

# MODERN OPERATING SYSTEMS

Third Edition  
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## Chapter 12

### Case Study 3: Symbian OS

# The History of Symbian OS

- Symbian OS Roots
  - Psion and EPOC
- Symbian OS Version 6
- Symbian OS Version 7
- Symbian OS Today

# An Overview of Symbian OS

- Object Orientation
- Microkernel Design
- The Symbian OS Nanokernel
- Client/Server Resource Access
- Features of a Larger Operating System
- Communication and Multimedia

# Client/Server Resource Access

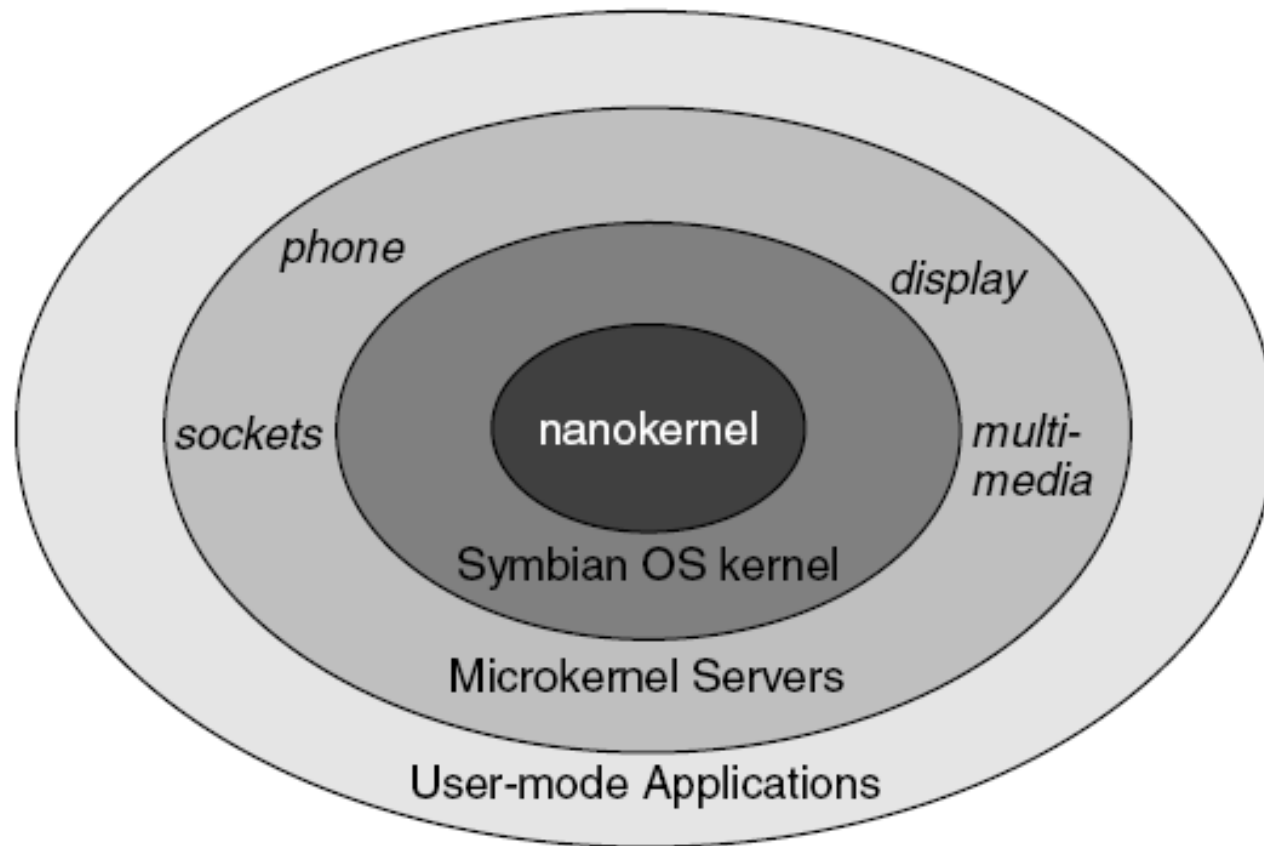


Figure 12-1. The Symbian OS kernel structure has many layers.

