language **en**

DASP-Core Vocabulary

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Abstract

This document proposes a vocabulary for modeling of informational and behavioural properties of Web APIs. It serves as one of the building blocks of DASP framework, whose primary goal is achieving fine-grained cross-domain security management for heterogenous environments and intelligent agents.

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1. Introduction

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Due to diverse implementation approaches and non-existence of unifying standards, APIs in practice expose their functionalities in a broad variety of ways, relying on a resource-oriented or RPC-like approaches, and often combining them into hybrid APIs. While several proposals have been made on structurally exposing interfaces of web services, their primary motivation was the description of web services for the purpose of automated composition and integration. In the scope of this work we address the lateral challenge of cross-domain security automation in and resource management for various contexts. We introduce domain-specific vocabularies that enable the modelling of different aspects of web services, security policies, protocols and agent-based interactions. This document presents working draft of DASP-Core vocabulary, which is intended to establish modular Web API descriptions for the purpose of unified, collaborative and multi-organizational security management.

1.1. Namespace declarations

Table 1: Namespaces used in the document

schema	<http://schema.org/>
ns	<http://creativecommons.org/ns#>
owl	<http://www.w3.org/2002/07/owl#>
xsd	<http://www.w3.org/2001/XMLSchema#>
skos	<http://www.w3.org/2004/02/skos/core#>
rdfs	<http://www.w3.org/2000/01/rdf-schema#>
o	<http://www.daspsec.org/o/>
dasp-core	<http://www.daspsec.org/o/dasp-core/>
dasp	<http://www.daspsec.org/o/dasp/>
rdf	<http://www.w3.org/1999/02/22-rdf-syntax-ns#>
terms	<http://purl.org/dc/terms/>
files	<https://joinup.ec.europa.eu/sites/default/files/ckeditor_files/files/>
vann	<http://purl.org/vocab/vann/>
foaf	<http://xmlns.com/foaf/0.1/>
dasp-core	<http://www.daspsec.org/o/dasp-core#>
dc	<http://purl.org/dc/elements/1.1/>

2. DASP-Core Vocabulary: Overview

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This ontology has the following classes and properties.

Classes

Access Method Action Dynamic Path Element Element Element Extractor Entity Selector HTTP DELETE method HTTP GET access method HTTP HEAD access method HTTP OPTIONS access method HTTP POST access method HTTP PUT access method Parameter Request Body Parameter Request Header Parameter Request Parameter Request URL Query Parameter Resource Response Header Parameter Response Parameter Service Static Path Element Transformation URL Path Object

Object Properties

affectsResource appliesOver hasAction hasElement hasElementContainer hasMethod hasURLPath hasURLPath:1 hasURLPath:2 hasURLPath:3 hasURLPath:4 hasURLPath:5 hasURLPath:6 hasURLPath:7 hasURLPath:8 isElementOf isProducedByAction supportsParameter supportsTransformation

Data Properties

hasContentExtractionRule hasJSONPathContentExtractionRule hasMutableEffect hasXMLPathContentExtractionRule

3. DASP-Core Vocabulary: Description

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The emergence of technologies and business models that extensively rely on cross-domain resource sharing raised new challenges concerning the governance and security of these processes. Due to the increasing degree of cross-system dependence and platform diversity, security management of resources hosted at various third parties becomes progressively complex and costly endeavor. The significance of this problem is recognized in the recent public initiatieves that aim to provide reusable tools and standards for cloud-based security management [CSA].

In our work we focus on advancing security of complex interactions performed in the scope of Web-APIs, which represent a prevailing building block of inter-organizational collaborations [API16,REST14]. For this purpose we establish a Data Sharing and Processing Framework (DASP), which consists of conceptual framework, architectural and interaction models. They are complemented with semantic vocabularies, supporting tools and validation models that support implementation and integration of the framework.

In this document we present DASP-Core vocabulary, which aims at providing a non-exhaustive base for specifying information and behavioural models of Web APIs. By specifying the models of Web APIs involved parties enable the efficient and interopebale security management of resources distributed across different organizations.

