Programação de Sistemas Distribuidos

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Mestrado em Engenharia Informática

DEI/ISEP

Disclaimer

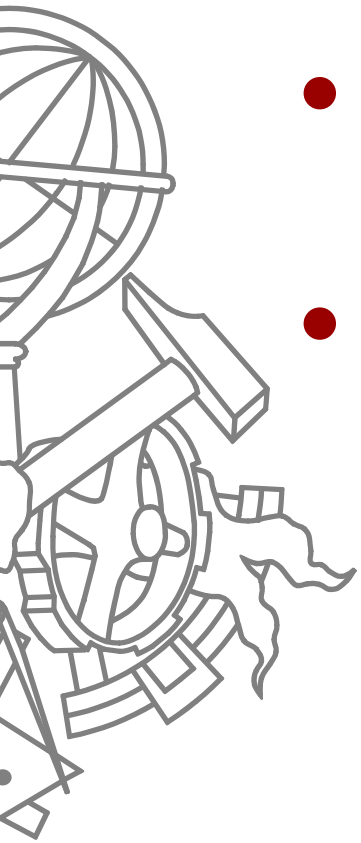
- Parts of this presentation are from:
  - Tannembaum

Today's lesson

- Decoupled communication
  - Message queueing
  - Enterprise Service Bus

DECOUPLED COMMUNICATION

Decoupled communication

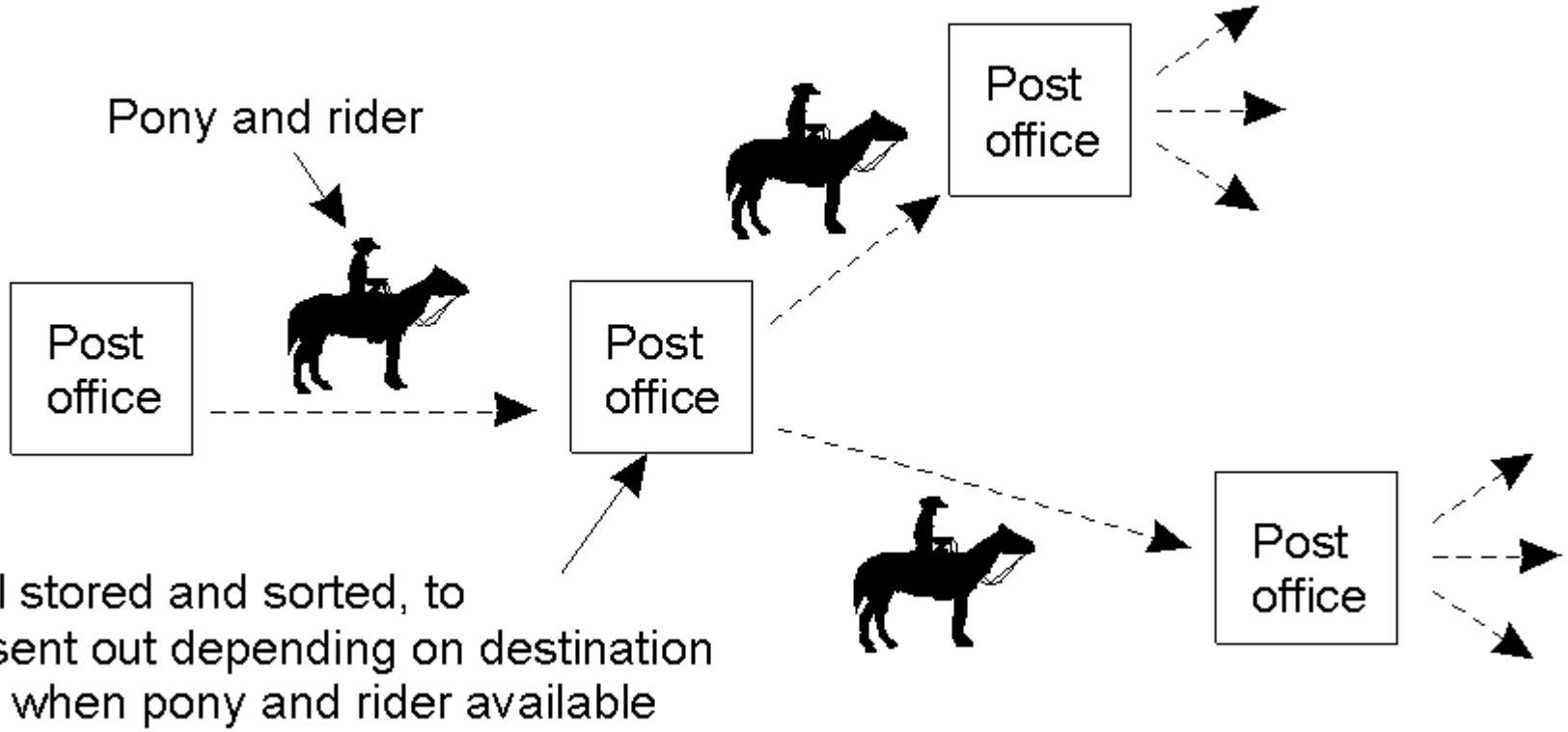


- What if the receiver is not avaliable?

