Education & Skills Funding Agency

LRS Getting Started Guide
Developing an LRS interface

January 2024

Audience: MI suppliers and IT developers

Contents

For the purposes of this document, ONLY the terms product/solution/interface are referred to in the same context as web services.

This guide is for anyone who plans to develop an LRS web service interface. Read this guide, as it provides a list of steps that you need to successfully complete before you can go live with your interface and your clients can connect web services to the LRS:

1 Decide on your solution

Read through this guide and the LRS Web Service Technical Specification to decide on which of the web service products you plan to build before starting any design, planning or development activity.

Appendix A, within this guide, provides a brief description of the different products available and the type of organisation they are applicable to.

The LRS Web Service Technical Specification contains the technical requirements for each product.

The Technical Specification is available from Gov.UK:
https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers

The interface you develop will depend on your client portfolio.

2 Design and plan

We recommend you start to design and plan the solution in preparation for the next stages.

It's critical the solution developed meets the conditions and criteria as set out in the LRS Web Service Technical Specification, otherwise your application in step 3 and 6 will be rejected.

Before embarking on coding your web service interface, you need to carefully consider the way in which your customers will use these services. Some things to get you started

- How the solution will be deployed?
- How often the web service will be called and at what point in the process?
- How each customers business process will deal with exceptions or response codes returned?

Read Appendix B, C, D and E

Important – remember that we will perform due diligence checks (steps 3 and 6) to understand and assure the way web services are developed is acceptable and won't comprise the data held within LRS.

3 LRS Web Service Interface Application

Next step is to apply for approval from LRS to start development.

At this stage, you will register with us and provide more information about the solution you intend to build.

Complete and submit a 'LRS Web Service Interface Application' which comprises of two sections:

- details of your organisation and clients (using the web service solutions).
- details about the solution, deployment, support wrapper and data assurance. We use the information provided to assess the intended solution meets security, user, and technology requirements, won't compromise data quality and considers the end to end support model after go-live.

Once we have approved the build, you will be given access to additional documents/tools (WSDL, test data) required for development and testing purposes.

The Interface Application Form is available from Gov.UK: https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers

Move to step 4.

4 Develop the solution

From this point, you will have access to all the necessary guidance, information and tools to develop the product(s).

Move to step 5.

5 Testing with LRS (integration testing)

To perform end-to-end integration testing, you need to apply for access to the test environment (known as 'Compatibility'). You can find out more information on how to get the best out of your testing and the process from the Testing Instruction Guide (WBS27) published on Gov.UK.

Compatibility offers a secure, production-like environment for performing integration testing. It also has baseline test data for running test scripts.

Note: The test environment is not scaled to the same size as production and organisations will struggle to perform performance testing.

Complete and submit a Test Application Form v4.2 (WBS06). You will be given access to the nominated web service products as per your Test Application instructions and LRS Web Service Interface Application.

The Testing Application Form is available from Gov.UK: https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers

Move to step 6.

6 Solution sign-off

Once the solution is ready to go-live, the final step is to provide evidence.

After your Web Services Interface Application is approved, a Developer Pack will be mailed to you. This includes a Compatibility Check Request and Evidence form and test scripts.

Complete and return the Compatibility Check Request and Evidence form, test scripts and any additional evidence requested.

Following successful sign off, move to step 7.

7 Go live – connect to the live LRS web service products

Each organisation using your interface must apply individually by completing and returning a Live Web Service Connection form to get access to the live web service products. You cannot submit the form on behalf of one of your users. Only permitted organisations registered with LRS have access to the LRS web service products.

Ensure your customers understand how to complete the form and what to do when they receive the digital certificate. **Note**: don't forget to update your WSDL with the production version.

Note: you will need to provide your customer(s) with a copy of the Live Web Service Connection. This form must be completed and submitted by your customer(s)/users, and not by the developer on behalf of customer(s).

The Live Web Service Connection Form is available from Gov.UK: https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers

Go Live.

8 Help and support

8.1 Design and build
You can get limited help from the LRS Service Desk as they can only advice on the web service products, definitions, procedures for registration, compatibility access or testing.

They will not be able to comment on the code you have written or your implementation model. The desk can be contacted by telephone on 0345 602 2589 or by email at lrs.support@education.gov.uk.

