
InterlockLedgerAPI Documentation

Release

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INTERLOCK LEDGER

This package is a python client to the InterlockLedger Node REST API. It connects to InterlockLedger nodes, allowing the creation of chains, interlocks, and storage of records and documents. This client requires the InterlockLedger Node Server version 3.6.2.

THE INTERLOCKLEDGER

An InterlockLedger network is a peer-to-peer network of nodes. Each node runs the InterlockLedger software. All communication between nodes is point-to-point and digitally signed, but not mandatorily encrypted. This means that data is shared either publicly or on a need-to-know basis, depending on the application.

In the InterlockLedger, the ledger is composed of myriads of independently permissioned chains, comprised of blockchained records of data, under the control of their owners, but that are tied by Interlockings, that avoid them having their content/history being rewritten even by their owners. For each network the ledger is the sum of all chains in the participating nodes.

A chain is a sequential list of records, back chained with signatures/hashes to the previous records, so that no changes in them can go undetected. A record is tied to some enabled Application, that defines the metadata associate with it, and the constraints defined in this public metadata, forcibly stored in the network genesis chain, is akin to validation that each correct implementation of the node software is able to enforce, but more importantly, any external logic can validate the multiple dimensions of validity for records/chains/interlockings/the ledger.

1.1 Setting Up the InterlockLedger API client

1.1.1 How to Use

To use the *il2_rest* package, you can add the *il2_rest* folder to your project and import the package.

```
>>> import il2_rest as il2
>>> node = il2.RestNode(cert_file = 'documenter.pfx', cert_pass = 'pwd')
```

1.1.2 Installing

The package can also be installed by running the following command on the *setup.py* folder:

```
$ pip3 install .
```

1.1.3 Dependencies

The *il2_rest* package was implemented using Python 3.6.9 and requires the following packages:

- colour (0.1.5)
- packaging (19.2)
- pyOpenSSL (19.1.0)

- requests (2.22.0)
- uri (2.0.1)

1.2 Quickstart Tutorial

1.2.1 The Basics

To use the `il2_rest` client, you need to create an instance of the `RestNode` by passing a certificate file and the address of the node (default value is `localhost`).

Note: The certificate must be already imported to the InterlockLedger node and be permissioned on the desired chain. See the InterlockLedger node manual.

With the `RestNode` class, it is possible to retrieve details of the node, such as the list of valid apps in the network, peers, mirrors and chains.

```
>>> import il2_rest as il2
>>>
>>> node = il2.RestNode(cert_file = 'documenter.pfx', cert_pass='password', port = _
↳ 32020)
>>> print(node.details)
Node 'Node for il2tester on Apollo' Node!qh8D-FVQ8-2ng_EIDN8C9m3pOLAtz0BXKuCh9OBD6U
Running il2 node#3.6.0 using [Message Envelope Wire Format #1] with Peer2Peer#2.1.0
Network Apollo
Color #20f9c7
Owner il2tester #Owner!yj...<REDACTED>...zk
Roles: Interlocking,Mirror,PeerRegistry,Relay,User
Chains: 20i...<REDACTED>..._fc, 5rA...<REDACTED>...Pso
```

To see and store records and documents, you need to use an instance of the `RestChain`. You can get `RestChain` instances by retrieving the list of chains in the network:

```
>>> for chain in node.chains:
...     print(chain)
...
Chain 'My first chain' #cA7CTUJxkcpGMpuGtg59kB9z5B1lR-gQ4k4xBn8VAuo
Chain 'Second chain' #5rA_Fp9mhn3jb26G2Lsue5gWjxUdjLIWAs8Xvkg5Pso
Chain '3.6.2 chain name' #A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE
```

Or by its chain id:

```
>>> chain = node.chain_by_id('A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> print(chain)
Chain '3.6.2 chain name' #A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE
```

Besides retrieving and storing records and documents, the `RestChain` class also allows to manage the active apps in the chain, see/permit keys, and do interlocks.

1.2.2 Managing Keys

You can see the list of keys permitted in the chain by using the following script:


```
>>> for key in chain.permitted_keys :
...     print(key)
...
Key 'emergency!AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE' Key!-
↳bLg6Sklpj3Bhnn8A7VXkGnyED2oWHn9AhjpKiPL7sK0
  Purposes: [Protocol,Action]
  Actions permitted:
    App #0 Action 131
Key 'manager!AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE' Key!
↳QX5JpVthlQ5acCf3x05gCFyc5HEHQQwsbwnJDXyVROM
  Purposes: [Protocol,Action,KeyManagement]
  Actions permitted:
    App #2 Actions 500,501
    App #1 Actions 300,301
```

If you are using a certificate allowed to permit keys, you can permit others key in the chain:

Note: To permit other keys, the certificate must be already imported to the Interlockledger node with actions for App #2 and actions 500,501.

```
>>> from il2_rest.models import KeyPermitModel
>>> key_model = KeyPermitModel(app = 4, appActions = [1000, 1001], key_id = 'Key!
↳MJ0kidltB324mfkiOG0aBlEocPA#SHA1',
...     name = 'documenter', publicKey = 'PubKey!KpgQEPgItqh<...REDACTED...>
↳BZk4axWhFbTDrxADAQAB#RSA',
...     purposes = [KeyPurpose.Action, KeyPurpose.Protocol])
>>> keys = chain.permit_keys([key_model])
>>> for key in keys :
...     print(keys)
...
Key 'emergency!AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE' Key!-
↳bLg6Sklpj3Bhnn8A7VXkGnyED2oWHn9AhjpKiPL7sK0
  Purposes: [Protocol,Action]
  Actions permitted:
    App #0 Action 131
Key 'manager!AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE' Key!
↳QX5JpVthlQ5acCf3x05gCFyc5HEHQQwsbwnJDXyVROM
  Purposes: [Protocol,Action,KeyManagement]
  Actions permitted:
    App #2 Actions 500,501
    App #1 Actions 300,301
Key 'documenter' Key!MJ0kidltB324mfkiOG0aBlEocPA#SHA1
  Purposes: [Action,Protocol]
  Actions permitted:
    App #4 Actions 1000,1001
```

1.2.3 Permitting Apps

To check the active apps in the chain:

```
>>> print(chain.active_apps)
[0, 1, 2, 3, 5]
```

To permit new apps:

```
>>> apps = chain.permit_apps([4])
>>> print(apps)
[4]
```

1.2.4 Storing Documents

You can store documents using the *il2_rest*. There are three ways to store a document: plain text, bytes or file. To store a text document you can use the following script:

```
>>> doc_resp = chain.store_document_from_text(content = 'Plain text', name = 'text_
↳file.txt')
>>> print(doc_resp)
Document 'text_file.txt' [plain/text] uXKjPk_ftuMIFv90sJnjJJ0JYc5VoLjCIVaLPdhVP4c
↳#SHA256
```

If you need to store an array of bytes, you can use the following script:

```
>>> new_document = chain.store_document_from_bytes(doc_bytes = b'Bytes message!',
↳name = 'bytes_file.txt', content_type = 'plain/text')
>>> print(new_document)
Document 'bytes_file.txt' [plain/text] ZegBNUskzzJRqKvIuOiuhyhJvXJ5YxMJL99ONvqkcXs
↳#SHA256
```

