

Classroom Preparation Activity

**Making Recommendations about Client Server Architectures.**

1 December 2000

**Question#1:** Recycled Furniture Inc. is a small new company with less than 10 employees. All of the employees are co-located in a single building. None of the employees has particular computer expertise, although one has been quite successful at following directions in published manuals (and calling help desks with questions). All employees have relatively powerful desktop computers (they got them relatively cheaply). Their current biggest computer issue is with sharing files -- they are using a sneakerNet (transferring files by copying them to disks and giving them to the next person). They are thinking they need to migrate to some type of network environment. Of the three client-server architectures we have discussed, which would you recommend and why? Please cite features of the problem in your justification.

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**Respondent 1:** Situations: Powerful computer, no very much computer experience (eliminates 3-tier), transfer files by copy to disk and give to others.

Therefore, I suggest Recycled Furniture should use file server architecture. This require client to have high computational power, they dont have experienced network MIS person, and file server architecture is easier to manage and is usable for small company for file sharing. Because the company is small, network traffic should not be a problem.

**Respondent 2:** The three-tier architecture is the best choice because

- 1) The servers handle all the computer applications so that employees with no computer experience can access the database without learning how to use the particular software.
- 2) Since all employees have powerful computers, the power expectation of the server computer will be the same as or higher than the employee's computers.
- 3) With this network installed, employees can share files over the network without using SneakerNet. They don't need to copy a disk and share it with others.

**Respondent 3:** I think that the file/server architecture is most appropriate in this case. This system is relatively simple to set up, knowledge for set up can be accessed on the web. Because the computers are powerful, there should be a suitable response time. A high network load is created by this architecture, but because there are few people using this system, this should not create a problem. The employee with the limited computer expertise should be able to accomplish most of the set up by following a direction manual. This seems to be the least costly and the most practical approach for the sharing of data in the Recycled Furniture Inc.

**Respondent 4:** I think what they need is a file server architectures. The company is a small company and their biggest issue is with sharing files. By setting file server architecture, the file server can act as a shared storage device and all data manipulation is performed at the client PCs. The cost is not expensive comparing with the other 2 architectures.

**Respondent 5:** I would recommend a File Server Architecture. The Lan acts as hard disk space available to all that are connected to the Lan. They can store all files on this space that they want to share with others. The files will appear in a new drive on their powerful desktop computers, and from this drive they can transfer the files with a push of a button instead of walking across the hall.

**Respondent 6:** File Server:

Manages file operations and is shared by each client PC. Since they are just sharing files, they can easily manage the whole database on their own PC. The limited number of people cuts down on the network traffic and the number of records desired at a time is minimal.

**Respondent 7:** I recommend the file server architecture to this company. Although the three client-server architectures can solve the biggest problem -- sharing files, the file server is the most suitable one for this small company.

Because the company only has less than 10 employees and all employees concentrate in a single building, the amount of copies of software needed (DBMS and application) is not a big number, and the network traffic is not busy. So the file server architecture can satisfy the need of the company, at the same time, with lower cost.

**Respondent 8:** The file server type is best for this situation. Since there are only a small amount of people that will be accessing and downloading the files and they have powerful computers so speed and network traffic will not be a problem. Also cost of software for client computers is not high.

**Respondent 9:** Recommend using file server architectures. Since all 10 employees have access to relatively well equipped PC, all required processing of files can be done at the client PC. Also major concern with networking is to sharing files, file server will be the best option to manage file operations between employees. (Company merely needs a shared data storage device at least for now) :)It is also the cheapest option to go.

**Respondent 10:** The file server makes the most sense here because there are only a few clients, the clients can handle the load, and it seems the company only needs the centralized storage that a file server brings.

**Respondent 11:** I would recommend a database server architecture. Since the company is small and few of the employees have computer expertise, a database server would allow for enough of the manipulation to be done on the server. The client workstation is only responsible for managing the user interface (application) therefore if any questions do arise they should be easily solved by the one person whom is resourceful enough to troubleshoot using manuals and helpdesks. A file server architecture could be appropriate since all employees have powerful desktop computers but there is not enough technical expertise to warrant the use of a file server architecture. For these reasons I would recommend a database server architecture.