8.2 Live web services and ongoing support
The MI supplier/organisation whom developed the LRS interface (web service products) is responsible for ongoing support of the solution. Clients must be informed of the end-to-end support model, providing guidance to your customers in the first instance:

- Your users/customers MUST first seek help about your system from yourselves. The LRS Service Desk will not resolve connectivity issues or other problems until you have performed a competent level of troubleshooting and can prove the issue is with LRS.
- You MUST provide your customers with advice and guidance about configuring the web service solution with LRS. Include within this guidance the Live Web Service Connection Form for connecting your system to the live LRS, which can be accessed via the following link: https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers

Appendix A – Web Service Descriptions

Below is an explanation of the web services available and who may consume them:

Web Service Operations	Description	Organisation Type	Note
Find learner by ULN	This operation provides the ability to search for a learner on LRS by ULN, first name and given name as the search criteria.	Training/learning provider	All four products must be developed as a package.
Find learner by demographics	This operation provides the ability to search for a Learner and their associated ULN on LRS. The minimum search criteria is a number of demographic fields, name, gender and postcode in order.		
Register single learner	This operation registers a learner on LRS and returns a newly allocated ULN.		
Update learner	This operation is used to update details on a learner's ULN record within LRS.		
Submit batch learner registration	The primary purpose of the batch is for obtaining ULN's. Do not use this service to update ULN details. It can also be used for checking of student details in verification only mode.	Training/learning provider	Both products must be developed as a package
Get batch learner registration	This operation returns the results of a batch registration previously submitted using the 'submit batch learner registration' job either via web service operation, or via the LRS portal.		
Get learner learning events (PLR)	This operation provides the ability to retrieve the learning events (participation and achievement data) for a learner as held on the LRS.	Training/learning provider	Single operation

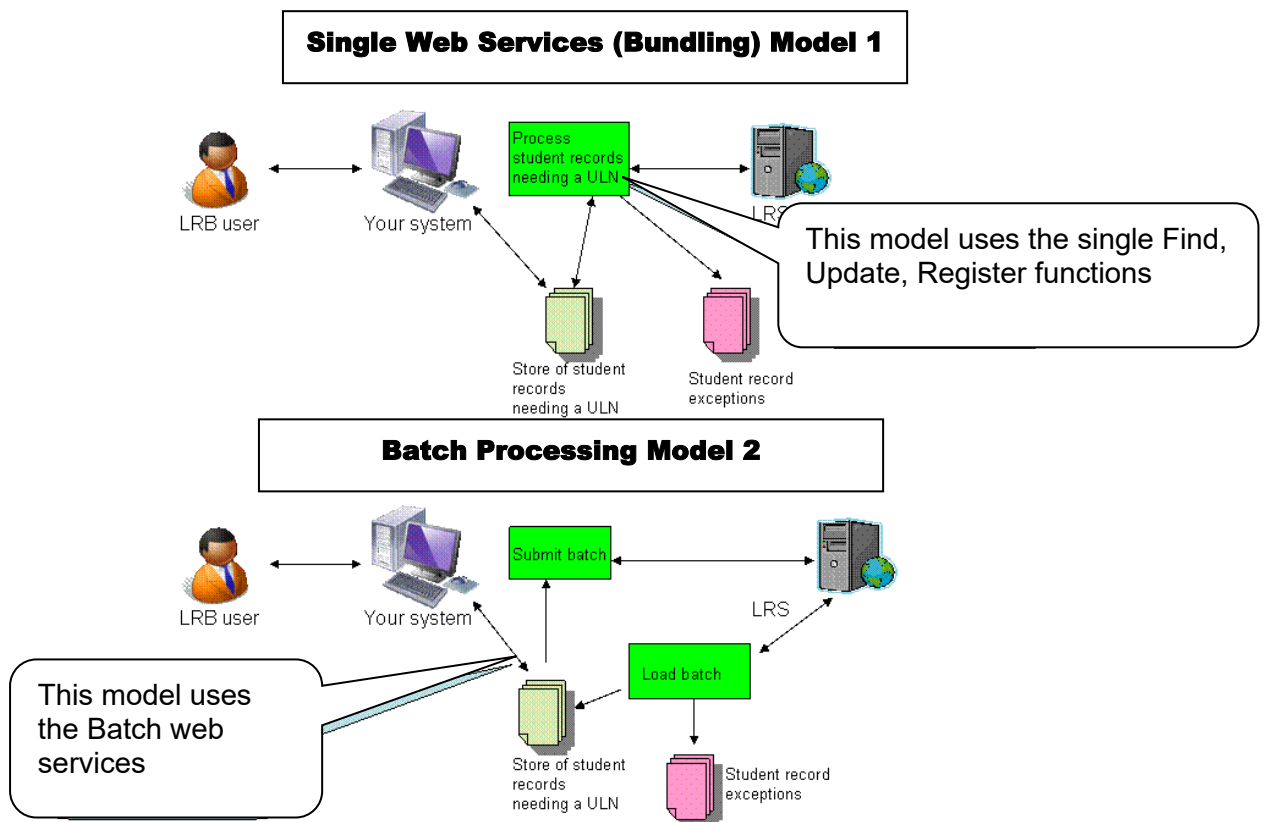| Verify learner details	This operation allows the external system to verify demographic details for a learner against the details held in LRS.	Awarding Organisation	Single operation
Submit verify learner details batch	Performs the same operation as 'verify learner details' but for one or more learners submitted in a batch. The results can be retrieved using the 'get verify learner details batch output' operation.	Awarding Organisation	Both products must be developed as a package
Get verify learner details batch output	This operation returns the results of a 'verify learner details batch' previously submitted using either the 'submit verify learner details batch' web service operation, or via the portal.		
Submit achievement batch job	This operation is used by Awarding Organisations only to create, update, withdraw or reinstate achievements. The results can be retrieved using the 'get achievement batch job' operation.	Awarding Organisation	Both products must be developed as a package
Get achievement batch job	This operation returns the results of a 'submit achievement batch job' web service operation, or via the portal.		

