Programación Distribuida y Tiempo Real

- SOD, SOR, Middleware
- Procesos

SD <==> Aplicaciones de Usuario

- “Programación Distribuida…”
- “Software de soporte”: Tanenbaum 1ed.
- SOD, SOR, Middleware (Tan-chap-01.ppt, p.12)
  - SOD (Tan-chap-01.ppt, pp. 16, 19)
  - SOR (Tan-chap-01.ppt, pp. 21, 22)
  - Middleware (Tan-chap-01.ppt, p. 24)
- SOD: el sistema distribuido como si fuera centralizado
- SOR: cada Sist. Op. “extendido” para el SD
- Middleware: “a mitad de camino”

Middleware

- Ejemplo de “algo de moda”

1. Client/Server Survival Guide, Third Edition, Robert Orfali, Dan Harkey, Jeri Edwards, ISBN: 0471316156, John Wiley & Sons, 1999: Mid.dle.ware: 1) a hodgepodge of software technologies; 2) a buzzword; 3) a key to developing client/server applications.
2. Information Week: Middleware is now everywhere and everything, so pervasive that it has passed into the realm of the non-entity.
3. Clara H. Parkes, Editor, DBMS Magazine, (May, 1998): So what exactly is middleware? First, it's a large software market that generated $1.7 billion in 1997. According to IDC, this market will grow to $7 billion in 2002—a 408% increase (Source: IDC, Middleware: 1998 Worldwide Markets and Trends, May, 1998). Now, the hard part. Middleware is a vague term that covers all the distributed software needed to support interactions between clients and servers. Think of it as the software that's in the middle of the client/server system. In this Survival Guide, we refer to middleware as the slash (/) component of client/server. In this first approximation, middleware is the glue that lets a client obtain a service from a server.
   Where does middleware start, and where does it end? It starts with the API set on the client side that is used to invoke a service, and it covers the transmission of the request over the network and the resulting response. Middleware does not include the software that provides the actual service—that's in the server's application's domain; nor does it include the database. On the client side, middleware does not include the user interface—that's in the client's application domain.

SOD-SOR-Middleware

- Resumen:

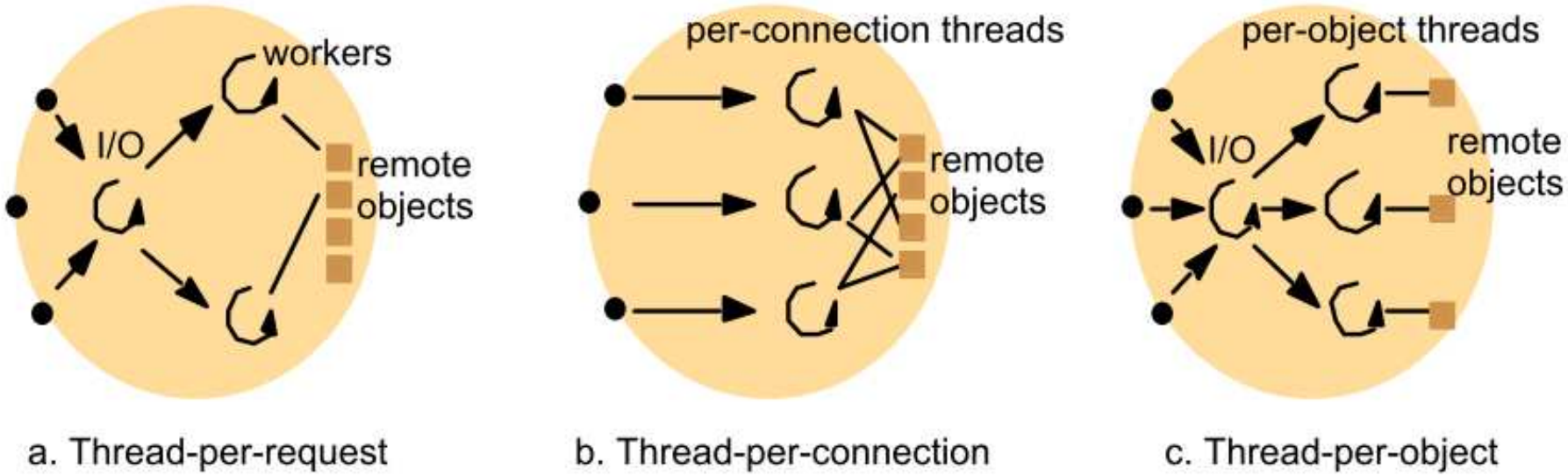
Item	Distributed OS		Network OS	Middleware-based OS
	Multiproc.	Multicomp.		
Degree of transparency	Very High	High	Low	High
Same OS on all nodes	Yes	Yes	No	No
Number of copies of OS	1	N	N	N
Basis for communication	Shared memory	Messages	Files	Model specific
Resource management	Global, central	Global, distributed	Per node	Per node
Scalability	No	Moderately	Yes	Varies
Openness	Closed	Closed	Open	Open