# Features of a Larger Operating System

- Processes and threads
- Common file system support
- Networking
- Memory management

# Processes And Threads in Symbian OS

- Threads and Nanothreads
- Processes
- Active Objects
- Interprocess Communication

# Threads and Nanothreads

Nanothreads can be in the following states:

1. Suspended
2. Fast semaphore wait
3. DFC wait
4. Sleep
5. Other

# Systems with No Virtual Memory

Memory management consists of the following tasks:

1. Management of application size
2. Heap management
3. Execution in-place
4. Loading DLLs
5. Offload memory management to hardware



# How Symbian OS Addresses Memory

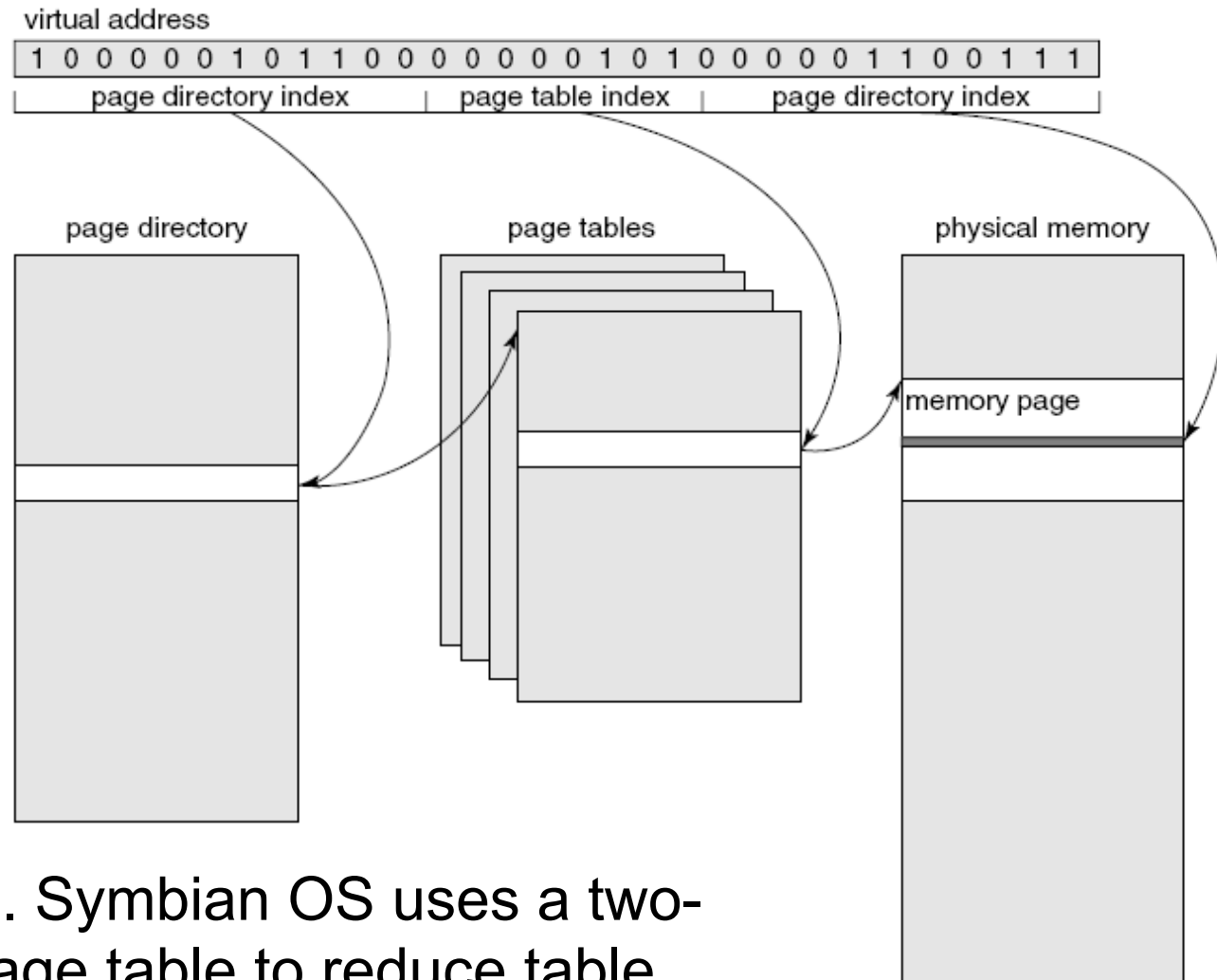


Figure 12-2. Symbian OS uses a two-level page table to reduce table access time and storage.

