

# Identity Authority Interface Version 1.0

## Committee Specification Draft 01

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#### Related work:

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- *Roles, Principles, and Ecosystem Version 1.0*. Edited by Matthew Reed. Latest version: <http://docs.oasis-open.org/coel/RPE/v1.0/RPE-v1.0.html>.
- *Behavioural Atom Protocol Version 1.0*. Edited by Joss Langford. Latest version: <http://docs.oasis-open.org/coel/BAP/v1.0/BAP-v1.0.html>.
- *Minimal Management Interface Version 1.0*. Edited by David Snelling. Latest version: <http://docs.oasis-open.org/coel/MMI/v1.0/MMI-v1.0.html>.
- *Public Query Interface Version 1.0*. Edited by David Snelling. Latest version: <http://docs.oasis-open.org/coel/PQI/v1.0/PQI-v1.0.html>.

#### Abstract:

This document defines the interface protocol for an Identity Authority (IDA). The IDA is a central web-based service, needed in any ecosystem that conforms to the ecosystem architecture, that statelessly provides unique, signed Pseudonymous Keys. These Pseudonymous Keys are used to register actors within the ecosystem and are then requested by an actor wishing to register an individual person within the ecosystem (and thus enter into data exchanges about that person's Behavioural Atoms).

#### Status:

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# 1 Introduction

[All text is normative unless otherwise labeled]

## 1.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

## 1.2 Normative References

- [RFC2119] Bradner, S., “Key words for use in RFCs to Indicate Requirement Levels”, BCP 14, RFC 2119, March 1997. <http://www.ietf.org/rfc/rfc2119.txt>.
- [RFC4122] Leach, P., Mealling, M., Salz, R., “A Universally Unique Identifier (UUID) URN Namespace”, RFC 4122, July 2005. <http://tools.ietf.org/html/rfc4122>
- [RFC3339] Klyne, G., Newman, C., “Date and Time on the Internet: Timestamps”, RFC 3339, July 2002. <http://www.ietf.org/rfc/rfc3339.txt>
- [COEL\_RPE-1.0] *Roles, Principles, and Ecosystem Version 1.0*. Latest version: <http://docs.oasis-open.org/coel/RPE/v1.0/RPE-v1.0.docx>

## 1.3 Non-Normative References

- [Data to Life] Reed, M. & Langford, J. (2013). Data to Life. Coalition, London. ISBN 978-0957609402

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## 2 The Identity Authority

An Identity Authority (IDA) provides an Identity Authority Interface (the API) that generates and subsequently validates a digitally signed unique Pseudonymous Key to be used in signup to Data Engine services. The IDA does not require any input to generate the Pseudonymous Key.

Section 3 of this document describes how the API is used by Operators and Data Engines to register Consumers or Devices. Section 4 gives details on the API itself.

The terms Pseudonymous Key, Data Engine, Operator, Hardware Developer and Service Provider are as defined in **[COEL-RPE-1.0]**.

### 3 Protocol Overview

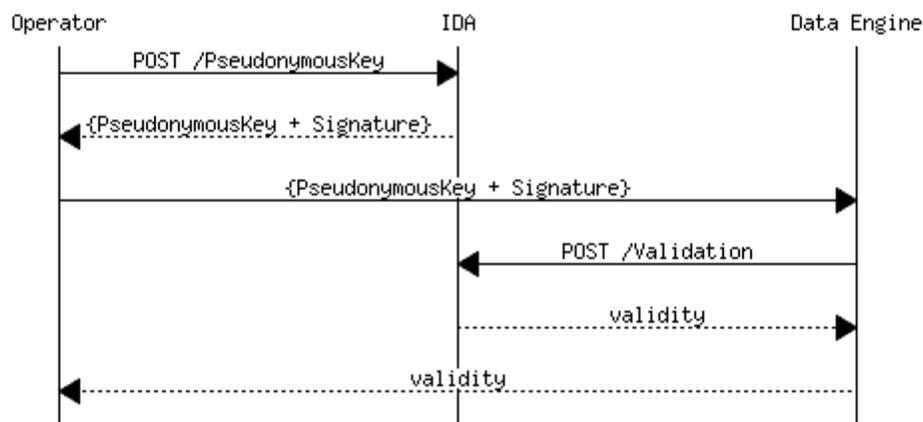


Figure 1: IDA/Data Engine signup sequence

Figure 1 shows the sequence an Operator MUST follow in signing up a new consumer: obtain a Pseudonymous Key from IDA and then use it to signup with the Data Engine. The Pseudonymous Key is used in all subsequent communications with the Data Engine such as sending data, requesting reports. For each new consumer, the Operator and Data Engine use a separate Pseudonymous Key. Applications that generate input (Behavioural Atoms) for the Data Engine also use the Pseudonymous Key.

