Patent	Filed	Published	Anticipate	Status	Google	Mesh	Abstract	Claims
J18. Issued 09.22.2020 10,785,316B2 Evolutionary Wireless Networks Fast Topology reforming, look ahead simulator.	02/28/18	09/22/20	01/12/29	Active	https://patents.google.com/patent/US10785316B2	https://meshdynamics.com/patents/19-092220-US10785316-Evolutionary-Wireless-Networks.pdf	A multilayer architecture for supporting variable networks is discussed. The architecture includes an application layer in communication with a simulation and network management layer and a coupling layer. The coupling layer interfaces with physical connections within a network device and the remaining layers; and wherein the simulation and network management layer sets one or more network parameters within the application layer.	1. A system for managing communications in a mesh node for supporting variable networks comprising: processing a network packet in the mesh node having data from non-IP chirp devices wherein at least some of the non-IP chirp device communications are directly sent to recipients in communication with said node; modeling at least one simulation of network conditions in communications with said node;setting up forwarding rules and packet flow paths for each data packet and storing said rules in a rules database interfacing with physical connections within said mesh node; and wherein the simulation sets one or more network mesh node parameters used by the mesh node; wherein said one or more mesh node parameters are updated in light of changes to network topology.2. The mesh node of claim 1 wherein said forwarding rules comprise a store of rules for network performance.3. The mesh node of claim 1 further comprising a store of audit tools for network performance.4. The mesh node of claim 1 further comprising an application management layer.5. The mesh node of claim 1 wherein said at least one communication packet comprises a message that is time sensitive.6. The mesh node of claim 5 wherein said time sensitive communication messages between publisher and subscribe messages.7. The mesh node claim 1 wherein said simulation created by said mesh node determines the optimum layout for a tree-based network where said mesh node participates.
J17. Issued 11.14.2017 US 9,819,747 Chirp Networks Real time publish-subscribe for terse M2M messaging	06/15/15	08/07/17	04/08/29	Expired - Fee Related	https://patents.google.com/patent/US9819747B2	https://meshdynamics.com/patents/111417-US9819747-Chirp.pdf	A network combining wireless and wired elements is described, using a multi-slot modular mesh node to house diverse transceiver elements (e.g. IR, Wi-Fi, Powerline). A radio agnostic tree based mesh network is formed, based on what type of wireless links are formed on the uplink and downlink of the backhaul and what type of radios are used for the Access Points AP. In addition to servicing IP based clients (e.g. Wi-Fi, WiMax, Bluetooth), the modular mesh nodes APs may also serve as receivers/collectors for low cost chirp devices. The method of transport is standard IP based packets yet security is inherent in this chirp-based implementation: only mesh nodes are privy to the routing tables that indicate that packet addresses are not IP. Multiple methods to obfuscate packet flow are presented. An organic approach to providing category/class based form of data type identification is proposed, to support a (dynamic) M2M Social Network Applications in-device discovery, registration and control are presented.	A system of transmitting of data packets within a network comprising:at least one device transmitting at least one short communication message;at least one network router comprising a chirp receiver for the at least one short communication message;wherein said chirp receiver accepts said short communication message during an access function of said router without interrupting other communications; andwherein said router further comprises an uplink function connecting said least one router to an external ip-based network using intermediary routers; a downlink function connecting said least one router to other routers within said network; and a scanning function wherein said uplink function, downlink function, scanning, and access functions are performed using one physical radio acting as multiple logical radios wherein the uplink function logical radio and the downlink function logical radio connect the routers participating in the system in a tree-based virtual switch.2. The system of claim 1 further comprising at least one non-chirp enabled network router having a single physical radio which performs the uplink function, downlink function, scanning function, and access function.3. The system of claim 1 wherein the updates to the routing information within the network follow O(n) complexity where n is a number of network participants.4. The system of claim 1 wherein said short communication message comprises a terse status update without a specific receiver.5. The system of claim 1 wherein said short communication message comprises a series of terse status updates received by the router wherein said router containerizes said series of terse messages.6. The system of claim 1 wherein said uplink function comprises a connection to a single parent forming a logical tree network.7. The system of claim 1 wherein said downlink function comprises a connection to other routers wherein said downlink routers do not communicate with one another directly, forming a logical tree network.8. The system of claim 1 wherein each router sends a regular heart beat status update.
J16. Issued 08.07.2017 US 9,730,100 Terse Message Networks Real time, M2M communications network.	10/24/14	09/08/17	03/18/24	Expired - Fee Related	https://patents.google.com/patent/US9730100B2	https://meshdynamics.com/patents/17-080817-US9730100-terse-message-mesh-networks.pdf	A tree-shaped mesh network is discussed which uses a meshof wireless nodes that form a tree shaped network with oneroot node having a connection to an external network; chirpclients; and wireless network clients. Chirp clients compriselow cost chirp devices wherein said low cost chirp devicestransmit short duration messages wherein transmission ofsaid short duration messages are scheduled at preset trans-mission intervals. At least one wireless node of the mesh ofwireless nodes is a designated chirp-aware node whereinsaid chirp-aware node sets the preset transmission intervalsfor chirp client communication by broadcasting a beaconprior to transmission by chirp clients and said chirp-awarenode further comprises a bridge between the short durationmessages and IP based devices wherein said bridge includesa wireless receiver to receive the short duration messagesand is connected to said external network. The short durationmessages are encapsulated into action frames, for onwardtransmission to other chirp aware routers. Each wirelessnode further comprises two logical radios and a service radiowherein each wireless node uplink and downlink operates ondistinct non-conflicting frequencies. The wireless networkclients communicate with the wireless nodes using nodeservice radio	The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:1. A tree-shaped mesh network comprising:a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network; chirp clients; and wireless network clients;wherein chirp clients comprise chirp devices having only one transceiver wherein said chirp devices transmit short duration messages using said transceiver wherein transmission of said short duration messages are scheduled at preset transmission intervals and said short duration messages comprise an information payload to be delivered to a participant in the mesh network;wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node wherein said chirp-aware node sets the preset transmission intervals for chirp client communication by broadcasting a beacon which prepares the mesh network for transmission by chirp clients of the short duration messages and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive the short duration messages and is connected to said external network;wherein the short duration messages are encapsulated into action frames by the at least one chirp-aware node, for onward transmission to other chirp aware routers;wherein each wireless node further comprises two logical radios wherein said two logical radios are implemented using a single physical radio, and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; andwherein said wireless network clients communicate with said wireless nodes using said service radios.2. The tree-shaped network of claim 1 wherein said chirp aware nodes further include firmware which allows the chirp aware nodes to designate a type of short duration messages which are transmitted using the tree-shaped network.3. The tree-shaped network of claim 2 wherein said chirp-aware node forwards encapsulated short duration messages to its parent node only if the encapsulated short duration messages have been requested.4. The tree-shaped network of claim 1 wherein said nodes further include agent processing software wherein said agents process the short duration messages received by said nodes comprising the tree-shaped network, wherein said agents process the data prior to sending said data to a parent node.5. The tree-shaped network of claim 4 wherein said agent comprises a navigation agent and a data handling agent wherein said navigation agent only processes a destination portion of the short duration message.6. The tree-shaped network of claim 5 wherein said destination portion comprises physical destination information within the tree-shaped network wherein said physical destination information comprises node by node directions.7. The tree-shaped network of claim 6 wherein said destination portion comprises logical destination information wherein said logical destination information comprises a designation of data handling agent for said short duration message.8. The tree-shaped network of claim 1 wherein nodes comprising said tree-shaped network switch parent nodes to lower a number of intermediate nodes to a top node within the tree network and wherein prior to switching to a new parent a node sends a probe message to test the signal quality at the proposed new parent node.9. The tree-shaped network of claim 8 wherein said signal quality information is transmitted by a node as part of a heartbeat information wherein said heartbeat information sent by the transmitting node includes a name of the node, a name of the parent node, a distance to the top node within the tree network, and a toll cost value.10. The tree-shaped network of claim 9 wherein said toll cost value comprises a value assigned to the current processing power usage at the transmitting node, a value count of active terse message and propagator children, and a value assigned to a link quality back to the root node.11. The tree-shaped network of claim 8 wherein names of nodes are assigned randomly with the constraint that a parent node may not have two children with a duplicate name.12. The tree-shaped network of claim 1 wherein said short duration messages do not include a fixed recipient address, and further wherein said short duration messages include the information payload and a duration field.the information payload and a duration field.
