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Data Gathering for a Node

Abstract

Methods and systems are disclosed including a mobile device configured for initiating a communication session with a transceiver interface of a node that comprises a network interface. The node may be queried via the communication session for a status report associated with an error, and an instruction may be communicated to the node via the communication session instructing the node to perform an operation. Communication may be established with the wireless access point via the wireless network after communication of the instruction. The transceiver interface may be configured to communicate via a second network to address issues in the wide area network.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation of and claims priority to U.S. patent application Ser. No. 18/488,379, filed Oct. 17, 2023, which is a continuation of U.S. patent application Ser. No. 15/906,509 filed Feb. 27, 2018 (now U.S. Pat. No. 11,831,499), which is a continuation of U.S. patent application Ser. No. 13/219,236 filed Aug. 26, 2011 (now U.S. Pat. No. 9,942,093), each of which is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] Communications and data service providers have implemented different types of wired and wireless networks including, for example, cellular data networks and wireless local area networks (WLANs). A WLAN may include a wireless access point (WAP), such as a wireless router, that establishes wireless communication with a user's mobile device. Service providers typically geographically locate WAPs in places where a large number of people pass on a given day, such as near restaurants, amusement parks, shopping malls, parks, etc.

[0003] Service providers often embed the WAPs within a housing or other physical structure to prevent tampering. This structure, however, can increase the amount of time required to service the WAPs. Service providers may also mount the WAPs in out of the way locations, such as on telephone poles or on telephone wires.

[0004] WAPs, like many other types of computer hardware, occasionally experience problems, such as errors. Such problems often require a service technician to physically access and manipulate by hand the WAP to address the problems.

[0005] Servicing the WAP often may be a time consuming process due to the difficulty in accessing and servicing the WAP. For instance, the WAP may be located in a housing attached to a telephone pole and would require a crane to lift the technician up to the housing. In high traffic areas, government regulation may limit the times during which the WAPs can be serviced to avoid disrupting pedestrian or automotive traffic. The technician may have to schedule a maintenance window with a governmental entity or other authority prior to beginning service. Delay in servicing, however, increases the amount of degraded performance or downtime of the WAP, which is undesirable.

SUMMARY

[0006] The following presents a simplified summary in order to provide a basic understanding of some aspects as described herein. The summary is not an extensive overview of all aspects. It is neither intended to identify key or critical elements nor to delineate the scope of the present disclosure. The following summary merely presents various example concepts in a simplified form as a prelude to the more detailed description below.

[0007] According to some aspects, a mobile device may be configured for initiating a communication session with a transceiver (e.g., short-range transceiver) interface of a node that comprises a network interface, which may be configured to communicate via a wide area network, and a wireless access point configured to establish a wireless network. The mobile device may be configured for querying the node via the communication session for a status report associated with an error preventing the node from communicating via the wide area network or the wireless

network. The mobile device may be configured for communicating an instruction to the node, via the communication session, instructing the node to perform an operation, and establishing communication with the wireless access point via the wireless network after communication of the instruction.

[0008] According to additional aspects, a node may be configured for establishing, by a transceiver (e.g., a short-range transceiver) interface of the node, a communication session with a mobile device, and generating a status report associated with an error preventing the node from communicating via a wide area network or a wireless network. The node may also be configured for processing an instruction, received via the communication session, instructing the node to perform an operation to remedy the error, and, in response to performing the operation, establishing, by a wireless access point of the node, a second communication session with the mobile device via the wireless network.

[0009] These and other aspects of the disclosure will be apparent upon consideration of the following detailed description.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A more complete understanding of the present disclosure and the potential advantages of various aspects described herein may be acquired by referring to the following description in consideration of the accompanying drawings, in which like reference numbers indicate like features, and wherein:

[0011] FIG. 1 is a functional block diagram of an example system for communicating with a node.

[0012] FIG. 2 is a flow diagram of an example method of a mobile device communicating with a node.

[0013] FIG. 3 is a flow diagram of an example method for a node to communicate with a mobile device.

[0014] FIG. 4 is an example functional block diagram.

DETAILED DESCRIPTION

[0015] In the following description of the various embodiments, reference is made to the accompanying drawings, which form a part hereof, and in which are shown by way of illustration various examples in which the embodiments may be practiced. It is to be understood that other embodiments may be utilized and structural and functional modifications may be made without departing from the scope of the present disclosure.