**Respondent 12:** Due to the company size, and knowing that the employee have very powerful computers I recommend a file server architecture.

The network might not be too loaded as they are only 10 employees.

The basic feature of the network they are interested in is the sharing of files so they do not need a too complicated system.

The data will be located on a server. Every user will have a DBMS and the applications on his/her computer, and will be responsible for the I/O features.

This solution will not be too expansive as it is a small company.

Besides, it is not worth involving more money in such a project for this 10-employee- company.

The users are not highly distributed so the set up of the network will be easy.

**PROBLEM:**

The company will have to buy many licences.

The possible future upgrade will have to be performed on each computer ( for the DBMS for instance).

The users who do not have particular expertise will need training.

**Respondent 13:** I think the File server will work best since they all have relatively powerful desktop computers.

Everyone can access it, not very busy, significant LAN traffic.

**Respondent 14:** they can use the File servers.

because first, everyone has powerful desktop computer, so each client computer have enough memory for full version of database, so the memory should not be a problem.

second, the file servers architecture has no need for the employee's expertise.

third, it is not complex and expensive too.

**Respondent 15:** I would recommend a database server architecture. It would be less expensive and easier to set up than a three-tier server. It would also be easier for most of the employees to use than a file server. Since only 1 employee seems to have some computer prowess, that employee could manage the database server fairly easily and help the other employees learn how to use the application program on their computers.

**Respondent 16:** I recommend file server architectures. All employees have powerful desktop computer that are able to do processing on it. They can keep their files on their sharing drive to avoid snakerNet. It is the small

company with less than 10 employees. It might be more expensive and harder to maintain the system if they implement database server architecture.

**Respondent 17:** File server architecture. Since the company is small, there would not be much of a problem with network traffic. Also, their biggest issue is with sharing files--a file server architecture will help them solve this particular problem since it is used for the sharing of files.

**Respondent 18:** They should go with a file server architecture. Myspace barcrapped out on me tonight. This will create problems because if the traffic on the LAN increases, then they'll run into problems with everything being slow. Also, if they decide to upgrade, then all the client computers will have to be upgraded.

**Respondent 19:** File Server, Company is small, employees have relatively powerful desktop CPU's. Programs and Queries can be performed at their stations. All that is needed is a shared file server.

**Respondent 20:** File server architecture. It's cheap, and since there's only 10 employees, upgrades won't be much of an issue. Also, all employees already have a powerful PC, which could handle all the processing easily. Because their biggest problem is the inefficient way of sharing files, a file server would easily resolve the problem. There is also minimal technical ability required. The one guy who's good at following instructions could be assigned to maintain the server, while all that the rest needed to know is how to FTP.

**Question#2:** Acme Consulting was formed by a group of UW IE graduates who came together to form an IE consulting company. The company has grown and now has employees in several locations around the state of Washington.

The company gets much of its competitive advantage by having a database of data from past projects. They have been able to use this database effectively to get new projects off the ground quickly. Currently, this database is housed in MS Access, but they are thinking about switching to Oracle in the next year -- they have heard Oracle is more powerful). Alos, their company is growing and they have been hiring many new people (and needing to buy many new machines).

Given their changing circumstances, they are recognizing a new to change their computing infrastructure. Although they do not have much money for technical expertise, they recognize how important it is for their business approach.

Of the three client-server architectures we have discussed in class, which would you recommend and why? Please use information from the scenario to justify your recommendation. this data and their approaches for the problems of past projects

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**Respondent 1:** Situation: Existing database, thinking about changing Operating system, and they are growing, and is already a large company.

I suggest they should use the 3-tier architecture. The 3-tier architecture so when they are switching operating system, they will not have to go off and install every computer. Files can be readily shared, and network traffic can be congested by the server. Furthermore, although there's a large initial purchase fee, lots or \$\$ can be saved in the long run. For example, they dont have to upgrade computers that often since the client side does not need much computing power.

**Respondent 2:** The three-tier architecture is the best choice because

- 1) Although this network is costly, the company can reduce the cost of the new machines because this network server can handle all the applications and database management, and the new machines do not need to be powerful for data access.
- 2) The company is hiring many people. This network can handle many people access because its servers run all the applications and database management. The people's computers require small RAM to access the data.

