



Australian Government
**Department of Education,
Science and Training**

Research Quality Framework

Assessing the quality and impact
of research in Australia

RQF Technical Specifications

**RESEARCH QUALITY FRAMEWORK:
Assessing the quality and impact of
research in Australia**

RQF TECHNICAL SPECIFICATIONS

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1. Objectives of the RQF Technical Specifications

1.1 Purpose of the RQF Technical Specifications

The purpose of the Research Quality Framework (RQF) *Technical Specifications* is to describe the interfaces provided by the Department of Education, Science and Training (DEST) for the electronic submission of data according to the requirements described in the *RQF Submission Specifications*.

The *RQF Submission Specifications* provide an overview of, and specify the content and data requirements for, submissions that are part of the 2008 RQF as well as to provide panel-specific guidance for Research Groups when compiling their evidence portfolios. The *RQF Technical Specifications* provide an overview of the mechanisms for electronically submitting the data that form an institution's submission to DEST. The *RQF Technical Specifications* also describe the data requirements for these interfaces with the RQF Information Management System (IMS), and the technologies and authentication mechanisms that must be used to communicate with them.

Institutions will prepare their RQF Institution Submissions using:

- The *RQF Submission Specifications*;
- The Schema files (section 6); and
- The Data Element Definitions (see Appendix A).

Following preparation of the information to be submitted for the RQF institutions can send data to DEST via, either:

- On-line data entry using a Web User Interface (section 5); and/or
- A system-to-system Bulk Submission Interface (section 6), using XML Web Services.

Institutions should use the Web User Interface to check, update and verify submitted data. The RQF IMS Bulk Submission Interface will also permit updates to the submitted data. In the Web User Interface, reports will be available to assist institutions to identify records that are invalid because they are incomplete or contain information that is not consistent with other data provided in the submission.

In addition to the information on electronic data submission, this document contains an overview of the process by which the RQF IMS will provide Panel Members, Advisors, and other users authorised by DEST with access to Research Outputs and details of mandatory requirements for institution's RQF repositories that contain these outputs.

To facilitate the necessary system-to-system interaction to Research Outputs, institutions' RQF repositories must implement interfaces that allow direct access to the Research Outputs via HTTP GET (i.e., Uniform Resource Locator or URL) and HTTP Basic Authentication over Secure Sockets Layer (SSL) or, in exceptional circumstances, another arrangement as authorised by DEST.

This document also outlines the technical requirements that form part of the basis for assessing an institution's RQF repository readiness and, consequently, their eligibility for grants under the Australian Scheme for Higher Education Repositories (ASHER) programme (section 3).

Additional requirements for assessing an institution's repository readiness, including the capacity for repositories to be deployed to fulfil the objectives of the Accessibility Framework, have been outlined by DEST in the application for support under the ASHER programme (available on the DEST website).

1.2 Scope

1.2.1 In Scope

The following areas are covered in this document:

- Overview of submission processes;
- Requirements for an institution's RQF repositories;
- Data elements that are used to compose an Institution Submission;
- Interface descriptions; and
- Environments, testing and support procedures.

1.2.2 Out of Scope

The following are out of scope for this document:

- Detailed business rules used to validate submission data (*RQF Submission Specifications*);
- Finalisation of some business processes (e.g., metrics and manual-handling); and
- Processes that are not supported by the RQF IMS.

1.3 Target Audience

This is a technical document aimed at:

- Institutions (developers and system implementers);
- Institution research office staff; and
- Third-party software developers.

1.4 Disclaimer

These *RQF Technical Specifications* provide information about how to interoperate with the RQF IMS. They are not intended to provide implementation instructions for individual systems. Institutions are responsible for their respective systems implementations to meet the requirements of these Specifications. The Commonwealth accepts no responsibility for any loss, damage, liability or expense incurred by any institution resulting from any use of these *RQF Technical Specifications* for any purpose.

The *RQF Technical Specifications* may be changed from time to time. The latest version of the *RQF Technical Specifications* can be found at the RQF website:

<http://www.dest.gov.au/research/rqf>

It is the responsibility of each institution to ensure that the latest version of the *RQF Technical Specifications* is used.

1.5 Version Control

Changes to this document will be managed through controlled versioning.

Versioning will be done at two levels: the document level and the XML Schema Level. Developers will be informed of all new document versions and XML Schemas through the RQF website. It should be noted that minor revisions to the XML Schema will not result in a reissuing of this document.

1.6 Attachments

This document is part of an electronically distributed *RQF IMS Technical Specifications Documentation Package*, which includes:

- A digital version of this document: *RQF Technical Specifications.pdf*;
- A folder labelled *Schemas* containing XML Schemas as *.xsd* files;
- A folder labelled *WSDL* containing the Web Service interface definition;
- A folder labelled *Schema-Docs* containing hyperlinked HTML documentation of the XML Schemas as *.html* files; and
- A folder labelled *Code-Tables* containing code values for data elements used in the RQF IMS as XML documents (*.xml* files).

Release Notes will be sent with the *RQF IMS Technical Specifications Documentation Package*. These notes have instructions on how to open and use the package information.

The Package is available as separate links via the RQF website:

<http://www.dest.gov.au/research/rqf>

1.7 Related Documents

Related policy documents issued by DEST:

- *RQF Submission Specifications*;

Relevant technical references include:

- Relevant *W3C specifications* (including HTTP, XML, SOAP and WSDL), see <http://www.w3.org>;
- ABS (1998), *Australian Standard Research Classification (ASRC)*, Cat. No. 1297.0 ABS, Canberra; and
- Attorney-General's Department, *Protective Security Manual (PSM 2005)*.

Other technical documentation may be sent to stakeholders to provide additional advice on integration with the RQF IMS if new issues or

requirements arise. All documentation will be posted on the RQF website.

Other RQF documents to be released by DEST include the *Guidance Material for Assessment Panels and Advisors*.

2. System Overview

An overview of the RQF IMS and its communication with external systems is shown in Figure 1. Only major data flows are shown.

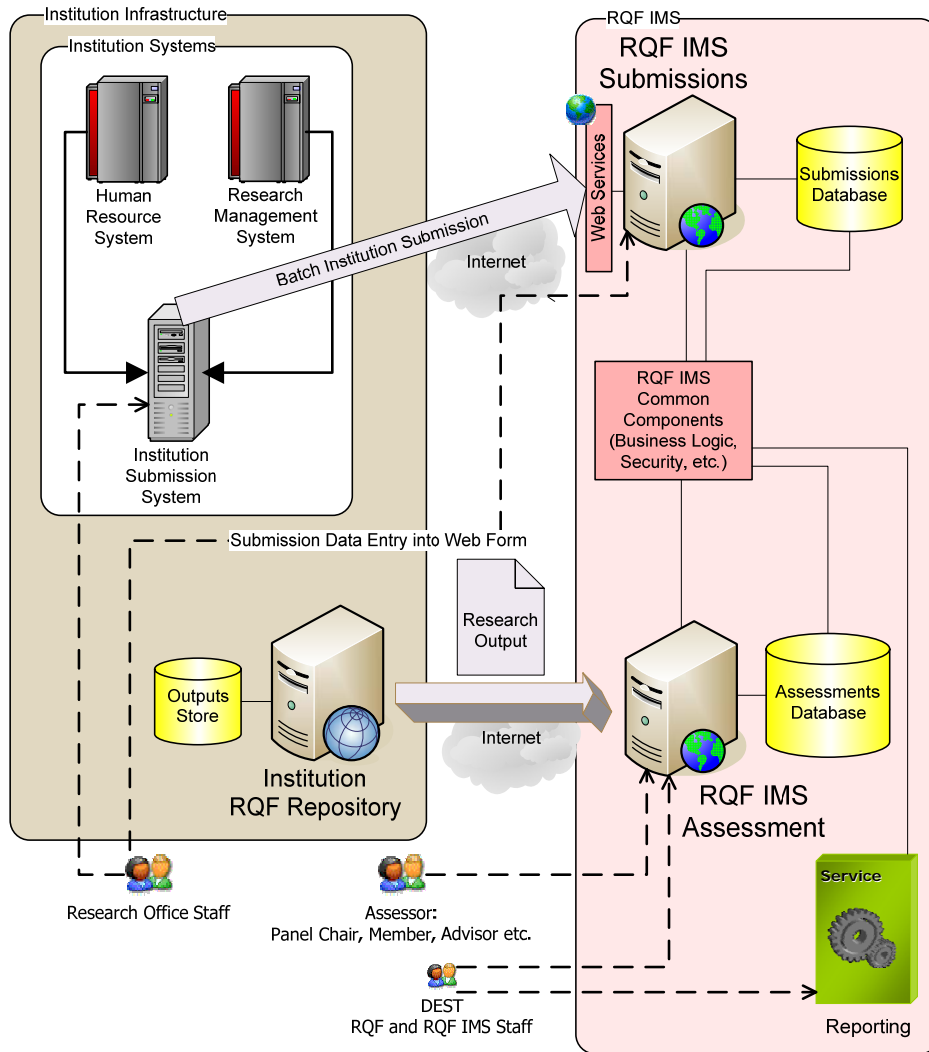


Figure 1: RQF IMS Overview

The RQF IMS will collect institution-level data and evidence portfolios as part of the Institution Submission, using online and batch interfaces. Institutions will be able to provide their submission either via the online RQF IMS submission Web User Interface and/or by using the system-to-system Bulk Submission Interface. The online web site or batch interfaces can be used to validate and update the submitted data. Institutions will be able to modify their submission data until it has been certified by the Vice-Chancellor or institutional equivalent. Certification by the Vice-Chancellor or institutional equivalent must occur by the date specified in the *RQF Submission Specifications*.

2.1 Panel Members' and Advisors' Access to Research Outputs (Relay Model)

In accordance with the *RQF Submission Specifications*, institutions must submit an evidence portfolio for each Research Group. Evidence portfolios will contain links to Research Outputs. The actual outputs will reside within the institution's RQF repositories. The stability of the links to the objects in the institution's RQF repositories must be guaranteed for the duration of the RQF assessment process.

To preserve the anonymity of Panel Members and Advisors, access to outputs is performed by the RQF IMS on behalf of the Panel Members and Advisors.

The following sequence diagram (Figure 2) shows the RQF IMS as an intermediary for relaying the Research Output from the institution's RQF repository to Panel Members' and Advisors' desktops.

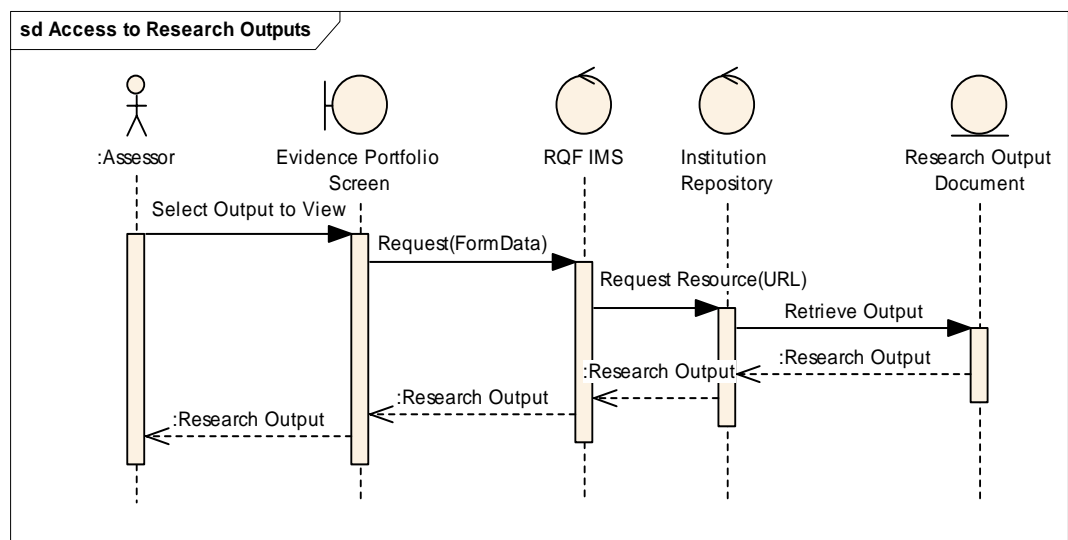


Figure 2: Relay Model System Sequence

2.2 Security

All RQF IMS submission interfaces will be authenticated and secured using Secure Sockets Layer (SSL).

The Web User Interface will implement a role-based access model for authorisation. For information regarding the authentication and roles related to the RQF IMS submission website, see section 5.2.

There will be one Web Service account per institution for the web service data submission interface. This account will only be permitted to submit or modify data for the institution for which it is issued. Institutions will be responsible for more granular security access controls if required. For information about the RQF IMS Web Services submission security, see section 6.2.

Authentication with institutions' RQF repositories, as required for access via the Relay Model (described in section 2.1), will use Basic Authentication with SSL or other arrangements as authorised by DEST. For information regarding institution repository security, see section 3.2.9.

2.3 International and Special Characters

International and special characters are supported through the UTF-8 character encoding standard for publication and outlet titles in Research Output bibliographic citation data. UTF-8 is only required for the publication title and outlet title metadata fields. There are no encoding requirements for Research Outputs.

Textual data that contains only 7-bit ASCII (i.e., Roman) characters will have the same encoding under both ASCII and UTF-8. This means that there are not likely to be any issues arising from systems which only support ASCII encoding. Similarly, there are not likely to be any issues converting from encodings which only support Roman characters for which a lossless conversion to ASCII exists. If systems which contain Research Output metadata support characters that do not exist in the ASCII character set, issues may arise when converting these characters.

Data stored in systems that support other Unicode encodings (e.g., UTF-16) should not present any issues because a simple conversion from characters in these encodings into UTF-8 will exist.

Institutions should use the optional title fields to describe non-English Research Outputs (refer to the Data Element Definitions section for more information, Appendix A). The English translations of titles are necessary to ensure that the Research Output is appropriately assigned for assessment.

2.4 Availability

2.4.1 RQF Information Management System

It is intended that the RQF IMS will be available 24 hours a day, 7 days a week during the submission and assessment processes, with the following possible exceptions:

- As required, a production migration and system maintenance window on Wednesday 1.00pm-7.00pm AEST. System availability in this period will depend on the number and type of production migrations, and the amount of production maintenance required. DEST will advise institutions and RQF Panel Members and Advisors in advance if the system will not be available on Wednesdays. In recognition of the likely demand on institution's RQF repositories by Panel Members and Advisors, DEST will endeavour to minimise down-time on Wednesdays during the Assessment Period; and
- An Infrastructure maintenance window on Thursday evenings, 6.00pm-12.00am AEST. The RQF IMS will generally be available during this period but interruptions to server availability may occur.

2.4.2 DEST RQF IMS Helpdesk

DEST will provide Helpdesk support for institutions, Panel Members and Advisors throughout the RQF process. Details of the Helpdesk arrangements will be provided to RQF Contact Officers, and Panel Members and Advisors, during each phase.

The RQF mailbox rqi@dest.gov.au will remain open throughout the RQF process.

2.4.3 Institution Repository Helpdesk

Institutions are required to provide a Helpdesk to respond to problems with repository access. DEST will liaise with the Helpdesk to resolve issues relating to access to Research Outputs during the following periods.

- Submissions period
 - During the submissions period, the RQF IMS will verify the links to Research Outputs.
 - The institution repository Helpdesk should resolve any access problems within 24 hours.
- Assessment period
 - During the Assessment Period, each institution is required to provide a Helpdesk to respond to problems with repository access by Panel Members and Advisors. When arranging for this support, institutions should be mindful of the most likely periods that Panel Members and Advisors will be undertaking assessment.
 - The DEST RQF IMS Helpdesk will liaise with institution repository Helpdesk staff during the Assessment Period to confirm the scheduled down-times for the institution's RQF repository. Institutions will be notified of the scheduled down-times for the RQF IMS. The schedules of institution RQF repository and RQF IMS down-times will be made available to Panel Members and Advisors in advance via the RQF IMS.
 - Where unscheduled institution RQF repository down-times occur, the institution Helpdesk staff must contact the RQF IMS Helpdesk to ensure that information on availability and access to the institution's RQF repositories are provided for Panel Members and Advisors. It is expected that institutions will keep scheduled down-times to a minimum during the Assessment Period.
- Post Assessment Period
 - During the post-assessment period up until the end of December 2008, institutions will be required to maintain links to Research Outputs and provide Helpdesk arrangements for accessing these links.
 - The Institutional Helpdesk should resolve any access problems within 24 hours.

3. Institution RQF Repository Requirements

Existing institution repositories may need to be modified to accommodate the requirements of the RQF. Recognising this, the Australian Government has provided support for the establishment of institution repositories through the Australian Scheme for Higher Education Repositories (ASHER) programme. This section outlines the technical requirements for repositories to ensure that institutions are operable for the RQF and comply with the *RQF Submission Specifications* and the *RQF Technical Specifications*. The technical requirements will be used to inform judgments by DEST of the institution's "repository readiness" and, consequently, the level of support an institution will be eligible for under the ASHER programme.

Additional requirements for assessing institution's repository readiness, including the capacity for repositories to be deployed to fulfil the objectives of the Accessibility Framework, have been outlined by DEST in the application for support under the ASHER programme (available on the DEST website).

3.1 Research Outputs

For the purposes of this document, Research Outputs are defined in the *RQF Submission Specifications*.

All submitted 'best' outputs of each researcher must include a small amount of technical metadata to describe the characteristics of the outputs for the purposes of the RQF IMS. Metadata that is stored and associated with the Research Output in the institution's RQF repository will not be accessible by Panel Members and Advisors. Institutions should include information from their metadata that is not otherwise covered in the Data Element Definitions (Appendix A) in their evidence portfolio as outlined in the *RQF Submission Specifications*.

Outputs not physically stored in repositories include items that cannot be readily digitised or otherwise electronically stored. Research Outputs that cannot be transferred using the RQF IMS will be handled and tracked manually. Additional information covering the process by which a Research Output can be made available outside the RQF IMS will be provided with the *Guidance Material for Assessment Panels and Advisors*.

Outputs that can be transmitted via the RQF IMS must conform to the requirements described in this document, guided by certain specifications and constraints, such as supported formats, file sizes and non-security related access issues.

3.2 Specifications for Research Outputs

3.2.1 Digital Research Output Links

Evidence portfolios submitted to the RQF IMS must include Uniform Resource Locator (URL) links to Research Output files. The Research Output files will be reviewed by Panel Members, Advisors, and other users authorised by DEST; hence the files must be accessible through the RQF IMS.

