

Invalidity of U.S. Patent No. 8,086,800 in view of Bahadiroglu

U.S. Patent No. 7,012,893 to Bahadiroglu (“Bahadiroglu”), which was filed on June 12, 2001 and published no later than December 12, 2002 qualifies as prior art under at least 35 U.S.C. §§ 102 and 103 as to the asserted claim of U.S. Patent No. 8,086,800 (“’800 patent”), as discussed in greater detail in the chart that follows.¹

To the extent Plaintiff alleges that Bahadiroglu does not disclose any particular limitation of claim 12 (the “Asserted Claim”) of the ’800 patent, either expressly or inherently, it would have been obvious to a person of ordinary skill in the art as of the priority date of the ’800 patent to modify Bahadiroglu and/or to combine the teachings of Bahadiroglu with other prior art references, including but not limited to the prior art references presently found in Defendants’ Invalidity Contentions and any supplements thereto and the relevant section of charts for other prior art for the ’800 patent in a manner that would have rendered the Asserted Claim invalid as obvious. The inclusion of the particular limitation into the methods and systems described in Bahadiroglu would have been obvious for at least the following reasons: It would have been obvious to modify the methods and/or systems disclosed in Bahadiroglu, alone or in combination with the references identified in Defendants’ Invalidity Contentions, to meet this limitation based on: (a) the teachings in Bahadiroglu itself; (b) a person of ordinary skill in the art implementing a predictable variation of the methods and/or systems disclosed in Bahadiroglu or in the other identified references; (c) the logic, judgment, intelligence, creativity, innovation and common sense a person of ordinary skill in the art would employ; (d) the inferences and creative and routine steps that a person of ordinary skill in the art would employ; (e) market demand for methods and/or systems to include this limitation; and/or (f) design needs or market pressures to solve a problem with a finite number of solutions that could have produced the desired outcome.

Defendants reserve the right to amend or supplement this claim chart at a later date pursuant to the Docket Control Order issued by the Court on June 16, 2023 (Dkt. No. 59).

¹ The citations are to the issued patent version of Bahadiroglu, and they also disclose the corresponding citations to the patent application publication version of Bahadiroglu, which are omitted for brevity. Nothing in these claim charts should be construed as an admission regarding infringement, either literally or under the doctrine of equivalents, or as an admission regarding Defendants’ understanding of the proper scope of the Asserted Claim. Given Plaintiff’s vague and ambiguous infringement contentions, the exemplary citations herein necessarily account for a variety of possible infringement arguments and claim constructions. Defendants reserve the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiff’s infringement contentions, and/or information obtained during discovery as the case progresses. Various positions put forth in this document are predicated on Plaintiff’s overly broad interpretation of its claims as evidenced by the infringement allegations received to date. Those positions are not intended to and do not necessarily reflect Defendants’ interpretation of the true and proper scope of Plaintiff’s claims, and Defendants reserve the right to adopt claim construction positions that differ from or even conflict with various positions put forth in this document.

A. Claim 12

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[12.pre] An integrated circuit comprising:	To the extent the preamble is limiting, Bahadiroglu discloses and/or renders obvious the preamble based on at least the following citations. See, e.g.: • Bahadiroglu at 20:4-15 It should also be noted with regard to the following discussions of an exemplary implementation of an Adaptive Packet Mechanism 20 that an Adaptive Packet Mechanism 20 will commonly be implemented by means of the program control of processors, such as personal computers or network servers, although at least certain mechanisms or functions of an Adaptive Packet Mechanism 20 may be implemented in dedicated circuitry. The possible implementations of Data Transmitters 10, Data Receivers 20 and Adaptive Packet Mechanisms 32 will be well understood by those of ordinary skill in the relevant arts, however, and as such will not be discussed in further detail herein. • Bahadiroglu at 16:47-62 These aspects of networks and connections, which are addressed by the present invention, are illustrated in FIGS. 1A through 1C for exemplary tests of a network connection between two identical Pentium III 500 MHZ Sony laptops with 128 MB memory wherein the two laptops were connected through the Internet, using identical wireless phones as modems. The connection speeds were at around 10 kilo bits per second up and 8 kilobits per second down and all of the tests used 10 KB of total data for the transfer. Two tests, tabulated in FIGS. 1A and 1B, used an inter-packet delay of 10 msec as the inter packet delay and were separated in time by 200 msec and the third test, tabulated in FIG. 1C, used an inter-packet delay of 20 ms. A numeric tabulation of the tests and test result of the tests illustrated in FIGS. 1A through 1C are presented in chart form in Appendices A, B and C, respectively. To the extent Bahadiroglu does not expressly disclose the preamble, a person of ordinary skill in the art would have determined that the preamble is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other

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	prior art for the '800 Patent in a manner that would result in the subject matter of the preamble given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.
[12.a] a plurality of processing modules including a first processing module having a first processing memory and a second processing module having a second processing memory;	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.: • Bahadiroglu at Abstract An adaptive packet mechanism and method for optimizing data packet transmission through a network connection between a sending node and a receiving node. Current network conditions in the connection are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of latency and jitter are used to determine an optimum packet size and an optimum inter-packet interval for transmission of packet data between the sending node and the receiving node and are used in the transmission of data packets from the sending node to the receiving node. Network conditions may be determined by transmission of monitor or data packets and may be determined at either or both of the sending or receiving nodes and the optimum packet size and inter-packet interval are determined by a fuzzy logic analyzer, a neural network analyzer or a combined fuzzy logic/neural network analyzer. • Bahadiroglu at 2:4–32 For example, various forms of networks have been developed that are dedicated to or specifically adapted to communication between computers. Networks specifically oriented to intercomputer communications typically provide individual computers shared access to a common communication backbone having relatively broad bandwidth, such as fiber optic cables or coaxial or twisted pair cable. The individual networked computers, commonly referred to as “nodes”, are typically granted access to the complete bandwidth of the backbone for the transmission of each information packet for a period, and when a transmitting computer completes transmission of a packet the backbone is made immediately available for the other computers or nodes connected to the network. Each computer thereby has access to the full bandwidth of the network, but only during the actual transmission of a packet, so that many computers may efficiently share the common “backbone”. A typical example of such a computer network is a personal computer (“PC”) network as PCs are used for a wide range of applications

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	requiring the PCs to communicate with each other over a computer network. Typical computer networks connecting PCs, as well as other computers, nodes and related devices and systems, include local area networks (“LANs”) interconnecting PCs located in relatively close proximity and wide area networks (“WANs”), which are typically comprised of a network of separate LANS and provide communications over wider areas. The “Web”, for example, is a very extensive WAN interconnecting LANs as well as PCs, larger computers, nodes and related devices. • Bahadiroglu at 13:21–26 The present invention is directed to an adaptive packet mechanism and method for use in a data communication network including at least one sending node for transmitting packet data and one receiving node for receiving packet data for optimizing data packet transmission through a connection between the sending node and the receiving node. • Bahadiroglu at 16:47-62 These aspects of networks and connections, which are addressed by the present invention, are illustrated in FIGS. 1A through 1C for exemplary tests of a network connection between two identical Pentium III 500 MHZ Sony laptops with 128 MB memory wherein the two laptops were connected through the Internet, using identical wireless phones as modems. The connection speeds were at around 10 kilo bits per second up and 8 kilobits per second down and all of the tests used 10 KB of total data for the transfer. Two tests, tabulated in FIGS. 1A and 1B, used an inter-packet delay of 10 msec as the inter packet delay and were separated in time by 200 msec and the third test, tabulated in FIG. 1C, used an inter-packet delay of 20 ms. A numeric tabulation of the tests and test result of the tests illustrated in FIGS. 1A through 1C are presented in chart form in Appendices A, B and C, respectively. • Bahadiroglu at 17:28–43 Referring to FIG. 2, therein is shown a diagrammatic representation of an exemplary Network 10 in which the present invention may be implemented. Exemplary Network 10 may be, for example, a packet based system, such as the Internet and may be comprised, for example, of a diverse range of networks linked to packet switched IP (Internet Protocol) backbones. A Network 10 is comprised of a plurality of

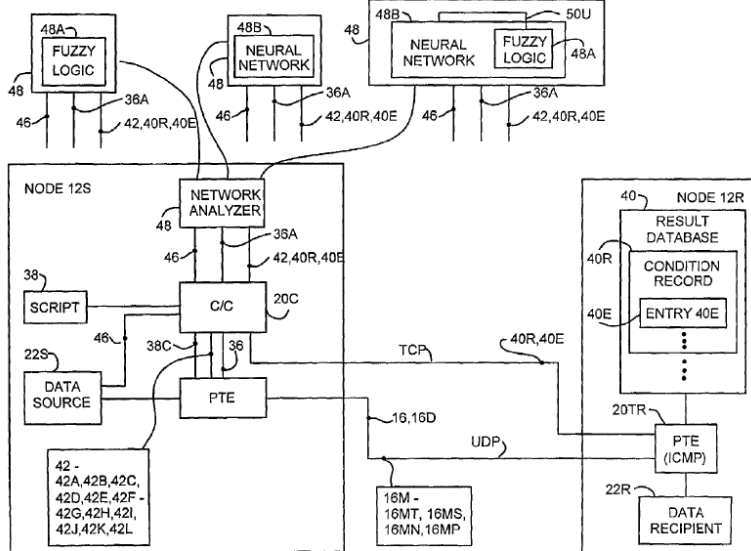
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	Nodes 12 interconnected by Lines 14 wherein Lines 14 may be any of a range of forms of transmission media, Such as, and for example, fiber optic cables, coaxial lines, telephone lines, wireless connections and so on. A Node 12, in turn, may be comprised of a computer, network server or router, a network or, for example, a more specialized data display or presentation device Such as a telephone, mobile phone or processing device, television or audio system. • Bahadiroglu at 17:44–18:7 Packets 16 containing data of any of a wide range of types are communicated from a Sending Node 12S to a Receiving Node 12R through a Connection 18, which is a Packet 16 transmission path between a Sending Node 12S and a Receiving Node 12R through Network 10. It will be understood by those of ordinary skill in the arts that a Connection 18 may be comprised of any combination of Lines 14 and Nodes 12 wherein the Nodes 12 in a Connection 18 may include, for example, routers, switches, networks or sub-networks or servers operating to establish a Connection 18 between a Sending Node 12S and a Receiving Node 12R. It will also be understood that a Connection 18 or a Network 10 or the path followed by Packets 16 may conform to a range of topologies, such as Frame Relay or an ATM. It will also be understood that a Connection 18 may be and typically is bi-directional, with the Sending Node 12S and the Receiving Node 12R alternating as the Sending Node 12S and Receiving Node 12R, depending upon the direction in which Packets 16 are being transmitted at any time. It will therefore be understood that the designations Sending Node 12S and Receiving Node 12R are solely for illustrative purposes in the following descriptions, and are not to be taken or understood as limiting or defining of the structure or function of a given Node 12. For example, a router in a Connection 16 may be regarded as, and for purposes of the present invention, may comprise either or both of a Sending Node 12S and Receiving Node 12R to receive Packets 16 from a Node 12 and to transmit Packets 16 onwards to another Node 12, and the present invention may be implemented within a Node 12 that is a router, switch or other element of a Connection 16. • Bahadiroglu at 19:11–19 In addition, the Packet Transfer Engines (PTE) 20T residing at the Sending Node 12S and at the Receiving Node 12R will operate as data communications protocol stack mechanisms, that is and for example, as a Transmission Control Protocol/Internet Protocol (“TCP/IP”) mechanism, to communicate

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	“payload” Data Packets 16C of the optimum packet size and at the optimum inter-packet interval between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R. • Bahadiroglu at 20:4–15 It should also be noted with regard to the following discussions of an exemplary implementation of an Adaptive Packet Mechanism 20 that an Adaptive Packet Mechanism 20 will commonly be implemented by means of the program control of processors, such as personal computers or network servers, although at least certain mechanisms or functions of an Adaptive Packet Mechanism 20 may be implemented in dedicated circuitry. The possible implementations of Data Transmitters 10, Data Receivers 20 and Adaptive Packet Mechanisms 32 will be well understood by those of ordinary skill in the relevant arts, however, and as such will not be discussed in further detail herein. • Bahadiroglu at 27:30–34 Before discussing the modes of operation of Collector/Controller (C/C) 20C and Packet Transfer Engines (PTE) 20TS and 20TR in detail, it should be noted that in the presently preferred implementation, the the modes of operation are controlled in part by inputs from Data Source 22S or from some other source in the Sending Node 12S indicating, for example, what type of data transfer operation is to be performed, such as a file transfer or the transmission of a continuous audio/video data stream, and the amount of data to be transferred. The Collector/Controller (C/C) 20C, in turn, selects an appropriate mode of operation for the particular data transfer requested by the Sending Node 12S, including the method by which network conditon information is to be acquired. The Collector/Controller (C/C) 20C, in turn, generates Control Outputs 38C to the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR to control the modes of operation of the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR during the requested data transfer. As will be described below, packet transfers between the Sending Node 12S and the Receiving Node 12R will involve both a data transfer mode and one or more network condition collection modes and may require the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR involved in the operation to switch between the data transfer modes and the network condition collection modes during the data transfer. In the presently preferred embodiment, the modes of

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	operation of the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR are determined by flags set in the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR by the Collector/Controller (C/C) 20C. • Bahadiroglu at 28:16–34 First considering the data transfer mode, that is, the method by which Data Packets 12D are transferred from a Sending Node 12S to a Receiving Node 12R, the Packet Transfer Engines (PTE) 20TS and 20TR residing at the Sending Node 12S and at the Receiving Node 12R will operate as or as part of the data communications Network Protocol Stack (Stack) 24 mechanisms of the Sending Node 12S and the Receiving Node 12R. That is and for example, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate as a Layer 28 of the Transmission Control Protocol/Internet Protocol (“TCP/IP”) mechanism to communicate “payload” Data Packets 16C between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20TS and 20TR communicate Monitor Packets 16M and Data Packets 16C at the UDP layer of TCP/IP and communicate with Collector/Controllers 20C at the TCP layer of TCP/IP. • Bahadiroglu at 28:35–54 In the data transfer mode, and according to the present invention, the Collector/Controller (C/C) 20C will provide a Packet Control 36 output to the Packet Transfer Engine (PTE) 20TS in the Sending Node 12R wherein the Packet Control 36 output will designate an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I for the current Connection 18 network conditions. The Packet Transfer Engine (PTE) 20TS will receive Data 22D from the Data Source 22S or from higher Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented, and will “packetize” the Data 22D into Data Packets 16C of the size designated by the Optimum Packet Size 36S. The Packet Transfer Engine (PTE) 20TS will transmit the Data Packets 16C to the Connection 18 at inter-packet intervals designated by Optimum Inter-Packet Interval 36I, either directly or through lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TS is implemented.

