PDP Engine Design Document

EOEPCA.SDD.xxx

TVUK System Team

Version 0.2, dd/mm/yyyy:

PDP Engine Design Document

EO Exploitation Platform Common Architecture

PDP Engine Design Document

EOEPCA.SDD.xxx

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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 PDP Engine Design for the Common Architecture.

1.2. Structure of the Document

Section 2 - Overview

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

Section 3 - Building Block Design

Provides the design of the PDP 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:

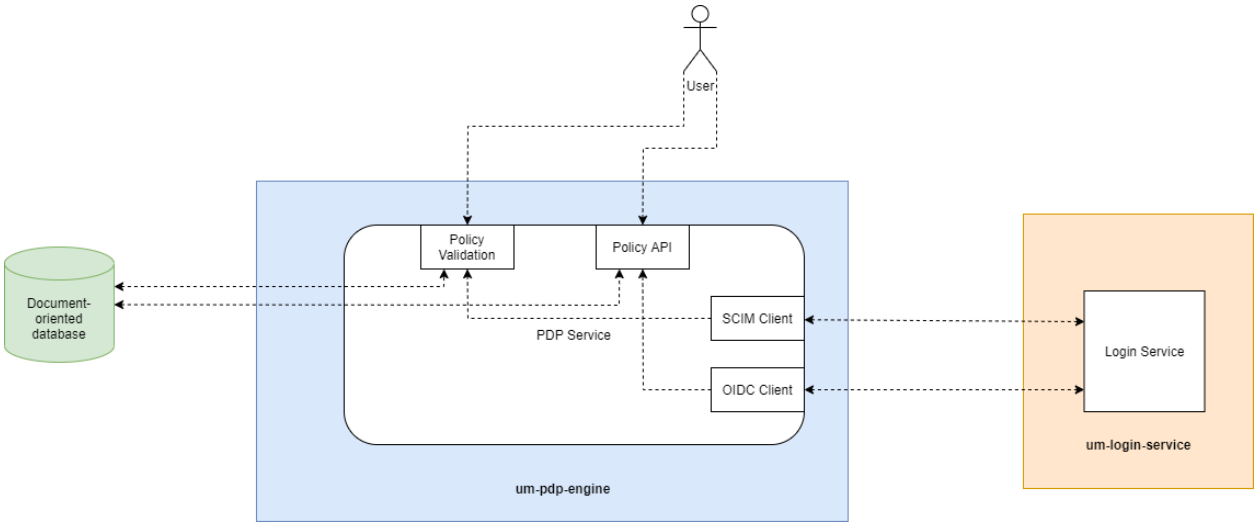
- High-Level Description of the Building Block
- Context within EOEPCA

The main functionality of the PDP is to be able to perform complex Policy Decisions based on Policy Documents. In order to do so, several functionality blocks are identified:

- Policy Check Endpoint. A XACML-compliant endpoint that allows to submit JSON XACML requests and receive the corresponding responses.
  - SCIM Client, allowing to retrieve user information that is local to the platform, whenever possible.
  - OIDC Client, allowing to authenticate the component as trusted within the architecture.
  - Resource API Client, allowing to retrieve details about the resources being accessed.
- Policy Repository Management. An exposed API allowing to register and/or query policies assigned to specific resources.

2.1.1. Initialization flow

The figure below, identifies the main workflows on which the PDP Engine participates, along with it's components:



When launched, the PDP will answer to all requests to 2 specific paths:

1. Policy Management (/policy/ and /policy/<policy_id or ObjectId(policy_id)>): To perform operations like GET/UPDATE/DELETE policies
2. Policy Access Check (/policy/validate): to check the policy access to a resource using a xacml

from the request
The requests should be accompained by an "Authorization: Bearer <valid_RPT>" for all endpoints except for the de /validate

Examples, given the example values of:
- path configured: "/pdp"
- PDP is at pdp.domain.com/policy
- For Validate policies: "/policy/validate"

