COM & DCOM

COM

Microsoft COM (Component object model) technology in MS window family of operating systems enables software components to communicate. COM is use by developers create are re-usable software components together to build applications, take advantage of windows service. COM objects can be created with the variety of programming languages. Object oriented language, such as c++, provided programming mechanism that simply the implementation of COM objects.

COM & DCOM Basics :-

(1) COM :

- It stands for component object model.
- It is a ms platform for s/w component entry introduce by ms in 1983.
- MS COM technology & ms COM windows family os enables component to communicate.
- It is a protocol which enables this software component to communicate.
- COM is used by developer to create reusable software component, like component together to build application take advantages of windows services.
- COM is used in application Such as ms office family of product.
- COM technology allows data link work document to dynamically linked the data in excel spread sheet & COM automatic allows user to build in their application to perform repetitive talk or control one application from other.
- The technology was based of OLF(object linking & embedding).
- It was first time introduced with windows 3.0.

(2) DCOM:

- DCOM stands for distributed component object model.
- It is the family of come technology includes COM+ , Active X, .net.
- MS protocol that enables the software component to communicate directly over a n/w in a renable manner. It is also called n/w OLF extends .
- DCOM is an edition to come that facilities the transparent distribution of object over n/w & internet.
- DCOM allows communication & manipulation of objects over a n/w connection.
- It was started from windows NT4.0.

COM & DCOM ISSUES

(1) **Persistence of code:-** A component once created can be used any numbers of items. Thus making developments a simpler task. It is used for number of times.

(2) **Sharing:-** This is one of the most wonderful feature provided by COM/ DCOM . It means we can design our component to be either in process to out process/remote process. But the calling application will interact with them in the same........the client application is never way of whether the component i.e using is an in process one or out process one accessed. Because of this developer can develop in a manner that makes most since to the client application using them.

(3) **Scalability:-** scalability to the refer to the ability of an application scope with the load in term of number of users using that application & also data moving across the n/w. A critical factor for a distributed application is its ability to grow with number of users, the amount of data & the required functionality. The application should be small & past when the demands are minimum. But should be able to handle additional demands without sacrifice functionality or reliability.

(4) **Language independency:-** COM provides programming language independence thus component created in one language can be used in any language.

(5) **Easy of Modification:-** components created COM are independent of each other because of this fact component can be upgraded without effecting the other part of the program or component.

(6) **Versioning:-** COM components are self versioning , this means that whatever some new functionality is added to an old component, the version of this component changes automatically when this component is if distributed to new client they can be old functionality as well as new functionality.

COM COMPONENTS

COM allows to create of independent on reusable component. COM component interact with each other in the basic of client /server model. Based on this component of COM can be categorized into two parts:

(1) **Client Component:-** Client component uses the services and functionality provided by the other COM component .

(2) **Server Components:-** It is a COM component that exposes its functionality to other component so that they can use it.

2. (a):- In –process Server Component

(b):- Out-process Server Component

(a). In process Server Component: It means its code executes in the same process which space is as client. Server is implemented as DLL stands for *"Dynamic Link Library"* DLL stores a specific set of functions & procedures separately from the executable. DLL is occupies the memory the only when the program calls for the function.

DLL gets executed in the same memory area of the client as DLL occupies the same memory that of the client . They can communicate with the client and first speed by calling procedure in DLL & we can access thousands of procedure that form the backbone of Microsoft windows operating system as well as routine written in other language. Basically DLLs are libraries of procedure that application can link to and used at runtime rather than link to statically at compile time.

(b). Out-process Server Component:- It means its run other process on a remote machine server is an implemented as a stand-alone executable having & ".exe". out process server in a different address space from that of client . They executed in a different address space than of client. If they field. It does not effect the entire client application but which is true in case of DLL.

