Erasmus Without Paper Network from development to production

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Agenda

• Erasmus Without Paper Project 2.0.
• Launching the EWP Network.
• What is the EWP Network?
• How to build the EWP node and get connected?
• What are possible user scenarios?
• Connecting to Mobility Tool+.
• Competence Center.
• What going into production means?

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Online DEMO, if time allows
Erasmus Without Paper Project 2.0

• Funded by the Erasmus+ Programme, Key Action 3, years 2018-2019.
• Basing on the results of EWP 1.0, aims at building the sustainable infrastructure for digitized exchange of mobility data.

Various pieces of the puzzle:
  • The EWP Network.
  • Connectors for SISs developed at home, by national consortia, by commercial providers.
  • Competence Center to help with dissemination and development.
  • Dashboard with IIA editor, OLA etc. for the others.
  • Open Source University Alliance to share code.
Official launch of the EWP Network

• Took place at the launch conference in Ghent, December 2018.
• More than 350 participants from across Europe.
• Live DEMO by teams representing:
  • SOP (Austria),
  • QS Unisolution (Germany),
  • SIGMA (Spain),
  • MUCI (Poland),
  • University of Ghent (Belgium),
  • University of Porto (Portugal)
• https://www.erasmuswithoutpaper.eu/launch-conference
Transcript of Records sent live from the University of Warsaw to Porto University
What is the EWP Network?

Design

• Network architecture, protocols, services etc. fully described in GitHub which is publicly available repository of source code:
  • ReadMe part – high level description in „common” language.
  • Flowcharts explaining the mobility process – for „business” oriented people.
  • XML, XSD files – for technical staff.
• Available at: https://github.com/erasmus-without-paper/
What is the EWP Network?

Registry

• Address book which gathers in one place information about:
  • who – is connected,
  • where – how to find him,
  • what – services are offered.

• Registry is updated automatically.

• Available at:
  • PROD: https://registry.erasmuswithoutpaper.eu/
  • DEV: https://dev-registry.erasmuswithoutpaper.eu/

• Eventually PROD registry will have a couple of instances synchronized in real time (SLA, HA).
What is the EWP Network?

**Connector (EWP server)**

- Piece of software which is a SIS’s agent in the EWP Network.
- Has to implement:
  - Security transport protocols (ECHO).
  - Discovery service (Manifest file).
- May implement some business oriented APIs.
- Exposed to the public by URL available in the Registry.
- One EWP node can host more than one HEI (recognized by domain names=SCHAC codes).
Discovery API (Manifest file)

Manifest Importer Status

Currently defined manifest sources and their statuses:

- https://dev-registry.erasmuswithoutpaper.eu/manifest.xml [OK]
- https://ewp.demo.usos.edu.pl/ewp/manifest [Details]
- https://ewp-hei.demo.usos.edu.pl/ewp/manifest [Details]

Manifest file:

```xml
<manifest>
  <host>hostmaster@usos.edu.pl</host>
  <apis-implemented>
    <discovery version="5.0.0">
      <url>https://ewp.demo.usos.edu.pl/ewp/manifest</url>
    </discovery>
    <echo version="2.0.0"/>
    <imobilities version="0.3.0"/>
    <institutions version="2.1.0"/>
    <organizational-units version="2.1.0"/>
    <iias version="2.1.0"/>
    <iia-cnr version="2.0.2"/>
    <omobilities version="0.15.0"/>
    <omobilities version="0.4.1"/>
    <courses version="0.7.1"/>
    <imobility-tors version="0.7.0"/>
    <imobility-tors version="0.1.1"/>
  </apis-implemented>
  <institutions-covered>
    <hei id="demo.usos.edu.pl">PL WARSZAWO1</hei>
    <other-id type="erasmus">99957294</other-id>
    <name xml:lang="pl">Uniwersytet Warszawski</name>
    <name xml:lang="en">University of Warsaw</name>
  </institutions-covered>
</manifest>
```
Other APIs (offered services)