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	- Bahadiroglu at 28:55–29:4 The Data Packets 16C are transferred through the Connection 18 to the Receiving Node 12R, and the Packet Transfer Engine (PTE) 20TR will receive the Data Packets 16C from the Connection 18, either directly or from lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TR will “depacketize” the Data 22D and will pass the Data 22D to the Data Recipient 22R, either directly or through higher Layers 28 of the Network Protocol Stack (Stack) 24, again depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TS will form the Data 22D into Data Packets 16C of the size designated by Optimum Packet Size 36S and will transmit the Data Packets 16C at the inter-packet interval designated by Optimum Inter-Packet Interval 36I. - Bahadiroglu at 36:33–57 As indicated in FIG. 6A, information representing the current network packet transmission characteristics or properties of a Connection 18 are provided to Collector/Controller (C/C) 20C, together with information pertaining to a present data transfer to be executed, and Collector/Controller (C/C) 20C in return generates a Packet Control 36 output indicated the present Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. As discussed above, the current network packet transmission characteristics may be provided as Network Conditions 42 from Packet Transfer Engines (PTE) 20TS or as a Condition Record 40R or as Condition Record Entries 40E from the Packet Transfer Engine 20TR. As shown, information pertaining to the current request for a data transfer is contained in a Transfer Request 46 from a Data Source 22S, which identifies, for example, the type of data transfer requested and the amount of data to be transmitted. In this regard, it should be noted that a Transfer Request 46 may be submitted by a Sending Node 12S, either at its own initiative or in response to a request from a data request from a Receiving Node 12R or may be submitted by a Receiving Node 12R as part of a data request to a Sending Node 12S. In either instance the Packet Control 36 outputs will be provided to the Sending Node 12S and possibly to the Receiving Node 12R, depending upon the type of data transfer to be performed.

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	- Bahadiroglu at Fig. 2 FIG. 2 ADAPTIVE PACKET MECHANISM 20 NETWORK 10 - Bahadiroglu at Fig. 6A

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	 FIG. 6A To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the '800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.
[12.b] a plurality of interconnect modules including a first interconnect module and a second interconnect module,	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.: • Bahadiroglu at 17:28-43

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wherein the first processing module is connected to the first interconnect module and the second processing module is connected to the second interconnect module; and	Referring to FIG. 2, therein is shown a diagrammatic representation of an exemplary Network 10 in which the present invention may be implemented. Exemplary Network 10 may be, for example, a packet based system, such as the Internet and may be comprised, for example, of a diverse range of networks linked to packet switched IP (Internet Protocol) backbones. A Network 10 is comprised of a plurality of Nodes 12 interconnected by Lines 14 wherein Lines 14 may be any of a range of forms of transmission media, Such as, and for example, fiber optic cables, coaxial lines, telephone lines, wireless connections and so on. A Node 12, in turn, may be comprised of a computer, network server or router, a network or, for example, a more specialized data display or presentation device such as a telephone, mobile phone or processing device, television or audio system. • Bahadiroglu at 18:59–19:10 In a presently preferred embodiment, Adaptive Packet Mechanism 20 includes or is comprised of two or more Packet Transfer Engines (PTE) 20T and one or more Collector/Controllers 20C. Briefly, and as will be described in further detail in following descriptions, a Transfer Engine 20T residing at a Sending Node 12S of a Connection 18 may operate under the direction of a Collector/Controller (C/C) 20CA to transmit sequences of one or more Monitor Packets 16M to a Transfer Engine 20T residing in the Receiving Node 12T of the Connection 18. One or both of the Packet Transfer Engines (PTE) 20T of the Connection 18 will determine the transmission characteristics of the Monitor Packets 16M through the Connection 18 and will extract or determine the current network conditions of the Connection 18, such as available bandwidth, latency and jitter. The network condition information will then be provided to a Collector/Controller (C/C) 20C, which will determine the optimum packet size and inter-packet interval for the current network conditions of the Connection 18. • Bahadiroglu at 19:11–19 In addition, the Packet Transfer Engines (PTE) 20T residing at the Sending Node 12S and at the Receiving Node 12R will operate as data communications protocol stack mechanisms, that is and for example, as a Transmission Control Protocol/Internet Protocol (“TCP/IP”) mechanism, to communicate “payload” Data Packets 16C of the optimum packet size and at the optimum inter-packet interval between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R.

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	• Bahadiroglu at 19:20–46 It will therefore be apparent that a Packet Transfer Engine (PTE) 20T will reside in each Node 12 of a Network 10 that is to function as a Sending Node 12S or as a Receiving Node 12R according to the present invention. Certain Nodes 12, however, may contain more than one Packet Transfer Engine (PTE) 20T. Examples of such would include, for example, Nodes 12 that are required to support more than one Connection 18, such as a router connected to more than one Network 10 or a server supporting a plurality of Connections 18 to other Nodes 12 concurrently. It will also be understood that a Network 10 may require only a single Collector/Controller (C/C) 20C as a Collector/Controller (C/C) 20C may operate with and control a plurality of Packet Transfer Engines (PTE) 20T, but may include a plurality of Collector/Controllers 20C, each of which may support a plurality of Packet Transfer Engines (PTE) 20T. Also, a Collector/Controller (C/C) 20C may reside in a Node 12 with a Packet Transfer Engine (PTE) 20T, that is, in either a Sending Node 12S or a Receiving Node 12R, or may reside in a Node 12 separate from the Nodes 12 in which the Packet Transfer Engines (PTE) 20T reside. The number and configuration of Packet Transfer Engines (PTE) 20T and Collector/Controllers 20C in a Network 10 will therefore depend, for example, upon the upon the number and configuration of Nodes 12 that are to operate as Sending Nodes 12S or Receiving Nodes 12R, or as both, the number of Connections 18 to be supported at any time, and so on. • Bahadiroglu at 19:47–20:3 Also, and although not shown in detail in FIG. 2, it will be recognized and understood that a Packet Transfer Engine (PTE) 20T residing in a Sending Node 12S or a Receiving Node 12R will effectively reside in and function as a layer or element of a layer of the Network Protocol Stack (Stack) 24 the Sending Node 12S or Receiving Node 12R. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20T communicate Packets 16 at the UDP layer of TCP/IP and Packet Transfer Engines (PTE) 20T communicate with Collector/Controllers 20C at the TCP layer of TCP/IP. It will be recognized and understood, however, that an Adaptive Packet Mechanism 20 may execute or operate with a wide variety of protocols and at a number of different layers of such protocols for the transfer of data through Networks 16. While the type, degree and methods for interoperating with such aspects of the protocols as packet size and inter-packet interval

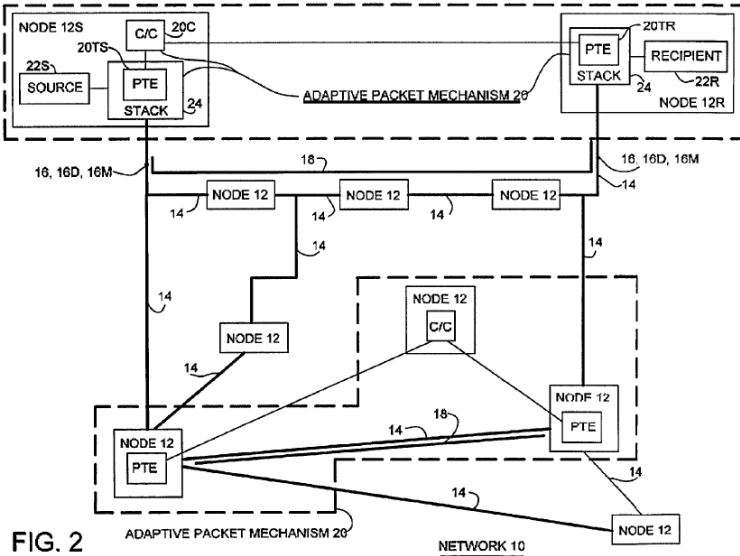
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	may vary significantly between protocols, such protocols are widely known and well understood by those of ordinary skill in the relevant arts, the details of particular protocols. As such, the means and methods by which various implementations and embodiments of the Adaptive Packet Mechanism 20 of the present invention may be adapted to each protocol will not be discussed in detail herein. • Bahadiroglu at 22:16-35 Network Layer 28C provides logical addressing, network routing, flow control that monitors the network connection, and sequencing and translation functions. Addressing is also performed in Network Layer 28, and the form of addressing is specific to a given protocol. For example, an Ethernet workstation may run both TCP/IP and Novell IPX/SPX Network Layer 28C protocols wherein each Network Layer 28C protocol will have a different logical addressing method. The Network Layer 28C protocols, such as TCP/IP, UDP/IP, IPX/SPX, DECNET, are also used by routers to interconnect Networks 16. It must be noted, however, that there are certain Network 10 Protocols 24 that do not extend to the Network Layer 28. These include DECLAT, IBM's Network Basic Input/Output System (NetBIOS), IBM's Extended User Interface (NetBEUI) for NetBIOS, and others. These Protocols 24 have no provisions for Network Layer 28C addressing and routing, so that connection of these Protocols 24 between different LANs must be accomplished with MAC Sub-Layer 28BA devices such as LAN bridges or LAN Switches. • Bahadiroglu at 24:32–55 It has been described above that a Adaptive Packet Mechanism 20 includes or is comprised of one or more Collector/Controllers 20C and two or more Packet Transfer Engines (PTE) 20T. Packet Transfer Engines (PTE) 20T operate under control of a Collector/Controller (C/C) 20C to determine the network conditions of Connections 18, wherein the network conditions examined by an Adaptive Packet Mechanism 20 pertain to the latency and jitter and the available bandwidth of the Connections 18, and to determine from these network conditions the optimum packet size and optimum inter-packet interval for the transmission of data packets through the Connections 18 for given amounts and types of data. As will be described, an Adaptive Packet Mechanism 20 operates in a number of modes to acquire the network condition information, including the transmission of

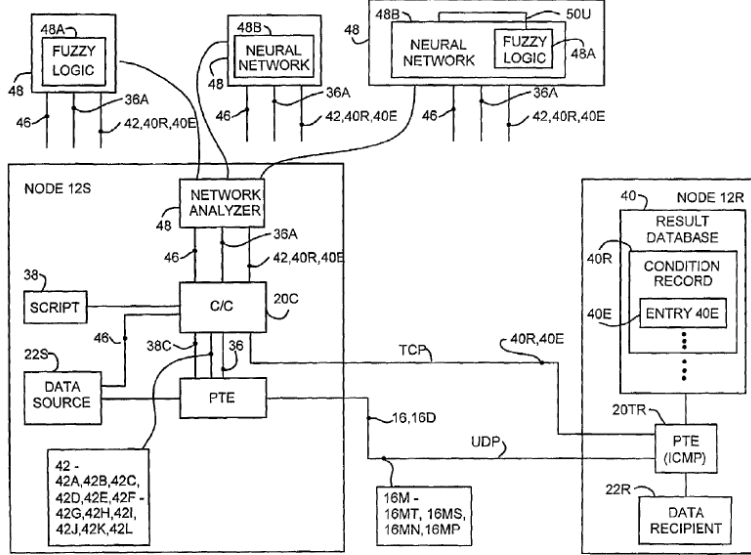
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	Monitor Packets 12M through the Connections 18 and by examination of the transmission of Data Packets 12D through the Connections 18. As will be described, the operations and functions of an Adaptive Packet Mechanism 20 are accomplished through a Packet Transfer Engine (PTE) 20T in each Node 12 that is to be a Sending Node 12S or a Receiving Node 12R or both, and a Collector/Controller (C/C) 20C that may reside, for example, in a Sending Node 12S or in a Node 12 separate from the Nodes 12S and 12R. • Bahadiroglu at 24:56–25:10 Referring to FIG. 6A, therein is illustrated the structure and operation of an Adaptive Packet Mechanism 20 with respect to a single Connection 18 between a Sending Node 12S and a Receiving Node 12R. As shown therein, a Packet Transfer Engine (PTE) 20T resides in the Sending Node 12S, and will hereafter be identified as the Packet Transfer Engine (PTE) 20TS, and second Packet Transfer Engine (PTE) 20T resides in the Receiving Node 12R, and will hereafter be identified as the Packet Transfer Engine (PTE) 20TR. It will be understood that the designations of Nodes 12 in FIG. 6A as Sending Nodes 12S and Receiving Nodes 12R and the corresponding designations of the Packet Transfer Engines (PTE) 20T as a Packet Transfer Engine (PTE) 20TS and a Packet Transfer Engine (PTE) 20TR are solely for purposes of the present discussions and are not intended or meant to be limiting. For example, the designations of sending and receiving Nodes 12 and Packet Transfer Engines (PTE) 20T would periodically in bi-lateral data packet communication between the Nodes 12, when the flow of data packets reverses, or that a Node 12 may operate as a Sending Node 12S in one Connection 18 and as a Receiving Node 12R in a different Connection 18. • Bahadiroglu at 25:43–67 Also, it has been described that a Packet Transfer Engine (PTE) 20T residing in a Sending Node 12S or a Receiving Node 12R will effectively reside in and function as a Layer 28 or element of a Layer 28 of the Network Protocol Stack (Stack) 24 the Sending Node 12S or Receiving Node 12R to form, transmit and receive Packets 16. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20T communicate Monitor Packets 16M and Data Packets 16C at the UDP layer of TCP/IP and communicate with Collector/Controllers 20C at

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	the TCP layer of TCP/IP. It will be recognized and understood, however, that an Adaptive Packet Mechanism 20 may execute or operate with a wide variety of protocols and at a number of different layers of such protocols for the transfer of data through Networks 16. While the type, degree and methods for interoperating with such aspects of the protocols as packet size and inter-packet interval may vary significantly between protocols, such protocols are widely known and well understood by those of ordinary skill in the relevant arts, the details of particular protocols. As such, the means and methods by which various implementations and embodiments of the Packet Transfer Engines (PTE) 20T of the present invention may be adapted to and implemented in each protocol will not be discussed in detail herein. • Bahadiroglu at 26:1–19 As described, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 are capable of multiple modes of operation. For example, in the data transfer mode the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate to transfer data from the Sending Node 12S to the Receiving Node 12R through the Connection 18. In the network data collection and network condition determination modes, hereafter referred to as the “test” modes, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 will operate to determine the network conditions of the Connection 18, such as available bandwidth, latency and jitter, and from this information will determine the currently optimum Packet 16 size and inter-packet interval for communicating Data Packets 16C through the Connection 18 for a given amount and type of data. • Bahadiroglu at 27:30–34 Before discussing the modes of operation of Collector/Controller (C/C) 20C and Packet Transfer Engines (PTE) 20TS and 20TR in detail, it should be noted that in the presently preferred implementation, the the modes of operation are controlled in part by inputs from Data Source 22S or from some other source in the Sending Node 12S indicating, for example, what type of data transfer operation is to be performed, such as a file transfer or the transmission of a continuous audio/video data

