Sistemas Distribuidos

Jueves, 19 de enero

- Virtualización de redes
- Comunicación indirecta

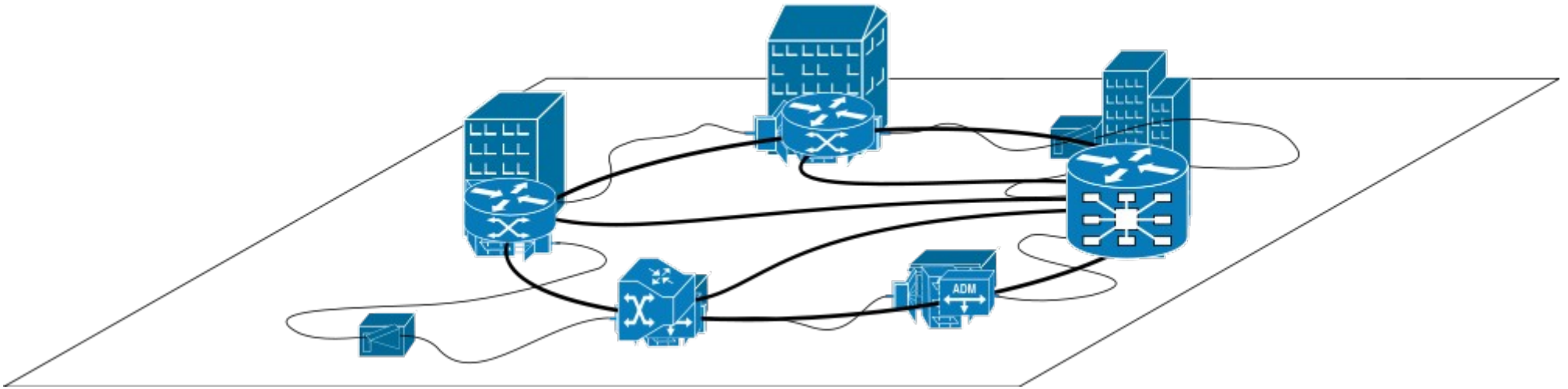
Quiz # 2

- Según el artículo “Virtual Machine Monitors: Current Technology and Future Trends”, ¿cuáles son los **principales desafíos** que presenta la **implementación de hipervisores** (VMMs)? Tenga en cuenta los aspectos relacionados con:
  - las **CPU**s,
  - la **memoria** y
  - el **sistema de E/S**.