[0016] FIG. 1 is a functional block diagram of an example system for communicating with a node, such as a mounted node. The system **100** may provide for an improved ability to communicate with a mounted node **102** that is experiencing an error or some type of malfunction. The node may be, for example, a strand mounted node such as the Belair Networks™ BA 100S strand mounted node or other type of device configured to establish a wireless network for communicating data with nearby devices or networks. The node **102** may be advantageously located by the network operator to better provide service. For example, the node **102** may be physically mounted on a telephone pole or placed in another location that is somewhat inaccessible due to traffic (e.g., pedestrian or automobile traffic, etc.) and/or due to being physically encased within a housing. The node **102** may even be located in a restricted access area, including, for example, a customer's home. It is noted that although FIG. 1 depicts only single components, multiple components as well as other components may be used.

[0017] A network operations center (NOC) server **104** may interact with some or all of the nodes **102** to determine, for example, whether each is operating normally. In an example, server **104** may be located at an operator's control location or a head end. Periodically, the server **104** may

communicate a status request to the node **102** via a wide area network (WAN1) **106** (or a local network) to confirm that each node **102** is operating normally. A channel established for communication between the server **104** and the node **102** via WAN1 **106** may be referred to as in-band communication channel. When functioning properly, the node **102** may respond to the status request with a status report. The status report may include information on the node **102** such as, for example, (1) system-uptime (e.g., duration of node's uptime, measured in, for example, in days, minutes), (2) health state of WiFi radios within the node **102**, (3) specific configuration parameters such as, for example, administrative state, transmit (tx) level, channel assignment, transmit (tx) type (e.g., 1×1, 2×3, 3×3 Multiple Input Multiple Output (MIMO)), (4) client association history log which may be used, for example, when a Law Enforcement Agency issues a subpoena for tracking purposes, (5) other types of responses, as well as any combination thereof.

[0018] When the node **102** experiences a problem, the server **104** may not be able to communicate with the node **102** via the wide area network **106**. If able to communicate, the server **104** may instruct the node **102** to perform a hard reset and to provide a status report thereafter informing the server **104** about whether the hard reset corrected the issue. If the hard reset did not correct the issue or if the server **104** is unable to communicate with the node **102** via the wide area network **106**, the server **104** or its operator may cause a service technician to be dispatched to the node **102**.

[0019] Rather than requiring a service technician to physically access the node **102** (e.g., touch with their hand), the system **100** may provide a different communication channel, e.g., an out of band communication channel, for communication between the server **104** and the node **102**. The out of band channel may include establishing a first communication session between the server **104** and a mobile device **112**, which may be used by a technician, located nearby the node **102** via a second wide area network (WAN2) **108** (or a local network), and a second communication session between the mobile device **112** and the node **102**. The mobile device **112** may be a mobile phone, a smart phone, a laptop computer, a netbook, a tablet computer, or other device configured for wireless communication. Each of the first and second communication sessions may include wireless or other types of communication. The WAN2 **108**, for example, may include a cellular data network (e.g., 3G cellular, 4G cellular, etc.) or other type of network and the node **102** may include a short-range transceiver (e.g., Bluetooth antenna) that permits wireless communication with a mobile device **112**.

[0020] Rather than requiring the technician to physically access and manipulate the node **102** by hand, the mobile device **112** may attempt to wirelessly communicate with the node **102** to attempt to resolve the error experienced by the node **102** from a nearby location. For example, the technician may be standing on the ground nearby a telephone pole on which the node **102** is mounted, instead of requiring hands-on access via a crane to physically access the node **102**.

[0021] To establish communication via the out of band communication channel, the mobile device **112** may move within range of a transceiver interface **122** of the node **102**. The transceiver interface **122** may include a transceiver (e.g., a short-range transceiver) to communicate data with one or more mobile devices **112**. The transceiver interface **122** may be used for establishing a communication session on the out of band communication channel with a nearby mobile device **112**. For example, the transceiver interface **122** may be used to establish a pico-net, a Bluetooth network, or other types of short-range networks. Other short-range networks used to establish communication channels that are simple, robust, low bandwidth may also be used.