- We need something
  - Assynchronous and persistent
  - E.g., voice mail

Persistence and Synchronicity in Communication (1)

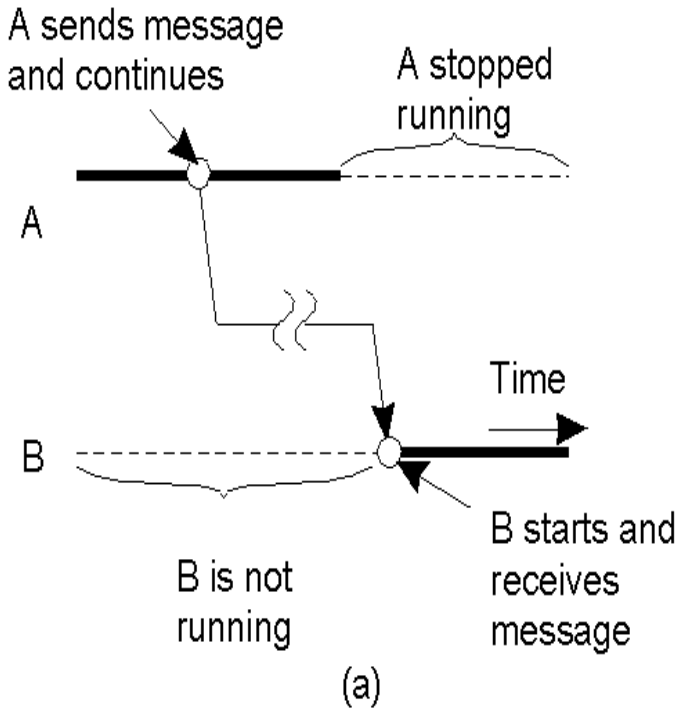
- Persistent communication of letters back in the days of the Pony Express.

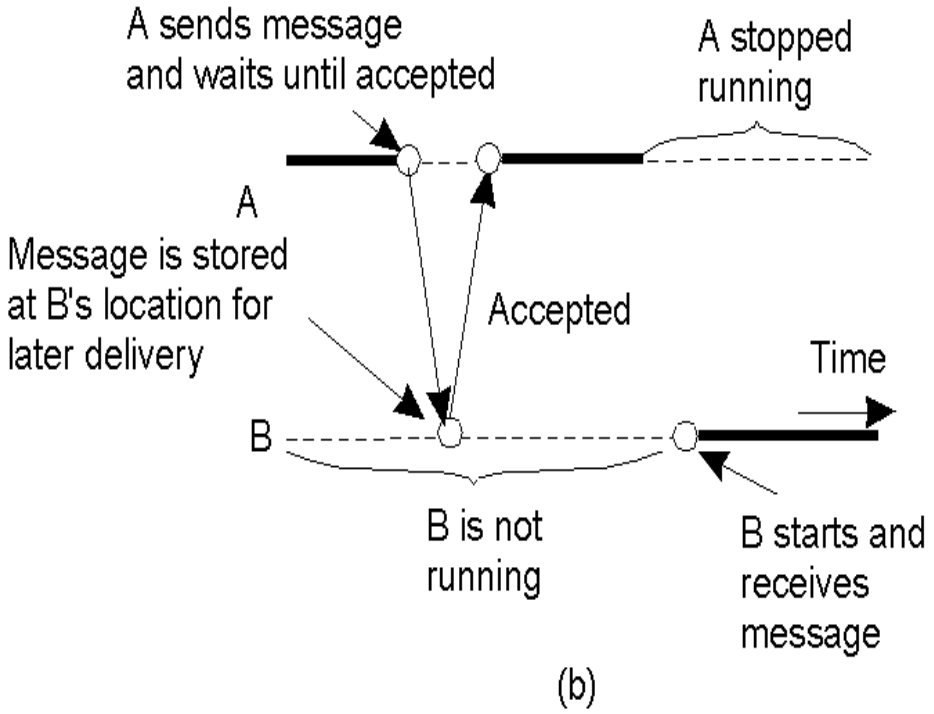


Persistence and Synchronicity in Communication (2)

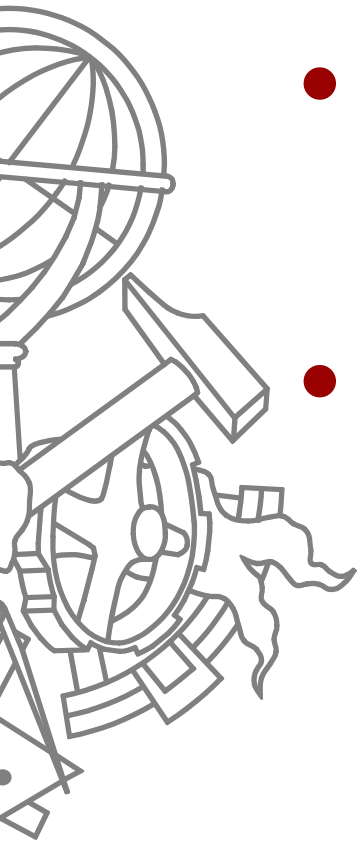
a) Persistent asynchronous communication

