Inland Revenue
Te Tari Taake

Inland Revenue

Build Pack: Income API

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Contents

1 Overview

1.1 This solution

Inland Revenue has a suite of digital services available for consumption by our service providers that supports efficient, electronic business interactions with Inland Revenue. The Income API described in this build pack document provides a mechanism for external partners to retrieve income data reported to Inland Revenue.

The PrePop operation on the Return service exposes income data that is summarised by tax period. The Income API exposes this income data in an un-summarised form and with no alignment to tax periods.

1.2 Intended audience

Access to the API end point is restricted to the tax management service providers who have been on-boarded to the API (referred to throughout the remainder of this document as 'Digital Service Providers'). Access to the Income API is currently restricted to tax intermediaries (such as tax agents and bookkeepers) and to customers using software on their own behalf.

Access to the data is limited to parties with access to the customer's income tax account—this consists of customers acting on their own behalf and intermediaries who are linked to the customer's income tax account.

1.3 Prerequisites

Party	Requirement	Description
Digital Service Provider	Acquire a X.509 certificate from a competent authority for the Test and Production environments.	This is required when using mutual TLS with cloud-based service providers or financial institutions. Note that the same certificate cannot be used for the Test and Production environments.

1.3.1 Mutual Transport Layer Security and certificates

Mutual Transport Layer Security (TLS) is implemented for this API. This requires the use of a publicly-issued X509 certificate from one of the trusted certificate authorities. Inland Revenue does not issue certificates to external vendors for web service security implementations.

Inland Revenue has the following minimum requirements for accepting public X509 keys:

- Minimum Key Length: 2048
- Signature Algorithm: SHA256[RSA]
- Self-signed certificates are not accepted
- Certificates issued by a private/internal certificate authority are not accepted.

In general, shorter-lived certificates offer a better security posture since the impact of key compromise is less severe but there is no minimum requirement for certificate expiry periods.

Below is a list for examples of certificate authority providers with no recommendations or rankings incorporated. It is recommended that a business researches which certificate authority meets their requirements:

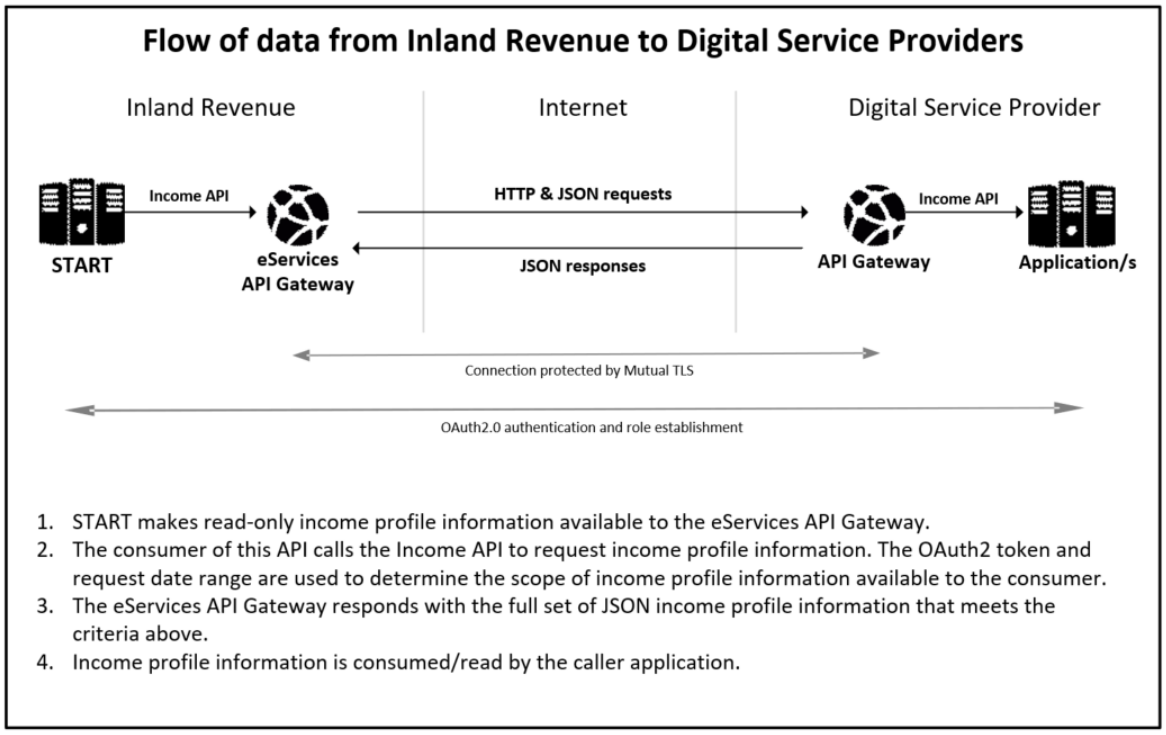
- Comodo
- GeoTrust
- DigiCert
- GlobalSign
- Symantec
- Thawte
- IdenTrust
- Entrust
- Network Solutions
- RapidSSL
- Entrust Datacard
- GoDaddy.