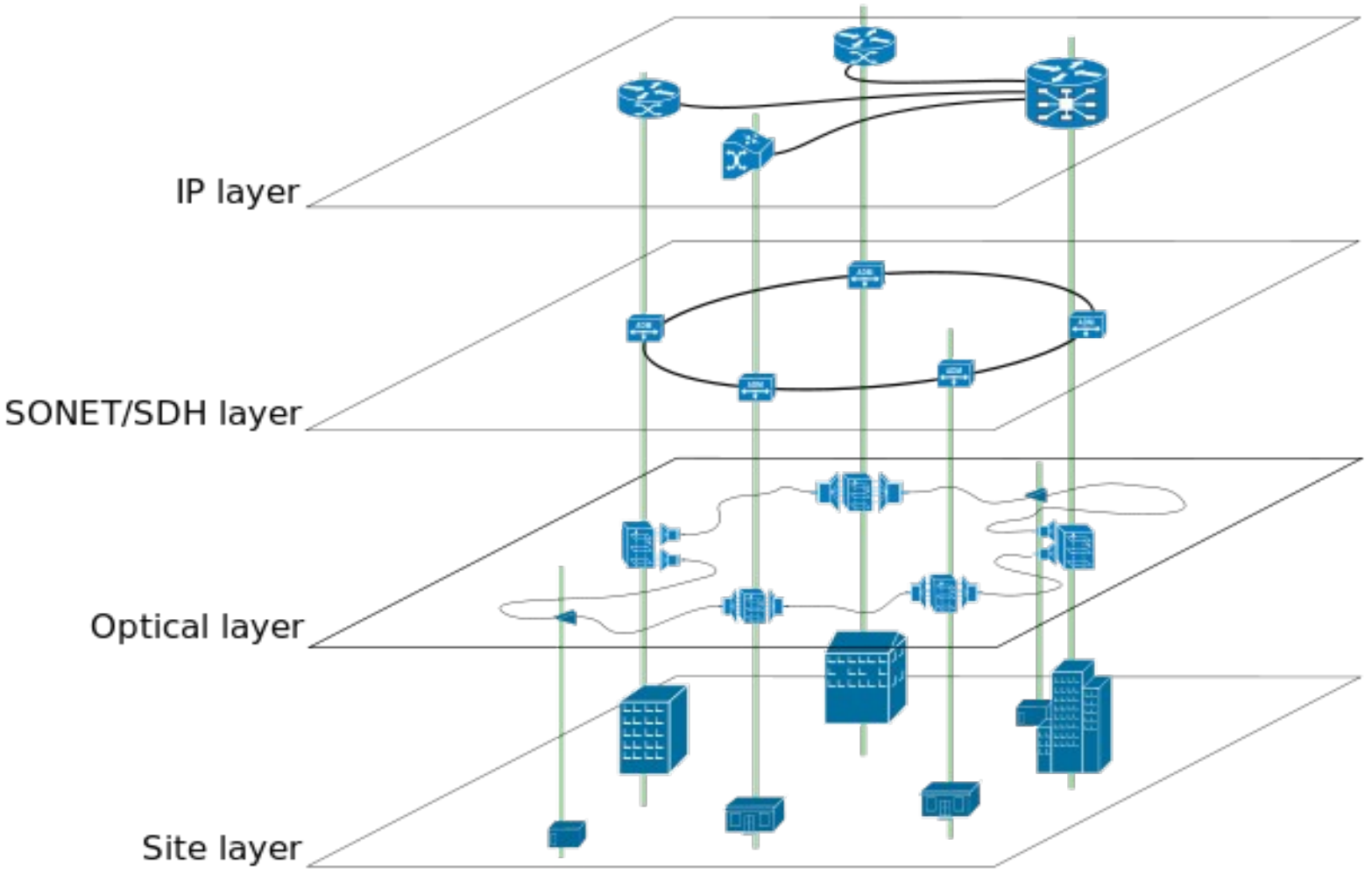
Virtualización de redes

- Redes superpuestas (overlay networks)
- Consiste de:
  - Nodos virtuales
  - Enlaces virtuales
- Provee algo que no ofrece la red subyacente:
  - Un servicio hecho a la medida de una necesidad
  - Una operación más eficiente
  - Una característica adicional, como comunicación segura o multicast