4. Cross reference for DASP-Core Ontology classes, properties and dataproperties

back to ToC

This section provides details for each class and property defined by DASP-Core Ontology.

4.1. Classes

Access Method Action Dynamic Path Element Element Element Extractor
Entity Selector HTTP DELETE method HTTP GET access method
HTTP HEAD access method HTTP OPTIONS access method HTTP POST access method
HTTP PUT access method Parameter Request Body Parameter Request Header Parameter
Request Parameter Request URL Query Parameter Resource Response Header Parameter
Response Parameter Service Static Path Element Transformation URL Path Object

Access Method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#AccessMethod

Represents an access method used to access a resource

has super-classes
thing [C]

has sub-classes
HTTP DELETE method [C], HTTP GET access method [C], HTTP HEAD access method [C], HTTP OPTIONS access method [C], HTTP POST access method [C], HTTP PUT access method [C]

is in range of
hasMethod [OP]

Action[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Action

Intent or operation executed over a resource using a combination of resource's endpoint, HTTP access method and other parameters

has super-classes

thing [c]

is in domain of

affectsResource [op], hasMethod [op], hasMutableEffect [dp], hasURLPath [op], hasURLPath:1 [op], hasURLPath:2 [op], hasURLPath:3 [op], hasURLPath:4 [op], hasURLPath:5 [op], hasURLPath:6 [op], hasURLPath:7 [op], hasURLPath:8 [op], supportsParameter [op], supportsTransformation [op]

is in range of

appliesOver [op], hasAction [op], isProducedByAction [op]

Dynamic Path Element[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#StaticPathElement

URL Path Object whose value varies according to predefined template

has super-classes

URL Path Object [c]

Element[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Element

Entity consisted in a resource, represented as a data segment that can be retrieved from the resource representation

has super-classes

Resource [c]

Element Extractor[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#ElementExtractor

Provides a mechanism to extract a particular element from its container context (resource or action). Typically, the provided mechanism is a language rule that is applied over a *Resource* or an *Action* to retrieve the data representation of the *Element*.

has super-classes

thing [c]

is in domain of

hasContentExtractionRule [dp], hasElementContainer [op], hasJSONPathContentExtractionRule [dp], hasXMLPathContentExtractionRule [dp], isProducedByAction [op]

Entity Selector[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Selector

Describes call parameters necessary to obtain a list of instances of an element or a resource. Typically applied to derive a minimalistic view of a resource.

has super-classes

thing [C]

HTTP DELETE method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#HTTP_DELETE

HTTP DELETE method is typically applied to delete a resource or its representation

has super-classes

Access Method [C]

HTTP GET access method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#HTTP_GET

HTTP GET access method is typically applied to retrieve a resource

has super-classes

Access Method [C]

HTTP HEAD access method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#HTTP_HEAD

HTTP HEAD access method, typically used to retrieve metainformation about the resource

has super-classes

Access Method [C]

HTTP OPTIONS access method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#HTTP_OPTIONS

HTTP OPTIONS access method, typically used to retrieve information, supported options and capabilities of the service or its exposed resources

has super-classes

Access Method [C]

HTTP POST access method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#HTTP_POST

HTTP POST access method, typically applied to submit a resource or command parameters

has super-classes

Access Method [C]

HTTP PUT access method[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#HTTP_PUT

HTTP PUT access method, typically applied to change a resource

has super-classes
Access Method [c]

Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Parameter

A structured data item that is used to provide a particular input parameter (to the service) or output parameter (to the accessing client)

has super-classes
thing [c]
has sub-classes
Request Parameter [c], Response Parameter [c]
is in range of
supportsParameter [op]

Request Body Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#RequestBodyParameter

Input parameter item provided to the service using a request body

has super-classes
Request Parameter [c]

Request Header Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#RequestHeaderParameter

Input parameter item provided to the service using a HTTP request header

has super-classes
Request Parameter [c]

Request Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#RequestParameter

Input parameter provided to the service, usually by trying to access its resource by invoking an exposed action

has super-classes
Parameter [c]
has sub-classes
Request Body Parameter [c], Request Header Parameter [c], Request URL Query Parameter [c]

Request URL Query Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#RequestURLQueryParameter