2 Solution design

2.1 Architecture

Inland Revenue is offering a suite of web applications in order to facilitate interactions via software packages. This API will be used by approved organisations to retrieve income information from Inland Revenue.

The diagram below illustrates the flow of data from Inland Revenue to the Digital Service Providers.



2.2 Supported message type

This service supports the following message type:

- **POST:** Retrieves income information from Inland Revenue. Requires an IRD number, a 'from' date, and an optional 'to' date.

2.3 Income API

2.3.1 Request payload

Field	Requirement	Description
IRD	Required	The customer's IRD number. The caller can either be the owner of the IRD or an intermediary working on behalf of the client IRD.
StartDate	Required	This will filter to the date income was declared to Inland Revenue. This is not limited to when the intermediary access was granted. The call to the API will (authorisation permitting) return the above customer's income data with a date greater than or equal to this date. In most cases this will be the current tax period. ISO 8601 date format. Example: 2019-01-31
EndDate	Optional	The effective-to date. This is the end of the date range. This is optional, but if omitted then the end-date is assumed to be unbounded. If present, this date must be greater than the **StartDate**. May be useful as a form of pagination. ISO 8601 date format. Example: 2019-01-31

2.3.2 Response payload

Field	Requirement	Description
IncomeRequired	Required	Date that the income was recognised—the array is sequenced in ascending order by this date
IncomeType	Required	Income type will use the same set of values that is returned by the Return.PrePop operation. See table below.
IncomeSource	Required	Income source—an ID type and value. This 2-tuple identifies the employer or investment account from which the income has been earned.
Amount	Required	This is the gross amount of income
Deductions	Required	This is the amount deducted from the above income

The income types that can be returned by **IncomeType** are listed as follows:

Income type	Display	MyIR display
ACC	Accident Compensation	ACC payment
ACC2006	Accident Compensation (2006)	ACC payment prior to 2006
ACCATC	ACC Attendant care	ACC attendant care payment
AIL	Approved Issuer Levy	Approved issuer levy
CAE	Casual Agricultural Employee	Casual agricultural employee
DIVIDN	Dividends	New Zealand dividends
DIVINT	Dividends treated as interest	Dividends treated as interest
EDW	Election Day Worker	Election day worker
ESS	Employee Share Scheme	Employee share scheme
EXCIMP	Excess Imputation Credits	Excess imputation credits
INCBEN	Income Tested Benefit	Work and income benefit
LOSCAR	Loss carried forward	Losses brought forward from previous years
LTCINC	LTC Income	LTC income
MAORI	Māori Authority	Māori authority
NONBUS	Non-business expense	Non-business expense
NRDIV	Non-resident dividends	Non-resident dividends received
NRINT	Non-resident interest	Non-resident interest received
NZINT	Interest	New Zealand interest received
PENSION	NZ Superannuation or Pension	New Zealand Superannuation or veteran's pension
PIE	Certificates (PIE)	Certificates (PIE)
PPL	Paid Parental Leave	Paid Parental Leave
PTRINC	Partnership Income	Partnership income
RESNRINT	Reserve scheme interest (non-resident)	Reserve scheme interest
RESNZINT	Reserve schemes interest (resident)	Reserve Scheme interest received
RINGLTC	LTC ring fencing rental losses	LTC ring fencing rental losses
RINGPRT	Partnership ring fencing rental losses	Partnership ring fencing rental losses
RLWT	RLWT Deducted	Residential Land Withholding Tax (RLWT) Credit
RND	R&D tax credit carry forward	R&D tax credit carry forward
ROYALT	Royalties	Royalties
SALWAGE	Salary / Wages	Salary and wages