In cases where this is not possible, other means will be used to ensure that the Panel Members, Advisors, and other users authorised by DEST have access to the Research Outputs. The RQF IMS will demand and validate that the Research Output links provided by an institution in the submitted evidence portfolios are accessible and point to actual Research Output files and not metadata pages. URL-based automatic resolution of persistent identifiers or handles such as Digital Object Identifiers (DOIs) via sites such as dx.doi.org are generally not suitable mechanisms for providing links and hence will not be used by the RQF IMS. For the RQF IMS, each link must point directly to a single file. If a Research Output consists of multiple files, the institution must include a separate link for each file.

The RQF IMS will require some technical metadata about the Research Output link to facilitate link validation and management (section 3.2.2). Metadata outside these requirements can only be submitted within the available fields in the evidence portfolio to provide contextual information.

Panel Members and Advisors will not access links embedded in Research outputs when conducting assessments. If an embedded link is necessary for the assessment of the Research Output, the institution must ensure that it is submitted as one of the *Research Output URL* elements associated with that Research Output. It is not necessary for institutions to remove embedded links before submitting outputs.

3.2.2 Research Output Links Technical Metadata

The following table (Table 1) outlines technical metadata requirements to describe the Research Output.

This information supplements the data identified in the *RQF Submission Specifications*.

Table 1: Research Output Links Metadata

Data Element Name	Valid Values	Comment
Research Output Mime-Type	See data element in <i>Appendix A</i> . Including, but not limited to those registered with Internet Assigned Numbers Authority (IANA). For a list, refer to: http://www.iana.org/assignments/media-types	Recognised MIME Content-Type
Research Output Download Size	See data element in <i>Appendix A</i> .	Size of the file that is accessed by this link (specified in Bytes)
Research Output Content Notes	See data element in <i>Appendix A</i> .	Used to describe necessary application versions, codecs and other information that could be useful to Panel Members and Advisors for an output to be opened. This field should contain as much information as possible for audio and video formats (including bit-rate and frequency if known).
Research Output Repository Name	See data element in <i>Appendix A</i> . This identifier must be unique to the institution.	Required if an institution has more than one repository so that correct credentials can be used by the RQF IMS (section 3.2.3).

3.2.3 Multiple Institution Repositories

An institution may have more than one “institution RQF repository” for storing and managing Research Outputs. Panel Members, Advisors and other users authorised by DEST will be able to access these repositories via the RQF IMS if the repositories conform to the following requirements:

- Links are accessible from the internet;
- If secured, security conforms with the RQF IMS repository requirements (section 3.2.9);
- Uses standard HTTP/HTTPS ports; and
- Research Output formats and sizes conform to the *RQF Technical Specifications*.

3.2.4 Supported Formats

The RQF IMS will support all Research Output file types that can be rendered across the internet provided that these files conform to specified size constraints (section 3.2.5) and Panel Members' and Advisors' desktops are configured with the required software to properly view the Research Output file. As a minimum, the RQF IMS will assume that Panel Members' and Advisors' desktops are configured to properly display the following file types:

Table 2: Supported Formats

File type ¹	File Extension
Text files	txt
Adobe PDF	pdf
JPEG images	jpg, jpeg
GIF images	gif
Portable Network Graphics images	png

Research Outputs with file types not identified in the list of supported formats may still be included as part of an evidence portfolio. For these other formats the application or system requirements that are needed to access the file must be documented in the *Research Output Content Notes* (see Table 1) for the Research Output link. All other formats (except for HTML files) will be downloadable to Panel Members' and Advisors' desktops when a user confirms that their desktop is configured to display the downloaded file.

A Research Output that consists of multiple files should be submitted as one output with multiple links. ZIP format is only acceptable as an archive format for submitting Research Outputs that consist of multiple files. ZIP files must not be password-protected and must only be used where multiple links would not be suitable, for example a collection of related source code (software) files or HTML files.

The most important cases where a Research Output may normally be represented by HTML files are:

1. An output was originally published as a web page in a digital form;
2. A content-oriented web-site where the content files served by the site may be considered "static"; and/or
3. A web application, similar to a web-site, that implements server-side behaviour that requires installation of an application. Such an application may require other components to be installed, such as database software.

Where the output is represented by a web page or ordered sequence of pages (case 1 above), it is recommended that institutions use commercial-off-the-shelf software to convert the HTML into PDF format.

¹ **Note:** The file types listed as "Supported" are those that require only a modern web browser. Additional information should be provided for other file types, as indicated in the text.

However, a content-oriented web-site (case 2 above) should be placed into a ZIP file. The links **must** be relative links. In this example, Panel Members and Advisors will be permitted to follow these links but will be asked to exercise caution.

A web application (case 3 above) should be placed into a ZIP file as would other types of software nominated as Research Outputs for assessment.

3.2.5 Size Limits

Panel Members and Advisors will access Research Outputs stored in institution's RQF repositories. These outputs will be relayed to them via the RQF IMS (see section 2.1). The RQF IMS must provide a reasonable response time to Panel Members and Advisors. The response time is defined as the elapsed time from the time the user clicks on a link to the time the document is downloaded to the user's desktop.

Research Outputs submitted via the RQF IMS should be no greater than 15 MB in total per Output. It is anticipated that the vast majority of Research Outputs would be under this limit and that many would be less than 2 MB in size. These file sizes and limits may be revised following performance and capacity testing.

Note: The total size of a Research Output represented by multiple links should not exceed the 15MB maximum. This limit is necessary to control infrastructure capacity requirements for DEST and institutions and to control the response time observed by Panel Members and Advisors.

Research Outputs that exceed the maximum size will be handled manually outside the IMS. These will be handled in the same way as Research Outputs that cannot be digitised (section 3.1). Additional information covering the process by which a Research Output can be made available outside the RQF IMS will be provided with the *Guidance Material for Assessment Panels and Advisors*.

3.2.6 HTTP Ports

DEST security rules only allow a small number of permissible TCP/IP ports as per the *Protective Security Manual (PSM 2005)*. Institutions must configure their RQF repositories to use only standard HTTP and HTTPS ports (port 80 and 443). These ports are usually permitted through firewalls.

3.2.7 Repository Service Availability and Helpdesk Arrangement

Each institution will be required to set up a Helpdesk function to assist with repository access issues during the RQF process (section 2.4). DEST will liaise with institutions to ensure unscheduled down-times are reduced to an absolute minimum at all times.

DEST will provide Helpdesk support for institutions, Panel Members and Advisors throughout the RQF process. Details of the Helpdesk arrangements will be provided to RQF Contact Officers, and Panel Members and Advisors, during each phase.

3.2.8 Confidential or Sensitive Information

Confidential or sensitive information must be handled according to the procedures in the *RQF Submission Specifications*, section 4.3.6.8.

3.2.9 Authentication

Institutions are required to set up secure digital repositories to store Research Outputs that are not publicly accessible, whether because of copyright restrictions or because of commercial or cultural sensitivity. Where the institution or the researcher is the copyright owner, or where the copyright owner has given express permission for the Research Output to be stored in an 'open access' repository, the Research Output should be stored in an 'open access' repository or in an 'open access' part of an institution's RQF repository.

Access to Research Outputs included as part of the RQF will be controlled by access control lists within the RQF IMS. The RQF IMS will access institutions' RQF repositories to retrieve Research Outputs for relay back to Panel Members and Advisors.

Each institution using Basic Authentication over SSL must set up a special user account in each secure repository for use by the RQF IMS. Institutions must comply with the following security rules when assigning the RQF IMS user account:

- Passwords must be set to "never expire" during the RQF IMS processing phases;
- Strong passwords must be used – these must contain a combination of upper and lowercase characters, numbers and special characters (e.g., #, @, \$); and
- Passwords must be 7 or more characters long.

The RQF IMS user account will have read access to all objects within the repository that are required for the RQF IMS to allow Panel Members, Advisors and other users authorised by DEST to access the Research Outputs. The RQF IMS will present user credentials using Basic Authentication or another DEST authorised method. Secure repositories identified in the institution's RQF submission therefore must be configured to use the Basic Authentication protocol or other configuration as authorised by DEST. Institutions using Basic Authentication must also configure their RQF repositories with SSL certificates to secure the communications.²

3.2.10 Stability of Links

Submitted links to Research Outputs must be stable for the duration of the RQF process. With the exception of advised institution's RQF repository down-times, these links must be accessible at all times from submission to 31 December 2008. Institutions may continue to populate their repository and submit those additional outputs to DEST after 1 March 2008 until the submission phase has closed (i.e., 30 April 2008).

² The RQF IMS will manage and control access to Research Outputs and will allow only Panel members, Advisors and other users authorised by DEST to access the Research Outputs that are stored in an institution's RQF repository for the purposes of the RQF.

4. Data Elements

The data elements referred to in the *RQF Submission Specifications* are described in detail in Appendix A. In summary, these elements refer to:

- Institution-level data;
- Data for evidence portfolios for Research Groups, including:
 - Context Statement related material;
 - Research Group membership and data including nominated Research Outputs;
 - Impact Statement related material; and
- Individual researcher data.

Conceptually, the business object classes or high-level data element groupings that form part of an Institution Submission are shown in Figure 3. The purpose of many of these classes should be determined based on terms used in the *RQF Submission Specifications*. A more detailed description of the decomposition of these classes as data element groupings is contained in Appendix A: Data Element Definitions.

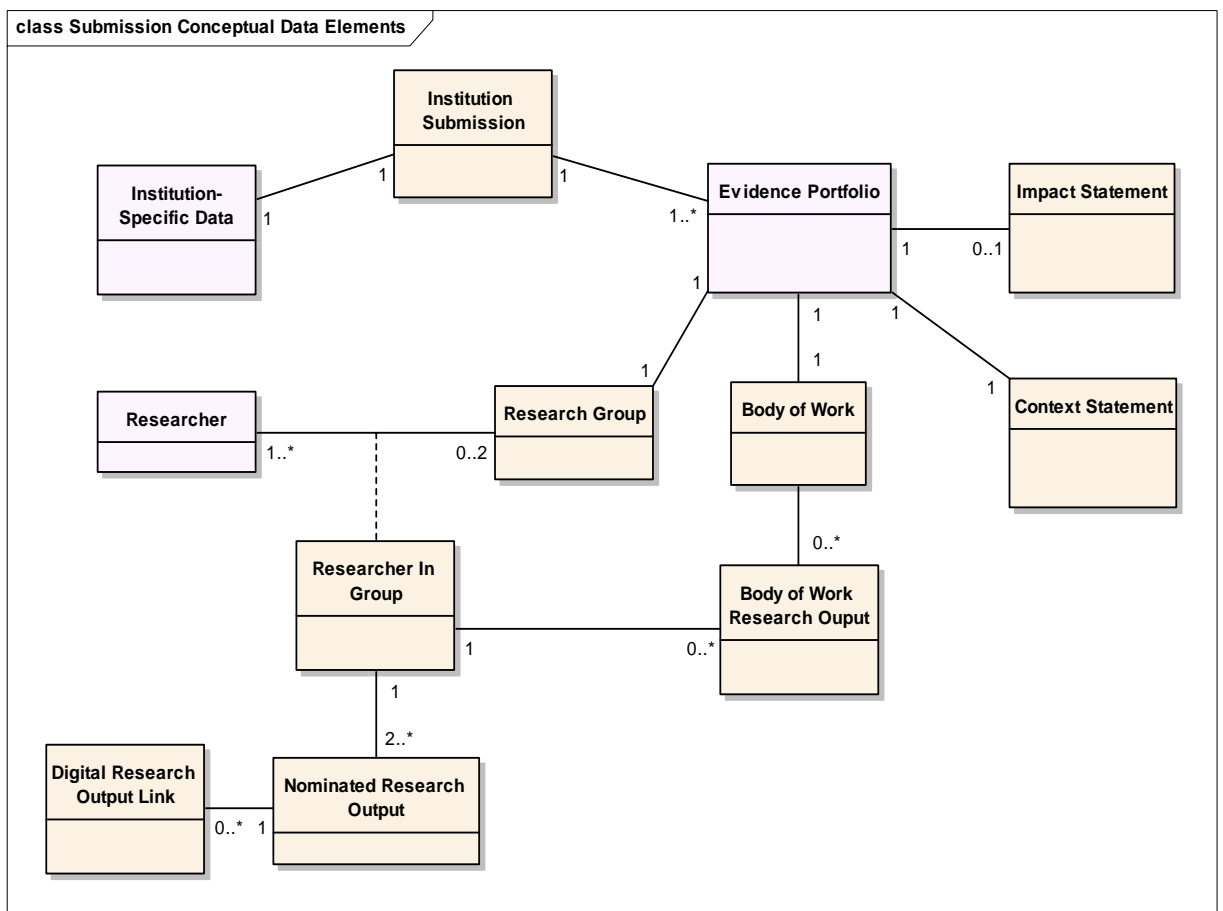


Figure 3: Conceptual Submission Data Classes

The multiplicities³ are shown in Figure 3, where the notation “minimum..maximum” defines the minimum and maximum number of participants in a relationship where “*” is the standard notation for “many” and the default should be read as 1. The multiplicities display absolute minimum numbers and may violate business rules that require additional data to validate.

The data for researchers also includes data that is specific to the Researcher’s relationship to a Research Group, shown using the *Researcher In Group* association class in Figure 3. Therefore Research Outputs that are considered part of the *Body of Work* for an *Evidence Portfolio* are also linked to a *Researcher*.

Outputs nominated by Researchers as part of their *Body of Work* (including those put forward as one of the “four best”), are grouped under the *Researcher*. Research Outputs for an *Evidence Portfolio* are an aggregation (duplications removed) of the Outputs reported by the Researchers in the Research Group. Research Outputs that are unique to a single researcher within a Research Group are removed from the *Body of Work* if the *Researcher* is removed from the *Research Group*.

The relationship between the *Researcher in Group* and the *Body of Work* will be used to validate that Research Outputs are not submitted across different Research Groups by the same *Researcher* (as precluded in the *RQF Submission Specifications*, section 4.3.7.3). Manual validation by DEST will occur in cases where automated system validations are not possible or practical.

Note: If a Researcher is deleted from the RQF IMS, some previously associated evidence portfolios may become invalid. This status will be reported via the relevant interface.

Body of Work Research Outputs can include older outputs that are considered for Impact Assessment. These can be distinguished using data elements described in Appendix A: Data Element Definitions (*Research Output, Older BOW Relevance Description*).

The role of Digital Research Output Links is described in section 3.2.1.

A mapping between the data elements, the XML Schema elements and the complex types is outlined in Appendix A: Data Element Definitions.

4.1 Codes

Code values that are required for an institution’s submission have been included in the *RQF IMS Technical Specifications Documentation Package*, or are described for the data item definitions in Appendix A: Data Element Definitions.

The *RQF Submission Specifications* require that Research Groups submit RFCD and SEO codes as 4- or 6-digit codes. Where 4-digit codes are submitted they will be packed with zeroes by DEST and recorded as 6-digit codes. For example, an RFCD code sent as 3101 (Architecture and Urban Environment) will be stored as 310100. Codes submitted using six digits (e.g., 310105 for History of the Built Environment) will be recorded as sent.

³ ‘Multiplicity’ in this context refers to the number of objects that participate in an association or relationship. These can be represented as: 0..1 – No instance, or one instance (optional), 1 – exactly one instance, 0..* or * - zero or more instances, 1..* - one or more instances (at least one).

4.1.1 RFCD Codes

The primary discipline-level (4-digit) RFCD code is the code that the Research Group uses to define the focus of its research activities. As explained in the *RQF Submission Specifications*, if it is not possible to accurately reflect the Research Group's activities using discipline-level RFCD codes, the Research Group must use the 'other' discipline level code (e.g., 2799 for Other Biological Sciences). A table of these codes is in the technical package provided to each institution.

4.1.2 SEO Codes

The primary group level (4-digit) Socio-Economic Objective (SEO) code is the code that the Research Group uses to define the focus of its research activities. As explained in the *RQF Submission Specifications*, if it is not possible to accurately reflect the Research Group's activities using group-level SEO codes, the Research Group must use either a 4-digit subdivision code (e.g., 6700 for Manufacturing) or the 4-digit 'other' group-level code (e.g., 7299 for Other Economic Issues). A table of these codes is in the technical package provided to each institution.

4.1.3 Panel Codes

Code	Panel
1	Biological Sciences
2	Physical, Chemical and Earth Sciences
3	Engineering and Technology
4	Mathematical and Information Sciences and Technology
5	Agriculture, Veterinary, Food and Environmental Sciences
6	Clinical Sciences and Clinical Physiology
7	Public Health and Health Services
8	Psychology, Psychiatry, Neurological, Behavioural and Cognitive Sciences
9	Social Sciences and Politics
10	Economics, Commerce and Management
11	Law, Education and Professional Practices
12	Humanities
13	Creative Arts, Design and Built Environment

4.1.4 Research Output Type Codes

Code	Research Output Type Code
A1	Book
B	Book chapter
C1	Journal article
E1	Conference publication
Q1	Design
Q2	Original Creative Work
O	Other

4.1.5 Institution Codes

The RQF IMS uses the HEIMS Institution Codes. A table of these codes is in the technical package provided to each institution.

5. Submissions Web User Interface

The RQF IMS Submissions Web User Interface will allow institutions to manage and validate their submission data using an online Web site.

5.1 Features

Institutions will be able to submit and modify their RQF submission data using the Web User Interface as an alternative to using the Bulk Submission Interface (section 6). Each institution will be issued with user accounts giving them access to the Web User Interface for data submissions. All users, including those that have read-only access, will have a user account. No user will be able to access the system anonymously.

Each institution will be able to perform the following functions using the Web User Interface:

- Manage RQF submission details;
- Manage institution-level submission data;
- Manage evidence portfolio data;
- Manage individual researcher details;
- Link a researcher to an evidence portfolio;
- Manage Research Outputs information and links included in an evidence portfolio;
- View, and export from the RQF IMS, all submission data entered by the institution;
- Execute automated validations for loaded submission data, including validation at the time of data entry and consistency reports where appropriate;⁴
- View any validation errors or warnings for invalid or incomplete data;
- Finalise submission details; and
- Certify the RQF submission data.