It is also possible to store an array of bytes by using the `DocumentUploadModel`:

```
>>> from il2_rest.models import DocumentUploadModel
>>> model = DocumentUploadModel(name = 'other_bytes_file.txt', contentType = 'plain/
↳text')
>>> new_document = chain.store_document_from_bytes(doc_bytes = b'Other bytes message!
↳', model = model)
>>> print(new_document)
Document 'other_bytes_file.txt' [plain/text] wLQypXsHLV0H7RdNrrM3NvViA7W1-
↳9pcClPgWGMmF6Q#SHA256
```

Finally, you can store a file by passing its path:

```
>>> new_document = chain.store_document_from_file(file_path = './test.pdf', content_
↳type = 'application/pdf')
>>> print(new_document)
Document 'test.pdf' [application/pdf] tZpQvucMOi-FYHNQvI9UaOampVCUPtw3m0Z5TXwuF20
↳#SHA256
```

```
>>> from il2_rest.models import DocumentUploadModel
>>> model = DocumentUploadModel(name = 'my_test.txt', contentType = 'plain/text',
↳cipher = CipherAlgorithms.AES256)
>>> new_document = chain.store_document_from_file(file_path = './test.txt', model =
↳model)
>>> print(new_document)
Document 'my_test.txt' [plain/text] FukEk1l0cTDSp4k4zJehM--5ZzjMz-LVeAsSeaMIeeg#SHA256
```

1.3 The *il2_rest* package

This reference manual details the functions, modules and objects included in the *il2_rest* API.

1.3.1 Client module

This module has the classes needed to connect and communicate with the InterlockLedger REST API v3.6.2.

RestChain

class `il2_rest.client.RestChain` (*rest, chainId, **kwargs*)
 Bases: `object`

REST API client to the InterlockLedger chain.

Note: It is not recommended to create an instance of `RestChain` outside of an instance of `RestNode`.

Parameters

- **rest** (`il2_rest.models.ChainIdModel`) – Instance of the node.
- **rest** – Chain model.

id

str – Chain id.

name

str – Chain name.

active_apps

list of int – Enumerate apps that are currently permitted on this chain.

add_record(model)

Add a new record.

Parameters **model** (`il2_rest.models.NewRecordModel`) – Model with the description of the new record.

Returns Added record information.

Return type `il2_rest.models.RecordModel`

Example

```
>>> node = RestNode(cert_file = 'recorder.pfx', cert_pass = 'password', port_
↳ 32020)
>>> chain = node.chain_by_id('cRPeHOITV_t1ZQS9CIL7Yi3djJ33ynZCdSRsEnOvX40')
>>> model = NewRecordModel(applicationId = 1, payloadTagId = 300,
...     payloadBytes = bytes([248, 52, 7, 5, 0, 0, 20, 2, 1, 4]))
>>> record = chain.add_record(model)
>>> print(record)
{
  "applicationId": 1,
  "chainId": "cRPeHOITV_t1ZQS9CIL7Yi3djJ33ynZCdSRsEnOvX40",
  "createdAt": "2020-02-13T18:59:50.9033962-03:00",
  "hash": "mAwajCPH1c369GZLLXWsd_E7WkkZ2tdLS3LsZWbCPnw#SHA256",
  "payloadTagId": 300,
  "serial": 4,
  "type": "Data",
  "version": 2,
  "payloadBytes": "+DQHBQAAFAIBBA=="
}
```

add_record_as_json (*applicationId=None, payloadTagId=None, payload=None, rec_type=<RecordType.Data: 'Data'>, model=None*)

Add a new record with a payload encoded as JSON. The JSON value will be mapped to the payload tagged format as described by the metadata associated with the payloadTagId

Parameters

- **applicationId** (int) – Application id of the record.
- **payloadTagId** (int) – Payload tag id of the record.
- **payload** (int) – Payload data encoded as json
- **rec_type** (*il2_rest.enumerations.RecordType*) – Type of record.
- **model** (*il2_rest.models.NewRecordModelAsJson*) – Model with the description of the new record as JSON. **NOTE:** if model is not None, the other arguments will be ignored.

Returns Added record information.

Return type *il2_rest.models.RecordModel*

Example

```
>>> node = RestNode(cert_file = 'recorder.pfx', cert_pass = 'password', port_
↳ 32020)
>>> chain = node.chain_by_id('tdiy2HnWv-4a_h5T4Xy8l93CQ0lVkIeu2r5qgSlALMY')
>>> model = NewRecordModelAsJson(applicationId = 1, payloadTagId = 300, rec_
↳ json= {'tagId': 300, 'version' : 0, 'apps': [4]})
>>> record = chain.add_record_as_json(model = model)
>>> print(record)
{
  "applicationId": 1,
  "chainId": "tdiy2HnWv-4a_h5T4Xy8l93CQ0lVkIeu2r5qgSlALMY",
  "createdAt": "2020-02-13T18:56:44.3002447-03:00",
  "hash": "Y8Xb9FpTkgxj38xlwzcaZXm8fUq-NYxODVcyOQtzJ3c#SHA256",
  "payloadTagId": 300,
  "serial": 4,
  "type": "Data",
  "version": 2,
  "payload": {
    "tagId": 300,
    "version": 0,
    "apps": [
      4
    ]
  }
}
```

add_record_unpacked (*applicationId, payloadTagId, rec_bytes, rec_type=<RecordType.Data: 'Data'>*)

Add a new record with an unpacked payload. Payload inner bytes **MUST** go in the body, in binary form. These inner bytes will be prefixed with the payloadTagId and the length, both encoded as ILInt, as required to assemble the record effective payload.

Parameters

- **applicationId** (int) – Application id of the record.
- **payloadTagId** (int) – Payload tag id of the record.

- **rec_type** (*il2_rest.enumerations.RecordType*) – Type of record.
- **rec_bytes** (bytes) – Payload bytes.

Returns Added record information.

Return type *il2_rest.models.RecordModel*

Example

```
>>> node = RestNode(cert_file = 'recorder.pfx', cert_pass = 'password', port_
↳= 32020)
>>> chain = node.chain_by_id('VzCJczfgBeIiIBlnTRbmtsPriqwrkHqtF2yt8nhTcjM')
>>> record = chain.add_record_unpacked(applicationId = 1, payloadTagId = 300,
↳rec_bytes = bytes([5, 0, 0, 20, 2, 1, 4]))
>>> print(record)
{
  "applicationId": 1,
  "chainId": "VzCJczfgBeIiIBlnTRbmtsPriqwrkHqtF2yt8nhTcjM",
  "createdAt": "2020-02-13T19:01:37.5175345-03:00",
  "hash": "cY7krS7BSJcBi7Ickq-u4iI6V6lYoKULfQtEZGJ-mC0#SHA256",
  "payloadTagId": 300,
  "serial": 4,
  "type": "Data",
  "version": 2,
  "payloadBytes": "+DQHBQAAFAIBBA=="
}
```

document_as_plain (*fileId*)

Retrieve document from chain as plain text.

Parameters **fileId** (str) – Unique id of the document file.

Returns Document content as a UTF-8 string.

Return type str

document_as_raw (*fileId*)

Retrieve document from chain as raw bytes.

Parameters **fileId** (str) – Unique id of the document file.

Returns Document model with content as raw bytes.

Return type *il2_rest.models.RawDocumentModel*

documents

list of *il2_rest.models.DocumentDetailsModel* – Enumerate documents that are stored on this chain.

force_interlock (*model*)

Forces an interlock on a target chain.