The signature is used so that the Data Engine can be assured that the Pseudonymous Key is genuine. Rather than using asymmetric key-pairs and distributing a public key and signing algorithm, the IDA provides the means for a receiver of a signed Pseudonymous Key to validate its signature. The Data Engine MUST use this validation mechanism..

It is assumed that this transaction is short – Operators only request Pseudonymous Keys when they need them and register them shortly afterwards (probably within minutes). The Identity Authority needs to be free to alter the means of signature (if for example it believes the mechanism used internally has been revealed). If this change happens during a transaction then validation will fail. This is an unlikely event, but parties in the transaction need to be able to manage it:

- Data Engines receiving a failed validation code MUST pass the failure back to the Operator.
- Operators receiving a failed validation code from the Data Engine MUST discard the Pseudonymous Key and request a new one from the IDA.
- If the second attempt also fails, the Operator SHOULD try once more after a short delay (1-2 seconds) before aborting the attempt to register.

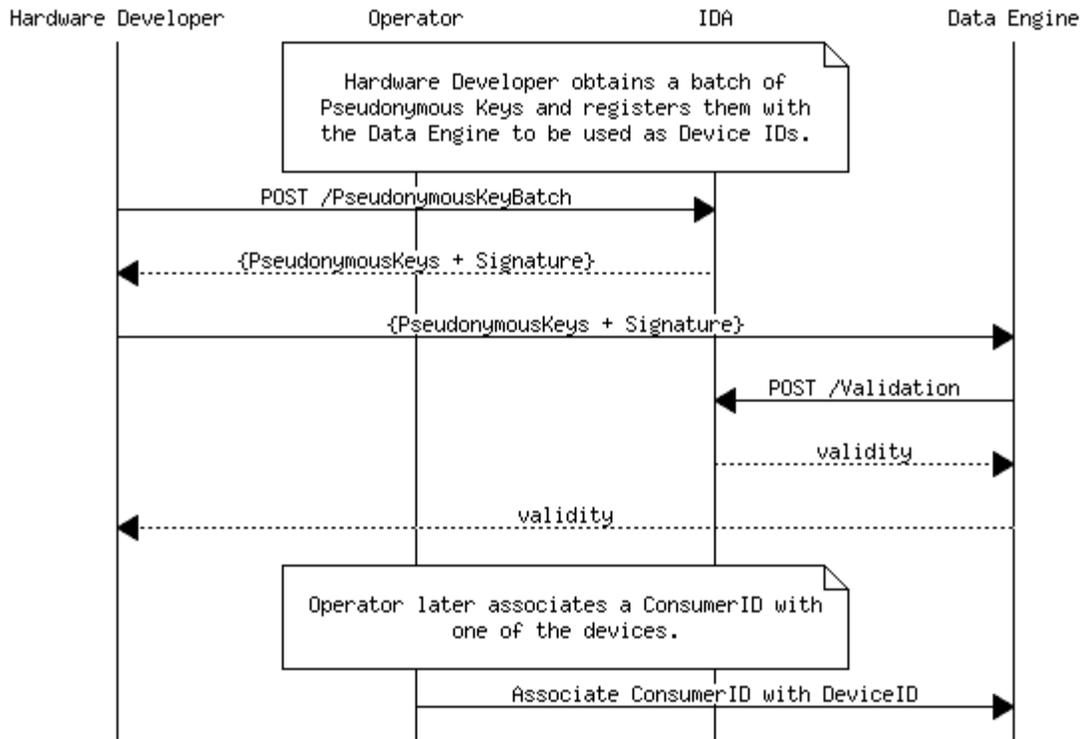


Figure 2: Hardware Developer registering a batch of DeviceIDs

The IDA also provides a means to generate a batch of up to 1000 Pseudonymous Keys in one request. The batch contains a single signature and the same protocol MUST be followed for validation: The Hardware Developer passes the batch to the Data Engine which MUST validate the batch with the IDA. It is expected that the batch transaction will be used to generate Pseudonymous Keys to be used in devices.

