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What's New in the Nanokernel

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Mac OS Core Engineering

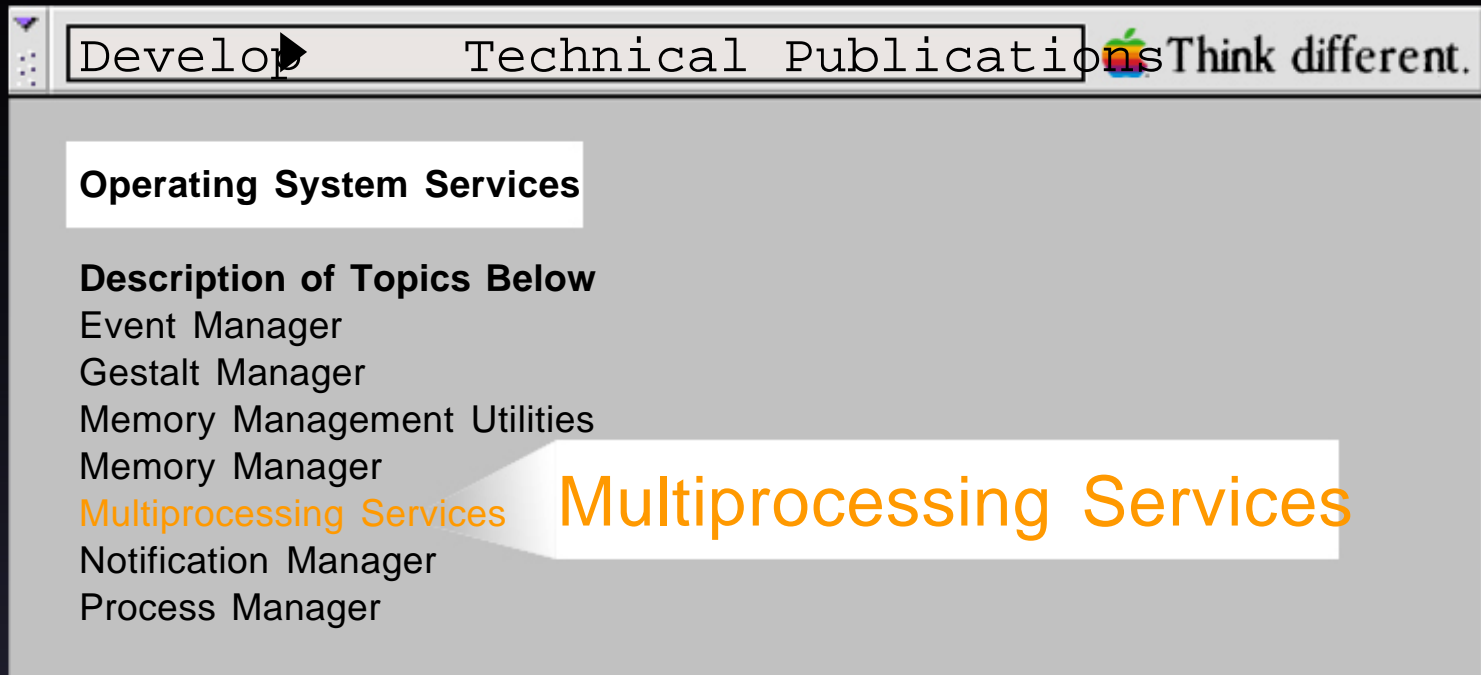
Agenda

- Multitasking basics
- Tasks and address spaces
- Shared resources and task synchronization
- Tasking architectures
- The Mac OS 8.6 Nanokernel
- What's coming next
- Demo and Q&A