(UNIT-2)

(Buliding Distributed Scalable Application with COM part 1):-

Distributed:- To be a true system mode an object architecture must allow a distributed involving system to support millions of objects. Without any risk, COM is such an application that can supports distributed objects that is allows application developer to split to get a single application into a number of different computer each of which can run into a different computer or some computer.

Scalable:- Scalable is a critical feature within those application that must support expending enterprises. A scalable application can be ready increase work load without insuring hardware express or poor performances . since COM provides network transparency, these application don't appeared to be located on different machines . so COM provides to build distributed & scalable application.

COM Security:- for a distributed object system is to be useful in the real world. It must provides a means of secure access of object & data they adopted.

COM provides security along several crucial :-

(a). COM uses operating system permission to determine whether a client has right to start the code associated with a particular object.

(b). persistent object, COM uses operating system permission to determining if a particular client can read the object at all & write whether they have read only or read write accessed etc.

(c). COM provides cross process or cross network with object server with standard security information about the client that are using it & also get security to the server that facilitates services.

TRANSACTION & DATABASE:

(A). Transaction are atomic operating in which no one point of the operation can succeed unless all part of the operation can successes.

(B). A successful transaction is committed & any change that it has made data sheet.

(C). Unsuccessful transaction is rolled back so that at data stored are returned to their state prior or transaction inspection.

(D). This transactional approach to data modification approach to data modification helps data store / maintain a consistent state, this means that there are no surprise if the account balance database can server have negative value unless the credit database has corresponding approved record.

(E). Transaction allows multiple changes like this to be created automatically.

HOW TRANSACTION ARE PERFORMED:

Transaction are generally committed through a two phase process that are:-

- In the first phase each of the participant votes to commit or about the transaction. Although database server are most common transaction participate if any participant votes to about the transaction is rolled back .
- In phase two all data stored involved are returned to their pre-transaction formed. If all participant votes to communicates the four transaction is committed. This doesn't mean that operations are completed , it just means that participants are committed to completion this part of transaction.

DATABASE SERVER:-

CLIENT

COM application:- Transactions have four integer factors known as ACID *i.e* (atomicity, consistency, insulation, durability)

(1). Atomicity:- Atomicity property refers to the fact all elements of a transaction are treated as an individual unit.

E.g . Transaction in all or nothing. In a transaction where four updated, all the tables will be transact or not

(2). Consistency: The consistency properties promises the data will remain stable manipulator of data will not corrupt or they corrupted by other concurrent operation. This database with those of other object in the system.

(3). Insulation : Transaction operation are isolated or independent from the other users of the data store involved. Therefore no other will ever a partial transaction.

(4). Durability : Durability property indicates that transaction are durable after being committed the operation will completed one way or another way.

APPLICATION FOR BUSINESS OPERATION CAN USUALLY HAVE FOLLOWING PROCESSES:-

- Take data entered by the user as input
- Process the input data as per the business logic.
- Strong the data or outputting in the users application.

Therefore , all application are having there element within them which are:-

(a). User interface: Through which user interact with the application. It is used for accepting input from the user & present the output to the user.

(b). Business rule/logic: It is the second element of any application

(c). DataBase Services: it is used to store & retrieve the data. These three elements decided the architecture of an application which are following:-

(1). SINGLE TIER ARCHITECTURE

EVERY THING IS AN EXECUTABLE FILE

DATABASE SERVICES

BUSINESS RULE

RULE

USER INTERFACE

- Single tier architecture are most common in desktop application
- It is also known as monolithic architecture machine.
- In a single tier architecture all the three elements of the application:- user interface logic & database services are packed in single executable field.
- It multi-user wants to us the application, the application has to be installed on each & every user machines.
- Even the database copied to each & every machine because of this changes made in are database can't be reflected in another database.
- The machine on which the monolithic application need to be distributed have to be every powerful & highly configured because all the three layer have to be process in a single machine.