Pseudonymous Keys are primarily intended to represent a consumer in the ecosystem. However, Operators and Service Providers also require keys to identify themselves in their machine to machine interactions. IDA generated Pseudonymous Keys MAY be used for this purpose since they are devoid of DIPI and unique across the ecosystem.

---

## 4 API Overview

### 4.1 Introduction

The Identity Authority (IDA) API provides a means for Operators to generate unique Pseudonymous Keys for Consumers or Devices. A Pseudonymous Key is REQUIRED when an Operator registers a consumer or device with a Data Engine. Pseudonymous Keys are digitally signed so that Data Engines can validate them to ensure they were generated by IDA and have not been altered.

### 4.2 Authentication and Authorisation

To access the IDA API, callers need API Credentials with two components:

- A userid to identify the caller.
- A password to authenticate the caller.

A userid MUST be assigned to one of the following two roles in the IDA:

- *Generator*: Allowing the userid to generate Pseudonymous Keys
- *Validator*: Allowing the userid to validate Pseudonymous Keys

HTTP basic authentication SHALL be used to authenticate calls to the API. Passwords SHOULD be 64 bytes in length and MUST be supplied as an ASCII string. This MUST be prefixed with the userid followed by a colon to form the token passed in the HTTP Authorisation Header.

Example:

```
"9abf5386-2ac6-4e61-abc4-6b809a85d6cb:JhmiDAInpo1SBrlrN6H09RqQoerdLCyepbXgE7005OSzXzMeUsGCEXaVNA  
MrKv8D"
```

If the userid is unrecognized, or the wrong password is supplied a HTTP status code *401 Invalid username or password* SHALL be returned.

If a request is made with a userid that is assigned a role that is not authorized to perform that action then the HTTP status code *403 Unauthorised* SHALL be returned.

### 4.3 PseudonymousKey endpoint

The IDA SHALL provide a PseudonymousKey end-point which provides the means to generate Pseudonymous Keys for users whose API Credentials have the Generator role.

---

API	Description
POST /PseudonymousKey	Generate a new signed Pseudonymous Key for an actor. The mechanism used to sign the response is periodically changed, so the response SHOULD be passed to the Data Engine shortly after generation or validation can return false.

---

### 4.3.1 Response

The response SHALL contain three parameters: The Pseudonymous Key; the timestamp at which the response was generated; and a signature that can be used for validation.

---

Parameter Name	Description	Type
<b>PseudonymousKey</b>	Unique key to be used to represent a consumer, Service Provider, Operator or device in the ecosystem.	<b>String:</b> Formatted as a UUID as defined in [RFC_4122, Section 3]
<b>TimeStamp</b>	Date and time at which the PseudonymousKey was generated.	<b>String:</b> Formatted as a date-time according to [RFC_3339].
<b>Signature</b>	ASCII encoded signature which the IDA will use for validation.	<b>String</b>

---

#### Media type:

application/json, text/json

#### Sample:

```
{
  "PseudonymousKey": "00000000-0000-0000-0000-000000000000",
  "TimeStamp": "2011-02-14T00:00:00",
  "Signature": "SGFDXCTVIVVIFUJUUVUYBKJKJHBK=="
}
```

### 4.4 PseudonymousKeyBatch endpoint

The IDA SHALL provide a PseudonymousKeyBatch end-point which provides the means to generate a batch of Pseudonymous Keys in one response packet for users whose API Credentials have the Generator role.

---

API	Description
POST /PseudonymousKeyBatch	Generate a new signed batch of Pseudonymous Keys. The mechanism used to sign the response is periodically changed, so the response SHOULD be passed to the Data Engine shortly after generation or

---

---

API	Description
-----	-------------

---

validation can return false.

---

#### 4.4.1 Request

The request body SHALL contain one parameter: Size.

---

Parameter Name	Description	Type
Size	The number of PseudonymousKeys to return in the batch.	Integer: $1 \leq n \leq 1000$

---

##### Media type:

`application/json, text/json`

##### Sample:

```
{"Size": 1000}
```

#### 4.4.2 Response

The response SHALL contain three parameters: An array of Pseudonymous Keys; the timestamp at which the response was generated; and a signature that can be used for validation.