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	stream, and the amount of data to be transferred. The Collector/Controller (C/C) 20C, in turn, selects an appropriate mode of operation for the particular data transfer requested by the Sending Node 12S, including the method by which network condition information is to be acquired. The Collector/Controller (C/C) 20C, in turn, generates Control Outputs 38C to the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR to control the modes of operation of the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR during the requested data transfer. As will be described below, packet transfers between the Sending Node 12S and the Receiving Node 12R will involve both a data transfer mode and one or more network condition collection modes and may require the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR involved in the operation to switch between the data transfer modes and the network condition collection modes during the data transfer. In the presently preferred embodiment, the modes of operation of the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR are determined by flags set in the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR by the Collector/Controller (C/C) 20C. • Bahadiroglu at 28:16–34 First considering the data transfer mode, that is, the method by which Data Packets 12D are transferred from a Sending Node 12S to a Receiving Node 12R, the Packet Transfer Engines (PTE) 20TS and 20TR residing at the Sending Node 12S and at the Receiving Node 12R will operate as or as part of the data communications Network Protocol Stack (Stack) 24 mechanisms of the Sending Node 12S and the Receiving Node 12R. That is and for example, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate as a Layer 28 of the Transmission Control Protocol/Internet Protocol (“TCP/IP”) mechanism to communicate “payload” Data Packets 16C between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20TS and 20TR communicate Monitor Packets 16M and Data Packets 16C at the UDP layer of TCP/IP and communicate with Collector/Controllers 20C at the TCP layer of TCP/IP. • Bahadiroglu at 28:35–54

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	In the data transfer mode, and according to the present invention, the Collector/Controller (C/C) 20C will provide a Packet Control 36 output to the Packet Transfer Engine (PTE) 20TS in the Sending Node 12R wherein the Packet Control 36 output will designate an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I for the current Connection 18 network conditions. The Packet Transfer Engine (PTE) 20TS will receive Data 22D from the Data Source 22S or from higher Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented, and will “packetize” the Data 22D into Data Packets 16C of the size designated by the Optimum Packet Size 36S. The Packet Transfer Engine (PTE) 20TS will transmit the Data Packets 16C to the Connection 18 at inter-packet intervals designated by Optimum Inter-Packet Interval 36I, either directly or through lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TS is implemented. • Bahadiroglu at 28:55–29:4 The Data Packets 16C are transferred through the Connection 18 to the Receiving Node 12R, and the Packet Transfer Engine (PTE) 20TR will receive the Data Packets 16C from the Connection 18, either directly or from lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TR will “depaketize” the Data 22D and will pass the Data 22D to the Data Recipient 22R, either directly or through higher Layers 28 of the Network Protocol Stack (Stack) 24, again depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TS will form the Data 22D into Data Packets 16C of the size designated by Optimum Packet Size 36S and will transmit the Data Packets 16C at the inter-packet interval designated by Optimum Inter-Packet Interval 36I. • Bahadiroglu at Fig. 2

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	 FIG. 2 ADAPTIVE PACKET MECHANISM 20 NETWORK 10 • Bahadiroglu at Fig. 6A

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	 FIG. 6A See also, e.g., Bahadiroglu at 20:20-67, 26:20-58, 40:24-40. To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the '800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.
[12.c] a network for connecting the first interconnect module to the second interconnect module	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.: • Bahadiroglu at Abstract

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in order to provide a communication connection between the first processing module and the second processing module, wherein the first interconnect module is connected between the first processing module and the network, and wherein the second interconnect module is connected between the second processing module and the network;	An adaptive packet mechanism and method for optimizing data packet transmission through a network connection between a sending node and a receiving node. Current network conditions in the connection are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of latency and jitter are used to determine an optimum packet size and an optimum inter-packet interval for transmission of packet data between the sending node and the receiving node and are used in the transmission of data packets from the sending node to the receiving node. Network conditions may be determined by transmission of monitor or data packets and may be determined at either or both of the sending or receiving nodes and the optimum packet size and inter-packet interval are determined by a fuzzy logic analyzer, a neural network analyzer or a combined fuzzy logic/neural network analyzer. • Bahadiroglu at 2:4–32 For example, various forms of networks have been developed that are dedicated to or specifically adapted to communication between computers. Networks specifically oriented to intercomputer communications typically provide individual computers shared access to a common communication backbone having relatively broad bandwidth, such as fiber optic cables or coaxial or twisted pair cable. The individual networked computers, commonly referred to as “nodes”, are typically granted access to the complete bandwidth of the backbone for the transmission of each information packet for a period, and when a transmitting computer completes transmission of a packet the backbone is made immediately available for the other computers or nodes connected to the network. Each computer thereby has access to the full bandwidth of the network, but only during the actual transmission of a packet, so that many computers may efficiently share the common “backbone”. A typical example of such a computer network is a personal computer (“PC”) network as PCs are used for a wide range of applications requiring the PCs to communicate with each other over a computer network. Typical computer networks connecting PCs, as well as other computers, nodes and related devices and systems, include local area networks (“LANs”) interconnecting PCs located in relatively close proximity and wide area networks (“WANs”), which are typically comprised of a network of separate LANS and provide communications over wider areas. The “Web”, for example, is a very extensive WAN interconnecting LANs as well as PCs, larger computers, nodes and related devices.

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	• Bahadiroglu at 13:21–26 The present invention is directed to an adaptive packet mechanism and method for use in a data communication network including at least one sending node for transmitting packet data and one receiving node for receiving packet data for optimizing data packet transmission through a connection between the sending node and the receiving node. • Bahadiroglu at 16:47-62 These aspects of networks and connections, which are addressed by the present invention, are illustrated in FIGS. 1A through 1C for exemplary tests of a network connection between two identical Pentium III 500 MHZ Sony laptops with 128 MB memory wherein the two laptops were connected through the Internet, using identical wireless phones as modems. The connection speeds were at around 10 kilo bits per second up and 8 kilobits per second down and all of the tests used 10 KB of total data for the transfer. Two tests, tabulated in FIGS. 1A and 1B, used an inter-packet delay of 10 msec as the inter packet delay and were separated in time by 200 msec and the third test, tabulated in FIG. 1C, used an inter-packet delay of 20 ms. A numeric tabulation of the tests and test result of the tests illustrated in FIGS. 1A through 1C are presented in chart form in Appendices A, B and C, respectively. • Bahadiroglu at 17:28–43 Referring to FIG. 2, therein is shown a diagrammatic representation of an exemplary Network 10 in which the present invention may be implemented. Exemplary Network 10 may be, for example, a packet based system, such as the Internet and may be comprised, for example, of a diverse range of networks linked to packet switched IP (Internet Protocol) backbones. A Network 10 is comprised of a plurality of Nodes 12 interconnected by Lines 14 wherein Lines 14 may be any of a range of forms of transmission media, Such as, and for example, fiber optic cables, coaxial lines, telephone lines, wireless connections and so on. A Node 12, in turn, may be comprised of a computer, network server or router, a network or, for example, a more specialized data display or presentation device Such as a telephone, mobile phone or processing device, television or audio system. • Bahadiroglu at 17:44–18:7

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	Packets 16 containing data of any of a wide range of types are communicated from a Sending Node 12S to a Receiving Node 12R through a Connection 18, which is a Packet 16 transmission path between a Sending Node 12S and a Receiving Node 12R through Network 10. It will be understood by those of ordinary skill in the arts that a Connection 18 may be comprised of any combination of Lines 14 and Nodes 12 wherein the Nodes 12 in a Connection 18 may include, for example, routers, switches, networks or sub-networks or servers operating to establish a Connection 18 between a Sending Node 12S and a Receiving Node 12R. It will also be understood that a Connection 18 or a Network 10 or the path followed by Packets 16 may conform to a range of topologies, such as Frame Relay or an ATM. It will also be understood that a Connection 18 may be and typically is bi-directional, with the Sending Node 12S and the Receiving Node 12R alternating as the Sending Node 12S and Receiving Node 12R, depending upon the direction in which Packets 16 are being transmitted at any time. It will therefore be understood that the designations Sending Node 12S and Receiving Node 12R are solely for illustrative purposes in the following descriptions, and are not to be taken or understood as limiting or defining of the structure or function of a given Node 12. For example, a router in a Connection 16 may be regarded as, and for purposes of the present invention, may comprise either or both of a Sending Node 12S and Receiving Node 12R to receive Packets 16 from a Node 12 and to transmit Packets 16 onwards to another Node 12, and the present invention may be implemented within a Node 12 that is a router, switch or other element of a Connection 16. • Bahadiroglu at 19:11–19 In addition, the Packet Transfer Engines (PTE) 20T residing at the Sending Node 12S and at the Receiving Node 12R will operate as data communications protocol stack mechanisms, that is and for example, as a Transmission Control Protocol/Internet Protocol (“TCP/IP”) mechanism, to communicate “payload” Data Packets 16C of the optimum packet size and at the optimum inter-packet interval between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R. • Bahadiroglu at 19:20–46

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	It will therefore be apparent that a Packet Transfer Engine (PTE) 20T will reside in each Node 12 of a Network 10 that is to function as a Sending Node 12S or as a Receiving Node 12R according to the present invention. Certain Nodes 12, however, may contain more than one Packet Transfer Engine (PTE) 20T. Examples of such would include, for example, Nodes 12 that are required to support more than one Connection 18, such as a router connected to more than one Network 10 or a server supporting a plurality of Connections 18 to other Nodes 12 concurrently. It will also be understood that a Network 10 may require only a single Collector/Controller (C/C) 20C as a Collector/Controller (C/C) 20C may operate with and control a plurality of Packet Transfer Engines (PTE) 20T, but may include a plurality of Collector/Controllers 20C, each of which may support a plurality of Packet Transfer Engines (PTE) 20T. Also, a Collector/Controller (C/C) 20C may reside in a Node 12 with a Packet Transfer Engine (PTE) 20T, that is, in either a Sending Node 12S or a Receiving Node 12R, or may reside in a Node 12 separate from the Nodes 12 in which the Packet Transfer Engines (PTE) 20T reside. The number and configuration of Packet Transfer Engines (PTE) 20T and Collector/Controllers 20C in a Network 10 will therefore depend, for example, upon the number and configuration of Nodes 12 that are to operate as Sending Nodes 12S or Receiving Nodes 12R, or as both, the number of Connections 18 to be supported at any time, and so on. • Bahadiroglu at 19:47–20:3 Also, and although not shown in detail in FIG. 2, it will be recognized and understood that a Packet Transfer Engine (PTE) 20T residing in a Sending Node 12S or a Receiving Node 12R will effectively reside in and function as a layer or element of a layer of the Network Protocol Stack (Stack) 24 the Sending Node 12S or Receiving Node 12R. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20T communicate Packets 16 at the UDP layer of TCP/IP and Packet Transfer Engines (PTE) 20T communicate with Collector/Controllers 20C at the TCP layer of TCP/IP. It will be recognized and understood, however, that an Adaptive Packet Mechanism 20 may execute or operate with a wide variety of protocols and at a number of different layers of such protocols for the transfer of data through Networks 16. While the type, degree and methods for interoperating with such aspects of the protocols as packet size and inter-packet interval may vary significantly between protocols, such protocols are widely known and well understood by those of ordinary skill in the relevant arts, the details of particular protocols. As such, the means and methods by which various implementations and embodiments of the Adaptive Packet Mechanism 20 of the present invention may be adapted to each protocol will not be discussed in detail herein.

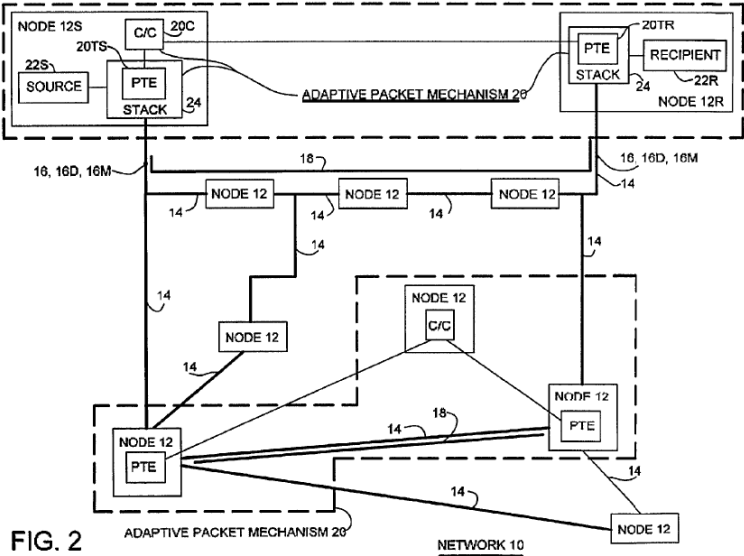
'800 Patent Claim Limitation	Bahadiroglu
	- Bahadiroglu at 22:10-35 Network Layer 28C of the OSI Protocol Model 24O is responsible for network processes to reliably send and receive data between networks. For example, a diagram of a standard Ethernet Frame 34 as may be sent through a Router 24 through Network Layer 28C using the TCP/IP is shown in FIG. 5. Network Layer 28C provides logical addressing, network routing, flow control that monitors the network connection, and sequencing and translation functions. Addressing is also performed in Network Layer 28, and the form of addressing is specific to a given protocol. For example, an Ethernet workstation may run both TCP/IP and Novell IPX/SPX Network Layer 28C protocols wherein each Network Layer 28C protocol will have a different logical addressing method. The Network Layer 28C protocols, such as TCP/IP, UDP/IP, IPX/SPX, DECNET, are also used by routers to interconnect Networks 16. It must be noted, however, that there are certain Network 10 Protocols 24 that do not extend to the Network Layer 28. These include DECLAT, IBM's Network Basic Input/Output System (NetBIOS), IBM's Extended User Interface (NetBEUI) for NetBIOS, and others. These Protocols 24 have no provisions for Network Layer 28C addressing and routing, so that connection of these Protocols 24 between different LANs must be accomplished with MAC sub-Layer 28BA devices such as LAN bridges or LAN switches. - Bahadiroglu at 23:35-43 Network Layer 24K includes hardware devices for Network 10 communication and programs and processes for controlling communications at the Network 10 hardware level. As in the instance of the OSI Model Protocol 24O, TCP/IP Protocol 24T supports virtual paths through the Network 10 between, for example, Transmitting Nodes 18 and Receiving Nodes 20, and communications configurations such as Asynchronous Transfer Mode, Ethernet and Frame-Relay. - Bahadiroglu at 24:56-25:10