b) Persistent synchronous communication





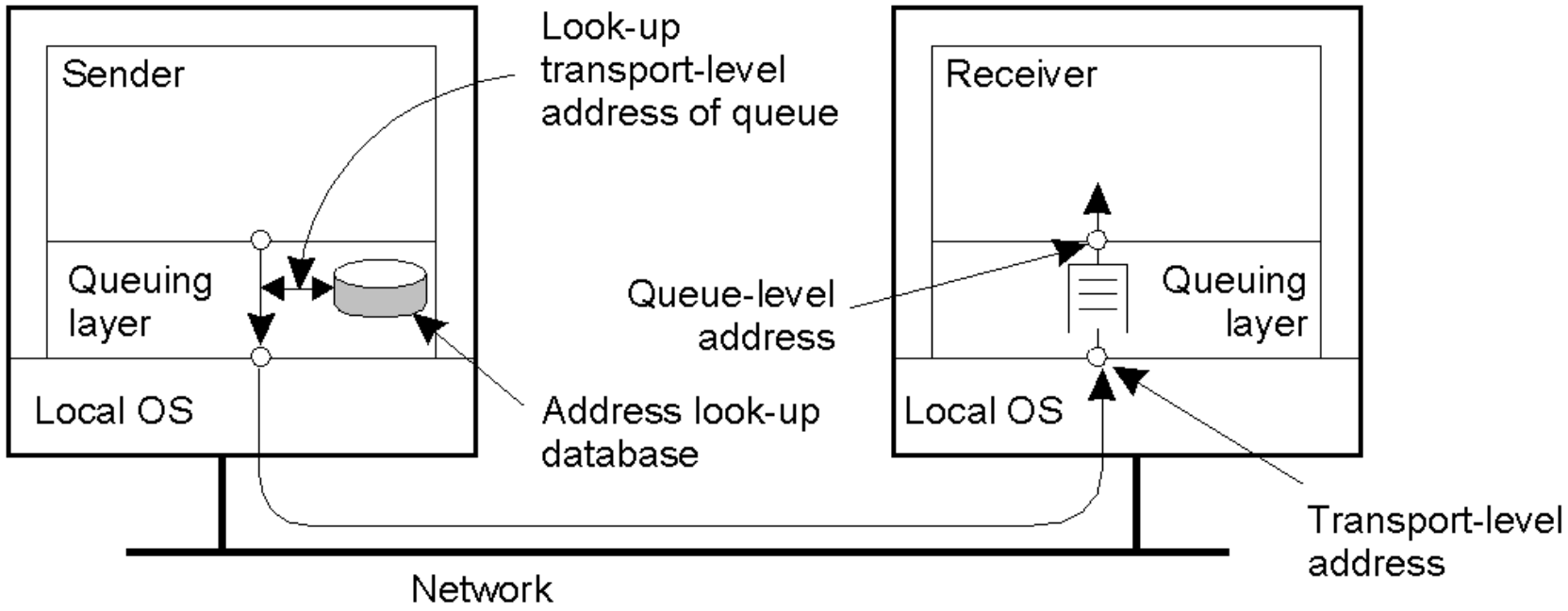
Reliability



- Guaranteed delivery in the presence of network or (receiver) application failures
- TCP reliabilibity vs. Reliable Messaging
  - TCP guarantees that the message is correctly delivered if the receiving endpoint is “alive”
  - Message Queues guarantee delivery even if the receiving end is not available without extra programming effort

