

**Supplementary documentation**

Topic            **Instructions for WCF configuration in a multi-server BIS environment**

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**1 Introduction**

This document describes the configuration of WCF (Windows Communication Foundation) for a multi-server BIS (BOSCH Building Integration System) system. Three cases are described:

1. **No editing required:** Describes under which circumstances the configuration files (generated by BIS installation and modified by the configuration browser) can be used without alteration
2. **Editing port numbers:** Describes where and how manually to modify the default port numbers in the configuration files, if required.
3. **Editing security modes:** Describes where and how manually to modify the security mode, if required.

**For any other modifications** to the configuration files please consult a Microsoft WCF specialist or Microsoft documentation on WCF configuration:

[http://msdn.microsoft.com/en-us/library/ms733830\(v=vs.110\).aspx](http://msdn.microsoft.com/en-us/library/ms733830(v=vs.110).aspx)

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## 2 Using the default configuration files

The BIS installation program provides configuration files containing default WCF settings for the most common scenario. You can generally use these files without modification if both the following criteria are met:

1. Any one of the following applies:
  - a. Your user accounts are in Active Directory within a domain
  - b. Your user roles are in the same Windows Group within a domain
  - c. The same usernames and their respective passwords exist on all connected machines (i.e. the MgtS account and all BIS user accounts)
2. TCP/IP protocol is enabled. The ports with numbers 27110, 27111 and 27112 are accessible through firewalls and/or routers between connected machines, and are not already used for other purposes.

## 3 Configuration files require modification

Modifications to default port numbers and security modes can be achieved by editing the relevant configuration files. The following sections describe where to find the files and how to modify them.

### 3.1 The configuration files

The BIS installation program creates distinct WCF configuration files for both Provider and Consumer servers respectively. The Remote Sites Connector configuration program in the BIS Configuration Browser modifies these files, and the modifications are sufficient in most cases, without manual editing:

- Configuration file for a Provider server:  
`C:\Mgts\Platform\WcfServerConfigTemplates\BisClientProxyWcfServer.exe.config`
- Configuration file for a Consumer server:  
The file name and parent directory name vary depending on which instance of the RemoteSitesConnector OPC server it is that you are configuring:  
`C:\Mgts\Platform\OPCServerConfigTemplates\RemoteSitesConnector\RemoteSitesConnector[i]\OpcRsc[i].exe.config`  
where [i] is either nothing (no characters) or an integer between 1 and 10

For example, if your multiple BIS servers are using the OPC server RemoteSitesConnector 5 then the corresponding configuration file created by the BIS installation program is

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```
C:\Mgts\Platform\OPCServerConfigTemplates\RemoteSitesConnector\RemoteS  
itesConnector5\OpcRsc5.exe.config
```

Note that only a new installation writes the configuration files to the file paths shown above. An update installation does not overwrite the configuration files, so as not to overwrite your manual changes. If required, fresh templates are available under  
C:\MgtS\Platform\OpcServerConfigTemplates\

## 3.2 Basic editing

There are basically two ways to modify WCF configuration parameters.

1. Edit the file as plain text in your editor of choice.
2. Edit the file using the Microsoft Configuration Editor Tool

The Microsoft Configuration Editor Tool is included in Windows SDKs, and can be downloaded from Microsoft Download Center: [http://msdn.microsoft.com/en-us/library/ms732009\(v=vs.100\).aspx](http://msdn.microsoft.com/en-us/library/ms732009(v=vs.100).aspx)

## 3.3 Editing port numbers

### 3.3.1 Editing port numbers for a Provider server

To run BIS with multiple BIS servers, port 27111 must always be open and available to BIS. This port number must never be changed.

The default port numbers for states and alarms are 27110 and 27112 respectively. The configuration file can be edited if you require port numbers other than these defaults.

To change these port numbers in the configuration file, locate the section illustrated below and modify the characters highlighted yellow.

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```
<netTcpBinding>
  <binding name="bisNetTcp" openTimeout="00:10:00" receiveTimeout="00:10:00"
    sendTimeout="00:10:00" maxBufferPoolSize="134217727" maxBufferSize="134217727"
    maxReceivedMessageSize="134217727">
    <readerQuotas maxArrayLength="100000" />
  </binding>
</netTcpBinding>
</bindings>
<services>
  <service name="BisClientProxyWcfServer.ClientProxyService">
    <endpoint address="net.tcp://localhost:27110/BisClientProxyInterfaces"
      binding="netTcpBinding"
      bindingConfiguration="bisNetTcp"
      contract="BisClientProxyWcfContracts.IClientProxyContracts" />
  </service>
  <service name="BisClientProxyWcfServer.AlarmMessagesProxyService">
    <endpoint address="net.tcp://localhost:27112/BisClientProxyInterfaces"
      binding="netTcpBinding"
      bindingConfiguration="bisNetTcp"
      contract="BisClientProxyWcfContracts.IAlarmMessageWcfProcessing" />
  </service>
</services>
```

Ensure that the port numbers match the corresponding port numbers in the configuration file for the Consumer server. See below for instructions on changing port numbers for the Consumer servers.

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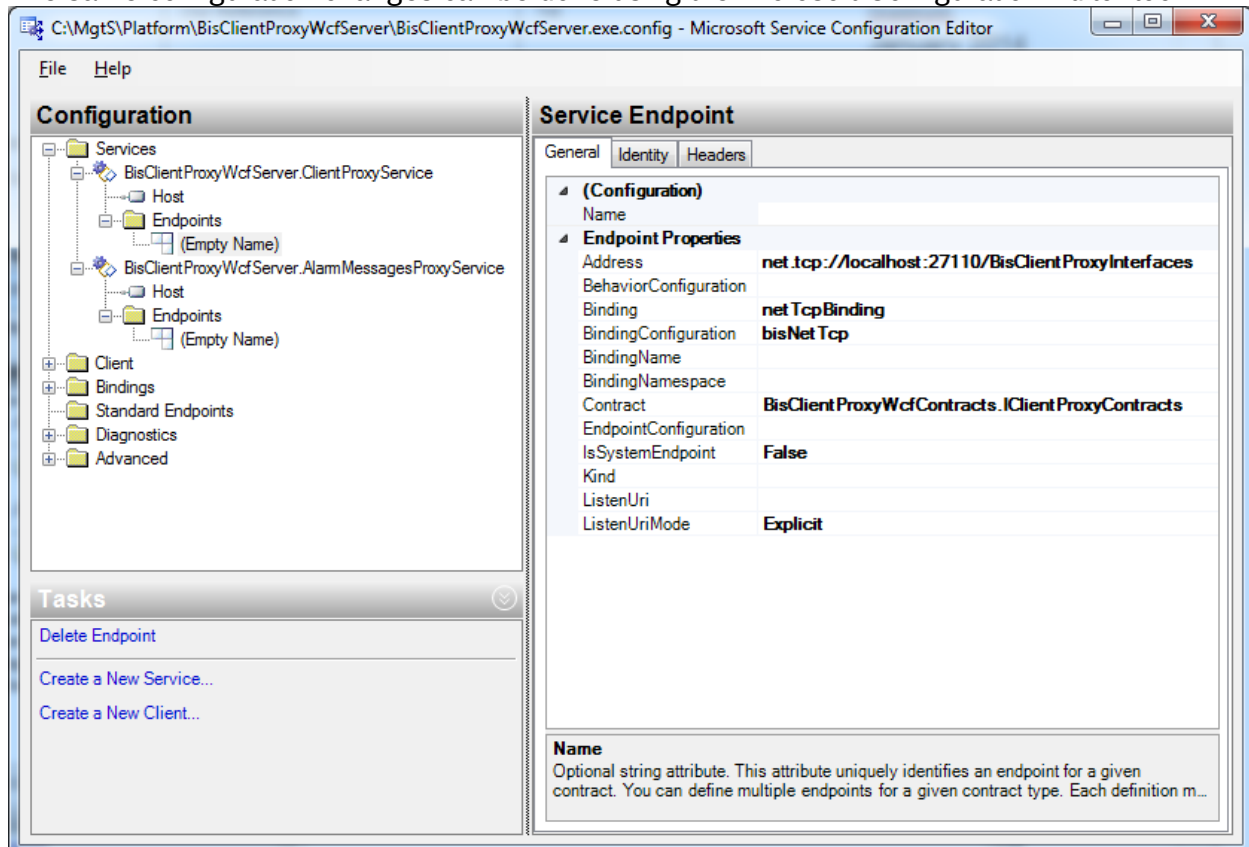
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The same configuration changes can be done using the Microsoft Configuration Editor tool:



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### 3.3.2 Editing port numbers for a Consumer server

The relevant section in the Consumer server configuration file resembles the following illustration.

