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Asp.net- Encrypt and Decrypt connection strings in web.config file

By: Suresh Dasari Nov 27, 2011

Categories: [Asp.net](#), [EncryptionandDecryption](#), [General](#)

Introduction:

In this article I will explain how to encrypt or decrypt connectionStrings in web.config file using asp.net.

Description:

In Previous posts I explained lot of articles regarding [Asp.net](#), [Gridview](#), [SQL Server](#), [Ajax](#), [JavaScript](#) etc. In many of articles I used **connectionStrings** section in **web.config** file to store database connection. The connectionStrings section contains sensitive information of database connections including username and password of database. Is it secured to store the sensitive information of database connections in plain text files called web.config and machine.config files?

If we are using applications in our internal servers with security then it's ok if we deploy our applications in shared host environment then we have chance to arise security problems to avoid these problems asp.net 2.0 provided built in protected configuration model functionality to encrypt or decrypt few sections of web.config file those are

RSAProtectedConfigurationProvider: This is default provider and uses the RSA public key encryption algorithm to encrypt and decrypt data.

DataProtectionConfigurationProvider: This provider uses windows data protection application programming interface to encrypt and decrypt the data.

The encrypting and decrypting of connection strings in web.config file will do by using **aspnet_regiis.exe** command line tool and **code behind**.

First Method:

First we will do encryption and decryption using **aspnet_regiis.exe** command line tool in file system website

To implement encryption and decryption first create one new website using visual studio.

After that open **web.config** file in application and add sample db connection in **connectionStrings** section like this

```
<connectionStrings>
<add name="dbconnection" connectionString="Data Source=SureshDasari;Integrated
Security=true;Initial Catalog=MySampleDB"/>
</connectionStrings >
```

After add dbconnection in connectionString check the below steps to encrypt or decrypt the connection string in web.config.

1) Go to Start >> All Programs >> Microsoft visual studio 2008 >> Visual Studio Tools >> Visual Studio 2008 Command Prompt (**Note:** if you're using windows 7 right click on command prompt and select Run as administrator)

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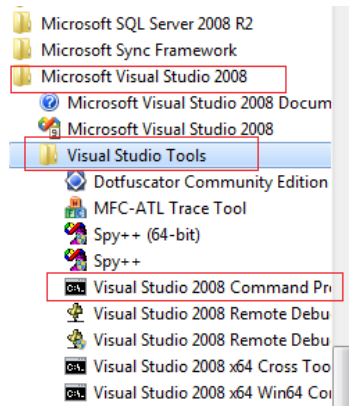
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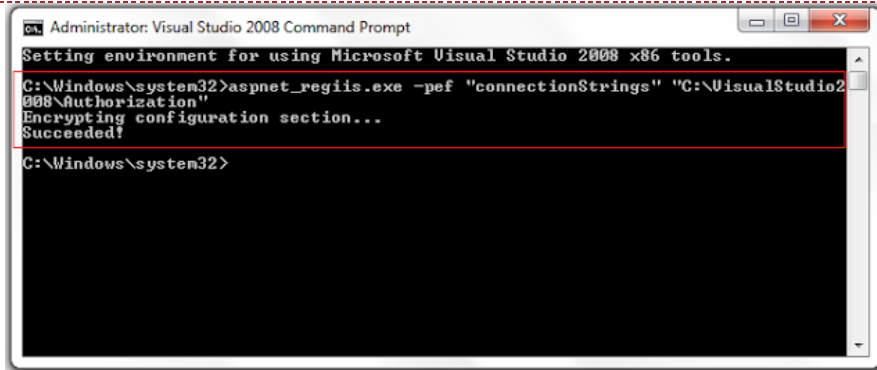
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2) After open command prompt type the following command **aspnet_regiis.exe -pef "connectionStrings" "C:\VisualStudio2008\Authorization"**

Here **-pef** indicates that the application is built as File System website. Second argument **connectionStrings** indicates that name of the configuration section needs to be encrypted. The Third argument is the physical path of the folder where the web.config file is located.

3) After enter the command click enter if everything goes well we will get success message like **"Encrypting configuration section... Succeeded!"**



Now open your application and check **connectionStrings** in web.config file that would be like this

```
<connectionStrings configProtectionProvider="RsaProtectedConfigurationProvider">
  <EncryptedData Type="http://www.w3.org/2001/04/xmlenc#Element"
    xmlns="http://www.w3.org/2001/04/xmlenc#">
    <EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#tripleDES-cbc" />
    <KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
      <EncryptedKey xmlns="http://www.w3.org/2001/04/xmlenc#" />
      <EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5" />
      <KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
        <KeyName>Rsa Key</KeyName>
      </KeyInfo>
      <CipherData>
        <CipherValue>ZNUbIEEnOwIzZC8qbzHj5F2GS9gLYSkWCIGCJGrgZAX8A+8oEIssyohhXUKvAubD3jizFc5IjbL<
      </CipherValue>
      </CipherData>
    </EncryptedKey>
    </KeyInfo>
    <CipherData>
      <CipherValue>tODWIPD0Q/B/mP14GQ/5tUxcjmHcy9a0oPunV5osNrMQRztgi2h5V6sxJOEh+NC+G9gQNkv1<
    </CipherValue>
    </CipherData>
  </EncryptedData>
</connectionStrings>
```

