

Ryan Somma

Week 9 Assignment

Using APA format, give short answers to the following:

1. Describe client/server, three-layer, and n-layer architecture. What are the differences between a client and a server? What is the function of each layer in a three-layer application? Why might more than three layers be used?

Client/server architecture divides software into two classes, a server that manages and provides access to resources, and a client that uses a communication interface to request services. Three-layer architecture divides the client/server architecture into a data layer, which manages stored data, a business logic layer, which implements rules and procedures of business processing, and a view layer, which accepts user input and displays processing results. N-Layer architecture divides these three layers into even more levels of responsibility, for instance, the data layer may have a data-access layer, which presents a unified method for the business layer to access resources.

2. What is a protocol stack? What are the components of a typical protocol in a client computer that can access many Web servers?

A protocol stack is software that implements the lowest five levels of the Open System Integration model. Stack 1 has a transport layer interface, sequenced packet exchange, and internet packet exchange, while stack 2 has sockets, transmission control protocol, and internet protocol.

3. List and describe three low-level peer-to-peer interprocess communication standards. What are the advantages and disadvantages of using these standards to implement distributed multi-layer applications?

Sockets are a unique combination of an IP address number and a port number that uniquely identify a client or server process on the Internet. Pipes are regions of shared memory through which multiple processes executing on the same machine can exchange data. A named pipe has the additional features of having a name that is permanently placed within a file system directory and the ability to communicate among processes on different computers. Remote Procedure Calls allow for processes on one machine to call a process on another machine.

Distributed applications usually use higher-level protocols often layered above the peer-to-peer protocols. With named pipes, multiple clients can send messages to a single server using the same named pipe. Parameter passing among machines is potentially problematic because data representation varies across CPUs and sometimes across operating systems.

4. Describe the two major standard families for component infrastructure and communication. If you were forced to choose one standard to support a new large-scale

information system, which would you choose? Why?

CORBA is one standard family for component infrastructure and communication. It specifies the middleware used by objects to interact across networks, and has two key components, the Object Request Broker (ORB), a service that maintains a component directory and routes messages among components, and an Internet Inter-ORB Protocol (IIOP), which is a component message-passing protocol. CORBA is a robust, scalable, and platform independent standard with a long development history and adopted by a large number of computing vendors and organizations.

If I had to choose a standard to support a new large-scale information system, I would adopt the Simple Object Access Protocol (SOAP) standard for distributed object interaction due to its few infrastructure requirements and relatively simple programming interface. Since SOAP is an open standard developed by the W3C and adopted by Microsoft's .NET platform, it has long-term potential for success. SOAP does have significant limitations, such as undefined implementation specifics that have created problems of interoperability.

5. What are directory services? What types of information might be made available through directory services? Describe the LDAP directory services standard.

Directory services are middleware that store the name and network address of distributed resources, responds to directory queries, accepts directory updates, and synchronize replicated or distributed directory copies. Directory services make information about registered users and their permissions to access directory objects, shared hardware resources, shared files, databases, and programs, computer systems, and specialized hardware devices such as network storage appliances available.

The Lightweight Directory Access Protocol (LDAP) services standard stores information about LDAP objects in a directory, with each object and instance of an objectclass that defines the attributes common to all member objects. All objects in an LDAP schema have a distinguished name, which uniquely identifies the object within an objectclass. A fully qualified distinguished name specifies a complete path from a directory root node through one or more container objects to a specific object.