Parameters **model** (*il2_rest.models.ForceInterlockModel*) – Force interlock command details.

Returns Interlocking details.

Return type *il2_rest.models.InterlockingRecordModel*

Example

```
>>> node = RestNode(cert_file = 'mykeymanager.pfx', cert_pass = 'password',
↳ port = 32020)
>>> chain = node.chain_by_id('VzCJczfgBeIiIBlnTRbmtsPriqwrkHqtF2yt8nhTcjM')
>>> model = ForceInterlockModel(targetChain = '8fox30W54ZkzM-shfUeU5C7ad-__fsf5nICwNpkCUk5w')
↳ fsf5nICwNpkCUk5w')
>>> interlocks = chain.force_interlock(model)
>>> for il in interlocks :
...     print(il)
...
Interlocked chain 8fox30W54ZkzM-shfUeU5C7ad-__fsf5nICwNpkCUk5w at record #14_
↳ (offset: 13671) with hash RyvOZIjnoUG4QX7FwQs3f6BqDfnOPb3txgXJNxLxtDo#SHA256
{
    "applicationId": 3,
    "chainId": "VzCJczfgBeIiIBlnTRbmtsPriqwrkHqtF2yt8nhTcjM",
    "createdAt": "2020-02-19T22:22:02.924546-03:46",
    "hash": "pGNSXOoI822Y_7F1ZNXw-x002ufXXbrQjNXpTMkZJpQ#SHA256",
    "payloadTagId": 600,
    "serial": 7,
    "type": "Data",
    "version": 2,
    "payloadBytes": "+QFgUgUBACsjAAEA8fox30W54ZkzM+shfUeU5C7ad+/
↳ fsf5nICwNpkCUk5wKDgr5NG8nIgEARYvOZIjnoUG4QX7FwQs3f6BqDfnOPb3txgXJNxLxtDo=",
    "interlockedChainId": "8fox30W54ZkzM-shfUeU5C7ad-__fsf5nICwNpkCUk5w",
    "interlockedRecordHash": "RyvOZIjnoUG4QX7FwQs3f6BqDfnOPb3txgXJNxLxtDo
↳ #SHA256",
    "interlockedRecordOffset": 13671,
    "interlockedRecordSerial": 14
}
```

interlocks

list of `il2_rest.models.InterlockingRecordModel` – List of interlocks registered in the chain.

permit_apps (apps_to_permit)

Add apps to the permitted list for the chain.

Parameters `apps_to_permit` (list of int) – List of apps (by number) to be permitted.

Returns Enumerate apps that are currently permitted on this chain.

Return type list of int

Example

```
>>> node = RestNode(cert_file = 'recorder.pfx', cert_pass = 'password', port_
↳ = 32020)
>>> chain = node.chain_by_id('A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> apps = chain.permit_apps([4])
>>> print(apps)
[4]
```

permit_keys (keys_to_permit)

Add keys to the permitted list for the chain.

Parameters `keys_to_permit` (list of `il2_rest.models.KeyPermitModel`) – List of keys to permitted.

Returns Enumerate keys that are currently permitted on chain.

Return type list of `il2_rest.models.KeyModel`

Example

```
>>> node = RestNode(cert_file = 'mykeymanager.pfx', cert_pass = 'password',
↳port = 32020)
>>> chain = node.chain_by_id('20ic_KPTCIDfrlwQPKBHdKKp1a6ADaFtBvBjvFmf_fc')
>>> model_1 = KeyPermitModel(app = 4, appActions = [1000, 1001], key_id =
↳'Key!MJ0kidltB324mfkiOG0aBlEocPA#SHA1',
...     name = 'documenter', publicKey = 'PubKey!KPgQEPgItqh<...
↳REDACTED...>BZk4axWhFbTDrxADAQAB#RSA',
...     purposes = [KeyPurpose.Action, KeyPurpose.Protocol])
>>> model_2 = KeyPermitModel(key_id = 'Key!aWJWFHYDmUXCTCIW2Ugih514XQ#SHA1',
↳name = 'recorder',
...     publicKey = 'PubKey!KPgQEPgItxD<...REDACTED...>
↳t1RvQCHPYtRADAQAB#RSA',
...     purposes = [KeyPurpose.Action, KeyPurpose.Protocol],
...     permissions = [AppPermissions(appId = 1, actionIds = [300,
↳301, 306, 302, 304, 303, 305, 307]])])
>>> keys = chain.permit_keys([model_1, model_2])
>>> for key in keys :
...     print(keys)
...
Key 'documenter' Key!MJ0kidltB324mfkiOG0aBlEocPA#SHA1
Purposes: [Action, Protocol]
Actions permitted:
App #4 Actions 1000, 1001
Key 'recorder' Key!aWJWFHYDmUXCTCIW2Ugih514XQ#SHA1
Purposes: [Action, Protocol]
Actions permitted:
App #1 Actions 300, 301, 306, 302, 304, 303, 305, 307
Key 'mykeymanager' Key!-u07iGMWlkUm3WVBqS867AI-Lbw#SHA1
Purposes: [KeyManagement, Action, Protocol]
Actions permitted:
App #2 Actions 500, 501
Key 'emergency!20ic_KPTCIDfrlwQPKBHdKKp1a6ADaFtBvBjvFmf_fc' Key!
↳vckqYtMYIcetbunEJc4w-whbnqtZc9a9qlNp5PePm2E
Purposes: [Protocol, Action]
Actions permitted:
App #0 Action 131
Key 'manager!20ic_KPTCIDfrlwQPKBHdKKp1a6ADaFtBvBjvFmf_fc' Key!hLZkEjBRofw1U-
↳JRkXfFdtBWfyM4sZNx8L3R5acakb4
Purposes: [Protocol, Action, KeyManagement]
Actions permitted:
App #2 Actions 500, 501
App #1 Actions 300, 301
```

`permitted_keys`

list of `il2_rest.models.KeyModel` – Enumerate keys that are currently permitted on chain.

`record_at (serial)`

Get an specific record.

Parameters **serial** (int) – Record serial number.

Returns Record with the specific serial number.

Return type `il2_rest.models.RecordModel`

record_at_as_json (*serial*)

Get an specific record with payload mapped to json.

Parameters **serial** (int) – Record serial number.

Returns Record mapped to JSON with the specific serial number.

Return type `il2_rest.models.RecordModelAsJson`

records

list of `il2_rest.models.RecordModel` – List of records in the chain.

records_as_json

list of `il2_rest.models.RecordModelAsJson` – List of records in the chain with payload mapped to JSON.

records_from (*firstSerial*, *lastSerial=None*)

Get list of records starting from a given serial number.

Parameters

- **firstSerial** (int) – Starting serial number.
- **lastSerial** (int, optional) – Last serial number.

Returns List of records in the given interval.

Return type list of `il2_rest.models.RecordModel`

records_from_as_json (*firstSerial*, *lastSerial=None*)

Get list of records with payload mapped to JSON starting from a given serial number.

Parameters

- **firstSerial** (int) – Starting serial number.
- **lastSerial** (int, optional) – Last serial number.

Returns List of records mapped to JSON in the given interval.

Return type list of `il2_rest.models.RecordModelAsJson`

store_document_from_bytes (*doc_bytes*, *name=None*, *content_type=None*, *model=None*)

Store document on chain using bytes.

If more details is needed to upload the document, please use a `il2_rest.models.DocumentUploadModel` model.