Note: You may have one or more endpoints depending on the topology of your multi-server BIS network. Multiple endpoints can be configured for each BIS Provider server. The endpoints for Provider and Consumer servers are identified by a combination of both node name and port number.

Use the `<endpoint>` elements with the names `localhost` and `localhost-Alarms` as a template and make copies for provider-specific endpoints in which you replace the text "localhost" with the provider name.

Note that this is what the Remote Sites Connector configuration tool does automatically when you add a further Provider server.

```
<client>
  <endpoint address="net.tcp://localhost:27110/BisClientProxyInterfaces"
    binding="netTcpBinding" bindingConfiguration="bisNetTcp"
    contract="BisClientProxyWcfContracts.IClientProxyContracts"
    name="localhost" kind="" endpointConfiguration="" />
  <endpoint address="net.tcp://localhost:27112/BisClientProxyInterfaces"
    binding="netTcpBinding" bindingConfiguration="bisNetTcp"
    contract="BisClientProxyWcfContracts.IAlarmMessageWcfProcessing"
    name="localhost-Alarms" kind="" endpointConfiguration="" />
  <endpoint address="net.tcp://localhost:27111/MessagePool"
    binding="netTcpBinding" bindingConfiguration="bisNetTcp"
    contract="MessagePoolWcfContracts.IMessagePoolContracts"
    name="MessagePool" kind="" endpointConfiguration="" />
  <endpoint address="net.tcp://test-hp11:27110/BisClientProxyInterfaces"
    binding="netTcpBinding" bindingConfiguration="bisNetTcp"
    contract="BisClientProxyWcfContracts.IClientProxyContracts"
    name="test-hp11" kind="" endpointConfiguration="" />
  <endpoint address="net.tcp://test-hp11:27112/BisClientProxyInterfaces"
    binding="netTcpBinding" bindingConfiguration="bisNetTcp"
    contract="BisClientProxyWcfContracts.IAlarmMessageWcfProcessing"
    name="test-hp11-Alarms" kind="" endpointConfiguration="" />
</client>
```

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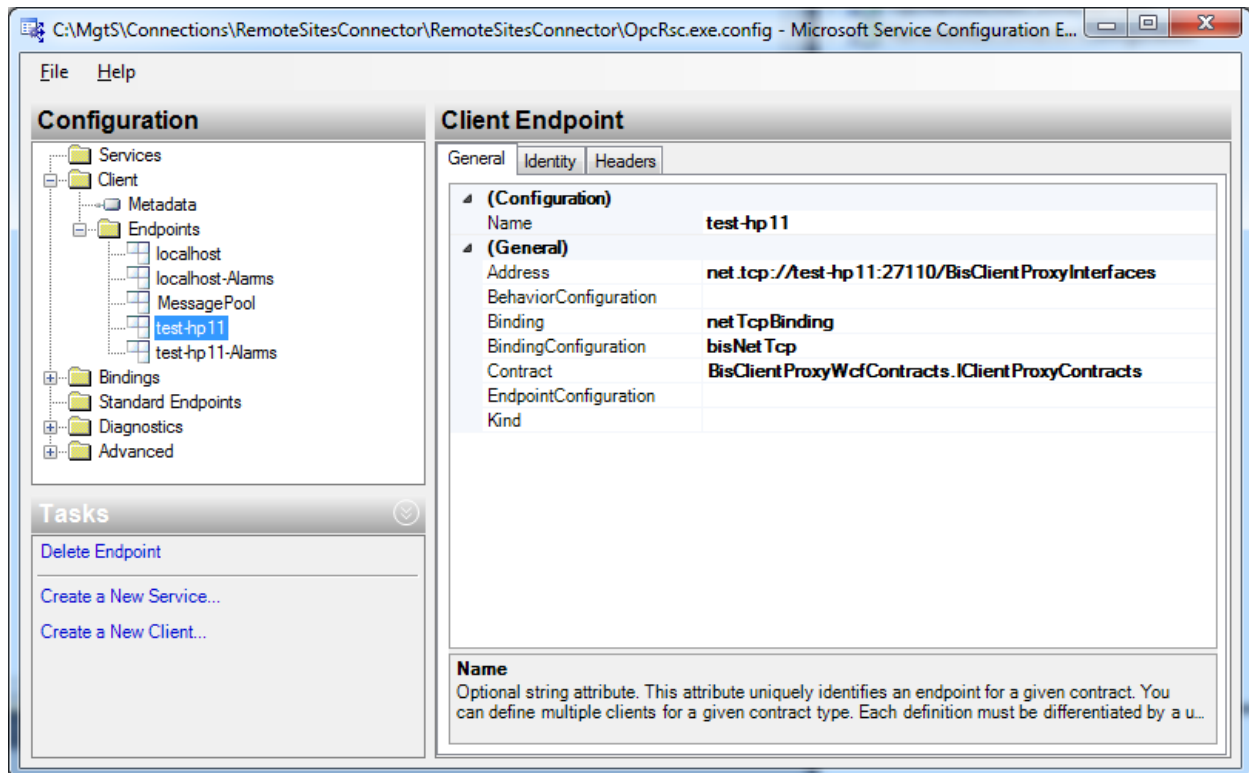
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### 3.4 Editing the security mode

There are numerous security parameters within WCF configuration. We have selected 3 most common security scenarios. For more information about the security options, refer to WCF Security Guidance, <http://wcfsecurity.codeplex.com/>.

#### 3.4.1 Using default transport security

The default security measures provided are Windows Authentication and Transport Security. Transport Security means the transport channel is encrypted from endpoint to endpoint. To use this security setting, ensure that any one of the following conditions is met:

1. Your user accounts are in Active Directory within a domain
2. Your user roles are in the same Windows Group within a domain
3. The same usernames and their respective passwords exist on all connected machines (i.e. the MgtS account and all BIS user accounts)

#### 3.4.2 Disabling security

In certain isolated networks where no security is needed, or where the network is encrypted or protected by hardware, security can be disabled.

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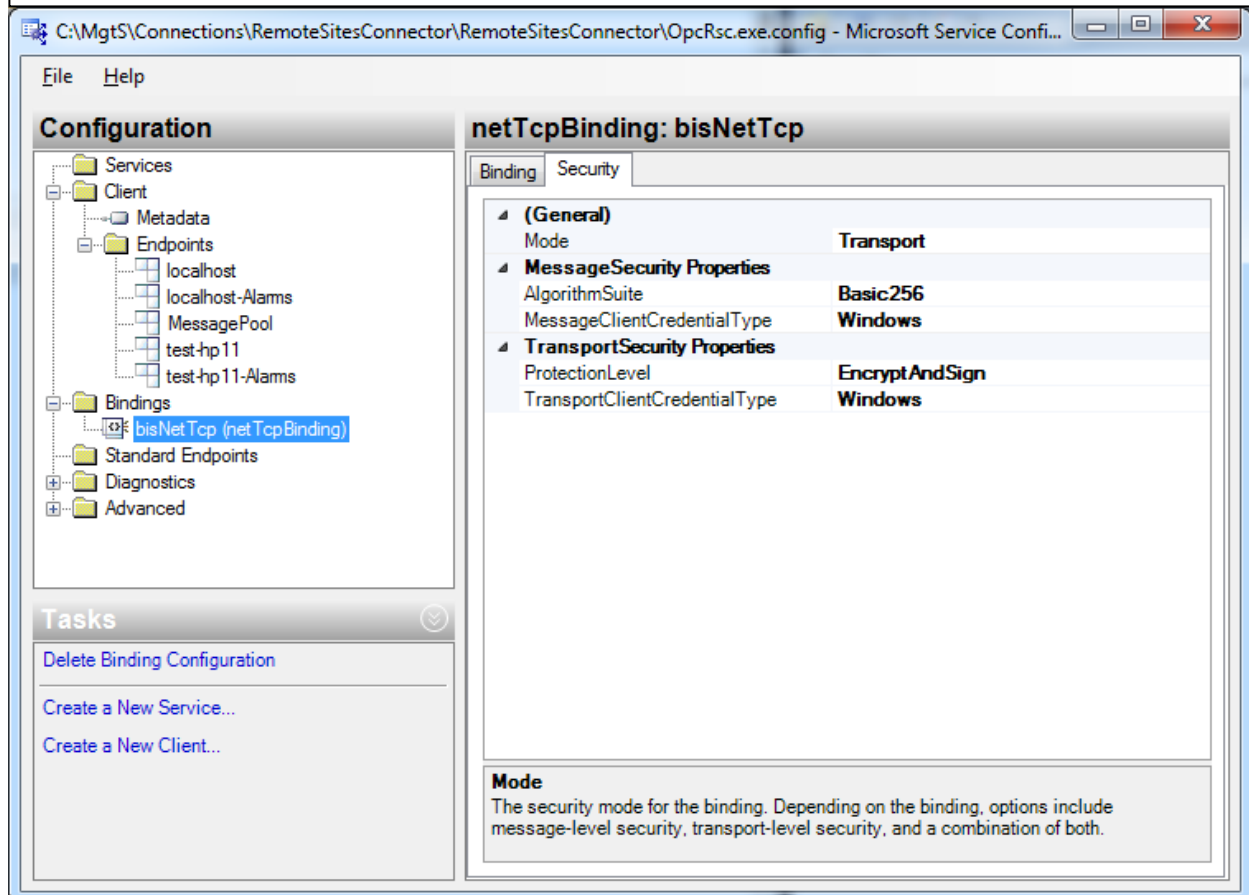
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To disable security on either Provider or Consumer servers, set the mode attribute of the `<security>` element to **None** in the respective configuration file. This can of course be done either in a text editor or in the Microsoft Configuration Editor Tool.

```
<bindings>
  <netTcpBinding>
    <binding name="bisNetTcp" openTimeout="23:59:59" receiveTimeout="23:59:59"
      sendTimeout="23:59:59" maxBufferPoolSize="134217727"
      maxBufferSize="134217727"
      maxReceivedMessageSize="134217727">
      <readerQuotas maxArrayLength="100000" />
      <security mode="None" />
    </binding>
  </netTcpBinding>
</bindings>
```