J15. Issued 06.07.2016 US 9,363,651 Chirp Networks Real time mesh networks for M2M and Industrial Internet	02/11/13	06/07/16	05/25/24	Active	https://patents.google.com/patent/US9363651B1	https://meshdynamics.com/patents/16-060716-US09363651B1-chirp-networks.pdf	In one version, the system uses a mesh of wireless nodes that form a tree shaped network. One of the nodes is a root node that has a connection to an external network, with other network participants being chirp clients, and wireless network clients. The chirp clients are low cost devices that transmit short duration messages that are scheduled using a chirp scheduling technique. At least one wireless node of the tree shaped network is designated as chirp-aware and has a bridge between the short duration messages and IP based devices. The bridge includes a wireless receiver and is connected to the external network. All nodes other than the root node disregard the short duration messages using adaptive filtering. Each node has two logical radios and a service radio, the nodes' uplink and downlink operating on non-conflicting frequencies. Wireless network clients communicate with the nodes using the service radios.	The invention claimed is:1. A tree-shaped mesh network comprising:a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network;chirp clients; andwireless network clients;wherein chirp clients comprise low cost chirp devices wherein said low cost chirp devices transmit short duration messages wherein transmission of said short duration messages are scheduled using a chirp scheduling technique;wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive the short duration messages and is connected to said external network;wherein all remaining wireless nodes of the mesh of wireless nodes disregard the short duration messages as random and transient noise by adaptively filtering out the short duration messages using Automatic Gain Control, Error correction or noise cancellation, wherein the short duration messages are sufficiently short in duration so that said adaptive filtering by all remaining wireless nodes disregards the short duration messages as random and transient noise;wherein each wireless node further comprises two logical radios and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; andwherein said wireless network clients communicate with said wireless nodes using said service radios.2. The tree-shaped mesh network of claim 1 wherein the designated chirp-aware node is at an edge of the tree-shaped mesh network and wherein said chirp-aware node containerizes the short duration messages into containerized packets.3. The tree-shaped mesh network of claim 2 wherein the designated chirp-aware node assigns a target to the containerized packets.4. The tree-shaped mesh network of claim 1 wherein the chirp scheduling technique comprises scheduling of chirp transmissions at random intervals.5. The tree-shaped mesh network of claim 1 wherein the chirp scheduling technique comprises the chirp-aware node further comprising a scheduling agent wherein said scheduling agent schedules chirps by low cost chirp devices to avoid collisions between the low cost chirp devices.6. The tree-shaped mesh network of claim 5 wherein said chirp-aware node schedule of the chirps further prevents multiple transmissions of concatenated chirp packets.7. The tree-shaped mesh network of claim 6 wherein said scheduling agent scans a radio environment surrounding the chirp-aware node to direct low cost chirp devices to avoid transmitting at busy time periods and to cluster transmissions during periods of lower spectrum use.8. The tree-shaped mesh network of claim 1 wherein short duration messages are concatenated by chirp-aware nodes for transmission as concatenated packets.9. The tree-shaped mesh network of claim 8 wherein transmissions within the network following concatenation of short duration messages occur using standard Internet Protocol data packets.10. The tree-shaped mesh network of claim 9 wherein said concatenated data packets are transmitted at scheduled internals to prevent overloading of the network with data.11. The tree-shaped mesh network of claim 9 wherein said concatenated packets include destination information and the destination information is updated to reflect changes in the performance of the mesh network.12. The tree-shaped mesh network of claim 9 wherein said concatenated packets are received by subscribers and wherein the concatenated packets include destination information and the destination information is updated a node within the tree-shaped mesh network to reflect requests by subscribers of the concatenated packets.
J14. Issued 02.09.2016 US 9,258,765 Chirp Networks Logical radios and time sensitive networks for IOT	05/02/14	02/09/16	05/08/23	Active	https://patents.google.com/patent/US9258765B1	https://meshdynamics.com/patents/16-020916-US09258765B1-chirp-networks.pdf	A wire-less/Wired mesh network is described, using a multi-slot modular mesh node to house diverse transceiver elements (e.g. IR, Wi-Fi, Powerline). A radio agnostic tree based mesh network is formed, based on what type of wire-less links are formed on the uplink and downlink of the backhaul and what type of radios etc are used for the Access Points AP, see FIG. 17,23.In addition to servicing IP based clients (e.g. Wi-Fi, WiMax, Bluetooth), the modular mesh nodes APs may also serve as receivers/collectors for low cost chirp devices. These devices are not “agile” and therefore contentious. APs, servicing these devices, alleviate potential contention by multiple means including: sending out a “incoming” CTS, efficient delivery through container based schedulable bus deliveries, and its reverse (moving chirp transmission times to be sequential)	1. A tree-shaped mesh network comprising:a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network; chirp clients; and wireless network clients;wherein chirp clients comprise low cost chirp devices wherein said low cost chirp devices transmit short duration messages;wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive said short duration messages;wherein all remaining wireless nodes, consisting of wireless nodes other than said at least one wireless node, disregard the short duration messages as random and transient noise by adaptively filtering out the short duration messages using Automatic Gain Control, Error Correction or noise cancellation, wherein the short duration messages are sufficiently short in length so that said adaptive filtering by all remaining wireless nodes disregards the short duration messages as random and transient noise;wherein each wireless node further comprises two logical radios and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; and wherein said wireless network clients communicate with said wireless nodes using thesaid service radios; andwherein the designated chirp-aware node is at an edge of the tree-shaped mesh network and wherein said chirp-aware node containerizes the short duration messages into containerized packets by adding an IP header to each said short duration message.2. The tree-shaped mesh network of claim 1 wherein the designated chirp-aware node assigns a destination address to each containerized packet.
J13. Issued 10.27.2015 US 9,127,738 Collaborative Logistics Ecosystem: Dynamic Scheduling over thin pipes	08/09/12	10/27/15	07/09/24	Active	https://patents.google.com/patent/US9172738B1/en?q=collaborative+logistics&oq=collaborative+logistics	https://meshdynamics.com/patents/15-102715-US09172738B1-collaborative-logistics.pdf	The system describes a collaborative machine social network system with several elements. There is at least one system participant which communicates with the network. The participant's communications include short bursts of information not directed to a particular recipient but rather the network as a whole. The network further includes propagator nodes and integrator nodes to process communications from participants.	The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:1. A machine-based collaborative social network comprising:an organized network segment comprising nodes wherein each node maintains a routing table of adjacent nodes and client devices acting as system participants;at least one system participant sending at least one communication chirp; wherein said at least one communication chirp is to be received by the social network and not a particular recipient; wherein said chirp comprises a terse network message repeatedly sent at the edge of the network without recipient information;defining at least one schedule preference for each system participant;wherein the social network propagator nodes receive and store said at least one communication chirp and wherein the social network further comprises integrator nodes which analyze and act upon chirps from the at least one system participant.2. The machine-based collaborative social network of claim 1 wherein said integrator nodes comprise the human interface to the social network.3. The machine-based collaborative social network of claim 2 wherein said integrator nodes provide alarms, exceptions, and other reports for consumption by humans.4. The machine-based collaborative social network of claim 1 wherein said propagator nodes store information regarding adjacent nodes and system participants to form a near-range picture of the network, locating end devices and other nearby propagator nodes.5. The machine-based collaborative social network of claim 1 wherein said propagator nodes package and prune the various data messages before broadcasting them to adjacent nodes.6. The machine-based collaborative social network of claim 1 wherein said propagator nodes disregard redundant chirp messages.7. The machine-based collaborative social network of claim 1 wherein said propagator nodes receive instructions from integrator nodes to direct messages to a specific direction of the network.8. The machine-based collaborative social network of claim 1 wherein said propagator nodes bridge various network communications media.9. The machine-based collaborative social network of claim 1 wherein said system participant further receives at least one communication chirp; wherein said at least one communication chirp is to be received from the social network and not a particular sender.10. The machine-based collaborative social network of claim 1 wherein each system participant is assigned a name.11. The machine-based collaborative social network of claim 10 wherein the name of each system participant is not guaranteed to be unique with in within the entire network.