(2). TWO-TIER ARCHITECTURE

- While single tier architecture are designed for desktop, two tier architecture are commonly designed for network where user access central data source.
- With two tier architecture the database doesn't reside on the users computer instead, there is a database server that handles the management of data.
- A client application, which resides on the users machines, is used to interact with the server.
- The client server relationship follows processing to be shared by both machines.
- A database server takes care of storing & retrieving data for multiple user. The difference between single inheritance is that data resides on a different machine which is accessed by the client.
- Two tier architecture are a simple method of creating distributed application, they can causes a considerable amount of network trafficking.
- This is also known as client server model / architecture.
- In two tier architecture business rule can either applied on the client side or on the server side. Based on this fact two tier architecture is classified in two types:

(a). **Thick client:** If the business rule are applied by the client side , this type of client-server architecture is known as thick client. In thick client , server is generally & storing data while most of the storing data while most of the validation are performed on the client itself.

(b). **Thin client:** in thin client architecture most of the business rule are applied on the server side & the client is only handling the user interface issues. Thin client architecture enables the developer change the business rule with much ease(easy). Business rule needs to be change only on the server & all the client needn't to be change.

N-TIER ARCHITECTURE

In create a distributed application that avoid a problem if network bottle-necks at the database server, we should consider using n-tier or multi-tier or three-tier architecture. This type of application splits the solution across the several computer. In three tier architecture the application is divided into three interface:-

- User interface
- Business logic/rule
- Database services, Where the user services handle all the user interface issue handle of database, the Business services layer manages the handling of business rule or logic applied & the data services layer includes storing & retrieving data from the database.
- This user interface still reside on the users computer & the database server However, the business rule or data services objects are placed into a component or separated application server the two computer. The three tier architecture model solves most of the problem associated with single tier & two tier architecture:- As business logic is applying on a new layer, business rules are encavouled from the client . client need not to how these rule are applying.

NEED FOR COM IN MIDDLE-TIER LAYER

In three-tier architecture business rules are generally applied on middle-tier . A distributed application which are three-tier in nature grew in popularity come~~m~~erged as the most favored technology. Due to com it ~~want~~ was possible for developers to create separates component for separate services. These components are independent to each other . In a three-tier or n-tier architecture com components are applied in middle-tier as business rule or logics. They are used to implement business services. These components are independent of each other & have distinct functionality.

(UNIT-3)

BUILDING DISTRIBUTED , SCALABLE APPLICATION WITH COM PART 2

Messaging: messaging is the process of sending completely encapsulated set of data between two application components.

- The message provides a loose communication channel between two components. Message can travel in one or both direction.
- Messages can travel in one or both direction.
- Messaging components can exist in the some thread, in the some process, in the different process on the some computer or even in the different process on different computer co-operatively different architecture.

QUEUE

Queue are the buffering mechanism that makes MSMQ(Microsoft message Queue) an effective tools for creating effective queue.

- Queue store a message until on appropriate application sees fit to retrieve the message.
- Queue makes it possible for various components even through they execute at different time at various location within enterprise or machine.
- Most message should be placed from which standard message are received. Message queues are usually created by application however some application might require than the MSMQ administrator create specific queues.
- Message queues can be public or private.
- Public queues are registered in the activated directory.
- Private queue are visible on the MSMQ machine on which they are created.

MSMQ

- MSMQ is a product of window based application development.
- It provides protocol independent communication between queue.
- MSMQ is a set of system component that use database technology to manage robust queue behavior and network facilitates.
- MSMQ is a very effective tool for creating effective queue.

CLUSTERING

Grouping of workstation in the network is called clustering.

- Cluster is a group of fully connected active terminal with server that works together & appeared as a single user system to its user .
- A grouping of inter-connected whole computer , working together as a unified resources that can create the illusion of being one machine.
- Clustering is the most popular process for distributed system implementation.
- Clustering is a very useful technology in COM.

