Minimal Management Interface Version 1.0

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- Roles, Principles, and Ecosystem Version 1.0. Edited by Matthew Reed. Latest version:
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  http://docs.oasis-open.org/coel/IDA/v1.0/IDA-v1.0.html.
- Public Query Interface Version 1.0. Edited by David Snelling. Latest version:
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Abstract:
This document defines a minimal interface between the Data Engine and other actors in the ecosystem, namely the Service Provider and the Operator. The interface provides for registering and managing Operators, Devices, and Consumers within a Data Engine. This interface represents the minimal requirements of a Data Engine’s management interface, but does not limit this interface to these capabilities.
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1 Introduction

This document defines the Minimal Management Interface (MMI) between the Data Engine and other actors in the ecosystem. It provides operation definitions on the Data Engine for use by a Service Provider to register a new Operator, to retrieve a list of existing Operators, to retrieve a list of Consumers associated with a given Operator, to suspend and resume Operators, register and unassign Devices and to assure a consumer is registered. It also provides operations definitions on the Data Engine for use by an Operator to register a Consumer, forget a Consumer and to associate a device with a consumer.

This interface represents the minimal requirements of a Data Engine’s management interface, but does not limit this interface to these capabilities. High quality Data Engines may offer more comprehensive management services.

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


[COEL_IDA-1.0] Identity Authority Interface Version 1.0. Latest version: http://docs.oasis-open.org/coel/IDA/v1.0/IDA-v1.0.docx


1.3 Non-Normative References


2 Interface Specification

The Minimal Management Interface on the Data Engine is divided into sections depending on which actor and function in a COEL ecosystem is communicating with the Data Engine. The following sub-sections define these interfaces.

2.1 Authentication and Authorisation

To access all Service Provider functions of the Data Engine MMI API, Service Providers need access credentials with two components:

- A userid to identify the caller.
- A password for authentication.

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.

Note that while Operators need to secure their connection to the Data Engine with TLS, they do not need to Authenticate or Authorise.

Example:

"9abf5386-2ac6-4e61-abc4-6b809a85d6cb:J1dOeWJ0kd3akhnSn4ma007M
DtUMVAXISgyOn9jI2U9NHNdRi14hfiw9c2I8PURcV1tNMWQkamsrFR4T24vKA=="

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

Note: All Operator functions do not require authentication or authorisation.

2.2 Service Provider: Create New Operator

Create a new Operator within the Data Engine and associate it with the requesting Service Provider. Completion of this operation allows the Operator to register new Consumers.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST service-provider/operator</td>
<td>Create an Operator identity within the Data Engine permitting that operator to create and register Consumers.</td>
</tr>
</tbody>
</table>
### 2.2.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key generated by an IDA and associated with the Operator being registered.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>TimeStamp</td>
<td>Time stamp of the OperatorID indicating when the IDA created this Pseudonymous Key.</td>
<td>DateTimeString: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>Signature</td>
<td>Signature proving that an IDA created this OperatorID.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>

**Media type:**

```
application/json, text/json
```

**Sample:**

```
{
  "OperatorID": "00000000-0000-0000-0000-000000000000",
  "TimeStamp": "2011-02-14T00:00:00",
  "Signature":
    "AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
     AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
     AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA=
    "
}
```

### 2.2.2 Response

If successful, an HTTP status code of 200 OK MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure.

If validation of the OperatorID fails, with a 410 (Gone) error from the IDA, an error 410 (Gone) should be returned.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>An optional description of why the registration failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

**Media type:**

```
application/json, text/json
```
Sample:

{"Reason":"Operator was not valid."}

# 2.3 Service Provider: Retrieve Operator List

A Service Provider uses this operation to retrieve a list of all registered Operators registered to the requesting Service Provider.

## API

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GET service-provider/operators</td>
<td>Retrieve a list of all Operators associated with the requesting Service Provider.</td>
</tr>
</tbody>
</table>

## 2.3.1 Request

The request is empty.