J12. Issued 06.02.2015 US 9,049,000 Real Time Packet Transforms To Avoid Re-Transmissions For Video	07/29/13	06/02/15	01/09/30	Active	https://patents.google.com/patent/US9049000	https://www.meshdynamics.com/patents/15-060215-US9049000-real-time-packet.pdf	There exists a need to reduce re-transmission delays in real time feeds (such as video) by sending the packet with sufficient repair/recovery information inside the packet container so the relaying stations and/or the receiving devices can fix errors in transmission by perusing the contents of the packet and the repair information, and modify the packet and then relay it. By providing the relaying station the ability to fix the error, retransmission of the packet is avoided along each relay station along the network path from source to destination and also by receiving devices that would otherwise request a re-transmission. This application teaches a method so real time streams (e.g. video) may be more efficiently transported over a CSMA based network.	1. A method for transmitting a standard format network packet containing real time information, comprising the steps of:modifying said packet by adding redundant information to the packet;modifying at least one packet header to add a position offset reference number that points to redundant information;revising all checksums within the packet as modified to agree with the packet contents as modified;transmitting the packet through a network, wherein transmitting further comprises the steps ofchecking the modified packet during transmission;if the modified packet is determined to have a checksum mismatch as received, modifying the packet by retrieving the redundant information pointed to by said position offset reference number and replacing a portion of the packet with said redundant information; andcalculating new checksums for packet; andrevising all checksums within the packet as modified to agree with the contents of the modified packet; andupon receipt, modifying the packet to return the packet's format to that of the standard packet format.2. The method of claim 1 wherein the redundant information is exclusively header information.3. The method of claim 2 wherein the redundant header information contains a checksum that specifically determines the validity of said redundant header information.4. The method of claim 3 wherein the IP header and the RTP header of a packet containing real time information are both modified to add position offset references that point to redundant header information for each header respectively.5. The method of claim 2, wherein only redundant header information is included within the modified packet and no redundant information is included to provide for repair of RTP data.6. The method of claim 1 wherein a number indicating a specific position offset reference number is repeated multiple times as a means to later determine the validity of the position offset reference number after transmission.7. The method of claim 1, wherein revising all checksums within the packet as modified to agree with the contents of the modified packet includes creating at least one checksum that matches real time video content containing errors.8. A method for transmitting a standard format network packet containing real time information through a multi-hop network, comprising the steps of:modifying said packet by adding redundant header information to the packet;modifying at least one packet header within said packet to add a position offset reference number that points to redundant header information;revising all checksums within the packet as modified to agree with the packet contents as modified;transmitting the packet to a first relay node in the multi-hop network;if the modified packet as received by the first relay node is determined to have a checksum mismatch relative to header information, modifying the packet by retrieving the redundant header information pointed to by said position offset reference number and replacing a portion of the header information for the packet with said redundant header information;recalculating checksums as required within the packet to agree with the packet contents as modified;transmitting the modified packet to a second network node within the multi-hop network; andwhen the packet is received by an end point node within the multi-hop network, modifying the packet including recalculating all checksums to return the packet's format to that of the standard packet format.9. The method of claim 8, wherein only redundant header information is included within the modified packet and no redundant information is included to provide for repair of RTP data.10. The method of claim 8, wherein recalculating checksums as required within the packet to agree with the packet contents as modified includes creating at least one checksum that matches real time video content containing errors.11. The method of claim 8 wherein the redundant header information contains a checksum that specifically determines the validity of said redundant header information.12. The method of claim 8 wherein the IP header and the RTP header of a packet containing real time information are both modified to add position offset references that point to redundant header information for each header respectively.13. The method of claim 8 wherein a number indicating a specific position offset reference number is repeated multiple times as a means to later determine the validity of the position offset reference number after transmission.14. A method of transforming of an IP packet for transmission on a network comprising:transforming the packet by adding redundant header information and position offset reference numbers that point to said redundant header information to the IP packet; andwhereupon being received by a network node, said transformed IP packet is processed by the method comprising the steps of:examining the transformed packet to determine if a level 2 cyclic redundancy check data for the packet's Layer 2 header matches;if the level 2 cyclic redundancy check data for the Layer 2 header does not match, retrieving first redundant header information located within said transformed packet according to a first position offset reference number and repairing the Layer 2 header utilizing said first redundant header information;examining the transformed packet to determine if a level 3 cyclic redundancy check data for the packet's header related to Layer 3 and above matches;if the level 2 cyclic redundancy check data related to Layer 3 and above does not match, retrieving second redundant header information located within said packet according to a second position offset reference number and repairing the header related to Layer 3 and above utilizing said second redundant header information; andif it is determined that the network node is not an end point node, recalculating the level 2 cyclic redundancy check data and the level 3 cyclic redundancy check data within the transformed packet as required to agree with the contents of the packet thus repaired, and transmitting the packet to another network node.15. The method of claim 14 further comprising:converting the transformed packet to the standard 802.11 format upon arrival at an end point node, wherein said conversion comprises recalculating the level 2 cyclic redundancy check data and the level 3 cyclic redundancy check data within the packet as required to agree with the contents of the standard packet.16. The method of claim 15, wherein recalculating the level 2 cyclic redundancy check data and the level 3 cyclic redundancy check data within the packet as required to agree with the packet contents includes creating at least one checksum that matches real time video content containing errors.17. The method of claim 15 wherein the redundant header information contains a header cyclic redundancy data that specifically determines the validity of said redundant header information.18. The method of claim 15 wherein a number indicating a specific position offset reference number is repeated multiple times as a means to later determine the validity of the position offset reference number after transmission.
J11. Issued 04.28.2015 US 9,019,956 Self Forming VoIP Networks Disruption tolerant network services	06/04/13	04/28/15	05/26/23	Active	https://www.google.com/patents/US9019956	https://www.meshdynamics.com/patents/15-042815-US9019956-self-forming-voip-network.pdf	A self-forming VoIP connection capability is described that may be superimposed over wired networks, wireless networks, or combinations thereof. As described herein, a local network cluster forms while isolated from a conventional SIP server, or alternately may exist as a cluster of network nodes and clients that later becomes isolated from a conventional SIP server by a break in the network. Either way, each network node thus enabled with distributed SIP registry functionality according to this invention independently constructs a local SIP registry and SIP server capability within that node. Subsequently, while isolated from a conventional SIP server, VoIP conversations among client devices connected to nodes within an isolated cluster will continue, and nodes and clients may join or leave an isolated cluster with conversations able to be initiated or continued while a node has network connectivity to the cluster.	1. A VoIP-capable network comprising:one or more VoIP client devices;two or more VoIP nodes forming an isolated cluster wherein the two or more VoIP nodes in the isolated cluster are in communication with one another;wherein each of the VoIP client devices communicates with at least one VoIP node;wherein each of the VoIP nodes further comprises a local SIP registry built by exchanging SIP information with the remaining VoIP nodes in the isolated cluster; andwherein a first VoIP client device in communication with a first VoIP node establishes a communication with a second VoIP device in communication with a second VoIP node using the local SIP registries of the first VoIP node and the second VoIP node; and wherein said client device communications is maintained regardless of network connectivity status.2. The VoIP-capable network of claim 1, wherein the local SIP registries of the isolated VoIP nodes are updated as the VoIP nodes and the VoIP client devices begin communication with the isolated cluster and end communication with the isolated cluster.3. The VoIP-capable network of claim 1, wherein updates to the local SIP registry of a VoIP node are communicated to remaining VoIP nodes in the isolated cluster by broadcasting one or more information packets containing local SIP registry information of the VoIP node.4. The VoIP-capable network of claim 1, wherein the local SIP registry of a VoIP node is updated according to information received from another VoIP nodes in the isolated cluster in special information packets that each contain local SIP registry information of another VoIP node.5. The VoIP-capable network of claim 1, wherein each VoIP node has the ability to function as a DHCP server to assign IP addresses to clients in communication with the VoIP node.6. The VoIP-capable network of claim 5, wherein the IP addresses are assigned from a range of IP addresses produced by a random number generator on each VoIP node.7. The VoIP-capable network of claim 1, further comprising means of connecting the isolated cluster to an external network, wherein upon connection to an external network, the SIP registry of an external SIP server connected to the external network is updated to include SIP registry information from the VoIP nodes.8. A method of maintaining VoIP capabilities within a network comprising:forming a cluster of two or more initially isolated network nodesestablishing communications between two or more client devices by way of the initially isolated network nodes, wherein in a first configuration, at least two of said initially isolated network nodes are in communication with each other but not in communication with an external SIP server, and wherein each of said at least two initially isolated network nodes supports VoIP communications based on a local SIP registry contained in each of the said nodes according to the method of:communicating with at least one other initially isolated node to exchange SIP registry information;updating the local SIP registry in said node as new information is acquired;sending and receiving VoIP packets from a sender isolated node to one or more recipient isolated nodes based on said local SIP registry functionality when a client device in communication with the sender node establishes communication with a client device in communication with the recipient node.9. The method of claim 8 further comprising changing said cluster from the first configuration to a second configuration wherein in the second configuration the said cluster is in communication with an external SIP server containing an external SIP registry; and updating the external SIP registry with the local SIP registries of each of said nodes comprising said cluster.10. The method of claim 8, further comprising updating the local SIP registries of the isolated nodes as nodes and clients join and leave the isolated cluster.11. The method of claim 8, wherein updates to the local SIP registry of each node is communicated to remaining nodes in the cluster by broadcasting an information packet containing the local SIP registry information.12. The method of claim 8, wherein each node functions as a DHCP server to assign IP addresses to clients connected to the node.13. The method of claim 12, wherein the IP addresses are assigned from a range of IP addresses produced by a random number generator on each node.14. A VoIP capable network comprising:a first initially isolated network node in communication with at least two VoIP clients, wherein the first isolated node further comprises a local SIP registry wherein said SIP registry contains address identifiers for each VoIP clients in communication with the first node; andwherein VoIP communication between said at least two VoIP clients are initiated by utilizing the local SIP registry.15. The VoIP capable network of claim 14, wherein the local SIP registry of the first isolated node is updated as the VoIP clients establish or terminate a network connection with the
