

**MICROSOFT.NET REMOTING, [ASP.NET](#) AND WINDOWS
COMMUNICATION FOUNDATION TECHNOLOGIES AND THE SUPPORT
OF DEVELOPMENT GOALS OF A DISTRIBUTED SOFTWARE SYSTEM.**

MICROSOFT .NET SUPPORT FOR DISTRIBUTED APPLICATION DEVELOPMENT

The Microsoft .NET platform is used for building applications, deploying them and running the distributed applications and systems over networks which include the internet (Microsoft .NET Framework, 2008). The .NET framework can be installed on any computer system running Microsoft Windows operating system and this is suitable for the ABC retail since the current systems are based on Microsoft Windows network infrastructure. Applications built by using Microsoft .NET have visually stunning user experience. The framework provided by Microsoft .NET helps in building applications that work the way you want and provides across software services and devices. The .NET applications allows users to interact with the internet using wide range of smart devices and allows the building and integration of web services running in a networked environment.

Web services are supported by the .NET platform and this makes it suitable in manipulating information which is needed across the network. The web services are applications that run on a Web server and communicate with other applications (Microsoft .NET Framework, 2008). These uses a series of protocols to respond to the different requests made. The Web services protocols are shown in the diagram below.

This is a sample only, all copyrights owned by the Genius writing Services

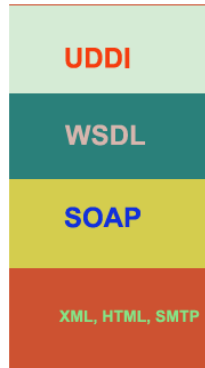


Fig 1: Web service protocols

The UDDI (Universal Discovery and Description Integration) allows the businesses to search for other businesses and allows them to search for the services that it needs to know and contact them. This allows for faster access to information and there are no communication delays during information requests and queries.

WSDL (Web Services Description Language) is an XML document that describes a certain set of SOAP and how the messages are exchanged. The SOAP (Simple Object Access Protocol) is the main communication protocol for the web services. UDDI, WSDI, SOAP rely on XML (Extensible Markup Language), HTTP (Hyper Text Transfer Protocol) and SMTP (Simple Mail Transfer Protocol).

These new technology standards are incorporated in the .NET platform and include XML (extended Markup Language) and Simple Access Protocol (SOAP) which fully utilize the abundance of computing and communications resources. XML is increasingly becoming popular and it provides the ability to present data and information and describe the nature of data. It allows the same information to be consumed by This is a sample only, all copyrights owned by the Genius writing Services

multiple applications or configured appropriately within a web browser on the client machine. This is of vital importance in ensuring that communication in the retail store is efficient and secure. Security is also enhanced by using XML encryption in which data is encrypted during communication ensuring that sensitive information is transmitted across the network without being interfered with or being exposed to unauthorised people. XML organises and displays data in a better way and the Microsoft .NET provides a mechanism for the integration of digital media support and other privacy enabling technologies which are used to control and manage personal information (Microsoft .NET Framework, 2008).

The Simple Object Access Protocol (SOAP) is a type of a lightweight protocol that is used for exchanging information. This is found in distributed environments and it ensures that there is message security. SOAP is a protocol which is XML based and it is composed of three parts which ensure that the transmitted message is secure. There is an envelope which defines the contents of the message to be transmitted and how it should be processed. The instances of application defined data types are contained in the encoding rules and the third component of the SOAP protocol is the convection for representing remote procedure calls and responses.

There is need to provide interaction between applications running and this is provided for by the Microsoft .NET framework. There is provision of a means to access functionality and this is implemented in programs that execute outside the .NET environment. There are features in the Microsoft .NET which provide for this. The This is a sample only, all copyrights owned by the Genius writing Services

applications running on the different platforms can interoperate by means of synchronous and asynchronous communication methods and the Microsoft .NET supports synchronous communication and thus the application running will not require modification to call a .NET Web service.

There can be different applications running at the different offices in the retail head office in Birmingham, the retail web site and the company's business partners. The need of communication between these applications results in the existence of better and secure mechanisms to allow secure communications between them. The .NET framework enables method level security which is specified by the developer and the system administrators. This uses the industry specific standard protocols such as TCP(Transport Control Protocol), XML(extensible Markup Language), SOAP(Simple Object Access Protocol) and HTTP(Hypertext Transfer Protocol) which facilitate the distributed application communications between the different applications in different locations and this makes the distributed computing secure.