Role-based access controls will be used to further restrict access to these functions. The exact nature and intent of these roles will be advised closer to the production release of the Submissions Web User Interface. In the case of the certification of RQF submission data, the Vice-Chancellor or institutional equivalent will be given a specifically privileged role in order to certify the RQF submission data for an institution.

Some of the features mentioned above, especially where actions depend on a user making a decision that is based on displayed data, will not be available through RQF IMS XML Web Services. For example, certification of the submission data can only be done using the Web User Interface.

It will also be possible to modify data using the Web User Interface after the data has been submitted through either the Bulk Submission Interface or the RQF IMS Submissions Web Service interface. As data can be overwritten

⁴ Additional validations and cross-checks will be performed manually by DEST.

using either interface, it will be necessary for an institution to manage internal processes with the understanding that the Web User Interface will permit in-place editing of data and also allow more granular updates to the data (e.g., field by field). The XML Web Service Interface is designed to be “document-centric” and therefore describes an approach that follows best practices for system-to-system communication.⁵

5.2 Authentication and Authorisation

The RQF IMS submission web site will use SSL to secure communications and all institution staff will be required to authenticate to access the site. Role-based access controls will be used to control access to certain functions within the RQF IMS.

Each RQF institution user will be issued with a DEST user account. The following security rules will apply to these accounts:

- Passwords expire every 30 days;
- Strong passwords will be used – They must contain a combination of upper and lowercase characters, numbers and special characters (e.g., #, @, \$);
- Passwords must be from 7 to 14 characters long; and
- The maximum number of failed logon attempts before the account will be locked is 5.

The RQF IMS submission web site will include a facility to change or reset current passwords, or email new passwords in the case of forgotten passwords.

5.3 Supported Browsers

The RQF submission web site will be developed to run and be “best viewed” on Microsoft Internet Explorer version 6.0.

Web browsers must be configured to enable java-script and pop-up windows for the RQF IMS submission web site.

⁵ Accounts will not be provided to researchers to update their own evidence portfolio using the RQF IMS.

6. Bulk Submission Interface

6.1 Overview

XML Web Services provides a mechanism for systems to exchange information over a network. By providing a standard interface and communicating using open standard protocols, all Web Service implementations operate in the same manner making communicating using Web Services a simple, open and platform-independent process.

Web Service interfaces are described by the Web Service Definition Language (WSDL). Web Service communication relies on protocols such as Transmission Control Protocol/Internet Protocol (TCP/IP), Hypertext Transfer Protocol (HTTP), and Simple Object Access Protocol (SOAP). These standards are developed and maintained by the World Wide Web Consortium (W3C), a member organisation consisting of leading technology vendors, corporate users, standards bodies and government organisations. As such, this provides a set of rich standards which are not tied to a specific vendor or system.

For these reasons, XML Web Services are suitable as a means for the RQF IMS to reliably receive bulk data submissions from institutions.

The RQF IMS Web Services will include a number of methods to allow institutions to submit and update their submission data. The available RQF IMS Web Services methods are:

Section 6.7.1	<i>SubmitResearchers:</i>	To submit new researchers
Section 6.7.2	<i>UpdateResearchers:</i>	To update existing researchers
Section 6.7.3	<i>DeleteResearchers:</i>	To permanently delete researchers
Section 6.7.4	<i>SubmitInstitutionData:</i>	To submit general institution data
Section 6.7.5	<i>UpdateInstitutionData:</i>	To update general institution data
Section 6.7.6	<i>SubmitEvidencePortfolios:</i>	To submit new evidence portfolios (EPs)
Section 6.7.7	<i>UpdateEvidencePortfolios:</i>	To update existing evidence portfolios
Section 6.7.8	<i>UpdateEvidencePortfolioAttachments:</i>	To upload attachments for EPs
Section 6.7.9	<i>DeleteEvidencePortfolios:</i>	To permanently delete evidence portfolios
Section 6.7.10	<i>Ping:</i>	To test connectivity with the Web Service

The following sections discuss the RQF IMS Web Services in more detail.

6.1.1 Web Service Requirements

RQF IMS Web Services will only cater for requests using SOAP 1.1. Web Service calls using HTTP-GET and HTTP-POST will not be supported. This is because using SOAP provides XML schema support for more complex data types. The transport method supported is SSL-encrypted HTTP.

In order to call the RQF IMS Web Services, an application or Software Development Kit (SDK) capable of calling XML Web Services is required. The application or SDK must support the following:

- XML 1.0;
- SOAP 1.1;
- HTTP 1.1; and
- SSL and Basic Authentication.

The following SDKs have been successfully tested with the RQF IMS Web Services (note that other standards-compliant SDKs may work):

- .NET 1.1;
- .NET 2.0;
- Axis 1.1;
- Axis2 1.2; and
- Zolera SOAP Infrastructure (ZSI) — Python.

6.2 Authentication

RQF IMS Web Services submissions will be configured to use Basic Authentication over SSL for secure communication. Basic Authentication is widely supported and part of the HTTP 1.1 standard. In Basic Authentication, the password is simply Base64 encoded so that it will be necessary to encrypt secure communications using SSL.

Each institution will be issued with a service account and password. The following security rules apply to login passwords for RQF IMS Web services:

- Passwords will be set to “never expire” during the period of the RQF submissions;
- Strong passwords will be used. These must contain a combination of upper and lowercase characters, numbers and special characters (e.g., #, @, \$);
- Passwords must be from 7 to 14 characters long;
- The maximum number of failed logon attempts before the account will be locked is 5; and
- If the account is locked, the institution must contact DEST (rqf@dest.gov.au) to reset the password.

Passwords issued for the RQF IMS for submissions will be disabled at the close of the RQF submission process.

6.3 Attachments

The RQF IMS will support the exchange of unstructured data in the SOAP messages. This will enable the Impact Statement and the descriptive component of the Context Statement to be included in the SOAP message.

In order to support older SDKs, RQF IMS Web Services will accept attaching the evidence portfolio documents as a byte array (schema type: base64Binary).

6.4 XML Schemas

This section describes the top level XML Schema complex types used in RQF IMS Web Service requests. Refer to the XSD HTML Documentation included in the *RQF IMS Technical Specifications Documentation Package* (section 1.6) for a more detailed decomposition of these types.

The actual request types are described in section 6.5. This section will be used to show the high-level business objects that can be modified directly through RQF IMS Web Services. However, the documentation for these fields is included in the schema annotations and the XSD HTML Documentation. Types referenced in this section that are not represented by complex types are actually simple types and are described in the XSD HTML Documentation and annotations.

Note that, in the class diagrams below, Association Roles (adorning the arrowheads) are represented as elements in the XSD Schemas. XSD elements are used everywhere instead of attributes for compatibility reasons with older SDKs that will be used to bind data serialisation code to the schemas. Where not specified, the default multiplicity is always one.

Appendix B: XML Schema Simple Types lists the simple types and restrictions (defined in the XML Schema) that are reused by many of the complex types.

6.4.1 Researcher

Researchers will be submitted independently from *EvidencePortfolios*.

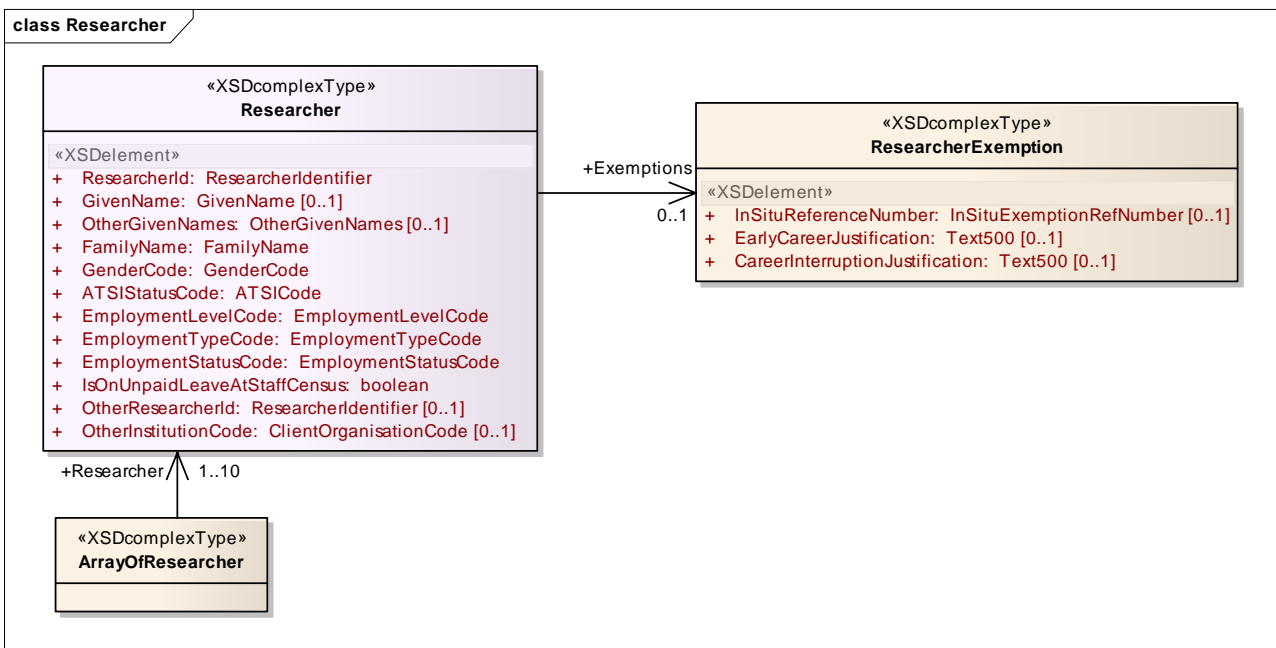


Figure 4: Researcher XSD Complex Types

6.4.2 InstitutionData

InstitutionData refers to institution-level statistical information. This information will not be displayed to Panel Members or Advisors.

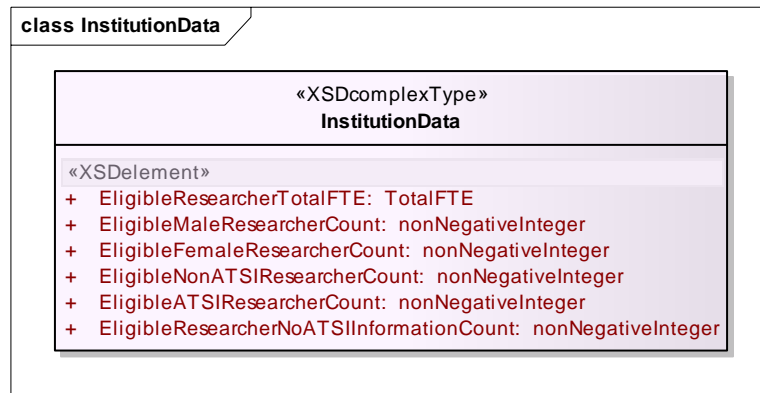


Figure 5: *InstitutionData* XSD Complex Types

6.4.3 EvidencePortfolio

An *EvidencePortfolio* for a *ResearchGroup* contains a Context Statement and an Impact Statement (or exemption type code) and other data relevant to the Research Group.

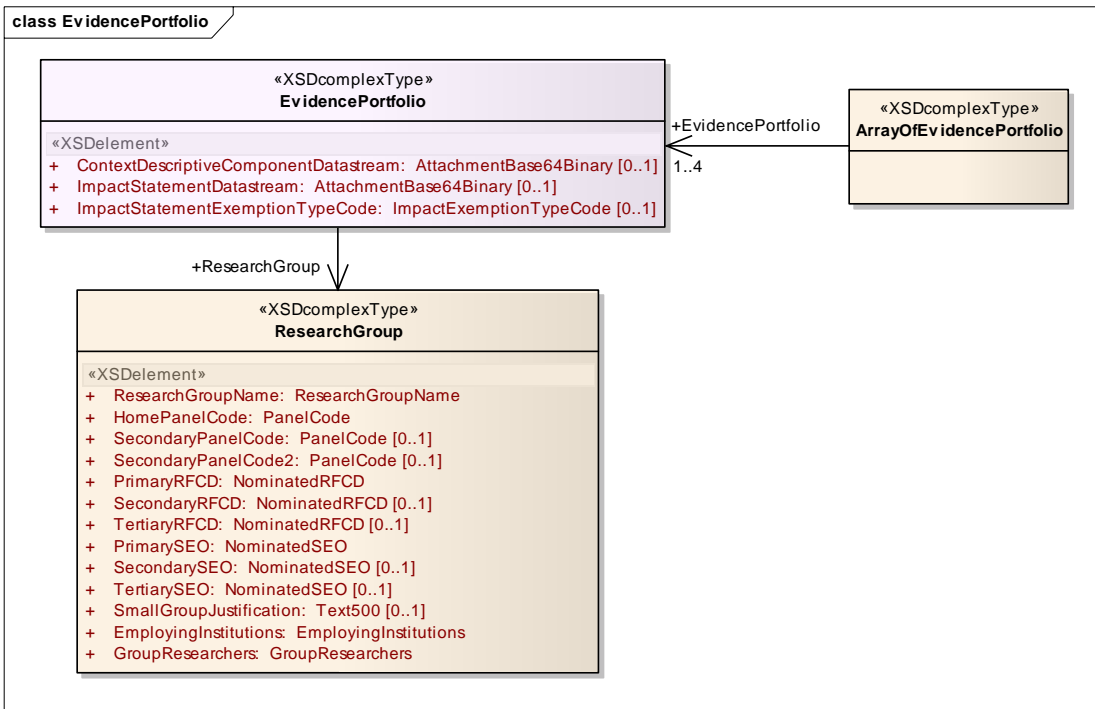


Figure 6: EvidencePortfolio XSD Complex Types

ResearchGroup can be further decomposed as described in the sections below.

Note: The *ContextDescriptiveComponentStream* and *ImpactStatementDataStream* elements are base-64 encoded PDF files representing the descriptive component of the Context Statement and the Impact Statement, respectively. The PDFs are prepared as part of an Institution Submission and must not contain embedded links. Formatting of the content of these PDF documents (such as page margins and font sizes) must conform to the requirements outlined in the *RQF Submission Specifications*.

6.4.4 ResearchGroup

ResearchGroup is used to contain many elements of an *EvidencePortfolio*, including the *GroupResearchers*, as shown below (Figure 7):

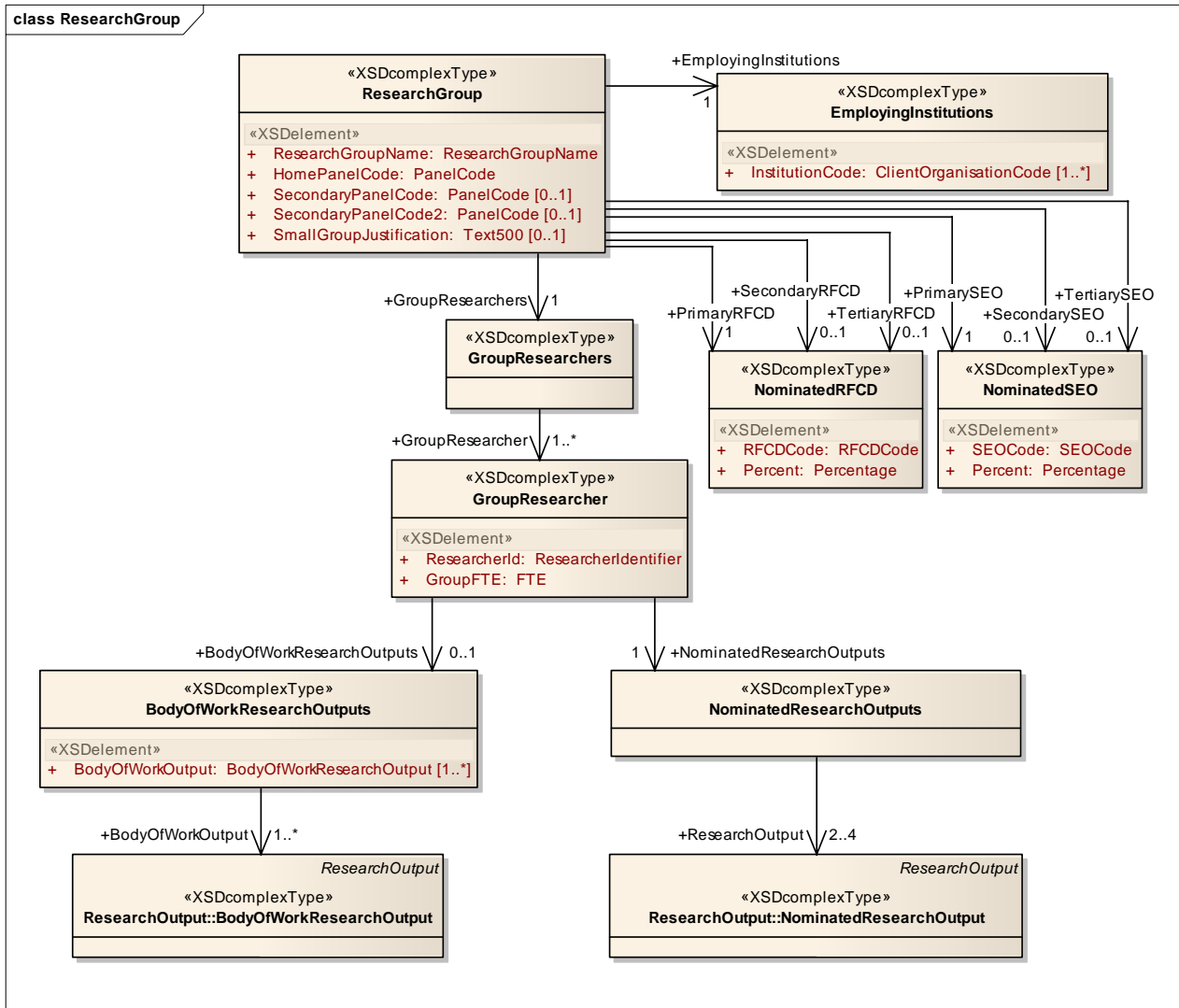


Figure 7: ResearchGroup XSD Complex Types

The two types of *ResearchOutputs* can also be decomposed into other complex types. Both *BodyOfWorkResearchOutput* and *NominatedResearchOutput* extend *ResearchOutput*.

The *OldOutputImpactRelevance* element is only required for older Research Outputs that are relevant to the group Impact Statement and were published or made available in the six years prior to the Assessment Period.

