FinTech in Enhancing Traditional Financial Services
with Web Services and Multi-Platform Clients

Kayun Chantarasathaporn[1*], Sudasawan Ngammongkolwong[2]
and Kantikamaht Rattanaparinyanukool[3]

[1, 3]Faculty of Business Administration, Huachiew Chalermprakiet University
18/18 Bangna-Trad Road Bangplee Samutprakarn
[2]Faculty of Science and Technology, Southeast Bangkok College
298 Sunphawut Road Bangna Bangkok
*E-mail: dr.kayun@gmail.com

Abstract

This article is related to overview and practical usage of financial technology or FinTech. It divides FinTech to 3 groups, enhancement of traditional financial services, innovative financial tools and services and algorithm related for executive support services. It also mentions about what should be concerned when using FinTech over public network like the Internet. To have a real touch of FinTech, this article offers sample basic program of motor vehicle insurance premium online quotation. This program contains 2 parts, server and client. Both of them are written in C#. Server is responsible for business logic and is written under open standard Web Services architecture. There are 2 types of client. One is written as Windows application while another is created as Web application. FinTech API's those are available online are also noted in the last part of the article.

Keywords : FinTech, financial technology, web services, web application, windows application

Introduction

Some people say that FinTech is a buzzword (Bryan, 2015). However, the market size of this buzzword has grown like a rocket from 930 million dollars in 2008 to 12 billion dollars in 2015 (Laroche-Gray, 2015). Such a rapid growth business makes researchers unavoidable to study

and professionals inevitable to join. This article is going to talk about overview of FinTech, sample of FinTech in financial related businesses, what concern should users have when using FinTech over the Internet, sample of FinTech with the cooperation of information technology and telecommunication infrastructure and available FinTech API's on the Internet. To demonstrate the practical usage of FinTech, this article provides the sample application that is related to FinTech in enhancing traditional financial services as car insurance premium online quotation software. Server side is written by using open standard Web Services architecture (Alonso, Casati, Kuno, & Machiraju, 2004). There are 2 client sample applications written in Windows and Web platform. Program codes written in C# of both server and multi-platform client are also listed in the latter part of the article.

FinTech overview

FinTech is abbreviated from Financial Technology. It uses the success of information technology, computer network and telecommunication infrastructure to support financial related business and create new financial services. One of the main reasons that helps FinTech grow fast is the stability, enhancement and rather low price of the Internet. One example is in Bangkok, last decade, 128Kbps ISDN was considered as an internet connection for business. However, in 2016, 20Mbps ADSL and 100Mbps FTTX (fiber optic service) are used for internet connection at home ("3BB Promotion," 2016). Though the speed has been risen up for more than 50 times, cost of connection is almost not increased.

Besides, regular internet connection via computer network, the spread of internet connection by smart phone via telecommunication network is another reason that push the usage of the internet. DazeInfo reported that 83 percent of internet connection in 2015 was from mobile phone (Srivastava, 2014). Adoption of FinTech starts from group of people who are familiar with using new technology, early adoption customer segment. This group is also considered high-income users (Gulamhuseinwala, Bull, & Lewis, 2015).

Now a day, several routine financial related services are provided through business web sites and mobile applications.

FinTech can be roughly divided to 3 groups

1) Enhancement of traditional financial services: This service group embraces FinTech as a support tool for increasing convenience, performance and speed of transactions. The sample usages in this case are money transfer by using Android App (smart phone application), insurance premium online quotation and policy purchase.

2) Innovative financial tools and services: This group tries to invent new financial tools and services by using benefit of the global internet. The global-level samples of well-known service providers in this case are Bitcoin (Nakamoto, 2008) and Paypal. In Thailand, one of the growing financial tool that is not provided by commercial bank and has stepped quietly is True Money. Another example of this group is peer-to-peer currency exchange service, such as, Midpoint (Liz, 2014) and TransferWise (TransferWise, 2015). Some of the services eliminate roles of commercial bank from the whole business transactions. In some countries, doing certain financial business needs to be processed by commercial bank, so FinTech may need to concern about the legislation violation as well.3)   Algorithm   related   for executive support services: The samples of this kind of FinTech are providing data analysis services, applying Artificial Intelligence to get some valuable information from existing data which can create new market target.

