

Chloe Norris

Summary of WSN Operating Systems

There are several different types of operating systems for WSNs, all of which have different aspects, pros, and cons. WSN operating systems are usually less complex than general-purpose operating systems. This is due to the special requirements for sensor network applications, and resource constraints in the hardware platforms.

Hardware for WSNs is not much different from hardware you may see in other traditional systems, therefore; making it possible to embed operating systems. One difference is that WSN operating systems do not have real-time support.

One of the first operating systems created for WSNs is TinyOS. The main difference with this operating system, and other operating systems is that TinyOS is based on event-driven programming, as opposed to multithreading. TinyOS programs are composed into event handlers and tasks. An event handler is called when some external event triggers the operating system to respond. The special language that is used to write this program is a C based language called nesC .

There are other operating systems that use C as the programming language; some of which include Contiki, Mantis, BTnut, and Nano-RK. Like TinyOS, Contiki is event driven, but differs in the aspect that it supports multithreading. Mantis and Nano-RK are based on preemptive multithreading. SOS is event-driven, and supports loadable modules. SOS also supports dynamic memory management. BTnut uses C code, and is based on cooperative multi-threading. One of the newer operating systems for WSN is LiteOS, which provides UNIX like abstraction, and supports C language.

Distributed algorithms are often targeted with WSNs. One of the biggest issues with WSNs is the scarcity of energy. The factor that most affects this issue is idle listening. Energy aware algorithms are an approach to saving energy. Another issue at hand is the transmission of data, and its range of transmission from the base station. Since it is highly unlikely that every node is able to reach the base station, data transmission is usually multi hop.

WSNs have specially designed network simulator platforms. One example is this is TOSSIM, which is a part of TinyOS. Agent based modeling and simulation is used to model wireless sensors as complex systems. Agent based modeling allows the designer to focus on solving an actual problem with an application design. Before agent based modeling was used in sensor networks, it was used to model Complex adaptive systems.

Data gathered from WSNs is usually numerical data saved in a central base station. The Open Geospatial Consortium (OGC) is specifying standards for interoperability interfaces and metadata encodings that enable real time integration of heterogeneous sensor webs into the Internet, allowing any individual to monitor or control Wireless Sensor Networks through a Web Browser. There are many different techniques for retrieving data from all of the nodes. Information fusion filters, aggregates, and creates interfaces with all of the gathered data.

Source: http://en.wikipedia.org/wiki/Wireless_sensor_network