PEP Engine Design Document

EOEPCA.SDD.xxx

TVUK System Team

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PEP Engine Design Document

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EO Exploitation Platform Common Architecture

PEP Engine Design Document

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COMMENTS and ISSUES	**PDF**
If you would like to raise comments or issues on this document, please do so by raising an Issue at the following URL https://github.com/EOEPCA/um-pep-engine/issues.	This document is available in PDF format here.
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AMENDMENT HISTORY

This document shall be amended by releasing a new edition of the document in its entirety. The Amendment Record Sheet below records the history and issue status of this document.

Table 1. Amendment Record Sheet

ISSUE	DATE	REASON
0.1	dd/mm/yyyy	Initial in-progress draft

Chapter 1. Introduction

1.1. Purpose and Scope

This document presents the PEP Engine Design for the Common Architecture.

1.2. Structure of the Document

Section 2 - Overview

Provides an over of the PEP Engine component, within the context of the wider Common Architecture design.

Section 3 - [mainDesign]

Provides the design of the PEP Engine component.

1.3. Reference Documents

The following is a list of Reference Documents with a direct bearing on the content of this document.

Reference	Document Details	Version
[EOEPCA-UC]	EOEPCA - Use Case Analysis EOEPCA.TN.005 https://eoepca.github.io/use-case-analysis	Issue 1.0, 02/08/2019
[EP-FM]	Exploitation Platform - Functional Model, ESA-EOPSDP-TN-17-050	Issue 1.0, 30/11/2017
[TEP-OA]	Thematic Exploitation Platform Open Architecture, EMSS-EOPS-TN-17-002	Issue 1, 12/12/2017
[WPS-T]	OGC Testbed-14: WPS-T Engineering Report, OGC 18-036r1, http://docs.opengeospatial.org/per/18-036r1.html	18-036r1, 07/02/2019
[WPS-REST-JSON]	OGC WPS 2.0 REST/JSON Binding Extension, Draft, OGC 18-062, https://raw.githubusercontent.com/opengeospatial/wps-rest-binding/develop/docs/18-062.pdf	1.0-draft
[CWL]	Common Workflow Language Specifications, https://www.commonwl.org/v1.0/	v1.0.2

Reference	Document Details	Version
[TB13-AP]	OGC Testbed-13, EP Application Package Engineering Report, OGC 17-023, http://docs.opengeospatial.org/per/17-023.html	17-023, 30/01/2018
[TB13-ADES]	OGC Testbed-13, Application Deployment and Execution Service Engineering Report, OGC 17-024, http://docs.opengeospatial.org/per/17-024.html	17-024, 11/01/2018
[TB14-AP]	OGC Testbed-14, Application Package Engineering Report, OGC 18-049r1, http://docs.opengeospatial.org/per/18-049r1.html	18-049r1, 07/02/2019
[TB14-ADES]	OGC Testbed-14, ADES & EMS Results and Best Practices Engineering Report, OGC 18-050r1, http://docs.opengeospatial.org/per/18-050r1.html	18-050r1, 08/02/2019
[OS-GEO-TIME]	OpenSearch GEO: OpenSearch Geo and Time Extensions, OGC 10-032r8, http://www.opengeospatial.org/standards/opensearchgeo	10-032r8, 14/04/2014
[OS-EO]	OpenSearch EO: OGC OpenSearch Extension for Earth Observation, OGC 13-026r9, http://docs.opengeospatial.org/is/13-026r8/13-026r8.html	13-026r9, 16/12/2016
[GEOJSON-LD]	OGC EO Dataset Metadata GeoJSON(-LD) Encoding Standard, OGC 17-003r1/17-084	17-003r1/17-084
[GEOJSON-LD-RESP]	OGC OpenSearch-EO GeoJSON(-LD) Response Encoding Standard, OGC 17-047	17-047
[PCI-DSS]	The Payment Card Industry Data Security Standard, https://www.pcisecuritystandards.org/document_library?category=pcidss&document=pci_dss	v3.2.1
[CEOS-OS-BP]	CEOS OpenSearch Best Practise, http://ceos.org/ourwork/workinggroups/wgiss/access/opensearch/	v1.2, 13/06/2017
[OIDC]	OpenID Connect Core 1.0, https://openid.net/specs/openid-connect-core-1_0.html	v1.0, 08/11/2014