From Accenture survey, FinTech has been accepted and invested by financial related business in rocket speed. In 2008, FinTech value was around 930 million dollars while it was around 12 billion dollars in 2015. Europe is the region that FinTech has highest grown rate, with an increase of 215% to $1.48 billion in 2014 (Laroche-Gray, 2015).

FinTech is not just the push of technology application to financial related industry. As this field is high value business that relates to various stakeholders, both governments and international agencies have to apply law and regulation strictly on it. To avoid facing difficulties, many new FinTech tools have to be concerned about this legal issue before launching to real market (Laroche-Gray, 2015).

Sample of FinTech in financial related business

There are several businesses and organizations in financial industry, such as, credit unions, banks, credit-card companies, insurance companies, accountancy companies, consumer-finance companies, stock brokerages, investment funds and some government-sponsored enterprises. With this reason, when referring to FinTech, users may need to specify which field that they are interested. By the way, there is one common infrastructure that all various FinTech of the whole industry use which is secured communication over the Internet.

1. Sample usages of basic FinTech to enhance existing businesses in current situation of financial related firms are as follows. Bank provides web and mobile application for customers to handle their day-to-day transactions and transfer money. Credit Card Company allows customers to submit request form, check the remaining credit and transactions online. Investment fund lets customer buy and sell fund unit via web and mobile application. Stock brokers offer customers with web and mobile application for tracking and trading stocks online. In many countries, government agencies provide online services, such as, Revenue Department allows taxpayers and companies to submit forms and pay tax via web, etc.

2. Sample usages of new innovative FinTech product are as follows.

    2.1. BitCoin: This digital currency can be considered by regular users as online cash. BitCoin, invented by Satoshi Nakamoto, is the first decentralized peer-to-peer payment network that is powered by its users with no central authority or middlemen (Nakamoto, 2008) Background of BitCoin is different from regular currencies which usually have some valuable things, such as, gold as a base. The base of BitCoin is mathematics algorithm (Rykwalder, 2014). There is no organization controlling BitCoin. The sample of terms, tools and parties that participate BitCoin system can be summarized shortly as follows.

       2.1.1 "Address" is the same to a personal's physical address. It is the only information the payee needs to provide to the payer who wants to pay BitCoin to him. Each Address will be used for a single transaction. BitCoin user can have unlimited number of Address.

2.2.2. "Block Chain" is a public ledger that records all transactions of BitCoin all around the world. There is no central authority responsible solely for this task. Block Chain uses distributed database concept to keep records of BitCoin transactions. Maintenance of the Block Chain is performed by communication among network of nodes that run BitCoin software.

2.2.3. "Miner" is one who offers computing power to do mathematical calculation to verify and record payments into a public ledger (Block Chain). Miner can get benefits from transaction fees and newly created BitCoins.

2.2.4. "Wallet" is like a place for keeping money which in this case is BitCoin. Wallet is a software installed at client side. It contains private key of the BitCoin user. There are 2 kinds of Wallet software, full and lightweight versions. Full client is installed in computer while lightweight client can be installed in mobile device. Full client can work completely for all client tasks as it contains local copy of Block Chain (over 65 GB on April 2016) while lightweight client needs to connect to server since it does not have Block Chain local copy. Another kind of Wallet requires no software at all. It is online Wallet. It is easy to use but since this will keep everything on server, user needs to absolutely trust the server operator.

2.2. Midpoint: The business of Midpoint can be considered as new way currency exchange that cuts the middleman role of commercial banks. Midpoint is the world's first authentic peer to peer (P2P) international currency matching and payments platform offering mid-market foreign exchange rates. Midpoints has its own patented matching technology. The concept of Midpoint is matching individuals and businesses opposite foreign currency needs. Transaction fee of Midpoint is quite lower than regular commercial banks.