### 3.4.3 Using certificate-based message security

Encryption by certificate may be chosen in cases where the prerequisites for default security settings cannot be met.



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Here we describe the most common form of encryption by certificate. For more advanced information with regards to certificates and settings please refer to WCF Security Guidance, <http://wcfsecurity.codeplex.com/> as well as Certification Authority concerning certificates.

Certificates for internal or temporary purposes can be generated without recourse to a certification authority, please refer to internet resources on 'Generate Self-Signed Certificate'. Once a valid certificate is installed properly on the provider machine, follow the steps for WCF configuration below.

### Editing the Provider configuration file

**IMPORTANT** Before replacing a configuration first backup the current configuration file.

To create a new configuration file, use the template supplied:

C:\Mgts\Platform\WcfServerConfigTemplates\BisClientProxyWcfServer.Cert.exe.config

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Find the section illustrated below, and replace the highlighted text with the **subject name** of the new certificate that you will be using. The subject is the holder of the private key associated with the certificate see <http://technet.microsoft.com/en-us/library/cc753994.aspx>

```

...
<system.serviceModel>
  <bindings>
    <netTcpBinding>
      <binding name="bisNetTcp" openTimeout="00:10:00"
        receiveTimeout="00:10:00" sendTimeout="00:10:00"
        listenBacklog="20" maxConnections="20"
        maxBufferPoolSize="134217727" maxBufferSize="134217727"
        maxReceivedMessageSize="134217727">
        <security mode="Message">
          <transport clientCredentialType="Certificate" />
          <message clientCredentialType="None" algorithmSuite="TripleDes" />
        </security>
        <readerQuotas maxDepth="2147483647" maxStringContentLength="2147483647"
          maxArrayLength="2147483647" maxBytesPerRead="2147483647"
          maxNameTableCharCount="2147483647"></readerQuotas>
      </binding>
    </netTcpBinding>
  </bindings>
  <behaviors>
    <serviceBehaviors>
      <behavior name="bisCertServiceBehavior">
        <serviceCredentials>
          <serviceCertificate findValue="SignedByCA"
            storeLocation="LocalMachine"
            x509FindType="FindBySubjectName" />
        </serviceCredentials>
      </behavior>
    </serviceBehaviors>
  </behaviors>
  <services>
    <service name="BisClientProxyWcfServer.ClientProxyService"
      behaviorConfiguration="bisCertServiceBehavior">
      <endpoint address="net.tcp://localhost:27110/BisClientProxyInterfaces"
        binding="netTcpBinding" bindingConfiguration="bisNetTcp"
        contract="BisClientProxyWcfContracts.IClientProxyContracts" />
    </service>
    <service name="BisClientProxyWcfServer.AlarmMessagesProxyService">
      <endpoint address="net.tcp://localhost:27112/BisClientProxyInterfaces"
        binding="netTcpBinding" bindingConfiguration="bisNetTcp"
        contract="BisClientProxyWcfContracts.IAlarmMessageWcfProcessing" />
    </service>
  </services>
</system.serviceModel>
...

```

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### **Editing the Consumer configuration file**

Start by using template file supplied, where [i] is either nothing (no characters) or an integer between 1 and 10:

```
C:\Mgts\Platform\OPCServerConfigTemplates\RemoteSitesConnector\RemoteS  
itesConnector[i]\OpcRsc[i].Cert.exe.config
```

Find the section illustrated below, and replace the highlighted text with the **subject name** of the certificate that the Provider server is to use.