Input parameter item provided to the service using an URL query item in the HTTP request

has super-classes
Request Parameter [C]

Resource[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Resource

Entity that is exposed by the service and directly accessible under some of its endpoints

Example

```
some example
```

has super-classes
thing [C]
has sub-classes
Element [C]
is in domain of
hasElement [OP]
is in range of
hasElementContainer [OP], isElementOf [OP]

Response Header Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#ResponseHeaderParameter

Output parameter provided from the service in HTTP response header

has super-classes
Response Parameter [C]

Response Parameter[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#ResponseParameter

Output parameter provided from the service, usually as a response to a request

has super-classes
Parameter [C]
has sub-classes
Response Header Parameter [C]

Service[C]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Service

Web service that exposes resources to the clients, broadly conforming to RESTful architectural style

has super-classes
thing [C]

Static Path Element[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#DynamicPathElement

URL Path Object with fixed value that stays stable for any underlying resource

has super-classes
URL Path Object [c]

Transformation[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#Transformation

Describes operation that can be dynamically executed over resource or an action (its input or output). Transformation is typically applied to provide a contextually adjusted view of a resource.

has super-classes
thing [c]
is in domain of
appliesOver [op]
is in range of
supportsTransformation [op]

URL Path Object[c]

back to ToC or Class ToC

IRI: http://www.daspsec.org/o/dasp-core#URLPathObject

Path element contained in URL endpoint

has super-classes
thing [c]
has sub-classes
Dynamic Path Element [c], Static Path Element [c]
is in range of
hasURLPath:1 [op], hasURLPath:2 [op], hasURLPath:3 [op], hasURLPath:4 [op], hasURLPath:5 [op], hasURLPath:6 [op], hasURLPath:7 [op], hasURLPath:8 [op]

4.2. Object Properties

affectsResource appliesOver hasAction hasElement hasElementContainer hasMethod hasURLPath hasURLPath:1 hasURLPath:2 hasURLPath:3 hasURLPath:4 hasURLPath:5 hasURLPath:6 hasURLPath:7 hasURLPath:8 isElementOf isProducedByAction supportsParameter supportsTransformation

affectsResource[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#affectsResource

Specifies a Resource or an Element that is affected by the Action. An entity is considered as affected if it gets exposed to the external client or it gets subjected to modifications that stem from the client's request.

This property may be added dynamically to the action based on parameters provided in the client request.

has super-properties
top object property

has domain
Action [c]

has range
Element [c] **or** Resource [c]

appliesOver[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#appliesOver

Denotes the transformation that can be applied over an Action, Resource or its Element.

has super-properties
top object property

has domain
Transformation [c]

has range
Action [c]

hasAction[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasAction

Denotes the *action* exposed by the *service*. In other environments can be applied to denote the action as the goal or related entity.

has super-properties
top object property

has range
Action [c]

hasElement[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasElement

Denotes an *Element* that is contained in the *Resource*, or an *Element*that is extracted by the rules provided in *ElementExtractor*

has super-properties
top object property

has domain
Resource [c]

has range
Element [c] **or** Element Extractor [c]

is inverse of
isElementOf [op]

hasElementContainer[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasElementContainer

Specifies the container entity that contains the *Element* dealt by the *Element Extractor*. Typically this entity is a *Resource* exposed by the *Service* through the *Action*.

has super-properties
top object property

has domain
Element Extractor [c]

has range
Resource [c]

hasMethod[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasMethod

Refers to the method used to describe an *Action*.

has super-properties
top object property

has domain
Action [c]

has range
Access Method [c]

hasURLPath[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath

Specifies the URL Path Object that is contained in the endpoint where a particular Action is exposed. Subproperties of this property denote each ordered URLPath item that is contained in the endpoint. Concatenated URL Path Objects refered from these properties represent a complete endpoint of the Action.