## 2.3.2 Response

If successful, an HTTP status code of 200 OK MUST be returned along with an array of Pseudonymous Keys each associated with an Operator associated with the requesting Service Provider. If unsuccessful, an HTTP error code SHOULD be returned, in which case a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>OperatorIDs</td>
<td>An array of Pseudonymous Keys one for each of the Operators associated with the requesting Service Provider.</td>
<td>Array of String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>Reason</td>
<td>An optional description of why the operation failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

Media type:

application/json, text/json

Sample:

```json
{"OperatorIDs": [ "00000000-0000-0000-0000-000000000000", "00000000-0000-0000-0000-000000000001", "00000000-0000-0000-0000-000000000002"]}
```
2.4 Service Provider: Retrieve Consumer List

A Service Provider uses this operation to retrieve a list of all Consumers registered to a given Operator, which is in turn registered to the requesting Service Provider.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST service-provider/consumers</td>
<td>Retrieve a list of all Consumers associated with a given Operator, which is in turn associated with the requesting Service Provider.</td>
</tr>
</tbody>
</table>

2.4.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key generated by an IDA and associated with an Operator registered with the Data Engine.</td>
</tr>
<tr>
<td></td>
<td><strong>Type</strong>: String; Format defined in [COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>

**Media type:** application/json, text/json

**Sample:**

```
{"OperatorID": "00000000-0000-0000-0000-000000000000"}
```

2.4.2 Response

If successful, an HTTP status code of 200 OK MUST be returned along with an array of Pseudonymous Keys each associated with a Consumer registered with the given Operator which is in turn associated with the requesting Service Provider. If unsuccessful, an HTTP error code SHOULD be returned, in which case a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConsumerIDs</td>
<td>An array of Pseudonymous Keys one for each of the Consumers associated with given Operator.</td>
<td><strong>Array of String</strong>: Format defined in [COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>
### Parameter Name | Description | Type
---|---|---
Reason | An optional description of why the operation failed. | String:

**Media type:**
application/json, text/json

**Sample:**
```json
{
    "ConsumerIDs": [
        "00000000-0000-0000-0000-000000000000",
        "00000000-0000-0000-0000-0000000001",
        "00000000-0000-0000-0000-0000000002"
    ]
}
```

---

### 2.5 Service Provider: Suspend Operator

Suspend the given Operator’s ability to create new Consumers and assign devices. This operation has no effect on data stored for existing Consumers. The Operator will still be permitted to execute a Forget Consumer operation.

#### 2.5.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key generated by an IDA and associated with the Operator to be suspended.</td>
</tr>
</tbody>
</table>

**Media type:**
application/json, text/json

**Sample:**
```json
{"OperatorID": "00000000-0000-0000-0000-000000000000"}
```
2.5.2 Response

If successful, an HTTP status code of 200 OK MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>An optional description of why the Operator suspension failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

Media type: 
application/json, text/json

Sample:
{
"Reason":"Operator does not exist."
}

2.6 Service Provider: Resume Operator

Resume the given Operator’s ability to create new Consumers and assign devices.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST service-provider/resumeOperator</td>
<td>Resume the given Operator’s ability to register new Consumers and assign devices.</td>
</tr>
</tbody>
</table>

2.6.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key generated by an IDA and associated with the Operator to be resumed.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>

Media type: 
application/json, text/json

Sample:
{"OperatorID": "00000000-0000-0000-0000-000000000000"}

### 2.6.2 Response

If successful, an HTTP status code of 200 *OK* MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>An optional description of why the Operator resumption failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

Media type: 
application/json, text/json

Sample:

```json
{"Reason":"Operator does not exist."}
```

### 2.7 Service Provider: Register Devices

All devices associated with a Service Provider are registered in advance of being assigned to a Consumer (see Section 2.12). Register Devices associates one or more Devices with Service Provider, assigns it a device type (Personal or IoT), and validates the Pseudonymous Keys of the device. A Device SHALL be registered only once. Only Operators associated with the Registering Service Provider MAY Assign the Device to a Consumer.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST service-provider/registerDevices</td>
<td>Register one or more devices with the Data Engine and associate the Devices’ Pseudonymous Keys and device types with the calling Service Provider.</td>
</tr>
</tbody>
</table>

### 2.7.1 Request

The request body is a JSON array containing the following JSON elements.
### Parameter Name | Description | Type
--- | --- | ---
**DeviceIDs** | An array of Pseudonymous Keys associated with the Devices and generated by an IDA. | **Array of String**: Format defined in [COEL_IDA-1.0].
**TimeStamp** | Time stamp indicating when the IDA created these Pseudonymous Keys. | **DateTimeString**: Format defined in [COEL_IDA-1.0].
**Signature** | Signature proving that an IDA created these Pseudonymous Keys. | **String**: Format defined in [COEL_IDA-1.0].
**DeviceType** | A string indicating that the devices are personal devices that MAY be assigned to exactly one Consumer each or IoT devices that MAY be assigned to multiple Consumers. | **String**: Either “Personal” or “IoT”.

