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| logo_ec_17_colors_300dpi | EUROPEAN COMMISSION  DG Employment, Social Affairs and Inclusion  Labour Mobilty  Free Movement of Workers, EURES |

Brussels,

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| --- |
| EURES  New Regulation (EU) 2016/589  Functional Message Exchange Specifications  Version 1.3.2 |

Document History

|  |  |  |
| --- | --- | --- |
| Version | Release Date | Description |
| 1.0 | 07/12/2016 | Version IOC 20161208 |
| 1.1 | 16/01/2017 | Clarifications of some requirements, fixes of small issues detected during the development of the default implementation modules, layout revision. |
| 1.2 | 29/03/2017 | Version IOC 20170329:   * Source of JV/CV made mandatory (see sections 2.1 and 3.5); * Reference concept definition updated to authorize the reuse of references of closed JVs/CVs (see section 2.1); * Added examples of correct usage of timestamps to reflect frequent publishing and unpublishing of the same JVs/CVs (see section 2.2.1); * Reference data type definition updated to authorize all ASCII printable characters, except the space (see section 2.1); * Business rule added in the Get details service description for the JVs/CVs with reused references (see section 3.5.3); * Specifications added for CV Input API and name of services changed to make them more generic (see section 3.5); * Chapter added for the support of compression in input APIs (see chapter 6). |
| 1.3 | 23/06/2017 | Version IOC 20170623:   * Default length for string and text added (see section 2.3.4); * Security chapter completed (see chapter 7); * Service Level Agreement chapter added (see chapter 8); |
| 1.3.1 | 11/07/2017 | Minor number added in version of URL examples of the input API |
| 1.3.2 | 08/05/2018 | Added information in chapter 7 on the extra security option offered by ECO to use headers and keys on each web service reply. |

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Reference Documents

This section contains the lists of all reference and applicable documents. When referring to any of the documents below, the bracketed reference will be used in the text, such as [[R01](#R01)].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ref. | Title | Reference | Version | Date |
| R01 | EURES Job Vacancy Data Standard description | EURES-JV-StandardStaticModel | 1.1 | 29/03/2017 |
| R02 | EURES Job Profile Data Standard description | EURES-CV-StandardStaticModel | 1.1 | 29/03/2017 |
| R03 | EURES New regulation | <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2016:107:TOC> | N/A | N/A |
| R04 | The JSON Data Interchange Format | <http://www.ecma-international.org/publications/files/ECMA-ST/ECMA-404.pdf> | N/A | N/A |
| R05 | EURES Interoperability: EURES Partner Process Manual | N/A | 6.0 | 05/12/2016 |

Table : Reference Documents

Abbreviations and Acronyms

|  |  |
| --- | --- |
| Abbreviation | Meaning |
| API | Application Programming Interface |
| CV | See definitions section below. |
| DG EMPL | Directorate-General of Employment, Social Affairs & Inclusion |
| EC | European Commission |
| HTTP | Hypertext Transfer Protocol |
| JSON | JavaScript Object Notation |
| JV | Job Vacancy as defined by the EURES Formats & Standards specifications. |
| REST | Representational State Transfer |
| TLS | Transport Layer Security |
| URI | Uniform Resource Identifier |
| URL | Uniform Resource Locator |
| XML | eXtensible Mark-up Language |

Table : Abbreviations and Acronyms

Definitions

|  |  |
| --- | --- |
| Term | Meaning |
| CV | The term CV in this document refers to the full concept of a Jobseeker profile, which is the combination of a Curriculum Vitae and desired employment criteria as defined in [R03­] The actual scope of information that is considered as a Jobseeker Profile is defined by the EURES Formats & Standards specifications [R02]. |
| EURES Formats & Standards Specification | Format imposed by EURES new regulation for the exchange of CVs and JVs between EC and the Member States |
| Input API | The role of the input API is to permit the exchange of JVs and CVs between EC and the Member States. It is divided into two different APIs: the EURES input API (implemented by EC) and the NCO input API (implemented by each Member State) |
| EURES Input API | The Input API provided by EC that will provide some useful services to the Member States (asking EC to perform a replication for example). |
| NCO Input API | The Input API provided by the Member States and called by EURES to replicate the JVs and CVs of the Member States. |
| National Coordination Office (NCO) | Responsible for the transfer of available data to EC and for providing general support and assistance to all EURES Members and Partners on their territory.  The NCOs also have the task of verifying compliance issues as regards the standards for the intrinsic and technical quality of data and data protection.  The IOC (interoperability contact person) is the designated single point of contact of the NCO that will be involved in all the agreed IOC processes that handle the communication between DG EMPL and the NCO |

Table : Definitions

# Introduction

## Purpose of the document

The purpose of this document is to specify the REST APIs that Member States must expose to EC to exchange the Member States JVs/CVs in a correct manner. This document specifies parts of the uniform system referred to in the EC regulation [R03]. In a next version, this document will also specify the REST Push API that will be exposed by EC to allow the Member States to trigger a replication of their data.

## Scope of the document

The scope of this document is limited to the following elements:

* The transmission format wrapper in which Member States must offer JVs and CVs in EURES HR Open Standard format to EC.
* The modalities for exchanging partial sets of JVs and CVs based on their creation, last modification and closing dates.
* Business rules regarding the acceptance of the disseminated JVs and CVs by EC.

In a next version of the document, the scope of the document will be extended to the specifications of the REST Push API that will be exposed by EC.

The following elements are out of the scope of this document:

* The specifications of the EURES HR Open Standard format for exchange of JVs (it is specified in [R01]);
* The specifications of the EURES HR Open Standard format for exchange of CVs (it is specified in [R02]).

## Intended audience

The present document is intended to be read by the following people:

* The DG EMPL representatives;
* EURES Interoperability contact persons.