HOW COM & .NET ARE RELATED

COM & .NET are complementary development technologies. The .net common language run time provides bi-directional transparent integration with COM. This means that COM & .NET application & components can use functionally from reach system. This protects our existing investment in COM applications while allowing us to take advantages of .net at a controlled place. COM & .NET can achieve similar result. The .net framework provides developers with the significant number of benefits including a robust, evidence based security model, automatic memory management & native web services support for new development , Microsoft re~~amends~~ .net as a preferred technology of its powerful managed run-time environment & services. recomends

COM

COM+ is the name of the com-based services & technology , first released in windows 2000. COM+ bought together the technology of COM component & the application host of Microsoft transaction. Server(MTS). COM+ automatically handles difficult programming tasks such as resources pooling disconnected application, event & distributed transaction. COM+ infrastructure also provides services to .net developers & application through the system. Enterprise name space of the .net framework. More information on creation .net components that use enterprise services is available on the MSDN website.

DEFINITION OF COM ON THE WEB

COM makes it easier to create component (piece of code) or use pre existing components that can interact with other components & applications.

- COM is a ms platform s/w component entry introduce by Microsoft in 1993. It is used to enable interprocess communication & dynamic object creation in any programming language that supports the technology.
- One of the more notable thinkers involved in the creation of COM architecture, distributed a code or couple of internal papers in Microsoft that embraced the concept of software components so, COM is very useful over the web.

ACTIVE X DLL

Components provide reusable code in the form of objects. An application that useful components code, by creating & coding their process & methods, is referred to as client. Component can run either in process or out process with respect to the clients that user their objects. An in process component, or active x DLL, run in another application's process . The client may be application itself or another in process components that the application is using . it create a file that has DLL file extension. The type of file contains sub-program design to be use as building design to be used as building blocks when creating a stand-alone program. *E.g:-* dynamic link library.

An active x document DLL file is design help to run programs on website step to create an active x DLL is a follows:-

- Create a new project by selecting the new project option from the file menu & select the active x DLL project type.
- Click on the open button. A blank class module is opened.
-
- On the project menu , click on project properties to open the project properties dialogue box, select the general tab, file out the information shown below & then click ok. The project name

reverse string is also used as the name of the components type library. It can be combined with the name of each class the component provides, to produce unique class name.

- Click ok save all settings.
- Set the instancing property for the class. In a class module, we need to define & methods of the class . The methods are the procedure & functions that all be exposed by the objects of the class.
- Press for open the properties window. Double click the name property & changes it to class reverse. This is the name we will use to create objects from the class . then our Active X DLL is created.

ACTIVE X CONTROL

It creates a file that has .ocx file extension. Active X control usually provides both sub-programs & an user interface that can reuse in other programs. A set of component technologies that enables s/w components to interact with one another in a networked environment, regardless of the languages in which they were created. Active X controls are 32 bit, which means that they only function under windows 95 & windows NT. Label , Textbox, option button, command button, checkbox, from list box , combo box, frame, scrollbar, timer control, slider control, font dialogue box, print dialogue box, etc are the basic active X controls. When we add a active x control to a program, it becomes part of the development & run-time environment. Thus to provides new functionality for our application. Active x controls leverage our capabilities as a visual basic programmer by retaining some familiar properties, events & methods , such as the name prosperity, which behaves as we would expect. The Active x control feature, method & properties greatly increases our flexibility & capability as a visual basic programmer.

DAO(Data Access Object)

In computer software a data access object (DAO) can object that provides an abstract interface to some type of database or persistence mechanism providing some specific operation without exposing detail of the database. It provides a mapping from application calls to persistence layer. This isolation separate the concerns of what data access the application need, in term domain specific object & data types (the public interface of the DAO) & how those needs can be satisfied with a specific DBMS. Database schema etc(the implementation of the DAO). This design pattern is quickly applicable to most programming language, most type of software with persistence needs & most type of database, but it is traditionally associated with EE application & guidelines (core J2EE patterns) for that platform.