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```
...
<system.serviceModel>
  <behaviors>
    ...
  </behaviors>
  <bindings>
    <netTcpBinding>
      <binding name="bisNetTcp" openTimeout="00:10:00" receiveTimeout="00:10:00"
        sendTimeout="00:10:00" maxBufferPoolSize="134217727"
        maxBufferSize="134217727"
        maxReceivedMessageSize="134217727">
        <security mode="Message">
          <transport clientCredentialType="Certificate" />
          <message clientCredentialType="None" algorithmSuite="TripleDes" />
        </security>
        <readerQuotas maxDepth="2147483647" maxStringContentLength="2147483647"
          maxArrayLength="2147483647" maxBytesPerRead="2147483647"
          maxNameTableCharCount="2147483647" />
      </binding>
    </netTcpBinding>
  </bindings>
  <client>
    <endpoint address="net.tcp://localhost:27110/BisClientProxyInterfaces"
      behaviorConfiguration="BisCertEndPointBehavior"
      binding="netTcpBinding" bindingConfiguration="bisNetTcp"
      contract="BisClientProxyWcfContracts.IClientProxyContracts"
      name="" kind="" endpointConfiguration="">
      <identity>
        <dns value="SignedByCA" />
      </identity>
    </endpoint>
    <endpoint address="net.tcp://localhost:27112/BisClientProxyInterfaces"