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	Referring to FIG. 6A, therein is illustrated the structure and operation of an Adaptive Packet Mechanism 20 with respect to a single Connection 18 between a Sending Node 12S and a Receiving Node 12R. As shown therein, a Packet Transfer Engine (PTE) 20T resides in the Sending Node 12S, and will hereafter be identified as the Packet Transfer Engine (PTE) 20TS, and second Packet Transfer Engine (PTE) 20T resides in the Receiving Node 12R, and will hereafter be identified as the Packet Transfer Engine (PTE) 20TR. It will be understood that the designations of Nodes 12 in FIG. 6A as Sending Nodes 12S and Receiving Nodes 12R and the corresponding designations of the Packet Transfer Engines (PTE) 20T as a Packet Transfer Engine (PTE) 20TS and a Packet Transfer Engine (PTE) 20TR are solely for purposes of the present discussions and are not intended or meant to be limiting. For example, the designations of sending and receiving Nodes 12 and Packet Transfer Engines (PTE) 20T would periodically in bi-lateral data packet communication between the Nodes 12, when the flow of data packets reverses, or that a Node 12 may operate as a Sending Node 12S in one Connection 18 and as a Receiving Node 12R in a different Connection 18. • Bahadiroglu at 25:43–67 Also, it has been described that a Packet Transfer Engine (PTE) 20T residing in a Sending Node 12S or a Receiving Node 12R will effectively reside in and function as a Layer 28 or element of a Layer 28 of the Network Protocol Stack (Stack) 24 the Sending Node 12S or Receiving Node 12R to form, transmit and receive Packets 16. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20T communicate Monitor Packets 16M and Data Packets 16C at the UDP layer of TCP/IP and communicate with Collector/Controllers 20C at the TCP layer of TCP/IP. It will be recognized and understood, however, that an Adaptive Packet Mechanism 20 may execute or operate with a wide variety of protocols and at a number of different layers of such protocols for the transfer of data through Networks 16. While the type, degree and methods for interoperating with such aspects of the protocols as packet size and inter-packet interval may vary significantly between protocols, such protocols are widely known and well understood by those of ordinary skill in the relevant arts, the details of particular protocols. As such, the means and methods by which various implementations and embodiments of the Packet Transfer Engines (PTE) 20T of the present invention may be adapted to and implemented in each protocol will not be discussed in detail herein.

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	- Bahadiroglu at 26:1–19 As described, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 are capable of multiple modes of operation. For example, in the data transfer mode the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate to transfer data from the Sending Node 12S to the Receiving Node 12R through the Connection 18. In the network data collection and network condition determination modes, hereafter referred to as the “test” modes, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 will operate to determine the network conditions of the Connection 18, such as available bandwidth, latency and jitter, and from this information will determine the currently optimum Packet 16 size and inter-packet interval for communicating Data Packets 16C through the Connection 18 for a given amount and type of data. - Bahadiroglu at 27:30–34 Before discussing the modes of operation of Collector/Controller (C/C) 20C and Packet Transfer Engines (PTE) 20TS and 20TR in detail, it should be noted that in the presently preferred implementation, the the modes of operation are controlled in part by inputs from Data Source 22S or from some other source in the Sending Node 12S indicating, for example, what type of data transfer operation is to be performed, such as a file transfer or the transmission of a continuous audio/video data stream, and the amount of data to be transferred. The Collector/Controller (C/C) 20C, in turn, selects an appropriate mode of operation for the particular data transfer requested by the Sending Node 12S, including the method by which network conditon information is to be acquired. The Collector/Controller (C/C) 20C, in turn, generates Control Outputs 38C to the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR to control the modes of operation of the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR during the requested data transfer. As will be described below, packet transfers between the Sending Node 12S and the Receiving Node 12R will involve both a data transfer mode and one or more network condition collection modes and may require the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR involved in the operation to switch between the data transfer modes and the network

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	condition collection modes during the data transfer. In the presently preferred embodiment, the modes of operation of the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR are determined by flags set in the Collector/Controller (C/C) 20C and the Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR by the Collector/Controller (C/C) 20C. • Bahadiroglu at 28:16–34 First considering the data transfer mode, that is, the method by which Data Packets 12D are transferred from a Sending Node 12S to a Receiving Node 12R, the Packet Transfer Engines (PTE) 20TS and 20TR residing at the Sending Node 12S and at the Receiving Node 12R will operate as or as part of the data communications Network Protocol Stack (Stack) 24 mechanisms of the Sending Node 12S and the Receiving Node 12R. That is and for example, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate as a Layer 28 of the Transmission Control Protocol/Internet Protocol (“TCP/IP”) mechanism to communicate “payload” Data Packets 16C between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R. For example, in a presently preferred embodiment of an Adaptive Packet Mechanism 20, Packet Transfer Engines (PTE) 20TS and 20TR communicate Monitor Packets 16M and Data Packets 16C at the UDP layer of TCP/IP and communicate with Collector/Controllers 20C at the TCP layer of TCP/IP. • Bahadiroglu at 28:35–54 In the data transfer mode, and according to the present invention, the Collector/Controller (C/C) 20C will provide a Packet Control 36 output to the Packet Transfer Engine (PTE) 20TS in the Sending Node 12R wherein the Packet Control 36 output will designate an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I for the current Connection 18 network conditions. The Packet Transfer Engine (PTE) 20TS will receive Data 22D from the Data Source 22S or from higher Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented, and will “packetize” the Data 22D into Data Packets 16C of the size designated by the Optimum Packet Size 36S. The Packet Transfer Engine (PTE) 20TS will transmit the Data Packets 16C to the Connection 18 at inter-packet intervals designated by Optimum Inter-Packet Interval

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	36I, either directly or through lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TS is implemented. • Bahadiroglu at 28:55–29:4 The Data Packets 16C are transferred through the Connection 18 to the Receiving Node 12R, and the Packet Transfer Engine (PTE) 20TR will receive the Data Packets 16C from the Connection 18, either directly or from lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TR will “depacketize” the Data 22D and will pass the Data 22D to the Data Recipient 22R, either directly or through higher Layers 28 of the Network Protocol Stack (Stack) 24, again depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TS will form the Data 22D into Data Packets 16C of the size designated by Optimum Packet Size 36S and will transmit the Data Packets 16C at the inter-packet interval designated by Optimum Inter-Packet Interval 36I. • Bahadiroglu at Fig. 2

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	 FIG. 2 Bahadiroglu at Fig. 6A

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	FIG. 6A See also, e.g., Bahadiroglu at 20:20-67, 26:20-58, 40:24-40. To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the '800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.
[12.d] wherein the first interconnect module includes a first memory for buffering	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.:

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first data from the first processing module, the first interconnect module further including a first determination unit, wherein the first determination unit is configured to determine a first optimal amount of data to be buffered by the first memory, and the second interconnect module includes a second memory for buffering second data from the second processing module, the second interconnect module further including a second determination unit, wherein the second determination unit is configured to determine a second optimal amount of data to be buffered by the second memory,	• Bahadiroglu at Abstract An adaptive packet mechanism and method for optimizing data packet transmission through a network connection between a sending node and a receiving node. Current network conditions in the connection are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of latency and jitter are used to determine an optimum packet size and an optimum inter-packet interval for transmission of packet data between the sending node and the receiving node and are used in the transmission of data packets from the sending node to the receiving node. Network conditions may be determined by transmission of monitor or data packets and may be determined at either or both of the sending or receiving nodes and the optimum packet size and inter-packet interval are determined by a fuzzy logic analyzer, a neural network analyzer or a combined fuzzy logic/neural network analyzer. • Bahadiroglu at 13:21–26 The present invention is directed to an adaptive packet mechanism and method for use in a data communication network including at least one sending node for transmitting packet data and one receiving node for receiving packet data for optimizing data packet transmission through a connection between the sending node and the receiving node. • Bahadiroglu at 13:27–43 According to the present invention, the current network conditions in the connection between the sending node and the receiving node are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of the latency and jitter of the connection are then used to determine an optimum packet size and an optimum inter-packet interval for transmission of packet data between the sending node and the receiving node. The amount and type of data to be transmitted from the sending node to the receiving node are also considered in determining the optimum packet size and the optimum inter-packet interval. The method and mechanism of the present invention may be

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	employed for the transmission of data packets from the sending node to the receiving node with packet sizes and at inter-packet intervals determined according to the network conditions. • Bahadiroglu at 14:10–27 According to a first aspect of the present invention, the network conditions are determined by transmitting a sequence of monitor packets from the sending node to the receiving node, each monitor packet including a departure time representing a time the monitor packet was transmitted from the sending node, a packet size representing a size of the monitor packet and a packet number representing a numerical position of the monitor packet in the sequence of monitor packets. In the receiving node, the monitor packets are reflected back from the receiving node to the sending node in the sequence in which the monitor packets are received at the sending node. The sending node, upon receiving the reflected monitor packets from the receiving node, determines network conditions in the connection between the sending node and the receiving node and, from the network conditions, determines an optimum packet size and an optimum inter-packet interval for transmitting packets from the sending node to the receiving node. • Bahadiroglu at 14:28–36 In a further aspect of the present invention, the receiving node will determine network conditions from the received monitor packets, and may store the network conditions in one or more condition records. Alternately, the receiving node may return the network conditions determined in the receiving node to the sending node, where the sending node will update the optimum packet size and inter-packet interval using the network conditions determined in the receiving node. • Bahadiroglu at 14:37–49 In a still further aspect of the present invention, packets will be transmitted from the sending node to the receiving node and the receiving node will transmit an acknowledgment for each packet received from the sending node. The sending node will utilize the acknowledgments received from the receiving node to determine network conditions in the connection wherein the network conditions

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	pertain to the latency and jitter of packet transmission between the sending node and receiving node for monitor packets of a known size and known inter-packet transmission interval. The sending node will determine from the network conditions an optimum packet size and optimum inter-packet interval for transmission of data packets to the receiving node. • Bahadiroglu at 14:50–60 In a yet further aspect of the present invention, the sending node will transmit a sequence of data packets from the sending node to the receiving node and the receiving node will determine the network conditions from the received data packets. The receiving node will return the network conditions determined in the receiving node to the sending node, and the sending node will determine an optimum packet size and an optimum inter-packet interval for the transmission of data packets from the sending node to the receiving node from the network conditions received from the receiving node. • Bahadiroglu at 16:10–26 Also in contrast from the methods of the prior art, the present invention does not attempt to control or modify internal conditions or operation of a network or connection, but adapts data transmission to the observed network or connection conditions solely by control and adaptation of externally controllable data transmission characteristics. In particular, the present invention attempts to directly determine the optimum bandwidth available through a network or connection, and to determine the data transmission characteristics to optimally conform to the available bandwidth. More specifically, the present invention adapts data transmission to existing real time network or connection conditions and available bandwidth by controlling packet size and inter-packet interval. Adaptation of network communications to the available bandwidth will, in turn, address such secondary effects as packet error rate, packet loss or packet dropping. • Bahadiroglu at 17:16–25

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	As will be described in the following, the method and mechanism of the present invention determines, in real time, the packet size and inter-packet interval that utilizes the maximum available bandwidth of the connection most efficiently under current network latency, jitter and traffic conditions by comparison of the relative latency and jitter of different sized packets. The present invention then adjusts the transmitted packet size and inter-packet interval in real time to that optimum for the current network and connection bandwidth. • Bahadiroglu at 18:38–58 As illustrated in FIG. 2 and as described in further detail in subsequent descriptions, the method and mechanism of the present invention is embodied in an Adaptive Packet Mechanism 20 that operates to determine the optimum Data Packet 16 size and inter-packet interval to most efficiently utilize the maximum available bandwidth of a Connection 16 between a Sending Node 12R and a Receiving Node 12R for the current conditions of Connection 16 latency and jitter. As described, this optimum packet size and inter-packet interval will, as a consequence, yield the highest probability of packets arriving successfully at a given Receiving Node 12R. As will be described in further detail in the following, Adaptive Packet Mechanism 20 operates to determine the current maximum available bandwidth and latency and jitter conditions of a Connection 16 by determining the Connection 16 conditions, referred to hereinafter as the network conditions directly determined by the Connection 16 bandwidth and directly determining the Connection 16 bandwidth, including the Connection 16 available bandwidth and the latency and jitter through the Connection 16 for selected sizes of Packets 16. • Bahadiroglu at 18:59–19:10 In a presently preferred embodiment, Adaptive Packet Mechanism 20 includes or is comprised of two or more Packet Transfer Engines (PTE) 20T and one or more Collector/Controllers 20C. Briefly, and as will be described in further detail in following descriptions, a Transfer Engine 20T residing at a Sending Node 12S of a Connection 18 may operate under the direction of a Collector/Controller (C/C) 20CA to transmit sequences of one or more Monitor Packets 16M to a Transfer Engine 20T residing in the Receiving Node 12T of the Connection 18. One or both of the Packet Transfer

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	Engines (PTE) 20T of the Connection 18 will determine the transmission characteristics of the Monitor Packets 16M through the Connection 18 and will extract or determine the current network conditions of the Connection 18, such as available bandwidth, latency and jitter. The network condition information will then be provided to a Collector/Controller (C/C) 20C, which will determine the optimum packet size and inter-packet interval for the current network conditions of the Connection 18. • Bahadiroglu at 24:32–55 It has been described above that a Adaptive Packet Mechanism 20 includes or is comprised of one or more Collector/Controllers 20C and two or more Packet Transfer Engines (PTE) 20T. Packet Transfer Engines (PTE) 20T operate under control of a Collector/Controller (C/C) 20C to determine the network conditions of Connections 18, wherein the network conditions examined by an Adaptive Packet Mechanism 20 pertain to the latency and jitter and the available bandwidth of the Connections 18, and to determine from these network conditions the optimum packet size and optimum inter-packet interval for the transmission of data packets through the Connections 18 for given amounts and types of data. As will be described, an Adaptive Packet Mechanism 20 operates in a number of modes to acquire the network condition information, including the transmission of Monitor Packets 12M through the Connections 18 and by examination of the transmission of Data Packets 12D through the Connections 18. As will be described, the operations and functions of an Adaptive Packet Mechanism 20 are accomplished through a Packet Transfer Engine (PTE) 20T in each Node 12 that is to be a Sending Node 12S or a Receiving Node 12R or both, and a Collector/Controller (C/C) 20C that may reside, for example, in a Sending Node 12S or in a Node 12 separate from the Nodes 12S and 12R. • Bahadiroglu at 25:11–41 It has also been described herein above that a Collector/Controller (C/C) 20C operating with and controlling the Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine (PTE) 20TR of a Connection 18 may reside in any Node 12 of the Network 10. It will therefore be understood that the Collector/Controller (C/C) 20C is shown in FIG. 6A as residing in Sending Node 12S only for