Parameters

- **doc_bytes** (bytes) – Document bytes.
- **name** (str) – Document name (may be a file name with an extension).
- **content_type** (str) – Document content type (mime-type).
- **model** (`il2_rest.models.DocumentUploadModel`) – Model with the description of the new document. **NOTE:** if model is not None, the other arguments will be ignored.

Returns Added document details.

Return type `il2_rest.models.DocumentDetailsModel`

Examples

Adding a file document without specifying the name. The file name in the file_path will be used as the name of the document.

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password')
>>> chain = node.chain_by_id('AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> new_document = chain.store_document_from_bytes(doc_bytes = b'Bytes_
↳message!', name = 'bytes_file.txt', content_type = 'plain/text')
>>> print(new_document)
Document 'bytes_file.txt' [plain/text]_
↳ZegBNUskzzJRqKvIuOiuhyhJvXJ5YxMJL99ONvqkcXs#SHA256
```

Using the model to specify the description of the document.

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password')
>>> chain = node.chain_by_id('AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> model = DocumentUploadModel(name = 'other_bytes_file.txt', contentType =
↳'plain/text')
>>> new_document = chain.store_document_from_bytes(doc_bytes = b'Other bytes_
↳message!', model = model)
>>> print(new_document)
Document 'other_bytes_file.txt' [plain/text] wLQypXsHLV0H7RdNrrM3NvViA7W1-
↳9pcClPgWGMmF6Q#SHA256
```

store_document_from_file (file_path, content_type=None, name=None, model=None)

Store document on chain using a file.

If more details is needed to upload the document, please use a `il2_rest.models.DocumentUploadModel` model.

Parameters

- **file_path** (bytes) – Filepath of the document file.
- **content_type** (str) – Document content type (mime-type).
- **name** (str, optional) – Document name (may be a file name with an extension). Can be derived from the file_path.
- **model** (`il2_rest.models.DocumentUploadModel`) – Model with the description of the new document. **NOTE:** if model is not None, the other arguments will be ignored.

Returns Added document details.

Return type `il2_rest.models.DocumentDetailsModel`

Examples

Adding a file document without specifying the name. The file name in the file_path will be used as the name of the document.

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password')
>>> chain = node.chain_by_id('AlwCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> new_document = chain.store_document_from_file(file_path = './test.pdf',
↳content_type = 'application/pdf')
```

```
>>> print(new_document)
Document 'test.pdf' [application/pdf] tZpQvucMOi-
↳FYHNQvI9UaOampVCUPtw3m0Z5TXwuF20#SHA256
```

Using the model to specify the description of the document.

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password')
>>> chain = node.chain_by_id('A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> model = DocumentUploadModel(name = 'my_test.txt', contentType = 'plain/
↳text', cipher = CipherAlgorithms.AES256)
>>> new_document = chain.store_document_from_file(file_path = './test.txt',
↳model = model)
>>> print(new_document)
Document 'my_test.txt' [plain/text] FukEk1l0cTDSp4k4zJehM--5ZzjMz-
↳LVeAsSeaMIeeg#SHA256
```

store_document_from_text (*content, name, content_type='plain/text'*)

Store document on chain using bytes.

If more details is needed to upload the document, please use a `il2_rest.models.DocumentUploadModel` model.

Parameters

- **doc_bytes** (bytes) – Document bytes.
- **content_type** (str) – Document content type (mime-type).
- **name** (str, optional) – Document name (may be a file name with an extension). Can be derived from the file_path.
- **model** (`il2_rest.models.DocumentUploadModel`) – Model with the description of the new document. **NOTE:** if model is not None, the other arguments will be ignored.

Returns Added document details.

Return type `il2_rest.models.DocumentDetailsModel`

Example

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password')
>>> chain = node.chain_by_id('A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> new_document = chain.store_document_from_text(content = 'Simple text',
↳name = 'document.txt')
>>> print(new_document)
Document 'document.txt' [plain/text] d_G2-zQ05L5QZ-
↳omHi7cfyJWlSes4xovJuFoOUNnxNo#SHA256
```

summary

`il2_rest.models.ChainSummaryModel` – Chain details

RestNetwork

class `il2_rest.client.RestNetwork` (*rest*)

Bases: object

Informations about the node network.

Parameters **rest** (*RestNode*) – Node of the network.

apps

AppsModel – List of valid apps in the network.

RestNode

class `il2_rest.client.RestNode` (*cert_file*, *cert_pass*, *port=32032*, *address='localhost'*)

Bases: `object`

REST API client to the InterlockLedger node.

You'll try to establish a bi-authenticated https connection with the configured node API address and port. The client-side certificate used to connect needs to be configured with the proper layered authorization role in the node configuration file and imported into a key permitted to update the chain that will be used.

Parameters

- **cert_file** (*str*) – Path to the .pfx certificate. Please refer to the InterlockLedger manual to see how to create and import the certificate into the node.
- **cert_pass** (*str*) – Password of the .pfx certificate.
- **port** (*int*) – Port number to connect.
- **address** (*str*) – Address of the node.

base_uri

uri.URI – The base URI address of the node.

network

RestNetwork – Network information client.

add_mirrors_of (*new_mirrors*)

Add new mirrors in this node.

Parameters **new_mirrors** (*list of str*) – List of mirrors chain ids.

Returns List of the chain information.

Return type *list of il2_rest.models.ChainIdModel*

certificate_name

str – Certificate friendly name.

chain_by_id (*chain_id*)

Get a chain by id.

Parameters **chain_id** (*str*) – Chain id.

Returns Chain instance with the corresponding id.

Return type *RestChain*

Example

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password',
↳port = 32020)
>>> chain = node.chain_by_id('A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE')
>>> print(chain)
Chain '3.6.2 chain name' #A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-iDKE
```

chains

list of *RestChain* – List of chain instances.

create_chain(model)

Create a new chain.

Parameters *model* (*il2_rest.models.ChainCreationModel*) – Model with the new chain attributes.

Returns Chain created model.

Return type *il2_rest.models.ChainCreatedModel*

Example

```
>>> node = RestNode(cert_file = 'admin.pfx', cert_pass = 'password', port = 32020)
>>> new_chain = ChainCreationModel(name = 'New chain name', description = 'New chain',
...                               managementKeyPassword = 'keyPassword',
...                               emergencyClosingKeyPassword = 'closingPassword')
>>> resp = node.create_chain(new_chain)
>>> print(resp)
Chain 'New chain name' #cRPeHOITV_t1ZQS9CIL7Yi3djJ33ynZCdSRsEnOvX40
```

details

il2_rest.models.NodeDetailsModel – Get node details.

interlocks_of(chain)

Get the list of interlocking records pointing to a target chain instance.

Parameters *chain* (str) – Chain id.

Returns List of interlockings.