## Structure of the document

The document is organized as follows:

Chapter 1: **Introduction** summarizes the purpose and scope of the EURES Functional Message Exchange Specifications document. This specifies the applications that are concerned by the document, and the intended audience;

Chapter 2: **Definitions** specifies the high-level concepts of the specification;

Chapter 3: **Services** specifies the different services the input APIs should offer;

Chapter 4: **Business Rules** provides a non-exhaustive specification of the business rules for the input APIs;

Chapter 5: **Versioning** elaborates on the versioning strategy to be used for the input APIs;

Chapter 6: **Compression** specifies the compression features that should be supported in the input APIs;

Chapter 7: **Security** specifies the security measures for the exchange of data between Member States and EC;

Chapter 8: **Service Level Agreement** describes the service level agreement between the Member States and EC for the uniform exchange system.

# Definitions

## Concepts

|  |  |  |
| --- | --- | --- |
| Reference | Concept | Description |
| C1 | Connection Point | A connection point is a URL used by a Member State to exchange data with DG EMPL via the NCO input API. A Member State has at most two active production connection points at a given moment in time: one for its JVs, and one for its CVs.  The format of the URLs is specified in section 3.2. |
| C2 | Source | A source delivers JVs and CVs through the connection point of the Member State to EC. All EURES Members and Partners linked to the Member State (NCO) will deliver their data through the same connection point. Each EURES Member or Partner that delivers its data through that connection point is considered as a Source. Sources never communicate their data directly to EC, only through the single connection point.  A source identifier must be attached by the Member State to each JV/CV. The usage of this source identifier will permit to apply specific actions on EC side to the JVs/CVs tagged (for instance, hide the JVs of a specific source on EURES portal). Quality information and issues can also be reported per source, thanks to the source identifier. Finally it can be used by DG EMPL to report on the contributions of data volumes per source.  The format of a source is a simple String as defined in section 2.3.4.1. Examples of source are “PES” or “Source1”.  Please note that the source is not the same as the ID of the connection point. DG EMPL will appoint a unique ID to all records received through a connection point. The source is a second level of traceability identification. |
| C3 | Reference | Each CV and JV must be uniquely identifiable by a reference within the Member State. Some important rules on this unique reference:   * The reference should remain unchanged for the same JV/CV from the moment of opening until it is closed; * The same reference should be used for the same job vacancy in all web service calls and responses; * One unique reference should never be used for different open JVs/CVs at the same time; * A unique reference can be reused if there is no open JV/CV that uses it. In other terms, it means that the reference of closed JVs/CVs can be reused. This is mostly the case when the source is using a system of publishing and unpublishing the same data multiple times over time. The same unique reference will be opened and closed several times over that period, but it will always point to the same JV/CV.  See the concept timestamps below for more information on this. **Important:** a reference should then never be re-used for different JVs/CVs because they would be considered as the same JV/CV that has been unpublished and re-published. This could therefore lead to quality issues in the data displayed to the end-user (e.g. bookmarked JVs/CVs); * Member States should provide the necessary checks to prevent sending multiple JVs/CVs with exactly the same content; * Member States should assure these rules over the data acquired from all their sources.   Further restrictions on the data format of the reference are specified in section 2.3.1. |
| C4 | National Data Consolidation Point | The database of a Member State that aggregates the JVs and CVs of all sources under the responsibility of the Member State. A Member State could have different databases for JVs and CVs, but only one for each. |
| C5 | Timestamps | The Member States should track the following timestamps for each JV/CV stored in the National Data Consolidation Points:   * Creation timestamp: the date and time of the creation of the JV/CV in the National Data Consolidation Point; * Last modification timestamp: the date and time of the last modification of the JV/CV in the National Data Consolidation Point; * Closing timestamp: the date and time of the closing date of the JV/CV in the National Data Consolidation Point.   The tracked time should at least contain hours, minutes and seconds. Tracking of milliseconds is optional.  Section 2.2.1 provides some more information and examples on how these timestamps could be determined.  The format to exchange the timestamps is specified in section 2.3.2. |

Table : Definition of concepts used in the specifications of the Input APIs

## Prerequisites

This section presents the prerequisites necessary for the correct implementation of the input APIs by the Member States.

### Tracking of Timestamps

The Member States should track the following timestamps for each JV/CV stored in the National Data Consolidation Point:

* Creation timestamp: the date and time of the creation of the JV/CV in the National Data Consolidation Point;
* Last modification timestamp: the date and time of the last modification of the JV/CV in the National Data Consolidation Point. For newly created JV/CV, this timestamp is optional (if provided, it must be equal to the creation timestamp);
* Closing timestamp: the date and time of the closing date of the JV/CV in the National Data Consolidation Point.

The tracked time should at least contain hours, minutes and seconds. Tracking of milliseconds is optional.

Important note: these timestamps should be considered from the point of providing the data to the uniform exchange system of EURES. This means that they might be different from the original timestamps that are recorded in the source systems.

**Example1**: a CV that is created on date 1, but only published to EURES on date 2, should have the **creation timestamp** of date 2 for EURES. It is the date that this CV becomes available for the EURES system.

**Example2**: the CV from example1 becomes unpublished in the national system. The CV however remains in the national system, it is not closed. To the EURES system, this should be reported with a **closing timestamp**, as the CV is disappearing for EURES as it is no longer published.

**Example3**: the CV from example2 becomes published again in the national system. To the EURES system it should be reported as a **creation timestamp** as there is no active record in the EURES system any more. In this case it is possible that the same reference that was used for example1 is reused for example3. This is allowed as the previous record has been closed and thus this reference still is only used for one active CV.

**Example4**: only if the active CV of example3 is modified without changes in its publication status, for instance because the actual content was changed, or the jobseeker changed the visisbility settings for his data, it should be reported with a **modification timestamp**. To have a modification timestamp, there should be an active CV in the EURES system.