Redes superpuestas



Redes superpuestas



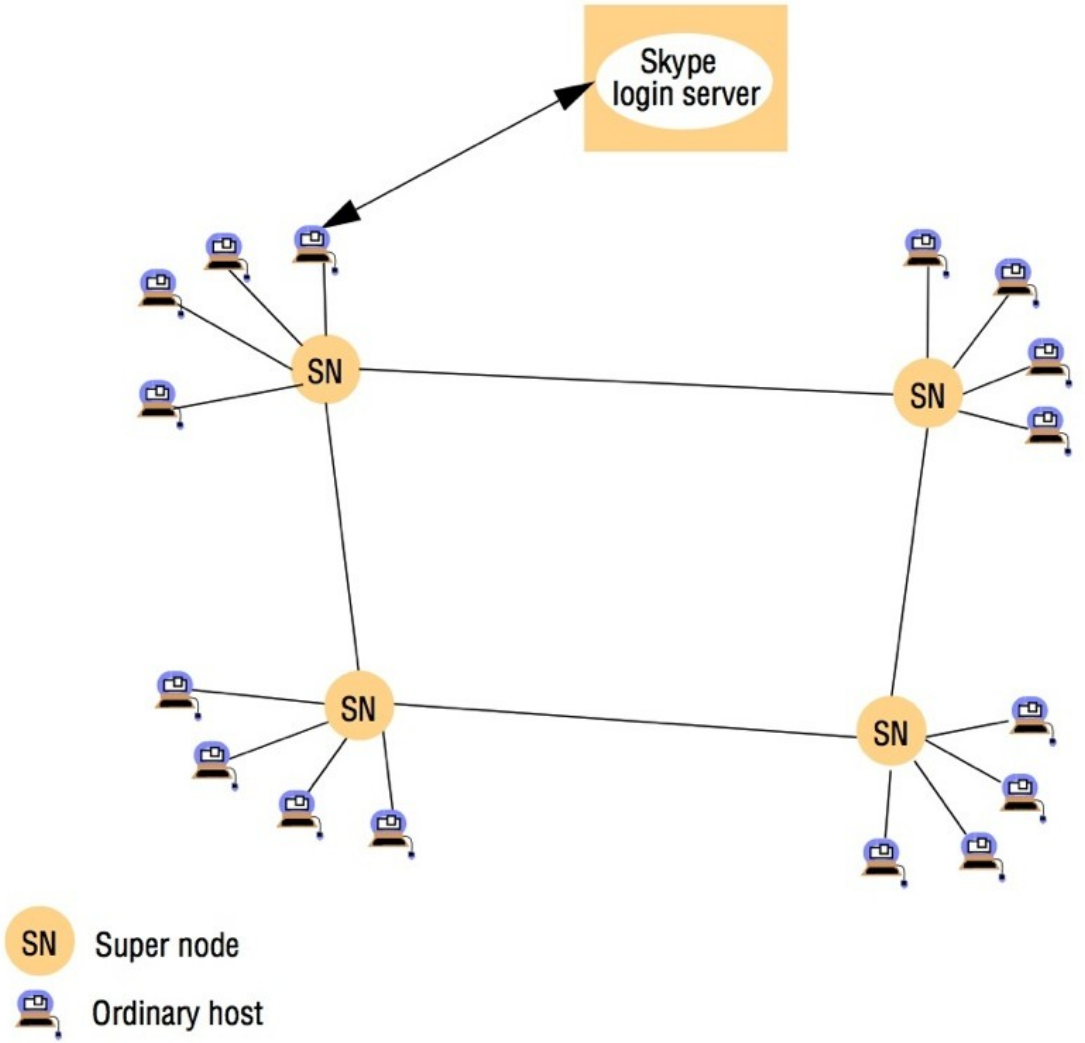
Tipos de redes superpuestas 1

Motivation	*Type*	*Description*
Tailored for application needs	Distributed hash tables	One of the most prominent classes of overlay network, offering a service that manages a mapping from keys to values across a potentially large number of nodes in a completely decentralized manner (similar to a standard hash table but in a networked environment).
	Peer-to-peer file sharing	Overlay structures that focus on constructing tailored addressing and routing mechanisms to support the cooperative discovery and use (for example, download) of files.
	Content distribution networks	Overlays that subsume a range of replication, caching and placement strategies to provide improved performance in terms of content delivery to web users; used for web acceleration and to offer the required real-time performance for video streaming [www.kontiki.com].

Tipos de redes superpuestas 2

Tailored for network style	Wireless ad hoc networks	Network overlays that provide customized routing protocols for wireless ad hoc networks, including proactive schemes that effectively construct a routing topology on top of the underlying nodes and reactive schemes that establish routes on demand typically supported by flooding.
	Disruption-tolerant networks	Overlays designed to operate in hostile environments that suffer significant node or link failure and potentially high delays.
Offering additional features	Multicast	One of the earliest uses of overlay networks in the Internet, providing access to multicast services where multicast routers are not available; builds on the work by Van Jacobsen, Deering and Casner with their implementation of the MBone (or Multicast Backbone) [mbone].
	Resilience	Overlay networks that seek an order of magnitude improvement in robustness and availability of Internet paths [nms.csail.mit.edu].
	Security	Overlay networks that offer enhanced security over the underling IP network, including virtual private networks, for example, as discussed in Section 3.4.8.

Ejemplo: Skype



Comunicación indirecta

- Comunicación entre procesos a través de un intermediario
- No hay acoplamiento entre el que envía y el o los que reciben
- Tampoco hay acoplamiento en el espacio y el tiempo

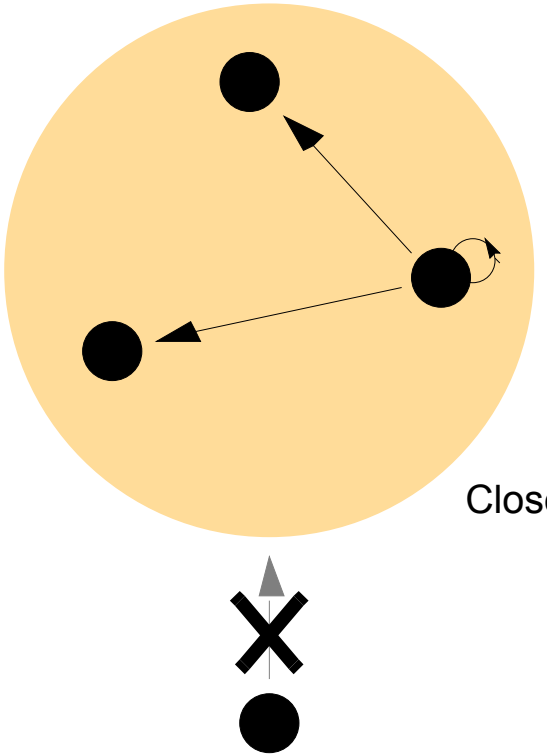
Acoplamiento en espacio y tiempo en SD

	Time-coupled	*Time-uncoupled*
Space coupling	*Properties*: Communication directed towards a given receiver or receivers; receiver(s) must exist at that moment in time *Examples*: Message passing, remote invocation (see Chapters 4 and 5)	*Properties*: Communication directed towards a given receiver or receivers; sender(s) and receiver(s) can have independent lifetimes *Examples*: See Exercise 15.3
Space uncoupling	*Properties*: Sender does not need to know the identity of the receiver(s); receiver(s) must exist at that moment in time *Examples*: IP multicast (see Chapter 4)	*Properties*: Sender does not need to know the identity of the receiver(s); sender(s) and receiver(s) can have independent lifetimes *Examples*: Most indirect communication paradigms covered in this chapter

