff)" algorithm identified in Figure 4.

Regarding this Choose() algorithm, the specification states that:

> If there is more than one common format, then the node will select a format from among the common formats. This selection can be random or can be based upon a predetermined priority or can be based upon any criterion or criteria chosen by or for the user. The selection can be executed by the node's interface circuitry or software running on the node's [data processing device] . . .

Col. 5:28-35. The specification follows this statement with an example of the selection criteria that can be used, stating that the source node could "select a format having the desired encryption with the highest rate of data transfer available for the selected encryption." Thus, the specification intentionally leaves undisclosed the inner workings of the Choose() function that is used to select a transfer format.

Although the third element of Intel's proffered structure is left open ended in this manner, the court declines to adopt the construction urged by Broadcom in its brief that "[b]ecause there is no specific structure disclosed for performing the claimed function . . . the [transfer format selection means] must be construed to cover . . . any circuitry or any software that is capable of performing the claimed function." Such a construction is too

broad, because the inventors did disclose the specific structures that they deemed essential to the invention. Essentially, the '830 patent discloses an algorithm whose first step is to represent format sets of nodes using bit strings, whose second step is to obtain that bit string, and whose third step is to select a common transfer format with which to transmit information between the nodes. The corresponding structure to perform the function of the format selection means is circuitry or software programmed to perform those three steps. See WMS Gaming Inc., 184 F.3d at 1349.

Accordingly, the court finds that the specification does specifically disclose the corresponding structure that the inventors intended to be the essence of their invention: the bit string that represents the format sets of the nodes and the set of algorithms that are used by a source node to obtain that bit string. The structure/algorithms associated with these two components are well-detailed in the specification and figures. With respect to the third component of the structure, the inventors did not disclose any detailed algorithm to perform the sub-function of selecting of the transfer format to be used. Instead, relying on the knowledge of those with ordinary skill in the art, the inventors intentionally left this part of the structure, referred to in Figure 4 by the function "Choose(FSetEff)," open and flexible.

In sum, the corresponding structure that is disclosed to perform the claimed function of the transfer format selection means is: (1) a bit string representation of the destination node's supported format set; (2) that is retrieved in accordance with an

algorithm disclosed in Figure 4 that first searches the source node's associated memory, and then, if necessary, conducts an inquiry dialog; and (3) any circuitry configuration or any software programmed to execute an algorithm that first uses the bit string representation of the destination node's supported format set to determine which transfer formats are common to the transfer format sets of the source node and the destination node and compatible with the communication medium and then selects one transfer format from those common transfer formats to use in transmitting the information to the destination node. This selection can be random or can be based upon a predetermined priority or can be based upon any criterion or criteria chosen by or for the user.

i. "format set"

The parties dispute the meaning of the term "format set." Intel claims that a format set is the collection of individual formats for a node, represented by a string of bits, where each individual bit represents a single format. Broadcom agrees that the term "format set," as used in the phrase in claim 1, "wherein each of the said nodes has a format set comprised of one or more formats," means that every node coupled to the network must have a "format set" and that the format set is a collection of individual formats for a node that contains at least "one format." Broadcom disagrees, however, that a "format set" must be represented by a string of bits, where each individual bit represents a single format.

The claims of a patent must be read as a whole. Reviewing the claims, the court

finds that a format set need not be represented by a string of bits. Claims 6 and 17, which depend, respectively from claims 1 and 15, add the limitation "wherein said format sets are represented by bit strings." The term "format set" must have the same meaning in each claim. Southwall Tech., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1579 (Fed. Cir. 1995) ("claim terms must be interpreted consistently"). If the stand alone term "format set" were required to be represented by a bit string, the scope of this term as used in claims 6 and 17 would be superfluous. Beachcombers, 31 F.3d at 1162. Therefore, the court finds that the term "format sets" means a collection of individual formats for a node consisting of at least one format.

j. "default node" and "default format"; "supplemented node" and "supplemented format"

Claim 1 further limits the plurality of nodes that it is claiming by using the phrase:

> wherein said plurality of nodes is comprised of at least one default node and at least two supplemented nodes; wherein each of said nodes has a format set comprised of one or more formats . . . wherein each of said format sets includes at least one default format . . . wherein said at least one default format is included in the format sets of each of said nodes . . . [and] wherein the format set of each said supplemented node includes at least one supplemental format in addition to said at least one default format. . . .

