

## Introduction

This article provides instructions on how to configure Moodle to use web services and REST API for four (4) core most commonly used web services with response examples in JSON and XML.

These web services are used when integrating two or more different systems through users and enrollments to courses. Web services is one means of integration, which requires development on the primary application to call Moodle web services. For custom web services or consulting please call sales line for a quote.

The article has been split into different sections to make it easier to follow along.

### Sections/Summary of the Steps

Please note the following Sections/Steps.

- [Section 1](#): Adding Web Services
- [Section 2](#): API Reference
- [Section 3](#): Common Errors

### How to Add Web Services:

Below are the step by step instructions for adding web services.

**Using Custom web services:** You can install custom web services by copying your web service plugins to the **local** folder on FTP.

1. **Enable Web services:** Ensure that web service is enabled under **Advanced Features** so that you can use them. Do it from Site Administration > Advanced features > Enable Web Services > Checkbox On.
2. **Create an External Service:** Go to Site Administration > Plugins > Web Services > External Services. Click on 'Add' under **Custom Services** header. On page 'External Service' form. Enter a name in the **name** textbox for your web service.  
Select *Enable* and *Authorized* checkboxes (if the webservice is only for authorized users). There are other options you can use if you want to. Click the **Add Service** button to add your service. Doing that will redirect you to Add Functions page.
3. **Add Functions to Your Created web service:** Click Add Functions > Select All the Core functions (or the ones that you need) > Click Add Functions Button.

4. **Enable Protocols:** Go to Site Administration > Plugins > Web Services > Manage protocols page and/or enable REST protocol and XML-RPC protocol based on your need.
5. **Manage Tokens:** Go to Site Administration > Plugins > Web services > Manage Tokens > Add. Specify username/id, i.e. the user, who will use the token. From the dropdown option named **service**, select your web service name you have just created in steps 3 and 4. You can optionally set IP Restriction and Token Validity date here as well. Press save changes.

## API Reference

This API reference is organized by resource type. Each resource type has one or more methods.

### Resource types

1. Users
  - 1.1. core\_user\_create\_users
  - 1.2. core\_user\_get\_users\_by\_field
  - 1.3. core\_user\_update\_users
2. Enrolments
  - 2.1. enrol\_manual\_enrol\_users

#### 1.1 Users: core\_user\_create\_users

Create users.

### Request

#### HTTP request

POST http://localhost/moodle/webservice/rest/server.php

Property name	Value	Description
---------------	-------	-------------

#### Required properties

wstoken	string	Valid Moodle token
---------	--------	--------------------

wsfunction	core_user_create_users	Function name
------------	------------------------	---------------

#### Optional properties

moodlewsrestformatjson		parameter to allow JSON output
------------------------	--	--------------------------------

#### Parameters

Property name	Value	Description
---------------	-------	-------------

#### Required properties

users[0][username]	string	Username policy is defined in Moodle security config
--------------------	--------	--

users[0][password]	string	Plain text password consisting of any characters
--------------------	--------	--

users[0][firstname]	string	The first name(s) of the user
---------------------	--------	-------------------------------

users[0][lastname]	string	The family name of the user
--------------------	--------	-----------------------------

users[0][email]	string	A valid and unique email address
-----------------	--------	----------------------------------

#### Optional properties

users[0][auth]	string	Default to "manual" Auth plugins include manual, ldap, imap, etc
----------------	--------	--

users[0][idnumber]	string	Default to "" An arbitrary ID code number perhaps from the institution
--------------------	--------	--

users[0][lang]	string	Default to "en". Language code such as "en", must exist on server
----------------	--------	---

users[0][theme]	string	Theme name such as "standard", must exist on server
-----------------	--------	---

users[0][timezone]	string	Timezone code such as Australia/Perth, or 99 for default
--------------------	--------	--

users[0][mailformat]	int	Mail format code is 0 for plain text, 1 for HTML etc
----------------------	-----	--

users[0][description]	string	User profile description, no HTML
-----------------------	--------	-----------------------------------

users[0][city]	string	Home city of the user
----------------	--------	-----------------------

users[0][country]	string	Home country code of the user, such as AU or CZ
-------------------	--------	---

users[0][firstnamephonetic]	string	The first name(s) phonetically of the user
-----------------------------	--------	--

users[0][lastnamephonetic]	string	The family name phonetically of the user
----------------------------	--------	--

users[0][middlename]	string	The middle name of the user
----------------------	--------	-----------------------------

users[0][alternatename]	string	The alternate name of the user
-------------------------	--------	--------------------------------