[0022] The node **102** may include components for communicating via WAN1 **106** and WAN2 **108**. In an example, the node **102** may include a network interface **114** for communication via the WAN1 **106**, a processor **116**, a memory **118**, a power controller **120** to control power to the node **102**, a transceiver interface **122**, which may include a short range transceiver, and one or more wireless access points **124**. The memory **118** may be a computer readable medium, such as a hard disk, a flash drive, a read only memory (ROM), a random access memory (RAM), an optical drive, or other physical device configured to tangibly store computer readable instructions. The processor

116 may process the instructions to control the network interface **114**, power controller **120**, transceiver interface **122**, and access point **124** and to cause the node **102** to perform the operations described herein.

[0023] The one or more wireless access points (WAPs) **124** may be devices configured to establish one or more wireless networks using a protocol such as, for example, IEEE 802.11, for robust and high data rate transmission. Each wireless access point **124** may include a transceiver to transmit and receive data from consumer mobile device(s) **110** and/or mobile device(s) **112**.

[0024] When first being deployed, a technician may physically install the node **102** at a desired location. For example, a storeowner may contact an Internet Service Provider requesting Internet service at their open air cafe and a technician may install the node **102** on a nearby telephone pole. The node **102** may be placed on a telephone pole, hung on a telephone wire, installed or encased in a housing or other physical structure, or installed at other desired locations. Once installed, the mobile device **112** may establish a communication session with the node **102** via the transceiver interface **122** to download device and location information from the node **102** for transmission to the server **104** via WAN2 **108**. The mobile device **112** may also instruct the node **102** to communicate this information to the server **104** via WAN1 **106**. Device information may include, for example, a network address (e.g., media access control (MAC)) of the node **102** and/or a serial number of the node **102**. Location information may include, for example, one or more of a global positioning system (GPS) coordinates of the node **102**, a geographic marker identifier, etc. A geographic marker identifier may identify a geographic landmark on which the node **102** is located. The geographic marker identifier may be a telephone pole identifier, for example, indicating that the node **102** is located on a particular telephone pole.

[0025] In use, a user of consumer mobile device **110** or other individuals may report a problem (e.g., no access, slow data rates, etc.) with wirelessly accessing the Internet (or another network or database) via the node **102**. To report the problem, the user may place a telephone call, may send an email, SMS or MMS message, may access a webpage, or otherwise communicate to report the error. The error may be communicated to the server **104**. The server **104** may also detect the error, for example, by communicating a status request to the node **102** and not receiving a status report in response within a predetermined amount of time (e.g., 5 minutes). The status report may also identify an error. The server **104** may attempt to address the error remotely by sending one or more commands to the node **102**. If unable to remotely address the problem, the server **104** may communicate a dispatch message to a dispatch center to dispatch a service technician to the geographic location of the node **102**. The dispatch message may include the device and location information of the node **102**, as well as a passcode of the node **102** described in further detail below.

[0026] Rather than having to gain physical access to the node **102**, the service technician may move within range of the transceiver of the transceiver interface **122** to determine if the mobile device **112** can communicate with the node **102**. For example, the node **102** may be mounted on a telephone pole, and the technician may move to a base of the telephone pole. If the transceiver interface **122** is operational and within range, the mobile device **112** may initiate pairing with the node **102**. Pairing may refer to establishing a communication session between the mobile device **112** and the node **102**. To pair with the node **102**, the transceiver interface **122** may prompt the mobile device **112** to provide a passcode or other authenticating information. The passcode may be used to authenticate the mobile device **112** as a device authorized to access control functions of the node **102**. The passcode may be unique to each node **102** or may be a generic to a group of nodes, and may prevent accidental pairing between the transceiver interface **122** and another device (e.g., consumer mobile device **110**) that does not have the correct passcode.

[0027] Upon verification of the passcode, the transceiver interface **122** may be paired with the mobile device **112** and may establish a communication session via one or more supported protocols (e.g., secure shell (SSH), telnet, hypertext transfer protocol (http), http secure (https), etc.). Pairing

may establish a master-slave relationship, wherein the mobile device **112** is the master and controls operations of the slave transceiver interface **122**.