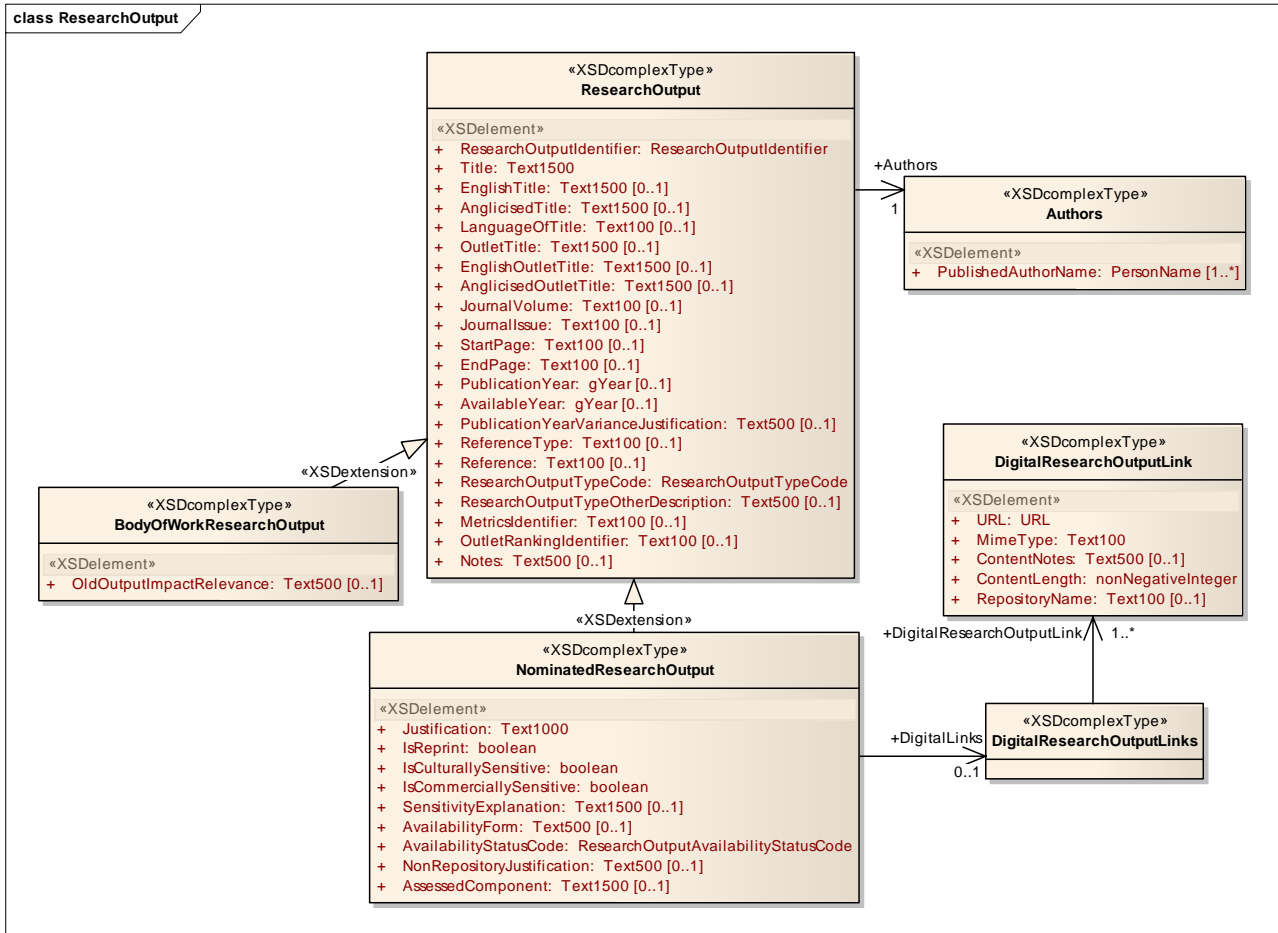


Figure 8: ResearchOutput XSD Complex Types

6.4.5 EvidencePortfolioStreams

It is possible to upload only the attachments for an *EvidencePortfolio* using a single method. Owing to the possibility that institutions may prefer to prepare attachments separately to other evidence portfolio data, the attachments are optional elements of the schema for an *EvidencePortfolio*.

The *EvidencePortfolio* will be reported as invalid until the attachments are included (via RQF IMS Web Services or the Web User Interface). Warnings will be returned from the Web Service methods that are used to submit or update the *EvidencePortfolio* indicating that the *EvidencePortfolio* remains in the “invalid” state. Warnings will also be displayed in the Web User Interface for the evidence portfolio when that record is displayed.

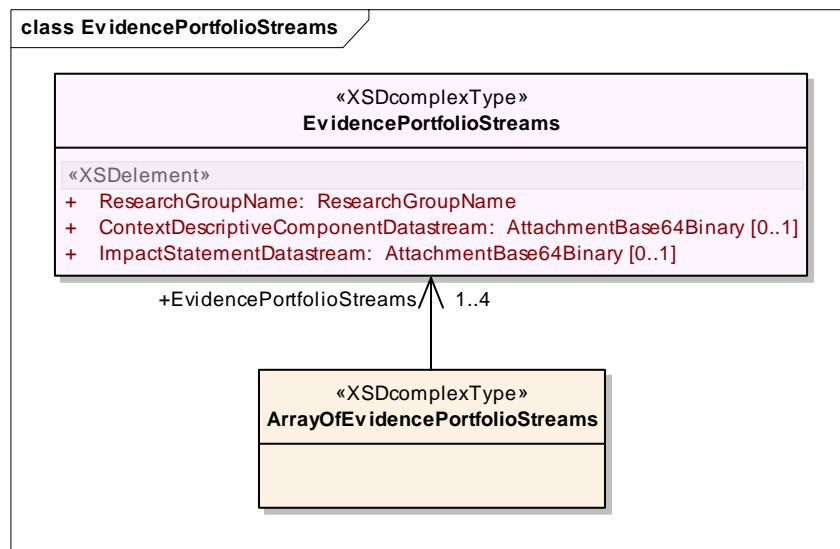


Figure 9: EvidencePortfolioStreams XSD Complex Types

6.5 Request and Response Definitions

The following object types will be used generally in all RQF Web Service calls:

- Response objects and request objects;
- Response control tables and request control tables; and
- Response transaction data and request transaction data.

In the following sections, element fields will be defined in terms of XML data types. If an XML data type has a prefix of **xs**, it refers to a built-in XML data type that is part of the <http://www.w3.org/2001/XMLSchema> namespace. If the data type has an **rqf** prefix, it refers to elements that are part of the <http://dest.gov.au/rqf/submission> namespace. Schema definitions for the RQF data types will be available in the *RQF IMS Technical Specifications Documentation Package* (section 1.6).

6.5.1 Request Identifiers

Request identifiers (*RequestIds*) are an important part of RQF IMS Web Services. They are included in every web method call to identify an individual request. The *RequestId* is a string and can be of any format. An obvious choice is to use a Globally Unique Identifier (GUID) although using an integer starting from 0 and incrementing by 1 with each web method call is also valid.

The value of the *RequestId* need only be unique within a particular institution and it must retain uniqueness over time. It will be the responsibility of the institution to ensure that all its client systems internally keep track of all previous *RequestIds* and to synchronise the generation of unique *RequestIds* for new calls.

Every time a method is called a new *RequestId* must be sent to the server. When returning the processing results of the request, the server response will include the same *RequestId*. In order to guarantee that the server does not process the same request twice due to a communication failure, calls to a web method providing an old *RequestId* will return the results of the old request. No new processing will be performed.

6.5.2 Request Object Schema

The request object will be a generic container that holds all the information a client needs to send to an RQF Web Service. It contains request control data (one *RequestControlTable*) and one or multiple request transaction data elements. There is a limit on the number of transactions allowed per request, namely 10 *Researchers* or 4 *EvidencePortfolios* per request. These values will be reviewed and may be updated as part of the system performance testing and the pilot phase.

The classes shown in Figure 10 below represent all of the request classes. For submit or update methods, the request class is actually named after the entity type (e.g., *InstitutionData*) using the following pattern: *{entityName}Request*.

An *EvidencePortfolioStreams* object is used to add and update the attachments for an *EvidencePortfolio*. The maximum number of *EvidencePortfolioStreams* objects per request is also 4 (as for *EvidencePortfolios*). The ability to add and update the attachments for an *EvidencePortfolio* using an alternative method to updating the entire *EvidencePortfolio* is provided. Following the successful submission, the attachments are considered to be part of the *EvidencePortfolio*.

The *InstitutionDataRequest* can only contain one transaction. All other requests can process multiple transactions and therefore contains either a collection of objects to submit or update or a collection of identifiers corresponding to objects to delete from the RQF IMS. The type of the collection will depend on the tools used to generate binding classes from the WSDL and including choices such as the target language.

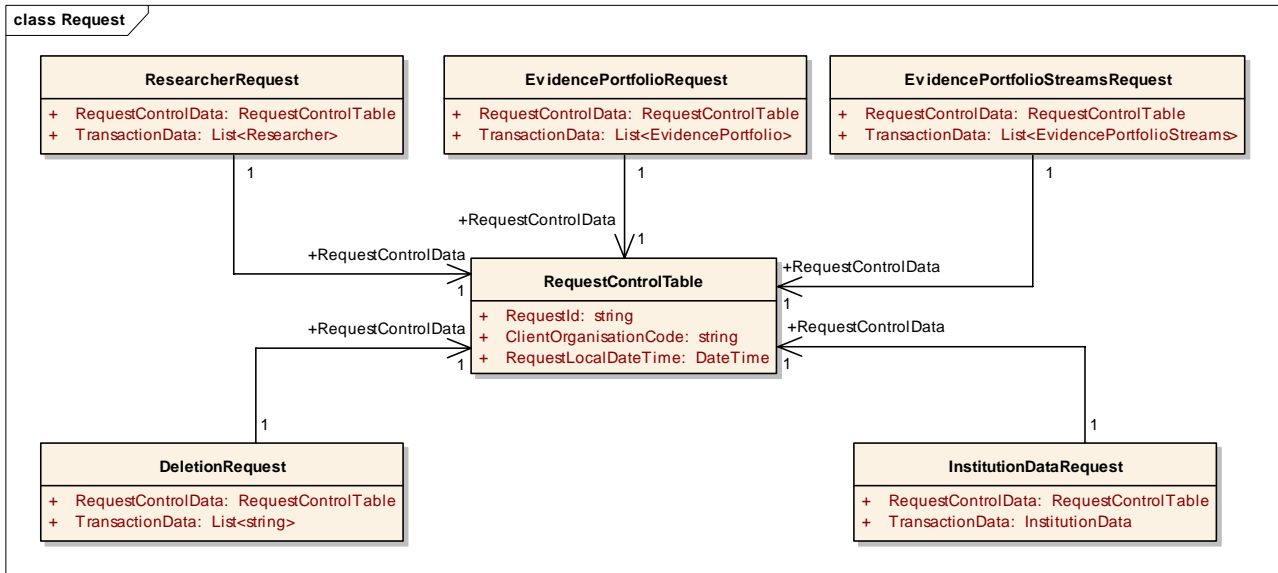


Figure 10: Submission Request Class Diagram

Deletion requests are a special case, in that only a collection of strings that represents the unique identifiers of the objects to delete needs to be sent in the *TransactionData*. Consequently, a single type is used: *DeletionRequest*. Unique identifiers, which are also used to identify transaction status in the corresponding response object, are shown in Table 3 (below). Refer to Appendix A: Data Element Definitions for more information about these fields.

InstitutionData cannot be deleted as this would invalidate the submission. The correct mechanism for replacing the *InstitutionData* is to perform an update operation.

Table 3: Unique Identifiers for Submission Request Types

Entity	Unique Identifier (from XML Schema)
Researcher	ResearcherID
InstitutionData	(already known from ClientOrganisationCode in the RequestControlTable)
EvidencePortfolio	ResearchGroupName
EvidencePortfolioStreams	ResearchGroupName

The classes in Figure 10 represent complex types in the XML Schema. Other types have a simple mapping to XSD simple types, such as *DateTime* (xs:dateTime) and *string* (xs:string). Enumerations map trivially to XSD enumerations. Note that the List<T> type (used in each request class) will be mapped to *ArrayOf{T}* as a SOAP operation parameter, i.e., *ArrayOfstring*, *ArrayOfResearcher*, *ArrayOfEvidencePortfolio* and *ArrayOfEvidencePortfolioStreams*.

ArrayOfstring will actually be exposed as *ArrayOfIdentifier* for the request types in the WSDL types section; however, *ArrayOfIdentifier* will still contain a collection of strings.

An *EvidencePortfolioStreams* object, as described in section 6.4.5, contains at least one of: *ContextDescriptiveComponentDataStream* and *ImpactStatementDataStream*.

The *ResearcherID* is necessary to allow institutions to create the correct associations in the Institution Submission data. The *ResearcherID* will not be used for any other purpose by DEST other than to assist with validation of RQF data or aggregating the data for reporting purposes. This data will be treated by DEST in a manner that ensures that information about individuals is not disclosed.

6.5.3 Response Schema

The response schema is a container for all information that an RQF Web service will send to a client. It will contain response control data (one *ResponseControlTable*) plus multiple response transaction data elements.

There are only two response types, as shown in Figure 11. The *InstitutionDataResponse*, corresponding to an *InstitutionDataRequest*, is the only response type that does not need to contain information about multiple transactions. In this case, only a *TransactionStatus* is reported, with relevant *AppMessages* containing warnings and errors as required. In contrast, the *DataSubmissionResponse* contains a collection of *TransactionResults*, each containing an Identifier (refer to Table 3) and a *TransactionStatus* for each transaction.

The *DataSubmissionResponse* corresponds to all request types other than *InstitutionDataRequest*. *DataSubmissionResponse* differs from *InstitutionDataResponse* in that it contains the *TransactionStatus* (inside a *TransactionResult*) for each requested transaction, whereas there is only ever one *InstitutionData* object passed within an *InstitutionDataRequest*.

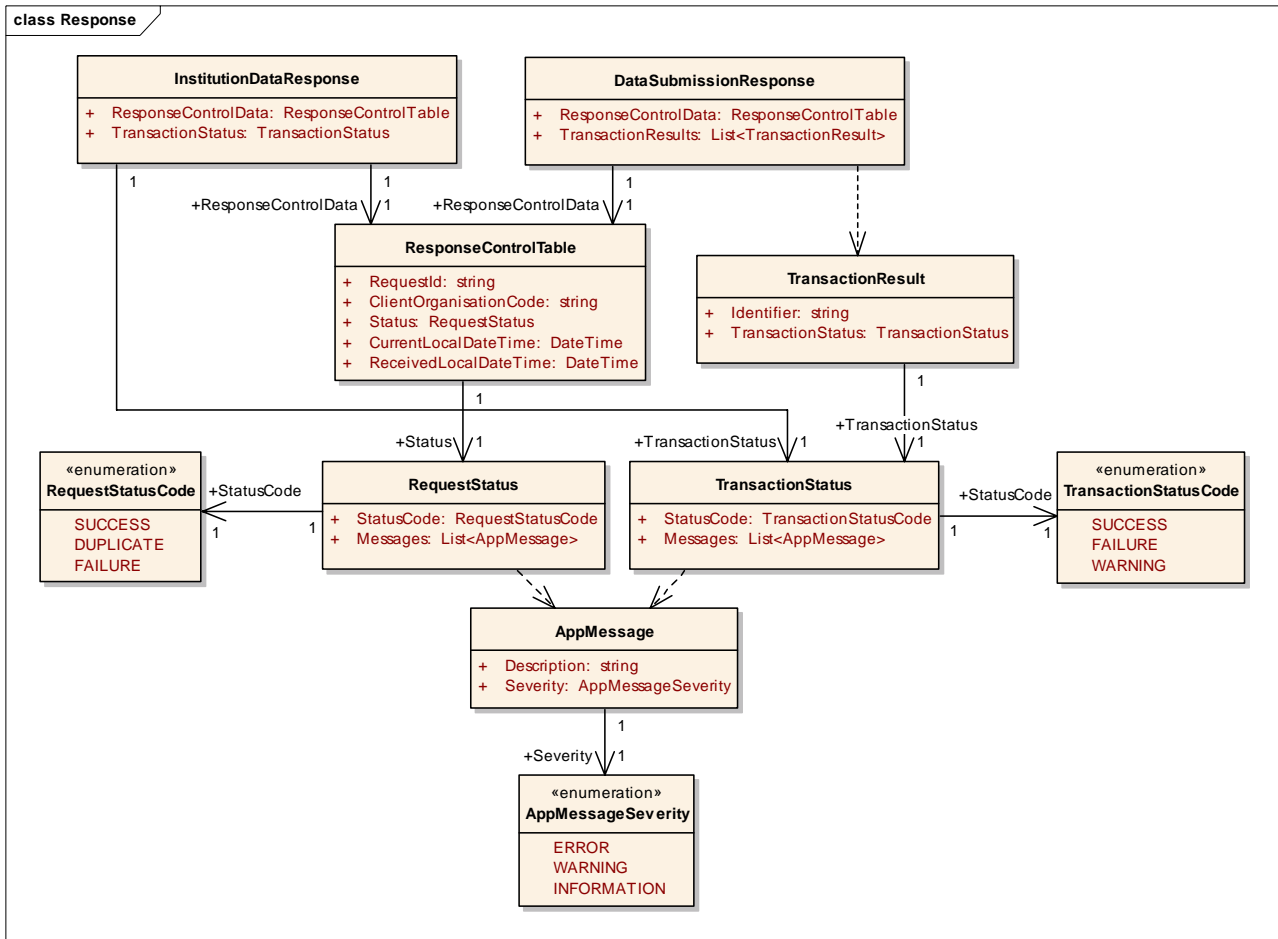


Figure 11: Response Class Diagram

Classes in Figure 11 represent complex types in the XML Schema. Other types have a simple mapping to XSD simple types, such as *DateTime* (xs:dateTime) and *string* (xs:string). Enumerations map trivially to XSD enumerations. Note that the List<T> type (used in *DataSubmissionResponse*, *TransactionStatus* and *RequestStatus*) will be mapped to *ArrayOf{T}* as a SOAP operation parameter, e.g.:

- o List<AppMessage> becomes *ArrayOfAppMessage*; and
- o List<TransactionStatus> becomes *ArrayOfTransactionStatus*.