#### Working Example

`http://yourmoodle.org/webservice/rest/server.php?wstoken=ce4d384c0c008b69fb409258cec722ba&moodlewsrestformat=json&wsfunction=core_user_create_users&users[0][username]=923116&users[0][email]=you@yourhost.org&users[0][lastname]=Test1&users[0][idnumber]=923116&users[0][firstname]=Moodle&users[0][password]=P@40ssword123!`

NOTE: use your Moodle site URL instead of **yourmoodle.org** and your generated token instead of **ce4d384c0c008b69fb409258cec722ba**

Response

## XML

### PostData Example:

```
$token = 'ce4d384c0c008b69fb409258cec722ba';

$randval = mt_rand(999, 99999999);

$userdata[] = array(

    'username' => 'testws' . $randval,

    'firstname' => 'testws',

    'lastname' => $randval,

    'password' => 'Testws.' . $randval,

    'email' => 'testws+' . $randval . '@example.com',

    'city' => 'Vancouver',

    'country' => 'CA',

    'idnumber' => $randval

);

$postdata = array(

    'wstoken' => $token,
```

```
'wsfunction' => 'core_user_create_users',  
  
'users' => $userdata  
  
);
```

### Response Example:

```
<?xml version="1.0" encoding="UTF-8"?>  
  
<RESPONSE>  
  
  <MULTIPLE>  
  
    <SINGLE>  
  
      <KEY name="id">  
  
        <VALUE>5</VALUE>  
  
      </KEY>  
  
      <KEY name="username">  
  
        <VALUE>testws8739153</VALUE>  
  
      </KEY>  
  
    </SINGLE>  
  
  </MULTIPLE>  
  
</RESPONSE>
```

### JSON

#### PostData Example:

```
$token = 'ce4d384c0c008b69fb409258cec722ba';  
  
$randval = mt_rand(999, 9999999);
```

```
$userdata[] = array(
    'username' => 'testws' . $randval,
    'firstname' => 'testws',
    'lastname' => $randval,
    'password' => 'Testws.' . $randval,
    'email' => 'testws+' . $randval . '@example.com',
    'city' => 'Vancouver',
    'country' => 'CA',
    'idnumber' => $randval
);
```

```
$postdata = array(
    'wstoken' => $token,
    'wsfunction' => 'core_user_create_users',
    'moodlewsrestformat'=>'json',
    'users' => $userdata
);
```

#### **Response Example:**

```
[
{
    "id": 5,
    "username": " testws8739153"
}
```

]

## 1.2 Users: core\_user\_get\_users\_by\_field

Retrieve users information for a specified unique field.

Request

### HTTP request

POST http://localhost/moodle/webservice/rest/server.php

Property name	Value	Description
---------------	-------	-------------

#### Required properties

wstoken	string	Valid Moodle token
---------	--------	--------------------

wsfunction	core_user_get_users_by_field	Function name
------------	------------------------------	---------------

#### Optional properties

moodlewsrestformat	json	parameter to allow JSON output
--------------------	------	--------------------------------

### Parameters

Property name	Value	Description
---------------	-------	-------------

#### Required properties

field	string	the search field can be 'id' or 'idnumber' or 'username' or 'email'
-------	--------	---

values[0]	String, int	Value for search field
-----------	-------------	------------------------

Response

### XML

### PostData Example:

```
$token = 'ce4d384c0c008b69fb409258cec722ba';
```

```
$postdata = array(  
    'wstoken' => $token,  
    'wsfunction' => 'core_user_create_users',  
    'field' => 'id',  
    'values[0]' => '5',  
  
);
```

#### **Response Example:**

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<RESPONSE>
```

```
<MULTIPLE>
```

```
<SINGLE>
```

```
<KEYname="id">
```

```
<VALUE>5</VALUE>
```

```
</KEY>
```

```
<KEYname="username">
```

```
<VALUE>testws8739153</VALUE>
```

```
</KEY>
```

```
<KEYname="firstname">
```

```
<VALUE>testws</VALUE>
```

```
</KEY>
```



```
<KEYname="lastname">
  <VALUE>8739153</VALUE>
</KEY>
<KEYname="fullname">
  <VALUE>testws 8739153</VALUE>
</KEY>
<KEYname="email">
  <VALUE>testws+8739153@example.com</VALUE>
</KEY>
<KEYname="address">
  <VALUEnull="null"/>
</KEY>
<KEYname="phone1">
  <VALUEnull="null"/>
</KEY>
<KEYname="phone2">
  <VALUEnull="null"/>
</KEY>
<KEYname="icq">
  <VALUEnull="null"/>
</KEY>
<KEYname="skype">
  <VALUEnull="null"/>
</KEY>
```