### Period of tracking of closed JVs/CVs

The Member States should keep a trace of the closed JVs/CVs for at least one week after their closing in the National Data Consolidation Point (at least the unique reference of the closed JVs/CVs must be kept).

## Data Types

### Reference

The reference of a JV or CV must be a string containing only seven-bit ASCII printable characters except the space character. In other terms, only ASCII characters from 33 to 126 in decimal notation (or from 0X21 to 0X7E in hexadecimal notation) are authorized inside a reference. A reference must be at most 36 characters long. Expressed as a regular expression it should match the expression [\x21-\x7E]{1,36}.

Table 5 lists the allowed characters for a reference.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dec | Char | Dec | Char | Dec | Char | Dec | Char | Dec | Char | Dec | Char | Dec | Char | Dec | Char |
| 33 | ! | 34 | ["](https://en.wikipedia.org/wiki/Quotation_mark) | 35 | [#](https://en.wikipedia.org/wiki/Number_sign) | 36 | [$](https://en.wikipedia.org/wiki/Dollar_sign) | 37 | % | 38 | & | 39 | ['](https://en.wikipedia.org/wiki/Apostrophe) | 40 | ( |
| 41 | [)](https://en.wikipedia.org/wiki/Right_parenthesis) | 42 | [\*](https://en.wikipedia.org/wiki/Asterisk) | 43 | [+](https://en.wikipedia.org/wiki/Plus_sign) | 44 | [,](https://en.wikipedia.org/wiki/Comma) | 45 | [-](https://en.wikipedia.org/wiki/Hyphen-minus) | 46 | [.](https://en.wikipedia.org/wiki/Full_stop) | 47 | [/](https://en.wikipedia.org/wiki/Slash_(punctuation)) | 48 | 0 |
| 49 | 1 | 50 | 2 | 51 | 3 | 52 | 4 | 53 | 5 | 54 | 6 | 55 | 7 | 56 | 8 |
| 57 | 9 | 58 | [:](https://en.wikipedia.org/wiki/Colon_(punctuation)) | 59 | [;](https://en.wikipedia.org/wiki/Semicolon) | 60 | [<](https://en.wikipedia.org/wiki/Less-than_sign) | 61 | [=](https://en.wikipedia.org/wiki/Equals_sign) | 62 | [>](https://en.wikipedia.org/wiki/Greater-than_sign) | 63 | [?](https://en.wikipedia.org/wiki/Question_mark) | 64 | @ |
| 65 | A | 66 | B | 67 | C | 68 | D | 69 | E | 70 | F | 71 | G | 72 | H |
| 73 | I | 74 | J | 75 | K | 76 | L | 77 | M | 78 | N | 79 | O | 80 | P |
| 81 | Q | 82 | R | 83 | S | 84 | T | 85 | U | 86 | V | 87 | W | 88 | X |
| 89 | Y | 90 | Z | 91 | [[](https://en.wikipedia.org/wiki/Left_square_bracket) | 92 | \ | 93 | ] | 94 | ^ | 95 | \_ | 96 | ` |
| 97 | a | 98 | b | 99 | c | 100 | d | 101 | e | 102 | f | 103 | g | 104 | h |
| 105 | i | 106 | j | 107 | k | 108 | l | 109 | m | 110 | n | 111 | o | 112 | p |
| 113 | q | 114 | r | 115 | s | 116 | t | 117 | u | 118 | v | 119 | w | 120 | x |
| 121 | y | 122 | z | 123 | { | 124 | | | 125 | } | 126 | ~ |  |  |  |  |

Table : ASCII characters from 33 to 126 in decimal notation

### Timestamp

A timestamp must be expressed in milliseconds since 00:00:00,000 UTC on 1 January 1970. The timestamp must be a timestamp in the **UTC time zone**.

### Version

A version must be a number (major version) followed by a dot and another number (the minor version):

<major\_version>.<minor\_version>

The numbers must be equal to 0 or positive.

### String

#### Simple String

A string is a sequence of characters. All strings referred to must be encoded UTF-8 and must be the legal graphic characters of the Unicode standard ([U+20- U+D7FF] | [U+F8FF- U+FFFD] | [U+10000- U+10FFFF]). In the rest of the document, if not specified, the maximum length of a string is equal to 255 characters.

#### Text

The text datatype is an extension of String that allows control characters (example: carriage return) to be included. In the rest of the document, if not specified, the length of text is unlimited.

# Services

## Exchange Format

The exchange of data used in input APIs will be in the JSON format (specified in [R04]). However, the EURES HR Open Standard XML must be put in XML format inside the JSON that will be exchanged.

## Deployment URLs

### Member States Input APIs URLs

This section specifies the form of the URLs that must be used for exposing the JV Input API and the CV Input API. Section 3.5 provides examples of URLs.

#### Base URL

The <BASE\_URL> for the URLs of the input APIs on Member States side must respect the following form:

https://<HOST>[:PORT]/<CONTEXT\_PATH>

Scheme

The scheme must be “https” since the TLS protocol will be used to encrypt the exchanges between Member States and EC. However, in a first phase, it will not be mandatory for Member States to implement TLS protocol. Therefore, the scheme of the input API URLs could also be temporary “http”.

Host and port

The Member States are free to choose the host part of the URL. It can be optionally followed by a port number.

Context Path

The Member States are free to choose the context paths where will be deployed the JV input API and the CV Input API.

#### JV Input API URL

The services of the JV Input API (section 3.5) must be deployed on an URL that respects the following form:

<BASE\_URL>/input/api/jv/v<version\_number>

The version number corresponds to the version of the JV Input API exposed on the URL (see chapter 5 for more information about versioning of input APIs).

#### CV Input API URL

The services of the CV Input API (section3.5) must be deployed on an URL that respects the following form:

<BASE\_URL>/input/api/cv/v<version\_number>

The version number corresponds to the version of the CV Input API exposed on the URL (see chapter 5 for more information about versioning of input APIs).