Appendix B – Web Services – Batch vs Single Transaction

You will also need to consider which business model to adopt, 'Single web service functions' vs 'Batch web services' (see model illustrated below).

You can call the single web service functions multiple times for a set of learner records that have been accumulated – known as Bundling.

Bundling mimics what happens with batch processing.

Single Web Services (Bundling) Model 1

This model uses the single Find, Update, Register functions

Batch Processing Model 2

This model uses the Batch web services

Advantage and Disadvantage

- The advantage of using model 1 compared to model 2 is that it will give you a more immediate response (no waiting time for processing the file) and an improved exception and update handling capability.
- Bundling - main disadvantage is that it requires many more messages to be sent from and to your system which can affect performance.

> **Key Point: Carefully consider the way you deploy web services within your system.**

Appendix C – Deployment Models

There are three main deployment models covered in this section:

- Internet Based Model – where the solution is based on the worldwide web (www) and can be accessed by many users or organisations.
- Client Site Model – where the solution is installed by the customer and operates only for them. Note: it is still possible that you may use a browser interface within such a solution (e.g. intranet solutions).
- Agent Model – where you are a third party organisation acting on behalf of the organisation.

Internet based model

Internet solutions are accessible via the worldwide web and are theoretically available to everyone and any internet user in the world. With such a solution, it is important to consider security.
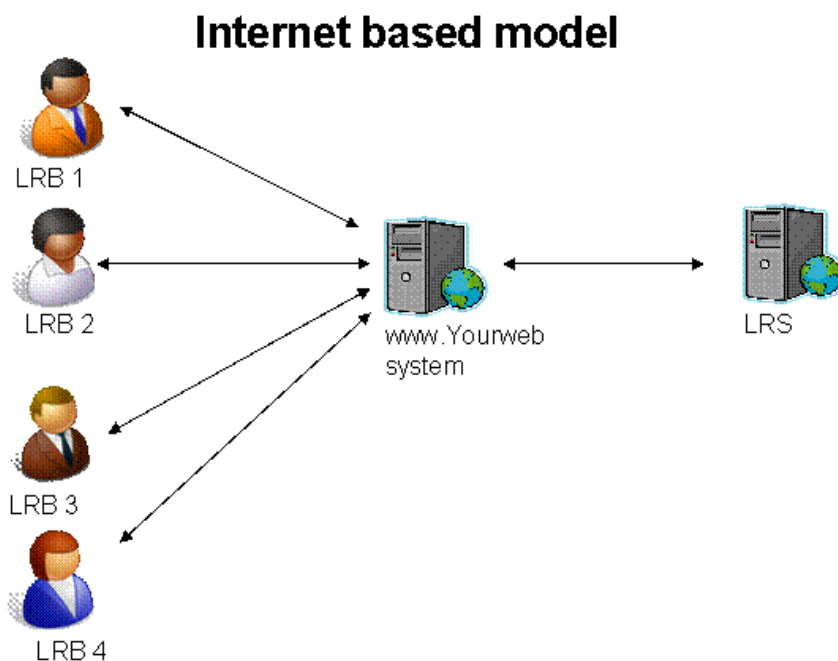
Internet solutions are acceptable to LRS provided that your model meets the following conditions:

1. The solution must **NOT** allow unauthorised persons to access learner information from LRS. Only permitting organisations registered with LRS should be allowed access.
2. LRS will **NOT** accept a solution where the web service is open to all or any internet user. For example, the development of a website allowing anyone to get any learner's ULN based on Find by demographic web service function is **NOT** permitted.
3. LRS will **NOT** accept a model where web service transactions do not identify the individual client organisation triggering the request. A developer cannot register on LRS as an LRB, AO or intermediary in the transaction.
4. Your model must be able to identify who is using the service and to which LRS registered organisation they belong to. This is because all LRS web service calls will

only work if you identify the origin as the registered organisation with web service access.