Income type	Display	MyIR display
SHREMP	Shareholder-Employee Salary	Shareholder-employee salary
SLS215	Income Adjustment - SLS	Income adjustment - SLS
SLSALL	Student Allowance	Student allowance
TRST	Estate / Trust Income	Estate/trust income
WT	Schedular Payments	Schedular payments

2.3.3 Income profile error codes

Error Code	Description
EU6001	Unexpected error occurred
EV1020	Authentication failure means the token (JWT or OAuth) provided is not valid
EV1021	No OAuth or JWT token is present as an HTTP header
EV1022	Access is not permitted for the requester to perform this operation for the submitted identifier
EV1100	Invalid input parameters—please check documentation
EV1200	The number of records retrieved exceeds the maximum limit
EV2234	IR number failed check digit
EV2235	IR number not found

2.3.4 Income profile limit

Due to the potentially large amount of income information available for a customer, there is a limit to the number of records that will be returned—an error will be returned if the number of records exceeds 10,000. If this is the case, the income profile information will need to be filtered with an **EndDate**.

2.4 Security

The API will require a unique identifier in order to establish the calling party's identity and to allow the access model to authenticate.

This design will use JSON Web Tokens (JWT) and OAuth2.0 tokens and protocol to establish the calling party's identity. The OAuth2.0 method requires a user to logon, while JWT is a machine-to-machine credential.

Each HTTPS header contains the authorisation attribute JWT/OAuth:

1. A signed JSON Web Token (JWT) token. This will establish a registered digital services provider identity via the asymmetric public key held in the key store established during onboarding.
2. An OAuth2.0 token that is a customer- or intermediary-level XIAMS user account recognised by START.

The Income API uses an HTTPS transport layer, with HTTP1.1 transport protocol supported.

Regarding transport layer security (TLS), note that while TLS1.3 is now an industry standard, it is not yet widely adopted, as doing so requires upgrades to perimeter security devices and software. Inland Revenue will upgrade to TLS1.3 once it is adopted widely enough, and where practical, external software partners should also anticipate upgrading to this version. TLS1.0 and TLS1.1 are not supported by myIR or Gateway Services.

Asymmetric keys of approved strength must be used. Inland Revenue requires the following ciphers and key strengths to be used:

Encryption:	Advanced Encryption Standard (AES)	FIPS 197	256-bit key
Hashing:	Elliptic Curve Digital Signature Algorithm (ECDSA) using P-256 or Secure Hash Algorithm (SHA-2) NOTE: ECDSA is preferred but RSA will be supported.	FIPS 180-3	SHA-256 (or greater)

Gateway Services will use this token in the HTTP header of a message in the same manner that an OAuth token has been used, namely:

```
"Authorization: {JWTAccessToken}"
```

Refer to the Identity and Access Services build pack for more information.