Note that the base URLs can be different for the JV Input API and the CV input API.

## General Rules

### Optional Elements

For the optional elements (i.e. having a 0..1 cardinality), the Member States are free to do not return the element at all in the response or to return it with a null value.

## Utility Services

### HealthCheck/Ping

The Ping service is a service that permits to check that the input APIs are correctly exposed by the Member State and accessible from the outside world.

|  |  |
| --- | --- |
| Name | Ping |
| Description | Service permitting to check the connectivity of the Member State |
| HTTP Method | GET |
| URL | /ping |
| Parameters | / |
| Response | A Text containing at least “Hello from Input API”. The text could also contain other useful information (for example, the version of the default implementation used by the Member State). |
| Example Request | GET https://fake.nco.com/input/api/jv/v1.0/ping |
| Example Response | “Hello from Input API” |
| Other information | This service must be deployed in the JV input API and in the CV input API. |

Table : Ping service specifications

## JV/CV Input api

The services presented in this section are applicable for both JVs and CVs input APIs since the same metadata information will be exchanged for the JVs and CVs (only the “content” field of the Get Details service will be different).

To distinguish the JV input API from the CV input API, the type of exchanged objects (JV or CV) must be included in the URLs (see section 3.2).

### Get All

The get all service returns all active JV/CV references.

|  |  |
| --- | --- |
| Name | Get All |
| Description | Service returning the list of references of all active JVs/CVs. The references of closed JVs/CVs cannot be returned in the list. |
| HTTP Method | GET |
| URL | /getAll |
| Parameters | / |
| Response | An object containing a list of references of all active JVs/CVs, the status, and the relevant mutation timestamps:  {“allReferences”:[Get All response objects]} |
| Example Request | GET https://fake.nco.com/input/api/jv/v1.0/getAll |
| Example Response | {  “allReferences”: [  {  "creationTimestamp": 1480505284175,  "lastModificationTimestamp": 1480505284175,  "reference": "4634107",  "source": "PrES1",  "status ": "ACTIVE"  },  {  "creationTimestamp": 1480505284550,  "lastModificationTimestamp": 1480505284550,  "reference": "5763755",  "source": "PES",  "status ": "ACTIVE"  }  ]  } |
| Relevant rules | BR0001 (the violation of this rule will lead to complete rejection of the response by EC)  + specific rules in Table 8 |

Table : Get All service specifications

#### Service Rules

|  |  |
| --- | --- |
| ID | Description |
| BR9001 | A JV/CV returned in the service Get All must have the ACTIVE status |
| BR9002 | The Get All service must return the list of references of all active JVs/CVs. The references of closed JVs/CVs cannot be returned in the list. |

Table : Specific rules for the Get All service

#### Get All Response Object

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Description | Data Type | Cardinality | Relevant rules |
| reference | The unique reference of this JV/CV. | Reference | 1 | BR0002 BR0003 |
| source | The source of the JV/CV. | Simple String | 1 | BR0002 BR0003 |
| status | The status of the JV/CV. | enum(ACTIVE) | 1 | BR0002 BR0003 |
| creationTimestamp | The date and time this JV/CV was first created in the National Data Consolidation Point. | Timestamp | 1 | BR0002 BR0003 |
| lastModificationTimestamp | The date and time this JV/CV was last modified in the National Data Consolidation Point. | Timestamp | 0..1 | BR0101 BR0103 BR0104 |

Table : Get All response object

### Get Changes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Get Changes | | | |
| Description | Service returning the list of references of created, modified and closed JVs/CVs since a specific instant (UTC timestamp). | | | |
| HTTP Method | GET | | | |
| URL | /getChanges/<modification\_timestamp> | | | |
| Parameters | Name | Parameter Type | Data Type | Description |
| modification\_timestamp | Path parameter | Timestamp | Specific instant (in UTC time zone) from which the list of references of created, modified and closed JVs/CVs after (or in the same instant) must be returned. |
| Response | An object containing a list of references of the created JVs/CVs, a list of references of the modified JVs/CVs and a list of references of the closed JVs/CVs:  {  “createdReferences”: [Get Changes response objects],  “modifiedReferences”: [Get Changes response objects],  “closedReferences”: [Get Changes response objects]  }  Ideally, the same reference should not simultaneously appear in the different lists. If the same JV/CV has been created/modified/closed during the period after <modification\_timestamp>, the reference of the JV/CV should only appear in the list of the last action.  However, to make easier the job of the Member States, they are authorized to put the same reference in the different lists. The IT system of EC will be able to handle this case. | | | |
| Example Request | GET https://fake.nco.com/input/api/jv/v1.0/getChanges/1474902768146  Get list of references of created, modified and closed JVs since 26/09/2016 15:12:48.146 UTC | | | |
| Example Response | {  "createdReferences": [  {  "creationTimestamp": 1480505284175,  "closingTimestamp": null,  "lastModificationTimestamp": 1480505284175,  "reference": "4634107",  "source": "PrES2",  "status ": "ACTIVE"  },  {  "creationTimestamp": 1480505284410,  "closingTimestamp": null,  "lastModificationTimestamp": null,  "reference": "ED23-QER8",  "source": "PES",  "status ": "ACTIVE"  }  ],  "modifiedReferences": [  {  "creationTimestamp": 1480508658741,  "closingTimestamp": null,  "lastModificationTimestamp": 1480547213097,  "reference": "4634108",  "source": "Source3",  "status ": "ACTIVE"  }  ],  "closedReferences": [  {  "creationTimestamp": 1480508658899,  "closingTimestamp": 1480547299568,  "lastModificationTimestamp": 1480547213665,  "reference": "85gh8tyB4",  "source": "PES",  "status ": "CLOSED"  }  ]  } | | | |
| Relevant rules | BR0001 (the violation of this rule will lead to complete rejection of the response by EC)  + specific rules in Table 11 | | | |