# Memory Implementation

Versions of memory implementation:

1. The moving model
2. The multiple model
3. The direct model
4. The emulator model

# Input and Output

- Device Drivers
- Kernel Extensions
- Direct Memory Access
- Special Case: Storage Media
- Blocking I/O
- Removable Media

# Removable Media

Features common to removable media:

1. All devices must be inserted and removed.
2. All removable media can be removed ‘ ‘hot,’ ’ that is, while being used.
3. Each medium can report its capabilities.
4. Incompatible cards must be rejected.
5. Each card needs power.

# Storage Systems

- File Systems for Mobile Devices
- Symbian OS File Systems
- File System Security and Protection

# Security in Symbian OS (1)

Steps when an application requires signing:

1. The software developer must obtain a vendor ID from a trusted third party.
2. When developer has developed software package, wants to distribute, developer must submit package to trusted third party for validation.

. . .

# Security in Symbian OS (2)

3. Trusted third party then verifies that list of software access types is complete and no other type of access occurs.
4. Installation package sent back to the software developer and may now be distributed to users.

# Security in Symbian OS (3)

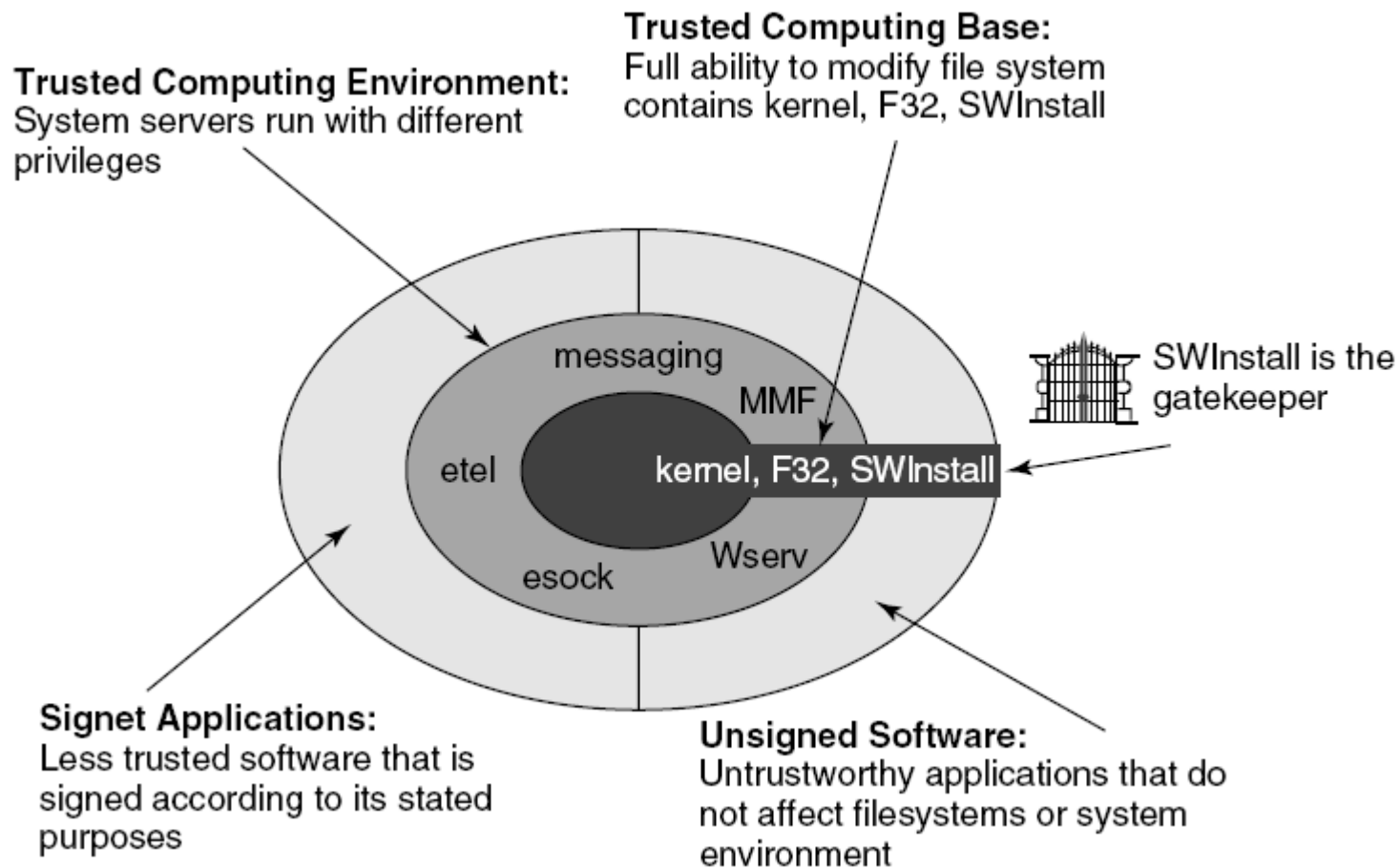
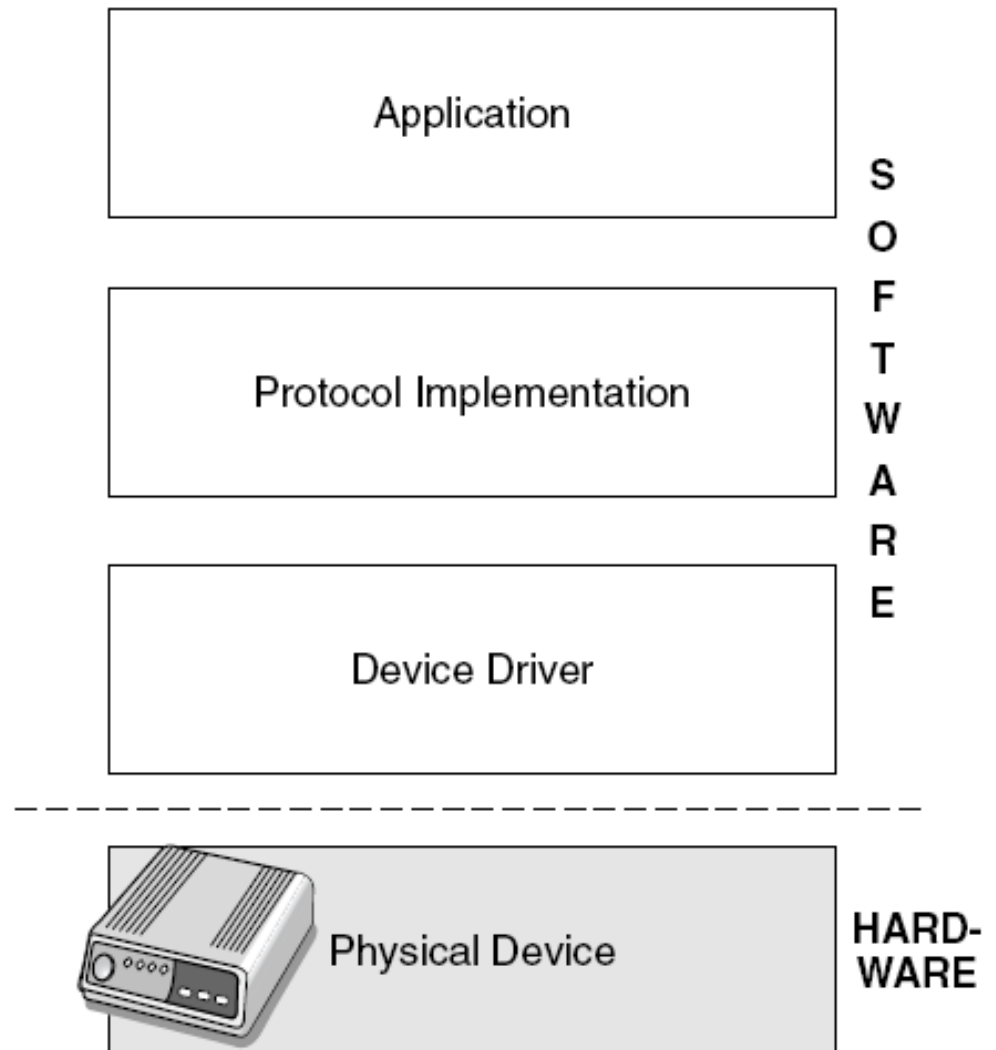


Figure 12-3. Symbian OS uses trust relationships to implement security.