[0028] After a successful pairing, the mobile device **112** may communicate commands, transmit software, etc., using the communication session instructing the transceiver interface **122** to perform certain functions on the node **102** and/or to extract data from the node **102**. For example, the mobile device **112** may communicate a query command to the transceiver interface **122** requesting the device and location information, discussed above, as well as a status report of the node **102**. The mobile device **112** may process the device and location information to confirm that the technician is attempting to service the correct node **102**.

[0029] The status report may specify one or more types of errors experienced by the node **102**. Example errors include the network interface **114** being unable to detect a signal from the WAN1 **106**, a signal to noise (SN R) ratio that is too low on one or more channels, a power drop across the node **102** that is too large or small, an error in a particular subcomponent, being unable to communicate with the WAN1 **106** via the network interface **114**, being unable to communicate with any mobile device **110/112** via the access point **124**, etc. Other errors may include, for example: (1) indicating that a backhaul link is down (e.g., this can translate to a secure tunnel encountering issues), (2) both access point radios are down for whatever reason (e.g., whether administratively disabled and/or caused by software and/or hardware), etc.

[0030] The status report may also provide usage statistics on data throughput to various consumer devices, such as mobile devices **110**, to determine if a particular device **110** is improperly using more bandwidth than allocated. The mobile device **112** may process the status report and/or may forward the status report to the server **104**, via the WAN2, **108** to diagnose an error and/or to determine how to address the error. In an example, the mobile device **112** may address the error by instructing the node **102** to perform a hard reset and/or by communicating a program script to modify software of the node **102** stored in the memory **118**.

[0031] For a hard reset, the mobile device **112** may communicate a hard reset instruction to the node **102** via the transceiver interface **122**. The transceiver interface **122** may monitor whether the node **102** turns itself off and then back on within a predetermined amount of time. If the node **102** does not, the transceiver interface **122** may instruct the power controller **120** to remove power to the node **102** and to resupply the node **102** with power to force the node **102** to turn off and back on.

[0032] The transceiver interface **122** may communicate a hard reset confirmation message informing the mobile device **112** whether the hard reset instruction was successfully performed and whether the hard reset address the error. The mobile device **112** may then attempt to wirelessly communicate with the node **102** via the transceiver of the wireless access point **124** to confirm that the issue with the wireless network has been resolved. If the issue persists, then the service technician may have to take further measures to address the error.

[0033] Instead of or in addition to instructing the node **102** to perform a hard reset, the mobile device **112** or the server **104** may identify a program script based on processing the status report to modify software of the node **102** stored in the memory **118**. The program script may include a software update and/or may include instructions to adjust settings of the node **102**.

[0034] If the node **102** is a cable modem, for example, these types of devices include a variable attenuator that attenuates radio frequency (RF) signals upon receipt from the WAN1 **106** prior to processing by the node **102**. If not properly configured, the variable attenuator may over-attenuate the RF signal. The node **102** may improperly determine that it is unable to receive the RF signal from the WAN1 **106**, which in fact the variable attenuator has attenuated the RF signal to such a low level that the node **102** cannot detect the RF signal. To detect over-attenuation, the status report may include an RF power measurement, a voltage measurement, and/or other types of measurements of the RF signal prior to and after the variable attenuator. The node **102** may be, for example, an optical node, a wireless node, or another type of node.

[0035] The mobile device **112** and/or the server **104** may process the status report to determine that, for example, the variable attenuator is improperly attenuating the RF signal and may communicate a program script to reconfigure the settings of the variable attenuator to reduce the amount of attenuation. The mobile device **112** may instruct the node **102** to store and execute the program script, and may communicate a confirmation message informing the mobile device **112** that the node **102** has loaded the program script. The mobile device **112** may then attempt to communicate with the node **102** via the transceiver of the wireless access point **124**. If the error has not been addressed by the program script, then the service technician may have to take further measures to address the error.

[0036] The status report may also identify heavy bandwidth users or devices of the node **102**. For instance, some consumer mobile devices **110** may contract with a service provider to receive a predetermined amount of bandwidth via the node **102**. If the usage statistics of the status report indicate that a particular consumer mobile device **110** is using more bandwidth than allocated, the processor **116** may execute the program script to cause the node **102** to reduce data throughput to a particular mobile device **110**. If the usage statistics indicate that a particular consumer mobile device **110** is pirating Internet or other network access (e.g., accessing the Internet via the node **102** when not authorized to do so), the processor **116** may execute the program script to cause the node **102** to block the network address (e.g., MAC address) of the pirating consumer mobile device **110**.

