

Agenda

- Evolution of WCF
- Evolution of Service Oriented Architecture (SOA)
- Four Tenets of SOA
- What is WCF
- Where does WCF Services fit in?

Evolution of WCF:

1. Monolithic Applications
 - a. Fox Pro and MS Access Applications which have both database and code at one place
 - b. SQL Server / Oracle database were used on network but the application was still a monolithic one.
 - c. Problem: Takes lots of time and No Code Reusability
2. Object Orientation – 1980's
 - a. Polymorphism
 - b. Encapsulation
 - c. Sub-classing
 - d. Problem: It by itself didn't facilitate the dynamic evolution of software at runtime. Once an application was built, it was static. There wasn't an easy way to infuse new code into an application.
3. COM Components
 - a. Write code once and reuse in multiple applications.
 - b. Location Transparent
 - c. Tight Coupling
 - d. Runtime Metadata (self describing systems)
 - e. Problem: Worked well on single machine(using method invocation on an object reference), we hit scaling problems when we tried to stretch it out and apply it as the substrate for distributed software integration (across machines)
4. DCOM
 - a. Network Version of COM – Sharing COM objects over network
 - b. Biggest failure of Microsoft as not at all reliable and scalable.
5. COM+
 - a. DCOM + MTS (Transaction Services)
 - b. Object Pooling and Just In Time Activation.
6. .NET Remoting
 - a. Option for .Net developers for Distributed application development.
 - b. Best option only when both client and server are on same network.
7. Web Services
 - a. Provides Objects functionality over HTTP
 - b. Data is exchanged over the network in XML format.
 - c. SOAP is the protocol used for communication.
8. WCF is the next generation of Web Service with following enhancements
 - a. Supports sending messages not only using HTTP but also using TCP and Named-Pipe and MSMQ
 - b. Support for sending messages using formats other than SOAP which includes Representational State Transfer (REST) and Plain Old XML (POX)

- c. Service can be hosting in different types of application unlike web services which needs Web server only.
- d. Built in support for Transaction and reliable sessions

Service Oriented Architecture:

- A service is a program that perform a task and that you can interact with through well defined messages.
 - XML is the format in which Web Service and its client communicate with each other.
- Service Oriented applications consists of loosely coupled services that communicates through Messages and Contracts
 - Client does not instantiate the service
 - Messages are Requests and Responses exchanged between client and server.
 - Contracts specify what requests you can make on the service and how it will respond.

Four Tenets of Service Orientation

1. Boundaries are Explicit

Attributes based programming enables developers to explicitly define external service contracts. All communication occurs through messages. A Service is not aware of how the other service / client are constructed and it only knows how to send a message and how to receive a returned message.

2. Services are autonomous

Services and consumers are independently versioned, deployed, operated and secured. These are going to evolve and can change any time without effecting the clients.

3. Share schema & contracts, not class:

Contracts describe the messages services can send and receive.

Data never includes behavior, object with data and behavior are local phenomenon

4. Compatibility based on policy

Service can define the circumstances under which client can communicate with them.

For Example a Service may require authentication using X509 certificate or may require the client to be on the same network.

Service policy statements are created automatically based on configuration, class attributes and method signatures. Client channels are automatically configured via retrieved service policy.

What is Windows Communication Foundation?

- Introduced in .NET Framework 3.0 and enhanced in .NET framework 3.5. It has classes in the Namespace System.ServiceModel
- It unifies ASMX (Web Services), WSE (Web Service Extensions), .NET Remoting, Enterprise Services (Attribute Based Prog.) and MSMQ (Asynchronous Communication). i.e. it is one model whether communication is internal or external.

- It is a programming model for building service-oriented applications. It's the MS Next Generation Platform for SOA.
- It is the latest mechanism that developers can use to build distributed and interoperable applications that talk to each other.

Where does WCF Services fit in?

Three Tier Arch

Presentation / Client Tier → Business Tier → Data Access Tier → Database

Service Tier

Presentation / Client Tier → **Service Tier** → Business Tier → Data Tier → Database

Basic Requirement for Developing WCF Service and Client

Server

Define and implement Service contract

Construct a Service Host Instance for the Service type exposing endpoints

Open the Communication channel

Client

Requires a copy of the Service contract and information about endpoints

Construct a communication channel for a particular endpoint and call operations

Next: Develop First WCF Service and Understand the code auto generated by VS.NET