J10. Issued 03.10.2015 US 8,976,733 Persistent Mesh for Isolated, Mobile. Disruption tolerant, self healing.	08/12/13	03/10/15	05/08/23	Active	https://patents.google.com/patent/US8976733	https://meshdynamics.com/patents/15-031015-US8976733-persistent-mesh.pdf	A structured wireless mesh network is disclosed where a tree-like connection topology is formed. In one embodiment, each node has separate uplink and downlink radios operating on different channels. When a cluster of such nodes becomes isolated as in the case of a mobile mesh application, a node in the cluster according to this invention acts as a root node thus enabling the tree structure to persist, even in isolation. Example methods of joining sub networks are disclosed that guide the joining of mesh networks and channel management. Nodes that may operate in isolation also support a distributed DHCP capability such that IP addresses are assigned to clients even when a connection to a central DHCP server is unavailable.	1. A structured mesh network capable of isolated operation, comprising:at least two structured mesh nodes;wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a downlink radio operating on a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another structured mesh node using its uplink radio and whether client devices or other structured mesh nodes connect to each structured mesh node using said each structured mesh node's downlink radio;wherein the structured mesh network functions in two configurations selected depending on whether a connection to said external network is present—a connected configuration and an isolated configuration;wherein in the connected configuration the structured mesh network includes at least one structured mesh node whose uplink radio comprises a connection to said external network; andwherein in the isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to said external network, and one of the structured mesh nodes acts as an isolated network root node of the isolated configuration and all remaining structured mesh nodes connect to the isolated network root node as isolated root children nodes forming a tree configuration;wherein clients and children nodes of each structured mesh node of the structured mesh network in the isolated configuration retain full connectivity within the structured mesh network when the isolated configuration is in effect; wherein the structured mesh network in the isolated configuration includes the isolated network root node having a local Dynamic Host Configuration Protocol (DHCP) server for the isolated configuration,wherein said DHCP server randomly selects a random address range from which to assign addresses to clients of said DHCP server.2. The structured mesh network of claim 1 wherein the connectivity logic contained by the structured mesh nodes realigns connections between the structured mesh nodes upon loss of said connection to said external network to form the isolated configuration.3. The structured mesh network of claim 2 wherein the connectivity logic contained by the structured mesh nodes designates the structured mesh node which in the connected configuration was connected to the external network as the isolated network root node.4. The structured mesh network of claim 2 wherein the connectivity logic contained by the structured mesh nodes designates the structured mesh node which in the connected configuration passed the most traffic as the isolated network root node.5. The structured mesh network of claim 2 wherein the connectivity logic contained by the structured mesh nodes selects the isolated network root node such that the resulting network's traffic traverses a minimal number of nodes.6. The structured mesh network of claim 2 wherein the connectivity logic contained by the structured mesh nodes selects the isolated network root node such that the isolated network root node is the most proximate to an external network connection point.7. The structured mesh network of claim 2 wherein the connectivity logic contained by the structured mesh nodes selects the isolated network root node such that the resulting network's throughput is maximized.8. The structured mesh network of claim 2 wherein the connectivity logic contained by the structured mesh nodes selects the isolated network root node such that the resulting network's latency is minimized.9. The structured mesh network of claim 1 wherein the connectivity logic contained by the structured mesh nodes realigns connections between the structured mesh nodes upon detection of an external network connection to form the
J09. Issued 12.30.2014 US 8,923,186 Chirp Networks Logical radios and bridging for IOT	09/26/12	12/30/14	05/08/23	Active	https://patents.google.com/patent/US8923186B1	https://meshdynamics.com/patents/14-123014-US8923186B1-chirp-networks.pdf	A system of aggregating messages utilizing at least one device transmitting at least one short communication message wherein said short communication message comprises a terse command or status message; at least one network router comprising a means of receiving the short communication messages; wherein said means receives said short communication message without interrupting other communications; and an uplink from the at least one router to an external ip-based network wherein said router aggregates said short communication messages and forwards the aggregated messages via the uplink to the external ip-based network wherein said external ip-based network comprises a tree-based logical network comprising wireless nodes.	1. A tree-shaped mesh network comprising:a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network; chirp clients; and wireless network clients;wherein chirp clients comprise low cost chirp devices wherein said low cost chirp devices transmit short duration messages wherein transmission of said short duration messages are scheduled at random intervals;wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive the short duration messages and is connected to said external network;wherein all remaining wireless nodes of the mesh of wireless nodes disregard the short duration messages as random and transient noise by adaptively filtering out the short duration messages using Automatic Gain Control, Error correction or noise cancellation, wherein the short duration messages are sufficiently short in duration so that said adaptive filtering by said all remaining wireless nodes disregards the short duration messages as random and transient noise;wherein each wireless node further comprises two logical radios and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; andwherein said wireless network clients communicate with said wireless nodes using said service radios.2. The tree-shaped mesh network of claim 1 wherein the designated chirp-aware node is at an edge of the tree-shaped mesh network and wherein said chirp-aware node containerizes the short duration messages into containerized packets.3. The tree-shaped mesh network of claim 2 wherein the designated chirp-aware node assigns a target to the containerized packets.

J08. Issued 08.27.2013 US 8,520,691 Persistent Mesh for Isolated, Mobile and Temporal.. see P3M	01/29/10	08/27/13	06/07/25	Expired - Fee Related	https://patents.google.com/patent/US8520691B2	https://www.meshdynamics.com/patents/13-082713-US8520691-persistent-mesh-network.pdf	A structured wireless mesh network is disclosed where a tree-like connection topology is formed. In one embodiment, each node has separate uplink and downlink radios operating on different channels. When a cluster of such nodes becomes isolated as in the case of a mobile mesh application, a node in the cluster according to this invention acts as a root node thus enabling the tree structure to persist, even in isolation. Example methods of joining sub networks are disclosed that guide the joining of mesh networks and channel management. Nodes that may operate in isolation also support a distributed DHCP capability such that IP addresses are assigned to clients even when a connection to a central DHCP server is unavailable.	A structured mesh network capable of isolated operation, comprising:at least two structured mesh nodes;wherein each structured mesh node comprises at least a connectivity logic;an uplink radio operating on an uplink frequency and a downlink radio operating on a distinct downlink frequency;wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio;wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprising a connection to an external network; and in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes connect to the isolated network root node as isolated root children nodes forming a tree configuration;wherein clients of nodes of the structured network in a second isolated configuration retain full connectivity within the structured network during the isolated configuration and wherein said client connectivity is uninterrupted during any transition from the isolated configuration to the first connected configuration; wherein distinct downlink frequencies are used by nodes for communication with one or more nodes lower on the tree configuration.2. The structured mesh network of claim 1 wherein the connectivity logic contained by the nodes realigns connections between the nodes upon loss of an external connection to form the isolated configuration.3. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes designates the node which in the first configuration connected to the external network as the isolated configuration root node.4. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes designates the node which in the first configuration passed the most traffic as the isolated configuration root node.5. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's traffic traverses a minimal number of nodes.6. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the isolated configuration root node is the most proximate to an external network connection point.7. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's throughput is maximized.8. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's latency is minimized.9. The structured mesh network of claim 1 wherein the connectivity logic contained by the nodes realigns connections between the nodes upon detection of an external network connection to form the connected configuration.10. The structured mesh network of claim 9 wherein solely the isolated network root node logic searches for the external network connection and establishes the external network connection.11. The structured mesh network of claim 10 wherein the previously unused uplink radio of the isolated network root node is used to connect to the external network.12. The structured mesh network of claim 1 wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises and isolated root node and at least one or more isolated children nodes and at least one child node of the first network establishes communication with a child node of the second network, thereby triggering a realignment due to joining in both networks.13. The structured mesh network of claim 12 wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node wherein the isolated root node of the smaller of the two networks becomes the child node.14. The structured mesh network of claim 12 wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node wherein the selection of the new isolated root node is made on the basis of physical position and direction of travel of the two networks.15. The structured mesh network of claim 1 wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises an isolated root node and at least one or more isolated children nodes and the root node of the first network establishes communication with a child node of the second network, thereby the root node of the first network becomes a child node of the second network.16. The structured mesh network of claim 15 wherein the unused uplink radio on the root node of the first network is used to connect to the child node of the second network.17. The structured mesh network of claim 16 wherein solely the root node of the first network is able to connect to a child of the second network.18. The structured mesh network of claim 1 wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio.19. The