      behaviorConfiguration="BisCertEndPointBehavior"
      binding="netTcpBinding" bindingConfiguration="bisNetTcp"
      contract="BisClientProxyWcfContracts.IAlarmMessageWcfProcessing"
      name="localhost-Alarms" kind="" endpointConfiguration="">
      <identity>
        <dns value="SignedByCA" />
      </identity>
    </endpoint>
    <endpoint address="net.tcp://localhost:27111/MessagePool"
      behaviorConfiguration="BisCertEndPointBehavior"
      binding="netTcpBinding" bindingConfiguration="bisNetTcp"
      contract="MessagePoolWcfContracts.IMessagePoolContracts"
      name="MessagePool" kind="" endpointConfiguration="">
      <identity>
        <dns value="SignedByCA" />
      </identity>
    </endpoint>
    <endpoint address="net.tcp://test-hp11:27110/BisClientProxyInterfaces"
      behaviorConfiguration="BisCertEndPointBehavior"
      binding="netTcpBinding" bindingConfiguration="bisNetTcp"
      contract="BisClientProxyWcfContracts.IClientProxyContracts"
      name="test-hp11" kind="" endpointConfiguration="">
      <identity>
        <dns value="SignedByCA" />
      </identity>
    </endpoint>
    <endpoint address="net.tcp://test-hp11:27112/BisClientProxyInterfaces"
      behaviorConfiguration="BisCertEndPointBehavior"
      binding="netTcpBinding" bindingConfiguration="bisNetTcp"