Table : Get Changes service specifications

#### Service Rules

|  |  |
| --- | --- |
| ID | Description |
| BR9101 | A JV/CV returned in the list *modifiedReferences* must have a last modification timestamp. |
| BR9102 | A JV/CV returned in the list *closedReferences* must have a closing timestamp. |
| BR9103 | A JV/CV returned in the list *createdReferences* should have the ACTIVE status. |
| BR9104 | A JV/CV returned in the list *modifiedReferences* should have the ACTIVE status. |
| BR9105 | A JV/CV returned in the list *closedReferences* must have the CLOSED status. |
| BR9106 | The list *createdReferences* must contain the references of JVs/CVs created since the instant passed as parameter. |
| BR9107 | The list *modifiedReferences* must contain the references of JVs/CVs modified since the instant passed as parameter. |
| BR9108 | The list *closedReferences* must contain the references of JVs/CVs closed since the instant passed as parameter. |
| BR9109 | The same reference should not simultaneously appear in the different lists. If the same JV/CV has been created/modified/closed since the instant passed as parameter, the reference of the JV/CV should only appear in the list of the last action. |

Table : Specific rules for the Get Changes service

#### Get Changes Response Object

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Description | Data Type | Cardinality | Relevant rules |
| reference | The unique reference of this JV/CV. | Reference | 1 | BR0002 BR0003 |
| source | The source of the JV/CV. | Simple String | 1 | BR0002 BR0003 |
| status | The status of the JV/CV. | enum(ACTIVE , CLOSED) | 1 | BR0002 BR0003 BR0201 BR0202 |
| creationTimestamp | The date and time this JV/CV was first created in the National Data Consolidation Point. | Timestamp | 0..1 | BR0103 BR0107 |
| lastModificationTimestamp | The date and time this JV/CV was last modified in the National Data Consolidation Point. | Timestamp | 0..1 | BR0101 BR0103 BR0104 |
| closingTimestamp | The date and time this JV/CV was closed in the National Data Consolidation Point. | Timestamp | 0..1 | BR0102 BR0105 BR0106 |

Table : Get Changes response object

### Get Details

|  |  |
| --- | --- |
| Name | Get Details |
| Description | Service returning the details of a list of JVs/CVs sent as parameter. |
| HTTP Method | POST[[1]](#footnote-1) |
| URL | /getDetails |
| Parameters | / |
| Request Body | A list containing the references of JVs/CVs:  [Reference] |
| Response | An object containing a map containing the references of existing JVs/CVs as keys and the details of JVs/CVs (see section 3.5.3.1) as values:  {  "details":  {  “JV1\_Reference/CV1\_Reference”: Details for active JVs/CVs / Details for closed JVs/CVsDetails for closed JVs/CVs,  “JV2\_Reference/CV2\_Reference”: Details for active JVs/CVs / Details for closed JVs/CVsDetails for closed JVs/CVs,  …  }  }  The Member States must provide the references and details of actives JVs/CVs and JVs/CVs closed in the last week inside the map.  The Member States may provide the references and details of JVs/CVs closed more than one week ago (they can chose what is the more convenient for them).  A reference can only appear at most once in the details response object and the data must correspond to the last action performed on the JV/CV. For example, if a JV/CV has been closed and then re-opened using the same reference, the JV/CV must appear only once in the details response object with the “ACTIVE” status.  The Member States can ignore the references of JVs/CVs unknown in their system. |
| Example Request | POST https://fake.nco.com/input/api/jv/v1.0/getDetails  Request Body: [“05c3b0ea”, “ce6c552e”, “b9927839”] |
| Example Response | {  "details":  {  “05c3b0ea”: Details for active JVs/CVs,  “ce6c552e”: Details for active JVs/CVs,  “b9927839”: Details for closed JVs/CVs  }  } |
| Relevant rules | BR0001 (the violation of this rule will lead to complete rejection of the response by EC)  + specific rules of Table 14  + section 4.2 for rejection rules of JVs/CVs. |

Table : Get Details service specifications

#### Service Rules

|  |  |
| --- | --- |
| ID | Description |
| BR9201 | A JV/CV returned in the services Get All and Get JVs should be findable in the Get Details service. |
| BR9202 | A JV/CV returned in the service Get All should have the ACTIVE status in the details returned by the Get Details service (except if the JV/CV is closed before calling the Get Details service). |
| BR9203 | A JV/CV returned in the list *createdReferences* of the Get Changes service should have the ACTIVE status in the details returned by the Get Details service. |
| BR9204 | A JV/CV returned in the list *modifiedReferences* of the Get Changes service should have the ACTIVE status in the details returned by the Get Details service. |
| BR9205 | The Member States must provide the references and details of actives JVs/CVs and JVs/CVs closed in the last week inside the response map. |
| BR9206 | The Member States may provide the references and details of JVs/CVs closed more than one week ago |
| BR9207 | A reference can only appear at most once in the details response object. The data must correspond to the last action performed on the JV/CV. |

Table : Specific rules for the Get Details service

#### Details

##### Details for active JVs/CVs

The table below depicts the elements of the Detail transmission format when the JV/CV is in “ACTIVE” status.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Description | Data Type | Cardinality | Relevant rules |
| reference | The unique reference of this JV/CV. | Reference | 1 | BR0002 BR0003 |
| source | The source of the JV/CV. | Simple String | 1 | BR0002 BR0003 |
| status | The status of the JV/CV. | enum(ACTIVE) | 1 | BR0002 BR0003 BR0201 BR0202 |
| content | The EURES HR Open Standard XML of the JV/CV (see [R01] for more details). | See [R01] for more details. | 1 | BR0002 BR0003 BR0401 BR0402 |
| contentFormatVersion | The format version EURES HR Open Standard XML. | Version | 1 | BR0002 BR0003 BR0301 |
| creationTimestamp | The date and time this JV/CV was first created in the National Data Consolidation Point. | Timestamp | 1 | BR0002 BR0003 |
| lastModificationTimestamp | The date and time this JV/CV was last modified in the National Data Consolidation Point. | Timestamp | 0..1 | BR0101 BR0103 BR0104 |

