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# **Generic IRmark specification**

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## **Introduction**

There is legislation in place that states that in the case of a civil dispute between the Inland Revenue (IR) and a taxpayer with regards to an Internet online submission, the submission held by the Inland Revenue is presumed to be correct unless the taxpayer can prove otherwise. In other words the burden of proof is on the taxpayer. There is therefore a requirement to enable the IR Online services and software that uses the services to provide a mechanism to aid a taxpayer to prove whether or not the submission held by IR is indeed the submission they sent.

The generic IRmark (pronounced IR Mark) and Digital receipt service for online Internet submissions will provide the mechanism that a taxpayer will need. The service will basically consist of:

1. The client side generation and server side validation at IR of a secure hash (IRmark).

Plus

2. The generation of a Digital receipt from the IR that will be returned to the submitter, which:
  - will confirm acceptance of submission
  - will confirm the validity of the submitted IRmark string
  - will contain the Inland Revenue's Digital certificate, so that the signature can be verified by a third party
  - will contain a service-specific message

## Simplified submission scenario - successful submission (see Appendix 1 and 2)

1. Taxpayer/Agent - enters return/form information
2. Taxpayer/Agent - decides return is complete
3. Application – Generates IRmark
  - a. Calculate IRmark over the <Body> of the document excluding the <IRmark> element – This is best implemented by using one of the third party security libraries that are available such as Apache or Phaos (sample Apache code is included as a separate tech pack item). A library provides facilities to:
    - canonicalise (c14n) the XML document
    - generate a 160-bit binary secure hash from the canonicalise XML using the SHA-1 algorithm
    - encode the binary data using base-64 to produce a 28 character string

**Note: Inland Revenue does not endorse any third party library and therefore does not accept any liability for their use within your application.**

- b. Insert calculated IRmark into <IRheader> to make return complete for online internet submission (encoded in base-64 – 28 characters), viewing and printing (encoded base-32 – 32 characters)
  - IRmark (base-64) string must be placed within the <IRmark> tag with the Type attribute 'generic'. Please see Core schema <IRheader> and separate tech pack item of example instance.
  - viewing – the IRmark should be able to be viewed (base-32) on screen by the user
  - printing – the IRmark (base-32) must be able to viewed on the printed return/form (approved substitute or minimum hardcopy specification as detailed in separate tech pack item)

**Note: To aid the ease of reading of the IRmark it is required that it is base-32 encoded and formatted for on screen viewing and printing with alpha characters in uppercase.**

**The characters used for base-32 encoding are easily humanly readable, as the resultant string is made up of single case alpha and numeric characters 2 to 7. Where as base-64, which must be used for valid submissions, is not easily humanly readable as the resultant string is made up of upper and lower case characters, digits 0 to 9 and three added characters (two encoding characters “/”, “+” and one padding character “=”).**

4. Online Internet submission to Inland Revenue through Government Gateway. The Inland Revenue will:
  - a. check submission against the payload <Body> schema
  - b. check against business validation rules
  - c. check IRmark

- d. generate receipt
- e. return *success response* (see page 6)

5. Application receives *success response*

- a. Check returned IRmark against submitted IRmark.
- b. Validate receipt (optional) – check digital certificate returned within the success response with the certificate authority.
- c. Give user option to view/print/save returned receipt with previously saved XML submission. Explaining that the receipt is important, as it is the Taxpayers proof of submission and therefore can be used if they needed to challenge the submission held by the Inland Revenue.

## **Success Response**

The success response will utilise the Success Response Schema (see separate tech pack item for Schema). A response conforming to the Schema will be returned in the body element of the Government Gateway submission response.

The generic IRmark success response receipt will consist of two main elements:

- Signature – containing a signature (using IR's private key) over the original submission. This is a standard W3C xmldsig signature block, with the IRmark in the DigestValue element.
- Message – plain text message containing IRmark in base-32 or advisory text for 'test in live' submissions and/or service information (inferred from envelope message class and taxpayer designatory information (e.g. UTR, Employer reference etc.)).

Sample XML documents with the <TestMessage> element set to one and zero are included as tech pack items along with their corresponding receipt.