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	purposes of illustration, and that this representation is not intended or meant to be limiting. As shown in FIG. 6A, and as will be discussed in further detail in a following description, Collector/Controller (C/C) 20C includes or is associated with a Network Analyzer 48 that may be implemented in a number of forms, but which receives the network condition information acquired by Packet Transfer Engine (PTE) 20TS or by Packet Transfer Engine (PTE) 20TS in combination with Packet Transfer Engine (PTE) 20TR and information pertaining to a currently to be executed data transfer to determine the optimum packet size and inter-packet interval under the current Connection 18 conditions and for the amount and type of data to be transferred. As will be discussed in the following, and for example, a Network Analyzer 48 may be implemented as fuzzy logic, or as a neural network or as a combination of a neural network with fuzzy logic, and the mode by which network condition information is acquired and used by the Collector/Controller 20C will be determined in part by the specific method used to implement Network Analyzer 48. In the reverse, the method used to implement Network Analyzer 48 will be determined in part by the methods and modes of operation available to acquire the network information and the types of network condition information that may be acquired. • Bahadiroglu at 26:1–19 As described, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 are capable of multiple modes of operation. For example, in the data transfer mode the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate to transfer data from the Sending Node 12S to the Receiving Node 12R through the Connection 18. In the network data collection and network condition determination modes, hereafter referred to as the “test” modes, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 will operate to determine the network conditions of the Connection 18, such as available bandwidth, latency and jitter, and from this information will determine the currently optimum Packet 16 size and inter-packet interval for communicating Data Packets 16C through the Connection 18 for a given amount and type of data. • Bahadiroglu at 26:42–58

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	In the network conditon collection modes of operation, and depending upon the specific network condition collection mode, one or both of the Packet Transfer Engines (PTE) 20TS and 20TR of the Connection 18 may acquire network condition information by determining the transmission characteristics of either or both of Monitor Packets 16M or Data Packets 12D transmitted through the Connection 18 from the Sending Node 12S to the Receiving Node 12R, and will extract or determine the current network conditions of the Connection 18, such as available bandwidth, latency and jitter. As described, the network condition information is provided to a Collector/Controller (C/C) 20C, wherein Network Analyzer 48 will determine the optimum packet size and inter-packet interval for the current network conditions of the Connection 18 and Collector/Controller (C/C) 20C will use these optimum packet size and inter-packet interval values during the data transfer mode. • Bahadiroglu at 29:66-31:20 Briefly considering Monitor Packets 16M and Data Packets 16C and the operation of the present invention in general, it has been described herein above that according to the present invention the available bandwidth, latency and jitter of a given Connection 18 is a function of the size of Packets 16 and of the inter-packet interval between successive Packets 16, that is, the intervals between Packets 16 that are transmitted consecutively through the Connection 18. The method and mechanism of the present invention determines the packet size and inter-packet interval that utilizes the maximum available bandwidth of the connection most efficiently under current network latency, jitter and traffic conditions, thereby maximizing the effective data transfer rate. In this regard, it is well known and understood by those of ordinary skill in the arts that a given Packet 16 is comprised of one or more fields of control bits or bytes, often referred to as “header” bits or bytes, used in managing and controlling the network transmission of the Packets 16, and one or more fields of data, which are the actual “payload” of a Packet 16. As such, the size of a Packet 16, that is, the number of bits or bytes contained in a Packet 16, is comprised of a fixed number, primarily comprised of the control or header fields, and a controllable number comprised of the data fields. It has been described that an Adaptive Packet Mechanism 20 controls the size of Packets 16 to be an optimum for the current network conditions of a Connection 18, and it will therefore be apparent that an Adaptive Packet Mechanism 20 does so by controlling the size of the data fields of the

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	Packets 16 as the control or header fields are typically determined by the communications protocol employed by the Sending Node 12S and Receiving Node 12R. The range of Packet 16 sizes will thereby range from a minimum determined primarily by the size of the control or header fields of the Packets 16 to a maximum determined by the communications protocol employed by the Sending Node 12S and Receiving Node 12R 24 executed by Network Interface Mechanism 26 and will include both the control or header fields and the maximum capacity of the data fields. As such, it will be understood that within the context of the present invention the size of a Packet 16, whether a Data Packet 16C or a Monitor Packet 16M, will be a function of both the control or header fields and the data fields. Referring to FIG. 6A, therein is illustrated an exemplary Monitor Packet 16M as may be used in a presently preferred implementation of this mode of operation. In the presently preferred embodiment, the Packet Transfer Engine (PTE) 20TS will transmit a sequence of 10 (ten) such Monitor Packets 12M, to allow the Adaptive Packet Mechanism 20 to obtain information pertaining to, for example, the average available bandwidth of the Connection 18 and the average jitter between Packets 16 over the Connection 18 over a sample of Monitor Packets 12M, and information pertaining to the extent the Packets 16 may arrive in a sequence that is out of order from the sequence in which they were transmitted. It must be noted that FIG. 6A illustrates, in particular, the data fields or “payload” of a Monitor Packet 16M, which in a presently preferred embodiment is referred to as a “28 byte packet”. As shown in FIG. 6A, and for example, a Monitor Packet 16M may include a Departure Time 12MT representing the time of departure of the Monitor Packet 16M from the Packet Transfer Engine (PTE) 20T, a Packet Size 16MS representing the size of the Monitor Packet 16M, and Packet Number 16MN representing the sequential position of the Monitor Packet 16M in a sequence of Monitor Packets 16M. A Monitor Packet 16M may also include a Transmission Parameters 16MP, which may be comprised, for example, of the current Packet Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. As described, the Monitor Packets 16M of the sequence of Monitor Packets 16M transmitted from the Sending Node 12S to the Receiving Node 12R are reflected or echoed back to the Sending Node 12S by the Packet Transfer Engine (PTE) 20TR as they are received by the Packet Transfer Engine

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	(PTE) 20TR, that is, immediately upon being received, or as rapidly as feasible, and in the order in which they are received. The Packet Transfer Engine (PTE) 20TS may determine the times and Sequence of arrival of the reflected or echoed Monitor Packets 16M returned from the Packet Transfer Engine (PTE) 20TR and will extract and determine Network Conditions 42. The Packet Transfer Engine (PTE) 20TS will provide Network Conditions 42 to the Collector/Controller (C/C) 20C, and, as described below, the Collector/Controller (C/C) 20C will determine a current Packet Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum InterPacket Interval 36I from the Network Conditions 42. • Bahadiroglu at 36:33–57 As indicated in FIG. 6A, information representing the current network packet transmission characteristics or properties of a Connection 18 are provided to Collector/Controller (C/C) 20C, together with information pertaining to a present data transfer to be executed, and Collector/Controller (C/C) 20C in return generates a Packet Control 36 output indicated the present Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. As discussed above, the current network packet transmission characteristics may be provided as Network Conditions 42 from Packet Transfer Engines (PTE) 20TS or as a Condition Record 40R or as Condition Record Entries 40E from the Packet Transfer Engine 20TR. As shown, information pertaining to the current request for a data transfer is contained in a Transfer Request 46 from a Data Source 22S, which identifies, for example, the type of data transfer requested and the amount of data to be transmitted. In this regard, it should be noted that a Transfer Request 46 may be submitted by a Sending Node 12S, either at its own initiative or in response to a request from a data request from a Receiving Node 12R or may be submitted by a Receiving Node 12R as part of a data request to a Sending Node 12S. In either instance the Packet Control 36 outputs will be provided to the Sending Node 12S and possibly to the Receiving Node 12R, depending upon the type of data transfer to be performed. • Bahadiroglu at 39:1-14 In operation, Fuzzy Logic Analyzer 48CA and a Neural Network 48CB receive either or both of Network Conditions 42 and Condition Records 20R from either or both of Packet Transfer Engine

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	(PTE) 20TS and Packet Transfer Engine (PTE) 20TR, depending upon the type of current data transfer and the current test mode employed and will receive Transfer Requests 46. The Combined Analyzer 48C will, in turn, generate Packet Control 36A outputs identifying an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I and will provide the Packet Control 36A outputs to the Collector/Controller (C/C) 20C. Collector/Controller (C/C) 20C will, in turn, provide the Packet Control 36 outputs to either or both of the involved Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine 30TR. • Bahadiroglu at 39:65-40:23 Considering a present example of a back propagation neural network as may be implemented as a Neural Network 48B or as a Neural Network 48CB in a Combined Analyzer 48C, such a neural network may be implemented in three layers, respectively designated as the input layer, the middle layer and the output layer. The input layer receives as inputs variable representing and comprising the information from which the neural network is to generate Packet Control 36A outputs and these variables will preferably comprise the minimum number of variable necessary to predict an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I. In a present embodiment, for example, the input layer may receive the information regarding transfer type and volume of data from a Transfer Request 46. The middle layer, in turn, is comprised of weighted neurons to perform the majority of operations necessary to determine the Optimum Packet Size 36S and Optimum Inter-Packet 36I values, while the output layer generates the actual Optimum Packet Size 36S and Optimum Inter-Packet 36I values as a Packet Control 36 output. Other inputs to the neural network will typically include training input, Such as Network Conditions 42 and Condition Records 40R representing the performance, condition and characteristics of the Connection 16. These inputs comprise a criteria by which the neural network may evaluate the generation of the Packet Control 36A outputs, and by which the neural network may “learn”. See also, e.g., Bahadiroglu at 28:35-29:4, 36:33-37:4, 40:52-64 (Claim 1), 40:65-41:5 (Claim 2). To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in

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	Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the '800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.
[12.e] the first interconnect module transferring the first data to the second processing module when the first data buffered in the first memory reaches the first optimal amount, and the second interconnect module transferring the second data to the first processing module when the second data buffered in the second memory reaches the second optimal amount	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.: • Bahadiroglu at 19:11–19 In addition, the Packet Transfer Engines (PTE) 20T residing at the Sending Node 12S and at the Receiving Node 12R will operate as data communications protocol stack mechanisms, that is and for example, as a Transmission Control Protocol/Internet Protocol ("TCP/IP") mechanism, to communicate "payload" Data Packets 16C of the optimum packet size and at the optimum inter-packet interval between a Data Source 22S in the Sending Node 12S and a Data Recipient 22R in the Receiving Node 12R. • Bahadiroglu at 28:35–54 In the data transfer mode, and according to the present invention, the Collector/Controller (C/C) 20C will provide a Packet Control 36 output to the Packet Transfer Engine (PTE) 20TS in the Sending Node 12R wherein the Packet Control 36 output will designate an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I for the current Connection 18 network conditions. The Packet Transfer Engine (PTE) 20TS will receive Data 22D from the Data Source 22S or from higher Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented, and will "packetize" the Data 22D into Data Packets 16C of the size designated by the Optimum Packet Size 36S. The Packet Transfer Engine (PTE) 20TS will transmit the Data Packets 16C to the Connection 18 at inter-packet intervals designated by Optimum Inter-Packet Interval 36I, either directly or through lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TS is implemented. • Bahadiroglu at 28:55-29:4

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	The Data Packets 16C are transferred through the Connection 18 to the Receiving Node 12R, and the Packet Transfer Engine (PTE) 20TR will receive the Data Packets 16C from the Connection 18, either directly or from lower Layers 28 of the Network Protocol Stack (Stack) 24, depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TR will “depaketize” the Data 22D and will pass the Data 22D to the Data Recipient 22R, either directly or through higher Layers 28 of the Network Protocol Stack (Stack) 24, again depending upon the Layer 28 at which the Packet Transfer Engine (PTE) 20TR is implemented. The Packet Transfer Engine (PTE) 20TS will form the Data 22D into Data Packets 16C of the size designated by Optimum Packet Size 36S and will transmit the Data Packets 16C at the inter-packet interval designated by Optimum Inter-Packet Interval 36I. • Bahadiroglu at 29:66-30:42 Briefly considering Monitor Packets 16M and Data Packets 16C and the operation of the present invention in general, it has been described herein above that according to the present invention the available bandwidth, latency and jitter of a given Connection 18 is a function of the size of Packets 16 and of the inter-packet interval between successive Packets 16, that is, the intervals between Packets 16 that are transmitted consecutively through the Connection 18. The method and mechanism of the present invention determines the packet size and inter-packet interval that utilizes the maximum available bandwidth of the connection most efficiently under current network latency, jitter and traffic conditions, thereby maximizing the effective data transfer rate. In this regard, it is well known and understood by those of ordinary skill in the arts that a given Packet 16 is comprised of one or more fields of control bits or bytes, often referred to as “header” bits or bytes, used in managing and controlling the network transmission of the Packets 16, and one or more fields of data, which are the actual “payload” of a Packet 16. As such, the size of a Packet 16, that is, the number of bits or bytes contained in a Packet 16, is comprised of a fixed number, primarily comprised of the control or header fields, and a controllable number comprised of the data fields. It has been described that an Adaptive Packet Mechanism 20 controls the size of Packets 16 to be an optimum for the current network conditions of a Connection 18, and it will therefore be apparent that an Adaptive Packet Mechanism 20 does so by controlling the size of the data fields of the

