

HOME NETWORKS: A SURVEY OF ARCHITECTURES AND TECHNOLOGIES

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The number of sensors and appliances with intelligent capabilities in the home environment are on the rise. There is a growing trend in introducing new functions into home appliances and sensors including the abilities to coordinate with other home appliances or sensors to accomplish a certain goal. These goals may include patient monitoring, smart energy usage, smart lighting, smart temperature control and security etc. The home appliances and sensors require a collective effort and coordination among each other in order to accomplish these goals. The coordination among the home appliance and sensors are achieved with the use of a network. The types of networks used to connect home appliances and sensors can be categorized in to two main groups as wired and wireless. Wired solutions include connecting the appliances and sensors with copper or optical cables with a router or a hub. Researchers have also used power lines for communication between the devices. Although a wired network can be used, it has a very low appeal for the use in the home environment. Due to these drawbacks wireless networks has attracted the attention of researchers and it has produced a multitude of methods and technology standards that are suitable for home environment. They include Near Field Communication (NFC), Bluetooth, ZigBee and WiFi etc. These technologies can be used for various implementations in the home environment. The method of using these wireless technologies can also vary such as using a WiFi router for centralized control or allowing the home appliances and sensors to connect in an ad hoc manner without centralized control. This paper provides an overview and comparison of the latest available technologies and architectures used for home networks through a literature review. A comparison is conducted with the latest relevant research work in their ability to achieve various goals as mentioned above including their drawbacks. The survey revealed that wireless networks has gained the upper hand as the preferred solution of home networks whether it is through centralized or distributed manner. The paper is concluded with an investigation into further unresolved issues and a future outlook of home networks.

Keywords: Home networks, Network architecture, Wired network, Wireless network