The .NET platform makes it very easy to deploy developed applications (Visual Studio 2008 Service Pack 1 and .NET Framework 3.5 Service Pack, 2008). The most common method of installing applications requires one to copy the application along with the components it requires into a directory on the target computer. The .NET framework handles the details of locating and loading the specific required application needs even if there exists different versions of the same application on the target computer. The .NET framework ensures that all of the required components the application that it depends on

This is a sample only, all copyrights owned by the Genius writing Services

are available on the computer before the application begins to execute. This feature of Microsoft .NET ensures that there are no failures after installation of the applications in the client machines which might be as a result of missing dependable components by the application.

The .NET framework does memory management by itself ensuring that the systems memory is well utilised resulting in the applications running faster and the overall system efficiency improving. The existence of a garbage collector is also important as it runs periodically on a separate thread and enumerates all the unusable objects and reclaims the memory allocated to them. This ensures that the systems memory is well utilised by the running applications and any unused memory resource is easily discovered by the system and put into resourceful use.

COMPARISON OF RPC AND MOM

The .NET remoting is an infrastructure in which the abstract approach is used in interprocess communication. Most of the system functionalities operate without drawing attention to itself (.NET Remoting Architecture, 2010). This remoting system enables communication between objects in different application domains or processes using different transportation protocols, formats for serialization, object lifetime schemes and

This is a sample only, all copyrights owned by the Genius writing Services

modes of object creation. The remoting makes it possible for intervention in almost any communication process.

The Windows Communication Foundation (WCF) is an application programming interface found in the .NET framework used for building connected and service oriented applications. The Service Oriented Architecture (SOA) used is the reliance on the Web services to send and receive data. This has an advantage of being loosely-coupled instead of being hard-coded from one application to another (.NET Remoting Architecture, 2010). This ensures that any client in a loosely-coupled relationship that is created on any platform can connect to any service as long as the essential contracts are met and adhered to.

WCF supports multiple message patterns and thus during transmission of messages the messages can be exchanged in one of the several patterns available. The mostly used pattern is the request/reply pattern where one of the endpoints requests data from a second endpoint and the second endpoint replies. There are other available patterns such as one-way message whereby a single endpoint sends a message without any expectations of a reply. The most complex pattern available is the duplex exchange pattern where there are two endpoints that establish a connection and send data back and forth which is similar to an instant messaging program. The availability of the different message patterns provides for greater efficiency and reliability when sending messages over the network.

This is a sample only, all copyrights owned by the Genius writing Services

The Windows Communication Foundation (WCF) supports publishing service metadata using the formats that are specified in industry standards such as WSDL, XML Schema and WS-Policy. The metadata is important since it can be used to automatically generate and configure clients for accessing the WCF services. The metadata can be then published over HTTP (Hypertext Transfer Protocol) and also HTTPS (Hypertext Transfer Protocol Secure) or even using the Web Service metadata exchange standard.

There is provision of security measures in WCF. The transmitted messages can be encrypted to protect the privacy of the message and also the users may be required to authenticate themselves before being allowed to receive and view the messages. This can be implemented using well known standards such as SSL (Secure Shell Login) or WS-Secure Conversation. The messages can also be sent on any of the built-in transport protocols and encodings available. The protocol mostly used is the HTTP used for on the World Wide Web. Another advantage is that WCF allows you to send messages over TCP (Transport Control Protocol), named pipes or MSMQ. The messages to be transported can be encoded as text or by using an optimised binary format. If the available transports and encodings available do not suit a person's needs one can create custom transport and encodings which are supported by WCF. This ensures that the transmitted information is securely sent over the communication channels.

Reliable message exchanges are supported by the WCF by using reliable sessions implemented over WS-Reliable Messaging and using MSMQ. During transmission there are durable messages which are a type of message that are never lost due to a disruption. This is a sample only, all copyrights owned by the Genius writing Services

in the communication channels. These kind of durable messages in a durable message pattern are always saved to a database. When a disruption occurs, the database allows you to resume the message exchange when the network connection is restored. This ensures that there is no message loss.

WCF has an integrated logging mechanism. This helps during tracing of log files which can be a boon during system maintenance. In the other technologies this is not implemented and thus this makes WCF a better technology as compared with the other existing ones. The security mechanism in WCF is simple but very robust and secure. There are default bindings which are provided by WCF and they can be trusted to the core. Such an example is the WSHTTP which is highly used and recommended.