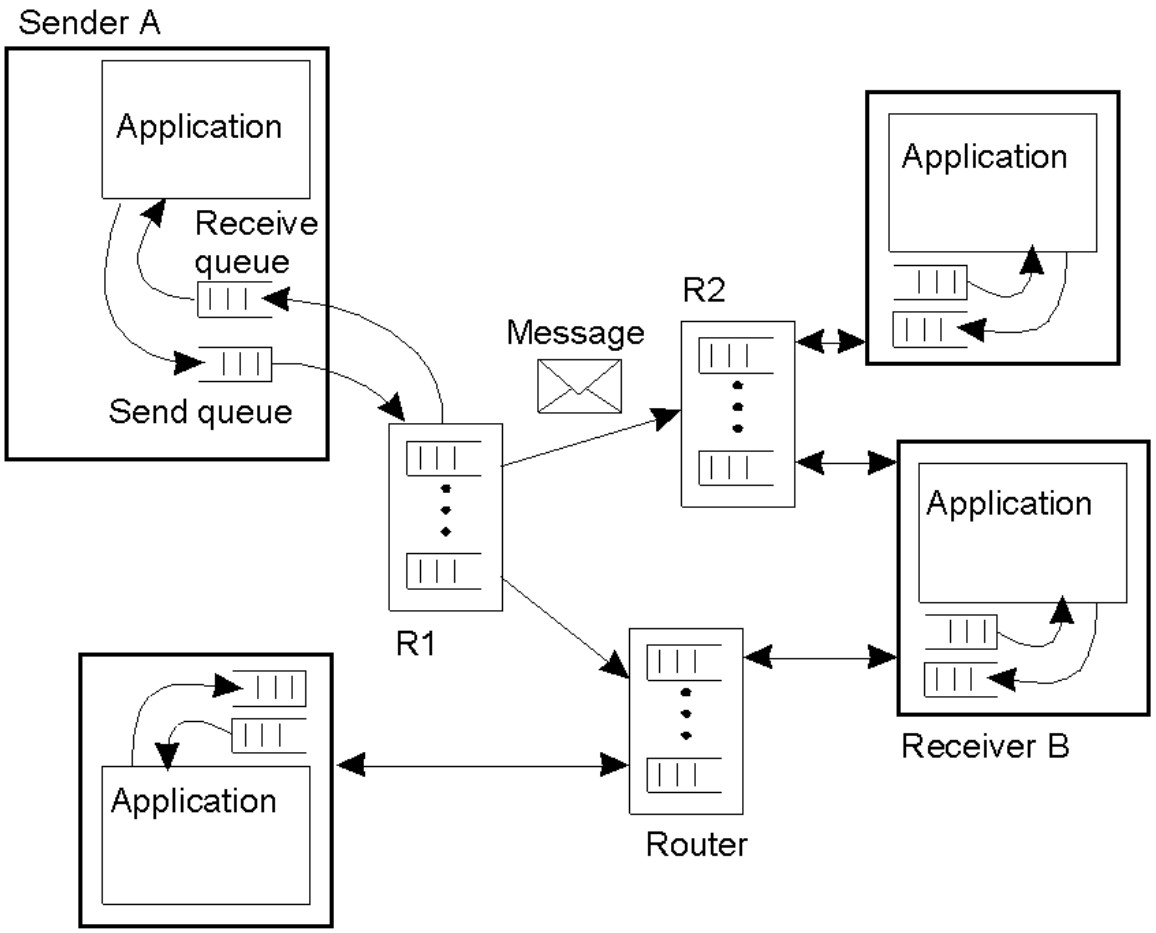
General Architecture of a Message-Queuing System (1)

- The relationship between queue-level addressing and network-level addressing.



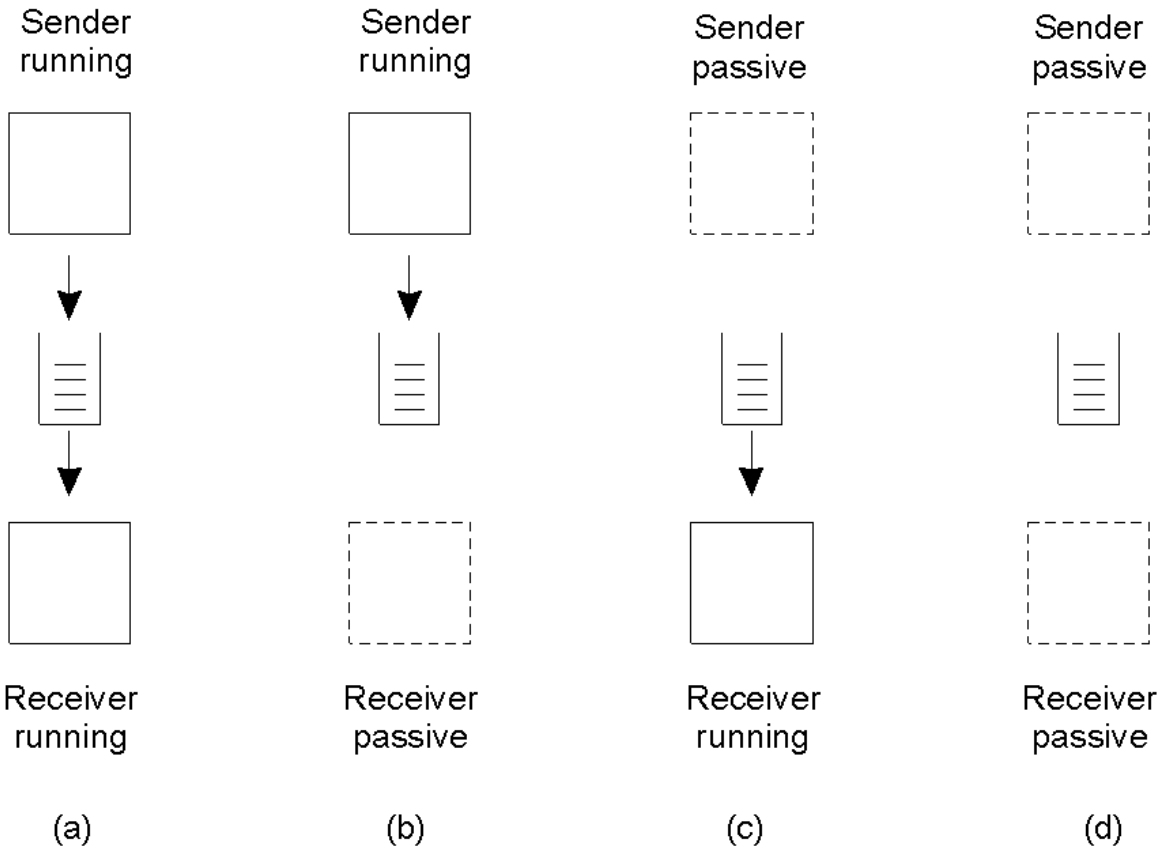
General Architecture of a Message-Queuing System (2)