3. Samples of FinTech in usage of Algorithm related for executive support services are as follows

3.1. Artificial Intelligence: One of popular research topics in AI is segmentation. FinTech applies this kind of research to provide service called personal finance. Currently, some businesses apply AI in FinTech deeper than segment level. They can go more personal until level of transaction. "Wallet.ai" provide smart wallet that can help customer to consider, analyze, compare price and get suggestion for every single thing that customer spends money on.

3.2. Big Data Analysis: Credit Scoring, Customer Retention, Risk Management and Investment Management are sample of fields that Big Data Analysis can help (Amit, 2016). As there are enormous transactional data in the mentioned fields, knowledge related to Big Data Analysis can be applied. New models of Credit Scoring are created by gathering data from many sources and quantifying some qualitative data. Samples of startup companies that work with this technique are like Credit Sesame, Faircent, and Vouch Financial. Customer Retention uses FinTech in improvising digital touch points to engage customers. Cardlytics, Cartera and Truaxis (acquired by MasterCard in 2012) are examples of company in this field. FinTech in Risk Management has sample usages in eradicating vulnerable access points, device identification, biometrics and behavior analysis. Samples of company that applies FinTech in Risk Management are Centrifuge, Feedzai and Klarna. Investment Management uses FinTech related to Big Data Analysis to provide efficient investment management solutions. The solutions are from the decision based on potential downside/upside scenarios those are calculated and summarized from utilization of search data, combination of multiple macroeconomic factors, quantification of related news and information. With prepared solutions, Investment Management with FinTech can also detect specific market anomalies and fire appropriated prevention to protect the portfolio. Wealthfront, Eidosearch, and Personal Capital are sample startup companies those are in this field.

What should be concern when using FinTech via the Internet?

As mentioned earlier, there are 3 kinds of FinTech services, enhancement of traditional financial services, innovative of financial tools and services and algorithm related for executive support services. Whenever they connect to the Internet, the risk from regular internet threats both client side and server side is unavoidable. First two kinds of FinTech usually communicate via the Internet while the last kind is often do in-house.

There are 3 points needed to be concerned when using any kinds of communication via public network. These points are shown in Figure 1 which are client, server and network.

- Client: Client side software can be either desktop or mobile client. Desktop client can be either standalone software or web client via browser. Mobile client also can be either standalone (mobile application) or web client via mobile browser. Now, almost all kinds of client connect to server through the Internet. What should be concerned at client side are identity theft. Standalone client that runs on virus infected system may be harmed by key logging threat. Key logger software will track everything user types on keyboard and send details to the destination (that hacker defines). Raw data those are sent will be explored and extracted to get important data, such as, credit card number, username, password, date of birth, social security number, answer of password hint question, etc. When combining such data altogether, the imposters can use these information in verification processes of online commercial transactions. For browser, the techniques can be different. However, the main purpose is the same, identity theft. One of the most deceived method is Phishing. Phishing creator creates fake website that looks like the official web pages to allure some careless users to fill their sensitive data in. The phisher owner can disguise himself to do some malicious transaction under the name of people whose identity is stolen.
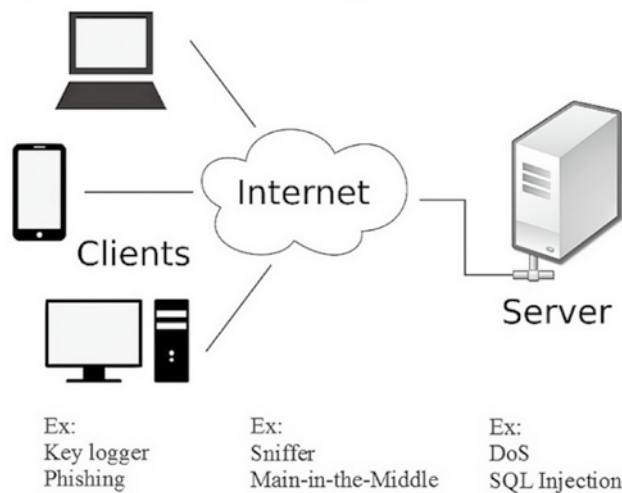
Figure 1. Sample threats between client and server through public network