Token	Request to PDP	PDP Action	PDP answer
No RPT/OAuth token	pdp.domain.com	None (request does not get to PDP endpoint)	None (the PDP doesn't see this request)
No RPT/OAuth token and Valid data	pdp.domain.com/policy /validate with a json as data	Validates the policy access related to the json request	Return a response with Permit access
No RPT/OAuth token and Not valid data	pdp.domain.com/policy /validate with a json as data	Validates the policy access related to the json request	Return a response with Deny access
RPT/OAuth token + Policy information as data	pdp.domain.com/policy /	Register Policy in the Back-end Database	Policy_id for the policy just created
No RPT/OAuth token + Policy information as data	pdp.domain.com/policy /	Register Policy in Back-end Database	401
RPT/OAuth token + Policy information as data	pdp.domain.com/policy /<policy_id or ObjectId(policy_id)>	Performs the operations of Get/Update/Delete policy	Get: Return the policy Update: "updated" or "no changes made" Delete: 204 if exists
No RPT/OAuth token + Policy information as data	pdp.domain.com/policy /<policy_id or ObjectId(policy_id)>	Performs the operations of Get/Update/Delete policy	401

2.2. External Interfaces

2.2.1. Exposed Interfaces

2.2.1.1. XACML (from/to Login Service)

The PDP exposes a policy check endpoint compliant with XACML 3.0 standards (http://docs.oasis-open.org/xacml/3.0/xacml-3.0-core-spec-en.html), whith a content-type application/json due to its JSON Profile.

For the function of parse XACML requests to get a decision about the access to a policy, you can use `/policy/validate`.

2.2.1.2. Policy API (to Policy Decision Point)

The PDP queries the corresponding PDP to retrieve information about a policy.
For this case we can use the `/policy/<policy_id or ObjectId(policy_id)>` to do all the operations related to insert, get, update and delete policies.

2.2.2. Consumed Interfaces

2.2.2.1. OIDC (to Login Service)

The PDP uses the OIDC protocol in order to authenticate itself as a valid UMA client, and uses this OIDC client in all UMA-related queries.It allows Clients to verify the identity of the End-User. (https://gluu.org/docs/gluu-server/4.0/admin-guide/openid-connect/)

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

- Discovery Endpoint: /.well-known/openid-configuration

And the keys used from Well Known Handler:

- Token Endpoint: KEY_OIDC_TOKEN_ENDPOINT
- UserInfo Endpoint: KEY_OIDC_USERINFO_ENDPOINT

2.2.2.2. SCIM (to Login Service)

The PDP 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 which is designed to reduce the complexity of user management operations. (https://gluu.org/docs/gluu-server/3.1.1/user-management/scim2/)

The keys used from Well Known Handler:

- User Atributes: KEY_SCIM_USER_ENDPOINT
- Private Key JWT Key: ENDPOINT_AUTH_CLIENT_PRIVATE_KEY_JWT

2.3. Internal Interfaces

2.3.1. Back-End database

In order to access the policies, these policies will be stored in a non-relational database. In which will be stored document-oriented information such as JSON-like documents with optional schemas.

2.4. 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)

2.4.1. 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 OpenID - https://github.com/EOEPCA/um-common-oidc-client
- EOEPCA's Well Known Handler - https://github.com/EOEPCA/well-known-handler
- Flask - https://github.com/pallets/flask
- MongoDB for python - https://pymongo.readthedocs.io/en/stable/index.html

