



Dynamic ESDL

Boca Raton Documentation Team

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Dynamic ESDL

Dynamic ESDL (Enterprise Service Description Language) is a methodology that helps you develop and manage web-based query interfaces quickly and consistently.

Dynamic ESDL takes an interface-first development approach. It leverages the ESDL Language to create a common interface “contract” that both Roxie Query and Web interface developers will adhere to. It is intended to allow developers to create production web services, with clean interfaces that can evolve and grow over time without breaking existing applications.

ESDL’s built-in versioning support helps ensure compiled and deployed applications continue to operate while changes are made to the deployed service’s interface for new functionality.

ESDL’s ability to define and reuse common structures helps maintain consistent interfaces across methods.

The Dynamic ESDL service is built to scale horizontally, and hooks are provided to add custom logging and security to help create fully “productionalized” web services.

Once a service is deployed, application developers and end-users can consume the service using REST, JSON, XML, SOAP, or form encoded posts. Dynamic ESDL provides quick and easy access to a WSDL, live forms, sample requests and responses, and testing interfaces to allow developers to test logic changes, data changes, or new features, as well as to interact with the service directly using SOAP, XML, or JSON.

Workflow Tutorial

Overview

In this section, we will:

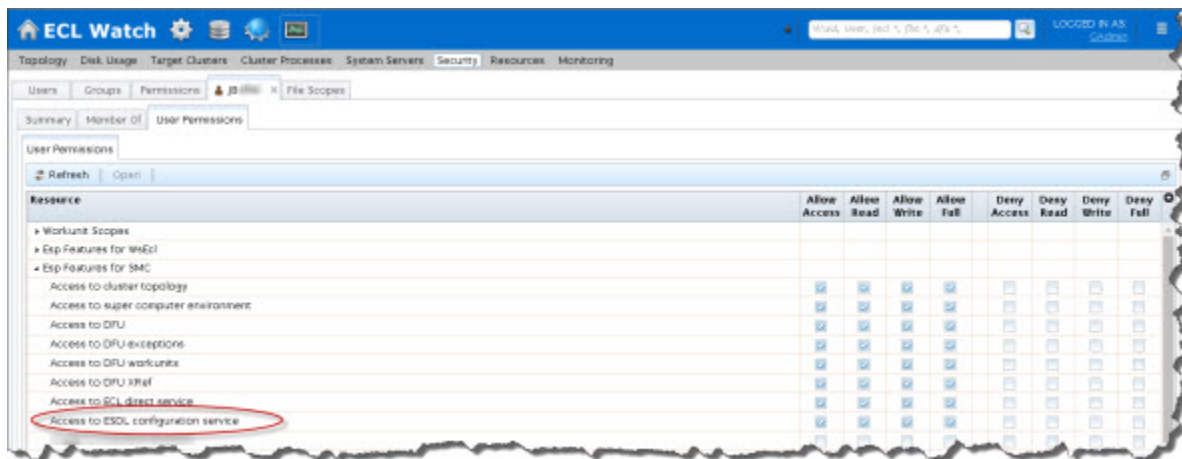
- Use Configuration Manager to add a Dynamic ESDL-based ESP Service and bind it to a port on an ESP server.
- Write an ESDL Service Definition.
- Generate ECL from the ESDL Service Definition, copy it to your ECL repository, and then write the ECL query that will deliver the result (the business logic).
- Compile the ECL business logic query and publish it to a Roxie cluster.

At this point you can test the query using WsECL.

- Publish the Dynamic ESDL definition.
- Bind the service methods to the Roxie queries using a configuration XML file.

DESDL and LDAP Security

If your HPCC platform is configured to use LDAP security, you must ensure any user who will be publishing ESDL Definitions has Access to **ESDL configuration service** set to **Allow Full**, as shown below.



Configure and Bind a Dynamic ESDL service

This step adds an ESP service and a service binding that reserves a port for the dynamic ESDL service. This step is independent of the development and publishing of the actual Roxie query, so you can set it up before or after your query is ready.

