Industrial Data Space

Information Model v1.0 – General Overview

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## Agenda

- **Overview**
  - Model representations ...

- **Information Model in detail**
  - Modeling concerns ...

- **Information Model in use**
  - Broker communication ...

- **Ontology governance process**
  - Source management, community ...

- **Summary**
  - Extended C-Hexagon

- **Q & A**
Overview
Information Model
Conceptual Representation

Source: https://www.internationaldataspaces.org/publications/ids-ram2-0/
**Information Model**

**Conceptual Representation // Example**

**USAGE CONTRACT**

A pivotal part of the Product concept introduced by the Commodization view of resources in Section Commodization View is the formal expression of Usage Contracts pertaining to the Product. The Usage Contract defines a validity Period and formal Rules agreed upon by Participants involved in the provision, or subsequent usage of the Product. The Rules specify Actions that an involved Party (Participant) is obliged, permitted or prohibited to perform with respect to an Asset (resource or a collection of resources). Formal Constraints state the applicability of Rules and refine the interpretation of Actions. Given the reference data example DAT1, a Permission allowing for an unrestricted usage of the data holds when the Data Consumer met her Obligation to cite the data source. The Reference data example DAT2 prohibits the resale of commercial data segments via a Prohibition on Data Consumer. With respect do data example DAT3 a Duty may express the Obligation on Data Provider to maintain a particular Quality of Service (QoS) level, i.e. publish the live sensor data at a particular rate and warrant a reliable delivery (QoS level “at least once”).

![Figure 3.40: Outline of the Usage Contract concept](image1)

![Figure 3.41: Outline of the Rule concept](image2)
Information Model
Declarative Representation (Ontology)

Source: https://github.com/IndustrialDataSpace/InformationModel
Information Model
Declarative Representation // Background

- W3C Standards
  - Linked Data, Semantic Web

- Resource Description Framework RDF
  - Abstract data model (triples)
    - Labeled directed graph
    - Subject - Predicate → Object
  - Variety of syntaxes (RDF, Turtle etc.)

- Web Ontology Language OWL
  - Class definitions/axioms
  - Reasoning (classification)

- Shapes Constraint Language SHACL
  - Structural validation

- SPARQL 1.1
  - Querying and inference

Source: https://www.w3.org/TR/rdf11-primer/
Information Model
Declarative Representation // Example

```
  13 # Classes
  14 # --------
  15
  16 ids_activity:Activity rdfs:subClassOf prov:Activity;
  17   a owl:Class;
  18   ids_trans:isAbstract true;
  19   rdfs:label "Activity"@en ;
  20   rdfs:comment "Something that occurs over a period of time and acts upon or with entities."@en;
  21   ids_rel:validation [ ids_rel:forProperty ids_activity:startedBy; ids_rel:constraint ids_rel:NotNull; ];
  22   ids_rel:validation [ ids_rel:forProperty ids_activity:startedAt; ids_rel:constraint ids_rel:NotNull; ];
  23   ids_rel:validation [ ids_rel:forProperty ids_activity:activityDescription; ids_rel:relationType ids_rel:OneToMany; ];
  24
  34 ids_activity:CreationActivity rdfs:subClassOf ids_activity:Activity;
  35   a owl:Class;
  36   rdfs:label "CreationActivity"@en ;
  37   rdfs:comment "Activity with the goal to generate or produce an entity."@en.
  38
  39 ids_activity:RemovalActivity rdfs:subClassOf ids_activity:Activity;
  40   a owl:Class;
  41   rdfs:label "RemovalActivity"@en ;
  42   rdfs:comment "Activity with the goal to decommission an entity so that it can never be used anymore."@en.
  43
  44 ids_activity:ProvisioningActivity rdfs:subClassOf ids_activity:Activity;
  45   a owl:Class;
  46   rdfs:label "ProvisioningActivity"@en ;
  47   rdfs:comment "Activity with the goal to bring an entity into an operational state."@en.
  48
  49 ids_activity:ShutdownActivity rdfs:subClassOf ids_activity:Activity;
  50   a owl:Class;
```
Information Model
Declarative Representation // Summary

- **Core**
  - [a] Model (modeling concepts and properties)
  - [b] Vocabulary (taxonomies of values)
  - Based on standard ontologies (DCAT, PROV-O, ODRL etc.)
  - Vendor and software independent
  - Generic and re-usable

- **Extensions**
  - Domain-specific extensions of [a] and [b]

- **Governance process**
  - Change and Release Management Policy for DCAT-AP
Information Model
Programmatic Representation