- Server: Usually, the servers for doing online business in FinTech are Web Server (using port number 80 or 443). However, the server can be any kinds (using any port and protocol). By the way, most of the servers in this task use TCP/IP connection. The popular types of threat at the server are Denial-of-Service and application layer attack (Shah, 2002). DoS is process of flooding the server until it reaches the overload limit and cannot response to valid users anymore. Another threat, application layer crack, the hacker intrudes the system by finding security holes in the software, either operating system or application. One of the popular attack technique in this field is SQL injection which sends the database command mixing with data in the fields that require plain text, such as, authentication page that asks for username and password.

- Network: As FinTech often uses the Internet as a carrier while it is the public network, security is one of the major concern. The popular threats along the network are sniffer (Shah, 2002) and Man-in-the-Middle attack. Sniffer is a device or program used for monitoring and capturing data that flow over the network. Sniffer can read data in network packets. Plain text data can be seen easily. Man-in-the-Middle attack occurs when hacker hides himself between

sender (client) and receiver (server). The communication between client and server can continue transparently, however, all data can be seen by the attacker. The effect is similar to sniffer, but it is in different layer of OSI model (Stewart, Sa, & Eh, 2006). One of the protection from reading communication data by these two threats is using strong data encryption because even the hacker gets the data, they cannot read. This is the reason why FinTech transactions which is related to money needed to use strongest encryption in entire communication system.

Sample of FinTech with the cooperation of information technology and telecommunication

This article will give an example of simple FinTech service that is the enhancement of traditional financial services in term of infrastructure usage and code of both client and server. The software design of the project separates jobs between client and server. Client is responsible for just user interface part, while server is responsible for business logic section as shown in Figure 2. Server is designed by using Web Services technique since it is open standard and the result can be used by clients those are created from several kinds of technology and platform. Web Services is an important part in SOA (Service-Oriented Architecture) (Newcomer & Lomow, 2005).
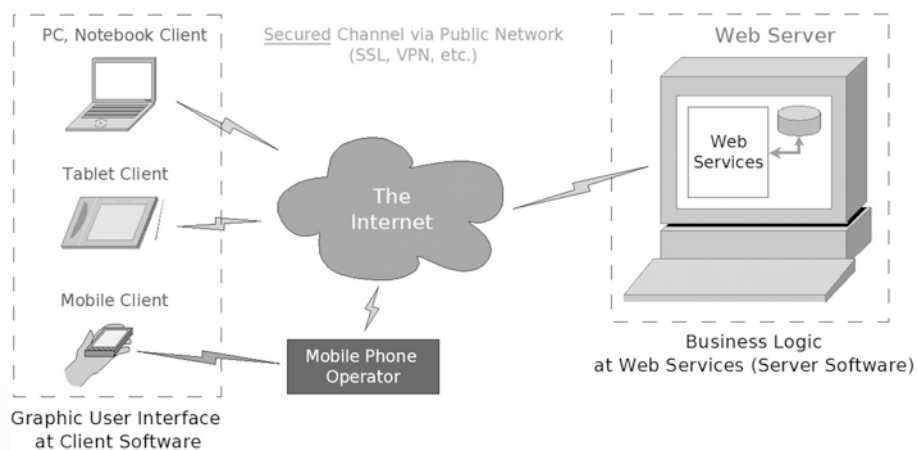

Figure 2. GUI is responsibility of clients while server takes care of business logic.

Another reason that Web Services has gained popular is because it uses port number 80 (regular connection) or 443 (secured connection), which are ports for web server, those are usually transparent for all firewalls.

The basic sample FinTech application that is the enhancement of traditional financial service used in this article is the online quotation of motor vehicle (car) insurance premium based on information that the prospected customer fills. There are many car insurance companies around the world providing the service like this, for example, Chill Car Insurance in Ireland ("Cheap Car Insurance Quotes | Chill Insurance Ireland," 2016).