Table : Details elements (for active JVs/CVs)

An example of Details object in JSON format is given in Table 16.

|  |
| --- |
| {  "creationTimestamp": 1480508652354,  "lastModificationTimestamp": 1480621023025,  "reference": "7u45-EFP",  "source": "Source3",  "status ": "ACTIVE",  "contentFormatVersion ": "1.0",  "content ": "EURES\_STANDARD\_XML"[[2]](#footnote-2)  } |

Table : Example of Details object for an active JV/CV

##### Details for closed JVs/CVs

The table below depicts the elements of the Detail transmission format when the JV/CV is in “CLOSED” status.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Description | Data Type | Cardinality | Relevant rules |
| reference | The unique reference of this JV/CV. | Reference | 1 | BR0002 BR0003 |
| source | The source of the JV/CV. | Simple String | 0..1 |  |
| status | The status of the JV/CV. | enum(CLOSED) | 1 | BR0002 BR0003 BR0201 BR0202 |
| content | The EURES HR Open Standard XML of the JV/CV (see [R01] for more details). | See [R01] for more details. | 0..1[[3]](#footnote-3) |  |
| contentFormatVersion | The format version EURES HR Open Standard XML. | Version | 0..1 |  |
| creationTimestamp | The date and time this JV/CV was first created in the National Data Consolidation Point. | Timestamp | 0..1 |  |
| lastModificationTimestamp | The date and time this JV/CV was last modified in the National Data Consolidation Point. | Timestamp | 0..1 |  |
| closingTimestamp | The date and time this JV/CV was closed in the Hub database | Timestamp | 1 | BR0102 BR0105 BR0106 |

Table : Details elements (for closed JVs/CVs)

An example of Details object in JSON format is given in Table 18.

|  |
| --- |
| {  "closingTimestamp": 1480621023025,  "reference": "7u45-EFP",  "status": "CLOSED"  } |

Table : Example of Details object for a closed JV/CV

## EURES Input API

An API will be defined in the future that will allow the Member States to request replications in live to EC.

# Business Rules

## JV/CV Input API

This section lists the business rules applicable in the JV/CV input API. The business rules applicable to the EURES HR Open Standard XML for JVs are listed in [R01]. The business rules applicable to the EURES HR Open Standard XML for CVs are listed in [R02].

### General

This section defines the general rules applicable to the JV/CV Input API.

|  |  |
| --- | --- |
| ID | Description |
| BR0001 | The JSON sent by Member State to EC must be well formed. Any syntax error in JSON response sent by a Member State will be detected by EC and the response will be ignored. |
| BR0002 | All mandatory fields in a response must be provided by Member States. |
| BR0003 | All fields must respect the format of their data type. |

Table : General rules for the JV/CV input API

### Timestamps consistency

This section defines the timestamps consistency rules.

|  |  |
| --- | --- |
| ID | Description |
| BR0101 | The last modification timestamp must be equal or after the creation timestamp. |
| BR0102 | The closing timestamp must be after the creation and modification timestamp. |
| BR0103 | Timestamps cannot be in the future. |
| BR0104 | If provided, the last modification timestamp must be valid |
| BR0105 | If provided, the closing timestamp must be valid |
| BR0106 | If a JV/CV is closed, a closing timestamp must be provided |
| BR0107 | If a JV/CV is active, a creation timestamp must be provided and it must be valid |

Table : Timestamp consistency rules for the JV/CV input API

### Status Consistency

This section defines the status consistency rules.

|  |  |
| --- | --- |
| ID | Description |
| BR0201 | The status of a JV/CV must be ACTIVE or CLOSED. |
| BR0202 | If a closing timestamp is provided, the status of the JV/CV must be CLOSED. |

Table : Status consistency rules for the JV/CV input API

### Content Format Version

This section defines the rule related to the content format version field.

|  |  |
| --- | --- |
| ID | Description |
| BR0301 | The field **contentFormatVersion** must contain a valid version of the EURES HR Open Standard for JVs/CVs. |

Table : Status consistency rules for the JV/CV input API

### EURES HR Open Standard XML

This section defines the rules related to EURES HR Open Standard XML.

|  |  |
| --- | --- |
| ID | Description |
| BR0401 | The EURES HR Open Standard XML provided by Member States must be well formed. |
| BR0402 | The elements inside EURES technical minimum layer must be valid (see [R01] for more details). |

Table : EURES HR Open Standard XML rules for the JV/CV input API

### Service specific rules

This section defines rules specific to each service of the JV/CV Input API.

#### Get All

See Table 8.

#### Get Changes

See Table 11.

#### Get Details

See Table 14.

## Rejection Rules

In the Get Details service, the violation of any of the following rules will lead to a rejection of the JV/CV by EC:

* BR0002;
* BR0003 (only for mandatory fields);
* BR0101;
* BR0102;
* BR0103;
* BR0104;
* BR0105;
* BR0106;
* BR0201;
* BR0202;
* BR0301;
* BR0401;
* BR0402.

# Versioning

The versioning strategy of the input API services will be using the classic strategy of adding a path parameter with the version. The version format will be “X.Y” where X is the major number and Y the minor version. The X major version will be increased in case of breaking change (examples: new mandatory parameter in a service or complete change of the structure of the response). In case of non-breaking change (example: adding a new field in the response), the version should not be changed. The minor version is reserved for future use. This strategy will be applied for JV Input API, CV Input API and EURES Input API.

The decision of increasing the version number of input APIs will be taken by EC.

