Windows NT

1988 Mission - design new OS for the future…

New Technologies: MicroKernel and Objects

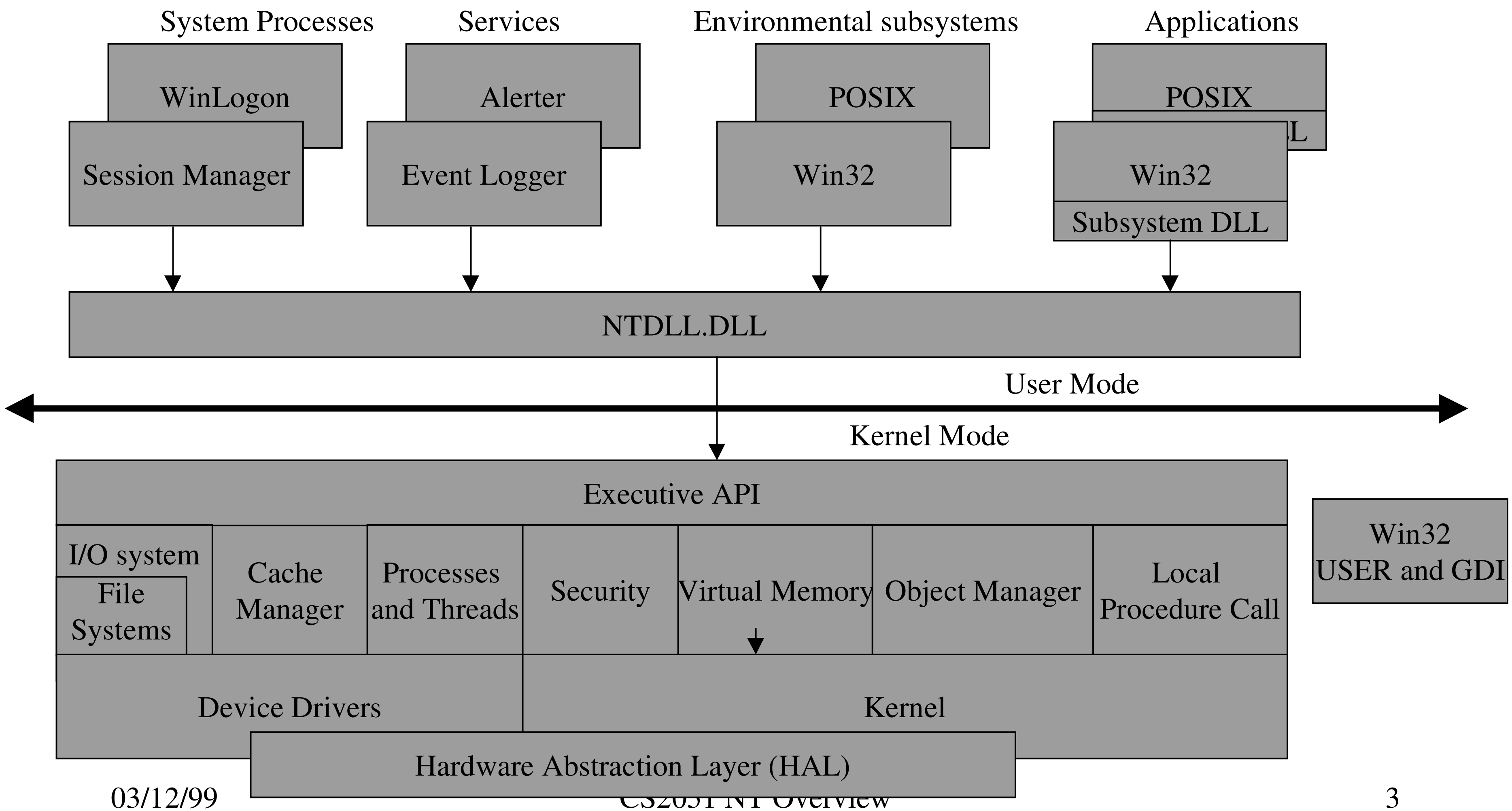
Goals:

- Portable (MIPS, 386, PPC, Pentium, Alpha)
- Scalable (16Mb laptops - 16GB SMP servers)
- Distributed
- Compatible (Win16, POSIX, OS/2)
- 32-bit
- Secure, Reliable

NT Models

- Client/Server
  - Highly structured
  - Strong Internal Interfaces
- Object Model
  - Uniform resource tracking, protection, sharing
  - For memory, files, processes, etc.
- Symmetric multiprocessing

Structure and Applications operation



NT Components: Kernel

- Small, fast, portable
- Resident, non-paged
- Kernel threads non-preempted
- Implements: *mechanisms*, no *policies*
  - Thread Scheduling and Dispatch
  - Trap handling and exception dispatching
  - Interrupt handling and dispatching
  - Multiprocessor synchronization
  - Kernel Object Support
- HAL - Hardware Abstraction Layer