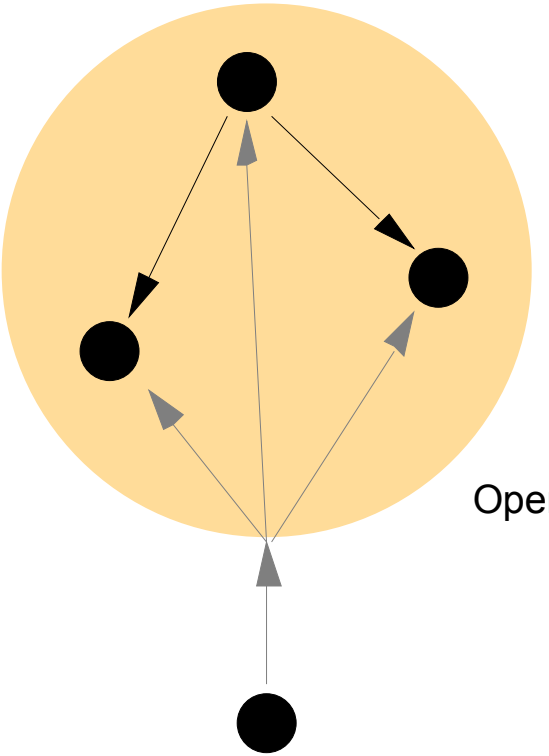
Comunicación grupal

- Diseminación de información a un gran número de clientes, como en la industria financiera
- Soporte de aplicaciones colaborativas en las que un gran número de clientes tienen que tener una vista común
- Soporte de estrategias de tolerancia a fallos, como replicación de servidores
- Soporte de supervisión y gestión de sistemas, como balance local de cargas