Online Documentation

<http://developer.apple.com/techpubs/macos8>



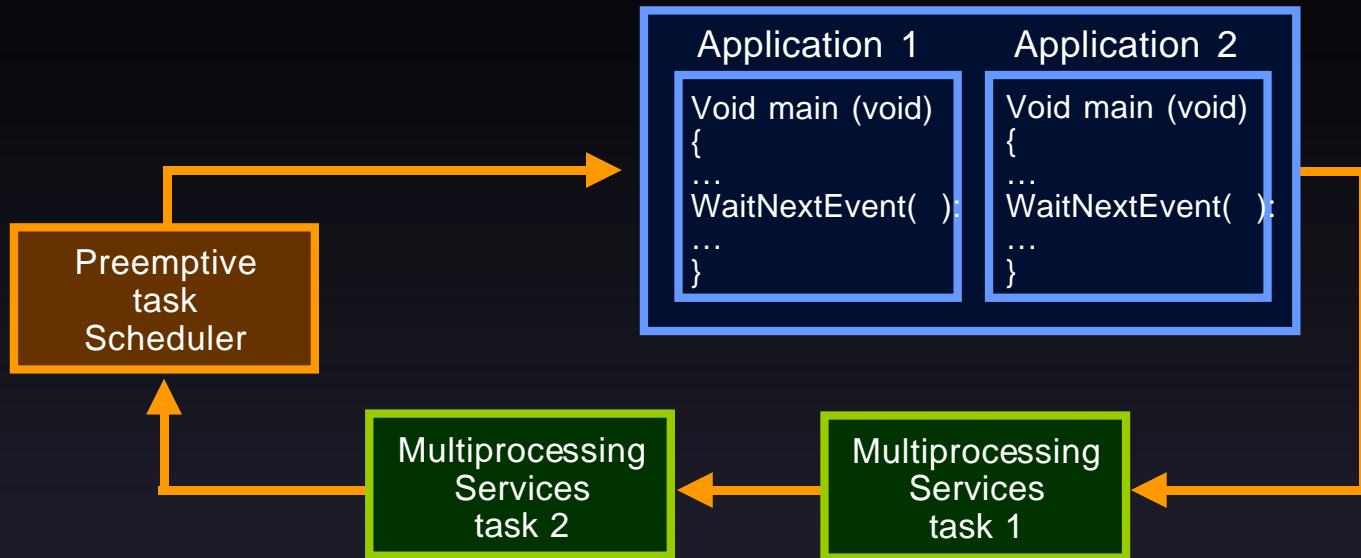
Multitasking Basics

- In Mac OS 8.6, a task is an independent execution path
- Multiprocessing is integrated, a general case of multitasking
- Both Cooperative and Preemptive multitasking models are supported

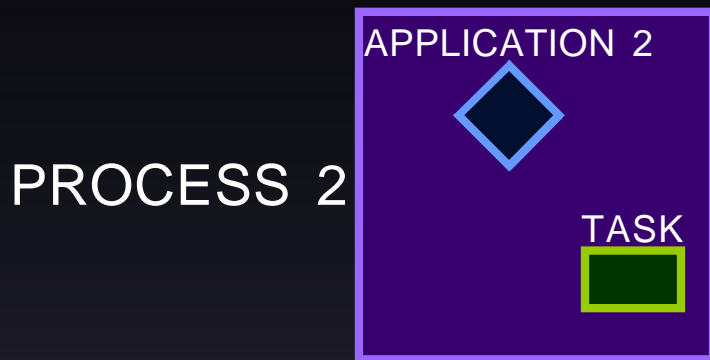
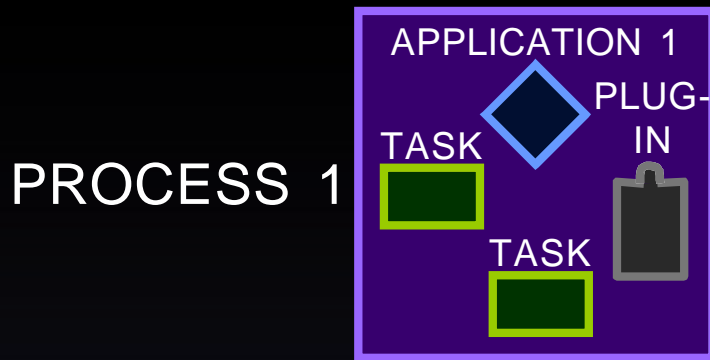


Task Models

- Cooperatively multitasked programs occupy a single preemptive task
- Scheduled with other preemptive tasks



Tasks and Address Spaces



- Application context assigned at launch
- MP tasks are associated with parent task's process
- Do not assume all processes share the same address space