HEI/API Coverage Matrix

<table>
<thead>
<tr>
<th>Institution</th>
<th>General Purpose APIs</th>
<th>IIA</th>
<th>OMobilities</th>
<th>IMobilities</th>
<th>IMobility ToRs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inst.</td>
<td>units</td>
<td>courses</td>
<td>course replic.</td>
<td>ver.</td>
</tr>
<tr>
<td>demo.usos.edu.pl</td>
<td>2.10</td>
<td>2.10</td>
<td>0.71</td>
<td>2.10</td>
<td>yes</td>
</tr>
<tr>
<td>hel.demo.usos.edu.pl</td>
<td>2.10</td>
<td>2.10</td>
<td>0.71</td>
<td>2.10</td>
<td>yes</td>
</tr>
<tr>
<td>uws.edu.pl</td>
<td>2.00</td>
<td>2.00</td>
<td>0.70</td>
<td>2.00</td>
<td>yes</td>
</tr>
<tr>
<td>up.pt</td>
<td>2.10</td>
<td>2.10</td>
<td>2.10</td>
<td>2.10</td>
<td>no</td>
</tr>
</tbody>
</table>
What is the EWP Network?

• **APIs** (*Application Programming Interfaces*) — a set of clearly defined methods of communication between various software components used to build applications.

• There are many APIs supporting the **EWP business model**:
  
  • **Primary Network** APIs (Discovery Manifest, Echo, Registry).
  
  • **General Purpose** APIs (Institutions, Organizational Units, Courses).
  
  • **Erasmus Mobility** APIs (Interinstitutional Agreements, Outgoing Mobilities, Incoming Mobilities, Nominations Approval, Mobility Arrival and Departure, Transcripts of Records, CNRs).
  
  • **MT+** APIs (Institutions, Projects, Dictionaries).

• Each API is relatively simple and can be implemented separately from the others.

• APIs may be implemented one by one, gradually building support for the whole process.

• There are APIs for **sending** (pushing) data and for **requesting** (pulling) data in response to **change notifications** (CNR). It is possible to handle EWP data exchange **automatically** by subscribing to notifications and firing triggers when they come.
What is the EWP Network?

**EWP Client**

- EWP functionalities spread over the **User Interface** of the Mobility module used by IRO.
- The most **business oriented** part of the project.
- Should be designed with close contact with the **business owner** (mostly IRO staff).
- May (will) change in time from less to more automated.
How to build EWP node and get connected?

- Implement the **EWP connector** with ECHO and Discovery (or take it from OSUA).
- Send URL to the Registry administrator ([usos@usos.edu.pl](mailto:usos@usos.edu.pl)).
- Start testing.
- Implement other APIs as agreed with local users.
- Update your manifest file as new APIs become available.
- Test, test, test (using automated tests, reference connector, demo installations of the partners, or you own).
How to build EWP node and get connected?

In the meantime:

- Design the **EWP client** with your business clients.
- Search for inspiration looking at installations of the partners.
- Integrate EWP services into your local processes.
- Test, test, test in DEMO EWP Network.
- Go to production.
How to get help on a technical level?

- Developers Guide: https://developers.erasmuswithoutpaper.eu/
- Self testing: API Validator.
- Self testing: XML Validator.
API Validator performs thousands of tests with parameters selected randomly or entered by hand.

**APIs defined in manifest**

<table>
<thead>
<tr>
<th>API</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECHO 2.0</td>
<td><a href="https://ewp.demo.usos.edu.pl/ewp/echo">https://ewp.demo.usos.edu.pl/ewp/echo</a></td>
</tr>
<tr>
<td>Security method</td>
<td>STTT, SHTT, HTTT, HHTT</td>
</tr>
<tr>
<td>Parameters</td>
<td>No parameters available.</td>
</tr>
<tr>
<td>Validate</td>
<td></td>
</tr>
<tr>
<td>Show results</td>
<td>STTT, SHTT</td>
</tr>
</tbody>
</table>

**INSTITUTIONS 2.1.0**

<table>
<thead>
<tr>
<th>Security method</th>
<th>Parameters</th>
<th>Validate</th>
<th>Show results</th>
</tr>
</thead>
<tbody>
<tr>
<td>STTT</td>
<td>hel_id</td>
<td></td>
<td>HHTT</td>
</tr>
</tbody>
</table>

**ORGANIZATIONAL-UNITS 2.1.0**

<table>
<thead>
<tr>
<th>Security method</th>
<th>Parameters</th>
<th>Validate</th>
<th>Show results</th>
</tr>
</thead>
<tbody>
<tr>
<td>STTT</td>
<td>hel_id, ewp.demo.usos.edu.pl</td>
<td></td>
<td>STTT</td>
</tr>
<tr>
<td></td>
<td>ounit_id</td>
<td></td>
<td>- 10000000</td>
</tr>
</tbody>
</table>