Overall picture of application of FinTech in this case can be considered as internet B2B business. The insurance company sell the policy to the broker at dealer price. The broker can have many branches in convenient places or online web sites. For selling offline, each branch may have client software in the format of either Windows or Web application. For Web application, it can be used for selling at both broker counter and website. About the price structure, each broker will set its own margin and add up the dealer price to get the retail price. The margin of each broker may be different.

Steps of working in this basic example are as follows. The staff at broker counter fills the form in the client software that can be in various platforms, such as, Web and Windows application. The provided data from the prospect customer (insured) are about age of the car, brand group of the car (in Thailand there are 5 groups, each group has different premium calculation factor), car engine size, sum insured and age of driver. These data are fed to the Web Methods in Web Services server at the insurance company. The Web Services will calculate and return the quoted dealer price of car insurance premium in the format of XML (eXtensible Markup Language). This XML data will be consumed by Web Services clients of the brokers (that can be in multi-platform). The dealer price will be added with the margin set by the broker and show the retail price of the policy on screen that is considered as GUI (Graphic User Interface) of the client.

Technical steps of this sample FinTech for enhancing traditional business via the Internet can be separated to 2 sections. First, server section that can be called as Web Services server located at the insurance company. Second, client section that can be either Windows or Web application (or any kinds that can consume Web Services).

Web Services, BasicSampleCarInsuranceService, contains 1 Web Method which is GetCarRelatedData as shown in Web Services test page in Figure 3. When clicking Web Method name in the test page, the invoke test page will show up like Figure 4. This Web Method requires 5 parameters, so, the invoke test page shows 5 textboxes for entering the values. To continue testing the Web Services in this invoke test page, the creator fills the 5 values and clicks "invoke" button. The dealer price of the policy can be seen in XML format result as shown in Figure 5.

Figure 3. "BasicSampleCarInsureService" Web Services contains "GetCarRelatedData"

   Web Method

Figure 4. Invoke Web Application page of "GetCarRelatedData" requires 5 parameters.

Figure 5. Browser shows dealer-priced premium result from Web Method is provided in XML format.

This article shows 2 sample clients running in different platform, Windows and Web Applications. Suppose that there are 2 brokers for the main insurance company (who provides Web Services). First is "AAA Insurance (Broker)" that uses Web Application client. Second is "ZZZ Insurebroker" that uses Windows Application client. Both of them apply different margins, 0.5% for AAA Insurance (Broker) and 0.25% for ZZZ Insurebroker. Both companies add up margin in their client software by themselves after getting dealer price from the insurance company. With this reason, even the data filled in to both client application are the same, the quoted premiums are different as shown in Figure 6 and 7 consecutively.

Figure 6. Web client get dealer-price from Web Services and add its own margin to get retail price.

All codes in this project are shown in the Appendix. Partial code of "BasicSample CarInsureService" Web Services written in C# is listed in Listing 1. Listing 2 is the code of AAA Insurance Web Application client. Code of ZZZ Insurebroker Windows Application client is shown in Listing 3. The complete codes of all 3 parts can be downloaded from "https://goo.gl/ 20VaFf". Both clients are also written in C# language.

Figure 7. Windows client get dealer-price from Web Services and add its own margin to get retail price.

Available FinTech API's on the Internet

For FinTech startup developers, one of the difficulty besides the technology itself is getting real detail data for testing their applications. Usually, such kind of data is quite expensive. Luckily that currently there is a non-profit organization named "FinTech Sandbox" (http:// fintechsandbox.org) that allows FinTech startup to use real financial related data and some financial API in their applications.

Another free financial data related to stocks from famous markets around the world can be gotten from "Yahoo! Finance". Delayed data from Stock Exchange of Thailand (SET) is also fed by "Yahoo! Finance". Sample of YQL (Yahoo! Query Language) that is very similar to SQL statements. The results of the query can be chosen to be either XML, JSON or CSV.