Return type list of *il2_rest.models.InterlockingRecordModel*

Example

```
>>> node = RestNode(cert_file = 'documenter.pfx', cert_pass = 'password')
>>> interlocks = node.interlocks_of('8fox30W54ZkzM-shfUeU5C7ad-_fsf5nICwNpkCUk5w')
>>> for interlock in interlocks :
...     print(interlock)
...
Interlocked chain 8fox30W54ZkzM-shfUeU5C7ad-_fsf5nICwNpkCUk5w at record #14
(offset: 13671) with hash RyvOZIjnoUG4QX7FwQs3f6BqDfnOPb3txgXJNxLxtDo#SHA256
{
  "applicationId": 3,
  "chainId": "A1wCG9hHhuVNB8hyOALHokYsWyTumHU0vRxtcK-idKE",
  "createdAt": "2020-02-26T23:17:03.018975-03:75",
  "hash": "0QjOJ-WQjauOF7qXeOxXabHxUgBR_KBNDZVDECbsszw#SHA256",
  "payloadTagId": 600,
  "serial": 9,
  "type": "Data",
  "version": 2,
  "payloadBytes": "+QFgUgUBACsjAAEA8fox30W54ZkzM+shfUeU5C7ad+/_fsf5nICwNpkCUk5wKDgr5NG8nIgEARyvOZIjnoUG4QX7FwQs3f6BqDfnOPb3txgXJNxLxtDo=",
```

```

    "interlockedChainId": "8fox30W54ZkzM-shfUeU5C7ad-_fsf5nICwNpkCUk5w",
    "interlockedRecordHash": "RyvOZIjnoUG4QX7FwQs3f6BqDfnOPb3txgXJNxLxtDo
↪#SHA256",
    "interlockedRecordOffset": 13671,
    "interlockedRecordSerial": 14
}

```

mirrors

list of *RestChain* – Get list of mirrors instances.

peers

list of *il2_rest.models.PeerModel* – Get list of known peers.

1.3.2 Models module

Resource models available in the InterlockLedger REST API v3.6.2.

CustomEncoder

```

class il2_rest.models.CustomEncoder(*,          skipkeys=False,          ensure_ascii=True,
                                     check_circular=True,          allow_nan=True,
                                     sort_keys=False, indent=None, separators=None,
                                     default=None)

```

Bases: `json.encoder.JSONEncoder`

Custom JSON encoder for the IL2 REST API models.

default (*obj*)

Set the behavior of the encoder depending on the type of obj.

BaseModel

```

class il2_rest.models.BaseModel

```

Bases: `object`

Base class for all models.

```

classmethod from_json(json_data)

```

Convert a dict (JSON like) to a *BaseModel* object.

Parameters *json_data* (dict) – JSON object to be converted.

Returns return an instance of the JSON model.

Return type *BaseModel*

```

json(hide_null=True, return_as_str=False)

```

Convert a *BaseModel* class to a dict (JSON like).

Parameters

- **hide_null** (bool, optional) – If True, discards every item (key, value) where value is None.
- **return_as_str** (bool, optional) – If True, return the JSON as a string instead of a dict.

Returns return obj as a JSON

Return type dict/str

classmethod `to_json(obj, hide_null=True, return_as_str=False)`

Convert an object to a dict (JSON like).

Parameters

- **obj** (list/dict/*BaseModel*) – Object to be converted to JSON.
- **hide_null** (bool, optional) – If True, discards every item (key, value) where value is None.
- **return_as_str** (bool, optional) – If True, return the JSON as a string instead of a dict.

Returns return obj as a JSON

Return type dict/str

AppsModel

class `il2_rest.models.AppsModel(network=None, validApps=[], **kwargs)`

Bases: `il2_rest.models.BaseModel`

Details of the InterlockApps available in the chain.

Parameters

- **network** (str) – Network name.
- **validApps** (list of *PublishedApp*/list of dict) – List of currently valid apps for this network.
- ****kwargs** – Arbitrary keyword arguments.

network

str – Network name

validApps

list of *PublishedApp* – Currently valid apps for this network

class `PublishedApp(alternativeId=None, appVersion=None, description=None, app_id=None, name=None, publisherId=None, dataModels=None, publisherName=None, reservedILTagIds=None, simplifiedHashCode=None, start=None, version=None, **kwargs)`

Bases: `il2_rest.models.BaseModel`

InterlockApp permitted in the chain.

alternativeId

int – Alternative id for the application.

appVersion

version – Application semantic version, with four numeric parts.

description

str – Description of the application.

id

int – Unique id for the application.

name

str – Application name.

publisherId

str – Publisher id, which is the identifier for the key the publisher uses to sign the workflow requests in its own chain. It should match the PublisherName

publisherName

str – Publisher name as registered in the Genesis chain of the network.

dataModels

list of *DataModel* – The list of data models for the payloads of the records stored in the chains.

reservedILTagIds

list of *il2_rest.util.LimitedRange* – The list of ranges of ILTagIds to reserve for the application.

simplifiedHashCode

int – The start date for the validity of the app, but if prior to the effective publication of the app will be overridden with the publication date and time.

start

datetime.datetime – The start date for the validity of the app, but if prior to the effective publication of the app will be overridden with the publication date and time.

version

int – Version of the application.

__eq__ (*other*)

bool: Return True if self and other have the same id and appVersion.

__lt__ (*other*)

bool: Return self.id < other.id. If self and other have the same id, return self.appVersion < other.appVersion.

__str__ ()

str: String representation of the published app.

compositeName

str – Concatenation of the App's publisher name, name and version.

AppPermissions

class *il2_rest.models.AppPermissions* (*appId=None, actionIds=[], **kwargs*)

Bases: *il2_rest.models.BaseModel*

App permissions

appId

int – App to be permitted (by number)

actionIds

list of int – App actions to be permitted by number.

__str__ ()

str: String representation of app permissions.

classmethod from_str (*permissions*)

Parse a string into an *AppPermissions* object.

Parameters *permissions* (str) – App permissions in the format used by the JSON response

('(<appId>,<actionId_1>,...,<actionId_n>').

Returns return an *AppPermissions* instance.

Return type *AppPermissions*

to_str()
str: String representation of app permissions in the JSON format ('#<appId>,<actionId_1>,...,<actionId_n>').

DataModel

class `il2_rest.models.DataModel` (*description=None, dataFields=None, indexes=None, payloadName=None, payloadTagId=None, version=None, **kwargs*)

Bases: `il2_rest.models.BaseModel`

Data model for the payloads and actions for the records the application stores in the chains.

description

str – Description of the data model.

dataFields

list of `DataModel.DataFieldModel` – The list of data fields.

indexes

list of `DataModel.DataIndexModel` – List of indexes for records of this type.

payloadName

str – Name of the record model.

payloadTagId

int – Tag id for this payload type. It must be a number in the reserved ranges.

version

int – Version of this data model, should start from 1.

class `DataFieldModel` (*cast=None, elementTagId=None, isOpaque=None, isOptional=None, description=None, Enumeration=None, enumerationAsFlags=None, name=None, serializationVersion=None, subDataFields=None, tagId=None, version=None, **kwargs*)

Bases: `il2_rest.models.BaseModel`

Metadata for field definition.

cast

`il2_rest.enumerations.DataFieldCast` – Type of the data field.

elementTagId

int – The type of the field in case it is an array.

isOpaque

bool – If True the field is stored in raw bytes.

isOptional

bool – Indicate if data field is optional.

name

str – Name of the data field.

serializationVersion

int – Data field definition version.

subDataFields

list of `DataModel.DataFieldModel` – If the data field is composed of more fields, indicates the metadata of the subdata fields.

tagId
int – Type of the field. (see tags in the InterlockLedger node documentation)

version
int – Version of the data field.

class DataIndexModel (*elements=None, isUnique=None, name=None, **kwargs*)
Bases: *il2_rest.models.BaseModel*

Index of the data model.

elements
list of *DataModel.DataIndexModel.DataIndexElementModel* – Elements of the index.

isUnique
bool – Indicate if the data field is unique.

name
str – Name of the index.

class DataIndexElementModel (*descendingOrder=None, fieldPath=None, function=None, **kwargs*)
Bases: *il2_rest.models.BaseModel*

Data index element.

descendingOrder
bool – Indicate if the field is ordered in descending order.

fieldPath
str – Path of the data field to be indexed.

function
str – To be defined.