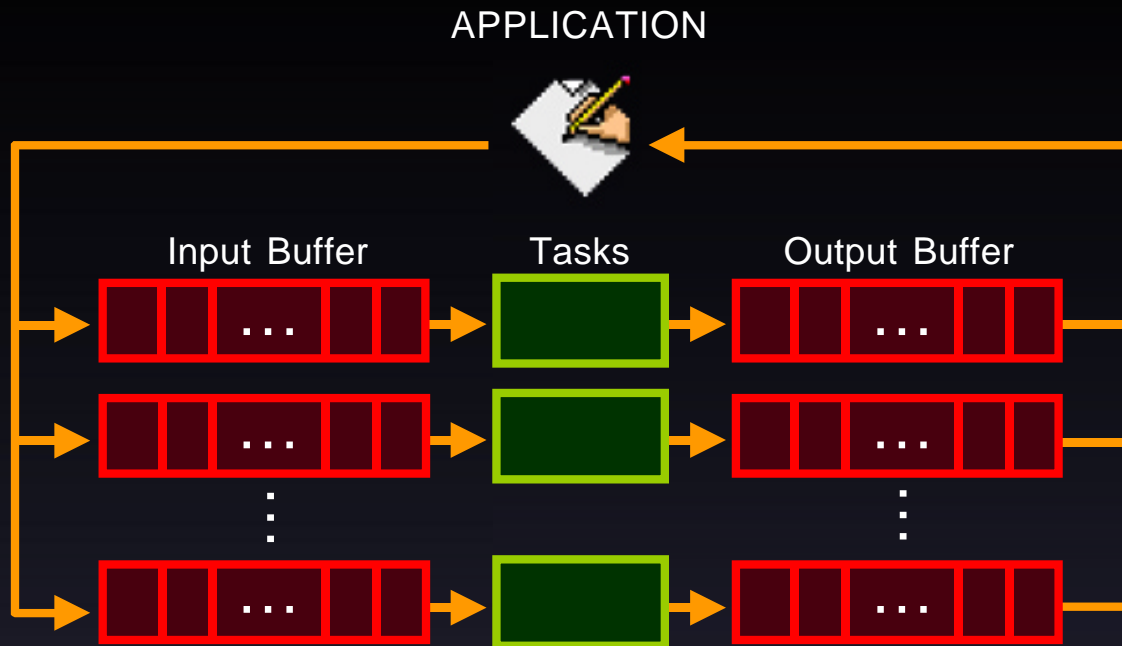
Shared Resources and Synchronization

- Several mechanisms exist to coordinate and synchronize tasks
 - Semaphores
 - Message Queues
 - Event Groups (new)
- Critical regions
 - Can handle recursive entries and multiple entry points



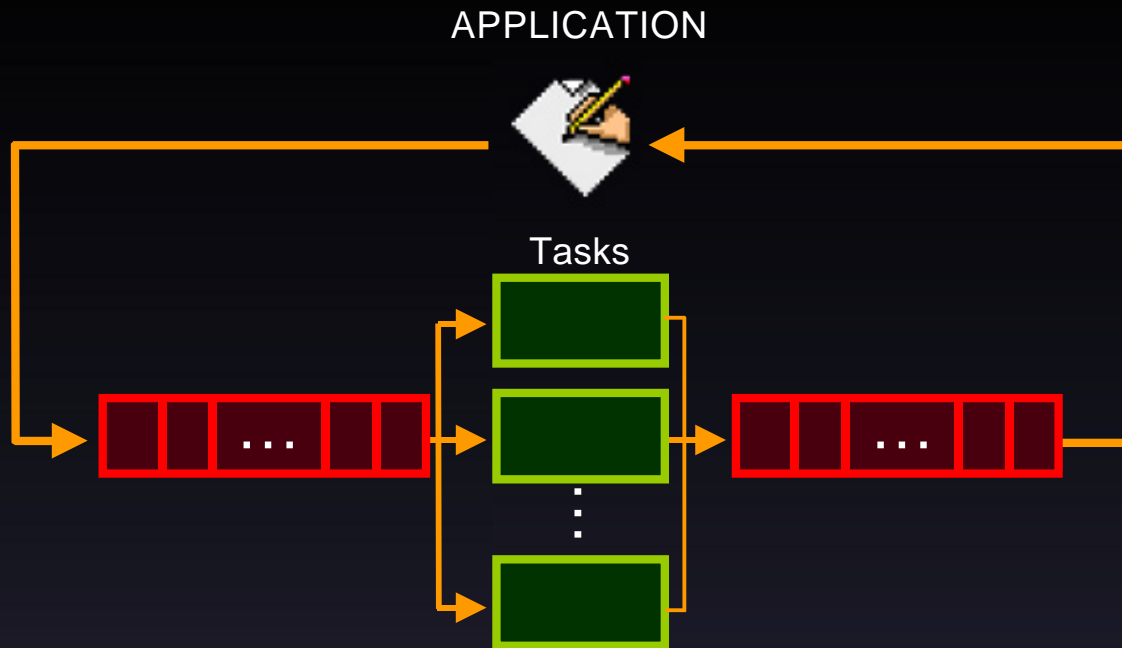
Tasking Architectures

Parallel Tasks with Parallel I/O Buffers



Tasking Architectures

Parallel Tasks with Single Set of I/O Buffers



Application Architectures

- Many applications have parallel and independent execution paths
- Examples:
 - Adobe Photoshop
 - A word processor



Mac OS 8.6 Nanokernel

- MP Library runs with VM enabled
- Existing MP apps run unchanged*
- Reduced RAM footprint
 - from 2MB+ down to 100K
- API is fully supported in Carbon

* Your mileage may vary, void where prohibited, no user serviceable parts inside.



Mac OS 8.6 Nanokernel

- Advanced Power Management support



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