6.5.4 Control Data

Control data is present in all communication between clients and RQF IMS Web Services. It provides information concerned with the RQF Web Service infrastructure and as such is essential to every RQF IMS Web Services method. There are two control data structures: *RequestControlTable* and *ResponseControlTable*.

RequestControlTable

RequestControlTable is a container for all request control data. For every call to a RQF Web Service, a *RequestControlTable* must always be sent. The *RequestControlTable* is sent wrapped within a Request object. The *RequestControlTable* contains the following fields:

Table 4: *RequestControlTable*

Field Name	XML Type	Description
RequestId	rqf:RequestId	The request identifier.
ClientOrganisationCode	rqf:ClientOrganisationCode	The client's 4-digit identifying code (e.g., institution code).
RequestLocalDateTime	xs:dateTime	Date and time on the client at the time of the call.

ResponseControlTable

Similarly, the *ResponseControlTable* is a container for all response control data. When a client receives a response from an RQF Web service, a *ResponseControlTable* is always present. The *ResponseControlTable* is sent wrapped in a response object. A *ResponseControlTable* object contains the following fields:

Table 5: *ResponseContoTable*

Field Name	XML Type	Description
RequestId	rqf:RequestId	The same request identifier of the original request.
ClientOrganisationCode	rqf:ClientOrganisationCode	The 4-digit identifying code of the client that issued the original request.
CurrentDateTime	xs:dateTime	Date and time on the server at the time the response was sent.
ReceivedDateTime	xs:dateTime	Date and time on the server when the server first received the request.
RequestStatus	rqf:RequestStatus	Contains a <i>RequestStatusCode</i> – the current status of the request, and <i>Messages</i> – a list of messages associated with the request.

The *RequestStatus* element contains two fields, *RequestStatusCode* and *Messages*. *RequestStatusCode* contains information on the status of the request itself. It is not related to the status of the individual transactions. For example, a request can have a *RequestStatusCode* equal to 'SUCCESS', but all of its individual transactions can fail business processing. *RequestStatusCode* can take the following values:

Table 6: *RequestStatusCode*

RequestStatusCode	Conditions
DUPLICATE	The <i>RequestId</i> of the current request has already been used. Request transaction data will contain the results of the original request. No new processing was performed on the server.
FAILURE	An error occurred with the request. Request transaction data will not contain results.
SUCCESS	The request has been processed successfully. Request transaction data will contain processing results.

The *Messages* element contains a list of messages concerned with the request. For example, if *RequestStatusCode* has a value of 'FAILURE', *Messages* will contain descriptions as to why the original request was invalid.

6.5.5 TransactionStatus

TransactionStatus is an element common only to response transaction schemas. It provides information about the results of business processing for an individual transaction. The *TransactionStatus* type has two fields: *TransactionStatusCode* and *Messages*. *TransactionStatusCode* indicates the processing status of the transaction, and *Messages* is an array of *Message* elements. Within the context of *TransactionStatus*, each *Message* element holds business validation or business error messages for that transaction.

TransactionStatusCode can take on the following values:

Table 7: *TransactionStatusCode*

TransactionStatusCode	Description
SUCCESS	The individual transaction processed correctly according to its respective business rules. Other response transaction data fields will contain valid output.
FAILURE	The individual transaction failed processing according to business rules. Other response transaction data fields will not contain valid output.
WARNING	The individual transaction processed correctly but with warnings. Other response transaction data fields will contain valid output; however the <i>Messages</i> element will contain warning messages which should be investigated by the client institution in order to maintain data and processing integrity.

6.5.6 Messages

As mentioned in the previous sections, both the *RequestStatus* and *TransactionStatus* fields contain the *Messages* element. This element is used to hold any messages concerned with either the request or its constituent transactions. The *Messages* element itself only contains an array of individual *Message* elements.

Each *Message* element contains three fields: *Code*, *Description* and *MessageSeverity*. *MessageSeverity* can take on one of the following values:

Table 8: Message Severity

MessageSeverity	Description
INFORMATION	The message is of an informational nature.
WARNING	The message provides a warning which should be investigated. When a warning message is produced, it indicates that the request or transaction was successful, but with caveats.
ERROR	The message is produced when the request or transaction has failed. It contains reasons as to why it failed and what caused the error.

6.6 Error Handling

6.6.1 Schema Errors

Every request received by an RQF Web Service is validated against the respective schema for that method. The validation performs checks to do with the format and structure of the request fields. If the request does not comply with the schema, the returning SOAP message will not contain any response data, only a SOAP fault. An example of a server response to an invalid request would look like:

```
<?xml version="1.0" encoding="utf-8" standalone="yes" ?>
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Body>
    <s:Fault>
      <faultcode xmlns="">s:Client</faultcode>
      <faultstring xml:lang="en-AU" xmlns="">Xml Schema Validation Error(s)</faultstring>
      <detail>
        <ValidationFault xmlns="http://dest.gov.au/rqf/submission">
          <Errors>
            <ValidationFaultItem>
              <TransactionIdentifier>12345</TransactionIdentifier>
              <ElementName>GivenName</ElementName>
              <LineNumber>1</LineNumber>
              <Column>277</Column>
              <Description>The 'http://dest.gov.au/rqf/submission:GivenName' element is
                invalid - The value 'very_very_very_very_long_name' is invalid
                according to its datatype 'http://dest.gov.au/rqf/submission:GivenName' - The
                actual length is greater than the MaxLength value.</Description>
            </ValidationFaultItem>
          </Errors>
        </ValidationFault>
      </detail>
    </s:Fault>
  </s:Body>
</s:Envelope>
```

Within the *detail* element, RQF will place a set of *ValidationFaultItem* elements, one for each error encountered. The *detail* element contains the following fields:

Table 9: *ValidationFaultItem*

SOAP Fault Element Name	Description
TransactionIdentifier	This refers to the <i>identifier</i> of the transaction data element that contains the error. This field applies to errors with transaction data only. Errors concerned with control data or errors to do with the entire request (e.g., duplicate <i>TransactionIdentifier</i> values) will result in an empty <i>TransactionIdentifier</i> value.
Element	The element in which the error occurred.
Line	The line number of the incoming request where the error occurred.
Column	The column number of the incoming request where the error occurred.
Description	A brief description of why the element was invalid.

Line and column number can be used to pinpoint where an error occurred in the SOAP message. The other fields (*TransactionIdentifier*, *Element* and *Description*) should be sufficient to pinpoint where the error occurred in the request.

Errors in the request control data (*RequestControlData*) will return a SOAP fault immediately and no input transaction data will be validated. If any schema validation errors are detected, the RQF IMS will not store the request. This means the same *RequestId* can be re-used.

6.6.2 Business Errors

Once the incoming request has been validated successfully against the schema, the server will process each transaction according to the relevant business rules. Any errors or messages for a transaction data element arising from this validation are stored in the *TransactionStatus* field.

6.6.3 RQF IMS Web Services

RQF IMS Web Services will be used to implement a system-to-system interface for submission of evidence portfolios in batches.

6.7 Interfaces

This section provides a list of all available RQF IMS Web Services and the methods associated with them.

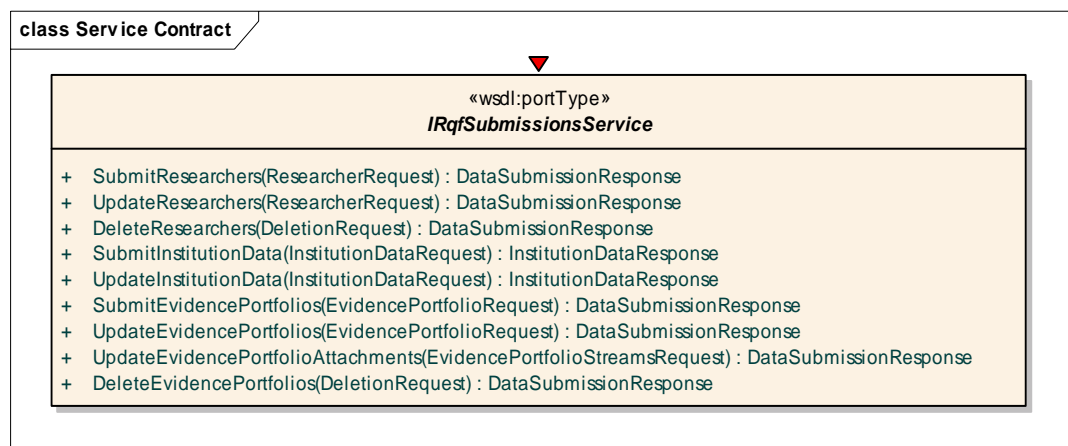


Figure 12: Web Service Methods

It is necessary to use Basic Authentication via SSL to call these methods. Further information is provided in section 6.2.

The endpoint for the RQF Submissions Web Service will be as follows:

End point URLs <https://rqf.dest.gov.au/WebServices/service.svc>

WSDL Locations <https://rqf.dest.gov.au/WebServices/service.svc?WSDL>

The interface methods are described in the subsections that follow:

Methods for Institution Submission Data Manipulation:

Section 6.7.1	<i>SubmitResearchers:</i>	To submit new researchers
Section 6.7.2	<i>UpdateResearchers:</i>	To update existing researchers
Section 6.7.3	<i>DeleteResearchers:</i>	To permanently delete researchers
Section 6.7.4	<i>SubmitInstitutionData:</i>	To submit general institution data
Section 6.7.5	<i>UpdateInstitutionData:</i>	To update general institution data
Section 6.7.6	<i>SubmitEvidencePortfolios:</i>	To submit new evidence portfolios (EPs)
Section 6.7.7	<i>UpdateEvidencePortfolios:</i>	To update existing evidence portfolios
Section 6.7.8	<i>UpdateEvidencePortfolioAttachments:</i>	To upload attachments for EPs
Section 6.7.9	<i>DeleteEvidencePortfolios:</i>	To permanently delete evidence portfolios
Section 6.7.10	<i>Ping:</i>	To test Web Service connectivity

An institution can only modify its own submission data. The account issued for calling these Web Services will be able to perform all of the above actions.

For information regarding the parameters and return types for all of the Web Service methods that follow, refer to the XML Schema HTML documentation in the *RQF IMS Technical Specifications Documentation Package* using the pattern *{methodName}.html*, e.g., *SubmitResearchers.html* (section 6.7.1).

6.7.1 SubmitResearchers

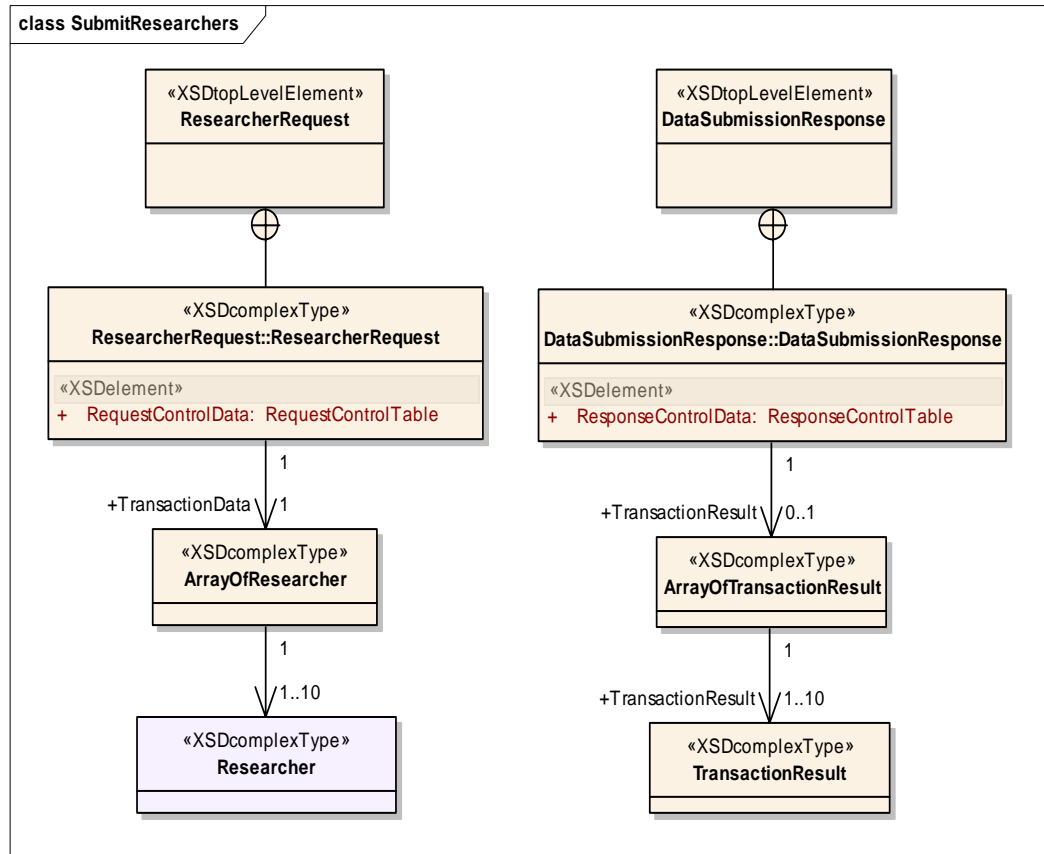


Figure 13: Submit Researchers

Method Signature

DataSubmissionResponse
 SubmitResearchers(ResearcherRequest request)

Description

SubmitResearchers can be used to submit multiple new Researchers to be created within the RQF IMS.

The RQF IMS will validate the data against formatting and business rules defined in the Data Element Definitions (Appendix A).

Pre-Conditions

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

Researchers must not already exist

If the Researcher ID already exists in the RQF IMS, a *TransactionStatusCode* of FAILURE will be returned in the response for each Researcher ID that already exists.

6.7.2 UpdateResearchers

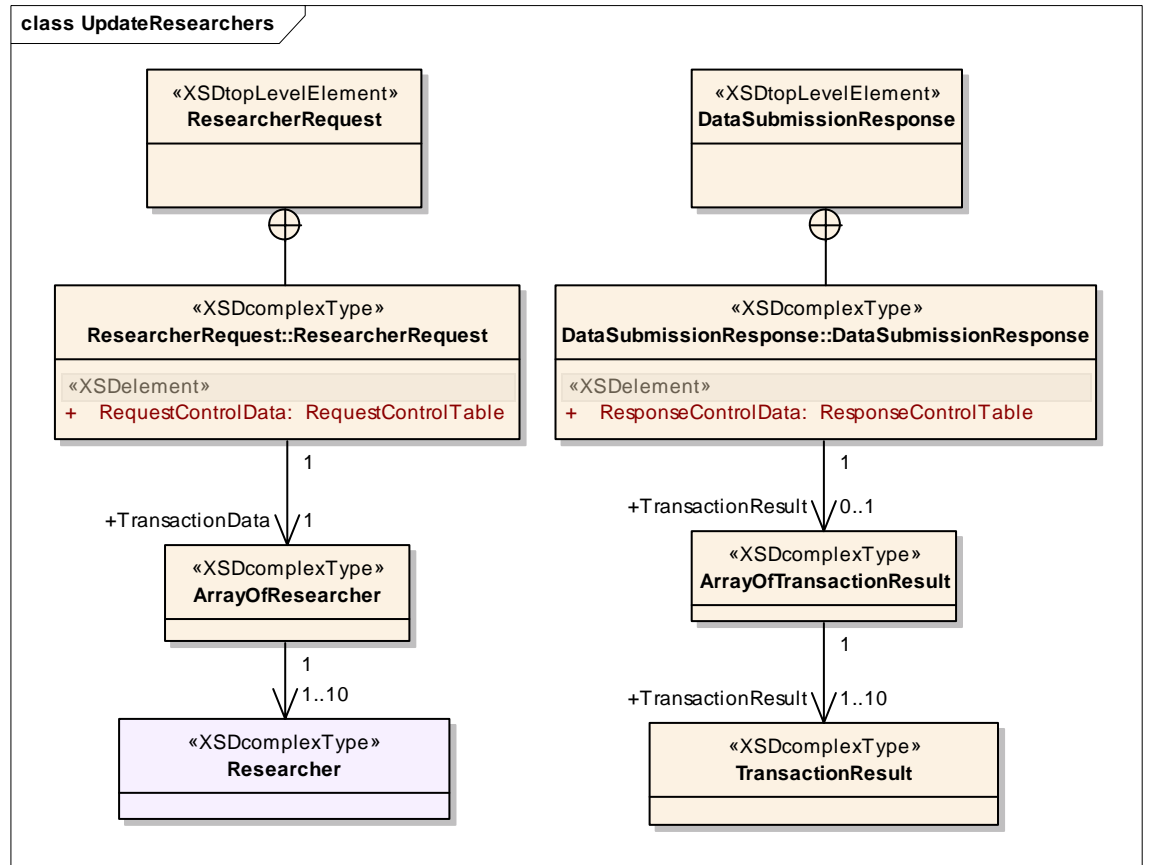


Figure 14: Update Researchers

Method Signature

DataSubmissionResponse
 UpdateResearchers(ResearcherRequest request)

Description

UpdateResearchers can be used to update a set of existing Researchers within the RQF IMS.

The RQF IMS will validate the data against formatting and business rules defined in the Data Element Definitions (Appendix A).

Pre-Conditions

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

Submitted Researchers must exist

A *TransactionStatusCode* of FAILURE will be returned in the response for each Researcher that does not exist.