- The general organization of a message-queuing

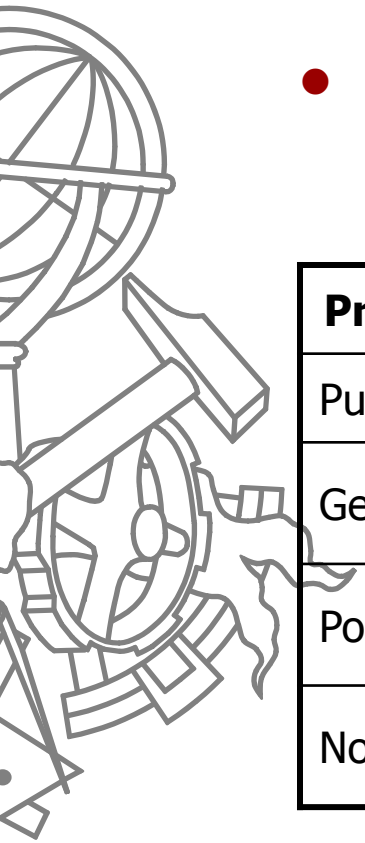


Message-Queuing Model (1)

- Four combinations for loosely-coupled communications using queues.



Message-Queuing Model (2)



- Basic interface to a queue in a message-queuing system.

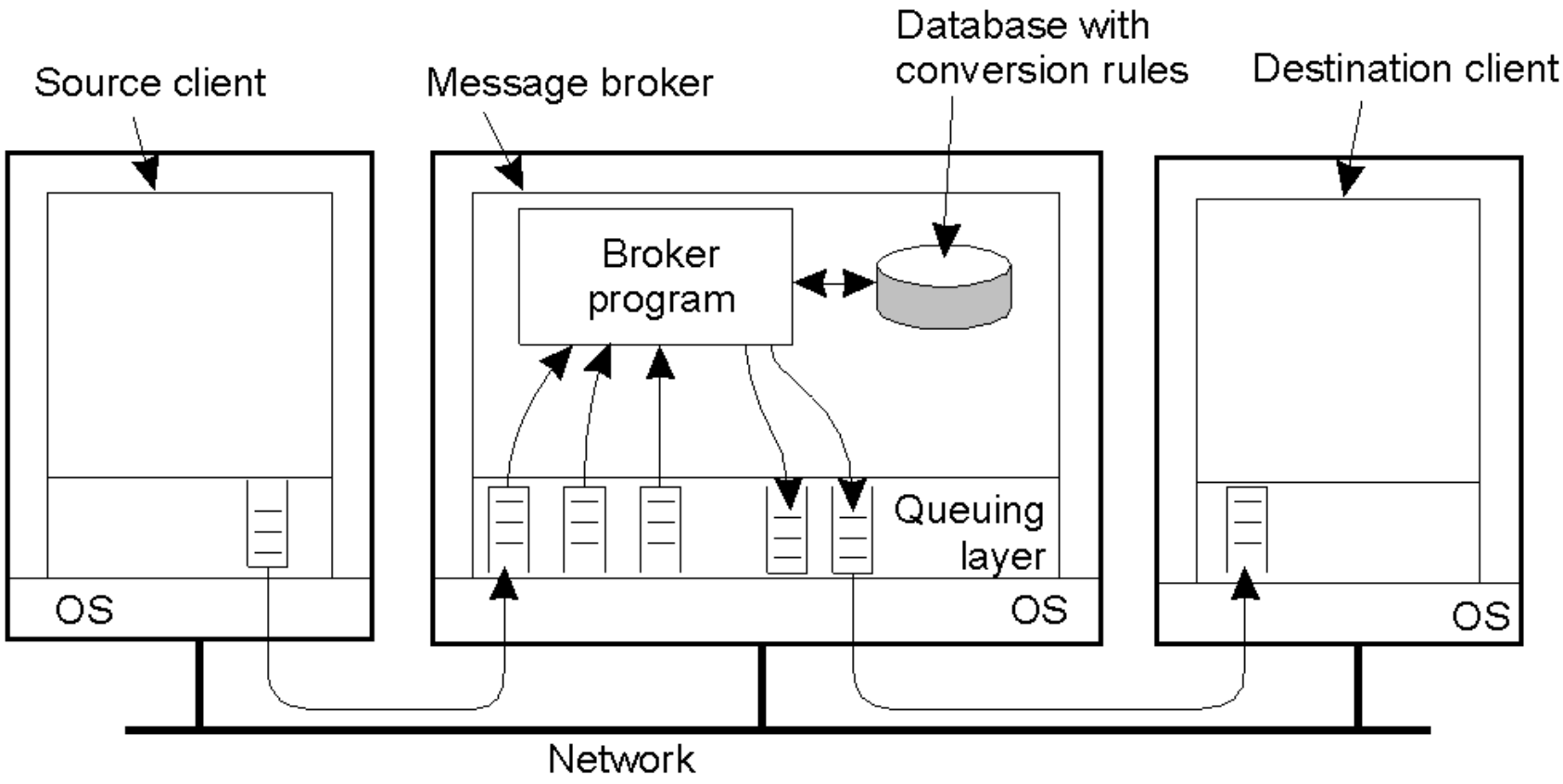
Primitive	Meaning
Put	Append a message to a specified queue
Get	Block until the specified queue is nonempty, and remove the first message
Poll	Check a specified queue for messages, and remove the first. Never block.
Notify	Install a handler to be called when a message is put into the specified queue.

