Bahan Ajar

Chapter 13

Materi Pembelajaran

Matakuliah :

WIRELESS SENSOR NETWORKS

Kode Matakuliah : SKO 20428

Prodi : SISTEM KOMPUTER

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Middleware for WSN

Middleware is usually below the application level and on top of the operating systems and network protocols.

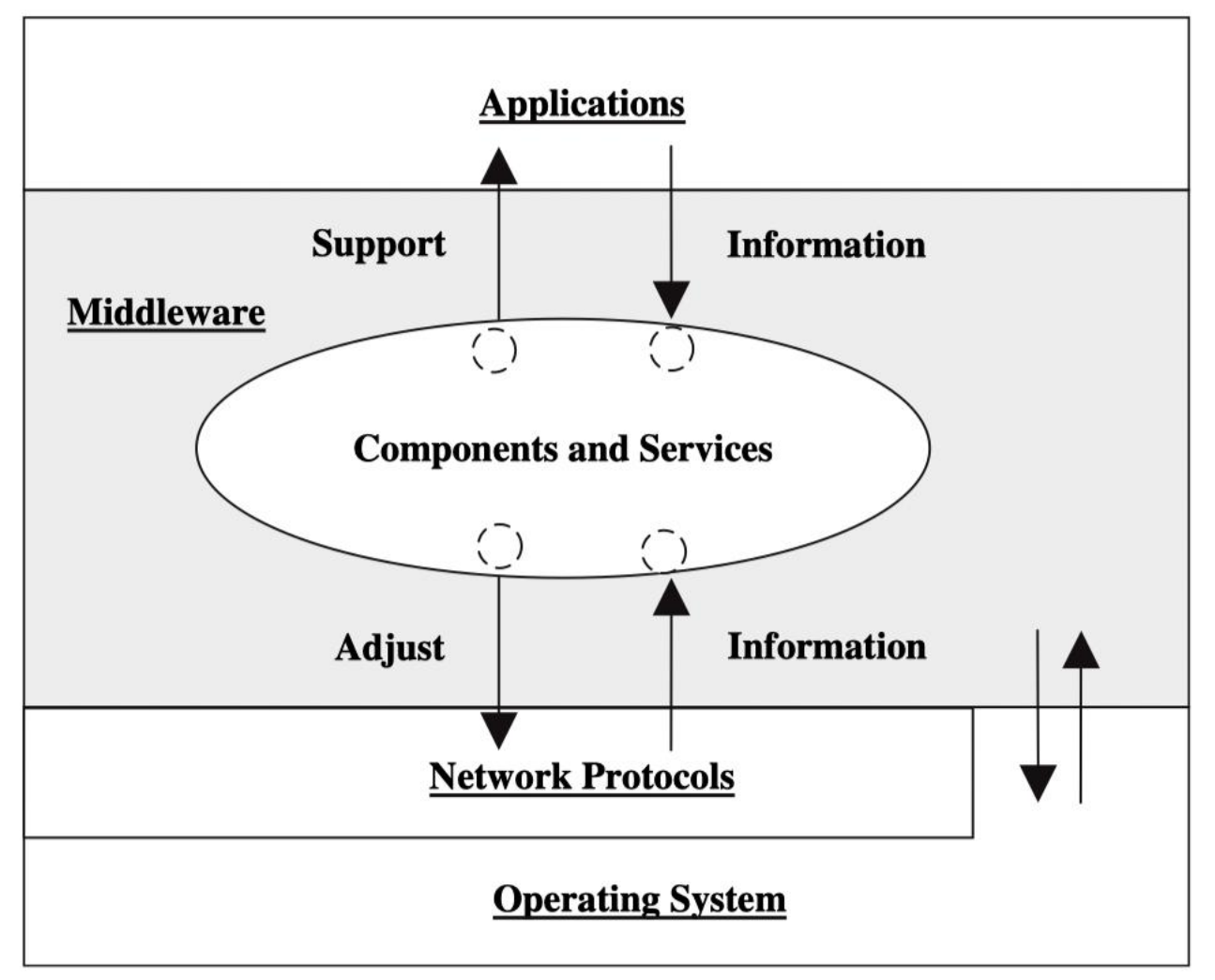
WSNs have special requirements in this area since they are very different from traditional networks and/or distributed computing systems.

Middleware for WSN

The basic middleware functions for WSNs are as follows:

1. System services to diverse applications.
2. An environment that coordinates and supports multiple applications.
3. Mechanisms to achieve adaptive and efficient utilization of system resources.
4. Efficient trade-offs between the multiple QoS dimensions; this can be used to adjust and optimize the required network resources.

Middleware ARCHITECTURE



Middleware ARCHITECTURE

Since WSN is a data-centric device, middleware would contain data management functions such as data dissemination, data compression, and data storage. For completeness, a brief overview of these functions is given.

Middleware ARCHITECTURE

- Data Dissemination

Data dissemination protocols consist of at least two phases:

1. The initial phase of triggering data transmission, often initiated by the sink, by sending out a query to inform sensor nodes of its intent.
2. The data transmission phase; sensor nodes report data to the sink. Data dissemination protocols need to indicate whether the data are to be transmitted in broadcast or unicast mode.

Middleware ARCHITECTURE

- Data Compression

Communication components consume most of the energy in WSNs. Computation uses less.

- Data Storage

Sensor nodes collect data related to the sensed events. Data need to be stored, usually for future use.

Middleware ARCHITECTURE

Several data storage schemes have been proposed in the literature:

1. External storage (ES).
2. Local storage (LS).
3. Data-centric storage
4. Provenance-aware data storage (PADS)
5. Multiresolution storage (MRS)

Another Existing Middleware

1. MiLAN (Middleware Linking Applications and Networks).
2. IrisNet (Internet-Scale Resource-Intensive Sensor Networks Services)
3. AMF (Adaptive Middleware Framework)
4. DSWare (Data Service Middleware)
5. CLMF (Cluster-Based Lightweight Middleware Framework)
6. MSM (Middleware Service for Monitoring)
7. DDS (Device Database System)
8. SensorWare

Tugas Mandiri (teori):

1. Apa fungsi utama midleware pada WSN? Jelaskan.
2. Bagaimana cara mengatasi kebutuhan sensor dengan kecepatan data yang tinggi, pemrosesan yang kompleks, dan QoS yang ketat.

Tugas Mandiri (praktikum):

Rancang komunikasi antar node menggunakan fungsi midleware Network Simulator.

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