[0037] The system **100** may thus be configured to improve a service provider's (e.g., technician's) ability to service a mounted node, without requiring physical access and manipulation of the node. The technician instead may communicate with a short-range transceiver interface of the node and attempt to wirelessly address any problems the node may be experiencing, rather than requiring the technician to physically access the node.

[0038] The example embodiments may also be useful to maintain other types of nodes including, for example, fiber nodes, bridge amplifiers, and line extenders. Generally, a node may be any device that could communicate via a secondary short range network to provide information about the node and a WAN **106** to exchange information with the server **104** or other device. A fiber node may, for example, convert upstream and downstream signals (e.g., RF signals) for transport over different media (e.g., for transport via optical fiber from coaxial cable and vice versa). A bridge amplifier may, for example, amplify upstream and downstream signals and split the signals to, for example, four branches of coax runs. A line extender may, for example, amplify upstream and downstream signals.

[0039] A fiber node, a bridge amplifier, and a line extender may only communicate using transport signals (e.g., layer 0 of the OSI stack), but may not have a protocol or perform demodulation.

[0040] These types of nodes often do not, but may, include an access point **124** providing a wireless network, and may be coupled to a first transport medium (e.g., a fiber optic cable) on one side and a second transport medium (e.g., a coaxial cable, wireless link, etc.) on the other. Such nodes often are difficult to physically access, and may benefit from having a short range transceiver interface **122**, as described above. The following discussion refers to an example embodiment for a fiber node, but is also applicable to other types of nodes.

[0041] In a fiber node example, such a node may be configured to communicate a status report to the server **104** or another computing device when a network interface **114** (or other type of transponder) is operating properly. The status report may contain information on one or more of a signal to noise ratio (SNRs) detected by connected devices (e.g., SNRs for cable modems and/or set top boxes connected to the fiber node), electrical current usage, temperature, downstream receive and transmit levels, upstream receive and transmit levels, and optical modulation index, or other information.

[0042] At some time, the network interface **114** may not be working properly. A technician may go to a geographic location of the fiber node and may attempt to communicate with the transceiver interface **122** using a mobile device **112** to obtain a status report. The status report may include

some or all of the information listed above, as well as any detected errors. The mobile device **112** may also, using the interface **122**, obtain a unique identifier of the fiber node and automatically collect information about devices (e.g., modems, set top boxes, etc.) connected to that particular fiber node. The mobile device **112** may then communicate some or all of the status report, including any of the other information collected from the fiber node, to the server **104** via the WAN **108** for processing.

[0043] In response, the server **104** may communicate an instruction to the mobile device **112** instructing how to remedy the problem. For example, the mobile device **112** may instruct the fiber node to perform a hard reset and/or to execute a program script in an attempt to remedy the error. The instruction may also instruct the fiber node to attempt to communicate with the server **104** via the network interface **114** and/or the mobile device **112** via the short-range transceiver interface **122** after performing the instruction to determine whether the fiber node is able to successfully communicate with the server **104** and/or mobile device **112**. If still unable to communicate with the server **104** (and not via the mobile device **112**), the technician may have to take further action to remedy the error, such as physically accessing the fiber node.

[0044] FIG. **2** is a flow diagram of an example method of a mobile device communicating with a node. The method may be implemented by the mobile device **112** or other devices (e.g., non-mobile devices) in the system **100**. The blocks or steps therein shown in FIG. **2** may be arranged in other orders, additional operations may be included in the method, and/or one or more of the blocks or steps therein may be removed. Also, some or all of the operations associated with any of the blocks may be repeated one or more times. The method may begin at block **202**. In block **202**, the method may include initiating, by a mobile device, a communication session with a transceiver interface. The transceiver interface may be part of a node that comprises a network interface configured to communicate via a first wide area network and a wireless access point configured to establish a wireless network. In block **204**, the method may include querying, by the mobile device, the node via the communication session for a status (e.g., a status report). The status report may be associated with an error preventing the node from communicating via the first wide area network or the wireless network. In block **206**, the method may include communicating an instruction to the node, via the communication session, instructing the node to perform an operation. Example operations are to load and execute a program script, to conduct a hard reset, to limit access to a particular mobile device, etc. In block **208**, the method may include establishing (or attempting to establish), by the mobile device, communication with a wireless access point via a wireless network after communication of the instruction. The method may then end or may return to any of the preceding blocks.