      contract="BisClientProxyWcfContracts.IAlarmMessageWcfProcessing"
      name="test-hp11-Alarms" kind="" endpointConfiguration="">
      <identity>
        <dns value="SignedByCA" />
      </identity>
    </endpoint>
  </client>
</system.serviceModel>
```

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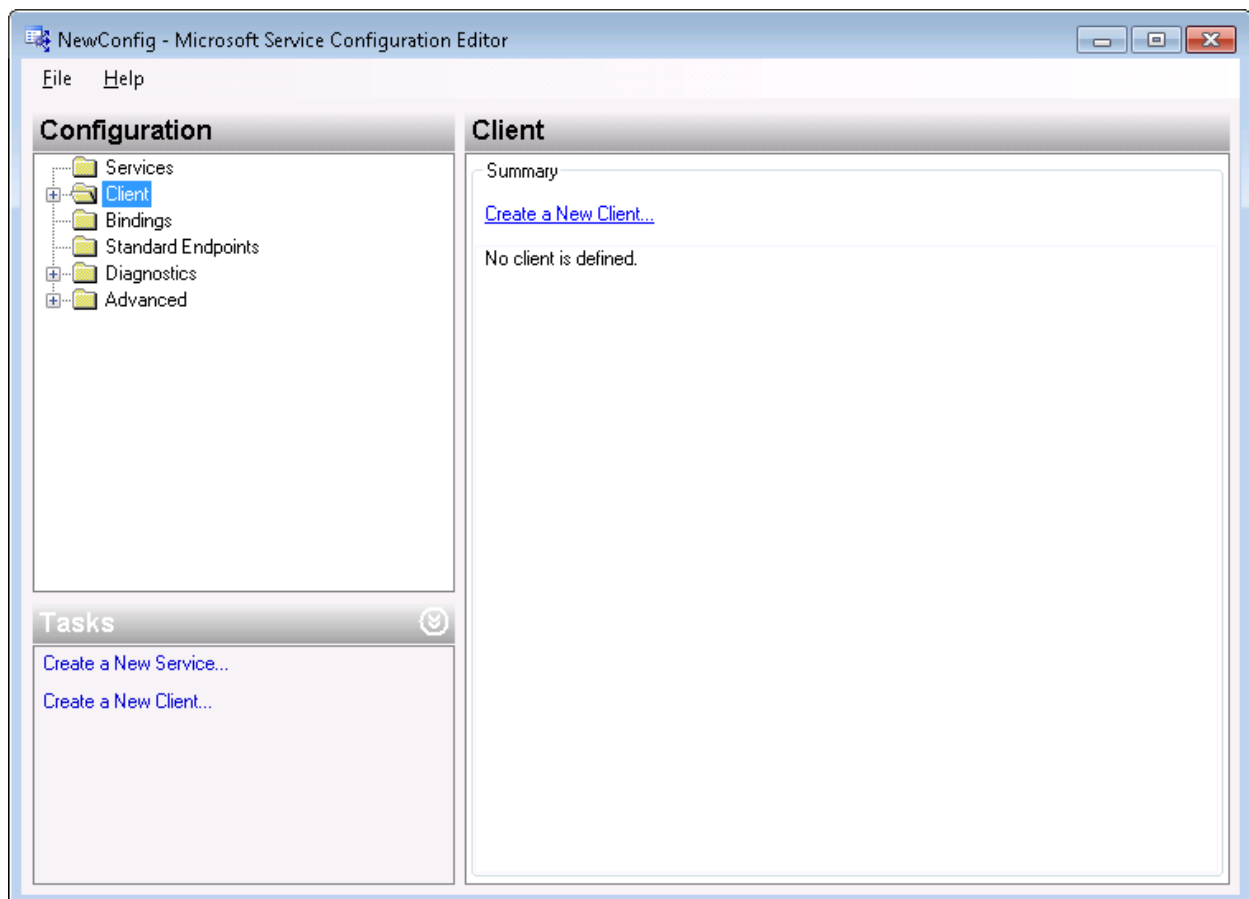
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**Creating the Consumer configuration file using Microsoft Service Configuration Tool:**

As an alternative to editing the XML files directly, you may follow the steps below to create a consumer server configuration with the Microsoft Service Configuration Editor

1. Open Microsoft Service Configuration Editor. Select the **Client** node in the upper left pane.
2. Click the link **Create a New Client...** in the right pane.



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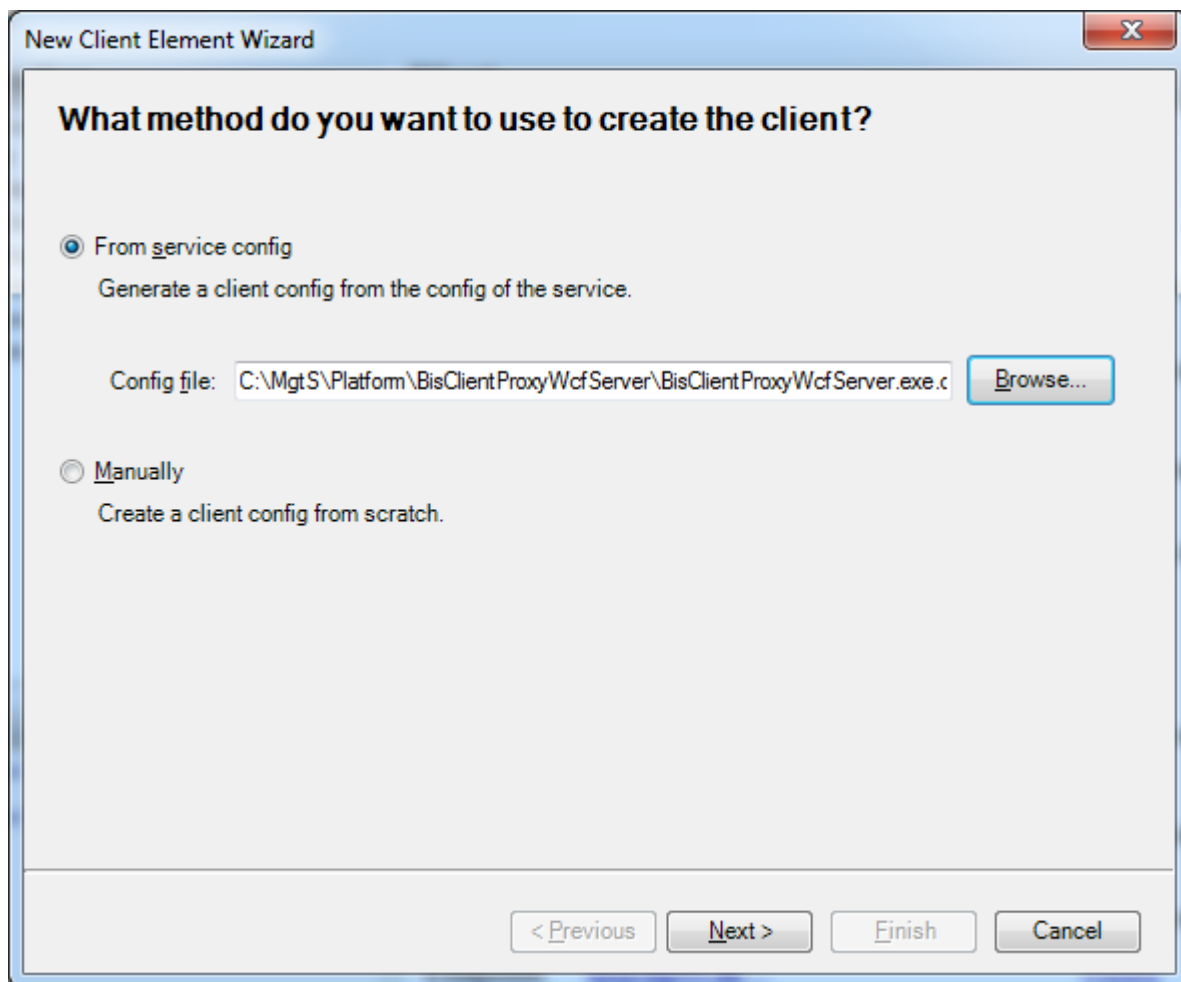
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3. Effect: the **New Client Element Wizard** appears
4. Select the radio button **From service config** and click the **Browse...** button to locate the Provider server configuration file.



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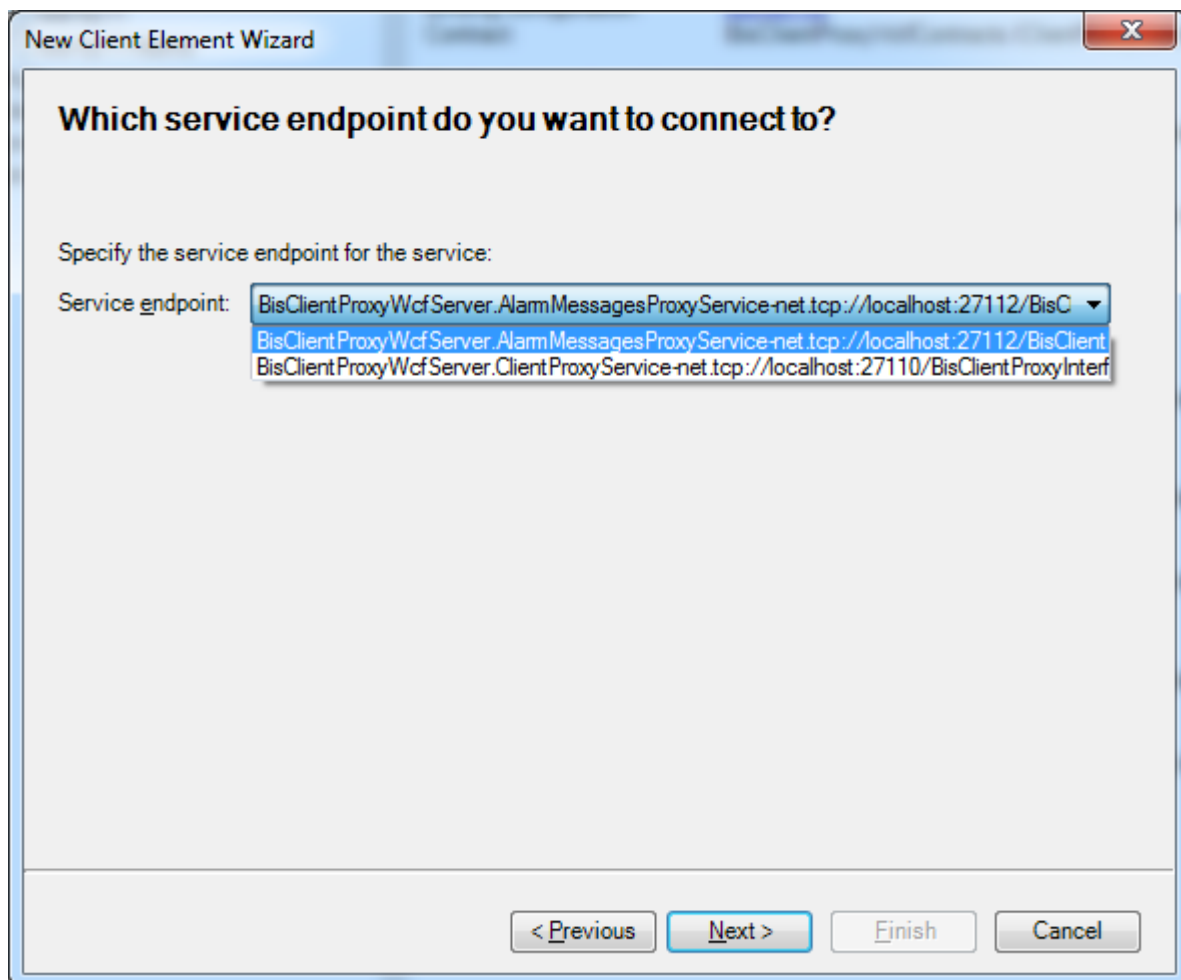