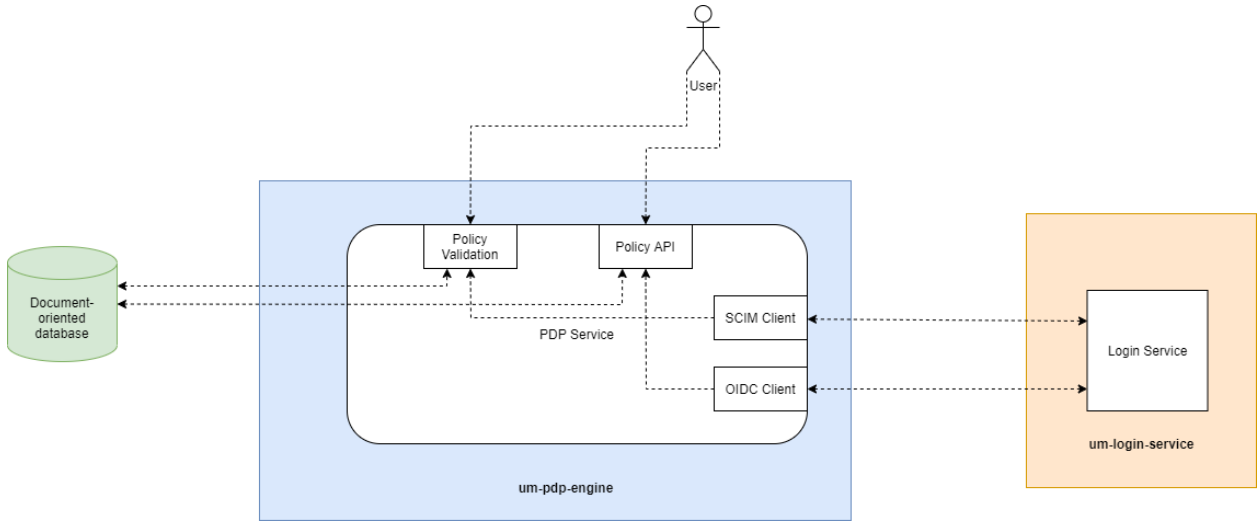
2.5. Static Architecture

Content Description

This section contains:

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

With the diagram below, you can see how the connection between the back-end database and the pdp-engine:



The PDP is composed of two main components:

- The PDP Engine (related to the endpoint that are exposed): This component will expose the endpoints that we commented before. For this it will be necessary to establish a client for SCIM

and another for OIDC.

- And a Back-end Database: This component store all information related to policies and will interact within the endpoints.

The next section Building Block Design

contains detailed descriptions and references needed to understand the intricacies of this component.

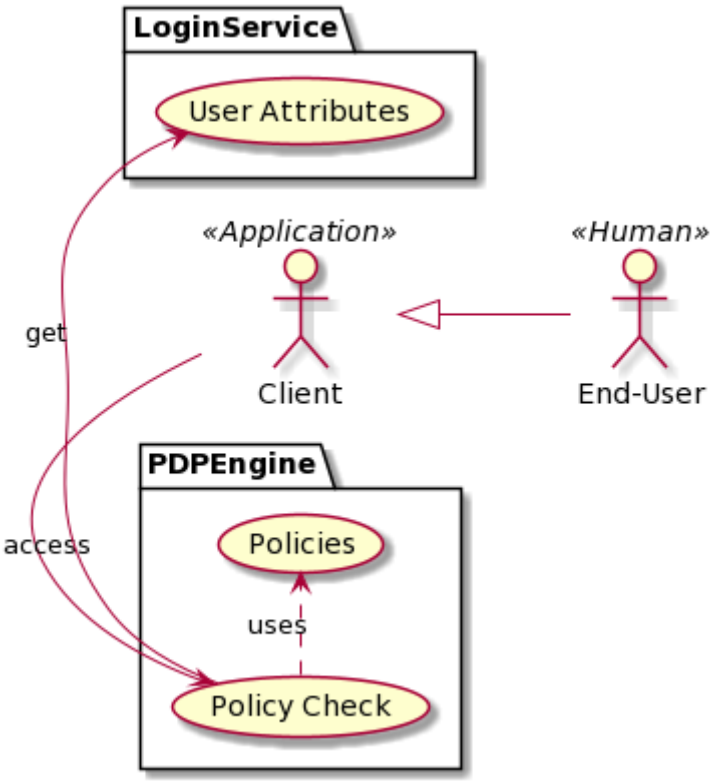
2.6. Use cases

Content Description

This section contains:

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

2.6.1. Policy Access Check Use Case



This diagram covers the following use cases:

2.6.1.1. Policy Access Check

When the PDP has obtained the policies, we proceed to compare the content of these policies with the values obtained from the request using the ScimHandler, mainly they are the resource id, action type, and the user_name, in case that some of these do not coincide, it will be response with "Deny" in the json or with a "Permit" if everything is correct.

2.6.1.2. Policy Retrieval

The PDP access through the resource id that was extracted from the XACML in the request and using the Policy_Storage class, allows to access the Back-end databse and extracts all the policies information stored for that resource id.

2.6.1.3. Get User Attributes

SCIM will be used in order to obtain the attributes for the user that have been extracted from the XACML of the request and then use them in the PDP functions. The issuer variable of the XACML subject-id field can be optionally used to determine the SCIM Endpoint on which the PDP will attempt to perform attribute release. If this value is not available, it will be extracted from configuration or environment variables.