The major drawback of WCF is that it is an implementation of SOA and hence its API's controlled by MS makes its interoperability to be a bit difficult. This might result in difficulties during the running of applications. The deployment of WCF applications requires underlying hardware resources on the platform on which the WCF applications will be running since there is an additional layer of abstraction which must be dealt with.

The Windows Communication Foundation (WCF) applies constraints on certain system processes for security or performance purposes and they come in two main forms. They are either quotas or throttles. The quotas are certain limits set if when reached or exceeded they trigger an exception at some point in the system. The throttles are also limits but they do not immediately cause exceptions to be thrown but instead, when the

This is a sample only, all copyrights owned by the Genius writing Services

throttle limit is reached, processing goes on but is within the limits set by that throttle value. The availability of the limited processing might trigger a certain kind of exception elsewhere but it depends upon the application.

There are also some constraining properties which are located at the serialization level. These are located at the transport level and some at the application level. This might be helpful in for example in hindering malicious clients from engaging in denial-of-service attacks against a service by causing excessive memory consumption. The values for constraints can be set accordingly to either increase or reduce performance accordingly and this might be a solution to the overloading of systems during the peak times. These controls are specifically designed to provide an out-of-the box mitigation from certain types of attacks. They can also be used to improve the performance metrics such as memory footprint, start-up-time and so on. The controls must be well implemented during use since they can impede service application performance or even prevent an application from working.

UTILISING GRID COMPUTING

Grid computing facilitates the creation of a single IT infrastructure which can be shared by multiple business processes. The computer resources are combined together from multiple administrative domains for a specific purpose. This is normally to solve a

This is a sample only, all copyrights owned by the Genius writing Services

certain problem that might be requiring a great number of computer processing cycles or the access to large amounts of data (Berman and Fox, 2003).

The main requirement of grid computing is many resources and this is achieved by connecting the available system resources mainly through networks. This requires the information to be transmitted across the channels to facilitate grid computing. WCF provides safe and secure channels of data transfer and communication which is important in grid computing. The server and client operating in the network to form grid computing need secure channels and this are provided by WCF by using protocols such as HTTP(Hypertext Transfer Protocol).

Grid computing uses middleware to divide and apportion pieces of a program among several resources in a computer system which in other cases might be many. This involves computation in a distributed fashion and this requires the systems to be stable and have minimal errors (Berman and Fox, 2003).

. This is achieved since WCF has many options of transmitting messages and there ensuring that there is consistencies in transmission of messages. The information needed during the distributed computing should be available to the required computers for processing and the WCF ensures that the pieces of a program that are divided among the system resources are reliably transmitted without failure.

The interoperability supported by WCF is important in supporting grid computing. This is because during the execution of a program the pieces of the program
This is a sample only, all copyrights owned by the Genius writing Services

are sent to different computer systems to be processed in a distributed environment. This might result in inconsistencies especially where there are different platforms involved. The WCF supports interoperability between different platforms and this ensures that grid computing is not distracted due to the existence of different platforms in the distributed environment.

Grid computing provides remote access to IT assets and aggregates computing power. The remote IT assets must be well protected from external interference or unauthorised people who might want to access the information. The WCF provides login security features by use of standards such as SSL (Secure Shell Login) or WS-Secure Conversation. This ensures that the users of the message authenticate themselves before receiving the message ensuring that only the required person or computer system has access to the information sent.

The client participating on the grid computing should be well connected with and also there should be enough resources available to be shared or be allocated pieces to process. The client should also be well connected with the central database since during transmission of messages it might be required to access the database in the event of a message failure which is backed up in the database.

REFERENCES:

Fran, B. Geoffrey, F. & Anthony J.G., 2003, *Grid Computing: Making the Global Infrastructure a Reality*. Wiley publishers.

<http://www.microsoft.com/net/overview.aspx>

http://www.w3schools.com/ngws/ngws_webservices.asp

Microsoft. "Microsoft .NET Framework 3.5 Administrator Deployment Guide".

Available at: <http://msdn.microsoft.com/library/cc160717.aspx> (Accessed 13 May 2010).

"Visual Studio 2008 Service Pack 1 and .NET Framework 3.5 Service Pack 1".

Available at: <http://msdn.microsoft.com/vstudio/products/cc533447.aspx>
(Accessed 15 May 2010).

This is a sample only, all copyrights owned by the Genius writing Services