Executive

- Process+Thread manager
- Virtual Memory Manager
- Security Reference Manager
  - enforces policies, checks object accesses, auditing
- I/O system - device independent
- Cache Manager
  - provides memory cache for disk activity
- Local Procedure Call
- Win32 Subsys
- Object Manager

Object Manager

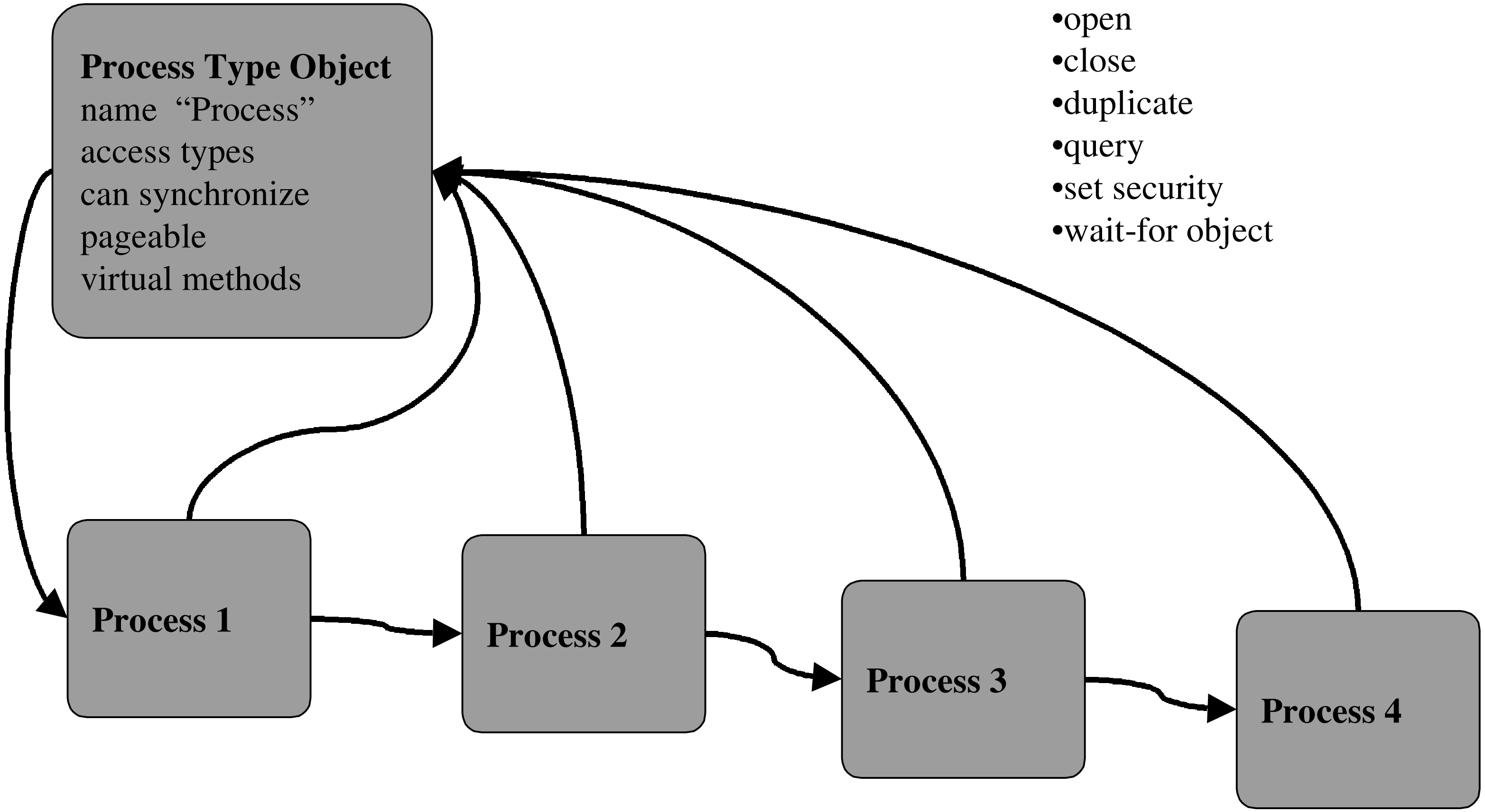
- Objects are used to describe:
  - Process (including address space and resources)
  - Thread (PC, registers, state, etc.)
  - Memory section (segment?)
  - File
  - Port (for local communication)
  - Event
  - Semaphore
  - Timer
  - (etc)

Read:

- Inside Windows NT by David A. Solomon
- Showstopper! The Breakneck Race to Create Windows NT by G.Paschal Zachary

(e.g.) Process Objects

Object generic methods:
- create
- open
- close
- duplicate
- query
- set security
- wait-for object



Device Drivers