1. If it is running, stop the HPCC system, using this command:

Centos/Red Hat

```
sudo /sbin/service hpcc-init stop
```

Ubuntu

```
sudo service hpcc-init stop
```

Debian 6 (Squeeze)

```
sudo /etc/init.d/hpcc-init stop
```



You can use this command to confirm HPCC processes are stopped (on Centos/Red Hat):

```
sudo /sbin/service hpcc-init status
```

For Ubuntu

```
sudo service hpcc-init status
```

For Debian 6 (Squeeze)

```
sudo /etc/init.d/hpcc-init status
```

2. Start the Configuration Manager service.

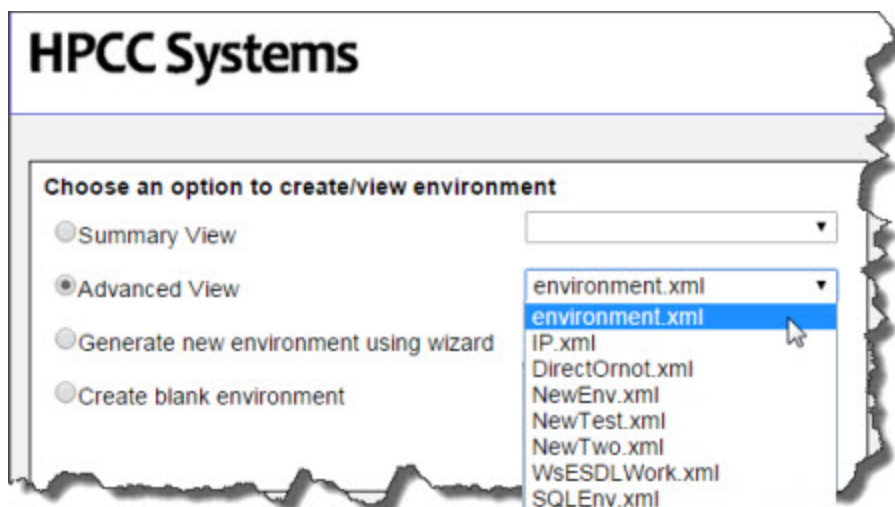
```
sudo /opt/HPCCSystems/sbin/configmgr
```

3. Using a Web browser, go to the Configuration Manager's interface:

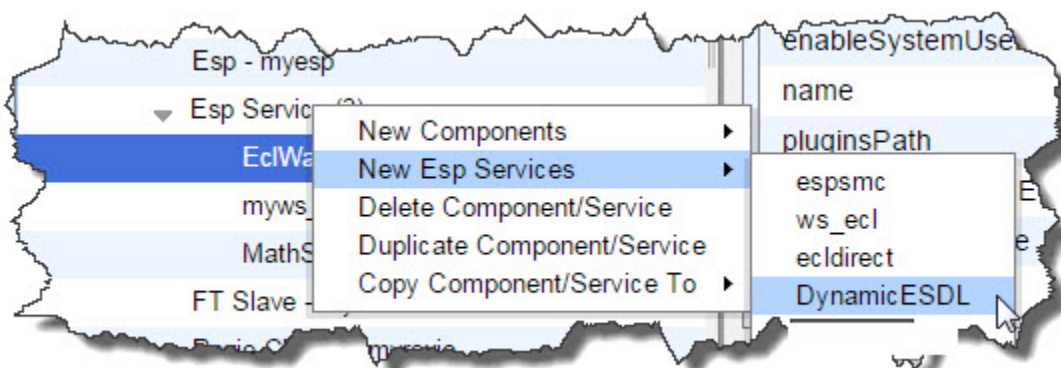
```
http://<node ip >:8015
```

The Configuration Manager startup wizard displays.

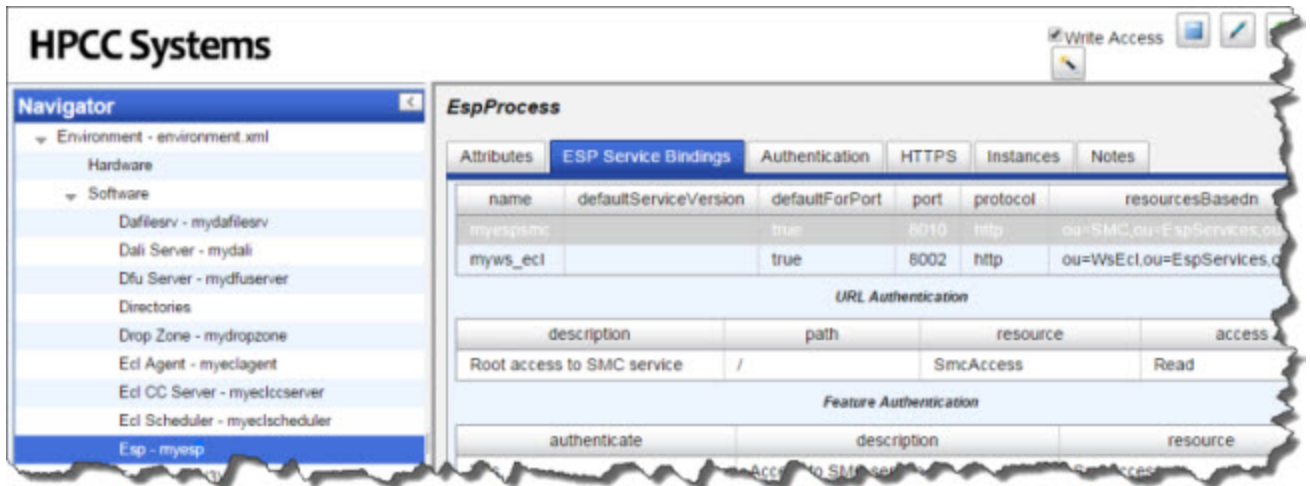
4. Select **Advanced View** and then select the source environment XML file to edit.