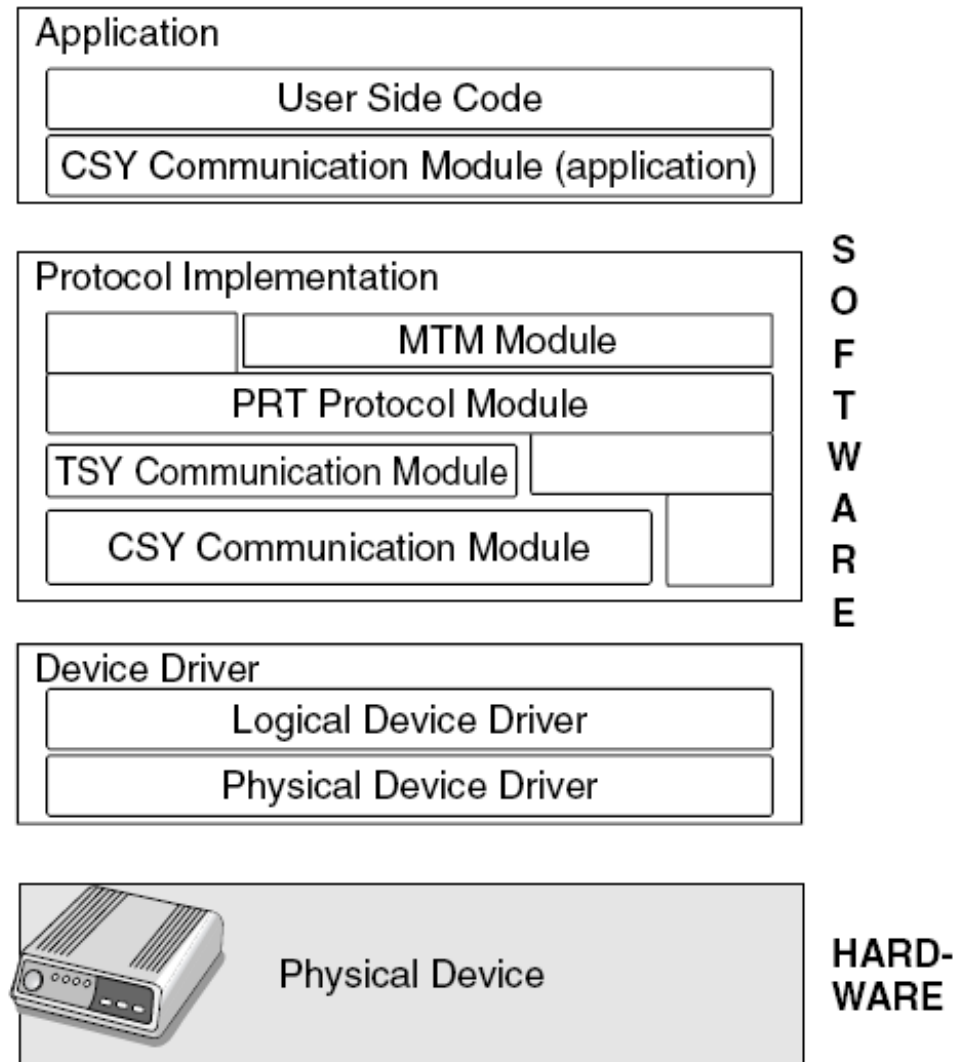
# Communication in Symbian OS

Figure 12-4.  
Communication in  
Symbian OS  
has block oriented  
structure.



# Infrastructure – The Physical Device

Figure 12-5. Communication structure in Symbian OS has a rich set of features.



# The Protocol Implementation Layer

- CSY Modules
- TSY Modules
- PRT Modules
- MTMs