6.7.3 DeleteResearchers

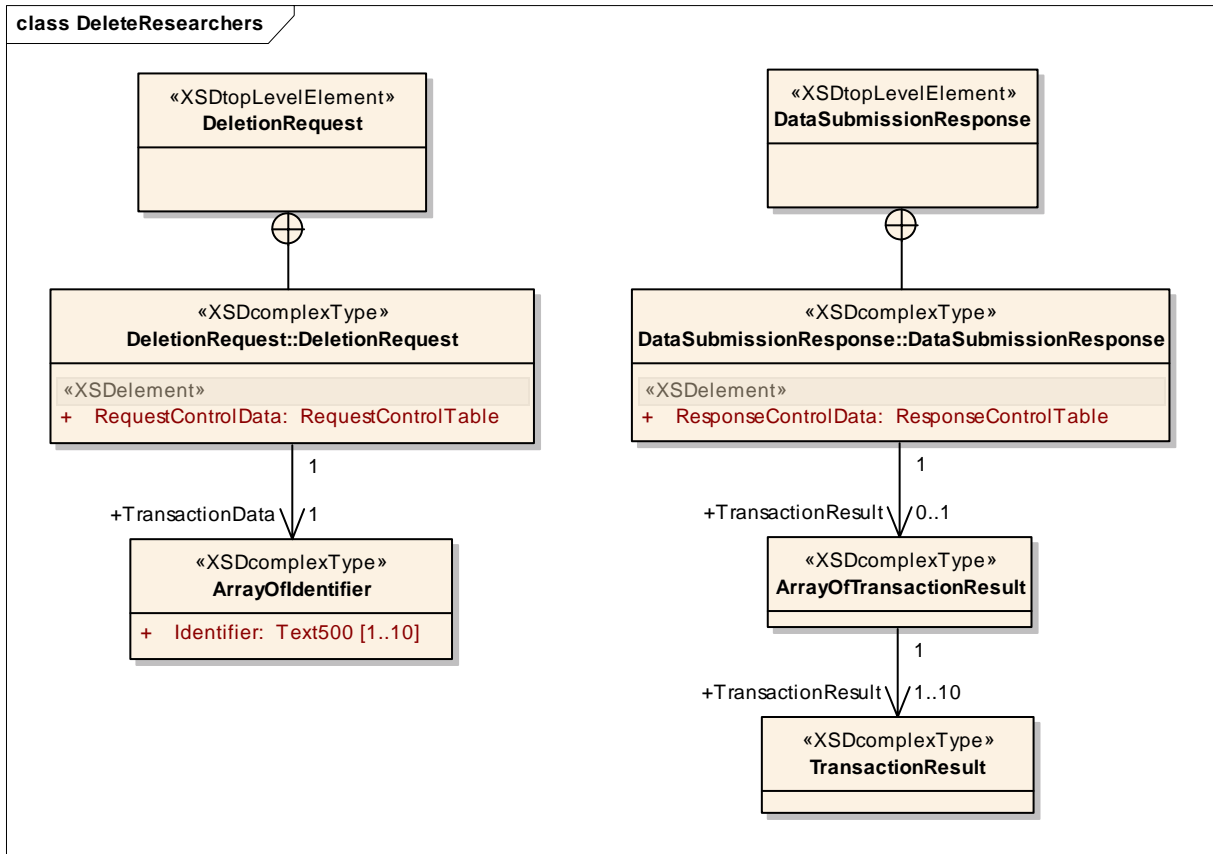


Figure 15: Delete Researchers

Method Signature

`DataSubmissionResponse DeleteResearchers(DeletionRequest request)`

Description

DeleteResearchers can be used to permanently delete a set of existing Researchers from the Institution Submission in the RQF IMS.

Pre-Conditions

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

Researchers to be deleted must exist

A *TransactionStatusCode* of FAILURE will be returned in the response for each Researcher that does not exist.

Post-Conditions

Deleted Researchers must be disassociated from evidence portfolios in the RQF IMS.

The Researcher, and their associations within evidence portfolios, will be physically deleted from the RQF IMS. Some previously associated evidence portfolios may become invalid. Warnings will be included in the response *AppMessages* to indicate which evidence portfolios have become invalid. Warnings will be returned for all evidence portfolios that the researcher was associated with. Institutions must review all these evidence portfolios to remove references to the deleted researcher and recalculate the Research Group statistical data.

6.7.4 SubmitInstitutionData

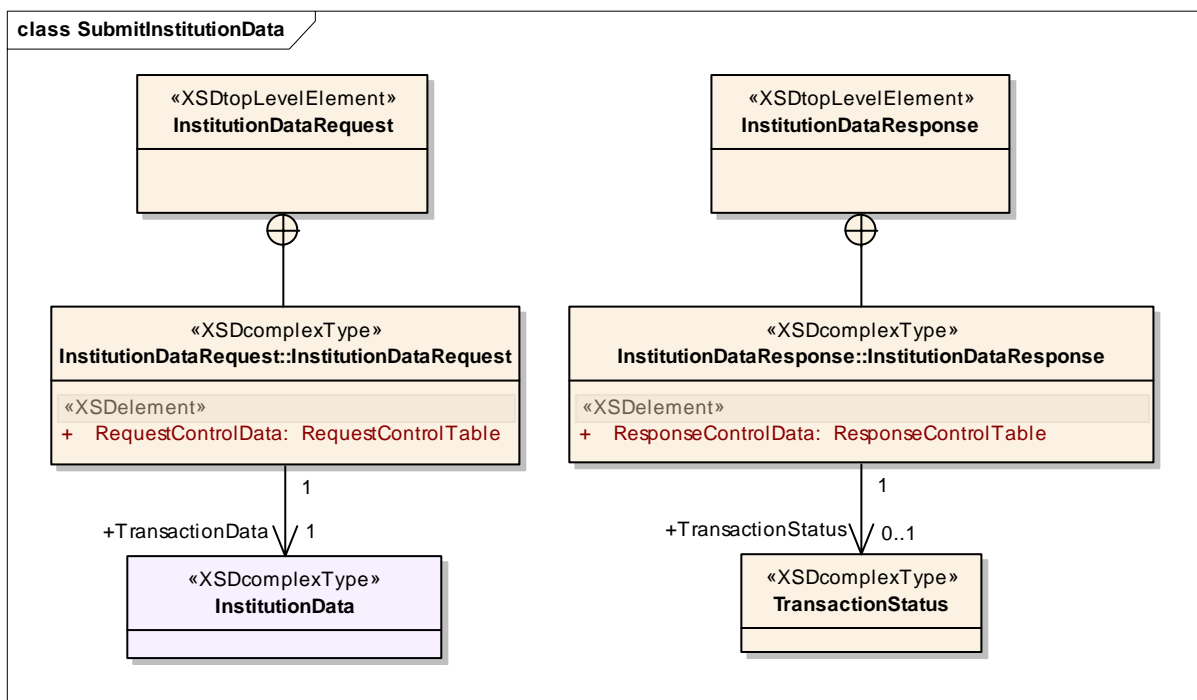


Figure 16: Submit Institution Data

Method Signature

InstitutionDataResponse
 SubmitInstitutionData(InstitutionDataRequest request)

Description

SubmitInstitutionData can be used to submit institution-specific data (*InstitutionData*) for the first time. Note that evidence portfolio data, including Impact and Context Statements, Research Group membership, etc., is not included in the institution-specific data submission. Information regarding individual Researchers is also not included.

The RQF IMS will validate the data against formatting and business rules defined in the Data Element Definitions (Appendix A).

Pre-Conditions

InstitutionData must not already exist

A *TransactionStatusCode* of FAILURE will be returned in the response if the *InstitutionData* has already been previously submitted. If this is the case, the correct call to replace existing *InstitutionData* is *UpdateInstitutionData()*.

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

6.7.5 UpdateInstitutionData

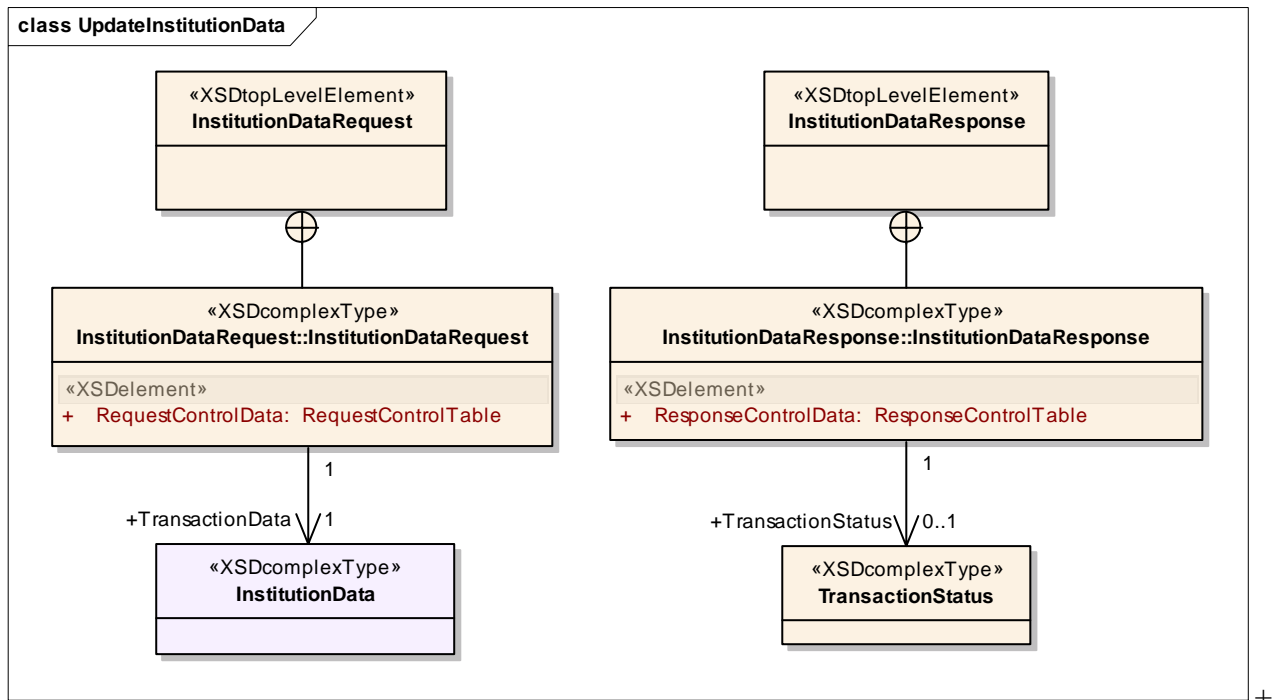


Figure 17: Update Institution Data

Method Signature

InstitutionDataResponse
 UpdateInstitutionData(*InstitutionDataRequest* request)

Description

UpdateInstitutionData can be used to update existing institution-specific data (*InstitutionData*).

The RQF IMS will validate the data against formatting and business rules defined in the Data Elements Definitions (Appendix A).

Pre-Conditions

InstitutionData must exist

A *TransactionStatusCode* of FAILURE will be returned in the response if *InstitutionData* has not previously been submitted for this institution.

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

6.7.6 SubmitEvidencePortfolios

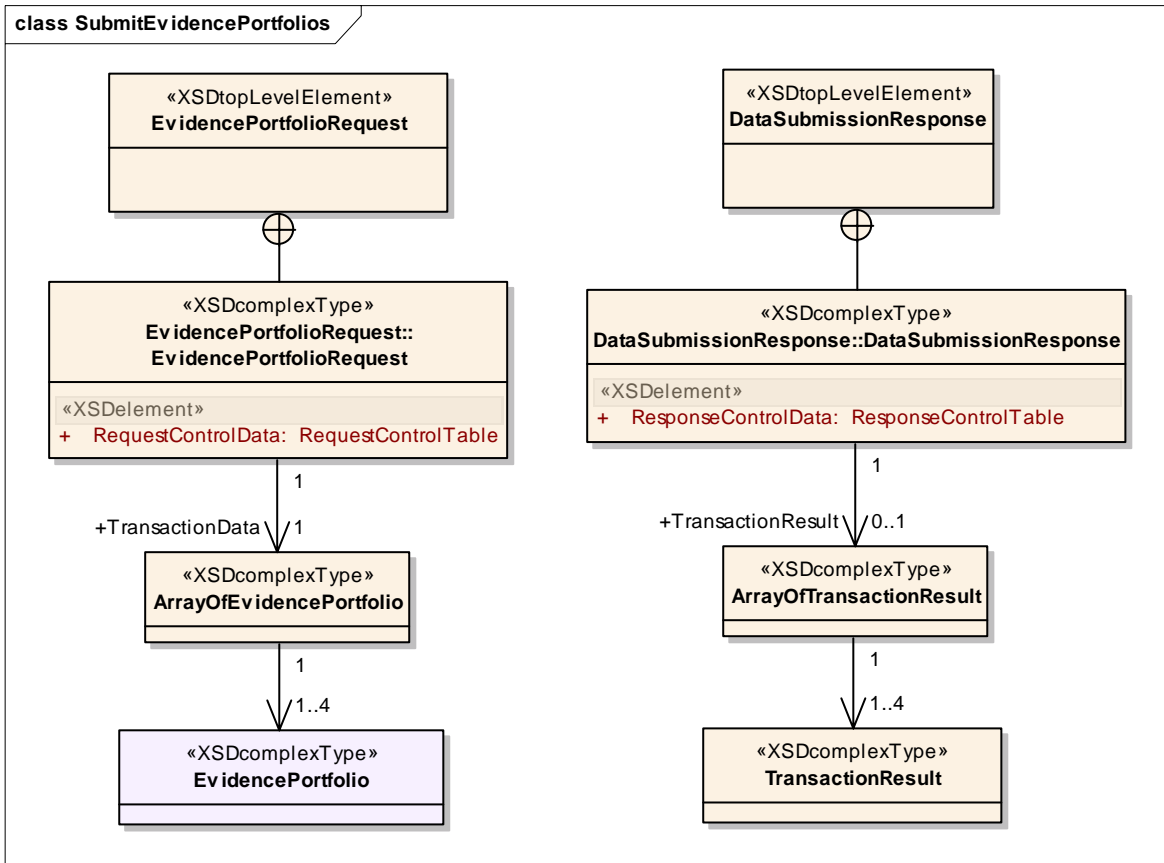


Figure 18: Submit Evidence Portfolio

Method Signature

DataSubmissionResponse
 SubmitEvidencePortfolios(EvidencePortfolioRequest request)

Description

SubmitEvidencePortfolios can be used to submit a set of new *EvidencePortfolios* to be created within the RQF IMS.

If some optional XML Schema elements are missing but these data items are required for an *EvidencePortfolio* to be considered valid (according to business rules), the corresponding *EvidencePortfolios* will still be stored in the RQF IMS but will be shown as incomplete in the Web User Interface. A warning will be generated for each *EvidencePortfolio* and included in the response.

The attachment *datastreams* are also optional, and may be submitted later using *UpdateEvidencePortfolios* or separately using *UpdateEvidencePortfolioAttachments*.

The RQF IMS will validate the data against formatting and business rules defined in the Data Item Definitions (Appendix A).

Pre-Conditions

Submitted EvidencePortfolios must not exist

A *TransactionStatusCode* of FAILURE will be returned in the response for each *EvidencePortfolio* that currently exists in the RQF IMS, based on the requirement that the *ResearchGroupName* must be unique within an institution.

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

6.7.7 UpdateEvidencePortfolios

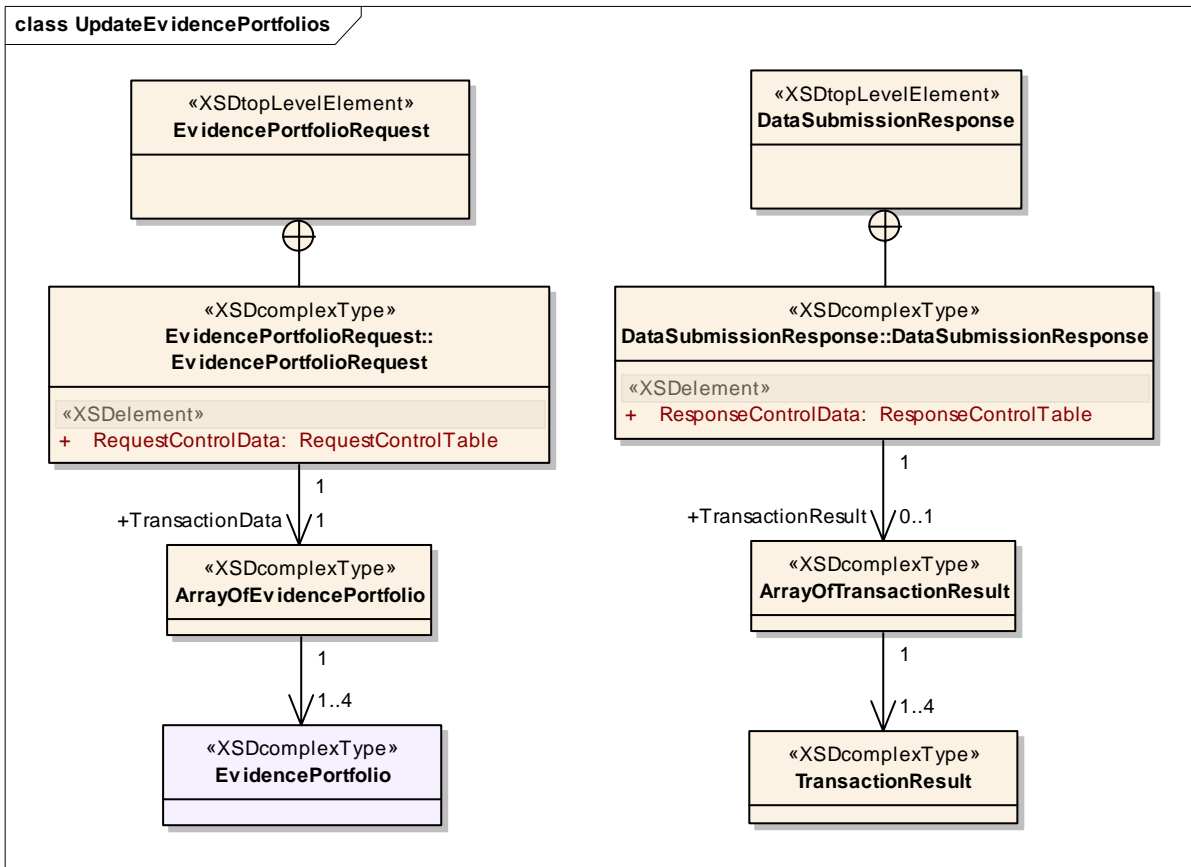


Figure 19: Update Evidence Portfolio

Method Signature

DataSubmissionResponse
 UpdateEvidencePortfolios(EvidencePortfolioRequest request)

Description

UpdateEvidencePortfolios can be used to update a set of existing *EvidencePortfolios* within the RQF IMS.

The RQF IMS will validate the data against formatting and business rules defined in the Data Item Definitions (Appendix A).

Pre-Conditions

EvidencePortfolios must exist

A *TransactionStatusCode* of FAILURE will be returned in the response for each *EvidencePortfolio* that does not exist. Note that a *ResearchGroupName* must be unique within an institution.