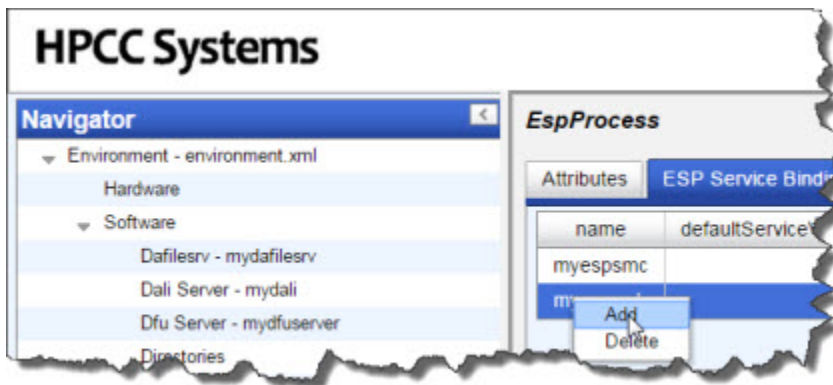
5. Press the **Next** button.
6. Right-click on **Esp Services** and select **New Esp Services > Dynamic ESDL**.



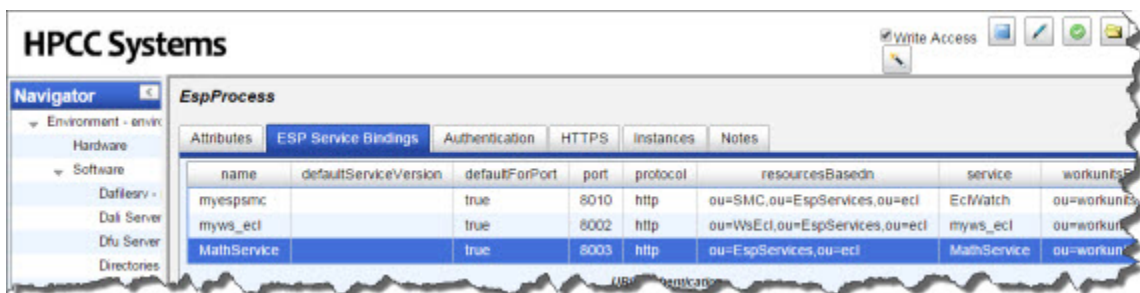
7. Provide a name for the service.
8. Select your ESP , then select the ESP Service Bindings tab.



9. Right-click in the list of bindings and select **Add**



10. Provide a name, port, and then select the service. The service definition you added will display in the list of available services.



11. Copy the NewEnvironment.xml file from the source directory to the /etc/HPCCSystems and rename the file to environment.xml

```
# for example
sudo cp /etc/HPCCSystems/source/NewEnvironment.xml /etc/HPCCSystems/environment.xml
```




Make sure that you have sufficient privileges to write file(s) to the destination directory before attempting to copy. If prompted to overwrite the destination file, you should answer **yes**.

12. Copy the `/etc/HPCCSystems/environment.xml` to `/etc/HPCCSystems/` on **every** node.

You may want to create a script to push out the XML file to all nodes. A sample script is provided with HPCC. The following command copies the XML files out to all nodes as required:

```
sudo /opt/HPCCSystems/sbin/hpcc-push.sh <sourcefile> <destinationfile>
```

13. Restart the HPCC system on **every** node. The following command starts the HPCC system on an individual node:

Centos/Red Hat

```
sudo /sbin/service hpcc-init start
```

Ubuntu

```
sudo service hpcc-init start
```

Debian 6 (Squeeze)

```
sudo /etc/init.d/hpcc-init start
```



You may want to create a script to push this command out to every node. A sample script is provided with HPCC. Use the following command to start HPCC on all nodes:

```
sudo /opt/HPCCSystems/sbin/hpcc-run.sh -a hpcc-init start
```

Write the ESDL Service Definition

In this section, we will write a the Service Definitions. The program listing below shows a service called *MathService*. It contains one method, *AddThis*, with a simple request and a simple response defined.

```
ESPservice MathService
{
    ESPmethod AddThis(AddThisRequest, AddThisResponse);
};

ESPrequest AddThisRequest
{
    int    FirstNumber;
    int    SecondNumber;
};

ESPresponse AddThisResponse
{
    int    Answer;
};
```

1. Save the file as MathService.ecm.

Generate ECL definitions from the ESDL Service Definition

In this section, we will generate ECL from this ESDL Service Definition file. This will use the esdl executable that is installed with Client Tools.