Online payment is another field in FinTech that has gotten support by many famous companies (Amit 2015). Some are from traditional payment service providers, such as, credit card companies like MasterCard, Visa and bank like Fidor Bank from German. Paypal, a leader digital payment over the Internet company also provides FinTech API. Until 2015, samples of other payment related companies those offer FinTech API are Braintree, CardConnect, Dwolla, iZettle, Marqeta, Square, Stripe, 2Checkout, Adyen, SecurionPay, Invoicera, Judo Payments, Go Cardless, Currency Cloud, Gini, BOKU, FinTecSystems, Wirecard, @Pay, Paynova, etc. For the merchants of contents, products and services online, both Apple and Google (Android Pay) also allow developers to use their public API. In the field of foreign exchange, besides OANDA, Open Exchange Rates offers its API, too. For digital currency like BitCoin, Coinbase from San Francisco offers API for operating BitCoin wallet and exchanging service. Kiva offers API of Peer-2-Peer lending platform for entrepreneur. Xignite is another site that FinTech developers should visit since it offers various kinds of FinTech API.

Most of the API providers need developers to verify themselves before using their API's or Web Services because the data are related to finance.

Conclusion

FinTech is the combination of financial services and technology. FinTech can be divided to 3 groups. First is enhancement of traditional financial services, such as, online banking. Second is innovative financial tools and services, such as, peer-to-peer lending. And, third is algorithm related for executive support services, such as, big data analysis for credit card scoring. One reason that help FinTech grows up rapidly is the efficiency of network infrastructure, both computer and telecommunication network. This article also shows sample of basic online car insurance premium calculation from the data that user fills in. Web Services technology is chosen to operate all major business logic in the sample because it is open standard that can generate XML results which various platform clients can consume. Clients can be built from any kinds of technology that support Web Services. Client side is responsible for providing graphics user interface and some basic calculation. The last part of this article mentions about the available FinTech API's from several companies that developers can use.