Grupos abiertos y cerrados

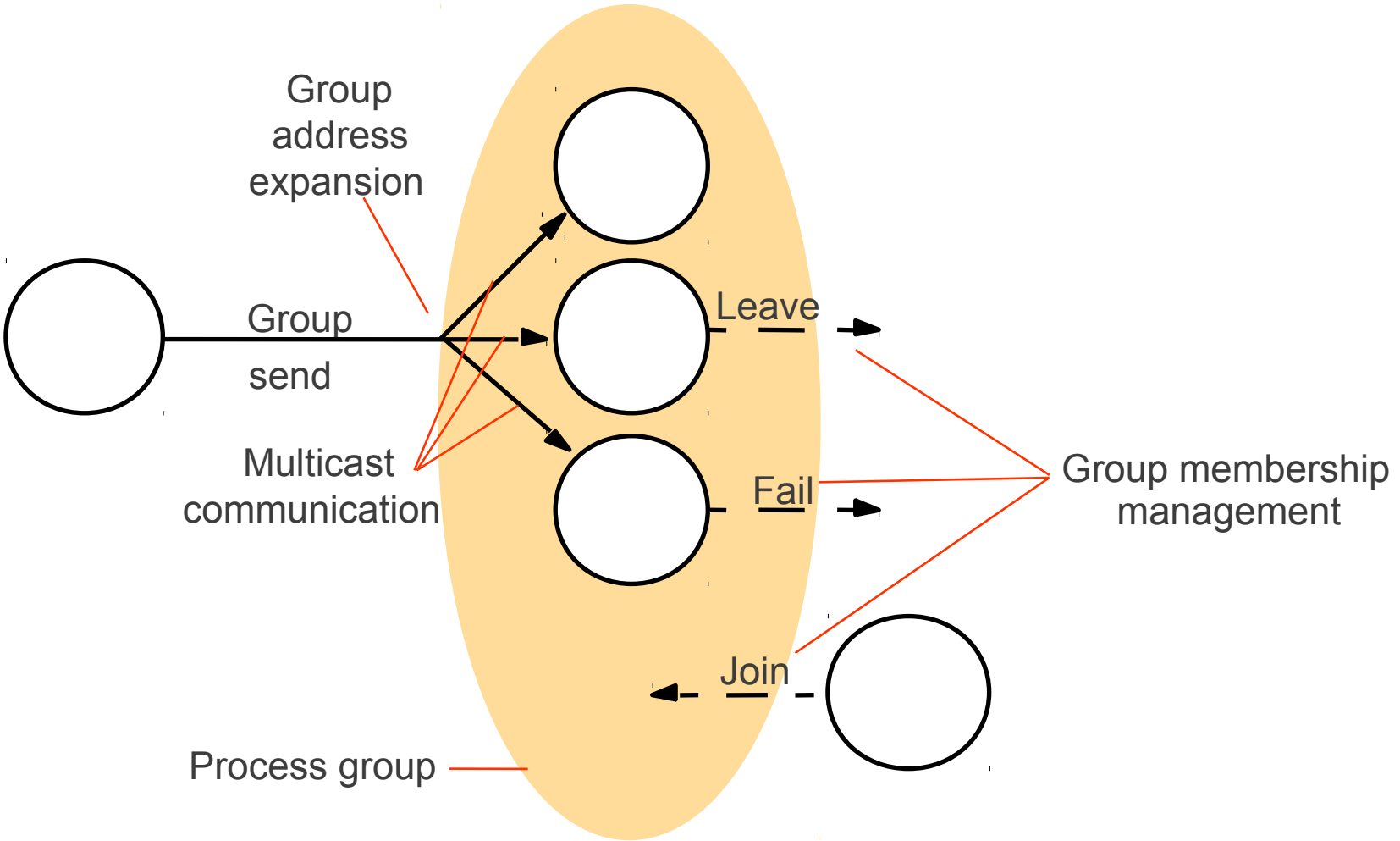


Closed group

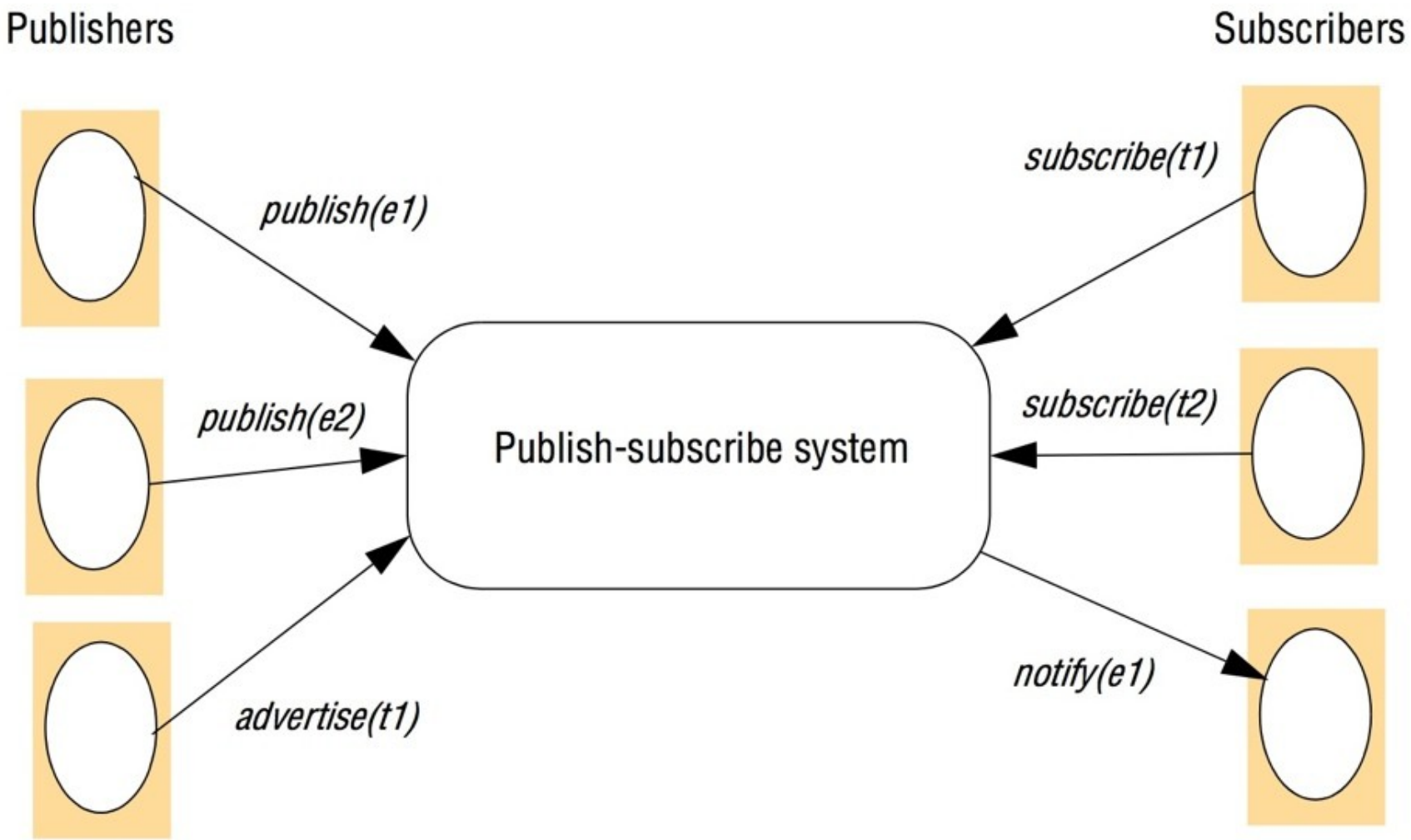


Open group

Gestión de pertenencia a grupos



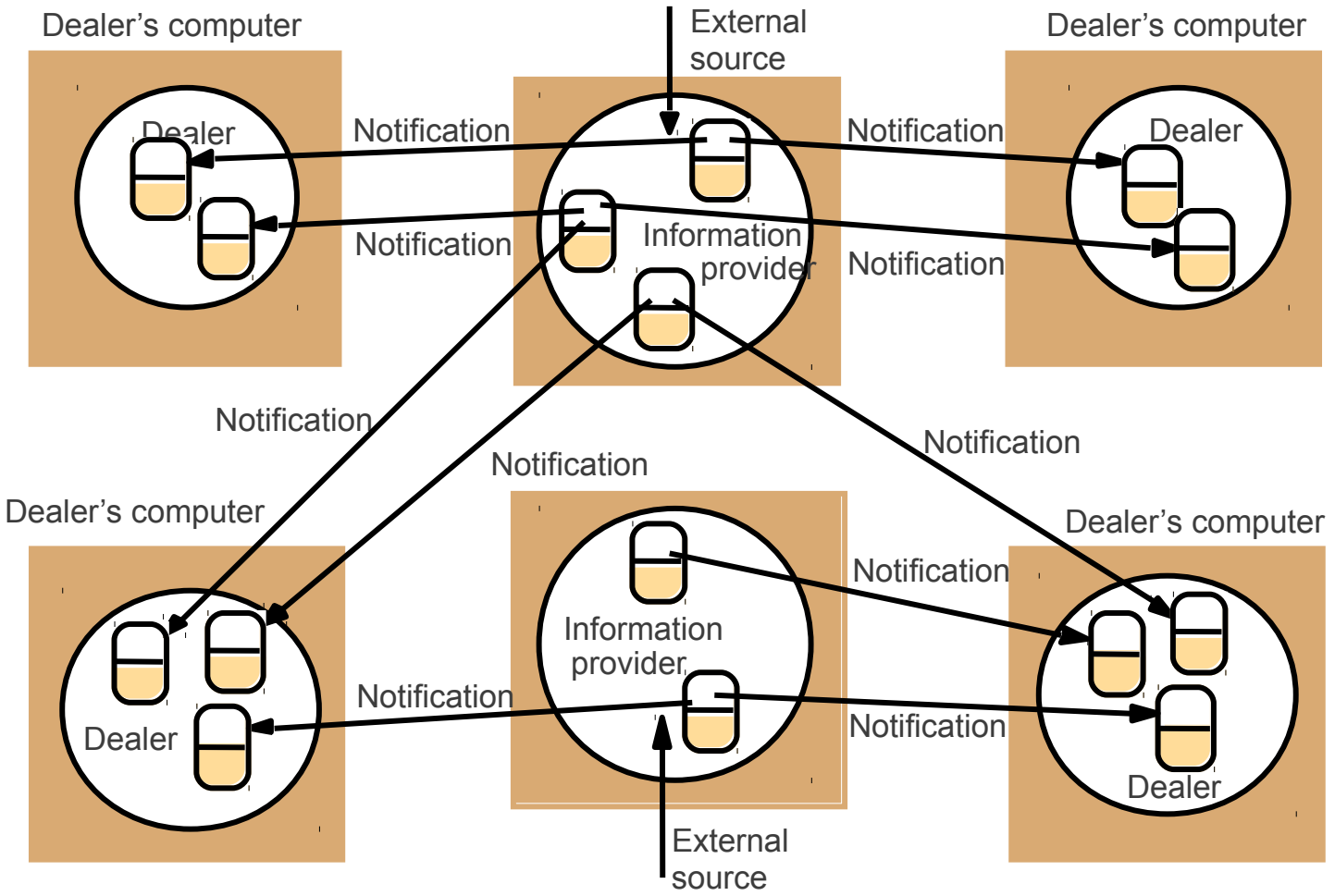
Publicación y subscripción o SBE



Aplicaciones de SBEs

- Sistemas de información financiera
- Feeds de datos en tiempo-real
- Soporte de trabajo cooperativo
- Soporte de computación ubicua
- Aplicaciones de supervisión, como monitoreo de redes
- Infraestructura de Google