Reference	Document Details	Version
[OGC-CSW]	OGC Catalogue Services 3.0 Specification - HTTP Protocol Binding (Catalogue Services for the Web), OGC 12-176r7, http://docs.opengeospatial.org/is/12-176r7/12-176r7.html	v3.0, 10/06/2016
[OGC-WMS]	OGC Web Map Server Implementation Specification, OGC 06-042, http://portal.opengeospatial.org/files/?artifact_id=14416	v1.3.0, 05/03/2006
[OGC-WMTS]	OGC Web Map Tile Service Implementation Standard, OGC 07-057r7, http://portal.opengeospatial.org/files/?artifact_id=35326	v1.0.0, 06/04/2010
[OGC-WFS]	OGC Web Feature Service 2.0 Interface Standard – With Corrigendum, OGC 09-025r2, http://docs.opengeospatial.org/is/09-025r2/09-025r2.html	v2.0.2, 10/07/2014
[OGC-WCS]	OGC Web Coverage Service (WCS) 2.1 Interface Standard - Core, OGC 17-089r1, http://docs.opengeospatial.org/is/17-089r1/17-089r1.html	v2.1, 16/08/2018
[OGC-WCPS]	Web Coverage Processing Service (WCPS) Language Interface Standard, OGC 08-068r2, http://portal.opengeospatial.org/files/?artifact_id=32319	v1.0.0, 25/03/2009
[AWS-S3]	Amazon Simple Storage Service REST API, https://docs.aws.amazon.com/AmazonS3/latest/API	API Version 2006-03-01

1.4. Terminology

The following terms are used in the Master System Design.

Term	Meaning
Admin	User with administrative capability on the EP
Algorithm	A self-contained set of operations to be performed, typically to achieve a desired data manipulation. The algorithm must be implemented (codified) for deployment and execution on the platform.
Analysis Result	The *Products* produced as output of an *Interactive Application* analysis session.

Term	Meaning
Analytics	A set of activities aimed to discover, interpret and communicate meaningful patters within the data. Analytics considered here are performed manually (or in a semi-automatic way) on-line with the aid of *Interactive Applications*.
Application Artefact	The 'software' component that provides the execution unit of the *Application Package*.
Application Deployment and Execution Service (ADES)	WPS-T (REST/JSON) service that incorporates the Docker execution engine, and is responsible for the execution of the processing service (as a WPS request) within the ‘target’ Exploitation Platform.
Application Descriptor	A file that provides the metadata part of the *Application Package*. Provides all the metadata required to accommodate the processor within the WPS service and make it available for execution.
Application Package	A platform independent and self-contained representation of a software item, providing executable, metadata and dependencies such that it can be deployed to and executed within an Exploitation Platform. Comprises the *Application Descriptor* and the *Application Artefact*.
Bulk Processing	Execution of a *Processing Service* on large amounts of data specified by AOI and TOI.
Code	The codification of an algorithm performed with a given programming language - compiled to Software or directly executed (interpretted) within the platform.
Compute Platform	The Platform on which execution occurs (this may differ from the Host or Home platform where federated processing is happening)
Consumer	User accessing existing services/products within the EP. Consumers may be scientific/research or commercial, and may or may not be experts of the domain
Data Access Library	An abstraction of the interface to the data layer of the resource tier. The library provides bindings for common languages (including python, Javascript) and presents a common object model to the code.
Development	The act of building new products/services/applications to be exposed within the platform and made available for users to conduct exploitation activities. Development may be performed inside or outside of the platform. If performed outside, an integration activity will be required to accommodate the developed service so that it is exposed within the platform.
Discovery	User finds products/services of interest to them based upon search criteria.
Execution	The act to start a *Processing Service* or an *Interactive Application*.

