

data must be handed off. Each hand-off requires that a node must receive a message, demodulate the message, apply error correction and possibly data decryption, repackage the message, set up the transmitter hardware and retransmit the messages, each step requiring processing time. Whereas mesh systems rely on multiple data hand offs between nodes, it is an object of this disclosure to minimize the number of handoffs thus improving latency. The minimal number of tiers is known to be one. Thus, an object of the disclosure is to provide reliable operation with a single communications tier.

[0004] Presently, when an individual meter is placed in a network system, the meter is assigned a communication channel over which communications between the meter and each of the gateways in the physical vicinity of the meter takes place. When an operator is setting up such a system, each meter is assigned a specific channel over which communication takes place. Although trained personnel attempt to select the communication channel based upon the proximity of the meter to a gateway or anticipated signal-to-noise ratio between the meter and a particular gateway, once the meter has been deployed, the communication channel frequency typically does not change unless the installer returns to reconfigure the meter or additional set-up is required at the network controller back-end.. Therefore, although the operator may attempt to optimize the system upon deployment, if physical characteristics of the area change or if other variables are modified, the system will drop out of optimization, which is not desired.

SUMMARY OF THE INVENTION

[0004a] In accordance with first aspect of the invention, a method for controlling the communication of data between an endpoint and a gateway is disclosed. The method includes the steps of: initially assigning a default communication channel for the endpoint; relaying at least one message from the endpoint to the gateway over the default communication channel; determining communications performance by using at least one of signal-to-noise ratio and signal quality of the message received by the gateway; selecting one of a plurality of communication channels for the endpoint based on the communications performance where by channels are associated with a level of performance, wherein the plurality of communication channels have modulation rates and message durations different from the default communication channel; and assigning a selected communication channel to the endpoint such that the endpoint communicates to the gateway along with similar performing endpoints over the selected communication channel.

[0004b] In accordance with second aspect of the invention, a method of controlling the communication of meter data from a meter to one of a plurality of gateways is disclosed. The method includes the steps of: relaying a plurality of messages from the meter to one or more of the gateways; determining the signal-to-noise ratio of the messages received by each of the plurality of gateways; selecting one of a plurality of communication channels for the meter based on the highest signal-to-noise ratio for the messages received by the plurality of gateways; assigning the selected communication channel to the meter; transmitting a plurality of messages from the meter to one or more of the gateways over the selected communication channel; and determining the signal-to-noise ratio of the messages received by each of the plurality of gateways and selecting another one of the plurality of communication channels for the meter when the signal-to-noise ratio for the messages received by the plurality of gateways increases or decreases, wherein a new communication channel is selected when the signal-to-noise ratio for the current communication channel exceeds an upper threshold value or falls below a lower threshold value for the current communication channel.

[0004c] In accordance with third aspect of the invention, a method of selecting the communication protocol for each meter of a plurality of meters in a communication system including a plurality of gateways that each communicate to a back end server is disclosed. The method includes the steps of: assigning a default communication channel to each of the plurality of meters, wherein the default communication channel is the same for all of the plurality of meters; relaying a plurality of messages from each of the meters; determining the signal-to-noise ratio of the messages received at each of the gateways for each of the plurality of meters; selecting one of a plurality of communication channels for each of the meters based upon the highest signal-to-noise ratio at one of the gateways for the plurality of message sent by the plurality of meters wherein the plurality of channels have increasing transmission rates and decreasing message durations, wherein the communication channel is selected to maximize the transmission rate and minimize the message duration; and assigning the selected communication channel to each of the plurality of meters.

[0005] The present disclosure relates to a system and method for controlling the communication of data between a multiplicity of endpoints (sometimes water gas or electricity meters, load controllers, PCT, utility displays, or the like) contained within a communication system and a single tier of intermediate gateways. The system optimizes the communication channel used to transmit the data between the meters and the gateways to ensure that each of the meters is transmitting data at the maximum rate while at the same time insuring a minimum "quality of service" and reliably, even to endpoints that in locations which are hard to reach and thus have lower signal to noise ratio (SNR).

[0006] During initial installation of meters in the communication system, each meter is initially assigned a default communication channel over which communications between the meter and the gateway will take place. The default communication channel is selected to have