Col. 11:34-38, 44-50. The parties dispute the meaning of the terms "default format," "default node," "supplemented format," and "supplemented node," as used in that phrase.

The parties first dispute the meaning of the terms "default format" and

"supplemented format." Intel contends that a "default format" is the format that the default node shares with the other nodes in the communication system. Broadcom urges the court to adopt their construction that a "default format" is the format that every node coupled to the communication medium can use to transfer data to every other node coupled to that medium. Intel contends that a "supplemented format" is an additional format that is distinct from the "default format." Broadcom argues that a "supplemented format" is one or more additional formats that are not common to all nodes coupled to the network. As one can glean from reviewing the parties proffered constructions, the parties' definitions regarding this term are very similar.

The '830 invention, as a whole, is directed at enabling all nodes to communicate with each other using a compatible and optimal transfer format. The specification explains that although nodes on the network may be qualitatively different in terms of the different transfer formats that they can use, based on the existence of a common format for data transmission between nodes, a nodes sending data to another node can use the invention to determine the best compatible format in which to do so. In other words, each node will be able to transfer data to each other node. According to the specification, "[t]he node format sets . . . each include a default format, i.e., the default format is common to each node format set . . . . This default format ensure that all nodes will be able to communicate with each other . . . . Supplemented nodes . . . can communicate with the default format, and, as described below, with supplemental formats." The

specification also expressly notes that multiple "default formats" may be used to practice the invention. Col. 3:44-46.

Based on the claims and specification language, the court finds that the meaning of the term "default format" is a common format that every node coupled to the communication medium can use to transfer data to every other node coupled to that medium. The meaning of the term "supplemental format" is an additional format, distinct from the "default format," that is not common to all nodes coupled to the network.

The parties similarly dispute the terms "default node" and "supplemented node." Intel contends that according to the claim language and the specification a "default node" is a node having a format set that includes the default format, which is the format the default node shares with the other nodes in the communication system. Intel similarly contends that a "supplemented node" is a node having a format set that includes, in addition to the default format (or default formats), one or more additional formats.

Broadcom claims that a "default node" is a node coupled to the communication medium which can transfer data over the network only in the default format. It is the data transfer format that every node which is coupled to the communication medium can use to transfer data to every other node coupled to the medium. Broadcom argues that a "supplemented node" is a node coupled to the communication medium which can transfer data over the network in the default format and which can also transfer data over the network in one or more supplemental formats.

According to Broadcom, Intel's proffered constructions are wrong for two reasons. First, Broadcom asserts that, according to the claims and specification, a default node is a node that includes only the default format, and a supplemented node is a node that includes in its format set one or more supplemental formats in addition to the default format. Second, Broadcom claims that it is not enough for the nodes to "have" a particular format in its format set. Rather, each node must be able to "use" each format to communicate with other nodes.

For the same reasons underlying the construction of "default format" and "supplemented format," which are stated above, the court finds the terms are defined as follows. A "default node" is a node coupled to the communication medium which can transfer data over the network only in the default format or default formats. A "supplemented node" is a node coupled to the communication medium which can transfer data over the network in the default format or default formats and which can also transfer data over the network in one or more supplemental formats.

2. Construction of Claim 7

Claim 7 of the '830 patent is a dependent claim that depends on claim 6, which in turn depends on claim 2, which in turn depends on claim 1. "A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim[s] to which it refers." 35 U.S.C. § 112 ¶ 4. Incorporating each of these dependencies, claim 7 recites:

> A computer communication system in accordance with claim 1 wherein said transfer format selection means is comprised

> of a source node cache for node format sets and a destination node cache for node format sets; and wherein transfer format selection is made by the source node by searching for the destination node format set in said source node cache and by selecting a format which is included in said destination node format set and the source node format set, wherein said format sets are represented by bit strings, [and] wherein bit positions of said bit strings represent formats.