```
<KEYname="yahoo">  
  <VALUEnull="null"/>  
</KEY>  
  
<KEYname="aim">  
  <VALUEnull="null"/>  
</KEY>  
  
<KEYname="msn">  
  <VALUEnull="null"/>  
</KEY>  
  
<KEYname="department">  
  <VALUE/>  
</KEY>  
  
<KEYname="institution">  
  <VALUEnull="null"/>  
</KEY>  
  
<KEYname="idnumber">  
  <VALUE>8739153</VALUE>  
</KEY>  
  
  
  
<KEYname="interests">  
  <VALUEnull="null"/>  
</KEY>  
  
<KEYname="firstaccess">  
  <VALUE>0</VALUE>
```

```
</KEY>

<KEYname="lastaccess">

  <VALUE>0</VALUE>

</KEY>

<KEYname="auth">

  <VALUEnull="null"/>

</KEY>

<KEYname="confirmed">

  <VALUEnull="null"/>

</KEY>

<KEYname="lang">

  <VALUEnull="null"/>

</KEY>

<KEYname="theme">

  <VALUEnull="null"/>

</KEY>

<KEYname="timezone">

  <VALUEnull="null"/>

</KEY>

<KEYname="mailformat">

  <VALUEnull="null"/>

</KEY>

<KEYname="description">

  <VALUEnull="null"/>
```

```
</KEY>

<KEYname="descriptionformat">

  <VALUEnull="null"/>

</KEY>

<KEYname="city">

  <VALUE>Vancouver</VALUE>

</KEY>

<KEYname="url">

  <VALUEnull="null"/>

</KEY>

<KEYname="country">

  <VALUE>CA</VALUE>

</KEY>

<KEYname="profileimageurlsmall">

  <VALUE> http://localhost/moodle/pluginfile.php/88/user/icon/f2</VALUE>

</KEY>

<KEYname="profileimageurl">

  <VALUE> http://localhost/moodle/pluginfile.php/88/user/icon/f1</VALUE>

</KEY>

<KEYname="customfields">

  <MULTIPLE/>

</KEY>

<KEYname="preferences">

  <MULTIPLE/>
```

```
</KEY>

</SINGLE>

</MULTIPLE>

</RESPONSE>
```

## JSON

### PostData Example:

```
$token = 'ce4d384c0c008b69fb409258cec722ba';

$postdata = array(

    'wstoken' => $token,

    'wsfunction' => 'core_user_create_users',

    'moodlewsrestformat'=>'json',

    'field' => 'id',

    'values[0]'=> '5',

);
```

### Response Example:

```
[
{
    "id": 5,
    "username": "testws8739153",
    "firstname": "testws",
    "lastname": "8739153",
    "fullname": "testws 8739153",
    "email": "testws+8739153@example.com",
    "department": ""
```

```

    "idnumber": "8739153",
    "firstaccess": 0,
    "lastaccess": 0,
    "city": "Vancouver",
    "country": "CA",
    "profileimageurlsmall": "http://localhost/moodle/pluginfile.php/88/user/icon/f2",
    "profileimageurl": "http://localhost/moodle/pluginfile.php/88/user/icon/f1"
  }
]

```

### 1.3 Users: core\_user\_update\_users

Update a user's information. Use fields similar to to the create user web service.

Request

#### HTTP request

POST http://localhost/moodle/webservice/rest/server.php

Property name	Value	Description
<b>Required properties</b>		
wstoken	string	Valid Moodle token
wsfunction	core_user_update_users	Function name

#### Optional properties

moodlewsrestformatjson		parameter to allow JSON output
------------------------	--	--------------------------------

#### Parameters

Property name	Value	Description
<b>Required properties</b>		
users[0][id]	int	ID of the user
users[0][username]	string	Username policy is defined in Moodle security config
users[0][password]	string	Plain text password consisting of any characters
users[0][firstname]	string	The first name(s) of the user
users[0][lastname]	string	The family name of the user
users[0][email]	string	A valid and unique email address
<b>Optional properties</b>		

users[0][auth]	string	Default to "manual" Auth plugins include manual, ldap, imap, etc
users[0][idnumber]	string	Default to "" An arbitrary ID code number perhaps from the institution
users[0][lang]	string	Default to "en". Language code such as "en", must exist on server
users[0][theme]	string	Theme name such as "standard", must exist on server
users[0][timezone]	string	Timezone code such as Australia/Perth, or 99 for default
users[0][mailformat]	int	Mail format code is 0 for plain text, 1 for HTML etc
users[0][description]	string	User profile description, no HTML
users[0][city]	string	Home city of the user
users[0][country]	string	Home country code of the user, such as AU or CZ
users[0][firstnamephonetic]	string	The first name(s) phonetically of the user
users[0][lastnamephonetic]	string	The family name phonetically of the user
users[0][middlename]	string	The middle name of the user
users[0][alternatename]	string	The alternate name of the user

Response

## XML

### PostData Example:

```
$token = 'ce4d384c0c008b69fb409258cec722ba';
$userdata[] = array(

    'id' => 5,

    'city' => mt_rand(0, 1000)

);

$postdata = array(

    'wstoken' => $token,

    'wsfunction' => 'core_user_update_users',

    'users' => $userdata

);
```

**Response Example:**

```
<?xml version="1.0" encoding="UTF-8" ?>
```

```
<RESPONSE>
```

```
</RESPONSE>
```

**JSON****PostData Example:**

```
$token = 'ce4d384c0c008b69fb409258cec722ba';
```

```
$userdata[] = array(
```

```
    'id' => 5,
```

```
    'city' => mt_rand(0, 1000)
```

```
);
```

```
$postdata = array(
```

```
    'wstoken' => $token,
```

```
    'wsfunction' => 'core_user_update_users',
```

```
    'moodlewsrestformat'=>'json',
```

```
    'users' => $userdata
```

```
);
```

**Response Example:**

```
null
```



## 2.1 Enrolments: enrol\_manual\_enrol\_users

Manual enrol users. The Role ID is the numeric value representing the role. By default student role has the ID 5.

Request

### HTTP request

POST http://localhost/moodle/webservice/rest/server.php

Property name	Value	Description
---------------	-------	-------------

#### Required properties

wstoken	string	Valid Moodle token
---------	--------	--------------------

wsfunction	enrol_manual_enrol_users	Function name
------------	--------------------------	---------------

#### Optional properties

moodlewsrestformatjson		Parameter to allow JSON output
------------------------	--	--------------------------------

### Parameters

Property name	Value	Description
<b>Required properties</b>		
enrolments [0][ roleid]	int	Role to assign to the user
enrolments [0][ userid]	int	The user that is going to be enrolled
enrolments [0][ courseid]	int	The course to enrol the user role in
<b>Optional properties</b>		
enrolments [0][ timestart]	int	Timestamp when the enrolment start
enrolments [0][ timeend]	int	Timestamp when the enrolment end
enrolments [0][ suspend]	int	set to 1 to suspend the enrolment

Response

### XML

### PostData Example:

```
$token = 'ce4d384c0c008b69fb409258cec722ba';
$enrolments[] = array(

    'roleid' => 5,

    'userid' => 2,

    'courseid' => 1

);

$postdata = array(

    'wstoken' => $token,

    'wsfunction' => 'enrol_manual_enrol_users',

    'enrolments' => $enrolments

);
```

### Response Example:

```
<?xml version="1.0" encoding="UTF-8" ?>

<RESPONSE>

</RESPONSE>
```

### JSON

### PostData Example:

```

$token = 'ce4d384c0c008b69fb409258cec722ba';
$enrolments[] = array(

    'roleid' => 5,

    'userid' => 5,

    'courseid' => 1

);

$postdata = array(

    'wstoken' => $token,

    'wsfunction' => 'enrol_manual_enrol_users',

    'moodlewsrestformat'=>'json',

    'enrolments' => $enrolments

);

```

### Response Example:

null

### Errors:

#### Error Message Structure

#### REST

```

<?xml version="1.0" encoding="UTF-8"?>

<EXCEPTION class ="invalid_parameter_exception">

    <MESSAGE>Invalid parameter value detected </MESSAGE>

    <DEBUGINFO></DEBUGINFO>

</EXCEPTION>

```

### <Common Causes of Errors:

The most common reasons why webservice error occurs are the following:

1. **Invalid parameter:** The values that you are passing doesn't meet the web service function parameter type standard. Please make sure you are passing the right values by going through this document meticulously.

#### Example:

- If you pass a space in username, the webservice will result in error.
  - When you need to pass a country code for using `core_user_create_user()`, be sure the country code is 2-letter standard code
2. **Token error:** Please check if you're using the right token created for the web service you intend to use.
  3. **Invalid Access:** Be sure you have the access to run the webservice (if the webservice is created for authorized users).
  4. **Not Passing all mandatory fields:** You can ignore the optional parameters to be passed. But the mandatory fields must be passed
  5. **Web service disabled:** Ensure necessary web services are enabled (Plugins > Webservices > External Services > Edit)
  6. **Protocol Disabled:** Ensure REST and XML-RPC protocol are enabled (Plugins > Webservices > Manage protocols).