You will find this in C:\Program Files (x86)\HPCCSystems\5.2.0\clienttools\bin on a Windows machine

or /opt/HPCCSystems/bin/ on a Linux machine.

1. From the command line, run:

```
esdl ecl MathService.ecm .
```

This produces a file named MathService.ecl in the current directory

```
/** Not to be hand edited (changes will be lost on re-generation) */  
/** ECL Interface generated by esdl2ecl version 1.0 from MathService.xml. */  
/*=====*/  
  
export MathService := MODULE  
  
export t_AddThisRequest := record  
  integer FirstNumber {xpath('FirstNumber')};  
  integer SecondNumber {xpath('SecondNumber')};  
end;  
  
export t_AddThisResponse := record  
  integer Answer {xpath('Answer')};  
end;  
end;  
  
/** Not to be hand edited (changes will be lost on re-generation) */  
/** ECL Interface generated by esdl2ecl version 1.0 from MathService.xml. */  
/*=====*/
```

2. Copy the MathService.ecl file to a module in your ECL Repository. For example, myMathService.

3. Write ECL to support the service:

```
IMPORT MyMathService;  
rec_in := MyMathService.MathService.t_AddThisRequest;  
  
First_Row := ROW ([], rec_in) : STORED ('AddThisRequest', FEW);  
c:= first_row.FirstNumber + first_row.SecondNumber;  
ds_out := ROW ({c}, MyMathService.MathService.t_AddThisResponse);  
OUTPUT(ds_out, NAMED('AddThisResponse'));
```

4. Compile and Publish to your Roxie cluster.

5. Test the service using WsECL :

```
http://<node ip >:8002
```

Publish the ESDL Service Definitions and Bind the ESDL Service

In this section, we will publish the ESDL Service definitions to the System Data Store and bind the methods to the published Roxie query.

1. Publish the Dynamic ESDL definition

```
esdl publish MathService MathService.ecm -s nnn.nnn.nnn.nnn -p 8010 --version 1
```

Replace nnn.nnn.nnn.nnn with your ECL Watch ESP server's IP address.

2. Create the configuration XML file

```
<Methods>
  <Method name="AddThis" url="<RoxieIP>:9876" querytype="roxie" queryname="AddThis"/>
</Methods>
```

Where name is the name of your method(s) and url is the Roxie server's IP and port and queryname is the published name (alias) of the query. For a multi-node Roxie, you can use a range in the form of nnn.nnn.nnn.n-xxx.

3. Save the file as MathSvcCfg.xml
4. Bind the service methods to the queries using a the configuration XML.

```
esdl bind-service myesp 8003 MathService.1 MathService --config MathSvcCfg.xml -s nnn.nnn.nnn.nnn -p 8010
```

Where myesp is the name of your ESP process, 8003 is the port you reserved for your Dynamic ESDL service.

5. Test the service using the new interface:

```
http://<node ip >:8003
```

ESDL Command Line Interface

The ESDL Command Syntax

esdl [--version] <command> [<options>]

<i>--version</i>	displays version info.
<i>help <command></i>	displays help for the specified command.
xml	Generate XML from ESDL definition.
ecl	Generate ECL from ESDL definition.
xsd	Generate XSD from ESDL definition.
wsdl	Generate WSDL from ESDL definition.
publish	Publish ESDL Definition for ESP use.
list-definitions	List all ESDL definitions.
delete	Delete ESDL Definition.
bind-service	Configure ESDL based service on target ESP (with existing ESP Binding).
list-bindings	List all ESDL bindings.
unbind-service	Remove ESDL based service binding on target ESP.
bind-method	Configure method associated with existing ESDL binding.
get-binding	Get ESDL binding.

esdl xml

esdl xml [**options**] **filename.ecm** [<**outdir**>]

<i>filename.ecm</i>	The file containing the ESDL definitions
<i>-r/--recursive</i>	process all includes
<i>-v/--verbose</i>	display verbose information
<i>-?/-h/--help</i>	show usage page
Output	(srcdir <outdir>)/filename.xml

This generates XML from the ESDL definition. This XML is an intermediate entity used by the ESDL Engine to create the runtime service definitions. This command is rarely used by itself.