**Media type:**
application/json, text/json

**Sample:**
```json
{"DeviceIDs": ["00000000-0000-0000-0000-000000000001", "00000000-0000-0000-0000-000000000002", "00000000-0000-0000-0000-000000000003"], "TimeStamp": "2011-02-14T00:00:00", "Signature": "AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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### 2.7.2 Response

If successful, an HTTP status code of 200 **OK** MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

If validation of the OperatorID fails, with a 410 (Gone) error from the IDA, an error 410 (Gone) should be returned.
### Parameter Name | Description | Type
---|---|---
**Reason** | An optional description of why the operation failed. | **String:**

**Media type:**

application/json, text/json

**Sample:**

```json
{"Reason": "DeviceIDs failed to validate with the IDA."}
```

### 2.8 Service Provider: Unassign Device

Remove all the assignments of the Device from Consumers to which it has been assigned. Note: for IoT devices all assigned Consumers will be unassigned and the Operator might need to reassign some Consumers if for example the Operator wished to remove only one Consumer.

**API**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELETE service-provider/unassignDevice</td>
</tr>
</tbody>
</table>

Remove the assignment of the device identified by a Pseudonymous Key from all Consumers associated with the Device.

#### 2.8.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DeviceID</strong></td>
<td>A Pseudonymous Key associated with the Device and generated by an IDA.</td>
</tr>
</tbody>
</table>

**Media type:**

application/json, text/json

**Sample:**

```json
{"DeviceID": "00000000-0000-0000-0000-000000000000"}
```
2.8.2 Response

If successful, an HTTP status code of 200 OK MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>An optional description of why the operation failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

Media type:
application/json, text/json

Sample:
{"Reason": "Device not registered by this Service Provider."}

2.9 Service Provider: Assure

This operation provides assurance that a given Consumer is associated to a given Operator and that both are associated with the requesting Service Provider.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST service-provider/assure</td>
<td>Assure that the given Consumer and Operator are associated with each other and with the requesting Service Provider.</td>
</tr>
</tbody>
</table>

2.9.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConsumerID</td>
<td>A Pseudonymous Key associated with the Consumer and generated by an IDA.</td>
<td>String: Format defined in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[COEL_IDA-1.0].</td>
</tr>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key generated by an IDA and associated with the Operator.</td>
<td>String: Format defined in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>
Media type:
application/json, text/json

Sample:
```
{
    "ConsumerID": "00000000-0000-0000-0000-000000000001",
    "OperatorID": "00000000-0000-0000-0000-000000000002"
}
```

### 2.9.2 Response

If successful, an HTTP status code of 200 OK MUST be returned along with a JSON object indicating if assurance was achieved or not. If unsuccessful, an HTTP error code SHOULD be returned, in which case a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assured</td>
<td>A Boolean value that is true if the given Consumer and Operator are associated with each other and with the requesting Service Provider and false otherwise.</td>
<td>Boolean</td>
</tr>
</tbody>
</table>

Media type:
application/json, text/json

Sample:
```
{"Assured": true }
```

### 2.10 Operator: Forget Consumer

Request that a Consumer associated with this Operator be forgotten by the Data Engine. This operation MAY not proceed synchronously, as the Data Engine MUST confirm the request with the Service Provider associated with the requesting Operator. The mechanism for confirmation is out of scope of this specification, e.g. email confirmation. The Data Engine MAY either delete all data associated with the Consumer or render that data non-personal.

The Data Engine SHOULD keep a record of which consumers have been forgotten (for audit purposes).

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST operator/forgetConsumer</td>
<td>Delete or render non-personal all data associated with the given Consumer.</td>
</tr>
</tbody>
</table>
2.10.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConsumerID</td>
<td>A Pseudonymous Key associated with the Consumer and generated by an IDA.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>

Media type:
application/json, text/json

Sample:

```
{“ConsumerID”: “00000000-0000-0000-0000-000000000000”}
```

2.10.2 Response

If successful, an HTTP status code of 201 Accepted MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>An optional description of why the operation failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

Media type:
application/json, text/json

Sample:

```
{“Reason”: “Internal error.”}
```

2.11 Operator: Create New Consumer

Create a new Consumer within the Data Engine and associate it with the given Operator. Completion of this operation allows Behavioural Atoms to be posted anonymously to the Data Engine and be associated with the given Consumer. This function does not require authentication or Authorization. This operation is not permitted when an operator is suspended.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST operator/consumer</td>
<td>Create a Consumer identity within the Data Engine associated with the given Operator.</td>
</tr>
</tbody>
</table>
## 2.11.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key associated with the Operator and generated by an IDA.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>ConsumerID</td>
<td>A Pseudonymous Key associated with the Consumer and generated by an IDA.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>TimeStamp</td>
<td>Time stamp of the ConsumerID indicating when the IDA created this Pseudonymous Key.</td>
<td>DateTimeString: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>Signature</td>
<td>Signature proving that an IDA created this ConsumerID.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>SegmentData</td>
<td>An OPTIONAL object containing (OPTIONALLY) residential time zone and latitude, gender, and year of birth.</td>
<td>Object: Composed of ResidentTimeZone, ResidentLatitude, Gender, and YearOfBirth.</td>
</tr>
<tr>
<td>ResidentTimeZone</td>
<td>The time zone in which the Consumer generally resides.</td>
<td>TimeZoneString: As +/- hh:mm from UTC.</td>
</tr>
<tr>
<td>ResidentLatitude</td>
<td>The latitude (rounded to an integer) at which the Consumer generally resides.</td>
<td>Integer: Representing latitude rounded to an integer.</td>
</tr>
<tr>
<td>Gender</td>
<td>The gender of the Consumer.</td>
<td>Integer 0-99:</td>
</tr>
<tr>
<td></td>
<td>0 not known</td>
<td></td>
</tr>
<tr>
<td>Parameter Name</td>
<td>Description</td>
<td>Type</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>YearOfBirth</td>
<td>Year in which the Consumer was born.</td>
<td>Integer: Representing year of birth.</td>
</tr>
</tbody>
</table>

The Gender parameter SHALL have enumerated fields reserved for compliance with [ISO/IEC 5218].

**Media type:**

application/json, text/json

**Sample:**

```json
{
  "OperatorID": "00000000-0000-0000-0000-000000000000",
  "ConsumerID": "00000000-0000-0000-0000-000000000000",
  "TimeStamp": "2011-02-14T00:00:00",
  "Signature":
    "AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
    AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA=",
  "SegmentData":
    {
      "ResidentTimeZone": "+03:00",
      "ResidentLatitude": 51,
      "Gender": 2,
      "YearOfBirth": 1993
    }
}
```

### 2.11.2 Response

If successful, an HTTP status code of 200 OK MUST be returned. If unsuccessful due to errors in the request content, an HTTP error code 400 (Bad Request) SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

If validation of the Consumer ID fails, with a 410 (Gone) error from the IDA, an error 410 (Gone) should be returned. A JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.
Media type:
application/json, text/json

Sample:
{
"Reason": "Invalid Latitude: must be in range -90..+90 ."
}

2.12 Operator: Assign a Device to a Consumer

Assign a Pseudonymous Key representing a device to a Consumer associated with the requesting Operator. All Atoms posted with this Pseudonymous Key will be associated with the corresponding Consumer. Once assigned to a Consumer, a Personal Device MUST not be reassigned to another Consumer, without first being Unassigned from all Consumers (see Section 2.8). An Operator MAY assign an IoT Device to multiple Consumers. This function does not require authentication or authorization. This operation is not permitted when an operator is suspended. The Device, the Operator, and the Consumer MUST already be registered with the Data Engine and associated with the same Service Provider.

<table>
<thead>
<tr>
<th>API</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST operator/device</td>
<td>Associate a device, identified by a Pseudonymous Key, to a registered Consumer associated with the requesting Operator.</td>
</tr>
</tbody>
</table>

2.12.1 Request

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeviceID</td>
<td>A Pseudonymous Key associated with the Device and generated by an IDA.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>OperatorID</td>
<td>A Pseudonymous Key of the Operator to which the Consumer is associated.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
<tr>
<td>ConsumerID</td>
<td>A Pseudonymous Key of the user to which the device is to be associated. The user MUST already be associated with the requesting Operator.</td>
<td>String: Format defined in [COEL_IDA-1.0].</td>
</tr>
</tbody>
</table>
Media type:
application/json, text/json

Sample:

```json
ds

{“DeviceID”: “00000000-0000-0000-0000-000000000000”,
 “OperatorID”: “00000000-0000-0000-0000-000000000001”,
 “ConsumerID”: “00000000-0000-0000-0000-000000000002”
}
```

### 2.12.2 Response

If successful, an HTTP status code of 200 OK MUST be returned. If unsuccessful, an HTTP error code SHOULD be returned and a JSON object MAY be returned providing some explanation of the failure, see section 2.2.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>An optional description of why the operation failed.</td>
<td>String:</td>
</tr>
</tbody>
</table>

Media type:
application/json, text/json

Sample:

```json
{
 “Reason”: “DeviceID is already associated with a consumer.”
}
```
3 Conformance

An implementation is a conforming Minimal Management Interface if the implementation meets the conditions set out in Section 2 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

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Editor</th>
<th>Changes Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21/08/2015</td>
<td>David Snelling</td>
<td>A few minor changes to test the revision process in Kavi.</td>
</tr>
<tr>
<td>2</td>
<td>21/09/2015</td>
<td>David Snelling</td>
<td>First complete version, based on submitted material.</td>
</tr>
<tr>
<td>3</td>
<td>25/09/2015</td>
<td>Paul Bruton</td>
<td>Added review comments</td>
</tr>
<tr>
<td>4</td>
<td>25/09/2015</td>
<td>Joss Langford</td>
<td>Review, spell correction and change of ‘sex’ to ‘gender’ in section 2.4</td>
</tr>
<tr>
<td>5</td>
<td>11/10/2015</td>
<td>David Snelling</td>
<td>Edits for issues: COEL-10 (Segment data), COEL-17 (Location of security), COEL-23 (Forget operation)</td>
</tr>
<tr>
<td>6</td>
<td>11/10/2015</td>
<td>David Snelling</td>
<td>Removed tracking</td>
</tr>
<tr>
<td>7</td>
<td>13/10/2015</td>
<td>Paul Bruton</td>
<td>Conformance includes reference to RPE document.</td>
</tr>
<tr>
<td>8</td>
<td>19/10/2015</td>
<td>David Snelling</td>
<td>COEL-13 and a few style and consistence issues.</td>
</tr>
<tr>
<td>9</td>
<td>23/10/2015</td>
<td>David Snelling</td>
<td>Adding OperatorID to New Consumer request.</td>
</tr>
<tr>
<td>10</td>
<td>30/10/2015</td>
<td>David Snelling</td>
<td>Removed text allowing reassignment of Devices by Operator.</td>
</tr>
<tr>
<td>11</td>
<td>31/10/2015</td>
<td>Joss Langford</td>
<td>Accept all changes, track changes off, check references and style consistency.</td>
</tr>
<tr>
<td>12</td>
<td>02/11/2015</td>
<td>David Snelling</td>
<td>Final date change</td>
</tr>
<tr>
<td>13</td>
<td>03/11/2015</td>
<td>Paul Bruton</td>
<td>Corrected authorization and authentication description; Spelling correction; Corrected description of TimeStamp and Signature parameters in operator/device, also added OperatorID parameter since there will be no authorization header in this request.</td>
</tr>
<tr>
<td>14</td>
<td>03/11/2015</td>
<td>Paul Bruton</td>
<td>Minor spelling correction.</td>
</tr>
<tr>
<td>15</td>
<td>25/11/2015</td>
<td>David Snelling</td>
<td>Fixed 45, 47, &amp; 52.</td>
</tr>
<tr>
<td>16</td>
<td>25/11/2015</td>
<td>David Snelling</td>
<td>Fixed Revision History.</td>
</tr>
<tr>
<td>17</td>
<td>25/11/2015</td>
<td>Joss Langford</td>