structured mesh network of claim 18 wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses.20. A multi-part mesh network comprising:a first mesh network and a second mesh network wherein each mesh network comprises:a) at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a distinct downlink radio operating on a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;b) in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprises a connection to an external network; andc) in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children nodes forming a tree configuration;wherein a first set of frequencies, the first network frequencies, is used by the first network for communications between the nodes of the first network; a second set of frequencies, the common frequencies, is used for communications between the two networks; and a third set of frequencies, the second network frequencies, is used for communications between the nodes of the second network;wherein each network is in the isolated configuration; andwherein initially no communication between the first network and the second network is occurring; wherein clients of nodes of each network in the multi-part mesh network in the isolated configuration retain full connectivity within the network and wherein distinct downlink frequencies are used by nodes for communication with one or more nodes lower on the tree configuration.21. The multi-part mesh network of claim 20 wherein the first set of frequencies and the third set of frequencies are mutually exclusive.22. The multi-part mesh network of claim 20 wherein upon establishment of new communication between a child node of the first network and a child node of the second network the isolated root node of either the first network or the second network becomes the root node of a resulting multi-part network.23. The multi-part mesh network of claim 22 wherein the connectivity logic of the root node of the root of the first network and the connectivity logic of the root of the second network select of the root node of the resulting multi-part network pursuant to a policy directive.24. The multi-part mesh network of claim 23 wherein the policy directive is based on the relative sizes of each network.25. The multi-part mesh network of claim 23 wherein the policy directive comprises a weighing of the direction of travel of each network and the position of each network.26. The multi-part mesh network of claim 23 wherein the policy directive comprises minimizing the latency of the resulting multi-part mesh network or maximizing the throughput of the multi-part network.27. The multi-part mesh network of claim 20 wherein upon establishment of new communication between the root node of the first network and a child node of the second network the isolated root node of the first network becomes a child node of the second network.28. The multi-part mesh network of claim 27 wherein the unused uplink of the first network root node is used to communicate with the child node of the second network.29. The multi-part mesh network of claim 28 wherein solely the root node of the first network may connect to a node of the
J07. Issued 08.20.2013 US 8,514,852 Real Time Packet Transforms To Avoid Re-Transmissions For Video	11/24/19	08/20/13	06/20/32	Expired - Fee Related	https://patents.google.com/patent/US8514852B2	https://www.meshdynamics.com/patents/13-082013-US8514852-real-time-packet-streaming-mesh-network.pdf	There exists a need to reduce re-transmission delays in real time feeds (such as video) by sending the packet with sufficient repair/recovery information inside the packet container so the relaying stations and/or the receiving devices can fix errors in transmission by perusing the contents of the packet and the repair information, and modify the packet and then relay it. By providing the relaying station the ability to fix the error, retransmission of the packet is avoided along each relay station along the network path from source to destination and also by receiving devices that would otherwise request a re-transmission. This application teaches a method so real time streams (e.g. video) may be more efficiently transported over a CSMA based network.	What is claimed is:1. A method for transmitting a standard format network packet containing real time information, comprising the steps of:modifying said packet by adding redundant information to the packet;modifying at least one packet header to add a position offset reference number that points to redundant information;revising all checksums within the packet as modified to agree with the packet contents as modified;transmitting the packet through a network; modifying the packet, including modifying all checksums, to return the packet's format to that of the standard packet format;if the modified packet, having been transmitted through a network, is determined to have a checksum mismatch as received, modifying the packet by retrieving the redundant information pointed to by said position offset reference number and replacing a portion of the packet with said redundant information; andrevising all checksums within the packet as modified to agree with the contents of the modified packet.2. The method of claim 1 wherein the redundant information is exclusively header information.3. The method of claim 2 wherein the redundant header information contains a checksum that specifically determines the validity of said redundant header information.4. The method of claim 3 wherein the IP header and the RTP header of a packet containing real time information are both modified to add position offset references that point to redundant header information for each header respectively.5. The method of claim 1 wherein a number indicating a specific position offset reference number is repeated multiple times as a means to later determine the validity of the position offset reference number after transmission.6. The method of claim 2, wherein only redundant header information is included within the modified packet and no redundant information is included to provide for repair of RTP data.7. The method of claim 1, wherein revising all checksums within the packet as modified to agree with the contents of the modified packet includes creating at least one checksum that matches real time video content containing errors.8. A method for transmitting a standard format network packet containing real time information through a multi-hop network, comprising the steps of:modifying said packet by adding redundant header information to the packet;modifying at least one packet header within said packet to add a position offset reference number that points to redundant header information;revising all checksums within the packet as modified to agree with the packet contents as modified;transmitting the packet to a first relay node in the multi-hop network;if the modified packet as received by the first relay node is determined to have a checksum mismatch relative to header information, modifying the packet by retrieving the redundant header information pointed to by said position offset reference number and replacing a portion of the header information for the packet with said redundant header information;recalculating checksums as required within the packet to agree with the packet contents as modified;transmitting the modified packet to a second network node within the multi-hop network; andwhen the packet is received by an end point node within the multi-hop network, modifying the packet including recalculating all checksums to return the packet's format to that of the standard packet format.9. The method of claim 8, wherein only redundant header information is included within the modified packet and no redundant information is included to provide for repair of real time information data.10. The method of claim 8, wherein recalculating checksums as required within the packet to agree with the packet contents as modified includes creating at least one checksum that matches real time video content containing errors.11. The method of claim 8 wherein the redundant header information contains a checksum that specifically determines the validity of said redundant header information.12. The method of claim 8 wherein the IP header and the RTP header of a packet containing real time information are both modified to add position offset references that point to redundant header information for each header respectively.13. The method of claim 8 wherein a number indicating a specific position offset reference number is repeated multiple times as a means to later determine the validity of the position offset reference number after transmission.14. A method of transforming of an IP packet for transmission on an 802.11 network comprising:transforming the IP packet by adding redundant header information and position offset reference numbers that point to said redundant header information to the IP packet; andwhereupon being received by a network node, said transformed IP packet is processed by the method comprising the steps of:examining the transformed packet to determine if a level 2 cyclic redundancy check data for the packet's Layer 2 header matches;if the level 2 cyclic redundancy check data for the Layer 2 header does not match, retrieving first redundant header information located within said transformed packet according to a first position offset reference number and repairing the Layer 2 header utilizing said first redundant header information;examining the transformed packet to determine if a level 3 cyclic redundancy check data for the packet's header related to Layer 3 and above matches;if the level 3 cyclic redundancy check data related to Layer 3 and above does not match, retrieving second redundant header information located within said transformed packet according to a second position offset reference number and repairing the header related to Layer 3 and above utilizing said second redundant header information; andif it is determined that the network node is not an end point node, recalculating all cyclic redundancy check data sets within the transformed packet as required to agree with the contents of the transformed packet thus repaired, and transmitting the transformed packet to another network node;converting the transformed packet to the standard 802.11 format if it is determined that the network node processing the transformed packet is an end point node, including recalculating cyclic redundancy check data sets within the transformed packet as required to agree with the contents of the transformed packet thus converted; andwherein a number indicating a specific position offset reference number is repeated multiple times as a means to later determine the validity of the position offset reference number after transmission.15. The method of claim 14, wherein recalculating all CRCs within the transformed packet as required to agree with the transformed packet contents thus converted includes creating at least one checksum that matches real time video content containing errors.16. The method of claim 14, wherein the redundant header information contains a CRC that specifically determines the validity of said redundant header information.
J06. Issued 07.02.2013 US 8,477,762 Self Forming VoIP Networks Disruption tolerant network services for Voice	01/12/09	07/02/13	04/30/28	Expired - Fee Related	https://patents.google.com/patent/US8477762B2	https://www.meshdynamics.com/patents/13-070213-US8477762-self-forming-voip-mesh-network.pdf	A self-forming VoIP connection capability is described that may be superimposed over wired networks, wireless networks, or combinations thereof. As described herein, a local network cluster forms while isolated from a conventional SIP server, or alternately may exist as a cluster of network nodes and clients that later becomes isolated from a conventional SIP server by a break in the network. Either way, each network node thus enabled with distributed SIP registry functionality according to this invention independently constructs a local SIP registry and SIP server capability within that node. Subsequently, while isolated from a conventional SIP server, VoIP conversations among client devices connected to nodes within an isolated cluster will continue, and nodes and clients may join or leave an isolated cluster with conversations able to be initiated or continued while a node has network connectivity to the cluster.	