SD <==> Aplicaciones de Usuario

- Aplicaciones de usuario <==> Procesos
- Procesos e hilos (*threads*)
    - Característica general: concurrencia y simultaneidad
    - ¿Tiene sentido tener hilos en el servidor?
    - ¿Tiene sentido tener hilos en el cliente?
- Soporte del SO (Coulouris, cap. 6)
- Procesos, hilos y migración (Tanenbaum, cap. 3)

SD <==> Aplicaciones de Usuario

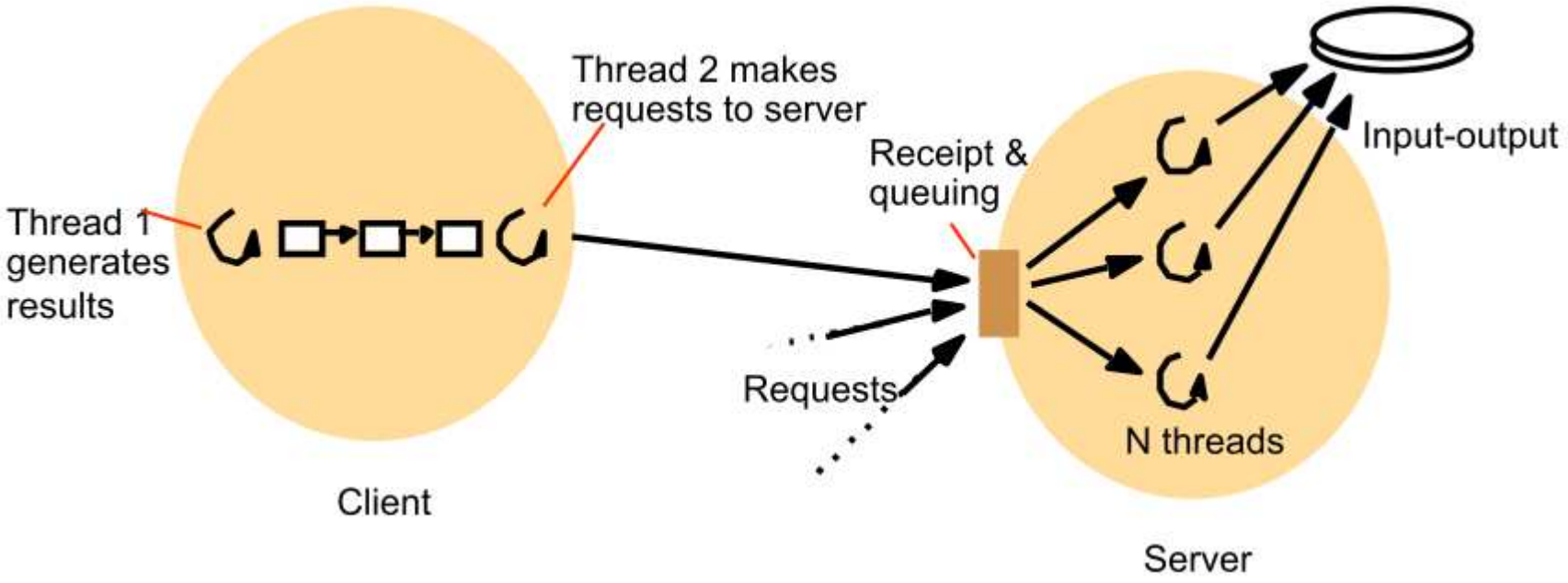
- Alternativas de hilos en un servidor (Coulouris)