Col. 11:56 - 12:28.

Many of the terms that are used in claim 7 have been previously construed above in the context of claim 1. The meaning of those terms in claim 7 is identical their meaning in claim 1. The terms whose meaning has not yet been construed are discussed below.

a. "cache"

The parties do not dispute the meaning of the term "cache." A "cache" is a memory. More specifically, according to its plain meaning, a cache is a portion of memory that can be accessed quickly. See Novell's Encyclopedia of Networking 116 (1997).

b. "wherein said format sets are represented by bit strings, [and] wherein bit positions of said bit strings represent formats."

The definition of the term "bit" itself is undisputed. A "bit" is an abbreviation for a binary digit. That is, a character used to represent one of the two digits, '1' or '0,' in a numeration system with a base of two, and only two, possible states. However, certain other elements of the phrase "wherein said format sets are represented by bit strings,

[and] wherein bit positions of said bit strings represent formats" are disputed by the parties.

Intel claims that the plain meaning of the phrase compels a finding that the meaning that each format set must be comprised of a series of 1's and 0's, where each individual bit position in the bit string corresponds to a single format. Broadcom, while agreeing that the term "wherein said bit positions of said bit strings represent formats" requires a one-to-one correspondence between formats and bit positions, disagrees with Intel's construction to the extent that a bit string is a "series" which requires the use of more than one bit. Broadcom asserts that a bit string may be comprised of one single bit, and that the meaning of the term "bit string" should therefore be "one or more bits."

The specification explains that in the preferred embodiment, the format set of each node is represented by a "32 bit word." Each bit position corresponds to a particular format. Therefore, in this implementation, a "32 bit word" could contain information about 32 different formats. If a bit equals '1' (or true), the format set includes the format corresponding to the bit position. If a bit equals '0' (or false), the format set does not include the format corresponding to the bit position.

The specification also indicates, however, that "bit strings having less or more than 32 bit positions can also be used." Col. 3:64-66. To illustrate its point that a single bit could be used, Broadcom notes that a format set that includes only a default format could be represented by a single bit '0,' and a format set that includes both a default format and

a supplemented format could be represented by a single bit '1.' However, in this example, the first bit position is used to indicate two different formats. While it is possible for a single bit to capture this information, the invention does not disclose such a system. Rather, according to the specification, "[e]ach bit position corresponds to a particular format." Thus, to accommodate two formats in the manner contemplated by the '830 patent with at least one default format and at least one supplemented format, as required by the invention, a bit string must contain two bit positions. Moreover, the language of claim 7 itself indicates that the strings have plural "bit positions."

Therefore the court declines to modify Intel's proposed definition of the term to allow the term bit string, as used in the patent, to be comprised of a single bit. The court finds that the phrase "wherein said format sets are represented by bit strings, [and] wherein bit positions of said bit strings represent formats" means that each format set must be represented by a series of 1's and 0's, where each individual bit position in the series of bits corresponds to a single format.

3. Construction of Claim 15

Claim 15 is an independent claim that, like claim 1, recites a "transfer format selection means." Claim 15, however, is directed to a "network interface." It is described using many of the same terms that are used to describe the "computer communication system" that is the focus of claim 1.

Claim 15 recites:

15. A network interface for interfacing a network having nodes and for supplementing the nodes of the network; said network interface comprising:

(a) at least one supplemental format;

(b) transfer format selection means for selecting a format for the transfer of data from a source node to a destination node;

wherein said network is comprised of a communication medium and a plurality of nodes coupled to said communication medium for the transfer of data between nodes;

wherein said transfer of data is a transfer of data from a source node selected from said nodes to a destination node selected from said nodes;

wherein each of said nodes has a format set comprised of at least one default format common to each format set;

wherein said network interface is adapted to supplement a node selected from said nodes by adding said at least one supplemental format to the format set of said selected node;

wherein said transfer format selection means is adapted to select a format which is common to the format sets of the source node and destination node and which is compatible with said communication medium; and

wherein said formats are defined in terms of data architecture;

wherein said data architecture is defined in terms of at least one member of the group consisting of encoding, encryption, compression and protocol.

