# Helen OS

Operating Systems Seminar

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# Introduction

- What is HelenOS?
  - open source general-purpose multiplatform POSIX-similar microkernel multiserver operating system designed from scratch
  - It is being developed by faculties, researchers, students of Charles University
  - Written in C + 13 other languages
  - Runs on 7 different processors ranging from
    - » 32-bit uni-processor little-endian ARMv4
    - » A commodity PC with x86
    - » x86-64 processor to a
    - » 64-bit multi-core big-endian UltraSPARC T1

# Spartan

- HelenOS is based on Spartan kernel which provides:
- Gives it a very solid and well developed base to build on
- Supports multi tasking
- Virtual memory
- Symmetric multiprocessing

# Technical overview

**Micro-Kernel**
- Multi tasking
- Memory management
- Inter-process communication

**Threads**
- Kernel based threads
- Supports symmetric multiprocessing
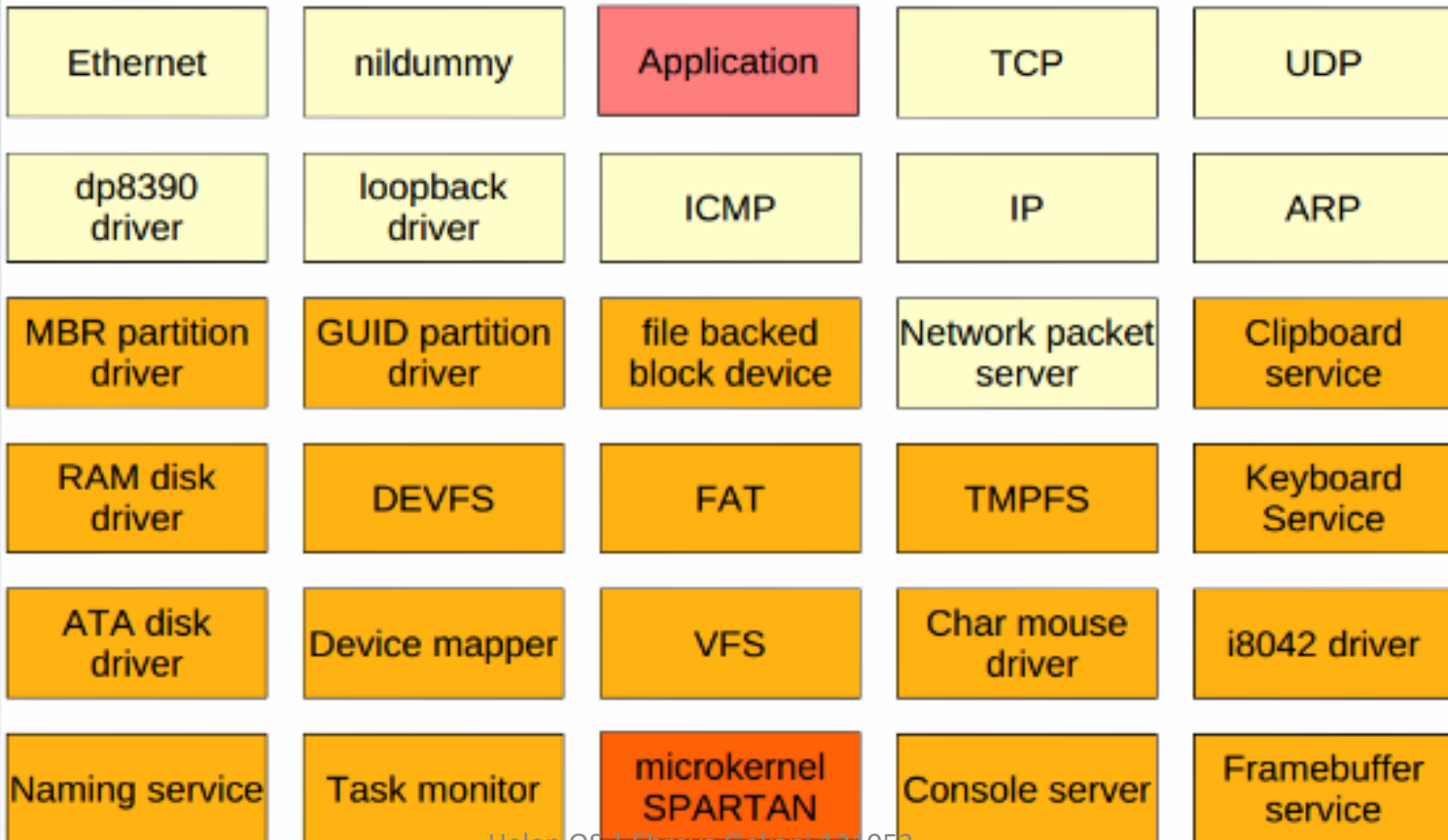- Threads are preemptively scheduled by the kernel

**System services**
- Device, file system drivers and other system services are implemented by a collection of user space task, creating multi-server nature of HelenOS

**Communication**
- Tasks communicate via HelenOS IPC
  - Connection oriented
  - Asynchronous
  - Can be used to send small fixed sized messages blocks of bytes or to negotiate sharing of main memory
- Communicating with self, peers and peers forward the call to third party

# Architecture

## Simplified HelenOS Architecture

| Ethernet | nildummy | Application | TCP | UDP |
|----------|----------|-------------|-----|-----|
| dp8390 driver | loopback driver | ICMP | IP | ARP |
| MBR partition driver | GUID partition driver | file backed block device | Network packet server | Clipboard service |
| RAM disk driver | DEVFS | FAT | TMPFS | Keyboard Service |
| ATA disk driver | Device mapper | VFS | Char mouse driver | i8042 driver |
| Naming service | Task monitor | microkernel SPARTAN | Console server | Framebuffer service |

# Services

- Command line which allows manipulating files, running applications, mounting file from disks, and disk images
- Can play Tetris or edit text files
- Supports multinational text throughout using Unicode
- Provides services such as device drivers, file systems, networking and user interface
- Most services are composed of multiple independent server processes, modular operating systems

# Future

- To become a complete and usable modern application
- Offering room for experimenting and research

# References

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