[0045] FIG. **3** is a flow diagram of an example method of a node communicating with a mobile device. The method may be implemented by the node **102** or other devices in the system **100**. The blocks or steps therein shown in FIG. **3** may be arranged in other orders, additional operations may be included in the method, and/or one or more of the blocks or steps therein may be removed. Also, some or all of the operations associated with any of the blocks may be repeated one or more times. The method may begin at block **302**. In block **302**, the method may include establishing, by a node (e.g., via a transceiver interface), a communication session with a mobile device. In block **304**, the method may include generating a status (e.g., status report) associated with an error, for example, preventing the node from communicating via a first wide area network or a wireless network. In block **306**, the method may include processing an instruction received via the communication session instructing the node to perform an operation to remedy the error. In block **308**, the method may include, in response to performing the operation, establishing (or attempting to establish), by a wireless access point of the node, a second communication session with the mobile device via a wireless network.

[0046] The method may then end or may return to any of the preceding blocks. Any of the above-mentioned functional blocks, including the server **104**, node **102**, consumer mobile device **110**, and

mobile device **112**, may each be implemented with at least one processor and at least one memory. The functional blocks may include hardware that may execute software and/or be configured in hardware to perform specific functions. The software may be stored on at least one computer-readable medium, which may be non-transitory, or on other memory in the form of computer-readable instructions. A computer may read those computer-readable instructions, and in response perform various steps as defined by those computer-readable instructions. Thus, any functions attributed to any of the functional blocks of FIG. 1 as described herein may be implemented, for example, by reading and executing such computer-readable instructions for performing those functions, and/or by any hardware subsystem (e.g., a processor) from which the computer is composed.

[0047] The term “computer-readable medium” as used herein includes not only a single physical medium or single type of medium, but also a combination of one or more physical media and/or types of media. Examples of a computer-readable medium include, but are not limited to, one or more memories, hard drives, optical discs (such as CDs or DVDs), magnetic discs, and magnetic tape drives.

[0048] Such a computer-readable medium may store computer-readable instructions (e.g., software) and/or computer-readable data (i.e., information that may or may not be executable). In the present example, a computer-readable medium (such as memory) may be included in any one or more of the functional blocks shown in FIG. 1 and may store computer-executable instructions and/or data used by any of those functional blocks. Alternatively or additionally, such a computer-readable medium storing the data and/or software may be physically separate from, yet accessible by, any of the functional blocks shown in FIG. 1.

[0049] An example functional block diagram is shown in FIG. 4 and may include processor **401**, a communications interface **402**, storage **403**, and a user interface **404**. In this example, the computer-readable medium may be embodied by storage **403**, and processor **401** may execute computer-executable instructions stored by storage **403**. Communications interface **402** may provide for unidirectional or bidirectional communications with any network or device external to that computer. User interface **404** may allow for unidirectional or bidirectional information transfer with a human user using, for example, a display or a keyboard. Again, any of the functional blocks of FIG. 1 may be implemented using the components shown in FIG. 4.

[0050] One or more aspects of the above examples may be embodied in computer-executable instructions, such as in one or more program modules, executed by one or more computers or other devices such as by any of the blocks in FIG. 1. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types when executed by a processor in a computer or other device. The computer executable instructions may be stored on a computer readable medium such as a hard disk, optical disk, removable storage media, solid state memory, ROM, RAM, etc. As will be appreciated by one of skill in the art, the functionality of the program modules may be combined or distributed as desired in various embodiments. In addition, the functionality may be embodied in whole or in part in firmware or hardware equivalents such as integrated circuits, field programmable gate arrays (FPGA), application specific integrated circuits (ASIC), and the like.

[0051] While embodiments have been described with respect to specific examples including presently preferred modes of carrying out the invention, those skilled in the art will appreciate that there are numerous variations and permutations of the above described systems and techniques. Thus, the spirit and scope of the invention should be construed broadly as set forth in the appended claims.