	End point for connections
Purpose	• End point to which digital service providers will connect
Client application type	• Cloud applications or in-house servers
Constraints	• Only for source locations with client-side TLS certificates

	End point for connections
	• On the cloud end point Inland Revenue has controls to shield service providers from issues caused by heavy usage from other providers
Mutual TLS	• Inland Revenue explicitly trusts the certificate the service provider associates with the TLS connection as client for Mutual TLS connections and uses it to identify the web service's sending party
Minimum TLS version	• 1.2
URL	• Contains …/gateway/..
Port	• 4046
Web service consumer identification	• Machine-to-machine authentication using client-signed JSON web tokens (JWT) • OAuth2 authorisation using tokens generated by XIAMS
Firewalling in production	• No IP address restrictions • Access limited by certificate enrolment
Firewalling in non-production environments	• No IP address restrictions • Access limited by certificate enrolment

Delegated permissions: The services will allow one to retrieve all of the Income Profile data for a customer to which the calling user (as represented by the JWT or OAuth2 token) has access. There may be additional accounts this identity does not have access to, but those will not be mentioned. If an account or data within it is targeted by the request parameters but the user does not have permission, an error will be returned.

2.4.1 OAuth

HTTP headers intended for OAuth access services will be have the JWT prefixed with "Bearer ".

HTTP Header	Example Value
Authorization	Bearer {JWTAccessToken}

Refer to the Identity and Access Services build pack for more information on authorisation flows.

2.4.2 M2M JWT

Authorisation intended for M2M (machine-to-machine) communication will not use "Bearer " flag on the HTTP header and only contain the JWT. The JWT will contain a field "startLogon" which can resolve to a myIR logon. The M2M JWT will be identified by a value of "M2M" in the Key ID ("kid"). The M2M JWT will be signed with a self-signed certificate, for which the public key was provided during onboarding.

HTTP Header	Example value
Authorization	{JWTAccessToken}

Example data structure used for M2M authorisation:

```
Base64Url encoded {
      "alg": <algorithm value>,
      "typ": "JWT",
      "kid": "M2M"
}
.
Base64Url encoded {
      "sub": <token subject>,
      "iss": <issuer value>,
      "startLogon": <myIR_user>,
      "iat": <epoch issued value>,
      "exp": <epoch expired value>
}
.
JWS Signature (
      base64UrlEncode(header) + "." + base64UrlEncode(payload)
)
```

2.4.2.1 Header

Field	Requirement	Description	Valid values
alg	Required	Signature or encryption algorithm	RS256, RS384, RS512 ES256, ES384, RS512
typ	Required	Type of token	JWT
kid	Required	Key ID	M2M

2.4.2.2 Payload

Field	Requirement	Description	Valid values
sub	Required	Subject (to whom the token refers)	SHA-1 Thumbprint/fingerprint of signing certificate
iss	Required	Issuer who created this token	eg CompanyNameA
startLogon	Required	The myIR logon of a representative of the token subject. The subject must be the data owner.	Valid myIR logon, or null
iat	Required	Issued at. The number of seconds since Unix epoch 1 Jan 1970, UTC.	Must not precede the signing certificate issue date Example: 1560144847
exp	Required	Expiration time. The number of seconds since Unix epoch 1 Jan 1970, UTC.	Must not exceed 8 hours from the **iat** (issued at) time value Example: 1574323940

2.4.2.3 startLogon

A myIR logon can be provided in order to use the myIR delegation model for identifying customers for whom income profile information should be retrieved. If the myIR logon is provided, then income profile information will only be shown for customers the logon can access. If a myIR logon is not used, the field should be included with a value of null, and the subject will determine the income profile information shown.

2.4.2.4 sub

A subject must be provided, which is the thumbprint of the signing certificate, and can be used to determine which income profile information should be retrieved. The subject will always be used to validate the signature of the JWT but will only be used for determining which income profile information to retrieve when a value for **startLogon** is not provided. The subject can be used for access when the subject is a tax preparer—income profile information will be returned for customers currently linked to the tax preparer.

3 End points and OpenAPI specifications

IMPORTANT
For the authoritative definitions, please refer to the OpenAPI specifications at https://www.ird.govt.nz/software-providers/

3.1 End points

Onboarding instructions are available at https://www.ird.govt.nz/software-providers/.