The version of the EURES HR Open Standard XML will be put in the contentFormatVersion metadata field in the response of the service.

# Compression

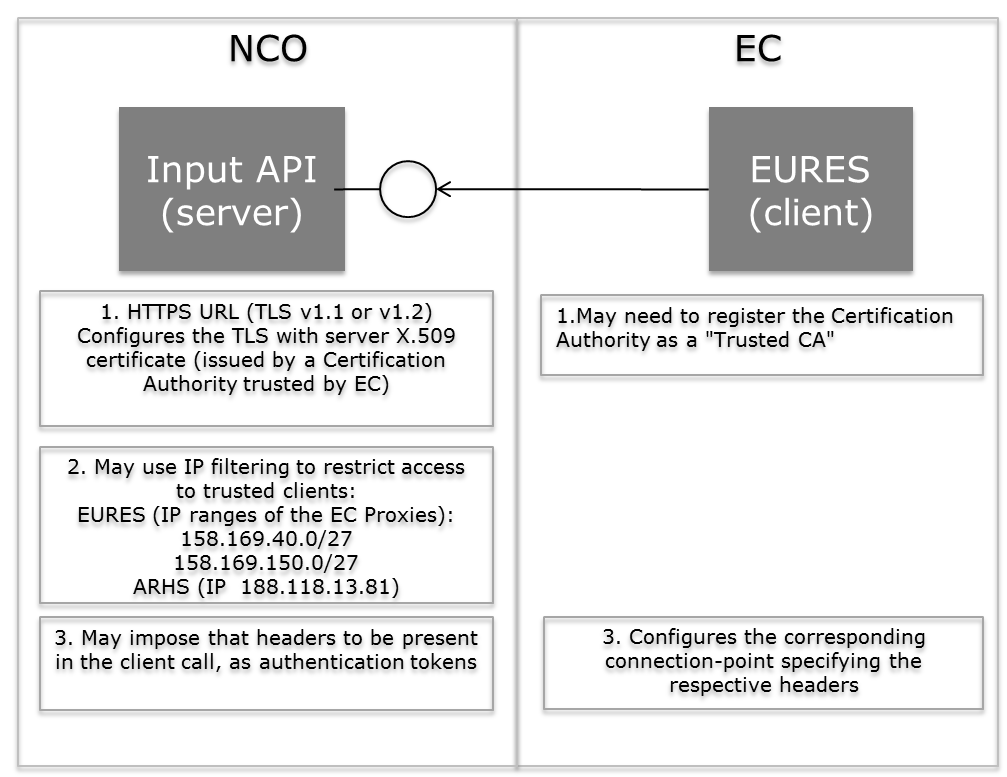
Given that the size of data exchanged between the Member States and EC could be large (several megabytes) in some cases (for instance, when getting all references of active JVs/CVs or when retrieving details of JVs/CVs with big content), the input APIs implemented by Member States should support the compression of data sent to EC to improve the transfer speed and reduce the bandwidth utilization. Since the input APIs are implemented using the HTTP protocol, the standard HTTP compression[[4]](#footnote-4) can be used for this purpose using standard Accept-Encoding and Content-Encoding header fields. The “gzip” compression format should at least be supported by the input APIs implemented by the Member States.

# Security

## Overview

The Input API described in this document is established at the level of the NCO, which sets up an API server. The API is consumed by the EURES system (acting as client), which downloads the data (i.e. the input) consisting of JV-s and CV-s.

The input API uses a combination of features to protect the data that EURES downloads from NCOs (JV-s and CV-s). The image below illustrates the deployment of the respective features. The main and only mandatory feature is using HTTPS in the communication (feature no 1). Features 2 and 3 are optional and NCOs have discretion in choosing to employ them or not.



**Fig Input API Security**

The main benefits are:

1. HTTPS protects against eavesdropping and against impersonators of false NCO-s, which would inject false data into EURES database (see 7.2).
2. IP Filtering acts as an authentication mechanism; it mitigates the likelihood of a fake-EURES requesting and getting data illegitimately. Even if the attacker uses a EURES IP address in its data-request, the reply will be sent to EURES IP address and not to attacker (see 7.3).
3. Pre-configured headers could be used to increase the strength of the authentication. For example a header can be configured in the EURES system for the respective NCO, acting as a password of the respective NCO. EURES will use the respective value in the data-request, while the NCO could refuse any such request if they do not contain the respective value.  
     
   As these headers are only known to the admin of the replication application at ECO, attackers will no longer be able to simulate a data-request to the NCO, even when pretending to use the EURES IP address. The API gateway at the NCO will refuse these requests as the headers are missing (see 7.4).

## Encryption of Communications

Given that the data exchanged between EC and Member States contain personal information (in particular the CVs), all the communications need to be encrypted. For this purpose, the TLS protocol[[5]](#footnote-5) will be used. The server needs to own a X.509 certificate to establish a secured communication with the client. In the context of the NCO Input API, the NCO connection point is the server and EC the client. It means that each Member State will need to acquire a certificate. The procedure to acquire a certificate and set up TLS in the environment of the Member State depends on the specific infrastructure and possibly on specific internal rules. Therefore it cannot be detailed here. However, the following sections provide some guidelines to the Member States. Note that the configuration of TLS is not an easy task and that it requires technical knowledges. It must be carefully performed to have a correct and secured configuration (see for example the list of points to be checked in [OWASP Transport Layer Protection Cheat Sheet](https://www.owasp.org/index.php/Transport_Layer_Protection_Cheat_Sheet)).

### Steps

On a high level point of view, the following steps must be performed to ensure secured communications between Member States and EC:

1. The NCO must acquire a server certificate;
2. The NCO must install the acquired certificate on its web server (Tomcat, Weblogic, etc.);
3. The NCO must configure TLS on its web server;
4. EC must ensure that it trusts the certificate authority that issued the certificate;
5. EC must call the input API of the NCO using the HTTPS URL.