Term	Meaning
Execution Management Service (EMS)	The EMS is responsible for the orchestration of workflows, including the possibility of steps running on other (remote) platforms, and the on-demand deployment of processors to local/remote ADES as required.
Expert	User developing and integrating added-value to the EP (Scientific Researcher or Service Developer)
Exploitation Tier	The Exploitation Tier represents the end-users who exploit the services of the platform to perform analysis, or using high-level applications built-in on top of the platform's services
External Application	An application or script that is developed and executed outside of the Exploitation Platform, but is able to use the data/services of the EP via a programmatic interface (API).
Guest	An unregistered User or an unauthenticated Consumer with limited access to the EP's services
Home Platform	The Platform on which a User is based or from which an action was initiated by a User
Host Platform	The Platform through which a Resource has been published
Identity Provider (IdP)	The source for validating user identity in a federated identity system, (user authentication as a service).
Interactive Application	A stand-alone application provided within the exploitation platform for on-line hosted processing. Provides an interactive interface through which the user is able to conduct their analysis of the data, producing *Analysis Results* as output. Interactive Applications include at least the following types: console application, web application (rich browser interface), remote desktop to a hosted VM.
Interactive Console Application	A simple *Interactive Application* for analysis in which a console interface to a platform-hosted terminal is provided to the user. The console interface can be provided through the user's browser session or through a remote SSH connection.
Interactive Remote Desktop	An Interactive Application for analysis provided as a remote desktop session to an OS-session (or directly to a 'native' application) on the exploitation platform. The user will have access to a number of applications within the hosted OS. The remote desktop session is provided through the user's web browser.
Interactive Web Application	An Interactive Application for analysis provided as a rich user interface through the user's web browser.
Key-Value Pair	A key-value pair (KVP) is an abstract data type that includes a group of key identifiers and a set of associated values. Key-value pairs are frequently used in lookup tables, hash tables and configuration files.
Kubernetes (K8s)	Container orchestration system for automating application deployment, scaling and management.

Term	Meaning
Login Service	An encapsulation of Authenticated Login provision within the Exploitation Platform context. The Login Service is an OpenID Connect Provider that is used purely for authentication. It acts as a Relying Party in flows with external IdPs to obtain access to the user's identity.
EO Network of Resources	The coordinated collection of European EO resources (platforms, data sources, etc.).
Object Store	A computer data storage architecture that manages data as objects. Each object typically includes the data itself, a variable amount of metadata, and a globally unique identifier.
On-demand Processing Service	A *Processing Service* whose execution is initiated directly by the user on an ad-hoc basis.
Platform (EP)	An on-line collection of products, services and tools for exploitation of EO data
Platform Tier	The Platform Tier represents the Exploitation Platform and the services it offers to end-users
Processing	A set of pre-defined activities that interact to achieve a result. For the exploitation platform, comprises on-line processing to derive data products from input data, conducted by a hosted processing service execution.
Processing Result	The *Products* produced as output of a *Processing Service* execution.
Processing Service	A non-interactive data processing that has a well-defined set of input data types, input parameterisation, producing *Processing Results* with a well-defined output data type.
Products	EO data (commercial and non-commercial) and Value-added products and made available through the EP. *It is assumed that the Hosting Environment for the EP makes available an existing supply of EO Data*
Resource	A entity, such as a Product, Processing Service or Interactive Application, which is of interest to a user, is indexed in a catalogue and can be returned as a single meaningful search result
Resource Tier	The Resource Tier represents the hosting infrastructure and provides the EO data, storage and compute upon which the exploitation platform is deployed
Reusable Research Object	An encapsulation of some research/analysis that describes all aspects required to reproduce the analysis, including data used, processing performed etc.
Scientific Researcher	Expert user with the objective to perform scientific research. Having minimal IT knowledge with no desire to acquire it, they want the effort for the translation of their algorithm into a service/product to be minimised by the platform.

Term	Meaning
Service Developer	Expert user with the objective to provide a performing, stable and reliable service/product. Having deeper IT knowledge or a willingness to acquire it, they require deeper access to the platform IT functionalities for optimisation of their algorithm.
Software	The compilation of code into a binary program to be executed within the platform on-line computing environment.
Systematic Processing Service	A *Processing Service* whose execution is initiated automatically (on behalf of a user), either according to a schedule (routine) or triggered by an event (e.g. arrival of new data).
Terms & Conditions (T&Cs)	The obligations that the user agrees to abide by in regard of usage of products/services of the platform. T&Cs are set by the provider of each product/service.
Transactional Web Processing Service (WPS-T)	Transactional extension to WPS that allows adhoc deployment / undeployment of user-provided processors.
User	An individual using the EP, of any type (Admin/Consumer/Expert/Guest)
Value-added products	Products generated from processing services of the EP (or external processing) and made available through the EP. This includes products uploaded to the EP by users and published for collaborative consumption
Visualisation	To obtain a visual representation of any data/products held within the platform - presented to the user within their web browser session.
Web Coverage Service (WCS)	OGC standard that provides an open specification for sharing raster datasets on the web.
Web Coverage Processing Service (WCPS)	OGC standard that defines a protocol-independent language for the extraction, processing, and analysis of multi-dimentional coverages representing sensor, image, or statistics data.
Web Feature Service (WFS)	OGC standard that makes geographic feature data (vector geospatial datasets) available on the web.
Web Map Service (WMS)	OGC standard that provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases.
Web Map Tile Service (WMTS)	OGC standard that provides a simple HTTP interface for requesting map tiles of spatially referenced data using the images with predefined content, extent, and resolution.
Web Processing Services (WPS)	OGC standard that defines how a client can request the execution of a process, and how the output from the process is handled.
Workspace	A user-scoped 'container' in the EP, in which each user maintains their own links to resources (products and services) that have been collected by a user during their usage of the EP. The workspace acts as the hub for a user’s exploitation activities within the EP

1.5. Glossary

The following acronyms and abbreviations have been used in this report.