Examples:

```
esdl xml MathService.ecm .
```

esdl ecl

esdl ecl filename.ecm [<outdir>] [options]

<i>filename.ecm</i>	The file containing the ESDL definitions.
<i>-x, --expandedxml</i>	Output expanded XML files.
<i>--includes</i>	If present, process all included files.
<i>--rollup</i>	If present, rollup all processed includes to a single ECL output file.
<i>-cde</i>	Specifies the HPCC Component files directory (location of xslt files).
<i>--ecl-imports</i>	Comma-delimited import list to be attached to the output ECL. Each entry generates a corresponding IMPORT statement.
<i>--ecl-header</i>	Text to include in header or target (generated) file (must be valid ECL).
Output	(srcdir <outdir>)/filename.ecl

This generates ECL structures from ESDL definition. These structures create the interface (entry and exit points) to the Roxie query.

Examples:

```
esdl ecl MathService.ecm .
```

esdl xsd

esdl xsd [options] filename.ecm [<outdir>]

<i>filename.ecm</i>	The file containing the ESDL definitions
<i>-r/--recursive</i>	process all includes
<i>-v/--verbose</i>	display verbose information
<i>-?/-h/--help</i>	show usage page
Output	(srcdir <outdir>)/filename.ecl

This generates XSD from the ESDL definition.

Examples:

```
esdl xsd MathService.ecm .
```


esdl wsd

esdl wsd [**options**] **filename.ecm** [<outdir>]

<i>filename.ecm</i>	The file containing the ESDL definitions
<i>-r/--recursive</i>	process all includes
<i>-v/--verbose</i>	display verbose information
<i>-?/-h/--help</i>	show usage page
Output	(srcdir <outdir>)/filename.ecl

This generates WSDL from ESDL definition.

Examples:

```
esdl wsd MathService.ecm .
```

esdl publish

esdl publish <servicename> <filename.ecm>][options]

servicename	The name of the service to publish
filename.ecm	The ESDL (*.ecm) file containing the service definitions.
--overwrite	Overwrite the latest version of this ESDL Definition
-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Publishes an ESDL service definition to the system datastore.

Examples:

```
esdl publish mathservice mathservice.ecm -s nnn.nnn.nnn.nnn --port 8010
```

esdl list-definitions

esdl list-definitions [options]

-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

This command lists published definitions

Example:

```
esdl list-definitions -s nnn.nnn.nnn.nnn --port 8010
```

esdl delete

esdl delete <ESDLServiceDefinitionName> <ESDLServiceDefinitionVersion> [options]

ESDLServiceDefinitionName	The name of the ESDL service definition to delete
ESDLServiceDefinitionVersion	The version of the ESDL service definition to delete
-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Use this command to delete an ESDL Service definition. If the Service definition is bound, you must first unbind it.

Example:

```
esdl delete mathservice 2 -s nnn.nnn.nnn.nnn --port 8010
```

esdl bind-service

esdl bind-service

esdl bind-service <TargetESPProcessName> <TargetESPBindingPort | TargetESPServiceName> <ESDLDefinitionId> <ESDLServiceName> [command options]

TargetESPProcessName	The target ESP Process name
TargetESPBindingPort TargetESPServiceName	Either target ESP binding port or the target ESP service name
ESDLDefinitionId	The Name and version of the ESDL definition to bind to this service (must already be defined in Dali)
ESDLServiceName	The Name of the ESDL Service (as defined in the ESDL Definition)
--config <file XML>	Configuration XML (either inline or as a file reference)
--overwrite	Overwrite the latest version of this ESDL Definition
-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Use this command to bind a Dynamic ESDL-based ESP service to an ESDL definition.

To bind an ESDL Service, provide the target ESP process name (ESP Process which will host the ESP Service as defined in the ESDL Definition.)

You must also provide the Port on which this service is configured to run (ESP Binding), and the name of the service you are binding.

Optionally provide configuration information either directly inline or using a configuration file XML in the following syntax:

```
<Methods>
  <Method name="myMthd1" url="http://<RoxieIP>:9876/somepath?someparam=value" user="me" password="mypw" />
  <Method name="myMthd2" url="http://<RoxieIP>:9876/somepath?someparam=value" user="me" password="mypw" />
</Methods>
```

Example:

```
esdl bind-service myesp 8003 MathSvc.1 MathSvc --config MathSvcCfg.xml -s nnn.nnn.nnn.nnn -p 8010
```

esdl list-bindings

esdl list-bindings [options]

-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Use this command to list bindings on a server.

