

# IN5020 - Distributed Systems Group Session

## Topic 3 – Object Based Distributed Systems

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## Question 1 -

What is the purpose of stub in Remote Procedural Call (RPC) paradigm?

# Stub

- Marshall and unmarshall parameters
- Takes care of the communication between the client and server
- Helps with access transparency

Question 2 -

Why do need Interface Definition Language  
(IDL)?

# Interface Definition Language (IDL)

- Defines the interface of the remote objects in a language-independent way
- To enable the communication between the clients and servers written in different languages (for example, a distributed object written in java language can be accessed by a client written in javascript)

Some of Common IDL languages:

- **OMG IDL** – used in CORBA
- **Apache Thrift** – developed at Facebook
- **Protocol Buffer** – Google's IDL (used in gRPC)

## Question 3 -

What are the similarities between RPC  
and RMI?

# RPC and RMI

## **Similarities:**

- both support programming with interfaces
- both typically constructed on top of request-reply protocols
- both offer a similar level of transparency

## **Differences:**

- RMI takes advantage of Object-Oriented Programming (uses of Classes, Objects, inheritance)
- RMI enables richer parameter semantics (all remote objects have unique ROR that can be also be passed as a parameter)



Question 4  
colouris 5.22



# Question - Calculate the total time

A client makes remote procedure calls to a server.

The client takes 5 milliseconds to compute the arguments for each request, and the server takes 10 milliseconds to process each request.

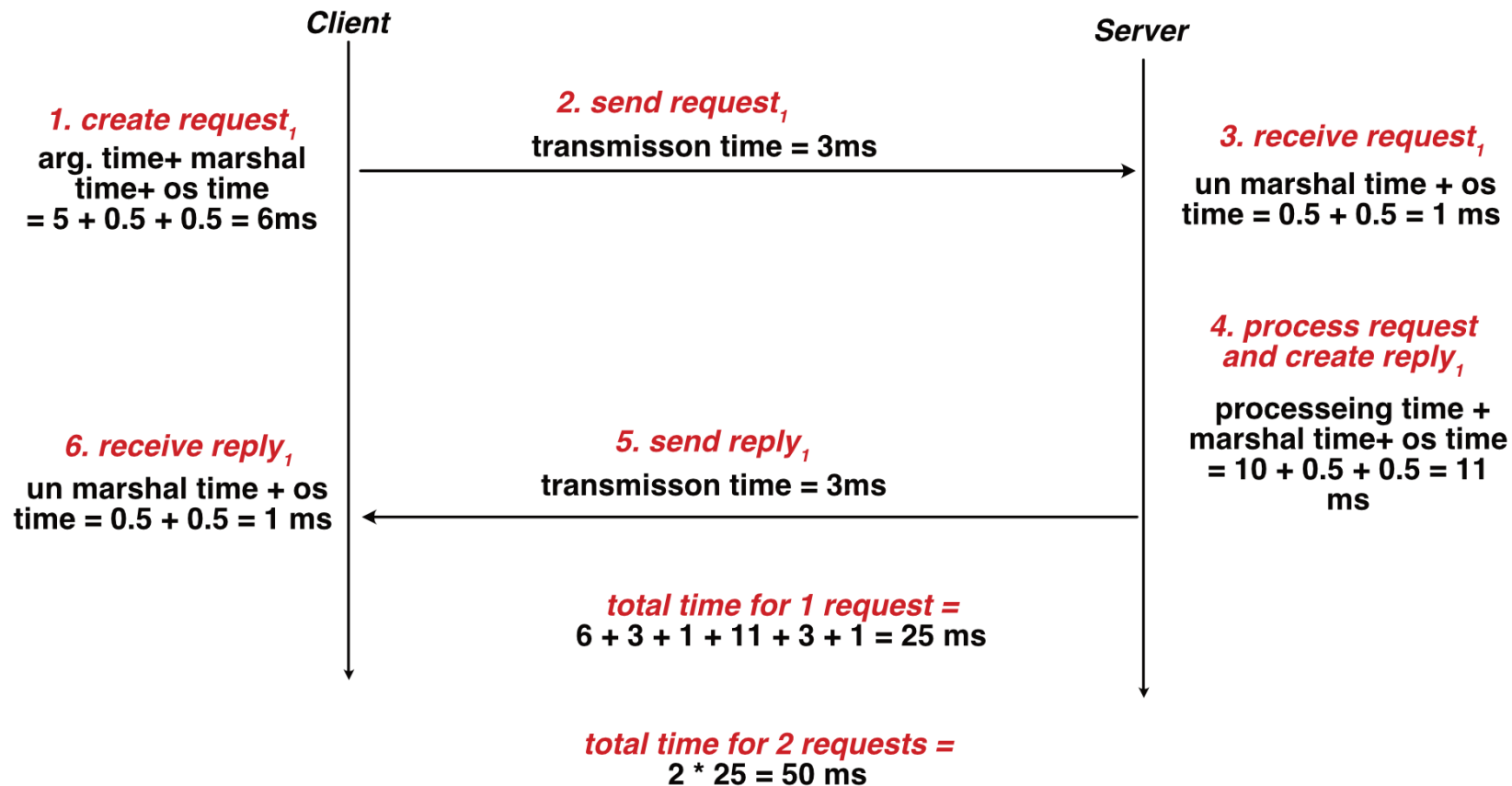
The local operating system processing time for each send or receive operation is 0.5 milliseconds, and the network time to transmit each request or reply message is 3 milliseconds.