has super-properties
top object property

has sub-properties
hasURLPath:1 [op], hasURLPath:2 [op], hasURLPath:3 [op], hasURLPath:4 [op], hasURLPath:5 [op], hasURLPath:6 [op], hasURLPath:7 [op], hasURLPath:8 [op]

has domain
Action [c]
has range
Static Path Element [c] **or** Dynamic Path Element [c] **or** URL Path Object [c]

hasURLPath:1 [op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:1

has super-properties
hasURLPath [op]
has domain
Action [c]
has range
URL Path Object [c]

hasURLPath:2 [op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:2

has super-properties
hasURLPath [op]
has domain
Action [c]
has range
URL Path Object [c]

hasURLPath:3 [op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:3

has super-properties
hasURLPath [op]
has domain
Action [c]
has range
URL Path Object [c]

hasURLPath:4 [op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:4

has super-properties
hasURLPath [op]
has domain
Action [c]
has range
URL Path Object [c]

hasURLPath:5 op

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:5

has super-properties
hasURLPath op

has domain
Action c

has range
URL Path Object c

hasURLPath:6 op

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:6

has super-properties
hasURLPath op

has domain
Action c

has range
URL Path Object c

hasURLPath:7 op

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:7

has super-properties
hasURLPath op

has domain
Action c

has range
URL Path Object c

hasURLPath:8 op

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasURLPath:8

has super-properties
hasURLPath op

has domain
Action c

has range
URL Path Object c

isElementOf[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#isElementOf

Specifies the *Resource* that contains a particular *Element*.

has super-properties
top object property

has domain
Element [c] **or** Element Extractor [c]

has range
Resource [c]

is inverse of
hasElement [op]

isProducedByAction[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#isProducedByAction

Specifies an *Action* whose output is considered as an container for *Element Extractor*. Note that *Action*may produce dynamic results depending on contextual conditions.

has super-properties
top object property

has domain
Element Extractor [c]

has range
Action [c]

supportsParameter[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#supportsParameter

Specifies a parameter that is supported by the *Action*. This parameter can be provided by using various mechanisms, such as HTTP header or URL query parameter. The actual parameter is derived from the entity type of provided parameter.

has super-properties
top object property

has domain
Action [c]

has range
Parameter [c]

supportsTransformation[op]

back to ToC or Object Property ToC

IRI: http://www.daspsec.org/o/dasp-core#supportsTransformation

Denotes the *Transformation* supported by the *Action*. Transformation enables the redaction or other kind of modification of the message that is provided as an input to the *Action* (requesT), or its output (response).

has super-properties
top object property

has domain
Action [c]

has range
Transformation [c]

4.3. Data Properties

hasContentExtractionRule hasJSONPathContentExtractionRule hasMutableEffect
hasXMLPathContentExtractionRule

hasContentExtractionRule[dp]

back to ToC or Data Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasContentExtractionRule

Provides the abstract rule used by *Element Extractor* to extract its target *Element* from given container (*Resource* or *Action*).

has super-properties
top data property

has sub-properties
hasJSONPathContentExtractionRule [dp], hasXMLPathContentExtractionRule [dp]

has domain
Element Extractor [c]

has range
string

hasJSONPathContentExtractionRule[dp]

back to ToC or Data Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasJSONPathContentExtractionRule

Provides the JSON Path rule used by *Element Extractor* to extract its target *Element* from given container (*Resource* or *Action*). Note that this rule can be applied on to valid JSON documents.

has super-properties
hasContentExtractionRule [dp]

has domain
Element Extractor [c]

has range
string

hasMutableEffect dp

back to ToC or Data Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasMutableEffect

Denotes the effect of the intent on mutability of a target resource. In other words, this parameter provides an information whether the triggering of an *Action* performs any kind of modification on its target (affected) resource.

has super-properties
top data property

has domain
Action c

has range
boolean

hasXMLPathContentExtractionRule dp

back to ToC or Data Property ToC

IRI: http://www.daspsec.org/o/dasp-core#hasXMLPathContentExtractionRule

Provides the XML Path rule used by *Element Extractor* to extract its target *Element* from given container (*Resource* or *Action*). Note that this rule can be applied only to valid XML documents.

has super-properties
hasContentExtractionRule dp

has domain
Element Extractor c

has range
string

Legend

back to ToC

c: Classes
op: Object Properties
dp: Data Properties
ni: Named Individuals

5. References

back to ToC

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