Col. 12:62-13:24.

Many of the terms that are used in claim 15 have been previously defined above in the context of claims 1 and 7. The meaning of those terms in claim 15 is identical their meaning in those claims as set forth above. The terms whose meaning has not yet been construed, which includes the preamble and a limiting wherein clause, are discussed below.

a. Preamble: "A network interface for interfacing with a network having nodes and for supplementing the nodes or the network, said network interface comprising:"

The parties dispute the meaning of the phrase, "a network interface for interfacing with a network having nodes and for supplementing the nodes or the network." This phrase is not technically an element of claim 15, because it is contained in the preamble to the claim. Intel states that the network interface of claim 15 is "the apparatus that carries out the function for connecting a node to the communication medium." Intel's Opening Br. at 29. Broadcom, however, contends that the plain language of the claim makes clear, that the network interface of claim 15 does not merely connect a new node to a network; rather, it "supplements" a node that is already connected to the network by "adding at least one supplemental format to the format set of that node."

Broadcom argues that this meaning is confirmed by the specification, which describes the supplemental interface of Figure 16, by explaining that "[c]ircuitry 31 and software 32 form a network interface which supplements a default node to form a supplemented node (previously a default node)." Col. 9:43-48. The specification further

notes that "[default n]odes A and B can be altered by the addition of supplemented interface circuitry 31 and software 32 as described above and depicted in Figure 16. Nodes A and B then become supplemented nodes." Col. 9:21-29.

Intel contends that the preamble should not be read to limit the claims. See Apple Computer, Inc. v. Articulate Sys., Inc., 234 F.3d 14, 22 (Fed. Cir. 2000); Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861, 868 (Fed. Cir. 1985). Language in a claim preamble acts as a limitation only when such language serves to "give meaning to a claim and properly define the invention," not when the preamble merely states a purpose or intended use of the invention. In re Paulsen, 30 F.3d 1475, 1479 (Fed. Cir. 1994) (quoting DeGeorge v. Bernier, 768 F.2d 1318, 1322 n.3 (Fed. Cir. 1985)). Intel asserts that the preamble of claim 15 simply states the intended use of a network interface: supplementing a node or nodes in a network.

Viewing the claims in light of the written description and in light of the language of claim 15 read as a whole, the court finds that the recitation in the preamble of claim 15 of "network interface for interfacing with a network having nodes and for supplementing the nodes of the network," standing alone, merely to states a purpose or intended use of the invention. Nothing in the preamble is necessary to define claim 15. Claim 15 is fully defined by its elements and the limiting wherein clauses which follow them.

The court finds that the preamble language reciting "[a] network interface for interfacing with a network having nodes and for supplementing the nodes of the

network," is language of intended use and does not serve to limit the meaning of the claim. The court will address Broadcom's argument regarding the limitations of the wherein clause in the following section.

b. "wherein said network interface is adapted to supplement a node selected from said nodes by adding said at least one supplemented format to the format set of said selected node;"

Broadcom raises the same argument that the invention covered by claim 15 is limiting to the supplementing of nodes that are already connected to the network by the phrase "wherein said network interface is adapted to supplement a node selected from said nodes by adding at least one supplemented format to the format set of said selected node".