Term	Definition
AAI	Authentication & Authorization Infrastructure
ABAC	Attribute Based Access Control
ADES	Application Deployment and Execution Service
ALFA	Abbreviated Language For Authorization
AOI	Area of Interest
API	Application Programming Interface
CMS	Content Management System
CWL	Common Workflow Language
DAL	Data Access Library
EMS	Execution Management Service
EO	Earth Observation
EP	Exploitation Platform
FUSE	Filesystem in Userspace
GeoXACML	Geo-specific extension to the XACML Policy Language
IAM	Identity and Access Management
IdP	Identity Provider
JSON	JavaScript Object Notation
K8s	Kubernetes
KVP	Key-value Pair
M2M	Machine-to-machine
OGC	Open Geospatial Consortium
PDE	Processor Development Environment
PDP	Policy Decision Point
PEP	Policy Enforcement Point
PIP	Policy Information Point
RBAC	Role Based Access Control
REST	Representational State Transfer
SSH	Secure Shell
TOI	Time of Interest
UMA	User-Managed Access

Term	Definition
VNC	Virtual Network Computing
WCS	Web Coverage Service
WCPS	Web Coverage Processing Service
WFS	Web Feature Service
WMS	Web Map Service
WMTS	Web Map Tile Service
WPS	Web Processing Service
WPS-T	Transactional Web Processing Service
XACML	eXtensible Access Control Markup Language

Chapter 2. Overview

2.1. Building Block Overview

Content Description

This section contains:

- High-Level Description of the Building Block
- Context within EOEPCA

The main functionality of the PEP is to be able to stand between a client and the client's desired resource. By creating this setup, where only the PEP is visible to an external request, we effectively secure whatever is behind the PEP. The PEP will enforce any policy for a resource configured in the Authorization Server, following the UMA 2.0 standard.

The PEP, when started, follows these steps:

1. Load the configuration from the config file
2. Parse the configuration from the Auth Server (for example, the correct endpoints), using WellKnownHandler
3. If no client is configured at the config file, it will register itself, using the SCIM Client
    a. If the PEP had to register itself, then it will save the client's information on the config file, saving it in case a restart is needed.
4. Create OIDC and UMA clients
    a. The creation of the UMA client implies also that resources' ID are being grabbed from the Auth Server and loaded in memory for the PEP to handle. In the future the resources will be stored in a DB instead of just RAM.
5. If it doesn't exist yet, a resource called "ADES Service" will be created. This is intended as a demo registration, and can be safely deleted when not neeeded.
6. Start reverse proxy using Flask and await requests

When launched, the PEP will answer to all requests that start with the configured path. These answers will come in the form of UMA tickets (if there are no RPT provided, or an invalid one is used).
In case the request is accompained by a header using a valid RPT in the format `Authorization: Bearer <valid_RPT>`, the PEP will make a request to the resource server, for the resource located exactly at the path requested (minus the configured at config), and return the resource's server answer.

Examples follow, assuming the following conditions:

- path configured for the reverse proxy is "/pep"
- the PEP is at pep.domain.com/pep
- Resource server is at remote.server.com

Token	Request to PEP	PEP Action	PEP answer
No RPT	pep.domain.com	None (request does not get to PEP endpoint)	None (the PEP doesn't see this request)
No RPT	pep.domain.com/pep/thing	Generate ticket for "/thing"	401 + ticket
Valid RPT for "/thing"	pep.domain.com/pep/thing	Request to remote.server.com/thing	Contents of remote.server.com/thing
Valid RPT for "/thing"	pep.domain.com/pep/different	Generate ticket for "/different"	401 + ticket
INVALID RPT for "/thing"	pep.domain.com/pep/thing	Generate ticket for "/thing"	401 + ticket
No RPT	pep.domain.com/pep/thing/with/large/path	Generate ticket for "/thing/with/large/path"	401 + ticket
Valid RPT for "/thing/with/large/path"	pep.domain.com/pep/thing/with/large/path	Request to remote.server.com/thing/with/large/path	Contents of remote.server.com/thing/with/large/path

To further clarify the flow the PEP uses, you can also take a look at the Data Flow in section Data flow

2.2. External Interfaces

2.2.1. HTTP(S) (Reverse Proxy Listener)

An HTTP listener, which can be configured through the config file.
This is the only input interface to interact directly with the PEP from outside, and is managed by the reverse proxy.