Example:

```
esdl list-bindings -s nnn.nnn.nnn.nnn -p 8010
```

esdl unbind-service

esdl unbind-service <TargetESPProcessName> <TargetESPBindingPort | TargetESPServiceName> [options]

TargetESPProcessName	The target ESP Process name
TargetESPBindingPort TargetESPServiceName	Either target ESP binding port or the target ESP service name
-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Use this command to unpublish ESDL Service based bindings.

To unbind an ESDL Service, provide the target ESP process name (ESP Process which will host the ESP Service as defined in the ESDL Definition.) You must also provide the Port on which this service is configured to run (the ESP Binding), and the name of the service you are unbinding.

Example:

```
esdl unbind-service myesp 8003
```

esdl bind-method

esdl bind-method <TargetESPProcessName> <TargetESPBindingName> <TargetServiceName> <TargetServiceDefVersion> <TargetMethodName> [options]

TargetESPProcessName	The target ESP Process name
TargetESPBindingName	Either target ESP binding name
TargetServiceName	The name of the Service to bind (must already be defined in dali.)
TargetServiceDefVersion	The version of the target service ESDL definition (must exist in dali)
TargetMethodName	The name of the target method (must exist in the service ESDL definition)
--config <file XML>	Configuration XML (either inline or as a file reference)
--overwrite	Overwrite the latest version of this ESDL Definition
-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Use this command to publish ESDL Service based bindings.

To bind an ESDL Service, provide the target ESP process name (ESP Process which will host the ESP Service as defined in the ESDL Definition.)

You must also provide the Port on which this service is configured to run (ESP Binding), and the name of the service you are binding.

Optionally provide configuration information either directly inline or using a configuration file XML in the following syntax:

```
<Methods>
  <Method name="myMthd1" url="http://<RoxieIP>:9876/somepath?someparam=value" user="me" password="mypw" />
  <Method name="myMthd2" url="http://<RoxieIP>:9876/somepath?someparam=value" user="me" password="mypw" />
</Methods>
```

Example:

```
esdl bind-service myesp 8003 MathSvc.1 MathSvc --config MathSvcCfg.xml -s nnn.nnn.nnn.nnn -p 8010
```


esdl get-binding

esdl get-binding <ESDLBindingId> [options]

ESDLBindingId	The target ESDL binding id <espprocessname>.<espbindingname>
-s, --server	The IP Address or hostname of ESP server running ECL Watch services
--port	The ECL Watch services port (Default is 8010)
-u, --username	The username (if necessary)
-pw, --password	The password (if necessary)
--version <ver>	ESDL service version
--help	display usage information for the given command
-v, --verbose	Output additional tracing information

Use this command to get DESDL Service based bindings.

To specify the target DESDL based service configuration, provide the target ESP process (esp process name or machine IP Address) which hosts the service.

You must also provide the Port on which this service is configured to run and the name of the service.

Example:

```
esdl get-binding myesp.dESDL_Service -s nnn.nnn.nnn.nnn -p 8010
```

ESDL Language Reference

ESDL Structures

ESPstruct

ESPstruct is a set of elements grouped together under one name. These elements, known as *members*, can have different types and different lengths. Structures can be nested and support inheritance.

Example:

```
ESPstruct NameBlock
{
    string FirstName;
    string MiddleName;
    string LastName;
    int Age;
};
```

ESPrequest

The request structure for a method.

Example:

```
ESPrequest MyQueryRequest
{
    string FirstName;
    string MiddleName;
    string LastName;
    string Sortby;

    bool Descending(false);
};
```

ESPresponse

The response structure for a method.

Example:

```
ESPresponse MyQueryResponse
{
    string FirstName;
    string MiddleName;
    string LastName;
};
```

ESPParray

A structure for unbounded arrays. Arrays support inheritance and can be nested.

Example:

```
ESPstruct NameBlock
{
    string FirstName;
    string MiddleName;
    string LastName;

    int Age;
};

ESPParray<ESPstruct NameBlock, Name> Names;
```

This results in something like:

```
<Names>
  <Name>
    <FirstName>James</FirstName>
    <MiddleName>Joseph</MiddleName>
    <LastName>Deerfield</LastName>
    <Age>42</Age>
  </Name>
  <Name>
    <FirstName>Emily</FirstName>
    <MiddleName>Kate</MiddleName>
    <LastName>Constance</LastName>
    <Age>33</Age>
  </Name>
</Names>
```

ESPenum

A structure containing an enumerated value.