**Respondent 3:** Because there may be extensive data in this database, it may be the most practical to use the three tier system. The initial costs may be more expensive than the other architectures, but they will be less expensive in the long run. In this architecture a server can be built to meet the specific needs of the company. Often this system can react to business changes quickly which will result in a competitive advantage. The company is growing and may become too large to support a two tier architecture, therefore it is a better decision to implement a three-tier architecture initially. If monetary resources are not available, a database server architecture should be implemented.

**Respondent 4:** Database server ARCHITECTURE.

Since company are thinking to use of stored procedure, a module of code written in Oracle. They have compitative advantage by having database of data from past projects, so thay are easily to build a database server.

**Respondent 5:** I would recommend a two-tier client/server environment. With many users being added, it is important to decrease your network traffic. Using a two-tier architecture will help to do this. Implementing a two tier system is cheaper in the short term than implementing a three tier system. This will accomodate the consulting company's current fund situation.

**Respondent 6:** Database Server:

Their system is responsible for database storage, access, and processing in a client server environment. The system requires only the processing power necessary to handle the database. Updating and integrity checking can be done in one location.

**Respondent 7:** I recommend the database server architecture for Acme Consulting.

Because the employees distribute in several locations around the state of Washington, the network traffic can be reduced by moving DBMS to the database server, compared with file server architecture. And the data security and integrity are better than file server.

Consider that they hired many new people and would buy many new machines, it is costly to install software and application for each computer.

At the same time, Oracle is a DBMS software. They can install Oracle only in the server.

**Respondent8:** Either three tier or database server is best. Because they rely heavily on past project info, data integrity is a major issue. Three-tier seems to be the best for that. However, the employees might need more freedom to ask specific queries which they could get from the database server.

**Respondent 9:** Recommend Database Server Architecture. The major concern for the company is to keep the database up and running (keeping the data integrity is crucial issue). Since the company is moving towards more powerful database applications, they will require complex operations to be performed in database server instead of each client PCs. Also since the database server can be tuned up for performance optimization, it will accommodate many new employees.

**Respondent 10:** The database server is the better option here because they have a growing number of clients and don't have the money needed to go all out for the three-tier architecture. It servers as a good balance between computing power and cost. Also they need the flexibility in the DBMS they use and the database server gives them that.

**Respondent 11:** I would recommend a three-tier architecture. Although they "do not have much money for technical expertise" it is clear that the company is committed to a higher level of technology and anticipates its necessity with the growth of their company. They could do well with a database server architecture but given the size of the company already, any future upgrades to applications would have to be done on every client computer and would therefore be costly. Since the company is growing and ther are "hiring many new people" they should consider hiring some technological expertise in this process. Although a database server would be sufficient for handling a stored procedure (Oracle) the company seems most committed to the future and the technical changes from which will affect the company. For these reasons I would recommend a three-tier architecture over a database server architecture.

**Respondent 12:** The company is planning to switch to Oracle. If they want to save money they should not use and architecture which relies on the DBMS of the users. Otherwise they will have to make sure that every possible client has the appropriate DBMS. Thus, we have to decide between the database server architecture and the three tier architecture. I would say that both could be adapted efficiently to the company. But due to the current costs they are facing ( new DBMS, new hardware, new employee ...), I would say that more money could be saved if they choose the database server architecture. Indeed, they will not need a too high-capacity server ( or at least less 'powerful' than the three tier one). The users (IE graduate students) might have enough knowledge to manage the applications on their own computer. I think that Acme business does not imply a too important flow of information or too high transaction volumes: that is a database server network will be sufficient without affecting the response time.

**Respondent 13:** Database server.

This server can store Access information that they need and can restore it later on.

**Respondent 14:** the database server architecture is good for them. first, with the employees increase, the LAN's communication load would added. so sharing powerful database will effectively avoid this.

**Respondent 15:** I would recommend a database server architecture. This way they would only have to purchase the new DBMS for the server and not for every users computer. They would not want to go to the three-tier architecture because it would cost more money and it would require more expertise to set up and run than the company could afford at this time.

