Mesh networking announcement, new spec from Bluetooth

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Credit: Bluetooth SIG

(Tech Xplore)—Mesh-networking capabilities now in Bluetooth are making news. The Bluetooth Special Interest Group announced that Bluetooth technology has been updated with support for mesh networking, and Bluetooth published the spec.

According to the Bluetooth video, Bluetooth is constantly expanding on

the way things connect, with an impact on the point to point connections, wireless audio market, connected device market, and one to many communications. And now, with mesh connections, Bluetooth is unleashing the potential of many to many communications.

Mesh networking operates on Bluetooth Low Energy (LE) and is compatible with core specification version 4.0 and higher.

Bluetooth mesh networking specifications, as well as the tools required to qualify Bluetooth products with mesh networking support, are now available.

"With Bluetooth mesh, tens, hundreds, or even thousands of devices can now connect to automate homes and businesses, create wireless sensor networks and track assets on an unprecedented scale," said Bluetooth video notes. This is said to unleash the potential of many-to-many communications.

Peter Sayer, IDG News Service, said, "Mesh networking will make it simpler to connect sensors across industrial sites, or to create smart home or building automation networks."

A Bluetooth signal can be transmitted from device to device, reaching further distances, said Juli Clover in *MacRumors*.

Jordan Kahn, *9to5Google* on Tuesday said they added the new spec after many requests from its member companies.

Bluetooth in answering FAQ questions about the architecture said that "unique to Bluetooth mesh networking, all nodes in a network are decentralized and can talk to each other directly. There are no centralized hub or routing nodes, so there is no single point of failure."

Peter Sayer elaborated on how this might materialize:

"It will offer a new way for devices to join the Internet of Things. Once a building has a mesh network to control lighting, say, other devices can use it as wireless infrastructure for other applications such as asset tracking and wayfinding, said Martin Woolley, technical program manager at Bluetooth SIG, the organization behind the Bluetooth standard."

Sayer said Bluetooth treats mesh networking as just another networking topology built on Bluetooth Low Energy.

"Bluetooth SIG said that it expects to see products using the new Mesh Networking specs within six months if not sooner, and devices that are already shipping will be able to add support through software updates (including smartphones and tablets)," wrote Kahn.

On the FAQ page, Bluetooth answered the question, When will commercial products be available for Bluetooth mesh networking? "You can expect to see commercial products with Bluetooth mesh networking technology available this year."

As for security, the spec indicates much care and attention accorded for protection.

"The spec's developers have taken care to protect Bluetooth mesh networks against replay attacks by ensuring each message has a unique sequence number. The spec also provides different encryption layers for the network infrastructure and the applications that run over it," Sayer said.

Bluetooth mesh networking has been designed to prevent numerous types of attacks: Brute-force attacks are prevented via 128-bit keys, and

a minimum of 64-bit authentication on every single packet.

Replay attacks are prevented by using fresh sequence numbers of every packet sent and checking those on every packet received. Man-in-the-middle attacks are prevented using ECDH cryptography during provisioning with out-of-band authentication.

Trashcan attacks are prevented using a key-refresh procedure, allowing keys in all remaining devices and blacklisting the removed/broken devices. The attempt to disassemble a thrown-out device will not work, as it cannot reveal any security information.

Physically insecure device attacks are prevented by allowing devices in an insecure location to have separate keys to those in a physically secure location.

Visitor attacks are prevented, giving guests and visitors temporary and limited access to the network using a separate set of keys.

An attacker listening to mesh packets cannot determine which device sent that message since there are no identifying values.

The Bluetooth SIG blog stated, "Bluetooth mesh will make the largest initial impact in commercial lighting and industrial applications, and will eventually become a common technology in the larger Internet of Things ecosystem."

More information: blog.bluetooth.com/introducing … ooth-mesh-networking