Example:

```
ESPenum EyeColors : string
{
    Brn("Brown"),
    Blu("Blue"),
    Grn("Green"),
};

ESPstruct Person
{
    string FirstName;
    string MiddleName;
    string LastName;

    ESPenum EyeColors EyeColor("Brown"); //provides a default value
```

```
};
```

ESPinclude

ESPinclude allows you to include an external ESDL file. This is similar to the #include statement.

Example:

```
ESPinclude(commonStructures);
```

ESPservice

This defines an ESP web service interface. Once defined, this interface definition can be assigned (bound) to a Dynamic ESDL-based ESP Service.

An ESPservice should contain one or more method definitions.

Example:

```
ESPservice MyService
{
    ESPmethod MyMethod1(MyMethod1Request, MyMethod1Response);
    ESPmethod MyMethod2(MyMethod2Request, MyMethod2Response);
};
```

ESPmethod

This defines a method definition you can reference in an ESPservice structure. The method definition should contain references to a previously defined ESPrequest and ESPresponse.

Example:

```
ESPservice MyService
{
    ESPmethod MyMethod1(MyMethod1Request, MyMethod1Response);
    ESPmethod
    [
        description("MyMethod Two"),
        help("This method does everything MyMethod1 does plus a few extra features"),
        min_ver("1.2")
    ]
    MyMethod2(MyMethod2Request, MyMethod2Response);
};
```

ESDL Datatypes

boolean bool

A boolean or logical data type having one of two possible values: true (1) or false (0).

Example:

```
boolean includeFlag;  
bool includeMore;
```

string

A data type consisting of sequence of alphanumeric characters.

Example:

```
string FirstName;
```

int

An integer value.

Example:

```
int Age;
```

int64

A 64-bit integer value

Example:

```
int64 Iterations;
```

float

A 4-byte floating point or real number.

Example:

```
float Temperature;
```

double

An 8-byte floating point or real number.

Example:

```
double Temperature;
```

binary

A data type containing binary data, similar to a BLOB .

Example:

```
binary RetinaScanSample;
```

ESDL, XSD, and ECL Type Mapping

ESDL	XSD	ECL
Bool boolean	bool	boolean
Binary	Base64Binary	String (base64 encoded)
Float	float	REAL4
Double	double	REAL8
Int	int	INTEGER
Int64	long	INTEGER8
String	string	String

ESDL Attributes

You can use ESDL attributes to extend and override the default behavior of an ESDL definition. For example, adding a `max_len(n)` to a string defines the string will only need to store a certain number of characters.

Many attributes are treated as hints that may have more effect on some implementations than others. For example, `max_len(n)` will affect generated ECL code, but is ignored when generating C++.

max_len (n)

The `max_len` attribute specifies the field length for ECL string field.

Example:

```
[max_len(20)] string City;
```

It means that in ECL, City field is a fixed length of 20 chars. For integer type, the `max_len` means the maximum size in bytes for the integer (8*`max_len` bits integer).

Example:

```
[max_len(3)] int Age;
```

This generates ECL code:

```
integer3 Age{xpath('Age')};
```

This attribute works for ESPenum type, too. The ECL type is also string.

```
[max_len(2)] ESPenum StateCode State;
```

Here the StateCode is 2-char state code enumeration.

This attribute can also be used for ESPstruct, ESPrequest, ESPresponse:

```
ESPstruct [max_len(1867)] IdentitySlim : Identity  
{  
    ...  
};
```

This generates ECL code:

```
export t_MyQuery := record (share.t_Name), MAXLENGTH(1867)  
{  
};
```

The ECL option `MAXLENGTH` helps ECL engine better manage memory.

This does not affect the type in the XSD/WSDL. ESP ignores this attribute when generating the schema. The type for a string is `xsd:string` which has no length limit. Therefore, the schema stays the same if the field length changes in the Roxie query.

ecl_max_len (n)

This `ecl_max_len` attribute tells the ECL generator to use ECL `maxlength` instead of the regular field length.

Example:

```
[ecl_max_len(50)] string CompanyName;  
[max_len(6)] string Gender;
```

The generated ECL code is:

```
string CompanyName { xpath("CompanyName"),maxlength(50) };  
string6 Gender { xpath("Gender") };
```

Note: when both *max_len* and *ecl_max_len* are specified, *ecl_max_len* is used and *max_len* is ignored.

ecl_name ("name")

The *ecl_name* attribute specifies the field name in generated ECL code. By default, the field name in ECL is the same as the name defined in ECM. However, in some cases, the name could causes issues in ECL. For example keywords in ECL cannot be used as a field name.