Decouple even more

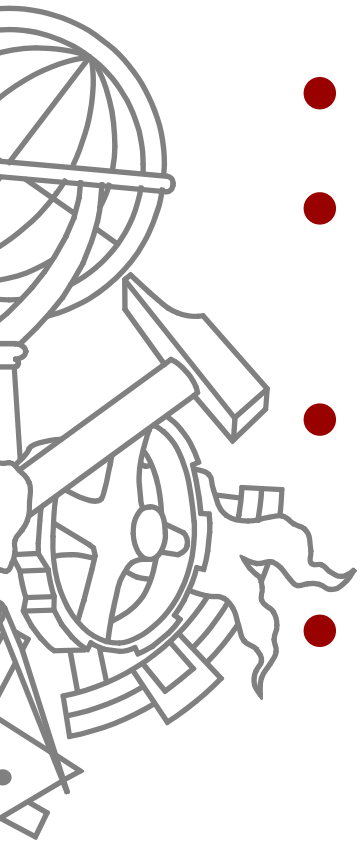
- Message broker
  - Delivers, and
  - Translates message formats

Message Brokers

- The general organization of a message broker in a message-queuing system.

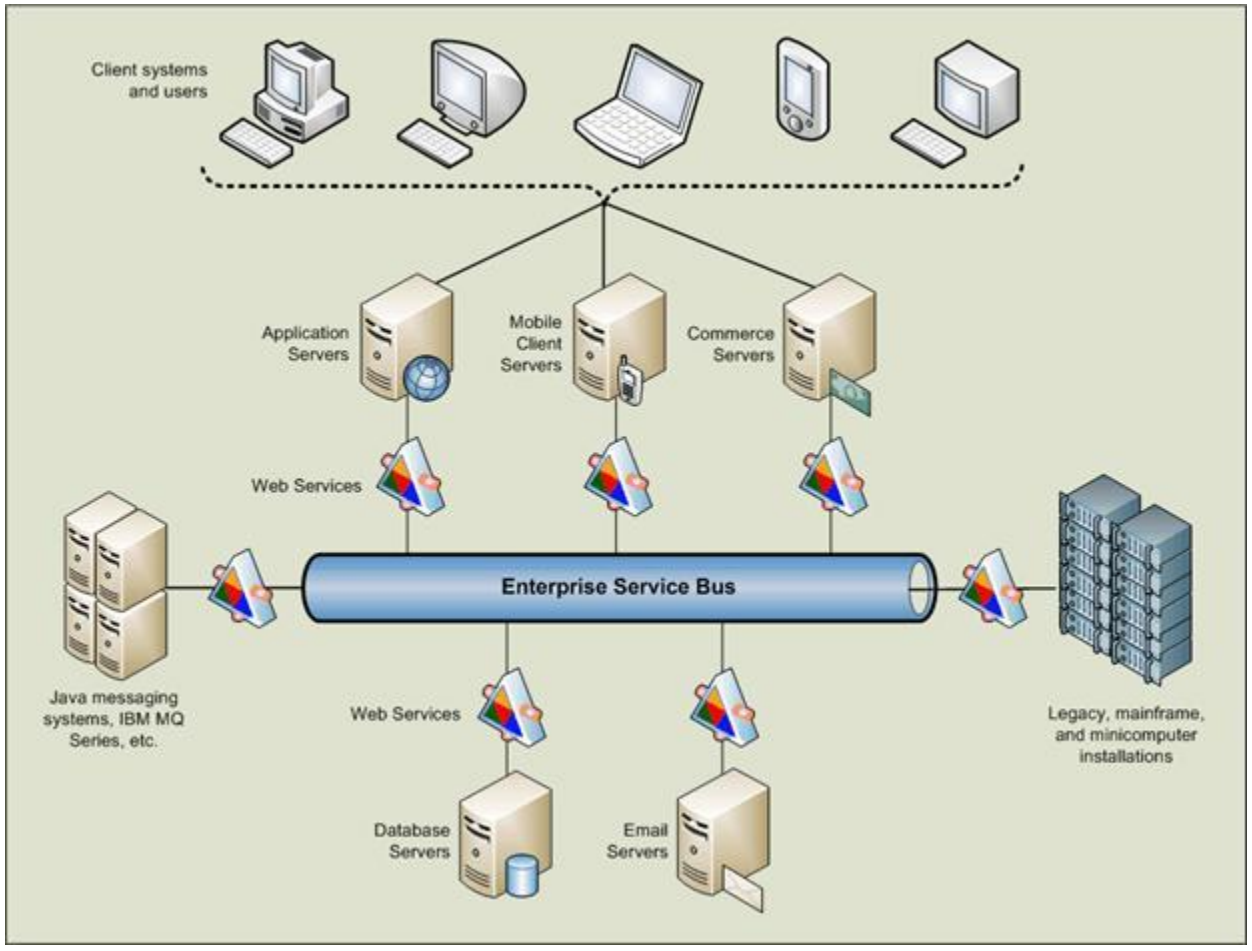


Enterprise Service Bus (ESB)