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5. Effect: The wizard will automatically show the available service endpoints. You must then repeat the next actions for both service endpoints.
6. Click **Next >**



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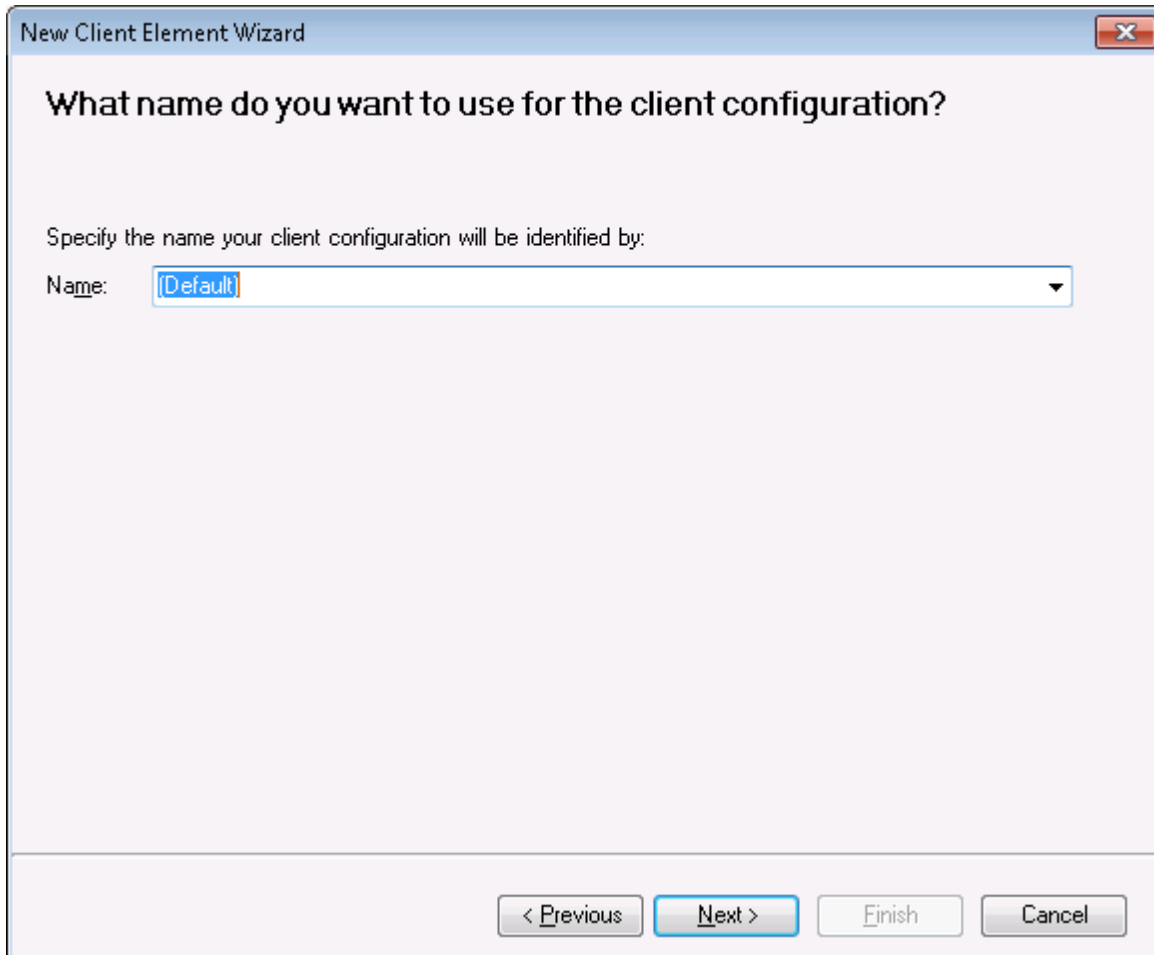
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7. Leave **Name** as **(Default)**. Click **Next >** to proceed.



New Client Element Wizard

What name do you want to use for the client configuration?

Specify the name your client configuration will be identified by:

Name:

< Previous   Next >   Finish   Cancel



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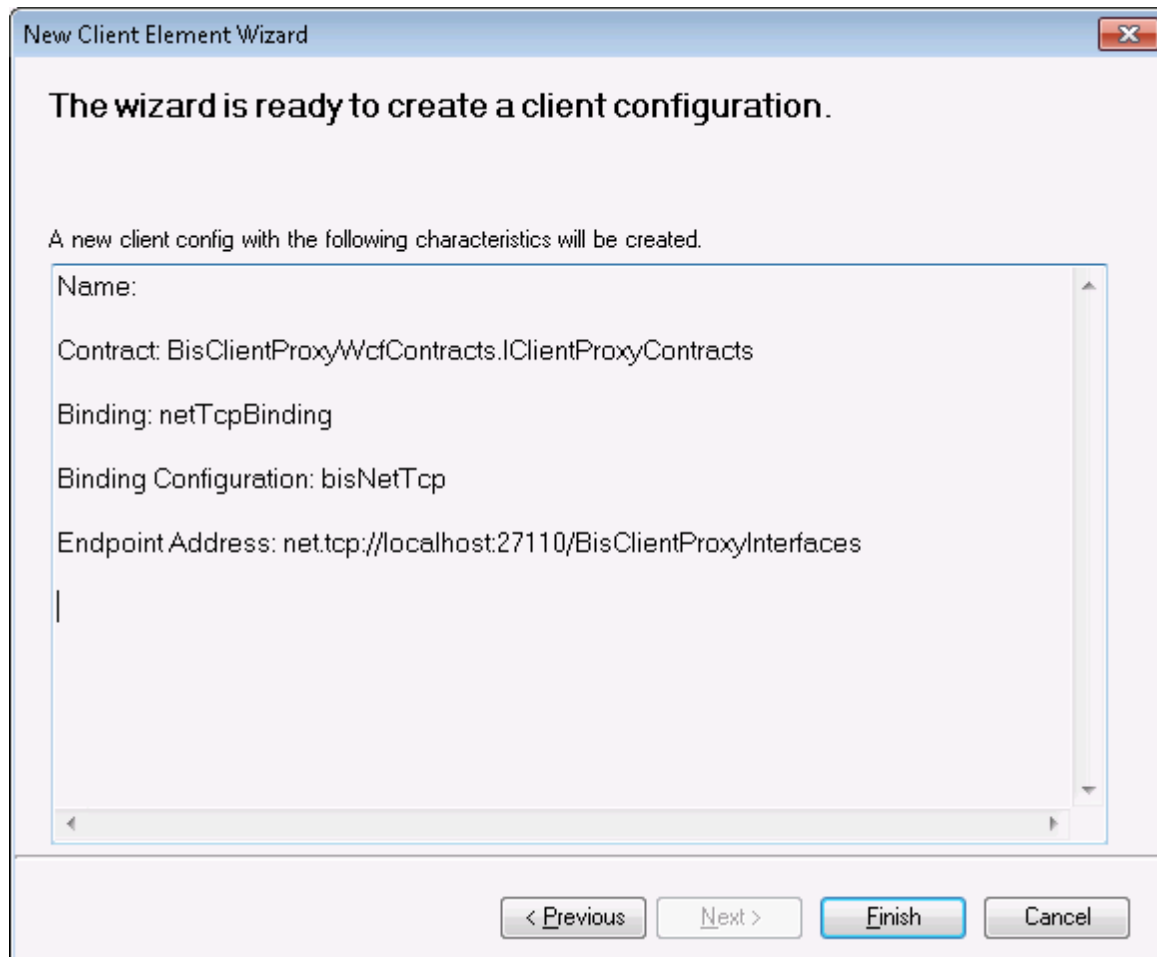
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## 8. Click **Finish**



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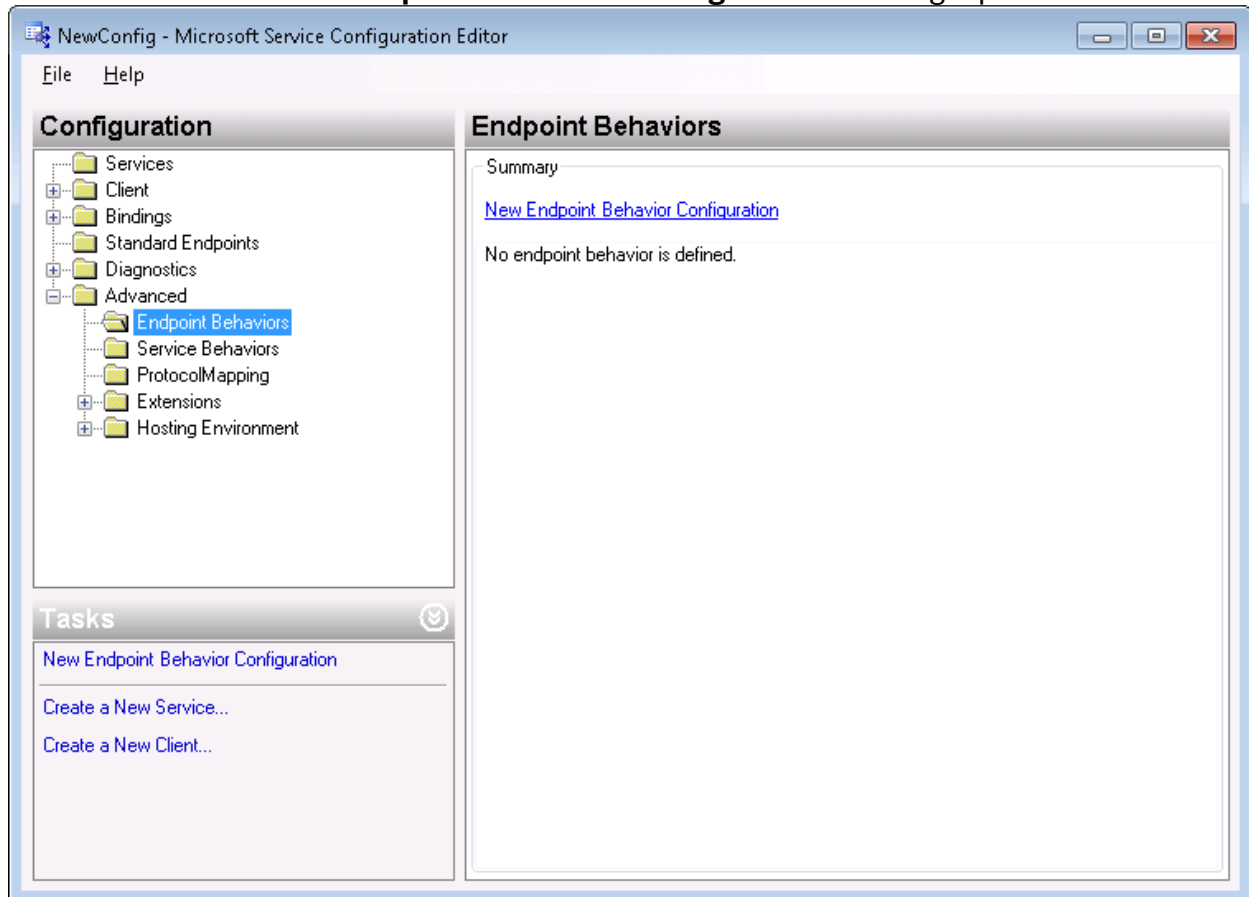
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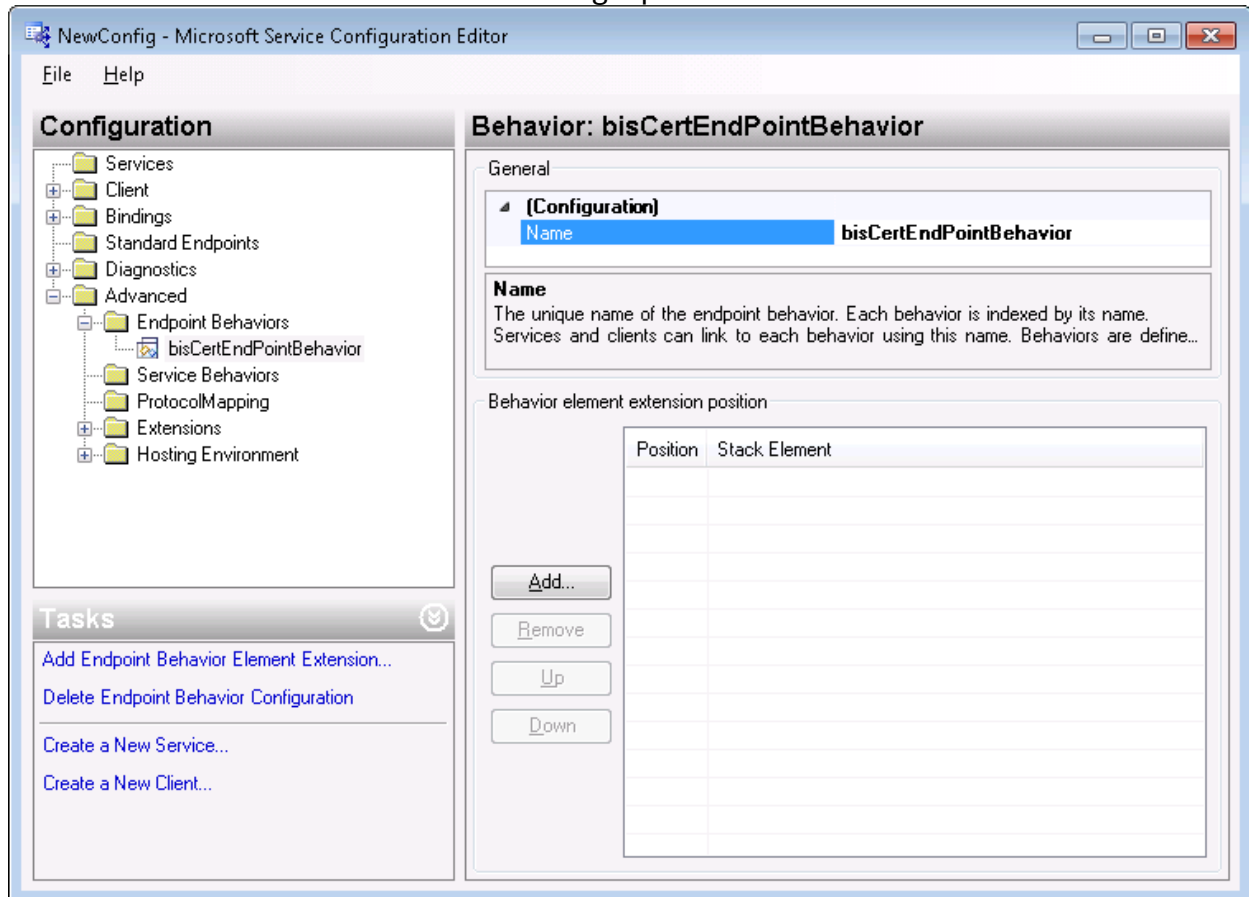
9. In the Configuration pane select **Advanced > Endpoint Behaviors**

10. Click the link **New Endpoint Behaviour Configuration** in the right pane.



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11. Give **Name** the value **bisCertEndPointBehaviour**12. Click the **Add...** button in the lower right pane

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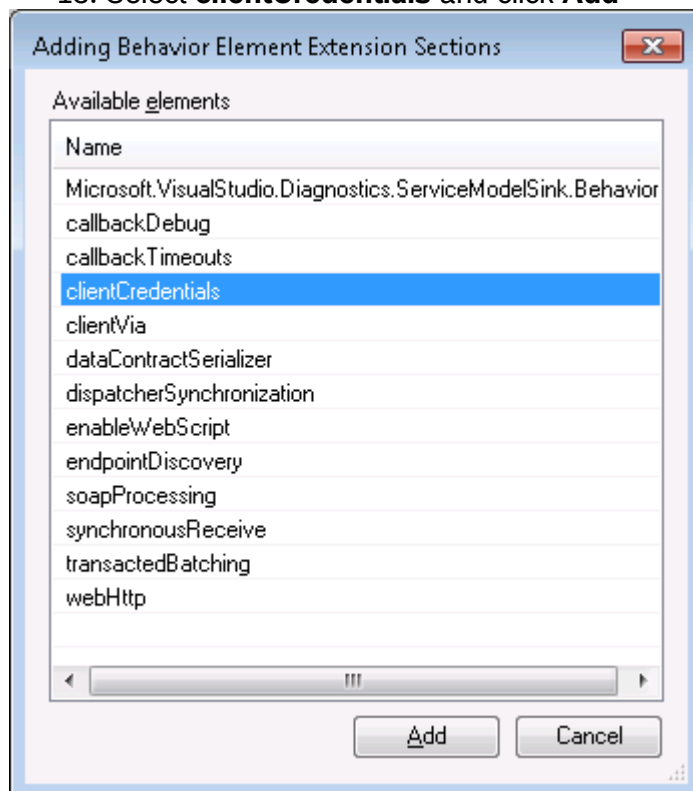