Example:

```
[ecl_name("_export")] string Export;  
[ecl_name("_type")] string Type;
```

Here, both **EXPORT** and **TYPE** are ECL keywords and cannot be used as ECL field names. We use *ecl_name* to tell the esdl2ecl process to generate acceptable names.

counter and count_val

These two attributes are used to help ESP calculate the record count of the response.

counter counts the number of children of the nodes. When the node is an array, it is the same as the number of items in the array.

count_val will use the value of the node as record count. Field **RecordCount** is implicitly marked as *count_val*.

When an response has multiple counter, count_val, the sum of the values is returned as record-count.

Example:

```
[counter] ESParray<MyRecord, Record> Records;  
[count_val] int TotalFound;
```

max_count_var

The *max_count_var* attribute is used to specify the expected max items in a dataset (ESParray).

Example:

```
[max_count_var("iesp.Constants.JD.MaxRecords")] ESParray <ESPstruct MYRecord, Record> Records;
```

Roxie will define the constant `iesp.Constants.JD.MaxRecords` and change it at will without affecting ESP.

ecl_null (n | string)

The *ecl_null* attribute tells ESP to remove the field altogether if the field's value is *n* or *string*. This provides a means to remove a field completely when there is no data for it.

Example:


```
[ecl_null(0)] int Age;  
[ecl_null("false")] bool IsMatch;
```

Age 0 means there is no Age data for this person. So, if Age is 0, the <Age> tag is not returned.

Without this attribute, <Age>0</Age> would be returned.

For the second example, a bool value of *false*, returned as a string, is treated as null and therefore the tag is not returned.

leading_zero(n)

The *leading_zero* attribute adds zero(s) to the field value so that the total length is *n*.

Example:

```
ESPstruct Date  
{  
    [leading_zero(4)] Year;  
    [leading_zero(2)] Month;  
    [leading_zero(2)] Day;  
};
```

So the Date will always have a 4-digit Year and a 2-digit Month and a 2-digit Day.

ecl_hide

The *ecl_hide* attribute hides the field from ECL (that is, the field is removed when generating the ECL code). This is used for some special cases.

Example:

```
ESPstruct Relative  
{  
    [ecl_hide] ESParray<ESPstruct Relative, Relative> Relatives;  
    "  
};
```

In this case, the Relative structure is defined in a recursive manner, and ECL does not support such a construct. Therefore, we use *ecl_hide* to avoid the recursive definition in ECL.

Sometimes a field is hidden from ECL for other reasons. In these cases, *ecl_hide* is not needed.

ecl_type ("type")

The *ecl_type* attribute defines the field type in ECL.

Example:

```
[ecl_type("Decimal10_2")] double RetailPrice;
```

ESDL does not have a monetary type, so we use *ecl_type* to define it.

ecl_keep

The *ecl_keep* attribute keeps the field in the generated ECL even though this field would have been hidden without this attribute.

min_ver

The min_ver attribute allows you to define the minimum (earliest) version where a field is visible. Requests using a prior version will not have access to the field.

Example:

```
[min_ver("1.03")] bool IsValid;
```

max_ver

The max_ver attribute allows you to define the maximum (latest) version where a field is visible. Requests using a later version will not have access to the field.

Example:

```
[max_ver("1.04")] bool IsValid;
```

depr_ver

The depr_ver attribute allows you to declare a field's end of life version. The field is deprecated at the specified version number. Requests using that version or any subsequent version will not have access to the field.

Example:

```
[depr_ver("1.04")] bool IsValid;
```

help

The help attribute (valid only for an ESPMethod) allows you to specify some additional text to display on the form that is automatically generated to execute a method.

Example:

```
ESPservice MyService
{
    ESPmethod MyMethod1(MyMethod1Request, MyMethod1Response);
    ESPmethod
    [
        description("MyMethod Two"),
        help("This method does everything MyMethod1 does plus a few extra features"),
        min_ver("1.2")
    ]
    MyMethod2(MyMethod2Request, MyMethod2Response);
};
```

description

The description attribute (valid only for an ESPMethod) allows you to specify some additional text to display on the form that is automatically generated to execute a method.

Example:

```
ESPservice MyService
{
```

```
ESPmethod MyMethod1(MyMethod1Request, MyMethod1Response);
ESPmethod
[
    description("MyMethod Two"),
    help("This method does everything MyMethod1 does plus a few extra features"),
    min_ver("1.2")
]
MyMethod2(MyMethod2Request, MyMethod2Response);
};
```