<td>Changes accepted and track changes switched off.</td>
</tr>
<tr>
<td>18</td>
<td>25/11/2015</td>
<td>David Snelling</td>
<td>Set date for final publication.</td>
</tr>
<tr>
<td>19</td>
<td>07/01/2016</td>
<td>David Snelling</td>
<td>Update to WD02 and changed error code management in line with issue COEL-42.</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>Author</td>
<td>Description</td>
</tr>
<tr>
<td>---</td>
<td>------------</td>
<td>----------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>20</td>
<td>14/01/2016</td>
<td>Paul Bruton</td>
<td>Made &quot;Reason&quot; codes in response body explicit and added comment in 2.6.2 about how to identify an invalid Consumer ID.</td>
</tr>
<tr>
<td>21</td>
<td>21/01/2016</td>
<td>David Snelling</td>
<td>Edits to change operator/forget to operator/forgetConsumer. Edits to pass on error 410 Gone from the IDA to the Operator. Text for call back mechanism for operator/forgetConsumer added.</td>
</tr>
<tr>
<td>22</td>
<td>12/02/2016</td>
<td>Paul Bruton</td>
<td>Accepted previous edits. Spelling correction in ‘forgetConsumer’ text; Change to 201 Accepted in forgetConsumer response.</td>
</tr>
<tr>
<td>23</td>
<td>02/03/2016</td>
<td>Paul Bruton</td>
<td>COEL-58 Added Service Provider: Unassign Device and sequence diagram to illustrate usage.</td>
</tr>
<tr>
<td>24</td>
<td>08/03/2016</td>
<td>Paul Bruton</td>
<td>COEL-58 Following discussion, proposing to implement this as a DELETE operation.</td>
</tr>
<tr>
<td>25</td>
<td>21/03/2016</td>
<td>Dave Snelling</td>
<td>Corrected spelling, updated ToC, and accepted changes for versions 22-24.</td>
</tr>
<tr>
<td>26</td>
<td>16/06/2016</td>
<td>Dave Snelling</td>
<td>COEL-15: Added suspension and resumption of operators. Moved Unassign Device next to other service provider operations.</td>
</tr>
<tr>
<td>27</td>
<td>17/06/2016</td>
<td>Dave Snelling</td>
<td>Typos and removed change tracking.</td>
</tr>
<tr>
<td>28</td>
<td>21/08/2016</td>
<td>Joss Langford</td>
<td>Gender field of segment data updated (COEL-74).</td>
</tr>
<tr>
<td>29</td>
<td>24/08/2016</td>
<td>David Snelling</td>
<td>Device assignment and unassignment and shared devices added. COEL-61.</td>
</tr>
<tr>
<td>30</td>
<td>24/08/2016</td>
<td>David Snelling</td>
<td>Added operation to assure the association between Consumer and Operator. COEL-66</td>
</tr>
<tr>
<td>31</td>
<td>26/08/2016</td>
<td>David Snelling</td>
<td>Fixed quotes in gender and batched DeviceIDs.</td>
</tr>
<tr>
<td>32</td>
<td>02/09/2016</td>
<td>David Snelling</td>
<td>Fixed number problems in the Register Devices Operation.</td>
</tr>
<tr>
<td>33</td>
<td>16/09/2016</td>
<td>Joss Langford</td>
<td>Reference correction COEL-81</td>
</tr>
<tr>
<td>34</td>
<td>23/09/2016</td>
<td>Paul Bruton</td>
<td>Reference to 410 (gone) added to sections that require IDA validation calls. Preamble updated. Question about parameters in Forget Consumer (COEL-82).</td>
</tr>
<tr>
<td>35</td>
<td>23/09/2016</td>
<td>Paul Bruton</td>
<td>Removed comment after resolution of COEL-82</td>
</tr>
<tr>
<td>36</td>
<td>10/10/2016</td>
<td>Joss Langford</td>
<td>Revision numbers corrected &amp; changes accepted.</td>
</tr>
</tbody>
</table>