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Appendix

Listing 1. "BasicSampleCarInsuranceService" Web Services C# Code

```csharp
using System;
using System.Web;
using System.Web.Services;

[WebService(Namespace = "http://InsureTech.in.th/")]
[WebServiceBinding(ConformsTo = WsiProfiles.BasicProfile1_1)]
[System.Web.Script.Services.ScriptService]

public class BasicSampleCarInsureService : System.Web.Services.WebService {
    const int intMinBasePremium = 7600; // minimum base by law in Thai Baht
    public BasicSampleCarInsureService () {
    }
    [WebMethod(Description = "Please fill data related to your car : Engine Size, Driver Age (18+ or -1 for not specify), Car Age, Sum Insured
(400,000-500,000) and Car Brand Group (1-5)")]
    public double GetCarRelatedData(int intEngineSize, int intDriverAge, int intCarAge, int intSumInsured, int intCarBrandGroup) {
        double dblInsurancePremium = 0;
        double dblTempPremium = 0;
        dblTempPremium = this.CalcPremiumFromEngineSize(intEngineSize, intMinBasePremium);
        dblTempPremium = this.CalcPremiumFromDriverAge(intDriverAge, dblTempPremium);
        dblTempPremium = this.CalcPremiumFromCarAge(intCarAge, dblTempPremium);
        dblTempPremium = this.CalcPremiumFromSumInsured(intSumInsured, dblTempPremium);
        dblTempPremium = this.CalcPremiumFromCarBrandGroup(intCarBrandGroup, dblTempPremium);
        dblInsurancePremium = dblTempPremium;
        return dblInsurancePremium;
    }
    public double CalcPremiumFromEngineSize(int intEngineSize, double dblTempPremium) {
        double dblResult = 0;
        if (intEngineSize < 2000) { // less than 2000 cc
            dblResult = dblTempPremium * 1.12; // less than 2000 cc, premium is 112%
        } else {
            dblResult = dblTempPremium; // greater than or equal 2000 cc, premium is 100%
        }
        return dblResult;
    }
    public double CalcPremiumFromDriverAge(int intDriverAge, double dblTempPremium) {
        double dblResult = 0;
        if (intDriverAge >= 18 && intDriverAge < 25) {
            dblResult = dblTempPremium * 0.95; // 18 <= driver age < 25, premium is 95%
        }
        else if (intDriverAge >= 25 && intDriverAge < 36) {
            dblResult = dblTempPremium * 0.9; // 25 <= driver age < 36, premium is 90%
        }
        else if (intDriverAge >= 36 && intDriverAge <= 50) {
            dblResult = dblTempPremium * 0.85; // 36 <= driver age <= 50, premium is 85%
        }
        else if (intDriverAge > 50) {
            dblResult = dblTempPremium * 0.8; // driver age > 50, premium is 80%
        }
        else if (intDriverAge == -1) {// not specify age, premium is 100%
            dblResult = dblTempPremium;
        }
        return dblResult;
    }
    public double CalcPremiumFromCarBrandGroup(int intCarBrandGroup, double dblTempPremium) {
        double dblResult = 0;
        switch (intCarBrandGroup) {
            case 1: // car brand is in group 1, premium is 140%
                dblResult = dblTempPremium * 1.4;  break;
            case 2: // car brand is in group 2, premium is 120%
                dblResult = dblTempPremium * 1.2;  break;
            case 3: // car brand is in group 3, premium is 110%
                dblResult = dblTempPremium * 1.1;  break;
            case 4: // car brand is in group 4, premium is 105%
                dblResult = dblTempPremium * 1.05;  break;
            case 5: // car brand is in group 5, premium is 100%
                dblResult = dblTempPremium;  break;
```

```
        }
        return dblResult;
    }
    // Sample calculation for car price between 400000-500000 Thai Baht only
    public double CalcPremiumFromSumInsured(int intSumInsured, double dblTempPremium) {
        double dblResult = 0;
        int intDiff = intSumInsured - 400000;
        if (intDiff == 0) {
            dblResult = dblTempPremium * 1.8;
        } else if (intDiff > 0 && intDiff <= 100000) {
            int intMultiplier =  intDiff / 10000;
            dblResult = dblTempPremium * (1.8 + (0.03 * intMultiplier));
        }
        return dblResult;
    }
    public double CalcPremiumFromCarAge(int intCarAge, double dblTempPremium)
    {
        double dblResult = 0;
        if (intCarAge > 0 && intCarAge <= 2) { // 0 < car age <= 2, premium is 100%
            dblResult = dblTempPremium;
        } else if (intCarAge > 2 && intCarAge <= 3) { // 2 < car age <= 3, premium is 102%
            dblResult = dblTempPremium * 1.02;
        } else if (intCarAge > 3 && intCarAge <= 4) { // 3 < car age <= 4, premium is 109%
            dblResult = dblTempPremium * 1.09;
        } else if (intCarAge > 4 && intCarAge <= 5) { // 4 < car age <= 5, premium is 115%
            dblResult = dblTempPremium * 1.15;
        } else if (intCarAge > 5 && intCarAge <= 6) { // 5 < car age <= 6, premium is 126%
            dblResult = dblTempPremium * 1.26;
        } else if (intCarAge > 6 && intCarAge <= 7) { // 6 < car age <= 7, premium is 135%
            dblResult = dblTempPremium * 1.35;
        } else if (intCarAge > 7 && intCarAge <= 8) { // 7 < car age <= 8, premium is 144%
            dblResult = dblTempPremium * 1.44;
        } else if (intCarAge > 8 && intCarAge <= 9) { // 8 < car age <= 9, premium is 145%
            dblResult = dblTempPremium * 1.45;
        } else if (intCarAge > 9 && intCarAge <= 10) { // 9 < car age <= 10, premium is 146%
            dblResult = dblTempPremium * 1.46;
        } else if (intCarAge > 10) { // car age > 10, premium is 147%
            dblResult = dblTempPremium * 1.47;
        }
        return dblResult;
    }
}
```