**Respondent 16:** I recommend three-tier architecture. It is the growing company that might need to change their database anytime. By having seperate application server and database server, it will help them avoid difficulty when they want to change something in the database to react to business change.

**Respondent 17:** Database server architecture. Since there are more clients using this than the previous example, a database server architecture would help with decreasing network traffic as processing moves from the client to the server. Also, since cost is an issue, a database server architecture would fulfill this company's needs and be less costly than if they were to implement a three-tier architecture, since a database server architecture would require less technical expertise (additional) than the three-tier.

**Respondent 18:** These guys have more demand for data integrity than the previous group, and they most likely don't have the money for the high level of technical support required to run a three-tier architecture. This system will make changing the DBMS difficult without having to rewrite the stored procedures. Also, upgrading clients requires that each client be upgraded separately.

**Respondent 19:** Database Server Architecture, company is large and growing, new computers are being purchased, so new software is needed. Not a lot of money is available for hired experts on three-tier architecture. Not an abundant in-house knowledge. Users of database are not in one location, rather, spread out around Washington, security issues may arise as well as integrity and efficiency. Users in different areas of Washington may not need to download the entire database to get the information that they need.

**Respondent 20:** They should go with database server architecture. Since they are planning a DBMS upgrade, a database server would provide a cheaper solution because the upgrade only needs to be done on the server, and not on the client side. Also, since they do not have much money for technical expertise, a three-tier architecture is not recommended. File server is not recommended because it would be difficult to have to upgrade all the client PCs that are in different location all over Washington.

**Question#3:** A group of entrepreneurial IE students have a business idea. Their idea is to develop a sports information service that can be accessed from a variety of different devices (i.e., palm pilot, cell phone, etc.). They think they can create code to poll publicly available sports information, format this information, and then distribute it to customers. Customers would subscribe to the service and their device would be outfitted with a cellular modem. They realize a key issue is to determine how to set up their computing architecture.

Of the three architectures discussed in class, which do you recommend and why? Please justify your recommendation with details from the case.

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**Respondent 1:** Situation: clients receiving using cellular modem (3G broad band wireless not yet available) so have slow transmission rate, information/data orientated, Students (especially IE students) lacks funding and \$\$ automatically eliminates 3-tier architecture.

The IE students should pick to use database server architecture mainly because wireless transmission is a major limitation to data transfer. In doing this, the client side (palms) handles simple information i/o and computing. By have database server approach, only raw data (small) will have to be transmitted.

**Respondent 2:** The three-tier architecture is the best choice because the applications needed to access data must not be powerful. Devices such as palm pilot and cell phone contain little RAM. This network runs application and database management in its servers, and it allows clients to access the data with small RAM.

**Respondent 3:** The three tiered architecture is most plausible in this case. This system seems as though it will be quite complex. Many people may be accessing the data simultaneously, so it seems necessary that the three tier architecture be used. It is advised that a expert in the three tiered architecture is consulted, instead of trying to set up the system by themselves.

**Respondent 4:** 3-tier architectures. Using an application server can improve performance by the use of code the created to poll publicly available information, format this information and then distribute it to customers. Database server is responsible for database storage, access and processing. Client server only manage the interfacing with customer through different devices.

**Respondent 5:** I would recommend a three tier architecture. First of all, if this company is in it for the long hall they want the system to be the least expensive in the long term, which the 3 tier system is. 3 tier systems also have higher customer service then other systems. They can support multiple interfaces accessing the same information, just as the new company wishes to do.

**Respondent 6:** Three-tier:

This system is an application server that allows a lot of versatility. Pretty of processing power and is able to handle a lot of network traffic. Other benefits include:

Scalability- easily expandable

Technology Flexibility- can run various programs

**Respondent 7:** I recommend the three-tier architecture for them.

This sports information service can be accessed from a variety of different devices. These devices are clients in this system and only user interfaces need to be handled on the client level. All other functions can be carried out on the servers, including application server and database server.

At the same time, the group wants to create code, format information, and then distribute it. Created code is stored in database server, and all other activities should be handled on the application server.

**Respondent 8:** Three-tier is best for this situation because of technological feasibility. Clients can easily get info without needing to know a lot about computers. It's also good for scalability. Since client is only in control of input/output and there are many of them, data integrity is easily upheld.

