

Bahan Ajar



Materi Pembelajaran

Matakuliah :

WIRELESS SENSOR NETWORKS

Kode Matakuliah : SKO 20428

Prodi : SISTEM KOMPUTER

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Operating System For WSN

A WSN is generally composed of a centralized station (sink) and tens, hundreds, or perhaps thousands of tiny sensor nodes.

The information is often unidirectional flow from the sensor nodes to the sink.

Therefore, WSNs are a special type of distributed network system that is similar to database, real-time, and embedded systems.

Operating System For WSN

Each sensor node needs an operating system (OS) that can control the hardware, provide hardware abstraction to application software, and fill in the gap between applications and the underlying hardware.

The traditional OS is system software that operates between application software and hardware and is often designed for workstations and PCs with plenty of resources. This is usually not the case with sensor nodes in WSNs. There are also embedded operating systems.

Operating System Design Issue

The first issue is **process management** and scheduling.

The second issue is **memory management**.

The third issue is the **kernel model**.

The fourth issue is the **application program interface (API)**.

The fifth issue is code **upgrade and reprogramming**.

Operating System Design Issue

Finally, because sensor nodes generally have no external disk, the operating system for WSNs cannot have a file system.

These issues should be considered carefully in the design of WSN OSs and to meet their constrained resources, network behavior, and data-centric application requirements.

Operating System Design Issue

Sensor operating systems (SOS) should embody the following functions, bearing in mind the limited resource of sensor nodes:

1. Should be compact and small in size since the sensor nodes have very small memory. The sensor nodes often have memories of only tens or hundreds of kilobytes.

Operating System Design Issue

2. Should provide real-time support, since there are real-time applications, especially when actuators are involved.

The information received may become outdated rather quickly. Therefore, information should be collected and reported as quickly as possible.



Operating System Design Issue

3. Should provide efficient resource management mechanisms in order to allocate microprocessor time and limited memory.
4. Should support reliable and efficient code distribution since the functionality performed by the sensor nodes may need to be changed after deployment.

Operating System Design Issue

5. Should support power management, which helps to extend the system lifetime and improve its performance.
6. Should provide a generic programming interface up to sensor middleware or application software.



Example Operating System for WSN

1. TinyOS
2. Mate
3. MagnetOS
4. MANTIS
5. OSPM (or dynamic power management, DPM)
6. EYES OS
7. SenOS
8. EMERALDS
9. PicOS

Tugas Mandiri (teori):

1. Apa fungsi operating system pada WSN? Jelaskan.
2. Kategori apa saja yang harus ada dalam operating system pada WSN? Jelaskan.

Tugas Mandiri (praktikum):

Rancang komunikasi antar node menggunakan fungsi operating system di Network Simulator.

end