1. A VoIP-capable network comprising:one or more VoIP client devices;two or more VoIP nodes forming an isolated cluster wherein the two or more VoIP nodes in the isolated cluster are in communication with one another;wherein each of the VoIP client devices communicates with at least one VoIP node;wherein each of the VoIP nodes further comprises a local SIP registry built by exchanging SIP information with the remaining VoIP nodes in the isolated cluster; andwherein a first VoIP client device in communication with a first VoIP node establishes a communication with a second VoIP device in communication with a second VoIP node using the local SIP registries of the first VoIP node and the second VoIP node.2. The VoIP-capable network of claim 1, wherein the local SIP registries of the isolated VoIP nodes are updated as the VoIP nodes and the VoIP client devices begin communication with the isolated cluster and end communication with the isolated cluster.3. The VoIP-capable network of claim 1, wherein updates to the local SIP registry of a VoIP node are communicated to remaining VoIP nodes in the isolated cluster by broadcasting one or more information packets containing local SIP registry information of the VoIP node.4. The VoIP-capable network of claim 1, wherein the local SIP registry of a VoIP node is updated according to information received from another VoIP nodes in the isolated cluster in special information packets that each contain local SIP registry information of another VoIP node.5. The VoIP-capable network of claim 1, wherein each VoIP node has the ability to function as a DHCP server to assign IP addresses to clients in communication with the VoIP node.6. The VoIP-capable network of claim 5, wherein the IP addresses are assigned from a range of IP addresses produced by a random number generator on each VoIP node.7. The VoIP-capable network of claim 1, further comprising means of connecting the isolated cluster to an external network, wherein upon connection to an external network, the SIP registry of an external SIP server connected to the external network is updated to include SIP registry information from the VoIP nodes.8. The VoIP-capable network of claim 1 wherein said nodes comprise mesh nodes.9. The VoIP-capable network of claim 8 wherein said mesh nodes provide VoIP optimized services within said mesh nodes.10. A method of maintaining VoIP capabilities within a network comprising:forming a cluster of two or more initially isolated network nodesestablishing communications between two or more client devices by way of the initially isolated network nodes, wherein in a first configuration, at least two of said initially isolated network nodes are in communication with each other but not in communication with an external SIP server, and wherein each of said at least two initially isolated network nodes supports VoIP communications based on a local SIP registry contained in each of the said nodes according to the method of:communicating with at least one other initially isolated node to exchange SIP registry information;updating the local SIP registry in said node as new information is acquired;sending and receiving VoIP packets from a sender isolated node to one or more recipient isolated nodes based on said local SIP registry functionality when a client device in communication with the sender node establishes communication with a client device in communication with the recipient node.11. The method of claim 10 further comprising changing said cluster from the first configuration to a second configuration wherein in the second configuration the said cluster is in communication with an external SIP server containing an external SIP registry; and updating the external SIP registry with the local SIP registries of each of said nodes comprising said cluster.12. The method of claim 10, further comprising updating the local SIP registries of the isolated nodes as nodes and clients join and leave the isolated cluster.13. The method of claim 10, wherein updates to the local SIP registry of each node is communicated to remaining nodes in the cluster by broadcasting an information packet containing the local SIP registry information.14. The method of claim 10, wherein each node functions as a DHCP server to assign IP addresses to clients connected to the node.15. A VoIP capable network comprising:a first initially isolated network node in communication with at least two VoIP clients, wherein the first isolated node further comprises a local SIP registry wherein said SIP registry contains address identifiers for each VoIP clients in communication with the first node; andwherein VoIP communication between said at least two VoIP clients are initiated by utilizing the local SIP registry, wherein the first isolated node further comprises communications means with other isolated notes wherein the first isolated node broadcasts its SIP registry information to other nodes in communication with the first node.16. The VoIP capable network of claim 15, wherein the local SIP registry of the first isolated node is updated as the VoIP clients establish or terminate a network connection with the first isolated node.17. The VoIP capable network of claim 15, wherein first isolated node comes into communication with other isolated nodes to form a cluster, and the local SIP registry information of each isolated node in the cluster is updated according to information received from other isolated nodes in the cluster.18. The VoIP capable network of claim 15, wherein the first isolated node further comprises a DHCP server to assign IP addresses to clients in communication with the first node.19. The VoIP-capable network of claim 18, wherein the IP addresses are assigned from a range of IP addresses produced by a random number generator on the first isolated node.20. The VoIP capable network of claim 18, wherein each node in the cluster has the ability to function as a DHCP server to assign IP addresses to clients connected to that node.21. The VoIP-capable network of claim 20, wherein each node in the cluster assigns IP addresses from a range of IP addresses produced by a random number generator on that node.22. The VoIP capable network of claim 15, wherein the information contained in an external SIP server is updated with the local SIP registry of the first isolated node upon

J05. Issued 06.11.2013 US 8,462,747 High Performance Mesh Networks- Switch Stack Paradigm Tree networks	03/26/10	06/11/13	08/27/24	Expired - Fee Related	https://patents.google.com/patent/US8462747B2	https://www.meshdynamics.com/patents/13-061113-US8462747-switch-stack-paradigm.pdf	A design and proof of concept of a new type of WLAN, complete with simulation and results from the simulation has been described. Each AP Node is implemented as a self-contained embedded OS unit, with all algorithms resident in its Operating system. The normal day-to-day functioning of the AP node is based entirely on resident control algorithms. Upgrades are possible through a simple secure communications interface supported by the OS kernel for each AP node. Benefits provided by a wireless network, as proposed in this invention, are that: it installs out of the box; the network is self-configuring; the network is redundant in that mesh network formalism is supported, ensuring multiple paths; load balancing is supported; there is no single point of failure; allows for decentralized execution; there is a central control; it is network application aware; there is application awareness; there is automatic channel allocation to manage and curtail RF interference, maximize non interference bandwidth and enable seamless roaming between adjoining wireless sub networks (BSS) and it supports the wireless equivalent for switching—for seamless roaming requirements.	1. A node-based mesh network comprising:one or more root nodes in communication with an external network;remaining nodes arranged in a hierarchy wherein each mesh node other than a root node has a single parent node and zero or more child nodes and wherein said parent node and said zero or more child nodes communicate with the mesh node using the two radio outward communication connection;wherein each parent node further comprises a data store for tracking child nodes in communication with each parent node; wherein each mesh node comprises an identifier for tracking its parent node; wherein for every parent node having at least one child node, said at least one child node's children and any children of these child nodes are descendant nodes of said parent node wherein each parent node further comprises a data store for tracking all descendant nodes in communication with each parent node;wherein data communications between nodes identifies a destination node of data sent from said external network or a source node; andwherein each child node communicates with its respective parent node and upon receiving data from a child node, that child node's parent node sends the data along a route path toward a destination nodewherein each parent node further comprises a data store to generate a route path for data received from a child; wherein the each parent node comprises a routing table the parent node routing data store sends the data to the destination node having first selected the destination node on the basis of the destination of the data per three possibilities, wherein in a first possibility the destination of the data is a child or descendant node of the parent node therefore the destination is a child node of the parent node wherein said child is on a route path ending in said destination, wherein in a second possibility the destination of the data is the parent therefore the date is processed by the parent node, wherein neither is true, the destination is a parent node of the parent node.2. The node-based mesh network of claim 1 wherein communications from said parent node to a child node occur using wireless communications employing a first RF channel and a first radio contained in said parent node; and wherein communications from said parent node to its parent node occur using wireless communications employing a second RF channel and a second radio contained in said parent node.3. The node-based network of claim 1 wherein two child nodes in wireless communication with each other exchange data independently of the shared parent node.4. The node-based network of claim 1 wherein each parent node excludes route path information about nodes other than its descendant nodes and its immediate parent node.5. The node-based network of claim 1 wherein the route path is updated in a node upon reconfiguration of the node-based network.6. The node-based network of claim 1 wherein each node further comprises a client-communication radio to exchange data with one or more client devices in wireless communication with the node.7. The node-based network of claim 1 wherein the network further comprises an access server wherein the access server communicates one or more operational constraints to network nodes.
J04. Issued 02.22.2011 US 7,894,385 Mobility Extensions for Wireless Multiple Radio Mesh see P3M	06/15/07	02/22/11	09/22/24	Active	https://patents.google.com/patent/US7894385B1	https://www.meshdynamics.com/patents/13-061113-US8462747-switch-stack-paradigm.pdf	The functionality of multiple radio backhaul is extended to mobility applications. The multiple radio backhaul uses at least one radio for the uplink and at least one radio for the downlink, both operating in different, non-interfering channels. A mobile mesh node scans and/or samples multiple radio channels to determine the best parent mesh node to connect to. Techniques devised to scan/sample the external Radio Frequency (RF) environment without sacrificing the overall up time performance of the network are described.	1. A method for operating a mesh network having a plurality of mesh nodes, comprising:for at least one mesh node of the mesh network, scanning a Radio Frequency (RF) environment using a dedicated scanning radio to determine a new potential parent mesh node for connecting with said at least one mesh node;wherein said at least one mesh node includes, in addition to said scanning radio, at least two relay radios in each mesh element and wherein said scanning radio and said at least two relay radios operate on different non-interfering channels;wherein said at least one mesh node is moving sufficiently rapidly that it may lose connectivity with its current parent mesh node, and wherein said dedicated scanning radio is utilized for discovery of potential new parent nodes and sampling of discovered potential new parent nodes is performed by an uplink relay radio of said at least one mesh node;wherein while said at least one mesh node samples potential new parent nodes, packets to be sent to said at least one mesh node from its current parent node are buffered by the current parent node, and packets to be sent from said at least one mesh node to its current parent are buffered by said at least one mesh node; andwherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of its children in a round-robin manner.2. A mesh network comprising:a plurality of mesh nodes; whereinat least one mesh node of the mesh network is configured to scan a Radio Frequency (RF) environment using a dedicated scanning radio to determine a new potential parent mesh node for connecting with said at least one mesh node; whereinsaid at least one mesh node includes, in addition to the scanning radio, at least two relay radios in each mesh element and wherein said scanning radio and said at least two relay radios operate on different non-interfering channels;wherein while said at least one mesh node samples potential new parent nodes, packets to be sent to said at least one mesh node from its current parent node are buffered by the current parent node, and packets to be sent from said at least one mesh node to its current parent are buffered by said at least one mesh node;wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of its children in a round-robin manner.3. A mesh network comprising:a plurality of mesh nodes; wherein each node within said plurality of nodes comprises at least three radios further including:a first relay radio operating on a first RF channel at a first point in time and dedicated to uplink connections to a single