The default listener for this interface is `0.0.0.0:5566/pep/<path-to-resource>`.

This interface will parse the path and the headers in order to assert authentication and authorization of the client requesting the resource.

2.2.2. HTTP(S) (to Resource Server)

The PEP will contact via HTTP with the configured Resource Server whenever a valid request with a valid RPT is done, or whenever RPT is not needed to access the resource.

The PEP will make a request to the RS, and will return the answer verbatim to the client that requested it, effectively acting like a transparent proxy from the client's point of view. This allows the mentioned desired behaviour of being able to protect anything just placing the PEP "in front of" the resource to protect.

2.2.3. UMA (to Login Service)

The PEP will make the requests needed to handle the resources, along with the necessary requests to create tickets and check the validity of RPTs.

The endpoints used for UMA are:

- RESOURCE_REGISTRATION
- PERMISSION
- INTROSPECTION

2.2.4. OIDC (to Login Service)

The PEP uses the OIDC protocol in order to authenticate itself as a valid UMA client, and uses this OIDC client in all UMA-related queries.

These queries are done against the Login Service, and the endpoints used are:

- TOKEN_ENDPOINT

2.2.5. SCIM (to Login Service)

The PEP has the capability to auto-register itself as a client if there is no client pre-configured from previous starts or previous configuration.

In order to do this, it utilizes the SCIM protocol, and queries the Login Service.

The endpoints used for SCIM are:

- AUTH_CLIENT_POST

2.3. Required resources

Content Description

This section contains:

- List of HW and SW required resources for the correct functioning of the building Block
- References to open repositories (when applicable)

2.3.1. Software

The following Open-Source Software is required to support the deployment and integration of the Policy Enforcement Point:

- EOEPCA's SCIM Client - https://github.com/EOEPCA/um-common-scim-client
- EOEPCA's UMA Client - https://github.com/EOEPCA/um-common-uma-client

- EOEPCA's Well Known Handler - https://github.com/EOEPCA/well-known-handler
- Reverse Proxy for Python - Flask - https://github.com/pallets/flask

2.4. Static Architecture

Content Description

This section contains:

- Diagram and description of the major logical components within the Building Block

The Policy Enforcement Point at this moment is composed of only one component: The reverse proxy.