3.2 OpenAPI specifications

An OpenAPI file allows you to describe your entire API, end points, operations on each end point, and operation parameters. The included .yaml file can be used along with an OpenAPI editor such as editor.swagger.io to view technical specifications for this operation and generate example client code.

4 Glossary

Acronym/term	Definition
API	Application Programming Interface—set of functions and procedures that allow applications to access the data or features of another application, operating system or other service.
Authentication	The process that verifies the identity of the party attempting to access Inland Revenue
Authorisation	The process of determining whether a party is entitled to perform the function or access a resource
End points	A term used to describe a web service that has been implemented
FIPS	Federal Information Processing Standard—a suite of IT standards from the US Federal Government
Gateway	Inland Revenue's web services gateway
HTTP, HTTPS	Hyper Text Transmission Protocol (Secure)—the protocol by which web browsers and servers interact with each other. When implemented over TLS1.2 HTTP becomes HTTPS.
IAMS	Identity and Access Management—a logical component that performs authentication and authorisation. Physically it is a set of discrete hardware and software products, plug-ins and protocols. Usually implemented as separate External IAMS (XIAMS) and Internal IAMS.
IAS	Identity and Access Service
IP	Internet Protocol—the principal communication protocol in the Internet protocol suite for relaying datagrams across networks
IRD	Inland Revenue Department (ie IRD number)
OAuth	An HTTPS based protocol for authorising access to a resource, currently at version 2
OpenAPI specifications	Formerly known as Swagger specifications—a specification for machine-readable interface files for describing, producing, consuming and visualising RESTful web services.
Payloads	This refers to the data contained within the messages that are exchanged when a web service is invoked. Messages consist of a header and a payload.
Schemas	An XML schema defines the syntax of an XML document, in particular of a payload. The schema specifies what a valid payload must or can contain, as well as validating the payload.
SHA	Secure Hashing Algorithm. There is a family of them that provide different strengths. SHA-2 is currently favoured over SHA-1, which has been compromised.
SOAP	Simple Object Access Protocol—a set of standards for specifying web services. GWS uses SOAP version 1.2

Acronym/term	Definition
SSL	Secure Sockets Layer certificates—used to establish an encrypted connection between a browser or user's computer and a service or website
START	Simplified Taxation and Revenue Technology—IR's new core tax processing application. It is an implementation of the GenTax product from FAST Enterprises.
TLS1.2	Transport Layer Security version 1.2—the protocol that is observed between adjacent servers for encrypting the data that they exchange. Prior versions of TLS and all versions of SSL have been compromised and are superseded by TLS1.2.
URL	Universal Resource Locator—also known as a web address
X.509 certificate	An international standard for encoding and describing a digital certificate. In isolation a public key is just a very large number, the X.509 certificate to which it is bound identifies whose key it is, who issued it, when it expires etc. When a counterparty's X.509 digital certificate is received, the recipient takes their public key out of it and store the key in their own keystore. The recipient can then use this key to encrypt and sign the messages that they exchange with this counterparty.
XIAMS	External IAMS—an instance of IAMS that authenticates and authorises access by external parties, for example customers, trading partners etc, as opposed to internal parties such as staff
YAML	"YAML Ain't Markup Language"—a human-readable data-serialisation language commonly used for configuration files and in applications where data is stored or transmitted.

5 Change log

This table lists all material changes that have been made to this build pack document since its release (most recent changes listed first). It does not encompass non-material changes, such as to formatting etc.

Date of change	Document section	Description
24/04/2020	2.3.2	Added new income types: • RINGLTC • RINGPRT • RND
18/03/2020	3.1	Detailed end points removed – readers instead referred to https://www.ird.govt.nz/software-providers/
18/02/2020	2.3.3	Updated EV1025 and EV1021 to the R4 error code description
17/02/2020	2.4	Added JWT descriptions
	2.3.2	Updated the income types that can be returned to include RESNRINT and RESNZINT
11/02/2020		V1.0 released