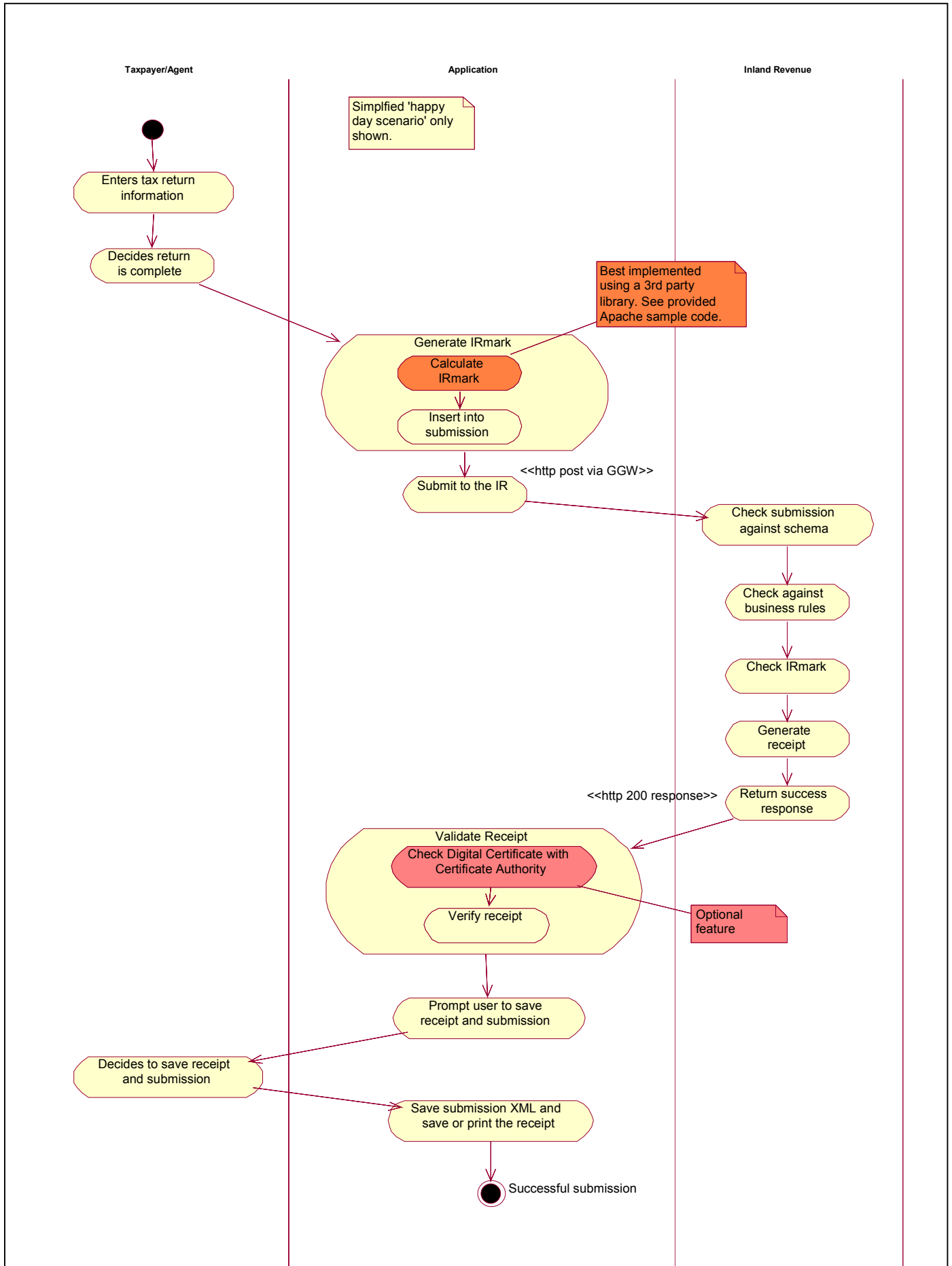
## **Error Response from Inland Revenue**

If the submitted IRmark matches the IR-calculated IRmark and the submission passes the other documented schema and business validations, then the response will be the generic IRmark response as described plus any service specific message. However, if the IRmark is incorrect or absent an error response will be returned:

<b>Error Code</b>	<b>Name</b>	<b>Condition</b>	<b>Text of Message</b>
2021	IRmark not calculated correctly.	IRmark calculated by the Inland Revenue service does not match the one submitted in the message.	The supplied IRmark is incorrect
2022	IRmark not found.	The IRmark is absent or not in the expected position within the submitted message.	IRmark not found

# Appendix 1

## Successful Submission process -





## Appendix 2

### IRmark submission and validation process -