Claims

1. A method comprising: sending, by a computing device and to a node, a query for data associated with a plurality of devices connected to a wireless network; and sending, by the computing device and to a mobile device, based on a determination that the computing device fails to communicate with the node, an instruction configured to cause the node to adjust a parameter associated with the wireless network, wherein the mobile device is connected to the node via a communication session established over a short-range communication interface of the node.
2. The method of claim 1, wherein the instruction comprises a reset command for the node.
3. The method of claim 1, further comprising: receiving, from the mobile device, the data associated with the plurality of devices connected to the wireless network.
4. The method of claim 1, further comprising: generating, based on the data associated with the plurality of devices connected to the wireless network, the instruction configured to cause the node to adjust the parameter associated with the wireless network.
5. The method of claim 1, wherein the data comprises one or more of: a duration of an uptime of the node; a health state of a wireless radio of the node; one or more transmission parameters; or a client association history log.
6. The method of claim 1, further comprising: determining, based on a response to the query, an error at the node, and wherein the sending the instruction is further based on the error at the node.
7. The method of claim 1, wherein the sending the query is via a first network and wherein the communication session is associated with a second network different from the first network.
8. An apparatus comprising: one or more processors; and memory storing instructions that, when executed by the one or more processors, cause the apparatus to: send, to a node, a query for data associated with a plurality of devices connected to a wireless network; and send, to a mobile device, based on a determination that the apparatus fails to communicate with the node, an instruction configured to cause the node to adjust a parameter associated with the wireless network, wherein the mobile device is connected to the node via a communication session established over a short-range communication interface of the node.
9. The apparatus of claim 8, wherein the instruction comprises a reset command for the node.
10. The apparatus of claim 8, wherein the instructions, when executed by the one or more processors, further cause the apparatus to: receive, from the mobile device, the data associated with the plurality of devices connected to the wireless network.
11. The apparatus of claim 8, wherein the instructions, when executed by the one or more processors, further cause the apparatus to: generate, based on the data associated with the plurality of devices connected to the wireless network, the instruction configured to cause the node to adjust the parameter associated with the wireless network.
12. The apparatus of claim 8, wherein the data comprises one or more of: a duration of an uptime of the node; a health state of a wireless radio of the node; one or more transmission parameters; or a client association history log.
13. The apparatus of claim 8, wherein the instructions, when executed by the one or more processors, cause the apparatus to: determine, based on a response to the query, an error at the node; and send the instruction further based on the error at the node.
14. The apparatus of claim 8, wherein the instructions, when executed by the one or more processors, cause the apparatus to send the query via a first network, and wherein the communication session is associated with a second network different from the first network.
15. One or more non-transitory computer-readable media storing instructions that, when executed, cause: sending, to a node, a query for data associated with a plurality of devices connected to a wireless network; and sending, to a mobile device, based on a determination that a computing device fails to communicate with the node, an instruction configured to cause the node to adjust a parameter associated with the wireless network, wherein the mobile device is connected to the node via a communication session established over a short-range communication interface of the node.

- 16.** The one or more non-transitory computer-readable media of claim 15, wherein the instruction comprises a reset command for the node.
- 17.** The one or more non-transitory computer-readable media of claim 15, wherein the instructions, when executed, cause: receiving, from the mobile device, the data associated with the plurality of devices connected to the wireless network.
- 18.** The one or more non-transitory computer-readable media of claim 15, wherein the instructions, when executed, cause: generating, based on the data associated with the plurality of devices connected to the wireless network, the instruction configured to cause the node to adjust the parameter associated with the wireless network.
- 19.** The one or more non-transitory computer-readable media of claim 15, wherein the data comprises one or more of: a duration of an uptime of the node; a health state of a wireless radio of the node; one or more transmission parameters; or a client association history log.
- 20.** The one or more non-transitory computer-readable media of claim 15, wherein the instructions, when executed, cause: determining, based on a response to the query, an error at the node; and the sending the instruction further based on the error at the node.
- 21.** The one or more non-transitory computer-readable media of claim 15, wherein the instructions, when executed, cause the sending the query via a first network, and wherein the communication session is associated with a second network different from the first network.
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