Here we don't want to write any code to decrypt the encrypted **connectionString** in our application because .NET automatically decrypts it. If we want to use the connection string just call it like normal way

```
string strconnection = ConfigurationManager.AppSettings["dbconnection"].ToString();
```

Now if we want to decrypt **connectionStrings** section in web.config use the following command **aspnet_regiis.exe -pdf "connectionStrings" "C:\VisualStudio2008\Authorization"**

After command execute we will get message like **"Decrypting configuration section... Succeeded!"**

free.

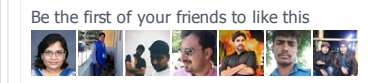
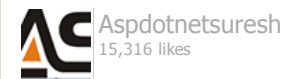
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view

```

Administrator: Visual Studio 2008 Command Prompt
Setting environment for using Microsoft Visual Studio 2008 x86 tools.
C:\Windows\system32>aspnet_regiis.exe -pef "connectionStrings" "C:\VisualStudio2
008\Authorization"
Encrypting configuration section...
Succeeded!
C:\Windows\system32>aspnet_regiis.exe -pdf "connectionStrings" "C:\VisualStudio2
008\Authorization"
Decrypting configuration section...
Succeeded!
C:\Windows\system32>_

```

Now check your **connectionStrings** section in your web.config file you will see decrypted connection string.

Till now we learned how to encrypt and decrypt **connectionStrings** section in **File system website**. If I want to encrypt connection string in **IIS based site** like i.e. **Deployed website** for that we need to use the following commands

Encrypt connectionStrings in web.config of **IIS based site**

aspnet_regiis.exe -pe "connectionStrings" -app "/SampleWebSite"

Here **-pe** indicates that the application is built as IIS based site. Second argument **connectionStrings** is the name of configuration section needs to be encrypted. The Third argument **-app** indicates virtual directory and last argument is the name of virtual directory where application is deployed.

Decrypt connectionStrings in web.config of IIS based site

aspnet_regiis.exe -pd "connectionStrings" -app "/SampleWebSite"

Till now we learned how to encrypt and decrypt connectionStrings section in web.config file using aspnet_regiis.exe command line tool now I will explain **code behind** method to encrypt and decrypt the connection string section in web.config.

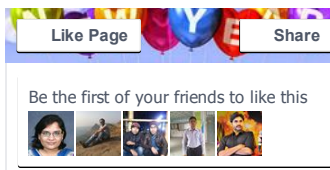
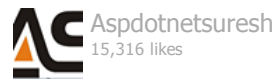
Second Method: In second method I will use **RSAProtectedConfigurationProvider** and **DataProtectionConfigurationProvider** to encrypt and decrypt connectionStrings in web.config using asp.net.

First open **Default.aspx** page and write the following code

```

<html xmlns="http://www.w3.org/1999/xhtml">
<head runat="server">
<title>Untitled Page</title>
</head>
<body>
<form id="form1" runat="server">
<div>
<asp:Button id="btnEncrypt" runat="server" Text="Encrypt" o
<asp:Button ID="btnDecrypt" runat="server" Text="Decrypt"
</div>
</form>
</body>
</html>

```



After that open code behind page and add the following namespace references

```

using System;
using System.Configuration;
using System.Web.Configuration;

```

After add namespaces write the following code in code behind

C# code

```

string provider = "RSAProtectedConfigurationProvider";
string section = "connectionStrings";
protected void Page_Load(object sender, EventArgs e)
{
}
protected void btnEncrypt_Click(object sender, EventArgs e)
{
Configuration cfg = WebConfigurationManager.OpenWebConfiguration(Request.ApplicationPath);
ConfigurationSection configSect = cfg.GetSection(section);
if (configSect != null)
{
configSect.SectionInformation.ProtectSection(provider);
cfg.Save();
}
}

```

```
protected void btnDecrypt_Click(object sender, EventArgs e)
{
    Configuration config = WebConfigurationManager.OpenWebConfiguration(Request.ApplicationPath);
    ConfigurationSection configSect = config.GetSection(section);
    if (configSect.SectionInformation.IsProtected)
    {
        configSect.SectionInformation.UnprotectSection();
        config.Save();
    }
}
```