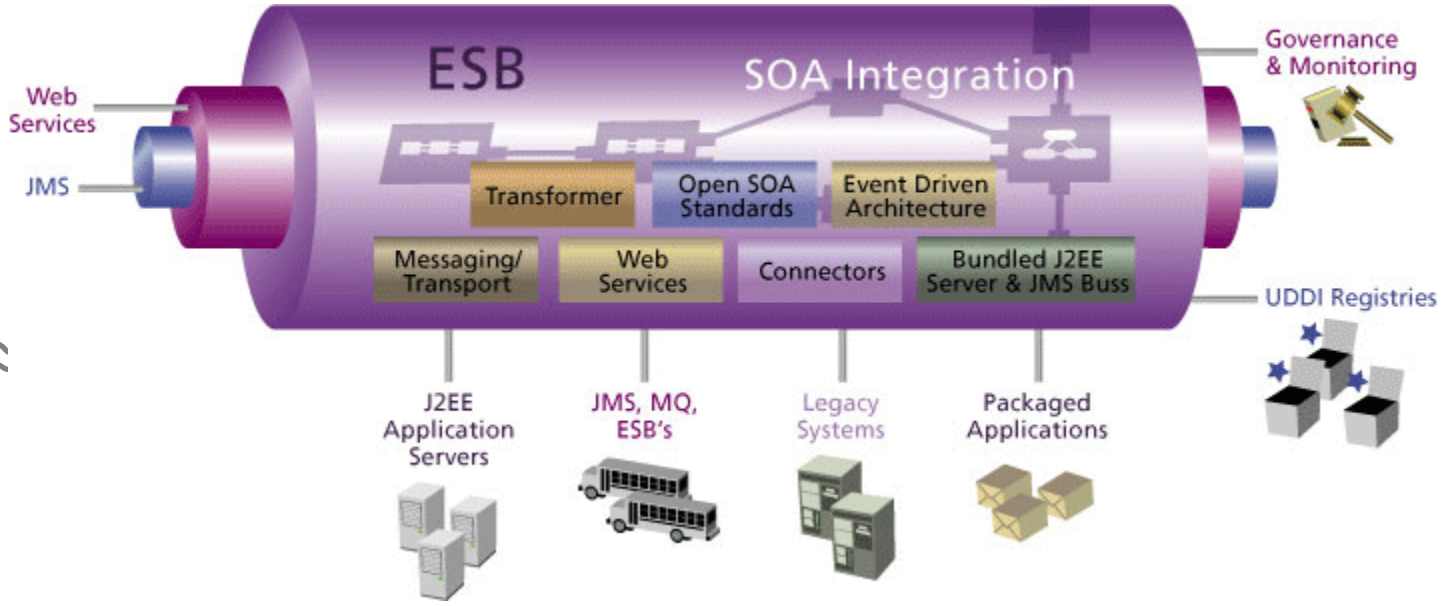
- Decouple senders and receivers
- Promotes construction of applications from basic functionality blocks
- A way to decouple message format from publishers and subscribers
- Can encode business logic in the bus itself (ex., process choreography)