ExportedKeyFile

class il2_rest.models.ExportedKeyFile (*keyFileBytes=None, keyFileName=None, keyName=None, **kwargs*)
Bases: *il2_rest.models.BaseModel*

Key file info.

keyFileBytes
bytes – Key file in bytes.

keyFileName
str – Filename of the key.

keyName
str – Name of the key.

ChainIdModel

class il2_rest.models.ChainIdModel (*chain_id=None, name=None, **kwargs*)
Bases: *il2_rest.models.BaseModel*

Chain Id

id
str – Unique record id

name
str – Chain name

__eq__(*other*)
bool: Return self.id == other.id.

__hash__()
int: Hash representation of self.

__lt__(*other*)
bool: Return self.id < other.id.

__str__()
str: String representation of the *ChainIdModel*.

ChainCreatedModel

```
class il2_rest.models.ChainCreatedModel(chain_id=None, name=None, keyFiles=[],
                                       **kwargs)
    Bases: il2_rest.models.ChainIdModel
    Chain created response.

    id
        str – Unique record id.

    keyFiles
        list of ExportedKeyFile – Emergency key file names.

    name
        str – Chain name.
```

ChainCreationModel

```
class il2_rest.models.ChainCreationModel(name, emergencyClosingKeyPassword,
                                         managementKeyPassword, additionalApps=None, description=None, emergencyClosingKeyStrength=<KeyStrength.ExtraStrong: 'ExtraStrong'>, managementKeyStrength=<KeyStrength.Strong: 'Strong'>, keysAlgorithm=<Algorithms.RSA: 'RSA'>, operatingKeyStrength=<KeyStrength.Normal: 'Normal'>, parent=None, **kwargs)

    Bases: il2_rest.models.BaseModel
    Chain creation parameters.

    additionalApps
        list of int – List of additional apps (only numeric ids).

    description
        str – Description (perhaps intended primary usage).

    emergencyClosingKeyPassword
        str – Emergency closing key password.
```

emergencyClosingKeyStrength*il2_rest.enumerations.KeyStrength* – Emergency closing key strength of key.**managementKeyPassword***str* – Key management key password.**managementKeyStrength***il2_rest.enumerations.KeyStrength* – Key management strength of key.**keysAlgorithm***il2_rest.enumerations.Algorithms* – Keys algorithm.**name***str* – Name of the chain.**operatingKeyStrength***il2_rest.enumerations.KeyStrength* – Operating key strength of key.**parent***str* – Parent record Id.**ChainSummaryModel**

```
class il2_rest.models.ChainSummaryModel (chain_id=None, name=None, activeApps=[],
                                         description=None, isClosedForNewTransactions=False, lastRecord=None, **kwargs)
```

Bases: *il2_rest.models.ChainIdModel*

Chain summary.

activeApps*list of int* – List of active apps (only the numeric ids).**description***str* – Description (perhaps intended primary usage).**isClosedForNewTransactions***bool* – Indicates if the chain accepts new records.**lastRecord***int* – Serial number of the last record.**DocumentBaseModel**

```
class il2_rest.models.DocumentBaseModel (cipher=<CipherAlgorithms.NONE: 'None'>,
                                         keyId=None, name=None, previousVersion=None,
                                         **kwargs)
```

Bases: *il2_rest.models.BaseModel*

Document base model.

cipher*il2_rest.enumerations.CipherAlgorithms* – Cipher algorithm used to cipher the document.**keyId***str* – Unique id of key that ciphers this document.**name***str* – Document name, may be a file name with an extension.

previousVersion

str – A reference to a previous version of this document (ChainId and RecordNumber).

is_ciphersed

(bool) – Return True if the document is ciphersed.

DocumentDetailsModel

```
class il2_rest.models.DocumentDetailsModel (cipher=<CipherAlgorithms.NONE: 'None'>,
                                             keyId=None, name=None, previousVersion=None,
                                             contentType=None, fileId=None, physicalDocumentID=None,
                                             **kwargs)
```

Bases: `il2_rest.models.DocumentBaseModel`

Document details.

contentType

str – Document content type (mime-type).

fileId

str – Unique id of the document derived from its content. The same content stored in different chains will have the same FileId.

physicalDocumentID

str – Compound id for this document as stored in this chain.

__str__()

(str): String representation of the document: 'Document '{name}' [{contentType}] {fileId}'.

is_plain_text

(bool) – Return True if the content type is plain/text.

DocumentUploadModel

```
class il2_rest.models.DocumentUploadModel (cipher=<CipherAlgorithms.NONE: 'None'>,
                                             keyId=None, name=None, previousVersion=None,
                                             contentType=None, **kwargs)
```

Bases: `il2_rest.models.DocumentBaseModel`

Document model used to upload/post documents in the chain.

contentType

str – Document content type (mime-type).

to_query_string

(str) – Request query representation.

RawDocumentModel

```
class il2_rest.models.RawDocumentModel (contentType=None, content=None, name=None,
                                         **kwargs)
```

Bases: `il2_rest.models.BaseModel`

Document as raw data.

Parameters

- **contentType** (str) – Document content type (mime-type).

- **content** (bytes/bytes) – Content of the document in raw bytes. If loaded from JSON, can be input as a base64 string which will be decoded to bytes.
- **name** (str) – Document name, may be a file name with an extension.

contentType

str – Document content type (mime-type).

content

bytes – Content of the document in raw bytes.

name

str – Document name, may be a file name with an extension.

ForceInterlockModel

```
class il2_rest.models.ForceInterlockModel (hashAlgorithm=<HashAlgorithms.SHA256:
                                         'SHA256'>, minSerial=0, targetChain=None,
                                         **kwargs)
```

Bases: `il2_rest.models.BaseModel`

Force interlock command details.

hashAlgorithm

`il2_rest.enumerations.HashAlgorithms` – Hash algorithm to use.

minSerial

int – Required minimum of the serial of the last record in target chain whose hash will be pulled.

targetChain

str – Id of chain to be interlocked.

__str__()

(str): String representation of the interlock.

KeyModel

```
class il2_rest.models.KeyModel (key_id=None, name=None, permissions=None, pub-
                                licKey=None, purposes=None, **kwargs)
```

Bases: `il2_rest.models.BaseModel`

Key model

Parameters

- **key_id** (str) – Unique key id.
- **name** (str) – Key name.
- **permissions** (list of `AppPermissions`) – List of Apps and Corresponding Actions to be permitted by numbers.
- **publicKey** (str) – Key public key.
- **purposes** (list of `il2_rest.enumerations.KeyPurpose`/str) – Key valid purposes.
- ****kwargs** – Arbitrary keyword arguments.

id

str – Unique key id.

name
str – Key name.

permissions
list of *AppPermissions* – List of Apps and Corresponding Actions to be permitted by numbers.

publicKey
str – Key public key.

purposes
list of *il2_rest.enumerations.KeyPurpose*/str – Key valid purposes.

__str__()
(str): String representation of the key details.

actionable
(bool) – Return True if ‘Action’ is in the list of purposes.