**COURSES 0.7.1**

<table>
<thead>
<tr>
<th>Security method</th>
<th>Parameters</th>
<th>Validate</th>
</tr>
</thead>
<tbody>
<tr>
<td>STTT</td>
<td>hel_id</td>
<td></td>
</tr>
<tr>
<td>SHTT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HTTT</td>
<td>los_id</td>
<td></td>
</tr>
<tr>
<td>HHTT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Trying Combination [GSTTT] GET request with a list of echo values \( a, b, a \). Expecting to receive a valid HTTP 200 Echo API response, with proper hel-id and matching echo values.

- Show/hide details
  - Preliminary request snapshot (#-2)
  - Actual request which was made (#-1)
  - Response received from server (#+1)

Trying Combination [PSTTT] with additional "gzip" added in Accept-Encoding. Expecting the same response, but preferably gzipped.

The client explicitly accepted gzip, but the server didn’t compress its response. That’s not an error, but it might be useful to support gzip encoding to save bandwidth.

- Show/hide details

Request for one of known ouitl-ids with unknown hel-id, expect 400.

HTTP 400 expected, but HTTP 200 received.

- Show/hide details

Request with correct hel_id and incorrect hel_id, expect 400.

HTTP 400 expected, but HTTP 200 received.

- Show/hide details

Request for one of known los-ids, expect 200 OK.

HTTP response status was okay, but the content has failed Schema validation. Our document parser has reported the following errors: 1. (Line 1) cvc-complex-type.2.4.a: Invalid content was found starting with element ‘rs2end-date’. One of “[https://github.com/erasmus-without-paper/ews-specs-types-academic-term/tree/stable-v1”, “display-name”, “https://github.com/erasmus-without-paper/ews-specs-types-academic-term/tree/stable-v1:start-date” is expected. 2. (Line 1) cvc-pattern-valid: Value ‘IUC2’ is not facet-valid with respect to pattern ‘(CR|CLS|MOD|DEP)’(\([1,40]\))’ for type ‘LosID’. 3. (Line 1) cvc-type.3.1.3: The value ‘IUC2’ of element ‘los-id’ is not valid. 4. (Line 1) cvc-pattern-valid: Value ‘IUC1’ is not facet-valid with respect to pattern ‘(CR|CLS|MOD|DEP)’(\([1,40]\))’ for type ‘LosID’. 5. (Line 1) cvc-type.3.1.3: The value ‘IUC1’ of element ‘los-id’ is not valid.

- Show/hide details
XML Schema Validator

This tool will help you with writing EWP XML documents. For example, you can paste the contents of your Manifest file here before you upload it onto your production site. You should be able to validate any XML document described in all RELEASEd, DEPRECATED and OBSOLETE specifications listed on Developers Hub website (plus, perhaps, some of the DRAFT ones).

Note, that this tool will validate against the schema only! Even if such validation succeeds, your file may still be invalid (if, for example, you didn’t adhere to the guidelines described in xsi:documentation elements included in the XSD files).