ADVANTAGES

The advantages of using data access object is the relatively simple & rigorous separation between two important part of an application that can & should know almost nothing of each other & which can be expected to involve frequently & independently. Changing business logic can ready on the same DAO persistence logic does not effect interface remains correctly implemented. In the specific context of the java programming language data access object as a design concept can be implemented of in a number of ways. This can range from a fairly single interface that separates the data access parts from the application logic to framework & commercial products. DAO coding paradigms can require some skills. Use technologies like EJBCMP come built into application server & can be used in application that use a JEE application server. Commercial products like top ink are available based on object relational mapping. Popular open source ORM products include Hibernate, Ebla, pure query, IBATTS , & apache open JPE.

The improved efficiency & performance of the data layer since it is standard reusable software.

Modifications can be made to the DAO implemented without altering other decoupled modules of the application.

DDE (Dynamic Data Exchange)

Dynamic data exchange is a technology for communication between multiple applications under Microsoft windows or operating system. Dynamics data exchange was first introduced in 1987 with the release of window 2.0 as a method of inter process communication so that one program can communicate or control another program, somewhat like SUN's RPC(Remote Procedure call). It used the "windows ones signing layer "functionality" within windows. Therefore DDF continues to work even in modern version of windows. DDF has been surprised by never newer technology. The primarily function of the DDE by its application name. Each application could further organize information by groups known as "topic" & each tqric could serve up individual pieces of data as an "item" a user wanted to pull a value from Microsoft excel which has contained in a spreadsheet called "book1.xls" in the cell in the first row & first column, the application would be "EXCEL" the topic book1.xls and the item "r1c1". A common use of DDE is for custom developed application to control off a generic protocol that allows any (component object model) one would generally need to know details of the application i.e either produce on consume the data.

SEQUENCE MODEL OF DAO

Data access object provide the ~~probability~~ Portability for applications from one data source to another data source . The data access object slides the actual data source instant of talking the data source directly the business object has to go through the data access object. Therefore, the data access object can be easily be replace with an object for a different data source the data source is the actual data source.

DATA SOURCE

DAO

BUSINESS OBJECT

TRANSFER OBJECT

OLE(Object Linking & Embedding)

OLE is a technology developed by Microsoft that allows embedding & linking to documents and other objects. For developers, it brought OLE control caution extension(ocx), a way to develop & use custom possible. Along with a side range of other interfaces, depending on the objects needs . OLE allows an editor to "form out" part of a document to another editor & then import it. Example:- a desktop publishing system might send some test to a word processor or a picture to bitmap editor using OLE, the main benefit of using OLE is to display visualizations of data from other programs that the host program is normally enable to generate itself (e.g a pie-chart in a text document) , as well as to create a master file referenced document. This called "linking" instead of ("embedding"). Its primary use it for managing compound documents , but it is also used for transferring data between different application using drag in drop & clip board operation. This concept of "embedding" is also control to much use of multimedia in web pages, which tend to embed video, contain including flash animation & audio files within the hypertext mark-up language (such as XML or SGML) possibly, but no necessarily, using a different embedding mechanism than OLE. Two different version of OLE are:- OLE 1.0 & OLE 2.0.

NET

COM development has largely been by the Microsoft NET & Microsoft now focuses its marketing efforts. On .NET, with .NET providing wrappers to the most commonly used COM controls. COM is still often used to look up complex, high performance code to front end code implemented in visual basic or ASP. To some extent COM is now deprecated in favor of .net since .net provides rapid development tools similar to visual basic for both windows form & web forms with just in time compilation back end code can be implemented in any .net language including c# , visual basic 8, c++ several of the services that comt provides have been largely replaced by recent release of .net. there is limited support for backward compatibility . A com object may be used in .net by implementing a run-time callable wrapper (RCW), .net object that conform to interface restriction may be used in com objects by calling a com callable (CCW) from both the com & .net sides, objects using the other technology appears native objects.