KeyPermitModel

```
class il2_rest.models.KeyPermitModel (key_id=None, name=None, permissions=None,
                                     publicKey=None, purposes=[], app=None, ap-
                                     pActions=None, **kwargs)
```

Bases: *il2_rest.models.BaseModel*

Key to permit.

Parameters

- **key_id** (str) – Unique key id.
- **name** (str) – Key name.
- **permissions** (list of *AppPermissions*) – List of Apps and Corresponding Actions to be permitted by numbers.
- **publicKey** (str) – Key public key.
- **purposes** (list of *il2_rest.enumerations.KeyPurpose*/str) – Key valid purposes.
- **app** (int) – App to be permitted (by number). *Note:* If app and appActions is passed as parameter, permissions parameter will be ignored.
- **appActions** (list of int) – App actions to be permitted by number. *Note:* If app and appActions is passed as parameter, permissions parameter will be ignored.
- ****kwargs** – Arbitrary keyword arguments.

id
str – Unique key id.

name
str – Key name.

permissions
list of *AppPermissions* – List of Apps and Corresponding Actions to be permitted by numbers.

publicKey
str – Key public key.

purposes
list of *il2_rest.enumerations.KeyPurpose*/str – Key valid purposes.

NewRecordModelBase

```
class il2_rest.models.NewRecordModelBase (applicationId=None,
                                           rec_type=<RecordType.Data: 'Data'>,
                                           **kwargs)

Bases: il2_rest.models.BaseModel

Base model for new Record.

applicationId
    int – Application id this record is associated with.

rec_type
    il2_rest.enumerations.RecordType – Block type. Most records are of the type 'Data'. Corresponds to the 'type' field in the JSON.
```

NewRecordModelAsJson

```
class il2_rest.models.NewRecordModelAsJson (applicationId=None,
                                              rec_type=<RecordType.Data: 'Data'>,
                                              rec_json=None,      payloadTagId=None,
                                              **kwargs)

Bases: il2_rest.models.NewRecordModelBase

New record model to be added to the chain as a JSON.

json
    dict – The payload data matching the metadata for PayloadTagId.

payloadTagId
    il2_rest.enumerations.RecordType – The tag id for the payload, as registered for the application.

to_query_string
    (str) – Request query representation.
```

NewRecordModel

```
class il2_rest.models.NewRecordModel (applicationId=None,   rec_type=<RecordType.Data: 'Data'>,
                                       payloadBytes=None, **kwargs)

Bases: il2_rest.models.NewRecordModelBase

New record model to be added to the chain as raw bytes.

payloadBytes
    dict – The payload in bytes. Must match the bytes schema of the application Id.
```

NodeCommonModel

```
class il2_rest.models.NodeCommonModel (color=None,   node_id=None,   name=None,   network=None,
                                         ownerId=None,  ownerName=None,
                                         roles=None,  softwareVersions=None, **kwargs)

Bases: il2_rest.models.BaseModel

Node/Peer common details

color
    Color – Mapping color.
```

id
str – Unique node id

name
str – Node name.

network
str – Network this node participates on.

ownerId
str – Node owner id

ownerName
str – Node owner name.

roles
list of str – List of active roles running in the node

softwareVersions
Versions – Version of software running the Node.

fancy_color
(str) – Return the color as its name or the corresponding hexadecimal values.

NodeDetailsModel

```
class il2_rest.models.NodeDetailsModel (color=None, node_id=None, name=None, net-
                                         work=None, ownerId=None, ownerName=None,
                                         roles=None, softwareVersions=None, chains=[],
                                         **kwargs)
```

Bases: *il2_rest.models.NodeCommonModel*

Node details

chains
list of str – List of owned records, only the ids

PeerModel

```
class il2_rest.models.PeerModel (color=None, node_id=None, name=None, network=None,
                                  ownerId=None, ownerName=None, roles=None, software-
                                  Versions=None, address=None, port=None, protocol=None,
                                  **kwargs)
```

Bases: *il2_rest.models.NodeCommonModel*

Peer details.

address
str – Network address to contact the peer.

port
int – Port the peer is listening.

protocol
il2_rest.enumerations.NetworkProtocol – Network protocol the peer is listening.

RecordModelBase

```
class il2_rest.models.RecordModelBase(applicationId=None, chainId=None, create-
                                     dAt=None, rec_hash=None, payloadTagId=None,
                                     serial=None, rec_type=None, version=None,
                                     **kwargs)
```

Bases: `il2_rest.models.BaseModel`

Base model for records.

Parameters

- **applicationId** (`int`) – Application id this record is associated with.
- **chainId** (`str`) – Chain id that owns this record.
- **createdAt** (`datetime.datetime`) – Time of record creation.
- **rec_hash** (`str`) – Hash of the full encoded bytes of the record.
- **payloadTagId** (`int`) – The payload’s TagId.
- **serial** (`int`) – Block serial number. For the first record this value is zero (0).
- **rec_type** (`il2_rest.enumerations.RecordType`) – Block type. Most records are of the type ‘Data’. Corresponds to the ‘type’ field in the JSON.
- **version** (`int`) – Version of this record structure.

applicationId

`int` – Application id this record is associated with.

chainId

`str` – Chain id that owns this record.

createdAt

`datetime.datetime` – Time of record creation.

hash

`str` – Hash of the full encoded bytes of the record.

payloadTagId

`int` – The payload’s TagId.

serial

`int` – Block serial number. For the first record this value is zero (0).

type

`il2_rest.enumerations.RecordType` – Block type. Most records are of the type ‘Data’. Corresponds to the ‘type’ field in the JSON.

version

`int` – Version of this record structure.

__str__()

(`str`): JSON representation of the record as string.

RecordModel

```
class il2_rest.models.RecordModel (applicationId=None, chainId=None, createdAt=None,
                                     rec_hash=None, payloadTagId=None, serial=None,
                                     rec_type=None, version=None, payloadBytes=None,
                                     **kwargs)
```

Bases: `il2_rest.models.RecordModelBase`

Generic opaque record.

Parameters **payloadBytes** (bytes/str) – The payload’s bytes. If loaded from JSON, can be input as a base64 string which will be decoded to bytes.

payloadBytes
bytes – The payload’s bytes.

RecordModelAsJson

```
class il2_rest.models.RecordModelAsJson (applicationId=None, chainId=None, create-
                                             dAt=None, rec_hash=None, payloadTagId=None,
                                             serial=None, rec_type=None, version=None,
                                             payload=None, **kwargs)
```

Bases: `il2_rest.models.RecordModelBase`

Record model as JSON.

payload
Payload bytes.

InterlockingRecordModel

```
class il2_rest.models.InterlockingRecordModel (applicationId=None, chainId=None,
                                                  createdAt=None, rec_hash=None,
                                                  payloadTagId=None, serial=None,
                                                  rec_type=None, version=None, payload-
                                                  Bytes=None, interlockedChainId=None,
                                                  interlockedRecordHash=None, inter-
                                                  lockedRecordOffset=None, interlocke-
                                                  dRecordSerial=None, **kwargs)
```

Bases: `il2_rest.models.RecordModel`

Interlocking details.

interlockedChainId
str – Interlocked Chain.

interlockedRecordHash
str – Interlock Record Hash.

interlockedRecordOffset
int – Interlocked Record Offset.

interlockedRecordSerial
int – Interlocked Record Serial.