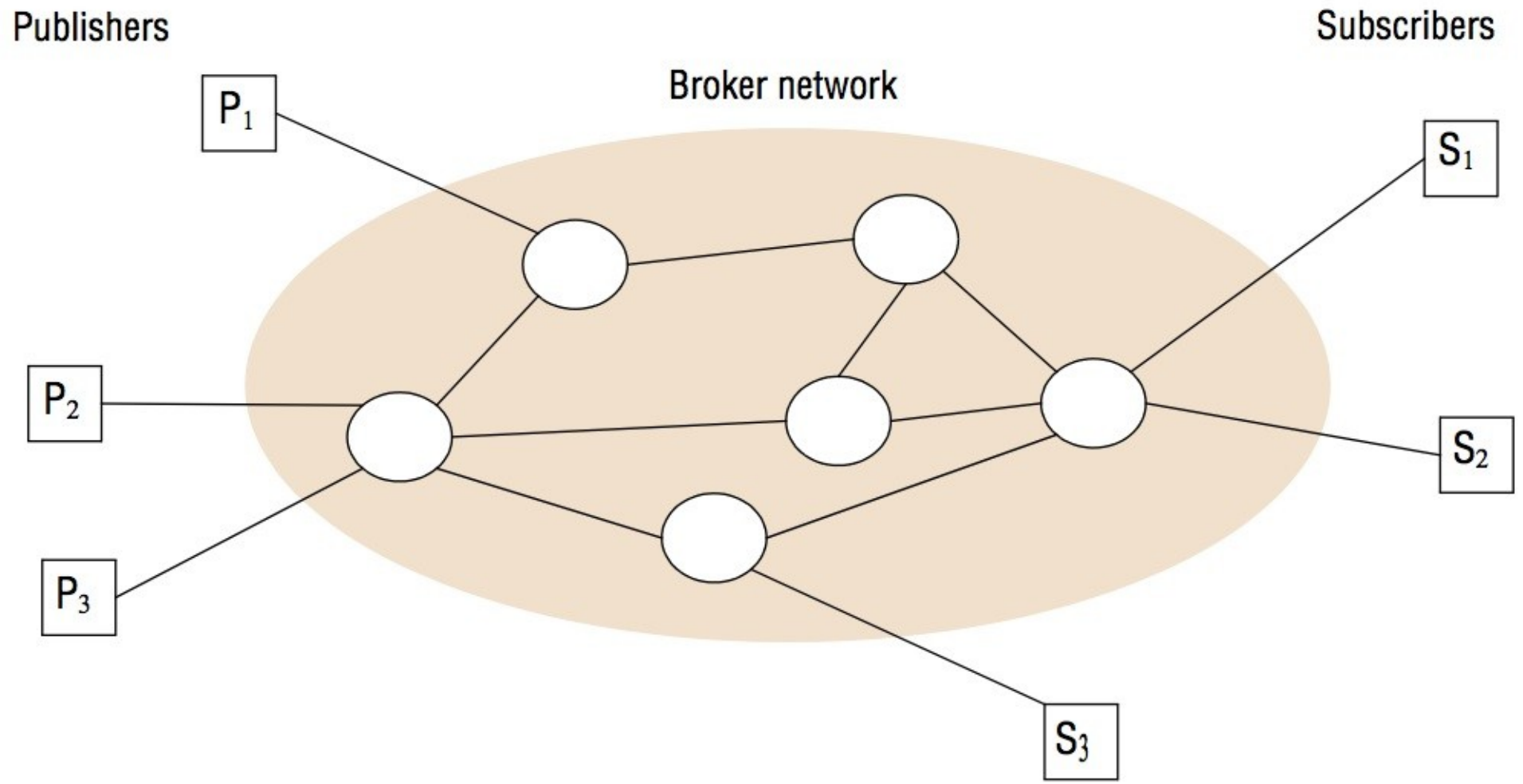
Ejemplo


Dealer's computer
External source
Dealer's computer
Dealer
Notification
Notification
Notification
Dealer
Information provider
Notification
Notification
Notification
Notification
Dealer's computer
Dealer's computer
Notification
Information provider
Notification
Dealer
Notification
External source
Dealer