It is undisputed that the term "to supplement" means to augment or to add to. According to Merriam-Webster's 3d. New International Dictionary at 24 (1986), "adapted" means "suited by nature, character, or design to a particular use, purpose, or situation." In other words, something "is adapted to" a particular functionality when one of its uses could include that functionality. The court must determine whether the phrase "is adapted to supplement" is to be given its ordinary meaning or whether the phrase, as used in the claim, is more limited. The court finds that this language requires that the claimed network interface have the *capability* to augment a node; there is no requirement imposed by the "adapted to" language that requires a node actually to be supplemented by the network interface described in claim 15. See, e.g., Sealed Air Corp. v. Int. Packaging

Sys., 5 U.S.P.Q.2d. 1001, 1012 (E.D. Va. 1987) (claim reciting "reservoir adapted to hold material" does not require material actually be disposed within reservoir"); Elkay Mfg. Co. v. Ebco Mfg. Co., No. 93 C 5106, 1998 WL 397844 at *13-14 (N.D. Ill. July 13, 1998) (construing claim language "removable mounting means adapted to fit on cabinet" as covering any device with removable mounting means that is capable of fitting on cabinet) rev'd on other grounds, 192 F.3d 973 (Fed. Cir. 1999).

The court also finds that the second part of the disputed phrase, "to supplement a node selected from said nodes by adding said at least one supplemented format to the format set of said selected node," limits claim 15 to apply to nodes that are or were already connected to the network. This interpretation is supported by a plain reading of the claim language. The "said nodes" from which the network interface "is adapted to supplement a node . . . by adding said at least one supplemented format to [its] the format set" are defined in an earlier wherein clause in claim 15 that states "wherein said network is comprised of a communication medium and a plurality of nodes coupled to said communication medium for the transfer of data between nodes." Each reference in the claim thereafter that refers to "said nodes" refer to the plurality of nodes that are coupled to the communication medium (i.e. nodes connected to the network). A node that is selected from that set of nodes therefore must be limited to that set of nodes.

This interpretation of the claim language is supported by the both embodiments of the invention of claim 15, found in Figures 16 and Figure 17. First, the specification

describes how existing nodes on the network can be altered to "become supplemented nodes" by adding the supplemental interface circuitry and software depicted Figure 16. Col. 10:66. Second, the specification indicates that nodes can also be supplemented by adding autonomous supplemental network interface circuitry in the form of a network card that is plugged into the backplane of a computer device and then connected to the network. The network card then interfaces with the network, which is represented in both examples by cable 1. The specification later notes that "nodes [ ] supplemented by supplemental interfaces including the circuitry and software of Fig. 17 . . . can be coupled to cable 1 as supplemented nodes." Col. 10:66-11:2.

In sum, the two embodiments disclosed in Fig. 16 and Fig. 17 indicate that an interface is "adapted to supplement" if its use can create a supplemented node. The court further finds that the phrase "a node selected from said nodes by adding said at least one supplemented format to the format set of said selected node" includes supplementing, by adding at least one supplemented format to the format set of, an existing node, or supplementing, by adding at least one supplemented format to the format set of, a previously connected networked node that is subsequently re-connected to the network through the claimed network interface card.

4. Construction of Claim 18

Claim 18 modifies claim 15 in a manner similar to that in which claim 7 modifies claim 1. It further focuses on the "string of bits' that is to be used to represent formats is

the scheme described in claim 15. Claim 18 depends on claim 17, which in turn depends on claim 16, which in turn depends on claim 15. Incorporating each of these dependencies, claim 18 recites:

> A network interface in accordance with claim 15 wherein said transfer format selection means is comprised of a source node cache for node format sets; and wherein transfer format selection is made by the source node by searching for the destination node format set in said source node cache and by selecting a format which is included in said destination node format set and the source node format set, wherein said format sets are represented by bit strings, [and] wherein bit positions of said bit strings represent formats.

Col. 13:25-38.

All of the terms that are used in claim 18 have all been previously defined above in the context of claims 1, 7, and 15. The meaning of those terms in claim 18 is identical their meaning in those claims as set forth above.

III. CONCLUSION

The following table is intended to summarize the court's claim construction findings for the parties' convenience.