Paste your XML document below and press Validate

XML document:

```xml
<units-
response
xmlns:xs2="https://github.com/erasmus-without-paper/ewp-specs-types-address/tree/stable-v1"
xmlns:xs3="https://github.com/erasmus-without-paper/ewp-specs-types-contact/tree/stable-v1"
xmlns:xs8="https://github.com/erasmus-without-paper/ewp-specs-aravauth/treex/tree/stable-v1"
</units-
response>

<unit>
  <unit-id>30cc54505221751ace51b09bc4382b8308</unit-id>
  <unit-code>DEMO01_EWP</unit-code>
  <name xml:lang="de">University of Schönbrunn (Partner)</name>
  <name xml:lang="en">University of Schönbrunn (Partner)</name>
  <ns2:street-address>
    <ns2:recipientName>University of Schönbrunn (Partner)</ns2:recipientName>
    <ns2:addressLine>Tivoliweg 17/13</ns2:addressLine>
    <ns2:postalCode>1120</ns2:postalCode>
    <ns2:locality>Mien</ns2:locality>
    <ns2:country>BE</ns2:country>
  </ns2:street-address>
</unit>

Result

OK

This seems to be a valid units-response element (from https://github.com/erasmus-without-paper/ewp-specs-api-ounits/tree/stable-v2).
Where to find technical stuff?

GitHub: https://github.com/erasmus-without-paper

- Specifications.
- Common data types.
- XSD Schemas.
- Examples of requests and responses in XML.
- Issue tracker.
- Libraries of code.

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GitHub Mobility process explained on flowcharts

<table>
<thead>
<tr>
<th>Exchanging ToRs (Transcripts of Records) after the mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student being sent</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

- **Incoming Mobility ToRs CNR API**
  - CNR = Change Notification Listener

- **ToR (re)import requested**
  - **Check what has changed. Ask the user (student and/or coordinator) for review.**
  - **Student marked it as ready for recognition.**
  - **Seems to be fair?**
    - **Yes**
      - **Waiting for the receiving HSO to fill things up (or contacts them)**
    - **No**
      - **Waiting for the receiving HSO to fill things up (or contacts them)**

- **Make the ToR visible via Incoming Mobility ToRs API. Notify the listeners.**
- **Manually decides when ToRs are ready.**
Mobility Tool+ Institutions API

- What is the status of this document?
- See the index of all other EWP Specifications

Summary

This document describes the Mobility Tool+ Institutions API. It is assumed that this API is implemented by only one host managed by the Directorate-General Education and Culture Unit (DG EAC) of the European Commission. However, the specification itself does not limit the number of hosts.

Once implemented by the host, it allows external clients to retrieve general information on institutions known by this host.

Request method

- Requests MUST be made with either HTTP GET or HTTP POST method. Servers MUST support both these methods. Server SHOULD reject all other request methods.
- Clients are advised to use POST when passing large number of parameters (servers MAY set a limit on string length).

Request parameters

Parameters MUST be provided in the regular application/x-www-form-urlencoded format.

pic (repeatable, required)

A list of institution PICs the client wants to retrieve information on (no more than 100 items).

This parameter is repeatable, so the request MAY contain multiple occurrences of it. The server is REQUIRED to return the PICs in the order of their occurrence.

Server implementers provide their own chosen value of max-ids via their manifest entry (see manifest.example) or should parse this value (or assume it is equal to 1).

Clients may retrieve proper PICs from other EWP APIs (most often, the Registry Service).

eche_at_date (required)

A date in the YYYY-MM-DD format. The Erasmus Charter for Higher Education (ECH) accreditation included should be the one valid at this date.

Response example

```xml
<mt-institutions-response>
  <hei>
    <pic>999975814</pic>
    <erasmus>N 051081</erasmus>
    <erasmus-charter startDate="2014-01-01" endDate="2020-12-31">29714-EPP-1-2014-1-NO-EPPKA3-ECHE</erasmus-charter>
  </hei>
  <name xml:lang="en">University of Oslo</name>
  <name xml:lang="no">Universitetet i Oslo</name>
  <a:mailing-address>
    <a:addressLine>University of Oslo</a:addressLine>
    <a:addressLine>PROBLEMVEIEN 5-7_polo</a:addressLine>
    <a:postalCode>0331</a:postalCode>
    <a:locality>Oslo</a:locality>
    <a:country>N0</a:country>
  </a:mailing-address>
</mt-institutions-response>
DEMO installations to test mobility scenarios

• Two installations:
  • University of Warsaw at [https://usosadm.demo.usos.edu.pl/usosadm/](https://usosadm.demo.usos.edu.pl/usosadm/)
  • Some other HEI at [https://usosadm-hei.demo.usos.edu.pl/usosadm/](https://usosadm-hei.demo.usos.edu.pl/usosadm/)
Scenarios and APIs

• Sharing institutional details, contacts, organizational units and factsheets.
• Negotiating inter-institutional agreements.
• Exposing course catalog.
• Sharing nominations, approval/rejection, changes.
• Learning agreements – all parts (before, during, after the mobility).
• Confirmation of the arrival and departure dates → grants.
• Digitally signed Transcript of Records with grade distributions (XML and PDF).