Listing 2. Web Services client in ASP.NET Web Form C# Code

```
using System;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;
using BasicServerCarInsureServiceProxy;

public partial class _Default : System.Web.UI.Page {
    const double dblServiceFee = 0.005; // service fee that AAA as a broker charges more
    const double dblVAT = 0.07; // VAT is 7%
    protected void Page_Load(object sender, EventArgs e) {}
    protected void btnClear_Click(object sender, EventArgs e) {
        // default values
        txtCarAge.Text = "0";
        txtCarBrandGroup.Text = "5";
        txtDriverAge.Text = "-1";
        txtEngineSize.Text = "0";
        txtSumInsured.Text = "500000";
        lblResult.Text = "";
    }
    protected void btnCalc_Click(object sender, EventArgs e) {
        // create object from proxy class
        BasicSampleCarInsureService b = new BasicSampleCarInsureService();
        try {
```

```
            int intEngineSize = Convert.ToInt32(txtEngineSize.Text);
            int intCarAge = Convert.ToInt32(txtCarAge.Text);
            int intCarBrandGroup = Convert.ToInt32(txtCarBrandGroup.Text);
            int intDriverAge = Convert.ToInt32(txtDriverAge.Text);
            int intSumInsured = Convert.ToInt32(txtSumInsured.Text);
            // call Web Method on Web Services
            double dblPremium = b.GetCarRelatedData(intEngineSize, intDriverAge, intCarAge, intSumInsured, intCarBrandGroup);
            dblPremium = (dblPremium * (1 + dblServiceFee)) * (1 + dblVAT); // calculate final premium + VAT
            lblResult.Text = "<center><table border='0'><tr><td bgcolor='yellow'>Thank you for visiting our service site.<br/>Your car insurance
premium include VAT is : <b>" + dblPremium.ToString("n2") + " Thai Baht</b>.<br/>Click <a href='#'>here</a> to check out
now.</td></tr></table></center>";
        } catch (Exception ex) {
            lblResult.Text = "Exception happened: " + ex.Message + "<br/>Stack: <br/>" + ex.StackTrace;
        }
    }
}
```

Listing 3. Web Services client in Windows Form C# Code

```
using System;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using ZZZInsureBrokerWinAppPrj.BasicSampleCarInsureServiceProxy;

namespace ZZZInsureBrokerWinAppPrj {
    public partial class ZZZInsureBrokerWinAppForm : Form {
        const double dblServiceFee = 0.025; // service fee that ZZZ as a broker charges more
        const double dblVAT = 0.07; // VAT is 7%
        public ZZZInsureBrokerWinAppForm() {
            InitializeComponent();
        }
        private void btnClear_Click(object sender, EventArgs e) {
            // default values
            txtEngineSize.Text = "0";
            txtCarAge.Text = "0";
            txtCarBrandGroup.Text = "5";
            txtDriverAge.Text = "-1";
            txtSumInsured.Text = "500000";
        }
        private void btnCalculate_Click(object sender, EventArgs e) {
            // creat object from proxy class
            BasicSampleCarInsureService b = new BasicSampleCarInsureService();
            try {
                int intEngineSize = Convert.ToInt32(txtEngineSize.Text);
                int intCarAge = Convert.ToInt32(txtCarAge.Text);
                int intCarBrandGroup = Convert.ToInt32(txtCarBrandGroup.Text);
                int intDriverAge = Convert.ToInt32(txtDriverAge.Text);
                int intSumInsured = Convert.ToInt32(txtSumInsured.Text);
                // call Web Method on Web Services
                double dblPremium = b.GetCarRelatedData(intEngineSize, intDriverAge, intCarAge, intSumInsured, intCarBrandGroup);
                dblPremium = (dblPremium * (1 + dblServiceFee)) * (1 + dblVAT); // calculate final premium + VAT
                MessageBox.Show("Thank you for visiting ZZZ Insurebroker.\r\nYour car insurance premium include VAT is : " +
dblPremium.ToString("n2") + " THB.\r\nClick finish click 'Check Out' button on the form ");
            } catch (Exception ex) {
                MessageBox.Show("Exception happened: " + ex.Message + "\r\nStack: \r\n" + ex.StackTrace);
            }
        }
    }
}
```