5. All organisations using your solution MUST be registered organisations. It is recommended that your guidance around the use of the Username field is explicit so that the message can help identify the person who triggered the request if a dispute arises later on.

6. You will also need to consider your procedures for organisations joining your internet service, as they may not have full functionality if the organisation has not registered with LRS or declared that they want to use web services via your service. If the organisation does not notify LRS, web service access will not be enabled and any transaction with their Organisation Reference will be rejected.

7. If you attempt to misuse web services by deploying your solution to another organisation and reuse another organisation's details in the web service calls then we will investigate. Misuse will result in removal of your web services from our approved list making them inaccessible to your customers.

> **Key Points:**
>
> 1. **Solution must provide a secure user logon.**
> 2. **Solution must identify users to a LRS registered organisation (LRB and AO) and provide their details in the web service call.**

Client site model
These solutions are not Internet based but either intranet or client PC based solutions.

Client Site model
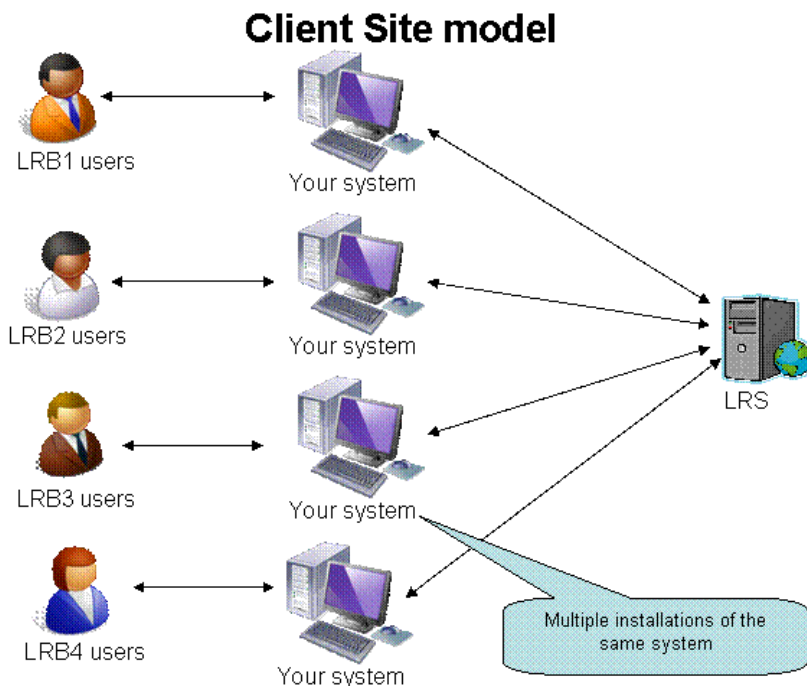
Within each web service call, your solution must:

1. Identify the LRS registered organisation (LRB) or (AO) issuing the request.

2. Allow each deployment of the solution to be configured to capture that particular organisation's LRS details.

- A single deployment will mean only employees or anyone acting on behalf of the organisation will be able to use the solution. It is not essential for your solution to have user security, but it is important individual users can be identified (see below).
- User security is covered by the Learning Provider Agreement or Awarding Organisation Agreement, organisations sign-up to when first registering with LRS. But for web services, there must be capability to trace individual users with permission to the solution.
- You must ensure your guidance around the use of the Username field is explicit so that the message can help identify the person who triggered the request if a dispute arises later on.
- If you attempt to misuse web services by deploying your solution to another organisation and reuse another organisation's details in the web service calls then we will investigate. Misuse will result in removal of your web services from our approved list making them inaccessible to your customers.

> **Key Point: Solution must identify users to LRS registered organisation (LRB or AO) and provide their details in the web service call.**

Agent model

Your organisation is not the organisation providing learning and cannot be a LRS registered organisation (LRB or AO) in your own right. You may be acting for one or more LRBs or AOs.