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University of Warsaw displays all obtained factsheets in the web portal for students and staff.
HEI generates ToRs for incoming students and notifies the partner (ToR CNR API)
University of Warsaw receives notification and then downloads ToR to the local system (Incoming Mobility ToR API).
Mobility Tool+

- Mobility Tool+ is managed by the *Directorate-General Education and Culture Unit* (DG EAC) of the European Commission. It is used for reporting purposes.

- It exposes:
  - MT+ Institutions API
  - MT+ Projects API
  - MT+ Dictionaries API
MT+ Institutions API
MT+ Projects API

Get data from EWP

Call year: 2015
Project ID: 2015-1-PB1-KA104-000181
Start: 01.07.2015
End: 01.07.2016
Action type: KA104

Project ID: 2015-1-PB1-KA104-000181
Start: 01.07.2015
End: 01.07.2016
Action type: KA104

* required fields

Get data from EWP  Close

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## MT+ Dictionaries API

### Education fields

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0110</td>
<td>Education, not further defined</td>
</tr>
<tr>
<td>0119</td>
<td>Education, not elsewhere classified</td>
</tr>
<tr>
<td>0213</td>
<td>Fine arts</td>
</tr>
<tr>
<td>022</td>
<td>Humanities (except languages)</td>
</tr>
<tr>
<td>0322</td>
<td>Library, information and archival studies</td>
</tr>
<tr>
<td>04</td>
<td>Business, administration and law</td>
</tr>
<tr>
<td>0412</td>
<td>Finance, banking and insurance</td>
</tr>
<tr>
<td>0413</td>
<td>Management and administration</td>
</tr>
<tr>
<td>0416</td>
<td>Wholesale and retail sales</td>
</tr>
<tr>
<td>05</td>
<td>Natural sciences, mathematics and statistics</td>
</tr>
<tr>
<td>051</td>
<td>Biological and related sciences</td>
</tr>
<tr>
<td>06</td>
<td>Information and Communication Technologies (ICTs)</td>
</tr>
<tr>
<td>0911</td>
<td>Dental studies</td>
</tr>
<tr>
<td>1014</td>
<td>Sports</td>
</tr>
<tr>
<td>1020</td>
<td>Hygiene and occupational health services, not further defined</td>
</tr>
<tr>
<td>1021</td>
<td>Community sanitation</td>
</tr>
<tr>
<td>103</td>
<td>Security services</td>
</tr>
<tr>
<td>1088</td>
<td>Services, Inter-disciplinary programmes</td>
</tr>
<tr>
<td>0915</td>
<td>Therapy and rehabilitation</td>
</tr>
<tr>
<td>102</td>
<td>Hygiene and occupational health services</td>
</tr>
</tbody>
</table>
• Provides all stakeholders with guidance on digitalising the internationalisation processes at any Higher Education Institution.

• Web portal available at https://cc.erasmuswithoutpaper.eu/

• Resources, tutorial videos, presentations and other tools and material to support the transition to digital Erasmus+ management.

• Entry/Exit procedure (DEV, PROD), SLA and any other legal issues.

• Single point of contact.

• Work in progress.
Erasmus Mobility Coordinators

Erasmus Without Paper allows your Higher Education Institution (HEI) to digitalise Erasmus+ mobility management processes. Depending on the way your currently manage Erasmus+ mobilities at your institution, this page will offer an overview of the different scenarios:

- 1. No Tool? Use the Erasmus Dashboard.
- 2. In-house built mobility management software? Connect to the EWP Network.
- 3. Use of 3rd party mobility management software? They will connect to EWP.

The following picture gives an overview of the different options. On this site you will find information and tools for all three scenarios.
Further development plans

• Designing MT+ API for reporting mobilities – *work in progress*.
  • Authorisation of end users.
  • Draft mobilities, final mobilities.

• Connecting Dashboard (with OLA and IIA editor) to the EWP Network – *work in progress*.

• Fine tuning and extending existing APIs (e.g. automatic Egracons grade conversion) – *work in progress*.

• Automatic tests for all APIs – *work in progress*.
What going into production means?

- Industrializing the EWP Network and its elements.
- Integrating various elements of the EWP ecosystem.
- Increasing network coverage by accepting new institutions.
- Supporting new partners in joining the network, on a political, organizational and technical level.
- Integrating data transfer with business processes of student mobility carried at higher education institutions.
- Integrating services offered by other networks into one digital platform for education sector.

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