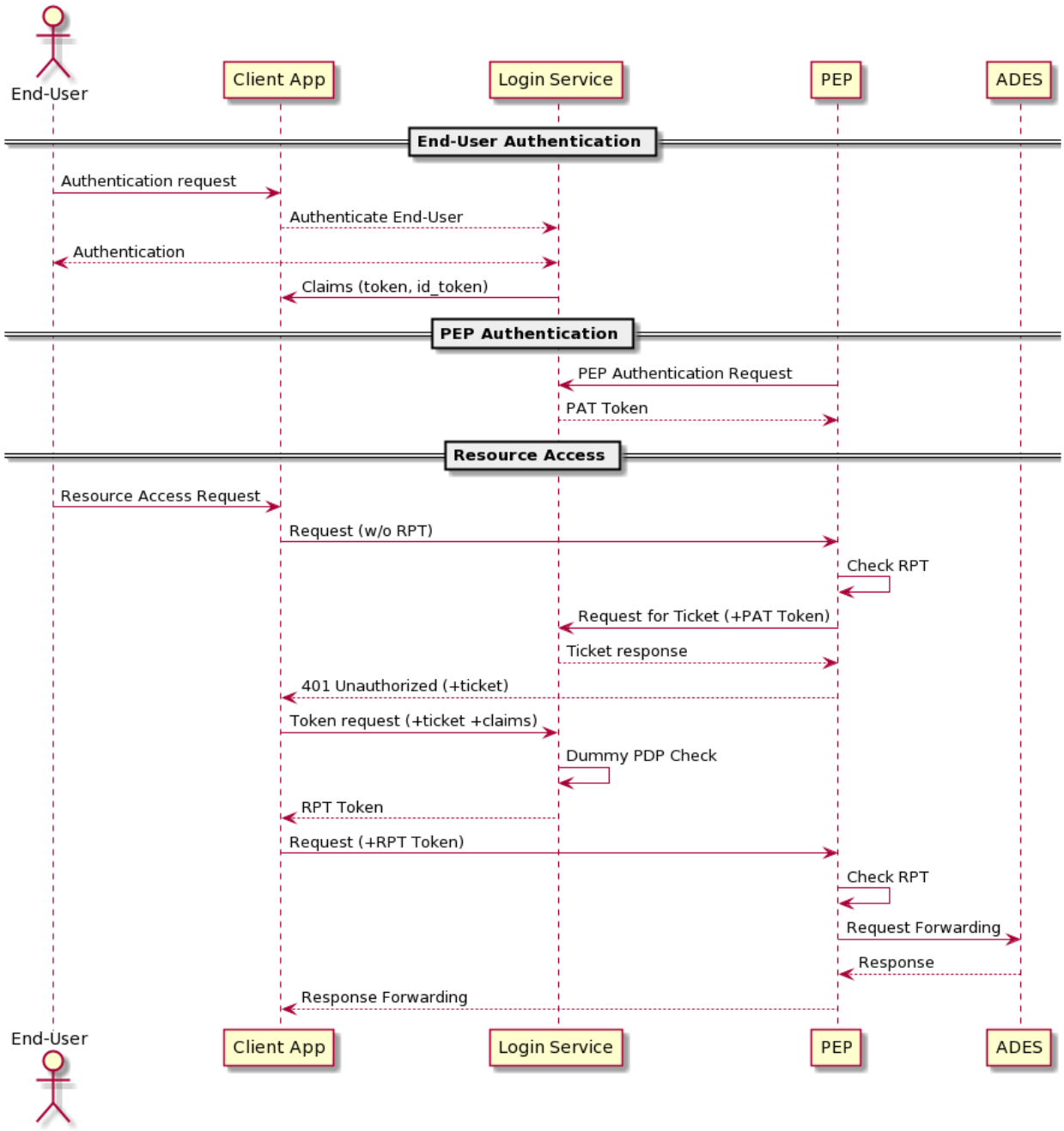
The next section [Design] contains detailed descriptions and references needed to understand the intricacies of this component.

2.5. Use cases

Content Description

This section contains:

- Diagrams and definition of the use cases covered by this Building Block



2.5.1. Self Authentication & Registration

(Represented in the above graph by the request to Login Service in the section "PEP Authentication")

The PEP has an internal UMA Client used for alll the necessary UMA requests. This client is completely auto-managed even to the point of self-registration, so no pre-configuration is needed in order to run a PEP instance.

2.5.2. Ticket generation

(Represented in the above graph by the request to Login Service called "Request for ticket")

The PEP generates appropiate tickets for access attempts to a resource, which can later be consumed and checked by the Authorization Server in order to give proper clearance to access that same resource.

Ticket generation as per the UMAv2.0 standard, are only valid for that requested it and for that specific resource.

2.5.3. Resource protection & RPT validation

The PEP when presented with an RPT in an `Authorization` HTTP header, will check the validity of this token for the requested resource. This token is only valid for a limited time, for a specific user, and for a specific resource. This makes attacks via copying an RPT extremely inneficient for an attacker.

The PEP will only protect the resources that it recognizes as such. This means that, even without an RPT, the PEP will alllow a client to pass-through directly to the resource server if there is no identified resource that matches what the client is requesting.

This behaviour, which is analogous to a blacklist approach (we only deny access a priori of a bunch of resources), can be easily switched to a "whitelist" with simple changes in the code.
On the other hand, this baseline functionality is desirable to allow PEP-chaining, and allows for more complex workflows in the future.

Chapter 3. Building Block Design

Content Description

This section contains:

- A concise breakdown of the Building Block in several independent services (when applicable). For each component, the following subsections are added:
  - Overview and purpose: indicating the functionality covered by the component
  - SW Reuse and Dependencies: indicating reuse of third party open source solutions (if any) and any pre-required Dependencies
  - Interfaces: both internal to the building block and those exposed externally
  - Data: Data usage of the building block, data flow and any GDPR concerns should be addressed here
  - Applicable Resources: links and references to (Reference Docs), and repositories.

When a breakdown is necessary, a general overview of the building block can be given. On the contrary, no breakdown indicates a single component development with the same expected sections.

3.1. Reverse Proxy Service

3.1.1. Overview and Purpose

The Flask-based reverse proxy serves as the interface for input queries. This reverse proxy is in charge of recieving the queries and returning the appropiate HTTP response.

