Computing Architectures Essay, Research Paper

IntroductionAn organization s computer network is a major asset and needs extensive planning for proper function. The network design process is a long and arduous task that requires knowledge of the business need of the organization and the technical skills to achieve those needs. The network designer must first address the major problem of what architecture should be employed in a particular network. The distributed approach and central approach are the two possible choices a network designer has to choose from. Background of Central & Distributed ArchitecturesThere are two mainframe architectures for a network Central and Distributed. Both architectures employ mainframe computers that hold massive amounts of data, which are accessed by terminals, and whose location is not important to an end-user. An example would be an airline reservation system. Reservation data can be read and changed by an airline clerk, which is then sent to the mainframe to be updated. The system is updated in microseconds so another user does not see old information. The central architecture consists of one storage computer that holds data, whereas the distributed architecture consists of two or more, smaller mainframes physically separated to serve the same purpose. Advantages and Disadvantages of Central vs. Distributed Data StorageAdvantages of Central Architecture: less maintenance and changes must only be reflected at one site. Less maintenance is required on the overall network because there is only one mainframe, whereas in the distributed approach there are more mainframes to maintain. Secondly, changes that are entered into the system by a user need to be updated only at one mainframe instead of being changed at more than one. For example, John has made a reservation at 8:00 AM for Monday to mainframe A and currently it is updating itself. At the same time Linda is accessing mainframe B, which is not updated yet. She sees the 8:00 AM slot for Monday as open and reserves it for her customer. The data is now corrupt. This is a very simple example of what can happen with the distributed architecture. With the central architecture the data is updated in one place, leaving no room for error.Disadvantages of the Central Architecture: A higher load on the network is incurred due to having only one central data access point. Second, there is no data redundancy, which means, if the one mainframe goes down the network goes down. Third, unauthorized access would yield more data to a hacker compared to the distributed approach.Advantages of Distributed Architecture: more redundancy since there are more mainframes with same data, more secure because a hacker doesn t have access to all the data, and less susceptible for entire network to go down since all data is not stored in one place.

Disadvantages of Distributed Architecture: More maintenance is required because there are more mainframes and data updates must be updated on more than one mainframe as stated earlier. Value of ProjectThe value of the project is enormous due to the information technology being a major asset for a company. Data retrieval and transportation is a vital part of most organizations and a must for a company to do business on any scale. That is why a network architecture decision must be made for the best data transfer method. The wrong choice will be a tremendous liability to an organization for two reasons: an undertaking of this kind is expensive and a network must grow as it gets older-meaning it must be planned out from the start correctly or else it will be of no worth later on. Methodology in Evaluation of Client Sever vs. Mainframe ArchitectureThe network designer has a set of predefined characteristics in order to choose the correct architecture for a particular network including: the physical size of the network, cost, efficiency, and performance. These are general determinants that must be taken into consideration before an architecture is chosen. SizeGenerally, a network that would reach globally, carry variable sized data, and have many users in different locations would be better suited for a distributed approach. The central approach would be ideal for a small branch office to a statewide network, with a maximum number of users at 1000, and carry continuous or steady traffic. CostA larger global network would be less concerned with cost, whereas a smaller network would be more concerned with it. Cost depends on the scale, amount of data that will be transmitted, complexity of work, etc. An installation of a network usually involves outside contractors with the aid of in-house network operators. The least cost will be determined by adding up work done by the outside vendors, equipment, software, consulting time, and proposals from different bidders. EfficiencyA standard measure in telecommunications is the 99% quality measure. A network should be totally operable, even if it is down 99% of a year. This can be tested before the installation takes place by running tests and simulations by vendors who are attempting to gain your business. PerformancePerformance will be reflected by the throughput of the network. How fast can data be delivered across the line to from the sender to the destination? This will vary from the type of protocol used in both architectures depending on the type of data to be transported. This can also be tested with simulations. Sources of InformationInteroperability in Today s Computer Networks, Carl Malamud, 1992Essential System Administration, O Reilly & Associates, 1995