__str__()
(str): String representation.

Versions

```
class il2_rest.models.Versions (coreLibs=None, messageEnvelopeWireFormat=None,
                                node=None, peer2peer=None, **kwargs)
    Bases: il2_rest.models.BaseModel
    Versions for parts of the software.

    coreLibs
        str – Core libraries and il2apps version.

    messageEnvelopeWireFormat
        str – Message envelope wire format version.

    node
        str – Interlockledger node daemon version.

    peer2peer
        str – Peer2Peer connectivity library version.
```

1.3.3 Enumerations module

Enumerations used in the InterlockLedger REST API v3.6.2.

Algorithms

```
class il2_rest.enumerations.Algorithms
    Bases: il2_rest.enumerations.AutoName
    Enumeration of the digital signature algorithms available in IL2.

    DSA = 'DSA'
    EcDSA = 'EcDSA'
    EdDSA = 'EdDSA'
    ElGamal = 'ElGamal'
    RSA = 'RSA'
    RSA15 = 'RSA15'
```

AutoName

```
class il2_rest.enumerations.AutoName
    Bases: enum.Enum
    Base Enum class to automatically generate the enumerations values based on the enumeration name.
```

DataFieldCast

```
class il2_rest.enumerations.DataFieldCast
    Bases: il2_rest.enumerations.AutoName
    Enumeration of casting options for DataField

    DateTime = 'DateTime'
```

```
Integer = 'Integer'
NONE = 'None'
TimeSpan = 'TimeSpan'
```

CipherAlgorithms

```
class il2_rest.enumerations.CipherAlgorithms
    Bases: il2_rest.enumerations.AutoName
    Enumeration of the cipher algorithms available in IL2.
    AES256 = 'AES256'
    NONE = 'None'
```

HashAlgorithms

```
class il2_rest.enumerations.HashAlgorithms
    Bases: il2_rest.enumerations.AutoName
    Enumeration of the hash algorithms available in IL2.
    Copy = 'Copy'
    SHA1 = 'SHA1'
    SHA256 = 'SHA256'
    SHA3_256 = 'SHA3_256'
    SHA3_512 = 'SHA3_512'
    SHA512 = 'SHA512'
```

KeyPurpose

```
class il2_rest.enumerations.KeyPurpose
    Bases: il2_rest.enumerations.AutoName
    Enumeration of the purpose of keys in IL2.
    Action = 'Action'
    ChainOperation = 'ChainOperation'
    ClaimSigner = 'ClaimSigner'
    Encryption = 'Encryption'
    ForceInterlock = 'ForceInterlock'
    InvalidKey = 'InvalidKey'
    KeyManagement = 'KeyManagement'
    Protocol = 'Protocol'
```

KeyStrength

```
class il2_rest.enumerations.KeyStrength
    Bases: il2_rest.enumerations.AutoName

    Enumeration of the strength of keys.

    Normal = 'Normal'
        RSA 2048

    Strong = 'Strong'
        RSA 3072

    ExtraStrong = 'ExtraStrong'
        RSA 4096

    MegaStrong = 'MegaStrong'
        RSA 5120

    SuperStrong = 'SuperStrong'
        RSA 6144

    HyperStrong = 'HyperStrong'
        RSA 7172

    UltraStrong = 'UltraStrong'
        RSA 8192
```

NetworkProtocol

```
class il2_rest.enumerations.NetworkProtocol
    Bases: il2_rest.enumerations.AutoName

    Enumeration of the network protocols.

    HTTPS_Proxied = 'HTTPS_Proxied'

    Originator_Only = 'Originator_Only'

    TCP_Direct = 'TCP_Direct'

    TCP_Proxied = 'TCP_Proxied'
```

NetworkPredefinedPorts

```
class il2_rest.enumerations.NetworkPredefinedPorts
    Bases: enum.IntEnum

    Enumeration of the default ports of the IL2 networks.

    MainNet = 32032

    MetaNet = 32036

    TestNet_Apollo = 32020

    TestNet_Janus = 32022

    TestNet_Jupiter = 32030

    TestNet_Liber = 32018

    TestNet_Minerva = 32024
```

```
TestNet_Neptune = 32026
```

```
TestNet_Saturn = 32028
```

RecordType

```
class il2_rest.enumerations.RecordType
    Bases: il2_rest.enumerations.AutoName
    Enumeration of the types of Records available in IL2.
    Closing = 'Closing'
    Corrupted = 'Corrupted'
    Data = 'Data'
    EmergencyClosing = 'EmergencyClosing'
    Root = 'Root'
```

1.3.4 Util module

Utility classes and functions for the InterlockLedger REST API v3.6.2.

LimitedRange

```
class il2_rest.models.LimitedRange(start, count=1, end=None)
    Bases: object

    A closed interval of integers represented by the notation '[start-end]'. If the range has only one value, the range
    is represented by '[start]'.
```

Parameters

- **start** (*int*) – Initial value of the interval
- **count** (*int*, optional) – How many elements are in the range
- **end** (*int*, optional) – If defined, define the end value of the interval

Raises *ValueError* – If 'count' is 0

start

int – Initial value of the interval

end

int – End value of the interval

__contains__ (*item*)

Check if item is in self.

Parameters *item* (*int/LimitedRange*) – Item to check if is in self.

Returns Return item in self.

Return type *bool*

__eq__ (*other*)

bool: Return self == other.

__hash__()
 int: Hash representation of self.

__str__()
 str: String representation of self.

count
 int – Number of elements in the interval.

overlaps_with(*other*)
 Check if there is an overlap between the intervals of self and other.

Returns Return True if there is an overlap.

Return type bool

classmethod resolve(*text*)
 Parses a string into a *LimitedRange*.

Parameters **text** (str) – String representing the range in the format of '[start]' or '[start-end]'.

Returns An instance of the LimitedRange represented by the *text*.

Return type *LimitedRange*

null_condition_attribute

`il2_rest.models.null_condition_attribute(obj, attribute)`
 Return the value of the item with key equals to attribute.

Parameters

- **obj** (dict) – Dictionary object.
- **attribute** (str) – Attribute name of obj.

Returns The value of the item. If obj is None, return None.

filter_none

`il2_rest.models.filter_none(d)`
 Remove items of a dictionary with None values.

Parameters **d** (dict) – Dictionary object.

Returns Dictionary without None items.

Return type dict

string2datetime

`il2_rest.models.string2datetime(time_string)`
 Convert a string to datetime object. The format of the string is as follows: 'yyyy-mm-ddTHH:MM:SS+HH:MM'.

Parameters **time_string** (str) – string with date and time.

Returns date time object.

Return type datetime.datetime

`to_bytes`

`il2_rest.models.to_bytes(value)`

Decodes value to bytes.

Parameters `value` – Value to decode to bytes

Returns

Return the value as bytes:

- if `type(value)` is `bytes`, return `value`;
- if `type(value)` is `str`, return the string encoded with UTF-8;
- otherwise, returns `bytes(value)`.

Return type `bytes`

ABOUT THIS DOCUMENTATION

This reference manual was created using Sphinx and Google style docstrings. If you need/want to create this manual in another format (HTML, man, etc), you will need to install Sphinx and Sphinx-Napoleon extension:

```
$ pip3 install --user sphinx sphinxcontrib-napoleon2
```

To create an HTML version you can use the following instructions:

```
$ cd docs/  
$ make html
```


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