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	Packets 16 as the control or header fields are typically determined by the communications protocol employed by the Sending Node 12S and Receiving Node 12R. The range of Packet 16 sizes will thereby range from a minimum determined primarily by the size of the control or header fields of the Packets 16 to a maximum determined by the communications protocol employed by the Sending Node 12S and Receiving Node 12R 24 executed by Network Interface Mechanism 26 and will include both the control or header fields and the maximum capacity of the data fields. As such, it will be understood that within the context of the present invention the size of a Packet 16, whether a Data Packet 16C or a Monitor Packet 16M, will be a function of both the control or header fields and the data fields. • Bahadiroglu at 30:43–31:20 Referring to FIG. 6A, therein is illustrated an exemplary Monitor Packet 16M as may be used in a presently preferred implementation of this mode of operation. In the presently preferred embodiment, the Packet Transfer Engine (PTE) 20TS will transmit a sequence of 10 (ten) such Monitor Packets 12M, to allow the Adaptive Packet Mechanism 20 to obtain information pertaining to, for example, the average available bandwidth of the Connection 18 and the average jitter between Packets 16 over the Connection 18 over a sample of Monitor Packets 12M, and information pertaining to the extent the Packets 16 may arrive in a sequence that is out of order from the sequence in which they were transmitted. It must be noted that FIG. 6A illustrates, in particular, the data fields or “payload” of a Monitor Packet 16M, which in a presently preferred embodiment is referred to as a “28 byte packet”. As shown in FIG. 6A, and for example, a Monitor Packet 16M may include a Departure Time 12MT representing the time of departure of the Monitor Packet 16M from the Packet Transfer Engine (PTE) 20T, a Packet Size 16MS representing the size of the Monitor Packet 16M, and Packet Number 16MN representing the sequential position of the Monitor Packet 16M in a sequence of Monitor Packets 16M. A Monitor Packet 16M may also include a Transmission Parameters 16MP, which may be comprised, for example, of the current Packet Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. • Bahadiroglu at 39:1-14

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	In operation, Fuzzy Logic Analyzer 48CA and a Neural Network 48CB receive either or both of Network Conditions 42 and Condition Records 20R from either or both of Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine (PTE) 20TR, depending upon the type of current data transfer and the current test mode employed and will receive Transfer Requests 46. The Combined Analyzer 48C will, in turn, generate Packet Control 36A outputs identifying an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I and will provide the Packet Control 36A outputs to the Collector/Controller (C/C) 20C. Collector/Controller (C/C) 20C will, in turn, provide the Packet Control 36 outputs to either or both of the involved Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine 30TR. See also, e.g., Bahadiroglu at 14:10-60, 17:16-25, 36:33-37:4, 40:52-64 (Claim 1), 40:65-41:5 (Claim 2). To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the '800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.
[12.f] wherein at least one of the first determination unit and the second determination unit is further configured to determine an optimal moment for sending the data in said first wrapper or said second wrapper according to communication properties of	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.: • Bahadiroglu at Abstract An adaptive packet mechanism and method for optimizing data packet transmission through a network connection between a sending node and a receiving node. Current network conditions in the connection are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of latency and jitter are used to determine an optimum packet size and an optimum inter-packet

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the communication between the master and the slave,	interval for transmission of packet data between the sending node and the receiving node and are used in the transmission of data packets from the sending node to the receiving node. Network conditions may be determined by transmission of monitor or data packets and may be determined at either or both of the sending or receiving nodes and the optimum packet size and inter-packet interval are determined by a fuzzy logic analyzer, a neural network analyzer or a combined fuzzy logic/neural network analyzer. • Bahadiroglu at 13:21–26 The present invention is directed to an adaptive packet mechanism and method for use in a data communication network including at least one sending node for transmitting packet data and one receiving node for receiving packet data for optimizing data packet transmission through a connection between the sending node and the receiving node. • Bahadiroglu at 13:27-43 According to the present invention, the current network conditions in the connection between the sending node and the receiving node are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of the latency and jitter of the connection are then used to determine an optimum packet size and an optimum inter-packet interval for transmission of packet data between the sending node and the receiving node. The amount and type of data to be transmitted from the sending node to the receiving node are also considered in determining the optimum packet size and the optimum inter-packet interval. The method and mechanism of the present invention may be employed for the transmission of data packets from the sending node to the receiving node with packet sizes and at inter-packet intervals determined according to the network conditions. • Bahadiroglu at 14:10–27 According to a first aspect of the present invention, the network conditions are determined by transmitting a sequence of monitor packets from the sending node to the receiving node, each

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	monitor packet including a departure time representing a time the monitor packet was transmitted from the sending node, a packet size representing a size of the monitor packet and a packet number representing a numerical position of the monitor packet in the sequence of monitor packets. In the receiving node, the monitor packets are reflected back from the receiving node to the sending node in the sequence in which the monitor packets are received at the sending node. The sending node, upon receiving the reflected monitor packets from the receiving node, determines network conditions in the connection between the sending node and the receiving node and, from the network conditions, determines an optimum packet size and an optimum inter-packet interval for transmitting packets from the sending node to the receiving node. • Bahadiroglu at 14:28–36 In a further aspect of the present invention, the receiving node will determine network conditions from the received monitor packets, and may store the network conditions in one or more condition records. Alternately, the receiving node may return the network conditions determined in the receiving node to the sending node, where the sending node will update the optimum packet size and inter-packet interval using the network conditions determined in the receiving node. • Bahadiroglu at 14:37–49 In a still further aspect of the present invention, packets will be transmitted from the sending node to the receiving node and the receiving node will transmit an acknowledgment for each packet received from the sending node. The sending node will utilize the acknowledgments received from the receiving node to determine network conditions in the connection wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node for monitor packets of a known size and known inter-packet transmission interval. The sending node will determine from the network conditions an optimum packet size and optimum inter-packet interval for transmission of data packets to the receiving node. • Bahadiroglu at 14:50–60

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	In a yet further aspect of the present invention, the sending node will transmit a sequence of data packets from the sending node to the receiving node and the receiving node will determine the network conditions from the received data packets. The receiving node will return the network conditions determined in the receiving node to the sending node, and the sending node will determine an optimum packet size and an optimum inter-packet interval for the transmission of data packets from the sending node to the receiving node from the network conditions received from the receiving node. • Bahadiroglu at 16:10–26 Also in contrast from the methods of the prior art, the present invention does not attempt to control or modify internal conditions or operation of a network or connection, but adapts data transmission to the observed network or connection conditions solely by control and adaptation of externally controllable data transmission characteristics. In particular, the present invention attempts to directly determine the optimum bandwidth available through a network or connection, and to determine the data transmission characteristics to optimally conform to the available bandwidth. More specifically, the present invention adapts data transmission to existing real time network or connection conditions and available bandwidth by controlling packet size and inter-packet interval. Adaptation of network communications to the available bandwidth will, in turn, address such secondary effects as packet error rate, packet loss or packet dropping. • Bahadiroglu at 17:16–25 As will be described in the following, the method and mechanism of the present invention determines, in real time, the packet size and inter-packet interval that utilizes the maximum available bandwidth of the connection most efficiently under current network latency, jitter and traffic conditions by comparison of the relative latency and jitter of different sized packets. The present invention then adjusts the transmitted packet size and inter-packet interval in real time to that optimum for the current network and connection bandwidth. • Bahadiroglu at 18:38–58

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	As illustrated in FIG. 2 and as described in further detail in subsequent descriptions, the method and mechanism of the present invention is embodied in an Adaptive Packet Mechanism 20 that operates to determine the optimum Data Packet 16 size and inter-packet interval to most efficiently utilize the maximum available bandwidth of a Connection 16 between a Sending Node 12R and a Receiving Node 12R for the current conditions of Connection 16 latency and jitter. As described, this optimum packet size and inter-packet interval will, as a consequence, yield the highest probability of packets arriving successfully at a given Receiving Node 12R. As will be described in further detail in the following, Adaptive Packet Mechanism 20 operates to determine the current maximum available bandwidth and latency and jitter conditions of a Connection 16 by determining the Connection 16 conditions, referred to hereinafter as the network conditions directly determined by the Connection 16 bandwidth and directly determining the Connection 16 bandwidth, including the Connection 16 available bandwidth and the latency and jitter through the Connection 16 for selected sizes of Packets 16. • Bahadiroglu at 18:59–19:10 In a presently preferred embodiment, Adaptive Packet Mechanism 20 includes or is comprised of two or more Packet Transfer Engines (PTE) 20T and one or more Collector/Controllers 20C. Briefly, and as will be described in further detail in following descriptions, a Transfer Engine 20T residing at a Sending Node 12S of a Connection 18 may operate under the direction of a Collector/Controller (C/C) 20CA to transmit sequences of one or more Monitor Packets 16M to a Transfer Engine 20T residing in the Receiving Node 12T of the Connection 18. One or both of the Packet Transfer Engines (PTE) 20T of the Connection 18 will determine the transmission characteristics of the Monitor Packets 16M through the Connection 18 and will extract or determine the current network conditions of the Connection 18, such as available bandwidth, latency and jitter. The network condition information will then be provided to a Collector/Controller (C/C) 20C, which will determine the optimum packet size and inter-packet interval for the current network conditions of the Connection 18. • Bahadiroglu at 24:32–55

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	It has been described above that a Adaptive Packet Mechanism 20 includes or is comprised of one or more Collector/Controllers 20C and two or more Packet Transfer Engines (PTE) 20T. Packet Transfer Engines (PTE) 20T operate under control of a Collector/Controller (C/C) 20C to determine the network conditions of Connections 18, wherein the network conditions examined by an Adaptive Packet Mechanism 20 pertain to the latency and jitter and the available bandwidth of the Connections 18, and to determine from these network conditions the optimum packet size and optimum inter-packet interval for the transmission of data packets through the Connections 18 for given amounts and types of data. As will be described, an Adaptive Packet Mechanism 20 operates in a number of modes to acquire the network condition information, including the transmission of Monitor Packets 12M through the Connections 18 and by examination of the transmission of Data Packets 12D through the Connections 18. As will be described, the operations and functions of an Adaptive Packet Mechanism 20 are accomplished through a Packet Transfer Engine (PTE) 20T in each Node 12 that is to be a Sending Node 12S or a Receiving Node 12R or both, and a Collector/Controller (C/C) 20C that may reside, for example, in a Sending Node 12S or in a Node 12 separate from the Nodes 12S and 12R. • Bahadiroglu at 25:11–41 It has also been described herein above that a Collector/Controller (C/C) 20C operating with and controlling the Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine (PTE) 20TR of a Connection 18 may reside in any Node 12 of the Network 10. It will therefore be understood that the Collector/Controller (C/C) 20C is shown in FIG. 6A as residing in Sending Node 12S only for purposes of illustration, and that this representation is not intended or meant to be limiting. As shown in FIG. 6A, and as will be discussed in further detail in a following description, Collector/Controller (C/C) 20C includes or is associated with a Network Analyzer 48 that may be implemented in a number of forms, but which receives the network condition information acquired by Packet Transfer Engine (PTE) 20TS or by Packet Transfer Engine (PTE) 20TS in combination with Packet Transfer Engine (PTE) 20TR and information pertaining to a currently to be executed data transfer to determine the optimum packet size and inter-packet interval under the current Connection 18 conditions and for the amount and type of data to be transferred. As will be discussed

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	in the following, and for example, a Network Analyzer 48 may be implemented as fuzzy logic, or as a neural network or as a combination of a neural network with fuzzy logic, and the mode by which network condition information is acquired and used by the Collector/Controller 20C will be determined in part by the specific method used to implement Network Analyzer 48. In the reverse, the method used to implement Network Analyzer 48 will be determined in part by the methods and modes of operation available to acquire the network information and the types of network condition information that may be acquired. • Bahadiroglu at 26:1–19 As described, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 are capable of multiple modes of operation. For example, in the data transfer mode the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate to transfer data from the Sending Node 12S to the Receiving Node 12R through the Connection 18. In the network data collection and network condition determination modes, hereafter referred to as the “test” modes, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 will operate to determine the network conditions of the Connection 18, such as available bandwidth, latency and jitter, and from this information will determine the currently optimum Packet 16 size and inter-packet interval for communicating Data Packets 16C through the Connection 18 for a given amount and type of data. • Bahadiroglu at 26:42–58 In the network condition collection modes of operation, and depending upon the specific network condition collection mode, one or both of the Packet Transfer Engines (PTE) 20TS and 20TR of the Connection 18 may acquire network condition information by determining the transmission characteristics of either or both of Monitor Packets 16M or Data Packets 12D transmitted through the Connection 18 from the Sending Node 12S to the Receiving Node 12R, and will extract or determine the current network conditions of the Connection 18, such as available bandwidth, latency and jitter. As described, the network condition information is provided to a Collector/Controller

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	(C/C) 20C, wherein Network Analyzer 48 will determine the optimum packet size and inter-packet interval for the current network conditions of the Connection 18 and Collector/Controller (C/C) 20C will use these optimum packet size and inter-packet interval values during the data transfer mode. • Bahadiroglu at 29:66-31:20 Briefly considering Monitor Packets 16M and Data Packets 16C and the operation of the present invention in general, it has been described herein above that according to the present invention the available bandwidth, latency and jitter of a given Connection 18 is a function of the size of Packets 16 and of the inter-packet interval between successive Packets 16, that is, the intervals between Packets 16 that are transmitted consecutively through the Connection 18. The method and mechanism of the present invention determines the packet size and inter-packet interval that utilizes the maximum available bandwidth of the connection most efficiently under current network latency, jitter and traffic conditions, thereby maximizing the effective data transfer rate. In this regard, it is well known and understood by those of ordinary skill in the arts that a given Packet 16 is comprised of one or more fields of control bits or bytes, often referred to as "header" bits or bytes, used in managing and controlling the network transmission of the Packets 16, and one or more fields of data, which are the actual "payload" of a Packet 16. As such, the size of a Packet 16, that is, the number of bits or bytes contained in a Packet 16, is comprised of a fixed number, primarily comprised of the control or header fields, and a controllable number comprised of the data fields. It has been described that an Adaptive Packet Mechanism 20 controls the size of Packets 16 to be an optimum for the current network conditions of a Connection 18, and it will therefore be apparent that an Adaptive Packet Mechanism 20 does so by controlling the size of the data fields of the Packets 16 as the control or header fields are typically determined by the communications protocol employed by the Sending Node 12S and Receiving Node 12R. The range of Packet 16 sizes will thereby range from a minimum determined primarily by the size of the control or header fields of the Packets 16 to a maximum determined by the communications protocol employed by the Sending Node 12S and Receiving Node 12R 24 executed by Network Interface Mechanism 26 and will include both the control or header fields and the maximum capacity of the data fields. As such, it will be understood that within the context of the present invention the size of a Packet 16, whether a