a. Thread-per-request b. Thread-per-connection c. Thread-per-object

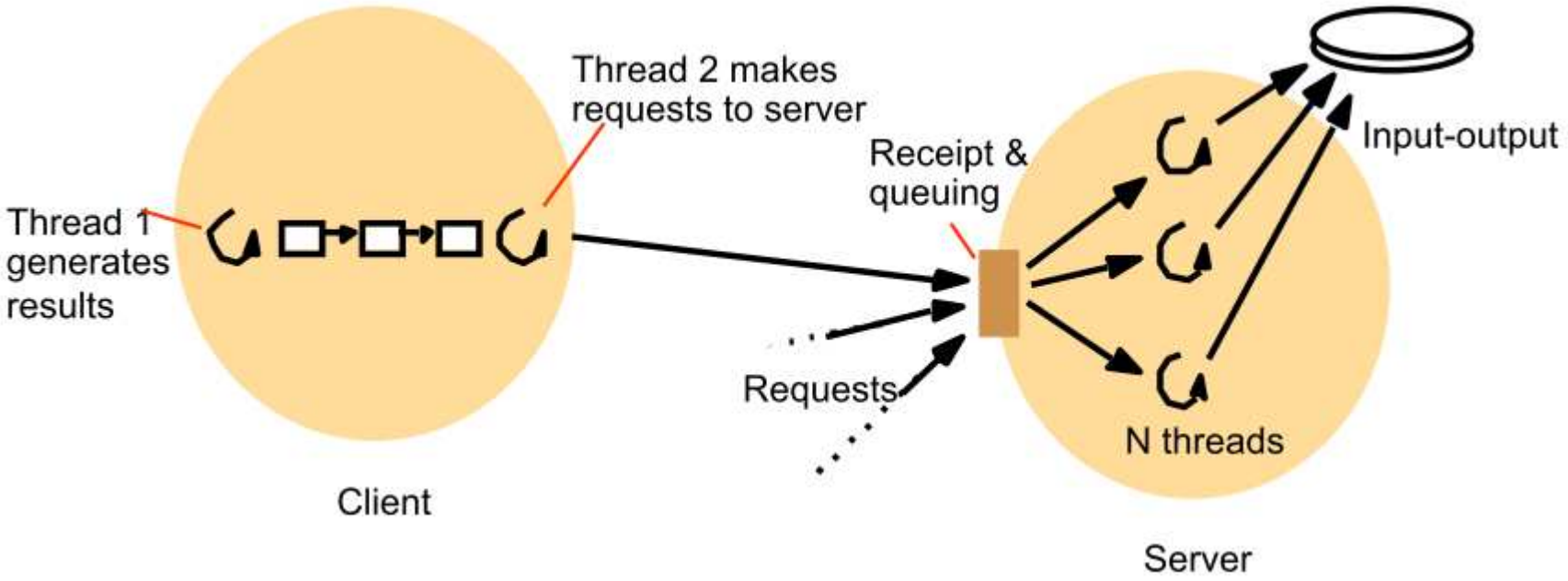
SD <==> Aplicaciones de Usuario

- Cliente y servidor con hilos (Coulouris)



SD <==> Aplicaciones de Usuario

- Cliente y servidor con hilos (Coulouris)



Otro ejemplo de hilos en el cliente: para requerimientos de diferentes servidores

“Emparchar” Aplicaciones

Observation: Many distributed systems are needlessly complex caused by mistakes that required patching later on. There are many false assumptions:

- The network is reliable
- The network is secure
- The network is homogeneous
- The topology does not change
- Latency is zero
- Bandwidth is infinite
- Transport cost is zero
- There is one administrator

(Van Steen)

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Dudas/Consultas

- Plataforma Ideas