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

6.7.8 UpdateEvidencePortfolioAttachments

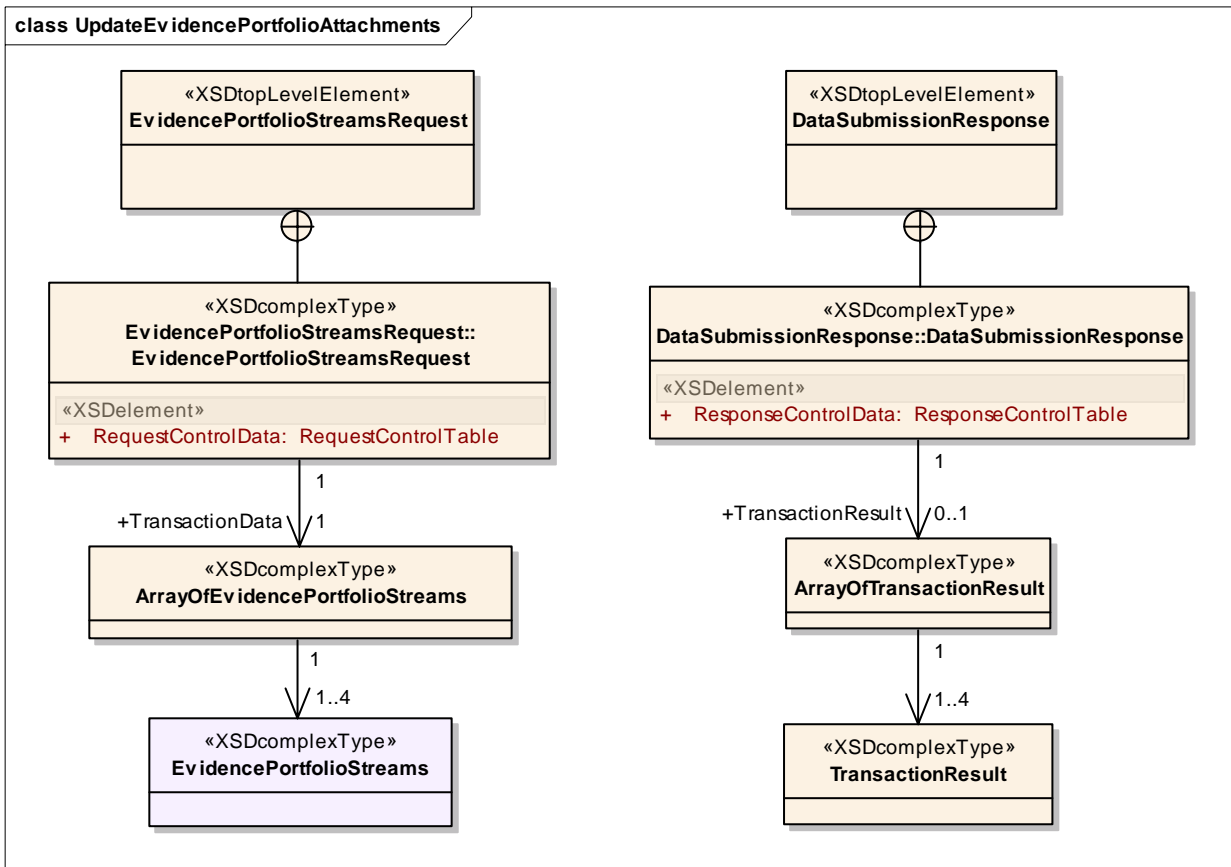


Figure 20: Update Evidence Portfolio Attachments

Method Signature

DataSubmissionResponse

UpdateEvidencePortfolioAttachments (EvidencePortfolioStreamsRequest request)

Description

UpdateEvidencePortfolioAttachments can be used to send attachments for existing evidence portfolios (that have already been submitted). The attachments include the descriptive components of the Context Statement and the Impact Statement. These attachments must be packaged into *EvidencePortfolioStreams* objects for each evidence portfolio to be updated in the request.

Pre-Conditions

EvidencePortfolios must exist

A *TransactionStatusCode* of FAILURE will be returned in the response for each *EvidencePortfolio* that does not exist. A *TransactionStatusCode* of WARNING will be returned in the response if one or both attachments (in the submitted *EvidencePortfolioStreams* object) for an *EvidencePortfolio* are overwritten (the Messages can be interrogated for additional information).

Note that existing attachments will be replaced. However, warnings will be returned in the response to indicate which attachments were replaced.

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

6.7.9 DeleteEvidencePortfolios

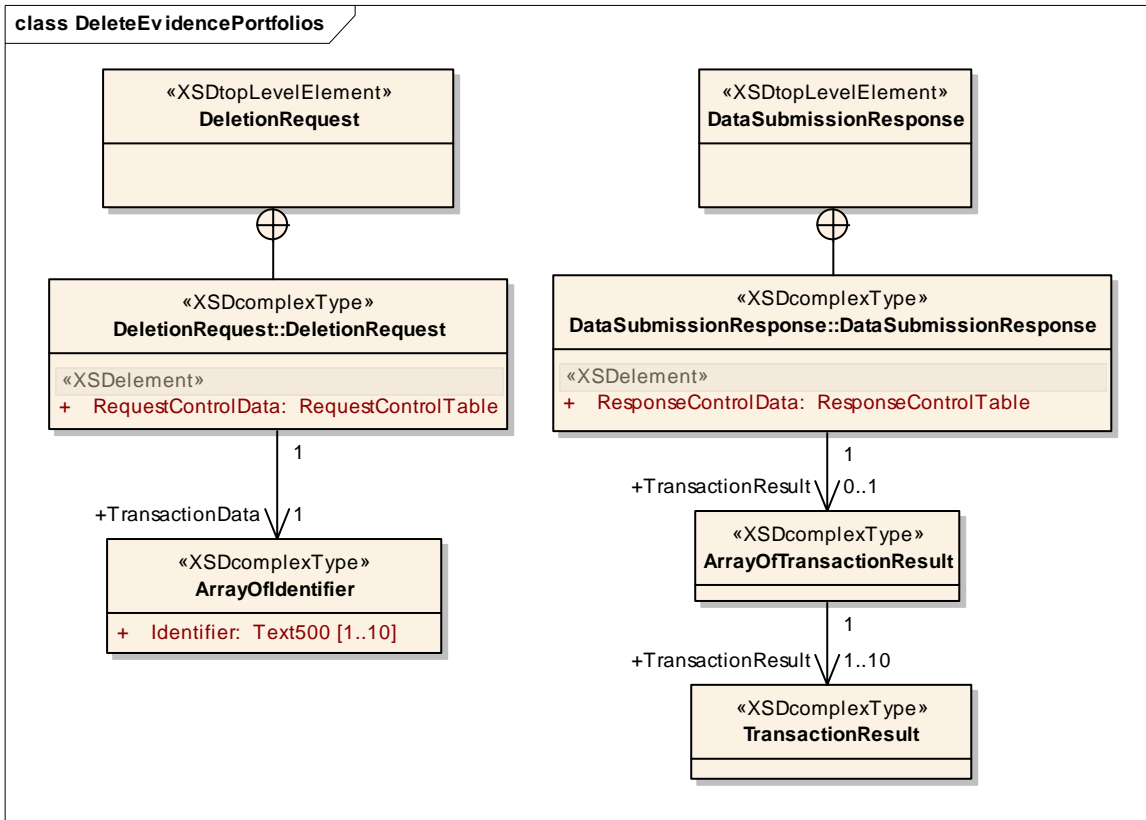


Figure 21: Delete Evidence Portfolio

Method Signature

DataSubmissionResponse
DeleteEvidencePortfolios(DeletionRequest request)

Description

DeleteEvidencePortfolios can be used to permanently delete a set of existing *EvidencePortfolios* (including attachments) from the submission in the RQF IMS.

Pre-Conditions

EvidencePortfolios must exist

A *TransactionStatusCode* of FAILURE will be returned in the response for each *EvidencePortfolio* that does not exist.

Submissions phase is open

A *RequestStatusCode* of FAILURE will be returned in the response if data is submitted after the submissions phase has closed.

6.7.10 Ping

Method Signature

string Ping()

Description

This method allows a client application to *ping* the server. It returns a string containing the date and time on the server.

7. Environments

There are two environments available to users of the RQF IMS (website and Web Services)

- Production; and
- External Test.

7.1 Production

See section 6 of this document for functionality available for the RQF IMS live production environment.

7.2 External Test

An External Test environment will be available by December 2007 to allow institutions to test functionality against the RQF IMS. Further details will be advised directly to RQF Contact Officers.

8. Troubleshooting

If any problems are encountered with the RQF IMS, contact the RQF IMS Helpdesk at rqf@dest.gov.au.

9. Glossary

9.1 Technical Terms

Term	Description
Authorisation	Determining a user's access to a resource. Authorisation almost always relies on the user having been authenticated.
Authorised user	Authorised users include Panel Members, Advisors and other users authorised by DEST. This will include authorised DEST officers during the Assessment Period. Additional Commonwealth officers may be authorised to use the RQF IMS following the Assessment Period.
Basic Authentication	A standard HTTP authentication protocol supported by most browsers where username and password is transmitted as Base-64 encoded text.
BLOBs	Short for <u>B</u> inary <u>L</u> arge <u>O</u> bjects A collection of binary data stored as a single entity in a database management systems.
DOI	Digital Object Identifier: DOI is a standard for persistently identifying a piece of intellectual property on a digital network and associating it with related data, the metadata, in a structured extensible way. DOIs can be resolved through the DOI resolver at http://dx.doi.org .
Embedded Links	For the purposes of RQF, embedded links are links that refer to objects external to the research output or URLs. These links provide a mechanism for associating related documents or URLs in the client document. Users can then access the external object or URL by clicking on the link.
GUID	Globally Unique Identifier: A special type of identifier used in software applications in order to provide a reference number that is unique in the context for which it is used.

Term	Description
Handle System	Handle System enables a distributed computer system to store names, or handles, of digital resources and resolve those handles into the information necessary to locate, access, and otherwise make use of the resources. These associated values can be changed as needed to reflect the current state of the identified resource without changing the handle. This allows the name of the item to persist over changes of location and other current state information. An overview of Handle System may be found at http://www.ietf.org/rfc/rfc3650.txt
HTTP	HyperText Transfer Protocol: An application layer protocol that provides a standard for Web browsers and Web servers to communicate.
HTTPS	HyperText Transfer Protocol (Secure): HTTP exchanged over an SSL encrypted session.
IANA	The Internet Assigned Numbers Authority (IANA). Of relevance to the RQF IMS is the registry of MIME types that may be found at: http://www.iana.org/assignments/media-types/ This registry includes types from: RFC-2046 (http://www.ietf.org/rfc/rfc2046.txt), RFC-1521 (http://www.ietf.org/rfc/rfc1521.txt), and others.
MegaBytes	1,048,576 Bytes
MIME	Multipurpose Internet Mail Extensions: Originally designed as a specification for formatting non-ASCII messages so that they can be sent via e-mail. In addition, Web browsers use MIME types to determine “helper” applications or components that can be used to view the content. RFC-1341 (http://www.ietf.org/rfc/rfc1341.txt)
SDK	Software Development Kit: A software development kit (SDK) is typically a set of development tools that allows a software engineer to create applications for a certain software package, software framework, hardware platform, computer system, video game console, operating system, or similar.
SOAP	Simple Objects Access Protocol: An XML based lightweight protocol for exchange of information in a decentralised, distributed environment.

Term	Description
SSL	<p>Secure Sockets Layer:</p> <p>A protocol developed by Netscape for transmitting private documents via the Internet. SSL works by using a private key to encrypt data that's transferred over the SSL connection. Both Netscape Navigator and Internet Explorer support SSL and many Web sites use the protocol to obtain confidential user information, such as credit card numbers. By convention, URLs that require an SSL connection start with https: instead of http: .</p>
TCP/IP	<p>Transmission Control Protocol/Internet Protocol:</p> <p>A suite of protocols that computers use to exchange information over the Internet.</p>
URL	<p>Uniform Resource Locator</p> <p>A global identifier for a network-retrievable document.</p>
UTF-8	<p>8-bit UCS/Unicode Transformation Format</p> <p>A variable-length character encoding for Unicode. It is able to represent any character in the Unicode standard. UTF-8 is the standard encoding method for Email, web pages and XML documents.</p>
W3C	<p>World Wide Web Consortium:</p> <p>An international consortium of companies involved with developing standards for the Internet and the Web.</p>
Web Services	<p>Web Services are designed to support interoperable machine-to-machine interaction over a network through the use of open standards that enable systems built on different technologies to exchange data and supply services. The modern definition that Web Services always use the W3C Simple Object Access Protocol (SOAP) specification to format messages (regardless of transport) is used here.</p>
WSDL	<p>Web Services Definition Language</p> <p>The standard format for describing a Web service. Written in XML, it defines how to access a web service and what operations it will perform.</p>
XML	<p>eXtensible Markup Language:</p> <p>A text based specification used to promote interoperable exchange of data through standardised validation mechanisms and expression of data in a human-readable, self-describing manner.</p>

Term	Description
XSD	<p>XML Schema Definition</p> <p>XML schema, published as a W3C Recommendation in May 2001, can be used to express a scheme: a set of rules to which an XML document must conform in order to be considered 'valid' according to that schema. However, unlike most other schema languages, XML Schema was also designed with the intent of validation resulting in a collection of information adhering to specific data-types, which can be useful in the development of XML document processing software.</p>

9.2 Business Acronyms

Acronym	Description
ABS	Australian Bureau of Statistics
AEST	Australian Eastern Standard Time
ASHER	Australian Scheme for Higher Education Repositories
ASRC	Australian Standard Research Classification
DEST	Department of Education, Science and Training
FTE	Full-time Equivalent
HEIMS	Higher Education Information Management System (DEST application)
IMS	Information Management System
ISBN	International Standard Book Number
ISSN	International Standard Serial Number
RFCD	Research Fields, Courses and Disciplines
RQF	Research Quality Framework
SEO	Socio-economic Objective

Appendix A: Data Element Definitions

The Data Dictionary lists the data fields identified for the RQF Submission process. This list provides a link between the business requirements in the *RQF Submission Specifications* and the *RQF Technical Specifications* as documented in the *RQF IMS Technical Specifications Documentation Package*.

A summary description of the data elements is included in the Data Dictionary (Table 10). For the complete definition of the terms and the context of the requirements, refer to the *RQF Submission Specifications*. The table includes a column that refers to the relevant section of the *RQF Submission Specifications*.

The rows of the data dictionary are ordered by Data Grouping and by Data Element.

The Data Dictionary contains the following columns:

Column Heading	Meaning and Usage
Data Grouping	A column that groups fields together to provide a particular set of information. For example, the Researcher data grouping contains fields that describe all of the details about a researcher.
Data Element	A unique business name for each piece of data that is being collected.
Type	The type of the individual fields and information on the values that will be stored. The possible types are : <ul style="list-style-type: none"> • Boolean – true or false. • Number – a number either integer or where required fractional. • Text - a variable length text string. • PDF fields are passed as BLOBs (Binary Large Object). They contain the contents of a PDF file representing the descriptive component of the Context Statement and the Impact Statement.
Length	The maximum number of characters that each text field can contain. No length is specified for the Number or PDF fields. Where appropriate ranges are specified within the schemas.

Column Heading	Meaning and Usage
Mandatory (M) or Optional (O)	<p>Whether or not the individual field is mandatory or optional.</p> <ul style="list-style-type: none"> • M - the data item is Mandatory, it must be provided before the set of information of which this field is a part can be successfully transferred into DEST. • O - the data item is Optional, it does not have to be provided before the set of information that this field is a part of can be successfully transferred into DEST. <p>Independent of whether or not a data item is mandatory or optional for the purpose of transferring the data into DEST, other business rule cross checking that is applied during or after the submission may require particular fields to contain particular values.</p>
Submission Spec Reference	The section number in the <i>RQF Submission Specifications</i> that refers to the business rule the data item supports or references.
Description	A general description of the data element, what it means and where appropriate what values it may be given.
XML Schema Type	A cross reference into the XML Schemas giving the XSD Complex Type that this data element belongs to.
XML Schema Element	A cross reference into the XML Schemas giving the XML Element that this data element is named.