**Respondent 9:** A form of three-tier architecture would serve the purpose. Two tier being an application program server and enterprise database server. Application program server will do the coding/decoding of the publically available sports information. Customer subscription can be processed via database server which will contain all formatted sports information. Three-tier architecture will give competitive edge as they are able to react to the changes in business and also it's technological flexibility will allow them to keep up with the advance in technology.

**Respondent 10:** The three-tiered architecture would be the best option. There are numerous clients with relatively low computing power and how minimal applications available. The solution is to make sure the client only has to deal with input/output. The bulk of the cost however will be taken on by the server.

**Respondent 11:** If this business idea were to attract many potential customers (ex: more than 100) then it would probably be necessary to have a three-tier architecture. The network must be sufficient enough to handle the capacity and variety of applications. Although I am unclear: if a customer's device is outfitted with a cellular modem does that mean the application is on the "client"?

**Respondent 12:** The case shows that the architecture needs to be very flexible as far as technology is concerned: the clients should be able to use various devices.

The three tier architecture appears to be the most flexibile one that can enable different types of users and different types of interfaces. We can have 'thin clients' in this case.

They can not expect every user to have an appropriate application (that is compatible) on his/her palm pilot or cell phone, to make requests on the servers. IT seems that they believe that they will have many clients accessing their service so they can not afford buying the licences for the users either.

The should have a lot of transactions, and a lot of accesses to their service if the company is thriving: thus the three tier solution is the best one. TPs will help monitoring the connections.

Besides as they have only the business idea for the moment, they need a flexible solution: they must be able to change some modules easily to adapt their architecture while creating the company. The three tier architecture will allow such easy changes and adaptations at low cost.

**Respondent 13:** 3-tier architectures.

This can process input and provide the information to customers.

**Respondent 14:** the three tier architecture is good for this scienario. because first, there may be a lot of customers, the scale may be large. second, there could be a lot of application program implemented at the same time. so additional application's existence is suitable. third, this business need would be matched by the convenience to adding new support modular. for example, add something to make the consumers use the cell phone to subscribe.

**Respondent 15:** Three Tier would seem to be the best choice. Customers would be accessing the information from a range of devices, some of which could not support the DBMS and possibly even the application. Therefore, these applications would need to be run by the server to allow the smaller devices to get the informaiton.

**Respondent 16:** I recommend three-tier architecture. Similarly as in case above, they need to react to business change. Thus, it is easier to seperate application server and database server.

**Respondent 17:** Three-tier architecture. In this scenario, the number of clients is the greatest, thus this architecture would be the best choice for this company. Also, multiple interfaces on different clients can access the same business processes.

**Respondent 18:** Irecommendthethreetierarchitecturebecausethenthe clientsdon'thavetodealwithhavingaDBMS. Thingslikecellularphonesdon'thavethecapacityorthe abilitytoruncomplexapplications,sotheideaistominimizetheamountthattheclientshavetodo. Therefore,thegroupwouldw anttogotoaserverorcentralizedsystemthatwillworkrapidly,performallthenecessaryqueriescentrally,andthendistributeth eboxscoresstraighttoapagerorcellphone. Sorryaboutthespacebar. ItbrokeearliertodayandIcan'tfixit.

**Respondent 19:** Three-tier Architecture. It is technologically flexible. easier to change DBMS engines, easier to implement various desired interfaces such as Web browsers or kiosks or in this case cell phones and palm pilots. Being entrepreneurial IE students we want to have the competitive advantage, so the ability to react to business changes quickly by changing small modules of code rather than entire applications can be used to gain this competitive advantage.

**Respondent 20:** Three-tier achitecture is the best solution for this situation. Because the device in which the customers will be using to access the dat has minimal processing power (palm pilot, cell phones, etc), we need to have a server dedicated to applications. Three-tier architecture is also perfect for the long-run because of its upgradability and flexibility. In an event that we need to make changes our system, it would not affect our customer in anyway. Also, because of a dedicated data server, and applications server, the three-tier architecture is more adept at handling large pool of users (which we would fully expect, as our company grows).