3.1.2. Software Reuse and Dependencies

All requirements for the executing of the reverse proxy are found under src/requirements.txt, and expect Python 3.6.9 or greater to work.

The most important are:

- **EOEPCA-SCIM**: Used to auto-register itself as a client to the Auth. Server upon startup
- **EOEPCA-UMA**: Used as the backbone of the PEP, allows for generation of tickets, verification of RPTs, and any other UMA-related action.
- **WellKnownHandler**: Used to dynamically check the configuration of the Authorization Server on each execution. For example, it can get the needed endpoints for any API the PEP needs, such as the token request for OIDC.
- **Flask**: External to EOEPCA's project, this library allows the PEP to create the actual reverse proxy, sending and recieving custom requests.

3.1.3. Interfaces

This component doesn't have any internal interfaces. For a reference of external interfaces see External Interfaces on Section 2 Overview

3.1.4. Data

3.1.4.1. Configuration

The PEP gets all its configuration from the file located under `config/config.json`.

The parameters that are accepted, and their meaning, are as follows:

- **realm**: 'realm' parameter answered for each UMA ticket. Default is "eoepca"
- **auth_server_url**: complete url (with "https") of the Authorization server.
- **proxy_endpoint**: "/path"-formatted string to indicate where the reverse proxy should listen. The proxy will catch any request that starts with that path. Default is "/pep"
- **service_host**: Host for the proxy to listen on. For example, "0.0.0.0" will listen on all interfaces
- **service_port**: Port for the proxy to listen on. By default, **5566**. Keep in mind you will have to edit the docker file and/or kubernetes yaml file in order for all the prot forwarding to work.
- **s_margin_rpt_valid**: An integer representing how many seconds of "margin" do we want when checking RPT. For example, using **5** will make sure the provided RPT is valid now AND AT LEAST in the next 5 seconds.
- **check_ssl_certs**: Toggle on/off (bool) to check certificates in all requests. This should be forced to True in a production environment
- **use_threads**: Toggle on/off (bool) the usage of threads for the proxy. Recommended to be left as True.
- **debug_mode**: Toggle on/off (bool) a debug mode of Flask. In a production environment, this should be false.
- **resource_server_endpoint**: Complete url (with "https" and any port) of the Resource Server to protect with this PEP.
- **client_id**: string indicating a client_id for an already registered and configured client. **This parameter is optional**. When not supplied, the PEP will generate a new client for itself and store it in this key inside the JSON.
- **client_secret**: string indicating the client secret for the client_id. **This parameter is optional**. When not supplied, the PEP will generate a new client for itself and store it in this key inside the JSON.