2.6.2. Policy Repository Management

2.6.2.1. Registration of policies

The process of registering the policies is performed in the main, for this purpose the Policy_Storage class is used which will allow actions such as inserting policies in the pod where the Back-end database is located.

2.6.3. Policy Delegation (to external PDPs)

Whenever a policy rule has a **delegate** parameter with a reference URI to an external PDP, the current PDP will forward the xacml request to the external PDP referencing itself in it. The external PDP will validate the remaining policies (that were referenced with the **delegate** parameter). If the external PDP has the policy, it will return a permission granted on its side. If all the policy checks are positively validated (current PDP and foreign PDP(s)), the permission is granted. If otherwise any policy check fails to validate, the permission is denied.

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. Policy Decision Engine

3.1.1. Overview and Purpose

The Flask-based endpoint allows to query and retrieve XACML-compliant requests.

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 as a complementary measure to the XACML passing of client assertions.
- **EOEPCA-OIDC**: Used to auto-register itself as a client to the Auth. Server upon start-up.
- **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 PDP needs, such as the token request for OIDC.
- **Flask**: External to EOEPCA's project, this library allows the PDP to expose its endpoints.
- **MongoDB**: Used to storage the policies for every resource, with the possibility of performing actions such as insert policies, modify, delete, etc

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 PDP gets all its configuration from the file located under config/config.json.

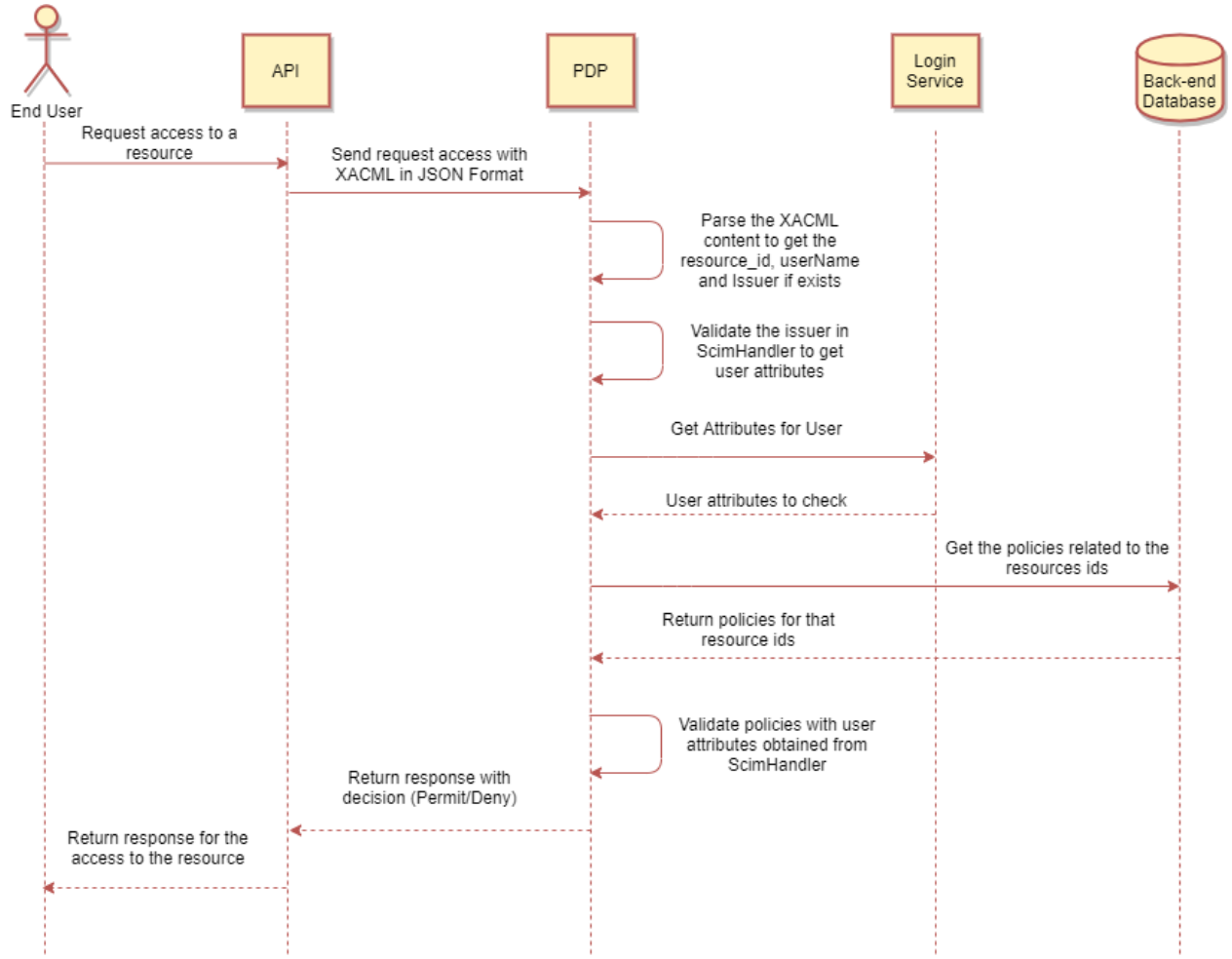
The parameters that are accepted, and their meaning, are as follows:

- **prefix**: "/path"-formatted string to indicate where the reverse proxy should listen. Default is "/pdp"
- **host**: Host for the proxy to listen on. For example, "0.0.0.0" will listen on all interfaces
- **port**: Port for the proxy to listen on. By default, 5567. 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.
- **check_ssl_certs**: Toggle on/off (bool) to check certificates in all requests. This should be forced to True in a production environment
- **debug_mode**: Toggle on/off (bool) a debug mode of Flask. In a production environment, this should be false.

3.1.4.2. Data flow

The only information the PDP handles are XACML json format from the request, and policies provided by a Back-End database.

What follows is an example of the nominal flow for the PDP:



3.1.5. Extensibility

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

- 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

- XACML 3.0 JSON Profile Specification 1.1 - http://docs.oasis-open.org/xacml/xacml-json-http/v1.1/xacml-json-http-v1.1.html
- EOEPCA's SCIM Client - https://github.com/EOEPCA/um-common-scim-client
- EOEPCA's OIDC 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
- Policy Language - https://app.swaggerhub.com/apis/hector-rodriguez/PolicyAPI/1-oas3

3.2. Policy Validation Service

3.2.1. Overview and Purpose

The functionality is to validate that the policy is fulfilled with the request received at the /validate endpoint, and return a response with the access or denied access.
For this purpose, the following points are considered:

- Validates the policy conditions (AND, OR, XOR, NOT) and returns True or False
- Validate the value received in the request with the policy values together with the condition (LESS, LESSEQUAL, GREATER, GREATEREQUAL, EQUAL) and return True or False
- Split the policy rule in order to obtain the value for each condition

3.3. Policy Repository

3.3.1. Overview and Purpose

It is the database based on MongoDB where the policies are stored and queried for the PDP pourposes

Included with the PDP there is a script at the source path that performs queries against a Mongo Database. The main purpose of this script is to reduce the usage of RAM when registering a policy locally and when querying for its content.
It is developed to generate a database called 'policy_db' in case it does not exist. The collection used for the storage of the documents is called 'policies'.
The main functionalities are:

- **Insert policy**: Will generate a document with the policy data recived as input if it alredy exists it will update it. The main parameters of the policy would be an auto-generated id provided by mongo which identify each document in the database, the resource_id provided by the login-service, the name for the policy, and the configuratino which will be the policy with its resource_id. This would be mandatory parameters in order to perform other kind of queries.
- **Update policy**: Updates the content of a policy stored matched by its ID
- **Get policy from resource id**: Finds the policy, attached to a resource by a resource_id given. Returns a list of policies in json format to the resource_id asociated.
- **Get policy from id**: Matches the policy by its unique ID
- **Delete policy**: Will recive a policy id and will find and delete the matched document

This script is manipulated by the API which would intercept the request in order to perform PUT, POST and DELETE methods.
In the future this will be complient with other databases in order to unify the methods mentioned above.

3.3.2. Software Reuse and Dependencies

At the moment the usage is mainly for the policy interaction purposes, but this can easily be reused by other agents.

3.3.3. Data flow

The database will only be accesible by the API or the Proxy.
The main methods for the interaction with the database are displayed in this dataflow as a summary of its scope:

3.3.4. Applicable Resources

- MongoDB image from DockerHub - https://hub.docker.com/_/mongo

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<< End of Document >>