ESB



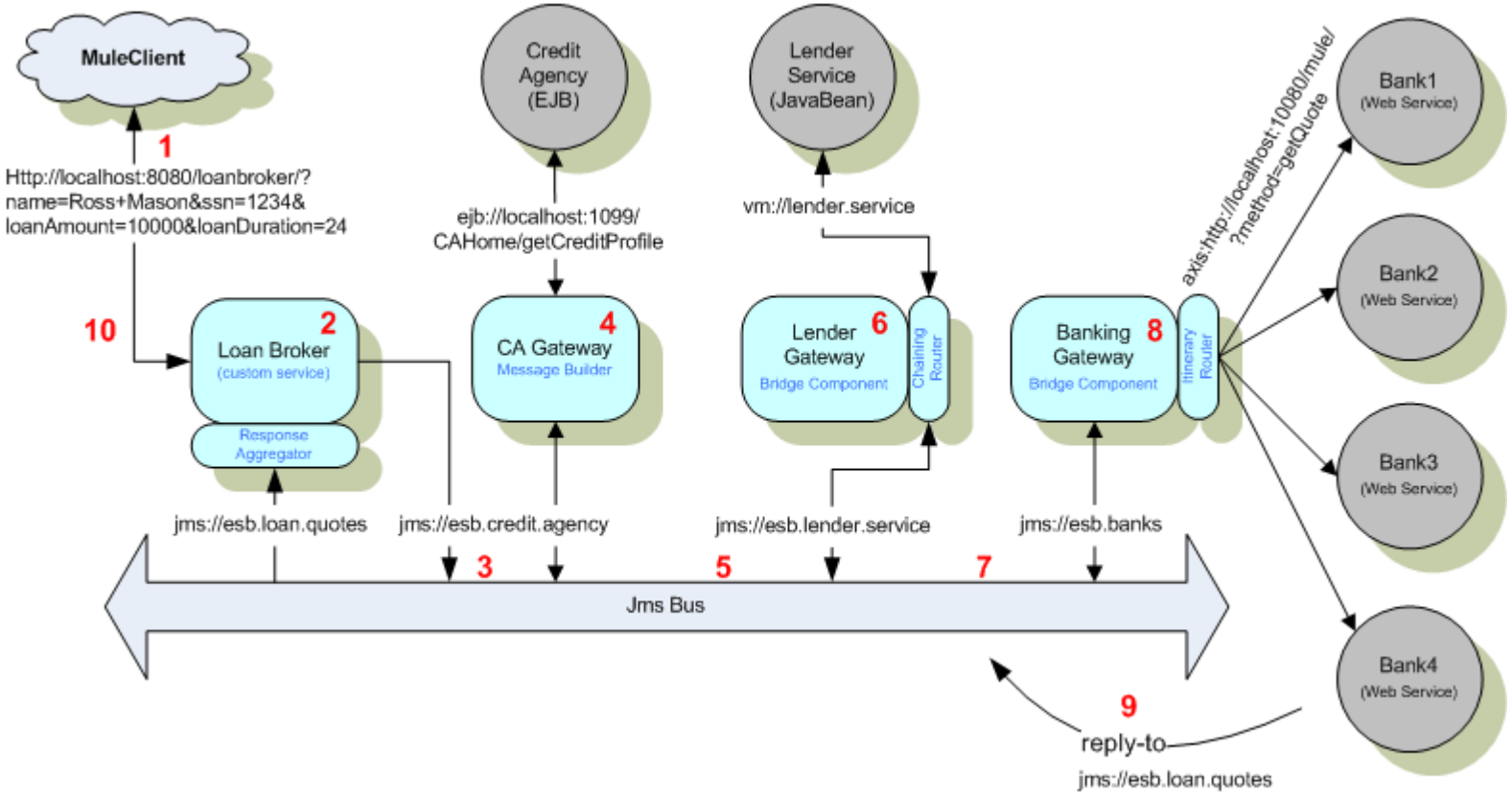
http://blogs.msdn.com/fmarasco/archive/2007/07/17/microsoft-esb-guidance.aspx

ESB



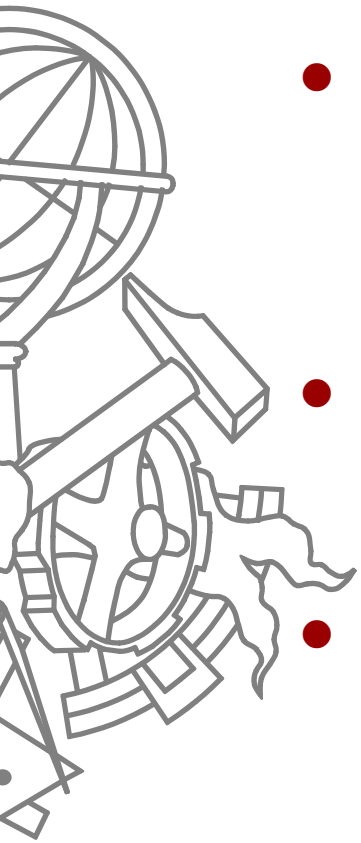
http://www.vitria.com/Business_Accelerator/esb.php

ESB sample app: Loan Broker



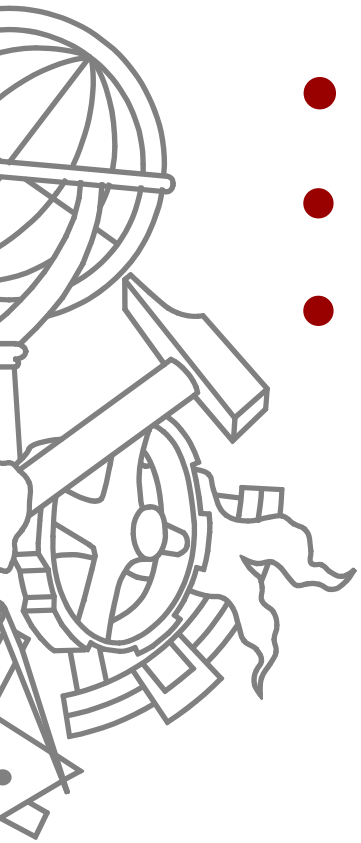
http://mule.mulesource.org/display/MULE/LoanBroker+ESB

Exercise



- Remember the example DS you provided in the last session.
- Would it be natural to use reliable messaging?
- Would it be natural to use a decoupled architecture?
- What about an ESB?

Bibliography



- Chapter 2 Tanenbaum
- http://en.wikipedia.org/wiki/Loose_coupling
- http://en.wikipedia.org/wiki/Message_queue