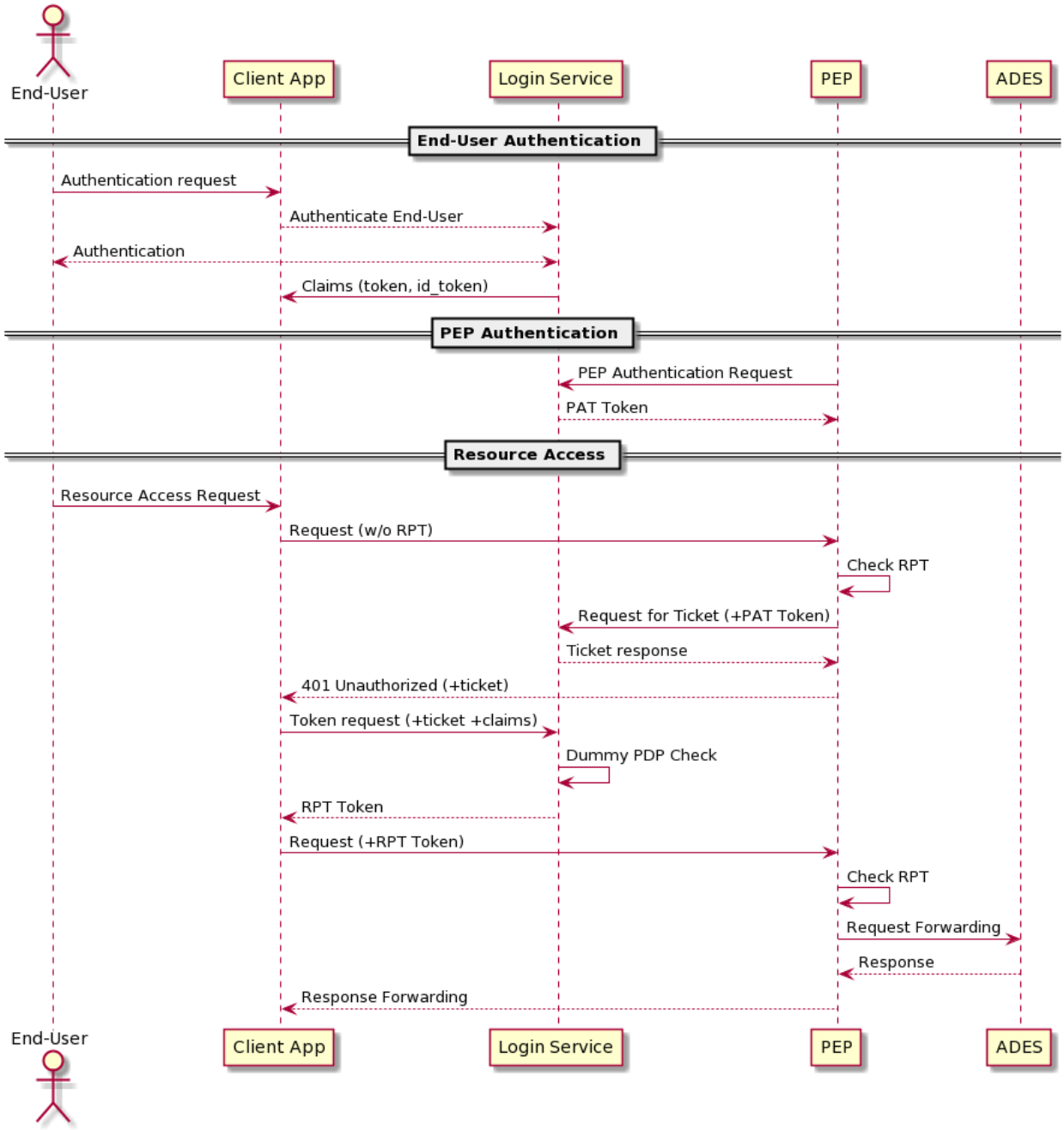
3.1.4.2. Data flow

The only information the PEP handles are tickets given by the Auth Server, and RPTs which are sent only to the Auth Server.

All data is ephimeral at the time of writting, except the data stored at the config file. The resources are loaded into memory, but in the future they will be stored on a separate database to allow large

amounts of resources and more complex queries.

What follows is an example of the nominal flow for the PEP, and "ADES" is the Resource Server the PEP is protecting:



3.1.5. Extensibility

The design of the PEP allows for further improvements if need be. For example:

- The resource management in memory could be expanded to a full on DB, by changing how `custom_uma.py` works internally.
- The UMA library used allows for quick implementations for resource managing, such as creation, deleting and editing.
- The proxy can be expanded to parse further parameters on top of the HTTP protocol, allowing for any kind of plugin or complex mechanism desired.

3.1.6. Applicable Resources

- UMA 2.0 Specification - https://docs.kantarainitiative.org/uma/wg/rec-oauth-uma-grant-2.0.html
- EOEPCA's SCIM Client - https://github.com/EOEPCA/um-common-scim-client
- EOEPCA's UMA Client - https://github.com/EOEPCA/um-common-uma-client
- EOEPCA's Well Known Handler - https://github.com/EOEPCA/well-known-handler
- Flask - https://github.com/pallets/flask

3.2. CLI

3.2.1. Overview and Purpose

Included with the PEP there is a folder with scripts at `/CLI`. These scripts serve as a demo tool, and could be used in testing. For more information on what variables are expected, all scripts incorporate a '-h' help command.

The files are the following:

- **authenticate-user.sh**: Takes credentials for a client and a user, and uses them to get an id_token from the Auth Server. This token can be used in other scripts or actions as long as it is valid.
- **get-rpt.sh**: Will use a ticket and credentials in the form of an id_token to request an RPT to access a resource.
- **request-resource.sh**: This script interacts with the PEP, and will make requests to it with the given parameters. It's a clean way of composing a correct http request to the PEP.

3.2.2. Software Reuse and Dependencies

The scripts need the library 'WellKnownHandler', to dynamically get the correct endpoints for the auth server, and thus they also need Python 3.6.9 or greater to execute it.

Other than that, only Bash and Curl are required.

3.2.3. Applicable Resources

- UMA 2.0 Specification - https://docs.kantarainitiative.org/uma/wg/rec-oauth-uma-grant-2.0.html
- EOEPCA's Well Known Handler - https://github.com/EOEPCA/well-known-handler

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