Claim 1	
A communication medium	The term communication medium means a collection of connections (generally links between nodes) in a communication system over which information may be transmitted.
a plurality of nodes coupled to said communication medium for a transfer of data between said nodes; wherein said transfer of data is a transfer of data from a source node selected from said nodes to a destination node selected from said nodes	The term node means any data processing device, including, but not limited to, a computer, a file server, a bridge, a gateway, a co-processor, modem server, memory, or printer, that includes a network interface, through which it is coupled to the communication medium. The term data means any thing passed between nodes that conveys meaning.

transfer format selection means for selecting a format for the transfer of data from said source node to said destination node . . . wherein said transfer format selection means is adapted to select a format which is common to the format sets of the source node and destination node and which is compatible with said communication medium	This claim element is drafted in means-plus-function format. The claimed function is selecting a format for the transfer of data from said source node to said destination node, which is common to the format sets of the source node and the destination node and which is compatible with said communication medium. The corresponding structure is (1) a bit string representation of the destination node's supported format set; (2) that is retrieved in accordance with an algorithm disclosed in Figure 4 that first searches the source node's associated memory, and then, if necessary, conducts an inquiry dialog; and (3) any circuitry configuration or any software programmed to execute an algorithm that first uses the bit string representation of the destination node's supported format set to determine which transfer formats are common to the transfer format sets of the source node and the destination node and compatible with the communication medium and then selects one transfer format from those common transfer formats to use in transmitting the information to the destination node.

wherein said plurality of nodes is comprised of at least one default node and at least two supplemented nodes	The term plurality, standing alone, means at least two. However, the plurality of nodes referred to in the claims is limited by the wherein clause that describes that the plurality must be "comprised of" at least one default node and at least two supplemented nodes. Therefore, as used in claim 1, the term "plurality" requires at least three nodes. The term default node is a node coupled to the communication medium which can transfer data over the network only in the default format or default formats. The term supplemented node is a node coupled to the communication medium which can transfer data over the network in the default format or default formats and which can also transfer data over the network in one or more supplemental formats.
wherein each of said nodes has a format set comprised of one or more formats	The term format sets means a collection of individual formats for a node consisting of at least one format. The term format is a data transmission characteristic that is defined in terms of "data architecture" and/or the "rate of data transmission."
wherein said formats are defined in terms of data architecture	Data architecture means one or more of the following data transmission characteristics: encoding, encryption, compression, and protocol.

wherein said data architecture is defined in terms of at least one member of a group consisting of encoding, encryption, compression and protocol	1) “Encoding” means the waveform pattern or other waveform representation of data bits used for transmission of data on the communication medium. 2)“Encryption” means the organization and arrangement of data into a nonintelligible form for transmission. 3) “Compression” means the representation of data in a shorter form which requires fewer bits to represent the data. 4) “Protocol” means the convention used for data transmission which defines frame organization and content including command codes for the protocol handler of the destination node.
wherein each of said format sets includes at least one default format	The term default format means a common format that every node coupled to the communication medium can use to transfer data to every other node coupled to that medium.
wherein said at least one default format is included in the format sets of each of said nodes	-
wherein the format set of each of said supplemented nodes includes at least one supplemental format in addition to said at least one default format	The term supplemental format means an additional format, distinct from the default format, that is not common to all nodes coupled to the network.

Claim 7	
A computer communication system in accordance with claim 6 wherein bit positions of said bit strings represent formats	The term cache (used in claim 6) means memory. The phrase “wherein said format sets are represented by bit strings, [and] wherein bit positions of said bit strings represent formats” means that each format set must be represented by bit strings must be comprised of a series (plural) of 1's and 0's, where each individual bit position in the series of bits corresponds to a single format.
Claim 15	
A network interface for interfacing with a network having nodes and for supplementing the nodes of the network, said network interface comprising	-

wherein said network interface is adapted to supplement a node selected from said nodes by adding said at least one supplemental format to the format set of said selected node	The phrase “adapted to supplement” means that the claimed network interface have the capability to augment a node. The phrase “a node selected from said nodes by adding said at least one supplemented format to the format set of said selected node” means supplementing, by adding at least one supplemented format to the format set of, an existing node, or supplementing, by adding at least one supplemented format to the format set of, a previously connected networked node that is subsequently re-connected to the network through the claimed network interface card.
Claim 17	
A network interface in accordance with claim 16 wherein said format sets are represented by bit strings.	-