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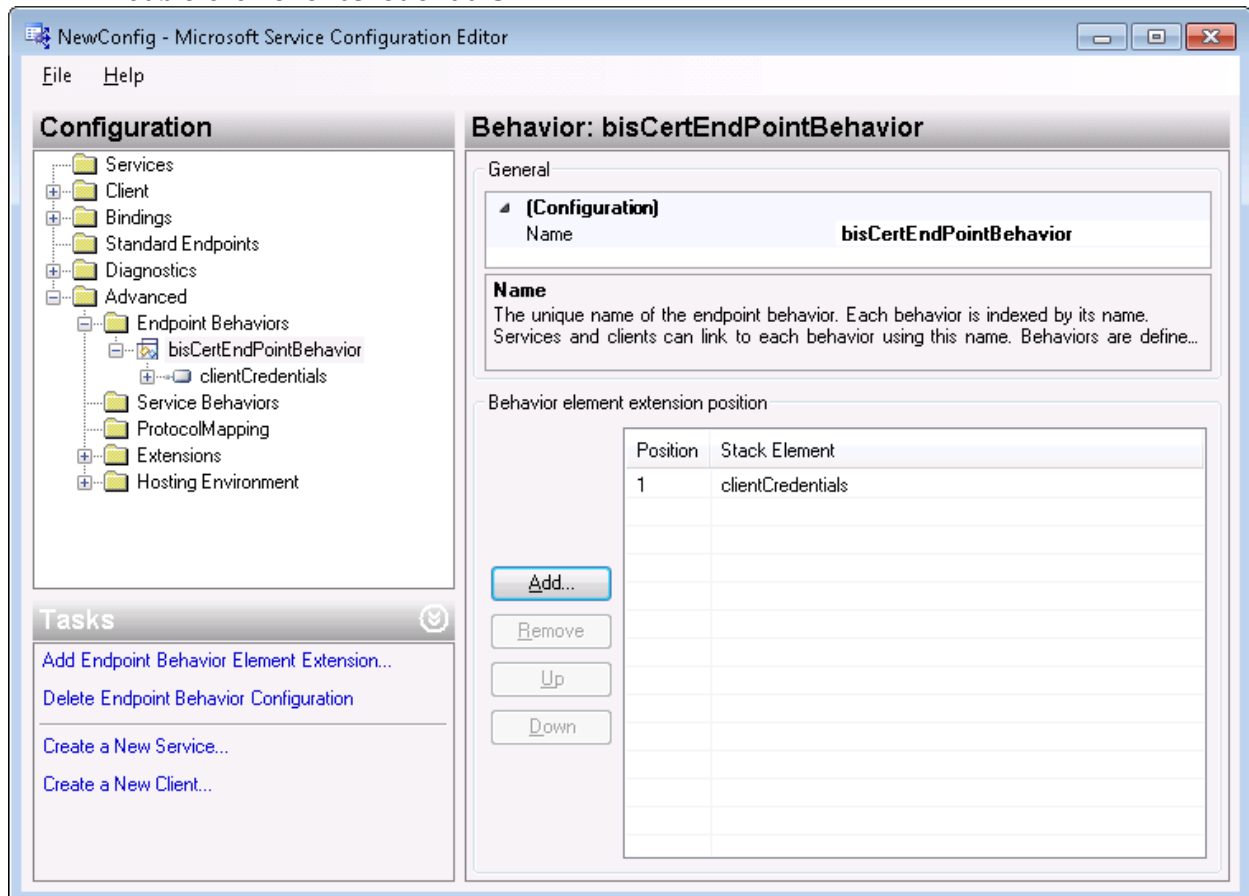
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**13. Select `clientCredentials` and click `Add`**

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## 14. Double click **clientCredentials**



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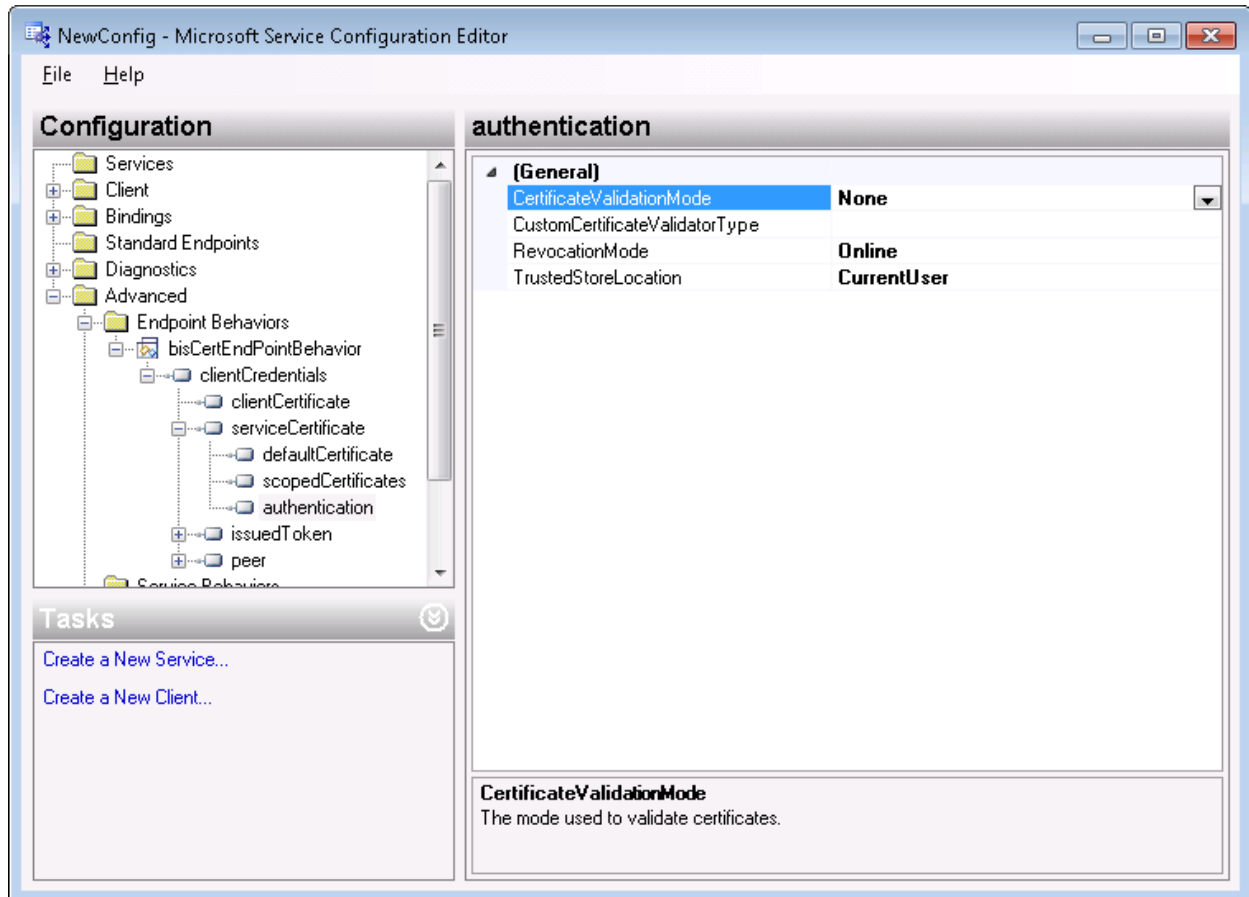
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15. Select **serviceCertificate > authentication**16. In **CertificateValidationMode** select **None**

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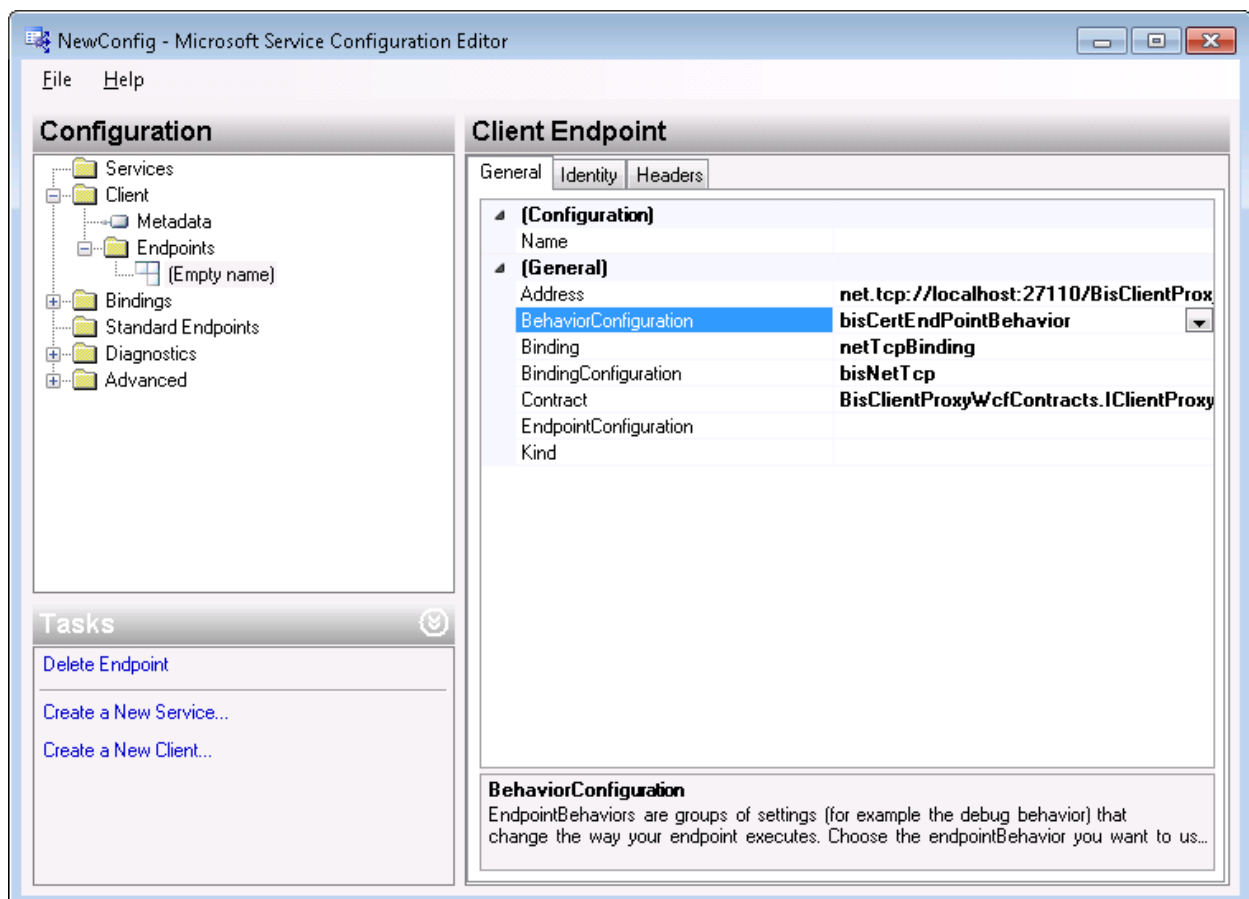
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17. Select **Client > Endpoints > (Empty name)**

18. In **BehaviourConfiguration** select the value **bisCertEndPointBehaviour** that you defined above.



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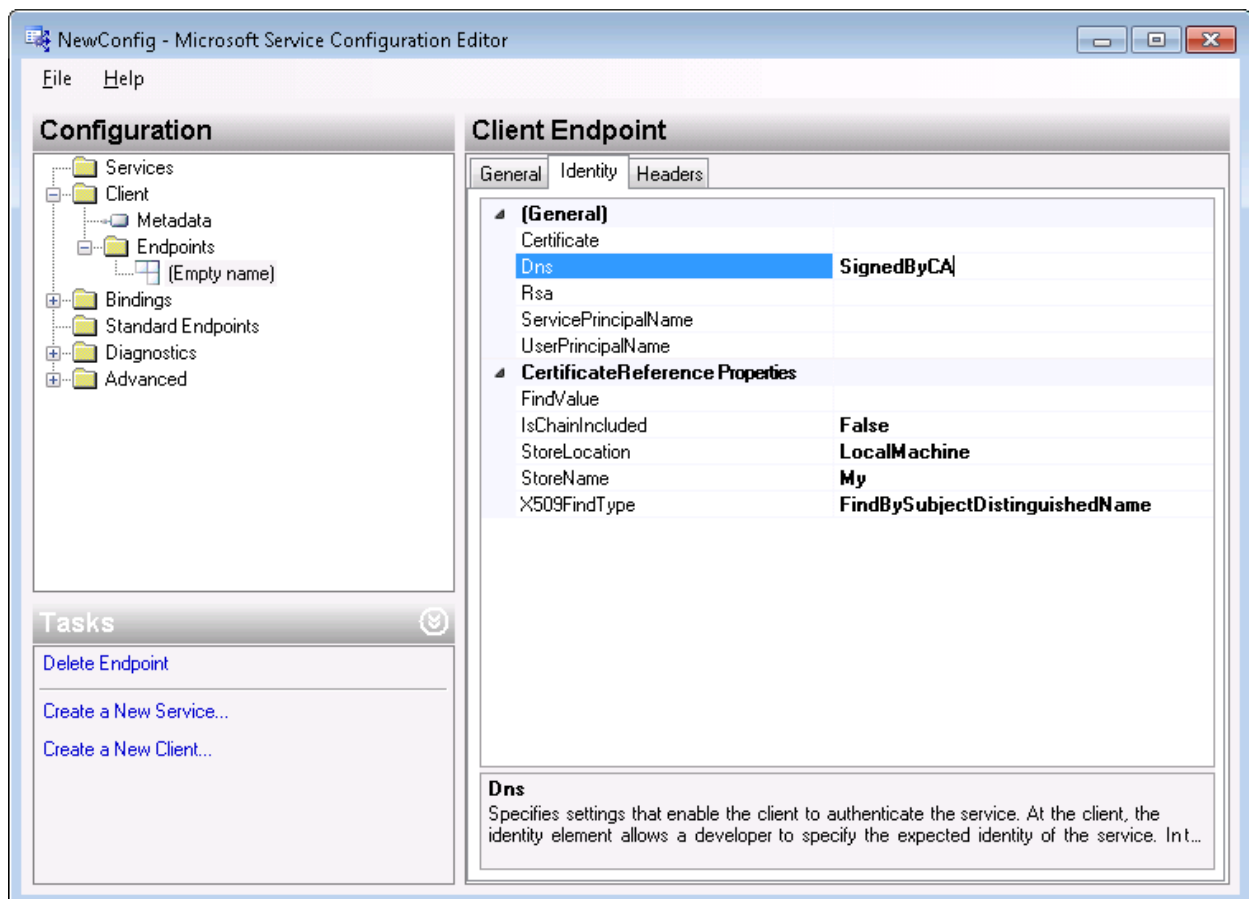
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19. Go to tab: **Identity**. For **Dns** enter the certificate's Subject Name as used by Provider Server for encryption.
20. Make sure you have a back up copy of the existing configuration before saving this newly created configuration.



-----End of document-----