Table 10: Data Element Definitions

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Context Statement Stream	Context Statement Descriptive Component	PDF		M	4.3.3.1	The descriptive component of the context statement. This document must not contain any embedded links. The format of the PDF content must conform with the RQF Submission Specifications.	EvidencePortfolio and EvidencePortfolioStreams	ContextDescriptiveComponentDatastream
Impact Statement Stream	Impact Statement Descriptive Component	PDF		O	5.2	The descriptive component of the impact statement. This document must not contain any embedded links. The format of the PDF content must conform with the RQF Submission Specifications.	EvidencePortfolio and EvidencePortfolioStreams	ImpactStatementDatastream
Institution Statistics	Aboriginal and Torres Strait Islander Is Count	Number		M	4.2.2	The number of eligible researchers, Level B or above, who are of Aboriginal or Torres Strait Islander descent, or both. Based on the definition of Aboriginal and Torres Strait Islander origin from the Higher Education Staff Collection element 424.	InstitutionData	EligibleATSIResearcherCount
Institution Statistics	Aboriginal and Torres Strait Islander Not Count	Number		M	4.2.2	The number of eligible researchers, Level B or above, who are neither of Aboriginal nor of Torres Strait Islander descent. Based on the definition of Aboriginal and Torres Strait Islander origin from the Higher Education Staff Collection element 424.	InstitutionData	EligibleNonATSIResearcherCount

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Institution Statistics	Aboriginal and Torres Strait Islander Not Provided Count	Number		M	4.2.2	The number of eligible researchers, Level B or above, who did not provide information with regard to Aboriginal or Torres Strait Islander descent. Based on the definition of Aboriginal and Torres Strait Islander origin from the Higher Education Staff Collection element 424.	InstitutionData	EligibleResearcherNoATSII nformationCount
Institution Statistics	FTE Eligible Researchers	Number		M	4.2.2	The total Full Time Equivalent (FTE) of eligible researchers, Level B or above only.	InstitutionData	EligibleResearcherTotalFTE
Institution Statistics	Gender Female Count	Number		M	4.2.2	The number of eligible researchers, Level B or above, who are female. Based on the definition of gender from the Higher Education Staff Collection element 402.	InstitutionData	EligibleFemaleResearcherCount
Institution Statistics	Gender Male Count	Number		M	4.2.2	The number of eligible researchers, Level B or above, who are male. Based on the definition of gender from the Higher Education Staff Collection element 402.	InstitutionData	EligibleMaleResearcherCount
Research Group	Assessment Panel Nomination Home	Text	2	M	3.5 4.3.1	The code for the Assessment Panel that the institution believes best aligns with the main focus of a Research Group's activities.	ResearchGroup	HomePanelCode
Research Group	Assessment Panel Nomination Secondary 1	Text	2	O	3.5 4.3.1	If the Research Group believes that the focus of its activities spans across more than one Assessment Panel then it may nominate a secondary home panel.	ResearchGroup	SecondaryPanelCode

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Group	Assessment Panel Nomination Secondary 2	Text	2	O	3.5 4.3.1	If the Research Group believes that the focus of its activities spans across more than two Assessment Panels then it may nominate an additional secondary home panel.	ResearchGroup	SecondaryPanelCode2
Research Group	Employing Institution Code	Text	4	M	3.3	Code of each institution that employed any researcher for the FTE reported in this Research Group. Refer 4.1.5 in this document.	ResearchGroup (EmployingInstitutions)	InstitutionCode
Research Group	Impact Assessment Exemption Code	Text	1	O	5.4	Exemption from Impact Assessment code: A – the research conducted by the Research Group is too new to have had any identifiable or verifiable impact: B - the sole intent of the research conducted by the Research Group is the advancement of knowledge in the discipline C - the research conducted by the Research Group takes longer than 12 years from publication to lead to an identifiable or verifiable impact.	EvidencePortfolio	ImpactStatementExemptionType Code
Research Group	Research Group Name	Text	500	M	4.3.1 4.3.2	The name that this Research Group uses to identify itself within the Institution Submission.	ResearchGroup	ResearchGroupName
Research Group	RFCD Code Primary	Text	6	M	3.6 4.3.1 4.3.2	The primary discipline-level RFCD code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedRFCD (ResearchGroup PrimaryRFCD element)	RFCDCode

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Group	RFCD Code Secondary	Text	6	O	4.3.1 4.3.2	The secondary discipline-level RFCD code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedRFCD (ResearchGroup SecondaryRFCD element)	RFCDCode
Research Group	RFCD Code Tertiary	Text	6	O	4.3.1 4.3.2	The tertiary discipline-level RFCD code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedRFCD (ResearchGroup TertiaryRFCD element)	RFCDCode
Research Group	RFCD Percentage Primary	Number		M	4.3.1 4.3.2	The percentage share (minimum 34 per cent, percentages must total 100 per cent) of the primary discipline-level RFCD code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedRFCD (ResearchGroup PrimaryRFCD element)	Percent
Research Group	RFCD Percentage Secondary	Number		O	4.3.1 4.3.2	The percentage share (minimum 20 per cent if not 0, percentages must total 100 per cent) of the secondary discipline-level RFCD code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedRFCD (ResearchGroup SecondaryRFCD element)	Percent

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Group	RFCD Percentage Tertiary	Number		O	4.3.1 4.3.2	The percentage share (minimum 20 per cent if not 0, percentages must total 100 per cent) of the tertiary discipline-level RFCD code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedRFCD (ResearchGroup TertiaryRFCD element)	Percent
Research Group	SEO Code Primary	Text	6	M	4.3.1 4.3.2	The primary group level Socio-Economic Objective (SEO) code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedSEO (ResearchGroup PrimarySEO element)	SEOCODE
Research Group	SEO Code Secondary	Text	6	O	4.3.2	The secondary group level Socio-Economic Objective (SEO) code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedSEO (ResearchGroup SecondarySEO element)	SEOCODE
Research Group	SEO Code Tertiary	Text	6	O	4.3.2	The tertiary group level Socio-Economic Objective (SEO) code which describes the focus of the Research Group's activities. See ABS (1998), Australian Standard Research Classification (ASRC), Cat. No. 1297.0 ABS, Canberra.	NominatedSEO (ResearchGroup TertiarySEO element)	SEOCODE

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Group	SEO Percentage Primary	Number		M	4.3.2	The percentage share (minimum 34 per cent, percentages must total to 100 percent) of the primary group level Socio-Economic Objective (SEO) code which describes the focus of the Research Group's activities.	NominatedSEO (ResearchGroup PrimarySEO element)	Percent
Research Group	SEO Percentage Secondary	Number		O	4.3.2	The percentage share (minimum 20 per cent if not 0, percentages must total to 100 percent) of the secondary group level Socio-Economic Objective (SEO) code which describes the focus of the Research Group's activities.	NominatedSEO (ResearchGroup SecondarySEO element)	Percent
Research Group	SEO Percentage Tertiary	Number		O	4.3.2	The percentage share (minimum 20 per cent if not 0, percentages must total to 100 percent) of the tertiary group level Socio-Economic Objective (SEO) code which describes the focus of the Research Group's activities.	NominatedSEO (ResearchGroup TertiarySEO element)	Percent
Research Group	Small Group Exemption Justification	Text	500	O	3.2 4.3.1	A short statement outlining why the Research Group has fewer than 5 researchers and meets the small research group exemption.	ResearchGroup	SmallGroupJustification
Research Group Researcher	Researcher Identifier Within Submission	Text	36	M	4.3.3.2	A unique identifier given by the institution to this researcher for the sole purpose of cross referencing within the Institution Submission. This number should have no relationship to any other number or ID used to identify researchers within or across institutions.	GroupResearcher	ResearcherId
Research Group Researcher	Researcher FTE within Group	Number		M	4.3.3.2	The total FTE (full time equivalent) that this researcher contributes towards this research group.	GroupResearcher	GroupFTE

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Output	Research Outlet Discipline Ranking Identifier	Text	100	O	4.3.5.1	This outlet's ranking Identifier from the list of discipline-specific rankings.	ResearchOutput	OutletRankingIdentifier
Research Output	Research Outlet Roman Characters	Text	1500	O	4.3.5.1	Phonetic sounding of the Outlet in roman characters where the Outlet is in a foreign language, particularly if it is in non-roman characters such as Korean or Japanese.	ResearchOutput	AnglicisedOutletTitle
Research Output	Research Outlet Translated	Text	1500	O	4.3.5.1	English translation of the Outlet where the outlet is in a foreign language.	ResearchOutput	EnglishOutletTitle
Research Output	Research Output Available Year	Text	4	O	4.3.5.1	The calendar year in which the output was first available if different to the published year.	ResearchOutput	AvailableYear
Research Output	Research Output Identifier	Text	36	M	4.3.5.1	A unique identifier given by the institution to this Research Output for the sole purpose of cross-referencing across the Institution Submission. Where a Research Output is reported by more than one Researcher within an institution, whether as a Best Output or in the remainder of the Body of Work, both instances should use the same Research Output Identifier and associated fields (e.g., Title, Reference).	ResearchOutput	ResearchOutputIdentifier
Research Output	Research Output Metrics Identifier	Text	100	O	6.2	If a metrics reference key is available for this Research Output, the value of that metrics reference key.	ResearchOutput	MetricsIdentifier
Research Output	Research Output Older BOW Relevance Description	Text	500	O	5.2.4	A statement of the link between the Older Research Output and Research Output(s) in the main Body of Work.	BodyOfWorkResearchOutput	OldOutputImpactRelevance

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Output	Research Output Outlet Title	Text	1500	O	4.3.5.1	The title of the Outlet (medium) in which this Research Output was published.	ResearchOutput	OutletTitle
Research Output	Research Output Publication Year	Text	4	O	4.3.5.1 4.3.6.2	The calendar year in which the output was published.	ResearchOutput	PublicationYear
Research Output	Research Output Publication Year Variance Justification	Text	500	O	4.3.6.2 4.3.7.1	For Best Research Outputs and fully reported Research Outputs, if the Research Output Publication Year is not the same year as the Research Output Available Year, the reason why.	ResearchOutput	PublicationYearVarianceJustification
Research Output	Research Output Reference	Text	100	O	4.3.5.1	A relevant reference for the Research Output (e.g., ISSN or ISBN) In the case of ISSN or ISBN numbers only digits and characters with no spacing or punctuation should be provided.	ResearchOutput	Reference
Research Output	Research Output Reference Type	Text	100	O	4.3.5.1	The type of reference used in Research Output Reference field (e.g., ISSN/ISBN).	ResearchOutput	ReferenceType
Research Output	Research Output Technical Notes	Text	500	O	4.3.5.1	Any additional descriptive or technical information needed to describe the Research Output. This information must not include metadata.	ResearchOutput	Notes
Research Output	Research Output Title	Text	1500	M	4.3.5.1	The full title of the Research Output.	ResearchOutput	Title
Research Output	Research Output Title Language	Text	100	O	4.3.5.1	Language of the title of the output if other than English.	ResearchOutput	LanguageOfTitle
Research Output	Research Output Title Roman Characters	Text	1500	O	4.3.5.1	Phonetic sounding of the full title in roman characters where the title of the output is in a foreign language, particularly if the title is in non-roman characters such as Korean or Japanese.	ResearchOutput	AnglicisedTitle

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Output	Research Output Title Translated	Text	1500	O	4.3.5.1	English translation of the title where the full title of the output is in a foreign language.	ResearchOutput	EnglishTitle
Research Output	Research Output Type Code	Text	2	M	4.3.5.1	A code describing the type of the output. Acceptable types are listed at section 4.1.4 in this document.	ResearchOutput	ResearchOutputTypeCode
Research Output	Research Output Type Other Description	Text	500	O	4.3.5.1	A short description of the type of Research Output if the value of Research Output Type Code is "Other".	ResearchOutput	ResearchOutputTypeOtherDescription
Research Output	Research Output Journal Volume	Text	100	O	4.3.5.1	The volume number of the research output where the research output is a journal article or equivalent.	ResearchOutput	JournalVolume
Research Output	Research Output Journal Issue	Text	100	O	4.3.5.1	The issue number of the research output where the research output is a journal article or equivalent.	ResearchOutput	JournalIssue
Research Output	Research Output Start Page	Text	100	O	4.3.5.1	The start page reference of the assessable component of the Research Output, if applicable. This field may include numbers or roman numerals.	ResearchOutput	StartPage
Research Output	Research Output End Page	Text	100	O	4.3.5.1	The end page reference of the assessable component of the Research Output, if applicable. This field may include numbers or roman numerals.	ResearchOutput	EndPage
Research Output Author	Research Output Author Name	Text	200	M	4.3.5.	All named authors, listed in the order in which they appear in the published output.	ResearchOutput(Authors)	PublishedAuthorName

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Output Best	Research Output Assessed Component	Text	1500	O	4.3.5.1	A description of which component of the Research Output should be assessed where only a component of the Research Output is relevant to the research being demonstrated by the inclusion of this Best Research Output.	NominatedResearchOutput	AssessedComponent
Research Output Best	Research Output Availability	Text	1	M	4.3.5.1 4.3.6.6	A code describing whether the Research Output is accessible in a repository or the reason why it is not: R - the Research Output is in the institution's repository. C - The copyright owner will not give permission for the Research Output to be stored in the institution's repository; S - Reasons of sensitivity; and/or P - Physical or technical limitations of the output. A link should be provided to some form of evidence (such as an image/photograph or summary) of the output.	NominatedResearchOutput	AvailabilityStatusCode
Research Output Best	Research Output Best Justification	Text	1000	M	4.3.5.1 4.3.6.5	An explanation as to why this output has been nominated as a best output.	NominatedResearchOutput	Justification
Research Output Best	Research Output Confidential	Boolean		M	4.3.6.6 4.3.6.8	Set to true when the Research Output is confidential.	NominatedResearchOutput	IsCommerciallySensitive
Research Output Best	Research Output Cultural Sensitivity	Boolean		M	4.3.6.6 4.3.6.8	Set to true when the Research Output is culturally sensitive.	NominatedResearchOutput	IsCulturallySensitive
Research Output Best	Research Output How Made Available	Text	500	O	4.3.5.1	If the Research Output is not available via a link into the institution's repository, then this field should describe in what form the output will be made available for assessment.	NominatedResearchOutput	AvailabilityForm

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Output Best	Research Output Non Repository Justification	Text	500	O	4.3.6.6 4.3.6.9	If the Research Output is not available via a link into the institution's repository. Then this field should provide an explanation of why it is not in the institution's repository.	NominatedResearchOutput	NonRepositoryJustification
Research Output Best	Research Output Reprint	Boolean		M	4.3.6.2	Whether the referenced Research Output is the first printing or a re-print. Equals True if the referenced output is a re-print. Equals False if the referenced output is a first print.	NominatedResearchOutput	IsReprint
Research Output Best	Research Sensitive Explanation	Text	1500	O	4.3.6.6 4.3.6.8	This field describes the nature of the sensitivity of the Research Output, and identifies the conditions for authorised users to view and/or not view the Research Output.	NominatedResearchOutput	SensitivityExplanation
Research Output Link	Research Output Content Notes	Text	500	O	4.3.6.6	Particular software application(s) and/or specific parameters needed to view the linked Research Output.	DigitalResearchOutputLink	ContentNotes
Research Output Link	Research Output Download Size	Number		M	4.3.6.6	The download size of the Research Output in bytes. The intention of this field is allow authorised users to estimate how long it will take to download the Research Output.	DigitalResearchOutputLink	ContentLength
Research Output Link	Research Output MIME Type	Text	100	M	4.3.6.6	If a particular MIME Type is required to view the Research Output, then this field holds that information.	DigitalResearchOutputLink	MimeType

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Research Output Link	Research Output Repository Name	Text	100	O	4.3.6.6	The name of the repository in which this Research Output will be stored. The RQF IMS will reference this against a list, established ahead of the submission process, to determine what credentials are required to access the Research Output.	DigitalResearchOutputLink	RepositoryName
Research Output Link	Research Output URL	Text	2048	M	4.3.5.1 4.3.6.6	The URL that links directly to the Best Research Output in the institution's repository, not to a cover page or to other meta data. In cases of the Best Research Output not being in the institution's repository, due to Physical or technical limitations of the output, then a link to an object that provides evidence of the existence of the work (e.g., an image) may be provided.	DigitalResearchOutputLink	URL

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Researcher	Researcher Aboriginal or Torres Strait Islander Status	Text	1	M	2.2.1.3 4.3.3.2	<p>Identification of Aboriginal or Torres Strait Islander descent. For privacy reasons, Indigenous Status information will not be displayed to Panel Members and Advisors or reported at any aggregation less than institutional level. This code also determines, if necessary, the exemption from the requirement for 4 'best' outputs.</p> <p>2 - Neither Aboriginal nor Torres Strait Islander descent 3 - Of Aboriginal descent 4 - Of Torres Strait Islander descent 5 - Of Aboriginal and Torres Strait Islander descent 9 - No information</p> <p>Based on the definition of Aboriginal and Torres Strait Islander origin from the Higher Education Staff Collection element 424.</p>	Researcher	ATSIStatusCode
Researcher	Researcher Employment Level	Text	3	M	4.3.3.2	<p>Employment level of the researcher. Based on Higher Education Staff Collection element 408.</p> <p>001 - 041 - Above Senior Lecturer 042 - 065 - Level C 066 - 099 - Level B 100 - 128 - Level A</p>	Researcher	EmploymentLevelCode
Researcher	Researcher Employment Status	Text	1	M	4.3.3.2	<p>The employment status of the researcher. Based on Higher Education Staff Collection element 412.</p> <p>2 - Research Only 3 - Teaching and Research</p>	Researcher	EmploymentStatusCode

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Researcher	Researcher Employment Type	Text	1	M	4.3.3.2	The basis in which the researcher is employed C - Contract T - Tenured	Researcher	EmploymentTypeCode
Researcher	Researcher Unpaid Leave at Census	Boolean		M	4.3.3.2	Describe the leave status of the researcher as at the census date: True – Researcher is on Unpaid Leave False – Researcher is not on Unpaid Leave	Researcher	IsOnUnpaidLeaveAtStaffCensus
Researcher	Researcher Gender	Text	1	M	4.3.3.2	For privacy reasons, Gender information required for Assessed Researchers will not be displayed to Panel Members and Advisors or reported at any aggregation less than institutional level. Based on Higher Education Staff Collection element 402. M - Male F - Female 9 - Unknown	Researcher	GenderCode
Researcher	Researcher Given Name	Text	40	O	4.3.3.2	If available the first or given name of the researcher.	Researcher	GivenName
Researcher	Researcher Identifier Within Submission	Text	36	M	4.3.3.2	A unique identifier given by the institution to this researcher for the sole purpose of cross referencing within the Institution Submission. This number should have no relationship to any other number or ID used to identify researchers within or across institutions.	Researcher	ResearcherId

Data Grouping	Data Element	Type	Length	Mandatory (M) or Optional (O)	Submission Spec Reference	Description	XML Schema Type	XML Schema Element
Researcher	Researcher Institution Organisation Code Other	Text	4	O	2.2.2 3.3 4.3.3.2	Where a researcher has been included in a Research Group submitted by another institution, the code of that institution. The code is based on HEIMS institution codes. Ref 4.1.5 in this document.	Researcher	OtherInstitutionCode
Researcher	Researcher Institution Researcher Identifier Other	Text	36	O	2.2.2 3.3 4.3.3.2	If Researcher Institution Organisation Code Other is provided, the identifier used by the other institution to identify this researcher in their RQF submission.	Researcher	OtherResearcherId
Researcher	Researcher Last Name	Text	40	M	4.3.3.2	The last or family name or surname of the researcher.	Researcher	FamilyName
Researcher	Researcher Other Given Name	Text	120	O	4.3.3.2	Any other given name(s) of the researcher.	Researcher	OtherGivenNames
Researcher Exemption	Early Career Researcher Exemption Justification	Text	500	O	2.2.1.1	For ECRs (Early Career Researchers) a short statement outlining why they meet the exemption from the requirement to have generated a minimum of four Research Outputs over the assessment period.	ResearcherExemption	EarlyCareerJustification
Researcher Exemption	In Situ Exemption Reference Number	Text	4	O	2.1.2	The In Situ Exemption reference number provided by DEST.	ResearcherExemption	InSituReferenceNumber
Researcher Exemption	Researcher Career Interruption Justification	Text	500	O	2.2.1.2	For career interruption researchers, a short statement outlining why they meet the exemption from the requirement to have generated a minimum of four Research Outputs over the assessment period.	ResearcherExemption	CareerInterruptionJustification

Appendix B: XML Schema Simple Types

For reference, the simple types referenced in section 6.4 are shown in Figure 22.



Figure 22: XSD Simple Types for the Submission Schemas