Marshalling or unmarshalling takes 0.5 milliseconds per message.

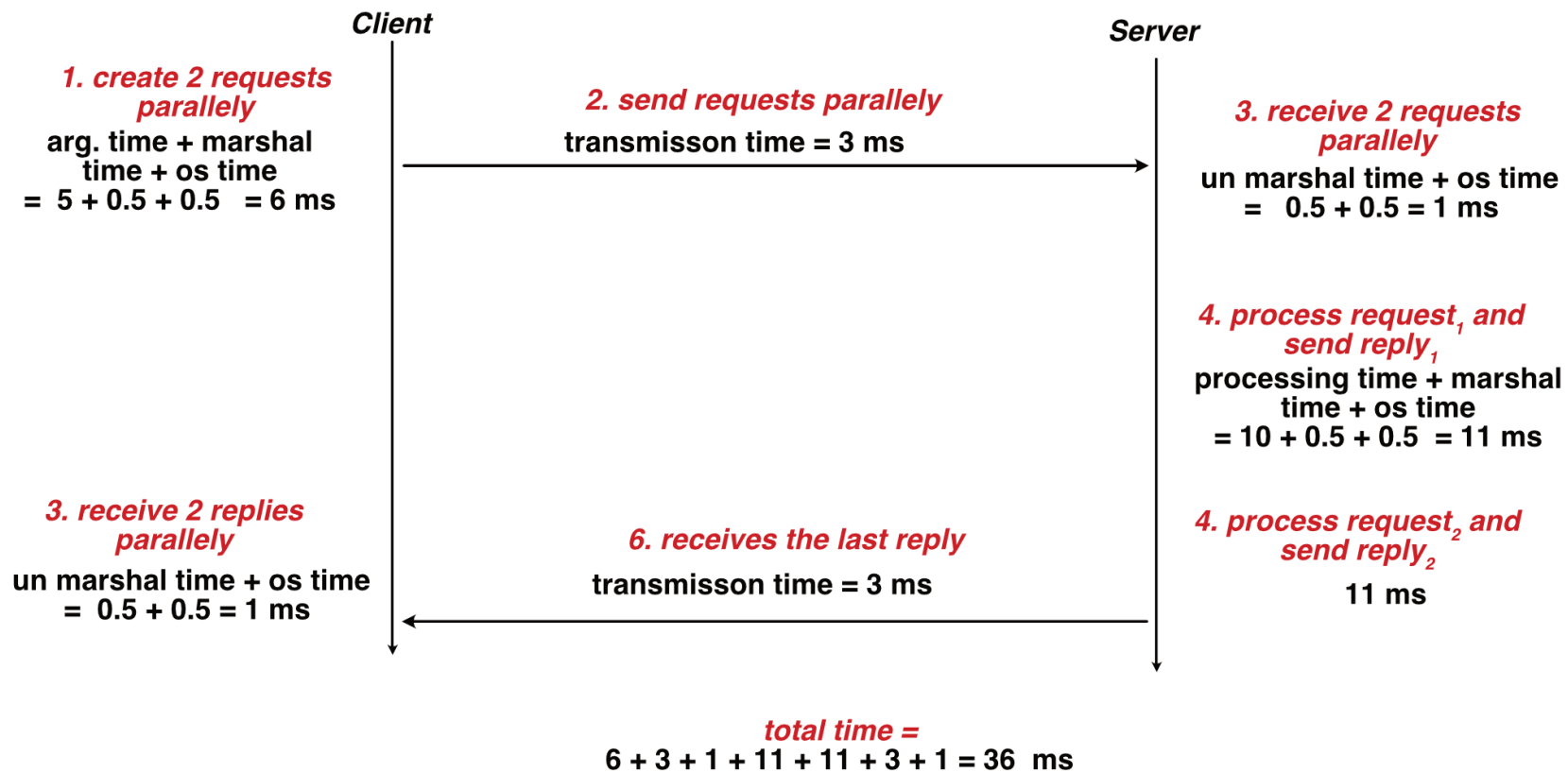
**Calculate the time taken by the client to generate and return from two requests:**

1. if it is single-threaded
2. if it has two threads that can make requests concurrently on a single processor

# Total time if client is single threaded



# Total time if client makes requests parallelly



Thank You