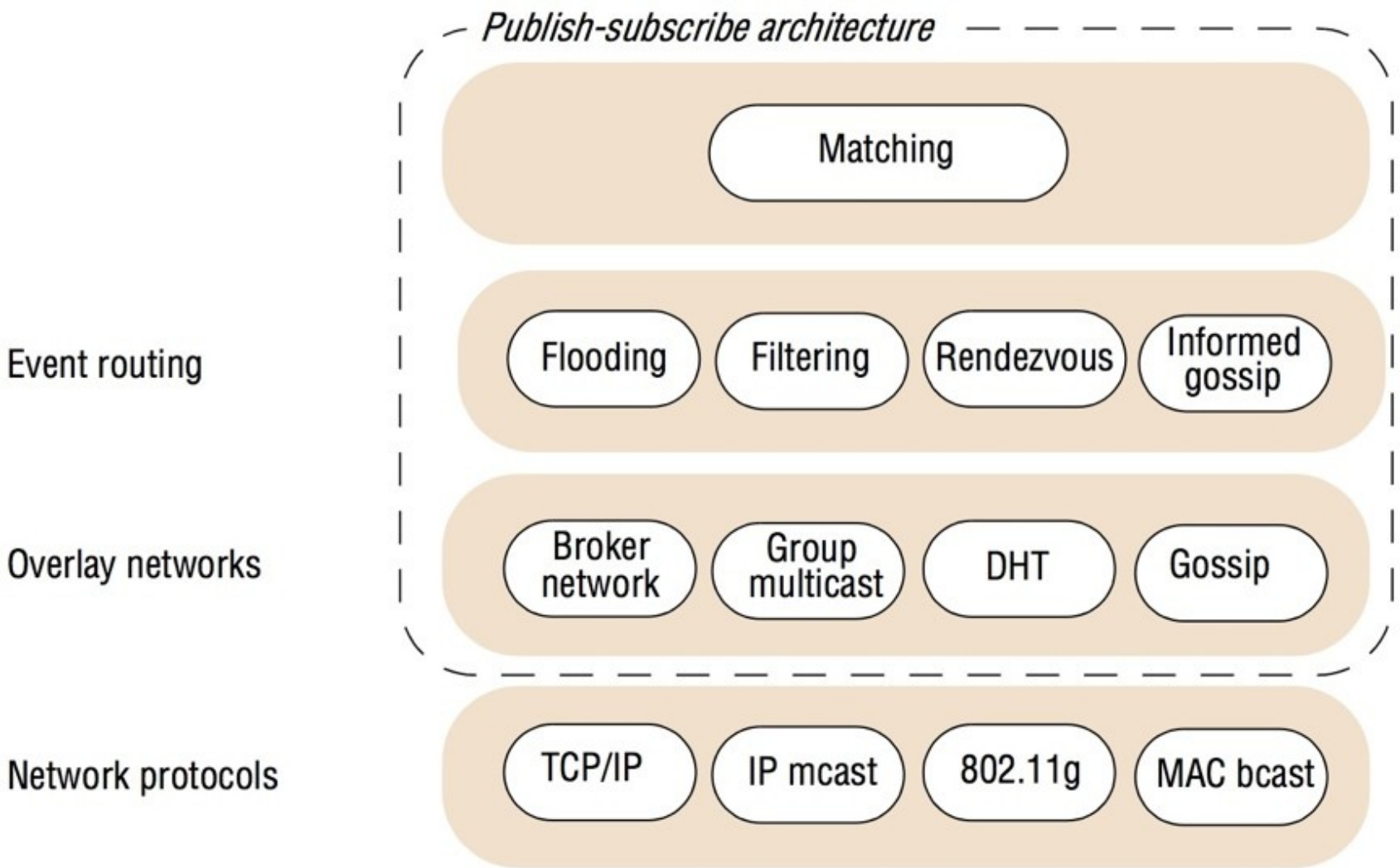
Características

- Heterogeneidad
- Asincronicidad
- Modelo de filtro de subscripción:
  - Basado en canal
  - Basado en tópico
  - Basado en contenido
  - Basado en tipo

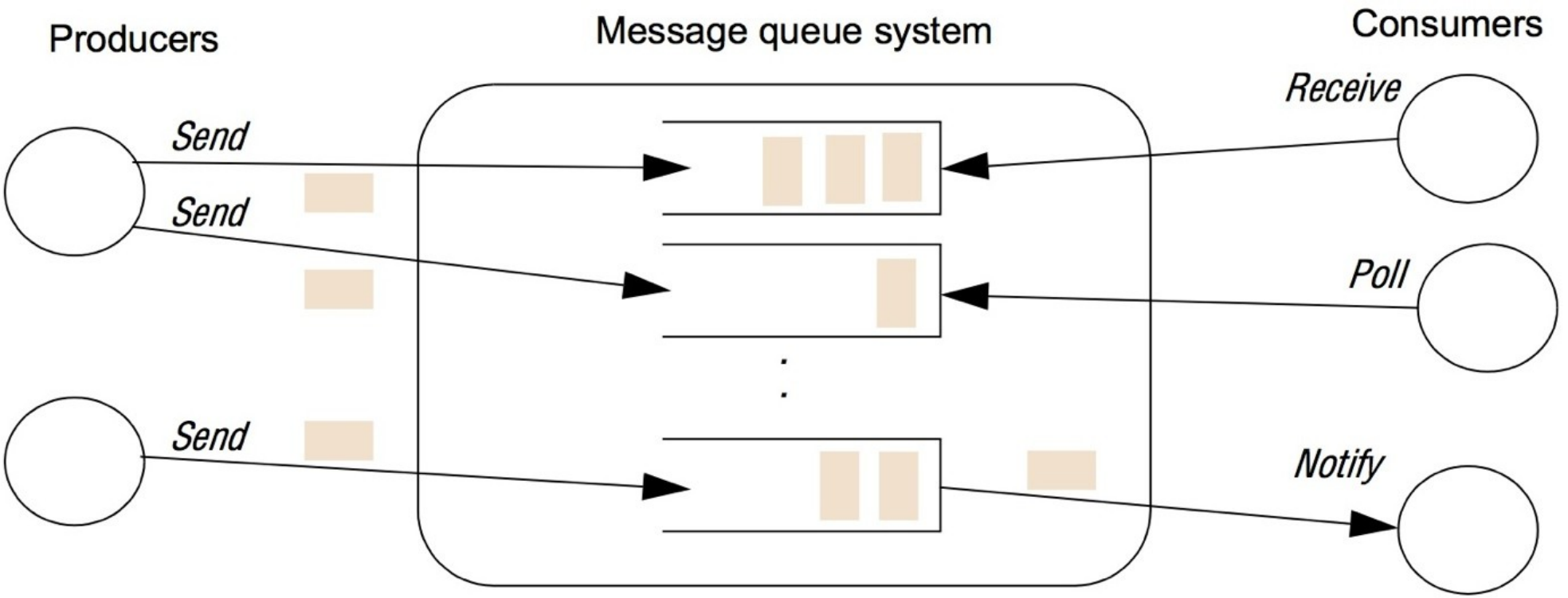
Red de gestores de eventos



Arquitectura



Paradigma de cola de mensajes



Memoria compartida distribuida