Standby thread state in the Windows NT family*

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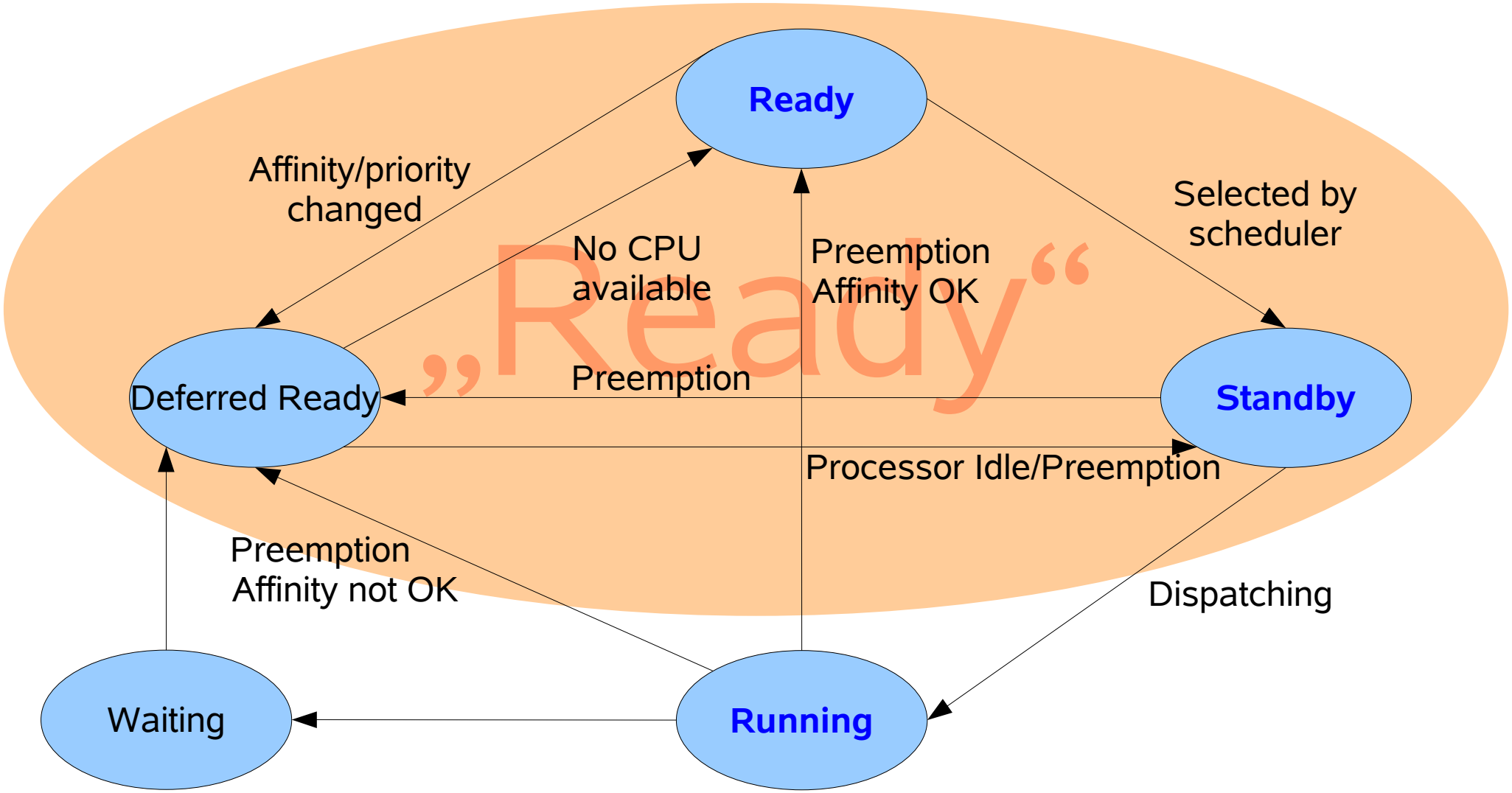
*NT 4, Windows 2000, XP, Vista. The implementations differ and specific documentation is hardly available.

Thread states overview (simplified)



Thread states (1)

- Per processor states:
  - **Ready**
  - **Standby**
  - **Running**
- Global states:
  - Deferred Ready
  - Waiting

Thread states (2)

- „Classic States“:
  - „Ready“: able to run
  - Running: current thread running on a processor
  - Waiting: blocked, waiting for an event
- Ready is split into:
  - DeferredReady: queued on any Processor
  - Standby: will be imminently start running
  - Ready: queued on target processor by priority

see [1]

Scheduling for another CPU

- High priority thread T1 on CPU A exits critical section
- Low priority thread T2 waits for CS
- CPU A can schedule T2 to another CPU B
  - A sets T2 as standby on CPU B
  - A sends interprocessor interrupt to B
  - B dispatches T2
- B does not need to decide again which thread to run next => Scalability

Locking

- local Ready queue will be used mainly, the global Deferred Ready only occasionally
- propability of one processor blocking the others on a SMP system when accessing global data structures is reduced

Literature

- [1] David B. Probert, Ph.D., *Windows Kernel Internals: Thread Scheduling*
  - http://www.i.u-tokyo.ac.jp/edu/training/ss/lecture/new-documents/Lectures/03-ThreadScheduling/
- [2] John Regehr, *Using Hierarchical Scheduling to Support Soft Real-Time Applications on General-Purpose Operating Systems*, Ch. 9
  - http://www.cs.utah.edu/~regehr/papers/diss/