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	Data Packet 16C or a Monitor Packet 16M, will be a function of both the control or header fields and the data fields. Referring to FIG. 6A, therein is illustrated an exemplary Monitor Packet 16M as may be used in a presently preferred implementation of this mode of operation. In the presently preferred embodiment, the Packet Transfer Engine (PTE) 20TS will transmit a sequence of 10 (ten) such Monitor Packets 12M, to allow the Adaptive Packet Mechanism 20 to obtain information pertaining to, for example, the average available bandwidth of the Connection 18 and the average jitter between Packets 16 over the Connection 18 over a sample of Monitor Packets 12M, and information pertaining to the extent the Packets 16 may arrive in a sequence that is out of order from the sequence in which they were transmitted. It must be noted that FIG. 6A illustrates, in particular, the data fields or “payload” of a Monitor Packet 16M, which in a presently preferred embodiment is referred to as a “28 byte packet”. As shown in FIG. 6A, and for example, a Monitor Packet 16M may include a Departure Time 12MT representing the time of departure of the Monitor Packet 16M from the Packet Transfer Engine (PTE) 20T, a Packet Size 16MS representing the size of the Monitor Packet 16M, and Packet Number 16MN representing the sequential position of the Monitor Packet 16M in a sequence of Monitor Packets 16M. A Monitor Packet 16M may also include a Transmission Parameters 16MP, which may be comprised, for example, of the current Packet Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. As described, the Monitor Packets 16M of the sequence of Monitor Packets 16M transmitted from the Sending Node 12S to the Receiving Node 12R are reflected or echoed back to the Sending Node 12S by the Packet Transfer Engine (PTE) 20TR as they are received by the Packet Transfer Engine (PTE) 20TR, that is, immediately upon being received, or as rapidly as feasible, and in the order in which they are received. The Packet Transfer Engine (PTE) 20TS may determine the times and Sequence of arrival of the reflected or echoed Monitor Packets 16M returned from the Packet Transfer Engine (PTE) 20TR and will extract and determine Network Conditions 42. The Packet Transfer Engine (PTE) 20TS will provide Network Conditions 42 to the Collector/Controller (C/C) 20C, and, as described below, the Collector/Controller (C/C) 20C will determine a current Packet

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	Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum InterPacket Interval 36I from the Network Conditions 42. • Bahadiroglu at 36:33–57 As indicated in FIG. 6A, information representing the current network packet transmission characteristics or properties of a Connection 18 are provided to Collector/Controller (C/C) 20C, together with information pertaining to a present data transfer to be executed, and Collector/Controller (C/C) 20C in return generates a Packet Control 36 output indicated the present Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. As discussed above, the current network packet transmission characteristics may be provided as Network Conditions 42 from Packet Transfer Engines (PTE) 20TS or as a Condition Record 40R or as Condition Record Entries 40E from the Packet Transfer Engine 20TR. As shown, information pertaining to the current request for a data transfer is contained in a Transfer Request 46 from a Data Source 22S, which identifies, for example, the type of data transfer requested and the amount of data to be transmitted. In this regard, it should be noted that a Transfer Request 46 may be submitted by a Sending Node 12S, either at its own initiative or in response to a request from a data request from a Receiving Node 12R or may be submitted by a Receiving Node 12R as part of a data request to a Sending Node 12S. In either instance the Packet Control 36 outputs will be provided to the Sending Node 12S and possibly to the Receiving Node 12R, depending upon the type of data transfer to be performed. • Bahadiroglu at 39:1-14 In operation, Fuzzy Logic Analyzer 48CA and a Neural Network 48CB receive either or both of Network Conditions 42 and Condition Records 20R from either or both of Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine (PTE) 20TR, depending upon the type of current data transfer and the current test mode employed and will receive Transfer Requests 46. The Combined Analyzer 48C will, in turn, generate Packet Control 36A outputs identifying an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I and will provide the Packet Control 36A outputs to the Collector/Controller (C/C) 20C. Collector/Controller (C/C) 20C will, in turn, provide the

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	Packet Control 36 outputs to either or both of the involved Packet Transfer Engine (PTE) 20TS and Packet Transfer Engine 30TR. • Bahadiroglu at 39:65-40:23 Considering a present example of a back propagation neural network as may be implemented as a Neural Network 48B or as a Neural Network 48CB in a Combined Analyzer 48C, such a neural network may be implemented in three layers, respectively designated as the input layer, the middle layer and the output layer. The input layer receives as inputs variable representing and comprising the information from which the neural network is to generate Packet Control 36A outputs and these variables will preferably comprise the minimum number of variable necessary to predict an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I. In a present embodiment, for example, the input layer may receive the information regarding transfer type and volume of data from a Transfer Request 46. The middle layer, in turn, is comprised of weighted neurons to perform the majority of operations necessary to determine the Optimum Packet Size 36S and Optimum Inter-Packet 36I values, while the output layer generates the actual Optimum Packet Size 36S and Optimum Inter-Packet 36I values as a Packet Control 36 output. Other inputs to the neural network will typically include training input, Such as Network Conditions 42 and Condition Records 40R representing the performance, condition and characteristics of the Connection 16. These inputs comprise a criteria by which the neural network may evaluate the generation of the Packet Control 36A outputs, and by which the neural network may “learn”. See also, e.g., Bahadiroglu at 28:35-29:4, 29:7-28, 36:33-37:4, 40:52-64 (Claim 1), 40:65-41:5 (Claim 2). To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant’s Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the ’800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person’s understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.

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[12.g] wherein the communication properties include ordering of data transport, flow control including when a remote buffer is reserved for a connection, then a data producer will be allowed to send data only when it is guaranteed that space is available for the produced data at the remote buffer, throughput where a lower bound on throughput is guaranteed, latency where an upper bound for latency is guaranteed, lossiness including dropping of data, transmission termination, transaction completion, data correctness, priority, and data delivery.	Bahadiroglu discloses and/or renders obvious this limitation based on at least the following citations. See, e.g.: • Bahadiroglu at 4:50–64 The preferred methods for obtaining satisfactory performance in networks have thereby focused on traffic management methods for managing and controlling the traffic load and flow in a network, mechanisms for allocating network bandwidth and improvements in protocols for the efficient transmission of data. Traffic flow and control measures, for example, typically include flow control for regulating the packet transmission rate of a transmitting system to a rate compatible with the rate the receiving system can absorb. Load regulation mechanisms, in turn, globally limit the number of packets present at any time in the network to thereby avoid overloading the capacity of the channels and routing switches while load balancing mechanisms distribute traffic over the links of the network to avoid local congestion. • Bahadiroglu at 13:27–43 According to the present invention, the current network conditions in the connection between the sending node and the receiving node are periodically determined wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node. The measurements of the latency and jitter of the connection are then used to determine an optimum packet size and an optimum inter-packet interval for transmission of packet data between the sending node and the receiving node. The amount and type of data to be transmitted from the sending node to the receiving node are also considered in determining the optimum packet size and the optimum inter-packet interval. The method and mechanism of the present invention may be employed for the transmission of data packets from the sending node to the receiving node with packet sizes and at inter-packet intervals determined according to the network conditions. • Bahadiroglu at 13:44–61

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	In a first aspect and implementation of the invention, the adaptive packet mechanism transmits a sequence of monitor packets from the sending node to the receiving node wherein each monitor packet includes a departure time representing a time the monitor packet was transmitted from the sending node, a packet size representing a size of the monitor packet and a packet number representing a numerical position of the monitor packet in the sequence of monitor packets. The receiving node reflects the monitor packets from the receiving node to the sending node in the sequence in which the monitor packets are received at the sending node, and the sending node, upon receiving the reflected monitor packets from the receiving node, determines network conditions in the connection between the sending node and the receiving node wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node for monitor packets of a known size and known inter-packet transmission interval. • Bahadiroglu at 13:62–14:9 In one implementation of the present invention the network conditions determined through the monitor packets include a maximum two way delay time for the transmission and reflection of a monitor packet, a minimum two way delay time for the transmission and reflection of a monitor packet, an average two way delay time for the monitor packets, an average jitter of the monitor packets, and a number of packets out of sequence. In further implementations of the present invention, the network conditions determined through the monitor packets further include a number of packets lost. In still further implementations of the present invention, the network conditions determined through the monitor packets further include an average available bandwidth, an average jitter, a maximum jitter and a minimum jitter. • Bahadiroglu at 14:37–49 In a still further aspect of the present invention, packets will be transmitted from the sending node to the receiving node and the receiving node will transmit an acknowledgment for each packet received from the sending node. The sending node will utilize the acknowledgments received from the receiving node to determine network conditions in the connection wherein the network conditions pertain to the latency and jitter of packet transmission between the sending node and receiving node

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	for monitor packets of a known size and known inter-packet transmission interval. The sending node will determine from the network conditions an optimum packet size and optimum inter-packet interval for transmission of data packets to the receiving node. • Bahadiroglu at 15:23–60 It has been described herein above that the volume of data traffic that may be communicated through a network connection between a data source and a data recipient, and the time required to communicate the data traffic through the network, is determined by the bandwidth of the connection. The bandwidth of a connection is in turn is determined and limited by the delays inherent in communicating data through the connection. The delays in communicating data through a network may, in turn, be regarded as comprised of a relatively constant component and a time variable component. The constant component, referred to as the “latency” of the network, includes, for example, the inherent delay times through the elements of the network, such as through the cables or lines, the switching routers and the communications processes or protocols being executed at each end of the connection. The latency of a network effects the overall efficiency and effective bandwidth or capacity of a network by imposing a practical limit on the maximum rate at which data can be communicated through the network, and is often determined by the element of the network connection having the lowest bandwidth. The time variable component of the delays through a network, referred to as “jitter”, is typically unpredictable and may arise from a number of causes, but most frequently results from variations in the traffic load along the route taken by a connection through a network. Jitter also effects the overall efficiency and effective bandwidth or capacity of a network by imposing a practical limit on the rate at which data can be communicated through the network and often limits the effective, practical bandwidth of the network or network connection to a value far below the theoretical maximum bandwidth of the network or network connection. It should also be noted that unlike the more constant latency of a network the jitter of a network or network connection, which is typically determined by the bandwidth of the lowest bandwidth element in the connection, the jitter of a network connection is typically comprised of sum of the network jitter components along the connection, which may vary independently. • Bahadiroglu at 15:61-16:9

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	In contrast to the methods and mechanisms of the prior art, the present invention does not attempt to determine network or connection conditions upon the basis of secondary factors, such as packet error, packet loss, packet dropping, or packet retransmission rates as in methods of the prior art, although such error factors may be used to refine the results of the present invention in certain implementations. The present invention instead, determines the data transmission conditions of a network or connection solely from externally observed data. That is, the present invention does not attempt to monitor conditions or events internal to a network or connection, but instead effectively treats a network or connection as a “black box” and relies solely upon capturing and extracting information pertaining to network or connection conditions that is directly accessible at the data transmitter and data receiver. • Bahadiroglu at 23:56-24:14 TCP/IP Protocol 24T is connection oriented packet transport System that establishes a connection between a Sending Node 12R and a Receiving Node 12R before the data is transmitted. Transport Layer 28K is responsible for management and control of data flow, including data flow speed adjustment to minimizes data corruption, and includes the TCP and UDP protocols for these purposes. In particular, the TCP protocol of Transport Layer 28K includes mechanisms for packet flow control, packet retransmission, packet sequencing and error correction. In the flow control functions, both the transmitting and the receiving node have control over the packet transmission rate in a manner that alleviates the probability of packet overflow. In addition, an acknowledgment of packet reception is transmitted from the receiving node to the transmitting node when a packet reaches a destination, thereby inform the sender that the packet has arrived intact. If the packet does not arrive intact and the sender does not receive acknowledgment within a specified time, the packet is retransmitted. In addition, the packets are numbered and transmitted in sequential order so that, should packets be transmitted or received out of order or should packets have to be retransmitted, the receiving node is enabled to reassemble the packets in the correct order. Finally, the TCP

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	generates and checks a checksum in each packet that records the original data bits of the packet, thereby providing error detection. • Bahadiroglu at 22:16-35 Network Layer 28C provides logical addressing, network routing, flow control that monitors the network connection, and sequencing and translation functions. Addressing is also performed in Network Layer 28, and the form of addressing is specific to a given protocol. For example, an Ethernet workstation may run both TCP/IP and Novell IPX/SPX Network Layer 28C protocols wherein each Network Layer 28C protocol will have a different logical addressing method. The Network Layer 28C protocols, such as TCP/IP, UDP/IP, IPX/SPX, DECNET, are also used by routers to interconnect Networks 16. It must be noted, however, that there are certain Network 10 Protocols 24 that do not extend to the Network Layer 28. These include DECLAT, IBM's Network Basic Input/Output System (NetBIOS), IBM's Extended User Interface (NetBEUI) for NetBIOS, and others. These Protocols 24 have no provisions for Network Layer 28C addressing and routing, so that connection of these Protocols 24 between different LANs must be accomplished with MAC Sub-Layer 28BA devices such as LAN bridges or LAN Switches. • Bahadiroglu at 22:36-46 Transport Layer 28D provides reliable network-to-network communications by providing service addressing, flow control, datagram segmentation, and source to destination error checking. Error checking also occurs in the Data Link Layer 28B and in Session Layer 28E, discussed below. A primary function of Transport Layer 28D is to pack data sent down from higher Layers 28 into smaller pieces, referred to as segments, and to assign each segment a segment number so that the data can be reassembled in the correct sequence and without errors in the Transport Layer 28D in the Receiving Node 12R. • Bahadiroglu at 23:63–24:14

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	In particular, the TCP protocol of Transport Layer 28K includes mechanisms for packet flow control, packet retransmission, packet sequencing and error correction. In the flow control functions, both the transmitting and the receiving node have control over the packet transmission rate in a manner that alleviates the probability of packet overflow. In addition, an acknowledgment of packet reception is transmitted from the receiving node to the transmitting node when a packet reaches a destination, thereby inform the sender that the packet has arrived intact. If the packet does not arrive intact and the sender does not receive acknowledgment within a specified time, the packet is retransmitted. In addition, the packets are numbered and transmitted in sequential order so that, should packets be transmitted or received out of order or should packets have to be retransmitted, the receiving node is enabled to reassemble the packets in the correct order. Finally, the TCP generates and checks a checksum in each packet that records the original data bits of the packet, thereby providing error detection. • Bahadiroglu at 24:32–55 It has been described above that a Adaptive Packet Mechanism 20 includes or is comprised of one or more Collector/Controllers 20C and two or more Packet Transfer Engines (PTE) 20T. Packet Transfer Engines (PTE) 20T operate under control of a Collector/Controller (C/C) 20C to determine the network conditions of Connections 18, wherein the network conditions examined by an Adaptive Packet Mechanism 20 pertain to the latency and jitter and the available bandwidth of the Connections 18, and to determine from these network conditions the optimum packet size and optimum inter-packet interval for the transmission of data packets through the Connections 18 for given amounts and types of data. As will be described, an Adaptive Packet Mechanism 20 operates in a number of modes to acquire the network condition information, including the transmission of Monitor Packets 12M through the Connections 18 and by examination of the transmission of Data Packets 12D through the Connections 18. As will be described, the operations and functions of an Adaptive Packet Mechanism 20 are accomplished through a Packet Transfer Engine (PTE) 20T in each Node 12 that is to be a Sending Node 12S or a Receiving Node 12R or both, and a Collector/Controller (C/C) 20C that may reside, for example, in a Sending Node 12S or in a Node 12 separate from the Nodes 12S and 12R.

