



Piconet

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Abstract: Bluetooth, the wireless protocol which uses a short range radio technology to simplify data transmission among internet devices over short distances facilitates a typical way to connect and exchange information between two or more devices through the creation of wireless Personal Area Networks (PANs) whose specifications are licensed by Bluetooth SIG (Special Interest Group) thereby supporting a dynamic topology known as piconet or PAN. A piconet can be visualized as an ad-hoc computer network of devices which use the protocols of Bluetooth technology.

Keywords: Piconet, Scatternet, Master-Slave, Bluetooth.

I. Introduction

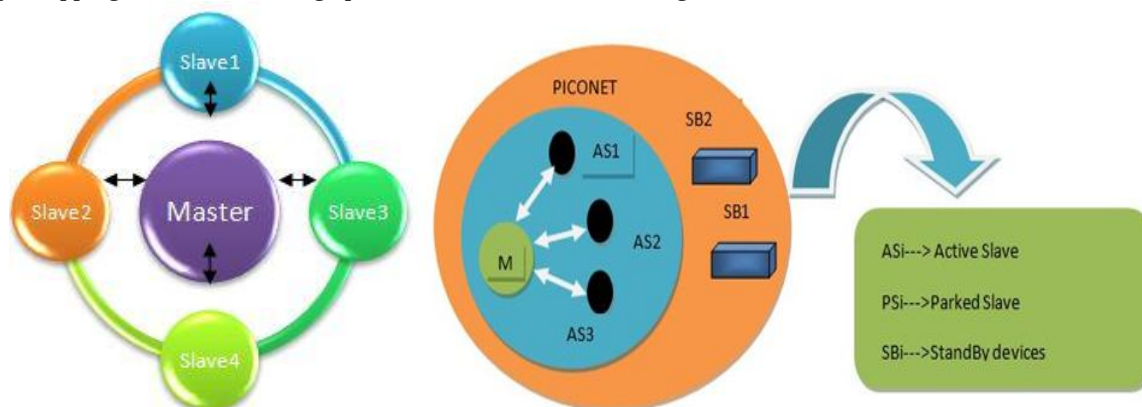
A piconet is a formation of network units. Piconet is a combination of PICO and NET, where PICO signifies very small or one-trillionth whereas NET signifies network. More often than not, 'piconet' signifies the very concept of 'PAN'(Personal Area Network). The Bluetooth protocols permit only one master device to interconnect with up to 7 active slave devices. A piconet is thus formed when at least two devices connect say a portable PC and a mobile phone.

II. Description

When two devices come within an acceptable range of each other, a Bluetooth link becomes feasible. Thus, in compliance to perfect specifications, one of the devices plays the role of MASTER whereas the other device plays the role of SLAVE. The master device determines not only the frequency hopping patterns but also the phases for propitious hopping sequences. In a single piconet, there can be only one master. At any given time of interval, a slave can take the form of either of the following nodes: a) Active node, b) Sniff node, c) Hold node, and d) Park Node

III. Scatternet Formation

Bluetooth devices can simultaneously participate in multiple piconets because of the time-division nature of resources. Such a device could be a master of one piconet and slave in another piconet, or slave in both the piconets. However, the device cannot be a master in both the piconets. Such an interaction of multiple piconets is known as a *scatternet*. A scatternet is a connected set of piconets and each piconet consists of single master and multiple slaves (set of slaves). A slave can take part in another piconet which is within the proximity to establish a communication link. *One misconception about bluetooth specification is that, per piconet a maximum of 8 devices can (1 master+ 7 slaves) only can be present or involve in communication. However, the truth is that there can be at the most 7 ACTIVE slaves whereas there can be any number of parked slaves in a piconet (up to 255 pragmatically).* The master has the capability to “swap out” active slaves for parked slaves. By swapping, master can manage piconets in order to connect large number of devices.



IV. Limitation

By installing a fake bluetooth access point, bluetooth internet access point may be affected. A device may have similar name as the actual access point thereby configuring and allowing the same PIN number. Thus, the internet can be accessed from a fake bluetooth access point. Moreover, hackers can exploit mobile owner's via bluetooth. Consider the two standard commands that are sufficient for stealing the phonebook information from a T610 mobile phone of Sony Ericsson: (1) hcitool command and (2) obexftp command. Another risk is that the pairing process is implemented in wide variety of mobiles, i.e., the list of discovered devices on the mobile phones may not display the actual bluetooth address or may display some other name of the located device. An authorized user has complete idea regarding the resources available. Hence the probability of the authorized user committing a crime can never be proscribed.

V. Conclusions

A device which is enabled by bluetooth technology operates either as slave or a master if it desires to communicate with other devices. Multiple bluetooth enabled devices may communicate internally within a specific geographic location, thereby forming a piconet, with their time slots controlled on a time-division multiplexing basis by the master and all follow the frequency hopping patterns of the master. A star topology is thus used in bluetooth piconets, in which, the master device is placed at the center of the star, which communicates with the slaves present. By using bridge nodes, interpiconet communication is possible.

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