### TLS Version

The Member States must implement the version 1.1 or 1.2 of TLS in their environment. The older versions of TLS/SSL are considered as insecure and should not be used anymore.

### Certificate

As indicated before, each NCO will have to acquire a server certificate to able to setup TLS in its environment.

There are three types of server certificates that offer three different levels of trust:

* The domain validated certificates;
* The organization validated certificates;
* The extended validated certificates.

In the context of the NCO input API, the level of trust offered by domain validated certificates (which are the cheapest ones) is sufficient.

Certificates are obtained via a trusted Cerfiticate Authority. It is recommended that the NCO liaises with their infrastructure team to determine whether they already have such a certificate or if they have to purchase one. The major Certificate Authorities are configured as trusted on the Commission's servers. In case of doubt, the NCO canopen a Jira ticket to have a Certificate Autority's status checked.

## Authentication

To ensure that only authorized entities access their input API, the Member States can setup a filtering mechanism to authorize the access to the input API to a restricted set of IP addresses[[6]](#footnote-6). If a NCO implements such mechanism, the access must be opened to EC and to the contractor of EC[[7]](#footnote-7) in charge of the development of the new system for the exchange of JVs anc CVs.

The access to the input API must be granted to the IP addresses of the EC proxies:

* 158.169.40.0/27
* 158.169.150.0/27

Please note that this is a range. The whole range needs to be accepted.

The access to the input API must be also granted to the IP address of the EC contractor:

* 188.118.13.81

## HEADER authentication at NCO

In addition to the IP address filtering, EURES is able to support an authentication mechanism implemented at NCO side that requires username/password or a token ID in a specific header.

Authentication in Web/REST API using header is a common method by providing a username/password or a token ID (that you would need to provide to EURES) in specific header.

For example, this is a method that can be used to REST API of JIRA (see <https://developer.atlassian.com/cloud/jira/platform/jira-rest-api-basic-authentication/#supplying-basic-auth-headers>). The link <http://blog.restcase.com/restful-api-authentication-basics/> also provides a good explanation in the section Basic Authentication.

Please note that this requires an implementation of the API gateway **on the side of the NCO**. ECO is capable of sending the headers and keys that are provided by an NCO by configuring them for each connection point. ECO will send the header and keys in each request going that these connection points. The implementation of the gateway in the NCO can then refuse requests that do not have the proper headers or keys.

# Service Level Agreement

This chapter describes the principles that govern the uniform exchange system of job vacancies and CVs between the Member States and DG EMPL .

## Information to be Provided by the NCO

### Scope of the data exchanged

The scope of the data that needs to be exchanged is defined in [R03].

## NCO Input API Availability

All systems involved in EURES (local Member State systems and EURES central system) should be available 7/7-24/24, except planned and announced downtimes (e.g. for maintenance purposes).

In case of planned downtimes of the uniform exchange system in a Member State, the Member State needs to inform DG EMPL via the foreseen ticket management process “Downtime announcement” in JIRA (consult the Interoperability process manual ([R05]) for more information).

Member States are expected to trigger or react to the different processes described in the Interoperability process manual ([R05]) that assure the availability and quality of the uniform exchange system. Any changes at the Member State that could impact the availability and functioning of the uniform exchange system must be handled conform the processes.

The data sent through the input API should reflect as far as possible the most recent data stored by the Member State in its system. Member States should ensure that modifications made by the owner of the data are provided in time through the INPUT API to ensure compliance with the consent they obtained.

The interoperability process manual ([R05]) will describe the processes to follow up this service level and react in case of issues.

## NCO Input API Response Times

The Member States systems should answer in an acceptable response time to the requests on their input API. The Table 24 indicates the maximum acceptable response time of the input API. Note that the acceptable response time for the “Get All” service depends of the number of JVs/CVs stored by the Member State system.

|  |  |
| --- | --- |
| Service | Maximum acceptable response time (in milliseconds) |
| Ping | 10.000 ms |
| Get All (X JVs/CVs) | X <= 100.000 : 10.000 ms  X > 100.000 : (X/10) ms |
| Get Changes | 10.000 ms |
| Get Details (chunk of X JVs/CVs) | X <= 300: 3.000 ms  X > 300: X \* 10 ms |

Table : Maximum acceptable response times for Input API

## Conformance Test Environment

To support a smooth implementation of system changes into production, a conformance test environment must be available to which a connection can be made from the EURES conformance test environment. The availability of this conformance environment is a requirement for certain processes described in the interoperability process manual ([R05]).

The Member State should be able to keep the database of this environment unchanged for the duration of a conformance test run.

This conformance test environment should represent a copy of the production system (infrastructure, applications deployed, data available, etc.). This conformance test environment will be used for integration tests in order to determine if any unexpected side-effects can be expected when preparing a new release of the EURES portal and/or of the NCO Input API for deployment in production.

*End of Document*

1. It would be more logical to use the GET method for this service but given that a list of references is passed as parameter and given that the length of URL is limited, it is preferable to use the POST method from a technical point of view. [↑](#footnote-ref-1)
2. See [R01] for examples of EURES HR Open Standard XML. [↑](#footnote-ref-2)
3. No error will be reported by EC if the content XML is sent when the JV/CV is closed but this is not recommended for performance reasons. [↑](#footnote-ref-3)
4. More information on HTTP compression can be found on <https://en.wikipedia.org/wiki/HTTP_compression> [↑](#footnote-ref-4)
5. <https://en.wikipedia.org/wiki/Transport_Layer_Security> [↑](#footnote-ref-5)
6. The setup of this mechanism is optional but if it is not configured, any entity will have access to the input API deployed by the Member State. [↑](#footnote-ref-6)
7. ARHS Development (<https://www.arhs-group.com/>) [↑](#footnote-ref-7)