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	- Bahadiroglu at 26:1–19 As described, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 are capable of multiple modes of operation. For example, in the data transfer mode the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR operate to transfer data from the Sending Node 12S to the Receiving Node 12R through the Connection 18. In the network data collection and network condition determination modes, hereafter referred to as the “test” modes, the Collector/Controller (C/C) 20C, Packet Transfer Engines (PTE) 20TS and Packet Transfer Engine (PTE) 20TR associated with a Connection 18 will operate to determine the network conditions of the Connection 18, such as available bandwidth, latency and jitter, and from this information will determine the currently optimum Packet 16 size and inter-packet interval for communicating Data Packets 16C through the Connection 18 for a given amount and type of data. - Bahadiroglu at 30:43–31:20 Referring to FIG. 6A, therein is illustrated an exemplary Monitor Packet 16M as may be used in a presently preferred implementation of this mode of operation. In the presently preferred embodiment, the Packet Transfer Engine (PTE) 20TS will transmit a sequence of 10 (ten) such Monitor Packets 12M, to allow the Adaptive Packet Mechanism 20 to obtain information pertaining to, for example, the average available bandwidth of the Connection 18 and the average jitter between Packets 16 over the Connection 18 over a sample of Monitor Packets 12M, and information pertaining to the extent the Packets 16 may arrive in a sequence that is out of order from the sequence in which they were transmitted. It must be noted that FIG. 6A illustrates, in particular, the data fields or “payload” of a Monitor Packet 16M, which in a presently preferred embodiment is referred to as a “28 byte packet”. As shown in FIG. 6A, and for example, a Monitor Packet 16M may include a Departure Time 12MT representing the time of departure of the Monitor Packet 16M from the Packet Transfer Engine (PTE) 20T, a Packet Size 16MS representing the size of the Monitor Packet 16M, and Packet Number 16MN representing the sequential position of the Monitor Packet 16M in a sequence of Monitor Packets 16M. A Monitor Packet 16M may also include a Transmission Parameters 16MP, which may be comprised, for example, of the current Packet

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	Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum Inter-Packet Interval 36I. As described, the Monitor Packets 16M of the sequence of Monitor Packets 16M transmitted from the Sending Node 12S to the Receiving Node 12R are reflected or echoed back to the Sending Node 12S by the Packet Transfer Engine (PTE) 20TR as they are received by the Packet Transfer Engine (PTE) 20TR, that is, immediately upon being received, or as rapidly as feasible, and in the order in which they are received. The Packet Transfer Engine (PTE) 20TS may determine the times and Sequence of arrival of the reflected or echoed Monitor Packets 16M returned from the Packet Transfer Engine (PTE) 20TR and will extract and determine Network Conditions 42. The Packet Transfer Engine (PTE) 20TS will provide Network Conditions 42 to the Collector/Controller (C/C) 20C, and, as described below, the Collector/Controller (C/C) 20C will determine a current Packet Control 36 representing the currently determined or predicted Optimum Packet Size 36S and Optimum InterPacket Interval 36I from the Network Conditions 42. • Bahadiroglu at 31:21–33 In one embodiment of Adaptive Packet Mechanism 20, Network Conditions 42 will include information pertaining to or representing, for example, such factors as the average available bandwidth of the Connection 18, jitter values for the Connection 18, and the occurrence or percent of Packets 16 that were received out of order, with these factors being determined for the interval in which the Monitor Packets 16M were transmitted and received back over the Connection 18. For example, Network Conditions 42 may include, for example, Average Available Bandwidth 42A, Average Jitter 42B, Maximum Jitter 42C, Minimum Jitter 42D, Packet Order Number Causing Maximum Jitter 42E and Packet Order Number Causing Minimum Jitter 42F. • Bahadiroglu at 33:6–24 It has been described herein above that the Packet Transfer Engine (PTE) 20TR residing in the Receiving Node 12R may extract and store network condition information pertaining to the Connection 18 for archival purposes and for subsequent use, and may store this information as a set

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	of Test Result Entries 40E in a Network Condition Record 40R in a Result Database 40. An exemplary Network Condition Record 40R is illustrated in FIG. 6C, wherein it will be seen that a Condition Record 40R may include, and for example, Network Test Result Fields 44A through 44AC. It will be noted that the values or information contained in each of Network Test Result Fields 44A through 44AC are defined in the exemplary Network Condition Record 40R shown in FIG. 6C. It will further be noted that certain of the values or information residing in Network Test Result Fields 44A through 44AC are the same as or similar to those determined for Network Conditions 42. • Bahadiroglu at 33:25–58 The determination of these and other values and information contained in Network Test Result Fields 44A through 44AC will be apparent to those of ordinary skill in the relevant arts, with the assistance of the definitions of the values and contents of the fields provided in FIG. 6C, and therefore will not be discussed further herein. In this regard, and as discussed above, it must be noted that the clocks residing in the Sending Node 12S and Receiving Node 12R of a Connection 18 are typically not synchronized, or at least are not synchronized to the degree of accuracy required to measure differences or changes in latency and jitter. Certain values, however, such as jitter, which is the packet to packet variation in latency through the Connection 18, may be determined relatively by determining the interval between the arrivals of successive packets and comparing these measured values to the inter-packet interval specified in the Monitor Packet 12M. Other Test Result Field 44 values or information, however, may be more readily determine at the Packet Transfer Engine (PTE) 20TR end of a Connection 18 than at the Packet Transfer Engine (PTE) 20TS end of the Connection 18. For example, the Monitor Packet 12M will identify the number of Monitor Packets 12M in the test sequence, and the number of packets received or number of reads or attempted reads to a socket or number of lost packets are more accurately determined by the Packet Transfer Engine (PTE) 20TR as the possibility of a lost or erroneous packet during the return transmission is eliminated. It will also be noted that Test Result Fields 44 include values or information not obtained by the Packet Transfer Engine (PTE) 20TS, such as the trend in delay or jitter times, while may be obtained by comparison of the arrival times of Monitor Packets 12M at the Packet Transfer Engine

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	(PTE) 20TR and are not dependent upon synchronization between the Sending Node 12S and Receiving End 12R clocks. • Bahadiroglu at 33:59–34:33 The network condition information acquired in and by the Packet Transfer Engine (PTE) 20TR may be used in a number of ways. For example, Monitor Packets 12M may be transmitted through one or more Connections 18 as described above during an initial or preliminary period before startup or initialization of the full, in-use operation of an Adaptive Packet Mechanism Network 20 to acquire network condition information about the Connections 18. The stored Condition Records 40R and Result Entries 40E collected in a Result Data Base 40 may then be used, for example, for the initial training of a neural network implemented in the Network Analyzer 48, or in the design of a fuzzy logic analyzer implemented in the Network Analyzer 48. The network condition information acquired in and by a Packet Transfer Engine (PTE) 20TR through the transmission of Monitor Packets 12M as described above, that is, the Condition Records 40R or Result Entries 40E may also be transmitted to the Collector/Controller (C/C) 20C in real time, that is, during operation of the Adaptive Packet Mechanism 20 in transmitting Data Packets 12D from a Sending Node 12S to a Receiving Node 12R. As described, these Monitor Packets 12M may be transmitted, for example, during “bursty” transmissions in the intervals when Data Packets 12D are not being transmitted, thereby allowing the acquisition of network condition information by the Packet Transfer Engine (PTE) 20TR in real time and during the use of the Adaptive Packet Mechanism 20 to transmit Data Packets 12D, so that the information in the Condition Records 40R or Result Entries 40E represents current conditions in the network. This information may then be used to update or modify, for example, a neural network implemented in the Network Analyzer 48 so that the operations of the neural network are continuously updated to reflect current conditions in the network. It should be noted that the “real time” collection of network condition information by a Packet Transfer Engine (PTE) 20TR, the information may be transmitted to the Collector/Controller (C/C) 20C at the conclusion of the sequence of Monitor Packets 16M, or as each Monitor Packet 12M is received. • Bahadiroglu at 37:58–38:30

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	It will be apparent from the above discussions that Network Conditions 42 directly or indirectly represent a significant number of network variables and that the relationship of these variables to the current optimum packet size and inter-packet interval is complex, often nonlinear and variable with time. In addition, and as a consequence, the number of possible combinations of values of these network variable will be extremely large. In addition, and according to the present invention, it is necessary for the Adaptive Packet Mechanism 20, and in particular the Network Analyzer 48, to be able to determine the optimum packet size and inter-packet interval for current connection conditions in “real time” because of the rapid variability of connection transmissioin conditions. There are, however, a number of methods for determining solutions to problems having large number of complexly related variables and that will meet the requirements and needs of an Adaptive Packet Mechanism 20 of the present invention, many of which will be well known to those of ordinary skill in the relevant arts. For example, two of these methods are referred to as “fuzzy logic” and “neural networks”, each of which have different characteristics and advantages and disadvantages and each of which may be used for the functions performed by an Adaptive Packet Mechanism 20. As will be described below, and as illustrated in FIG. 6A, a Collector/Controller (C/C) 20C of the present invention may include or be functionally associated with Network Analyzer 48 for determining the current packet size and inter-packet interval for a given set of current Network Conditions 42 and a current Transfer Request 46. A Network Analyzer 48 may be implemented by a variety of methods and mechansism, depending upon the requirements for a given Collector/Controller (C/C) 20C. Collector/Controller (C/C) 20C may include of be associated with, for example, a Fuzzy Logic Analyzer 48A, a Neural Network 48B or a Combined Analyzer 48C including a Fuzzy Logic Analyzer 48CA and a Neural Network 48CB. Each of these implementations will be discussed below but, as each of these methods are well known to those of ordinary skill in the relevant arts, each will be described only briefly. • Bahadiroglu at 39:65-40:23 Considering a present example of a back propagation neural network as may be implemented as a Neural Network 48B or as a Neural Network 48CB in a Combined Analyzer 48C, such a neural network may be implemented in three layers, respectively designated as the input layer, the middle layer and the output

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	layer. The input layer receives as inputs variable representing and comprising the information from which the neural network is to generate Packet Control 36A outputs and these variables will preferably comprise the minimum number of variable necessary to predict an Optimum Packet Size 36S and an Optimum Inter-Packet Interval 36I. In a present embodiment, for example, the input layer may receive the information regarding transfer type and volume of data from a Transfer Request 46. The middle layer, in turn, is comprised of weighted neurons to perform the majority of operations necessary to determine the Optimum Packet Size 36S and Optimum Inter-Packet 36I values, while the output layer generates the actual Optimum Packet Size 36S and Optimum Inter-Packet 36I values as a Packet Control 36 output. Other inputs to the neural network will typically include training input, Such as Network Conditions 42 and Condition Records 40R representing the performance, condition and characteristics of the Connection 16. These inputs comprise a criteria by which the neural network may evaluate the generation of the Packet Control 36A outputs, and by which the neural network may “learn’. • Bahadiroglu at Fig. 6C

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	NETWORK CONDITION RECORD 40R 44A - packet number - the number of packets that were sent for the whole data 44B - payload - the size of a sent packet in bytes 44C - totalbytes - the total aggregate bytes of the combined payloads that represent the total data 44D - Interpacketdelay_ms - the time spacing of packets sent (in ms) 44E - elapsedtime_sec - the duration the listener ran 44F - packetsIN - the # of packets received IN by listener per TRANSFER 44G - packetsOUT - the # of packets sent OUT by listener per TRANSFER 44H - bytesIN - the bytes received in per transfer 44I - bytesOUT - the bytes sent out per transfer 44G - bytesIN/sec - the rate of bytes 44H - bytesOUT/sec - the rate of bytes OUT 44I - packetsIN/sec - the rate of packets IN 44J - packetsOUT/sec - the rate of packets OUT 44K - numreads - the number of attempted reads from socket 44L - numreadsblocked - the number of reads to socket having nothing to read 44M - numkrmreaderrs - the number of read errors (e.g. MAC layer failure; helpful to show wireless network blackout conditions) 44N - numwrites - the number of attempted writes to socket 44O - numwritesblocked - the number of writes to socket unable to send out (shows that network is clogged; IP stack unable to accept more) 44P - numkernelwriteerrors - the number of write errors (see note on MAC layer) 44Q - numkernelunspecifiederrors - the number of unknown errors 44R - jitter avg sec - the avg jitter 44S - jitter max sec - the max jitter 44T - jitter min sec - the min jitter 44U - packet loss - packets not received (the packet loss) 44V - % loss - percentage of loss out of total 44W - pass sequence - # of packets in sequence (by checking the incremental sequence ID on each packet. Next packet ID is current ID + 1) 44X - fail sequence - # of packets not in precise sequence 44Y - % out of sequence - percentage of packets out of sequence out of total net condition 2-way delay average - the two-way, round trip packet delay as measured in seconds, to microsecond precision. The average value across all packets received during the specific data transfer and its time frame. 44Z - net condition 2-way delay max - the max of the delay value for the network condition 44AA - net condition 2-way delay min - the min of the delay value for the network condition 44AB - net condition jitter avg sec - the average jitter for the network condition 44AC - trendupordown - the change of the delay during the test (+ means the delay was increasing during the test, - means it was decreasing) FIG. 6C See also, e.g., Bahadiroglu at 16:63-17:15, 35:41-50.

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	To the extent Bahadiroglu does not expressly disclose this limitation, a person of ordinary skill in the art would have determined that this limitation is either inherent and/or obvious to one of ordinary skill in the art in view of the teachings of Bahadiroglu. Further, one of ordinary skill in the art would have been motivated to modify Bahadiroglu or combine it with any of the present prior art references found in Defendant's Invalidity Contentions and any supplements thereto and the relevant section charts for other prior art for the '800 Patent in a manner that would result in the subject matter of this limitation given, at the very least, the person's understanding of the state of the art, the problems addressed and solved in the prior art, and the teachings of Bahadiroglu.