Agent based model

LRB 1
LRB 2
LRB 3
Learner /Public
Agent
Your system
LRS
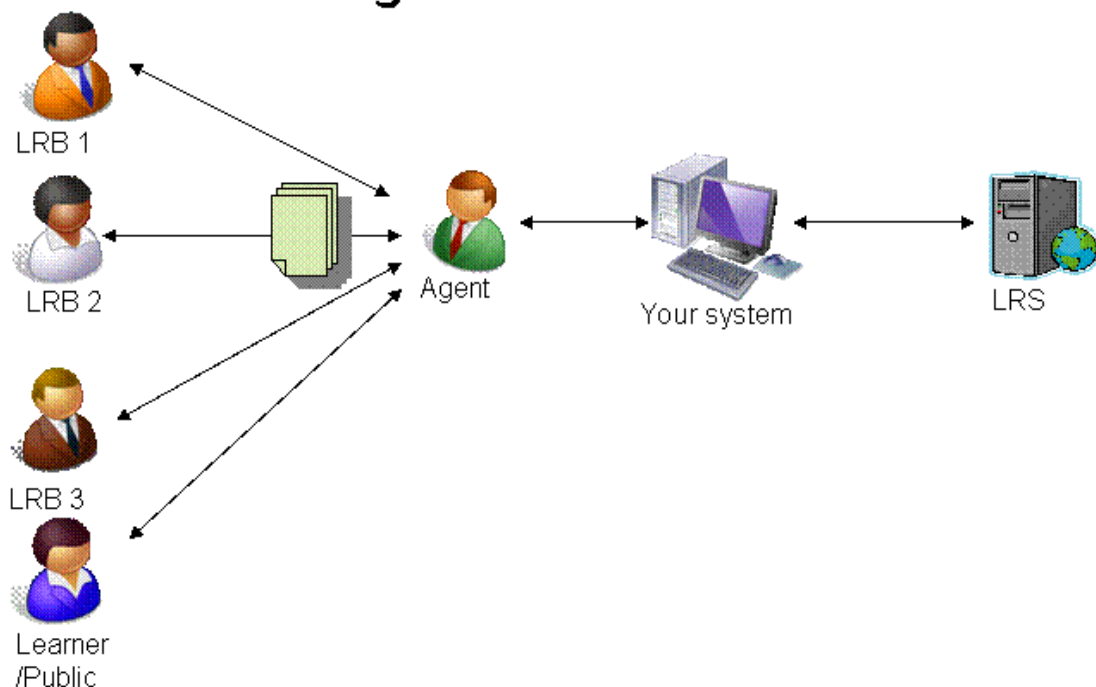
- If you are developing your solution for a single organisation then your solution will be equivalent to the Client Site solution above.

- If you are developing your solution for an agent for more than one registered organisation then your solution **MUST** allow your customers to be able to login independently for each organisation they are acting for. The web service transactions will then contain the correct LRS registered organisation's details (UKPRN).
- You must ensure your guidance around the use of the Username field is explicit so that the message can help identify the person who triggered the request if a dispute arises later on.
- Each organisation you are developing the interface for will need to be a registered organisation (by signing the appropriate Organisation Agreement and completing the Registration form) and will need to contact LRS to "switch on" web services otherwise the web service transactions will fail.
- If you attempt to misuse web services by acting for another organisation and reuse another organisation's details in the web service calls then we will investigate. Misuse will result in removal of your web services from our approved list making them inaccessible to your customers.

> **Key Point: Solution must identify users to LRS registered organisation (LRB or AO) and provide their details in the web service call.**

Appendix D – Response and Error Codes

There are two types of exceptions:

- Response - in that the web service request has failed for some reason
- Error – in that the LRS has failed to match the student

Response Code: These reflect a problem with connection or the request format and must be reported to your system support team first to investigate.

Error/Return Code: Errors codes are returned against single web services and return codes against batch which mimics the codes returned against the portal batch functionality.

More information is available in the LRS Technical Specification. The Technical Specification is available from Gov.UK: https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers

Appendix E – ULN Generation

The Unique Learner Number (ULN) is a 10 digit number which is made up of a 9 digit random number plus a 10th check digit.

The ULN Generation Guide will be made available once your application is approved to start development. As part of the solution an algorithm check can be added to validate the correct ULN format has been entered by the user before making a call to LRS via web service.

The ULN Generation document is available from Gov.UK:
https://www.gov.uk/government/publications/lrs-web-services-for-management-information-system-developers