

Assignment 2

Client/Server:

1)

i] This is the early age technology which separates the roles of computers as client and server. This technology is still powerful & popular among the network technologies to establish communication between two or more machines.

ii] In this model, the first tier handles the presentation and business logic of ^{the} user application (client) and the second tier handles the application organization and its data storage.

iii] In general, the server is a database server that is mainly responsible for the organization and retrieval of data. The application client handles the user interaction through variety of graphical user interface of the application.

iv] The client-server model has been widely used in Enterprise Resource Planning (ERP), billing, and Inventory application systems, banking etc.

2) CORBA:

i] It is an industry wide, open standard initiative. It is developed by Object Management Group. It is developed to enable distributed computing that supports a wide range of application environments.

- ii) It provides an object-oriented solution that does not enforce any proprietary protocols or any particular programming language, or a hardware platform.
- iii) By adopting CORBA, the applications can reside and run on any hardware platform located anywhere on the network, and can be written in any language.
- iv) Interface Definition Language (IDL) is a specific interface language designed to talk about the services provided by a CORBA remote object.
- v) CORBA defines a collection of system-level services for handling low-level application services like life-cycle, persistence, transaction, naming, security.

3] Java RMI:

- i) Java invented RMI APIs for communicating methods on any machine remotely. This is pure Java solution for handling distributed communication.
- ii) Through RMI object running on a client computer can invoke methods on an object present on server.

iii) Working of RMI

There are two special objects designed to establish communication between client & server.

a) Stub object (client side)

- It creates information block and sends this information to server, the block consists of

1. An identifier of the remote object to be used

2. Method name to be invoked

3. Parameters to the remote JVM.

b) Skeleton object (server side)

- The skeleton object passes the request from the stub object to the remote object.

It works as:

1. It calls the desired method on the real object present on the server.

2. It forwards the parameters received from the stub object to the method.

Microsoft DCOM:

i] It is a remote protocol designed by Microsoft to invoke RPCs. It consists of a set of extensions layered on the Microsoft Remote Procedure Call Extensions.

ii] (DCOM ~~protocol~~ protocol stack): Higher level

applications use the DCOM client to obtain object reference or make ORPC calls on the object. The DCOM client uses the Remote procedure call protocol Extensions, to communicate with the object server.

iii] The object server constitutes an object resolver service and one or more object exporters.

Objects are contained in object exporters.

iv] DCOM is language and platform independent. DCOM is a binary standard. DCOM provides the ability to use and reuse components dynamically, without recompiling on platform and language neutral principle.

v] However DCOM do not have any absolute way of addressing an object instance - everything is done through object interfaces.

Q] What is the role of J2EE in distributed computing?

→ i] J2EE provides a programming model based upon web and business component that are managed by the J2EE application server.

ii] The application server consists of many APIs and low level services available to the component. These low level services provide

security, transaction connections & instance pooling & concurrency services.

iii) The J2EE provides the interfaces to connect with various backend legacy & info system. J2EE also provides excellent client connectivity capability ranging from PDA to web browsers to rich client.

iv) The J2EE architecture is physically divided into ~~three~~ three tiers:

① Presentation tier: This tier is composed of web components which handle HTTP response, session management, device independent content delivery.

② Application tier: Application tier deals with the core business logic processing which may typically deal with workflow & automation.

③ ~~Interaction~~ Interaction tier: This tier deals with connecting & communicating to the back end enterprise information system (EIS) database application & legacy application and mainframe application.

6) Explain the use of XML in distributed computing.
→ XML is the extensible markup language.

if The simplicity of XML in combination with the web has opened up new possibilities for moving data & for building new application architectures centered around common internet protocols.

The changes include:

- ① A reduced dependence on proprietary data formats for applications.
- ② A new way to do B2B data exchange using XML instead of the formats defined by traditional EDI systems.
- ③ A shift from relying on tightly coupled systems such as CORBA, RMI & DCOM to a more loosely coupled internet-based framework centered around XML & SOAP.
- ④ A change in focus from object-oriented to service-oriented.
- ⑤ The emergence of web services as technology for discovering & connecting to internet-based services.

What is service oriented architecture? Explain its key characteristics?

- i] The SOA is essentially a collection of services. These services communicate with each other.
- ii] The SOA has following characteristics:
 - a) ~~The SOA services have self describing~~
 - a) It supports loose coupling everywhere in the project.
 - b) SOA supports interoperability
 - ~~c) It increases the quality of service~~
 - d) It supports vendor diversity
 - e) It promotes discovery & federation.
 - f) It is location-transparent
 - g) It is still maturing & achievable idea

What is stateless & stateful services? Explain with example.

- i] Stateless services: The type of network protocols in which client sends a request to the server & server responds back according to current ~~state~~ state.
- ② In stateless service there are no tight dependencies between client & server.

③ The stateless protocol design simplify the server design.

④ It handles transaction very fast.

e.g. DNS, HTTP, UDP

ii) Stateful services

① In this type, if a client sends a request to the server then it expects some kind of response, if it does not get any response then it resends the request.

② In stateful service there is tight dependency between server & client.

③ Its design makes the design of the server very complex & heavy.

④ It handles transaction very slowly.

e.g. FTP, Telnet

g) Explain any one web technology in detail used for implementing web services.

→ SOAP (Simple Object Access Protocol) is message protocol that enables the distributed elements of an application to communicate. SOAP can be carried over a variety of standard protocols, including the web-related HTTP.

ii] SOAP was developed as an intermediate language for applications that have different programming languages, enabling these applications to communicate over the internet.

iii] SOAP is a lightweight protocol used to create web APIs, usually with XML. It supports a wide range of communication protocols across the internet, HTTP, SMTP & TCP.

iv] SOAP messages are XML documents that are comprised of Envelope, Header & Body.

v] SOAP request is generated by client using XML document. Next, a SOAP client sends the XML document to a SOAP server. When the server receives SOAP message, it sends the message as a service invocation to the requested server-side application. A response containing the requested parameters, return values and data for the client is returned first to the SOAP handler & then to the requesting client.

10) What are RPCs?

→ i] It is defined as a request/response based synchronous communication when the client sends a request, the client waits until a response is sent back from the server before continuing any operation.

- PAGE NO. :
DATE: / /
- ii) The RPC-based web services are tightly coupled & are implemented with remote objects of the client application.
- iii) The client has capability to provide parameters in method calls to the web service provider. Then client invokes the web service by sending parameters to the provider that executes the required method & then send back the return value. Additionally using a RPC based communication model both the service provider & requester can register & discover services.

ii) What are the features of SOAP?

- (i) SOAP is a communication protocol & is used for communication between applications.
- (ii) SOAP is a format for sending messages.
- (iii) SOAP platform independent & language independent.
- (iv) SOAP is based on XML.
- Security & WS-routing are among the extensions under development. SOAP is simple & extensible.
- (v) SOAP can be used over any transport protocol such as HTTP, SMTP, TCP or JMS.
- SOAP allows you ^{to} get around firewalls.