---

Parameter Name	Description	Type
PseudonymousKeys	Array of unique keys to be used to represent a devices in the ecosystem.	<b>Array of String:</b> Each string formatted as a UUID as defined in [RFC_4122, Section 3]
TimeStamp	Date and time at which the PseudonymousKey was generated.	<b>String:</b> Formatted as a date-time according to [RFC_3339].
Signature	ASCII encoded signature which the IDA will use for validation.	<b>String</b>

---

##### Media type:

application/json, text/json

**Sample:**

```
{
  "PseudonymousKeys": [
    "00000000-0000-0000-0000-000000000000",
    "00000000-0000-0000-0000-000000000001",
    "00000000-0000-0000-0000-000000000002"]
  "TimeStamp": "2011-02-14T00:00:00",
  "Signature": "SGFDXCTVIVVIFUJUVUYBKJKJHBK=="
}
```

The IDA SHALL be capable of generating a batch of up to 1000 PseudonymousKeys.

## 4.5 Validation endpoint

The IDA SHALL provide a Validation end-point which provides the means to validate a signed PseudonymousKey or a signed batch of PseudonymousKeys for users whose API Credentials have the Validator role.

---

API	Description
POST /Validation	Validates a single signed Pseudonymous Key or a signed batch of Pseudonymous Keys to ensure that they were generated by IDA. The mechanism used for signing is periodically changed. If validation returns false, the caller MUST request that the Operator requests a new Pseudonymous Key.

---

### 4.5.1 Request

The request body format SHALL conform to the specification of EITHER the /PseudonymousKey response packet OR the /PseudonymousKeyBatch response packet.

**Media type:**

application/json, text/json

**Sample 1 (Single input):**

```
{
  "PseudonymousKey": "00000000-0000-0000-0000-000000000000",
  "TimeStamp": "2011-02-14T00:00:00",
  "Signature": "SGFDXCTVIVVIFUJUVUYBKJKJHBK=="
}
```

**Sample 2 (Batch input):**

```
{
  "PseudonymousKeys": [
    "00000000-0000-0000-0000-000000000000",
    "00000000-0000-0000-0000-000000000001",
    "00000000-0000-0000-0000-000000000002"]
  "TimeStamp": "2011-02-14T00:00:00",
}
```

```
    "Signature": "SGFDXCTVIVVIFUJUUVUYBKYKJHBK=="
  }
```

## 4.5.2 Response

The response SHALL contain one parameter: the result of the validation.

---

Parameter Name	Description	Type
Result	Validity of the packet: true or false	Boolean: true or false.

---

### Media type:

application/json, text/json

### Sample:

```
{"Result": true}
```

---

## 5 Conformance

An implementation is a conforming Identity Authority Interface if the implementation meets the conditions in Section 4 of this document AND the conformance criteria in **[COEL\_RPE-1.0]**

---

## Appendix A. Acknowledgments

The following individuals have participated in the creation of this specification and are gratefully acknowledged:

**Participants:**

Paul Bruton, Individual Member  
Joss Langford, Activinsights  
Matthew Reed, Coelition  
David Snelling, Fujitsu

## Appendix B. Revision History

Revision	Date	Editor	Changes Made
1	27/07/2015	Paul Bruton	Initial version for OASIS submission
2	15/09/2015	Paul Bruton	Header page, references, acknowledgements, conformance sections finalized. Body text still needs a review so that it clearly uses normative language in section 4, with sections 2 and 3 being descriptive text only.
3	21/09/2015	Paul Bruton	Clarification of terms by replacing 'access credentials' with 'API Credentials' to signify that the userid/password combination is used only for API access.
4	22/09/2015	Paul Bruton	Action #0016: Removed 'api/' prefix from methods in API.
5	23/09/2015	Paul Bruton	Added normative references for UUID and TimeStamp formats. Corrected sequence diagrams following removal of api/. Section 4 altered to use appropriate normative terms. Added definitions of request and response (action #0014). Added references to related works
6	25/09/2015	Joss Langford	Review with minor changes to clarify meanings and correct spelling.
7	05/10/2015	Paul Bruton	Previous changes accepted. Added reference to conformance criteria in RPE and clarified the name of the conformance target: Identity Authority Interface, referred to as the API.
8	19/10/2015	David Snelling	A few tweaks and fixed the COEL link.
9	20/10/2015	Paul Bruton	Accepted changes, Resolved COEL-39 (data engine must validate) and COEL-40 (removed unnecessary text about combining data engine data)
10	21/10/2015	Paul Bruton	Minor changes for consistent style
11	31/10/2015	Joss Langford	Accept all changes, track changes off, check references and style consistency.
12	02/11/2015	David Snelling	Final data change.
13	03/11/2015	Paul Bruton	Spelling correction following review.
14	25/11/2015	David Snelling	Set date for final CD publication.