VB.NET

```
Imports System.Web.Configuration
Partial Class _Default
Inherits System.Web.UI.Page
Private provider As String = "RSAProtectedConfigurationProvider"
Private section As String = "connectionStrings"
Protected Sub Page_Load(ByVal sender As Object, ByVal e As EventArgs)
End Sub
Protected Sub btnEncrypt_Click(ByVal sender As Object, ByVal e As EventArgs)
Dim config As Configuration =
WebConfigurationManager.OpenWebConfiguration(Request.ApplicationPath)
Dim configSect As ConfigurationSection = config.GetSection(section)
If configSect IsNot Nothing Then
    configSect.SectionInformation.ProtectSection(provider)
    config.Save()
End If
End Sub
Protected Sub btnDecrypt_Click(ByVal sender As Object, ByVal e As EventArgs)
Dim config As Configuration =
WebConfigurationManager.OpenWebConfiguration(Request.ApplicationPath)
Dim configSect As ConfigurationSection = config.GetSection(section)
If configSect.SectionInformation.IsProtected Then
    configSect.SectionInformation.UnprotectSection()
    config.Save()
End If
End Sub
End Class
```

After that open **web.config** file in application and add sample db connection in **connectionStrings** section like this

```
<connectionStrings>
<add name="dbconnection" connectionString="Data Source=SureshDasari;Integrated
Security=true;Initial Catalog=MySampleDB"/>
</connectionStrings >
```

Now run your application and check your web.config file after click on Encrypt button that would be like this

```
<connectionStrings configProtectionProvider="RsaProtectedConfigurationProvider">
<EncryptedData Type="http://www.w3.org/2001/04/xmlenc#Element"
xmlns="http://www.w3.org/2001/04/xmlenc#">
<EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#tripleDES-cbc" />
<KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
<EncryptedKey xmlns="http://www.w3.org/2001/04/xmlenc#">
<EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5" />
<KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
<KeyName>Rsa Key</KeyName>
</KeyInfo>
<CipherData>
<CipherValue>WagJ9DDjWTNc1nmYVNQXaQqXaIqZxaiCHAOtUJvTWBRZiuT6UK1fBEIM80PnL6dC5Umb8qvfi
</CipherData>
</EncryptedKey>
</KeyInfo>
<CipherData>
<CipherValue>qry5qnr3qxOgyoNPep7OKEiHpr/PPTsaeQ2mYUsSK7cg4Kkl9uPO4RyUXgBIkgCTsjbObqLIyndc
</CipherData>
</EncryptedData>
</connectionStrings>
```

If we want to implement encryption and decryption with "DataProtectionConfigurationProvider" just replace "RSAProtectedConfigurationProvider" with "DataProtectionConfigurationProvider" and use same code.

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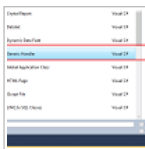


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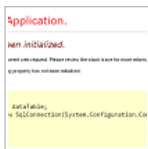
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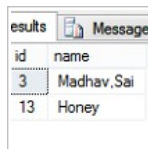
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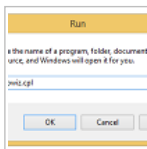
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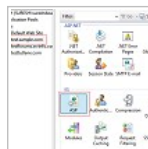
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Anonymous said...

hello Sir,

i liked your post. I have a question though, what if some one can get the decrypted value and then encrypt using .net. is there any key management technique to handle this security loop.

December 1, 2011 at 1:39 PM

Manoj said...

after encryption when i am using this connectionstring it gives me the following error

Failed to decrypt using provider 'RsaProtectedConfigurationProvider'. Error message from the provider: The RSA key container could not be opened. for this what i have to do ???

September 7, 2012 at 9:55 PM



Bharat Gunjal said...

Hello Suresh,

Really i like your post. But when try to encrypt appSettings folder then i got these error.

'Failed to encrypt the section appSettings using Provider RsaProtectedConfigurationProvider'. Error message from the provider. Object already exist.

How should i do this...please let me know.
Thanks in advance

October 10, 2012 at 2:27 AM



Srinivasulu Reddy said...

Hi Suresh ,

Thanks for post.

This is Srinivas you will not displaying the images

[October 16, 2012 at 7:57 AM](#)

Anonymous said...

ihlo;

5

[October 29, 2012 at 2:52 AM](#)

[Shery](#) said...

Still can not find this web.config file!

6

[May 23, 2013 at 12:27 AM](#)

Anonymous said...

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7

[May 23, 2013 at 1:30 AM](#)

 [manikandon](#) said...

hello sir...
i want sample project for 3tier architecture
mani925@gmail.com

8

[July 24, 2013 at 11:43 PM](#)

Anonymous said...

This is not working.

9

[May 17, 2014 at 5:59 PM](#)



[Ranjan Kumar](#) said...

This is working fine

Thanks

10

[May 22, 2014 at 10:32 PM](#)



[Biplov sarkar](#) said...

hello sir,
I have done the encryption with RSA , should i know why should i have to run as vs2010 as Admin than and than
only this code is work. why not for normal run. and other thing will this be work when we published the website in
IIS. please tell me will this work after published or not.

11

[June 4, 2014 at 6:16 AM](#)

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