J03. Issued 02.08.2011 US 7,885,243 High Performance Wireless Networks Distributed Control Mother - Cont	05/19/08	02/08/11	05/24/24	Active	https://patents.google.com/patent/US7885243B2/en?oq=7%2c885%2c243	https://www.meshdynamics.com/patents/11-020811-US7885243-distributed-control-wireless-network.pdf	A design and proof of concept of a new type of WLAN, complete with simulation and results from the simulation has been described. Each AP Node is implemented as a self-contained embedded OS unit, with all algorithms resident in its Operating system. The normal day-to-day functioning of the AP node is based entirely on resident control algorithms. Upgrades are possible through a simple secure communications interface supported by the OS kernel for each AP node. Benefits provided by a wireless network, as proposed in this invention, are that: it installs out of the box; the network is self-configuring; the network is redundant in that mesh network formalism is supported, ensuring multiple paths; load balancing is supported; there is no single point of failure; allows for decentralized execution; there is a central control; it is network application aware; there is application awareness; there is automatic channel allocation to manage and curtail RF interference, maximize non interference bandwidth and enable seamless roaming between adjoining wireless sub networks (BSS) and it supports the wireless equivalent for switching—for seamless roaming requirements.	A wireless mesh network comprising:an access server wherein the access server sets one or more functioning parameters of the wireless mesh network;one or more root nodes connected to said access server and an external network;one or more AP nodes wherein each AP node is in wireless two-way data communication with an associated parent node wherein said associated parent node is selected from all available parent nodes wherein an available parent node is another AP node within wireless communication range of the AP node and the associated parent node is an available parent node meeting one or more communication criteria or the associated parent node is a root node within wireless communication range;wherein an AP node is in wireless communication with zero or more clients; andwherein an AP node includes a means for switching two-way data communication from a first associated parent node to a second associated parent node based on the functioning parameters of the wireless mesh network and wherein an AP node contains one or more datasets;wherein the communication criteria comprises instructions for the AP node to select the associated parent node wherein an available parent node is selected to become the associated parent node if the available parent node is in wireless communication with a root node or if a root node is contained in the available parent node's route path dataset;wherein one of the datasets contained in an AP node comprises a route path dataset comprising an identifier for the associated parent node appended to the route path dataset for the associated parent node; andwherein one of the datasets contained in the AP node comprises an amount of AP data traffic wherein the amount of AP data traffic comprises the amount of data exchanged between the AP node and the zero or more clients in communication with the node and wherein another of the datasets contained in the AP node comprises a maximum capacity amount of the AP node.2. The wireless mesh network of claim 1 wherein one of the datasets contained in the AP node comprises a cost to connect and said cost to connect is calculated using the level of network congestion experienced by the available parent node.3. The wireless mesh network of claim 1 wherein the communication criteria comprises instructions for the AP node to select the associated parent node wherein the cost to connect of the associated parent is the lowest of all available parent nodes.4. The wireless mesh network of claim 1 wherein the communication criteria comprises instructions for the AP node to associate with an available parent node wherein the amount of AP data traffic is less than the sum of the maximum capacity amount of the available parent node and the available parent amount of AP data traffic.5. The wireless mesh network of claim 4 wherein the communication criteria comprises instructions for the AP node to associate with a single suitable parent node wherein a parent node is suitable if the throughput capacity of the parent node is the highest of all available parent nodes.6. The wireless mesh network of claim 1 wherein one of the datasets contained in an AP node comprises a throughput capacity of the AP node.7. The wireless mesh network of claim 1 wherein the means for switching two-way data communications selects the second associated parent node when the first associated parent node amount of AP data traffic approaches the parent node maximum capacity amount within a congestion value set by the access server.8. The wireless mesh network of claim 1 wherein the wireless communication with clients includes a means to adjust a signal strength of the AP node wireless communication with clients and wherein the means for adjusting the signal strength of the AP node decreases the signal strength of the AP node when the amount of data sent from the zero or more clients exceeds a data congestion threshold value.9. A wireless mesh network comprising:an access server wherein the access server sets one or more functioning parameters of the wireless mesh network;one or more root nodes connected to said access server and an external network;one or more AP nodes wherein each AP node is in wireless two-way data communication with an associated parent node wherein said associated parent node is selected from all available parent nodes wherein an available parent node is another AP node within wireless communication range of the AP node and the associated parent node is an available parent node meeting one or more communication criteria or the associated parent node is a root node within wireless communication range;wherein an AP node is in wireless communication with zero or more clients; andwherein an AP node includes a means for switching two-way data communication from a first associated parent node to a second associated parent node based on the functioning parameters of the wireless mesh network and wherein an AP node contains one or more datasetswherein one of the datasets contained in an AP node comprises a route path dataset comprising an identifier for the associated parent node appended to the route path dataset for the associated parent nodewherein the communication criteria comprises instructions for the AP node to select the associated parent node wherein an available parent node is selected to become the associated parent node if the available parent node is in wireless communication with a root node or if a root node is contained in the available parent node's route path dataset; andwherein one of the datasets contained in an AP node comprises a dataset of child node identifiers wherein the dataset of child node identifiers is a dataset identifying each AP node in wireless communication with the AP.10. The wireless mesh network of claim 9 wherein the dataset of child node identifiers is accessible to each child node.11. The wireless mesh network of claim 10 wherein the AP node dataset of child nodes contains two or more child nodes wherein the zero or more clients in communication with a first child node sends data wherein a destination of the data is a second child node, the first child node sends the data directly to the second child node.12. A wireless mesh network comprising:an access server wherein the access server sets one or more functioning parameters of the wireless mesh network;one or more root nodes connected to said access server and an external network;one or more AP nodes wherein each AP node is in wireless two-way data communication with an associated parent node wherein said associated parent node is selected from all available parent nodes wherein an available parent node is another AP node within wireless communication range of the AP node and the associated parent node is an available parent node meeting one or more communication criteria or the associated parent node is a root node within wireless communication range;wherein an AP node is in wireless communication with zero or more clients; andwherein an AP node includes a means for switching two-way data communication from a first associated parent node to a second associated parent node based on the functioning parameters of the wireless mesh network and wherein an AP node contains one or more datasetswherein one of the datasets contained in an AP node comprises a route path dataset comprising an identifier for the associated parent node appended to the route path dataset for the associated parent nodewherein the communication criteria comprises instructions for the AP node to select the associated parent node wherein an available parent node is selected to become the associated parent node if the available parent node is in wireless communication with a root node or if a root node is contained in the available parent node's route path dataset; andwherein the communication criteria further comprises instructions for the AP node to associate with a single suitable parent node wherein the route path dataset of the parent node is the shortest route path dataset of all available parent nodes.13. A wireless mesh network comprising:an access server wherein the access server sets one or more functioning parameters of the wireless mesh network;one or more root nodes connected to said access server and an external network;one or more AP nodes wherein each AP node is in wireless two-way data communication with an associated parent node wherein said associated parent node is selected from all available parent nodes wherein an available parent node is another AP node within wireless communication range of the AP node and the associated parent node is an available parent node meeting one or more communication criteria or the associated parent node is a root node within wireless communication range;wherein an AP node is in wireless communication with zero or more clients; andwherein an AP node includes a means for switching two-way data communication from a first associated parent node to a second associated parent node based on the functioning parameters of the wireless mesh network and wherein an AP node contains one or more datasetswherein one of the datasets contained in an AP node comprises a route path dataset comprising an identifier for the associated parent node appended to the route path dataset for the associated parent nodewherein the communication criteria comprises instructions for the AP node to select the associated parent node wherein an available parent node is selected to become the associated parent node if the available parent node is in wireless communication with a root node or if a root node is contained in the available parent node's route path dataset; andwherein the access server functioning parameters includes a latency modifier wherein the AP node means for switching from the first associated parent node to a
J02. Issued 09.01.2009 US 7,583,648 Managing Jitter and Latency in Wireless LANs Real time Terse messaging.	11/04/05	09/01/09	02/22/24	Expired - Fee Related	https://patents.google.com/patent/US7583648B2/en?oq=7%2c583%2c648	https://www.meshdynamics.com/patents/09-090109-US7583648-managing-jitter-latency-mesh-network.pdf	In order to better manage VoIP transmissions between an AP and multiple voice client devices, methods are described that use synchronization techniques combined with packet concatenation to greatly reduce latency and jitter while enabling a much larger number of simultaneous conversations than would otherwise be possible. A TDMA-style methodology is superimposed over the standard CSMA/CA mechanism of 802.11 to provide the benefits of both mechanisms while remaining fully compatible with an industry standard protocol. The synchronization/concatenation mechanism may be optionally used in conjunction with a wireless mesh network to provide enhanced roaming as well as the ability for concatenated VoIP packets to be distributed over a wider area, and in much greater quantity, through the mesh.	A method for transferring voice packets between a primary voice wireless access point and a plurality of voice client devices, comprising:dedicating the voice wireless access point solely to voice communication;assigning, relative to an access point beacon packet timing position, unique time slots for each voice client device to first monitor for a conflicting transmission then attempt to send their voice packets to the primary wireless access point;assigning, relative to said access point beacon packet timing position, a block receive time slot for the primary wireless access point to first monitor for a conflicting transmission then attempt to send concatenated voice packets to all of said plurality of voice client devices simultaneously;performing collision detection; andin the event that a collision is detected between a voice client device and another device, backing off transmission from the at least one of the plurality of voice client devices according to a contention window that is at least in part governed by a random number scheme.2. The method of claim 1 further including:concatenating voice packets that are to be sent to voice client devices;sending concatenated voice packets from the primary wireless access point to all voice client devices simultaneously during the assigned block receive time slot; andde-concatenating said concatenated voice packets, performed by each voice client device, such that each voice client device extracts the voice information intended specifically for that voice client device.3. The method of claim 1 further including:scanning to evaluate possible connections to alternative wireless access points, performed by a specific voice client device during unallocated time slots that are not assigned to that specific voice client device.4. The method of claim 3 where scanning to evaluate possible connections to alternative wireless access points occurs on other channels than the current channel used to connect to the primary wireless access point.5. The method of claim 3 further including:locating, during the process of scanning for alternative wireless access points, an alternative wireless access point offering a connection with higher signal strength compared to that of the current connection with the primary wireless access point; andsending a request for a change of connection to the alternative access point by way of the heartbeat information packet mechanism of a wireless mesh network wherein said request is relayed from one wireless mesh access point to another, until said request reaches said alternative wireless access point offering a connection with higher signal strength; andchanging the connection such that the specific voice client device connects with the alternative wireless access point instead of the primary access point.6. The method of claim 5 where said alternative wireless access point transmits and receives on a different channel than the current channel used to connect to the primary wireless access point.7. The method of claim 1 further including:Transferring data to and from an alternative wireless access point, performed by a specific voice client device during unallocated time slots that are not assigned to the specific voice client device.8. The method of claim 7 where transferring data to and from an alternative wireless access point occurs on other channels than the current channel used to connect to the primary wireless access point.9. The method of claim 7 wherein both the primary voice wireless access point and alternative data wireless access point exist as separate access point radios within an integrated access point unit.10. The method of claim 9 where the primary and alternative wireless access points operate on different channels.11. The method of claim 1 in the event that the collision is detected, the method further comprising backing off transmission from the device other than the plurality of voice client devices according to the contention window.12. A method for transferring voice packets between a primary wireless access point and a plurality of voice client devices, comprising:assigning, relative to an access point beacon packet timing position, unique time slots for each voice client device to send their voice packets to the primary wireless access point;assigning, relative to said access point beacon packet timing position, a block receive time slot for the primary wireless access point to send concatenated voice packets to all of said plurality of voice client devices simultaneously;concatenating voice packets that are to be sent to voice client devices;monitoring for a conflicting transmission:sending concatenated voice packets from the primary wireless access point to all voice client devices simultaneously during the assigned block receive time slot if a wireless medium is available for transmission;de-concatenating said concatenated voice packets, performed by each voice client device, such that each voice client device extracts the voice information intended specifically for that voice client device;scanning to evaluate possible connections to alternative wireless access points, performed by a specific voice client device during unallocated time slots that are not assigned to that specific voice client device;performing collision detection; andin the event that a collision is detected between a device other than the plurality of voice client devices and the plurality of voice client devices, backing off transmission from the at least one of the plurality of voice client devices according to a contention window that is at least in part governed by a random number scheme.13. The method of claim 12 where scanning to evaluate possible connections to alternative wireless access points occurs on other channels than the current channel used to connect to the primary wireless access point.14. A method for transferring voice packets between a primary wireless access point and a plurality of voice client devices, comprising:assigning, relative to an access point beacon packet timing position, unique time slots for each voice client device to send their voice packets to the primary wireless access point;assigning, relative to said access point beacon packet timing position, a block receive time slot for the primary wireless access point to send concatenated voice packets to all of said plurality of voice client devices simultaneously;concatenating voice packets that are to be sent to voice client devices;monitoring for a conflicting transmission;sending concatenated voice packets from the primary wireless access point to all voice client device simultaneously during the assigned block receive time slot if a wireless medium is available for transmission;de-concatenating said concatenated voice packets, performed by each voice client devices, such that each voice client device extracts the voice information intended specifically for that voice client device;transferring data to and from an alternative wireless access point, performed by a specific voice client device during unallocated time slots that are not assigned to that specific voice client device;performing collision detection; andin the event that a collision is detected between a device other than the plurality of voice client devices and the plurality of voice client devices, backing off transmission from the at least one of the plurality of voice client devices according to a contention window that is at least in part governed by a random number scheme.15. The method of claim 14 where transferring data to and from an alternative wireless access point occurs on other channels than the current channel used to connect to the primary wireless access point.16. The method of claim 2 wherein a voice client device:sends voice packets on a first channel to a first wireless access point;sends data packets on a second channel to a second wireless access point;receives data packets on a second channel from a second wireless access point; andreceives concatenated voice packets on a second channel from a second wireless access point.

J01. Issued 09.02.2008 US 7,420,952 High Performance Wireless Networks Using Distributed.. Mother Patent	05/08/03	09/02/08	05/21/25	Expired - Fee Related	https://patents.google.com/patent/US7420952B2/en?oq=7%2c420%2c952	https://www.meshdynamics.com/patents/08-090208-US7420952-distributed-control-wireless-network.pdf	A design and proof of concept of a new type of WLAN, complete with simulation and results from the simulation has been described. Each AP Node is implemented as a self-contained embedded OS unit, with all algorithms resident in its Operating system. The normal day-to-day functioning of the AP node is based entirely on resident control algorithms. Upgrades are possible through a simple secure communications interface supported by the OS kernel for each AP node. Benefits provided by a wireless network, as proposed in this invention, are that: it installs out of the box; the network is self-configuring; the network is redundant in that mesh network formalism is supported, ensuring multiple paths; load balancing is supported; there is no single point of failure; allows for decentralized execution; there is a central control; it is network application aware; there is application awareness; there is automatic channel allocation to manage and curtail RF interference, maximize non interference bandwidth and enable seamless roaming between adjoining wireless sub networks (BSS) and it supports the wireless equivalent for switching—for seamless roaming requirements.	1. A method of controlling a wireless mesh network, comprising:a) configuring the wireless mesh network with a first configuration, the wireless mesh network comprising a plurality of relay nodes, each of the relay nodes being capable of relaying traffic from a child node associated with the relay node, each of the relay nodes including a first radio interface configurable to relay traffic to a parent relay node and a second dual purpose radio interface configurable to both relay traffic from the child relay node and to communicate with a client node that is not a relay node, and at least one of the relay nodes is configured in the first configuration to relay traffic from a child relay node to a parent relay node;b) determining that a first one of the plurality of relay nodes in the wireless mesh network requires a channel selection change;c) dynamically selecting a second one of the plurality of relay nodes in the wireless mesh network to form a parent-child relationship with the first relay node; andd) making a channel selection change;wherein prior to being dynamically selected, the second relay node was a sibling node of the first relay node; andmaking a channel selection includes making a channel selection change to meet a performance requirement.2. A method as recited in claim 1, wherein the second node is selected to be a parent node of the first node.3. A method as recited in claim 1, wherein the second node is selected to be a child node of the first node.4. A method as recited in claim 1, wherein making a channel selection includes making a channel selection change to meet a latency requirement.5. A method as recited in claim 1, wherein making a channel selection includes making a channel selection change to meet a throughput requirement.6. A method as recited in claim 1, wherein determining that the first node requires a channel selection change includes determining that the channel selection change is required due to a performance requirement change.7. A method as recited in claim 1, wherein determining that the first node requires a channel selection change includes determining that the channel selection change is required due to congestion.8. A method as recited in claim 1, wherein the channel selection change is made to avoid channel interference.9. A method as recited in claim 1, wherein the channel selection change is made based on a change to network topology.10. A method as recited in claim 1, further comprising repeating b)-d).11. A method as recited in claim 1, further comprising receiving a monitoring signal that includes information about available nodes from which the second node is selected.12. A computer program product for controlling a wireless mesh network, the computer program product being embodied in a computer readable medium and comprising computer instructions for:a) configuring the wireless mesh network with a first configuration, the wireless mesh network comprising a plurality of relay nodes, each of the relay nodes being capable of relaying traffic from a child node associated with the relay node, each of the relay nodes including a first radio interface configurable to relay traffic to a parent relay node and a second dual purpose radio interface configurable to both relay traffic from the child relay node and to communicate with a client node that is not a relay node, and at least one of the relay nodes is configured in the first configuration to relay traffic from a child relay node to a parent relay node;b) determining that a first one of the plurality of relay nodes in the wireless mesh network requires a channel selection change;c) dynamically selecting a second one of the plurality of relay nodes in the wireless mesh network to form a parent-child relationship with the first relay node; andd) making a channel selection change;wherein prior to being dynamically selected, the second relay node was a sibling node of the first relay node; andmaking a channel selection includes making a channel selection change to meet a performance requirement.13. A computer program product as recited in claim 12, wherein the second node is selected to be a parent node of the first node.14. A computer program product as recited in claim 12, wherein the second node is selected to be a child node of the first node.15. A computer program product as recited in claim 12, wherein making a channel selection includes making a channel selection change to meet a latency