Information Model
Programmatic Representation // Example

```java
import de.fraunhofer.iais.eis.*;

/** Something that occurs over a period of time and acts upon or with entities. */
@RdfType("https://schema.industrialdataspace.org/activity/Activity")
public interface Activity {
    // standard methods
    @RdfId
    @javax.validation.constraints.NotNull URL getId();
    String toString();

    // accessor methods as derived from information model

    /** The participant who started the Activity. */
    @RdfProperty("https://schema.industrialdataspace.org/activity/startedBy")
    @NotNull
    URL getStartedBy();

    /** The point in time when the Activity was started. */
    @RdfProperty("https://schema.industrialdataspace.org/activity/startedAt")
    @NotNull
    XMLGregorianCalendar getStartedAt();

    /** Freetext description of what has been performed by the Activity. */
    @RdfProperty("https://schema.industrialdataspace.org/activity/activityDescription")
    Collection<? extends PlainLiteral> getActivityDescriptions();

    /** The participant who ended the Activity. */
    @RdfProperty("https://schema.industrialdataspace.org/activity/endedBy")
    URL getEndedBy();

    /** The point in time when the Activity was ended. */
    @RdfProperty("https://schema.industrialdataspace.org/activity/endedAt")
    XMLGregorianCalendar getEndedAt();
```
Information Model
Normative Representation // Ontology
Information Model
Reference Examples

Information Model – Reference Examples

Scenario
The reference examples are motivated by a scenario of observing traffic conditions at defined locations along the European highways for purposes of traffic control, predictive road maintenance, toll fee optimization and so on.

Resource
A Resource is a single digital content or a coherent set of digital contents exposed at particular conditions via a defined interface. Types of digital content range from structured data, documents, media, software etc. Examples below illustrate the various types and different aspects of resources.

Example DATA1: Free, historical data download
The resource example DATA1 showcases an easy, non-interactive access to historical data provided by the participant PART1. Monthly traffic statistics collected during a year since 2010 are exposed for download as individual files ("artifacts") via the Trusted Connector CONN2. The file names (e.g., E37_2018_01.csv) encode by convention the discriminating parameters, i.e. the highway (e.g., "E37"), year (e.g., "2018"), month (e.g., "01"), and the type of file by extension (csv). The reports comprise tabular data with a fixed number of labeled columns. Each row corresponds to an individual value tuple collected in a certain sampling area within a certain sampling period. The sampling area is identified by a readable name (String), a distance marker (double, km), and the geo-location (according to a predefined geo-spatial reference system). The remaining columns contain the measurement details, i.e. the time stamp of the sampling period (ISO 8601 period format), the average velocity (double, km/h), and the number of vehicles passing (integer). The data may be used free of charge, the policy requires a credits citation for a commercial use.

Source: https://github.com/IndustrialDataSpace/InformationModel/tree/develop/examples
Information Model in Detail
Modeling Concerns
C-Hexagon

- Content
- Context
- Concept
- Communication
- Community of trust
- Commodity
Concern – Content
Digital Contents Taxonomy
Digital Content
Container Example

**Aggregate** composed of multiple (individually defined) parts

data2:

```turtle
a ids:Container;
id:ids:title "European highway statistics"@en;
id:ids:description "Data collection about usage statistics of European highways"@en;
id:ids:keyword "highway", "statistics", "Europe";
id:ids:accrualPeriodicity "P1M"^^xsd:duration;
id:ids:contentPart ids:contentPart data2:generic_content;
id:ids:representation [a ids:ContainerRepresentation;
    id:ids:mediaType idsc_media:APPLICATION_TAR-GZIP;
    id:ids:instance data2:tar_gzip_archive;]

```

data2:tar_gzip_archive

```turtle
a ids:Artifact;
id:ids:byteSize "2123178072"^^xsd:nonNegativeInteger;
id:ids:creationDate "2018-10-01"^^xsd:date.
```

Source: https://github.com/IndustrialDataSpace/InformationModel/blob/develop/examples/DATA2.ttl
Digital Content
Text Example // Declarative Representation

- **Textual content** intended for **reading and interpretation**
  - Any digital representation of text, e.g. document, image etc.
  - Human and other intelligent agents

```ttl
data1:
  a ids:Text;
  ids:title "European highway statistics - accident report"@en;
  ids:keyword "report", "highway", "statistics", "Europe"
  ids:language idsc_lang:ENGLISH;
  ids:representation [
    a ids:TextRepresentation;
    ids:mediaType idsc_media:APPLICATION_PDF;
    ids:instance data1:report_pdf;
  ];

data1:report_pdf
  a ids:Artifact;
  ids:byteSize "1923497"^^xsd:nonNegativeInteger;
  ids:fileName "Highway_accident_statistics.pdf";
  ids:creationDate "2018-06-01"^^xsd:date.
```

https://github.com/IndustrialDataSpace/InformationModel/blob/develop/examples/DATA1.ttl
Digital Content
Text Example // Programmatic Representation

```java
digitalContent createDigitalContent() throws DatatypeConfigurationException {
    XMLGregorianCalendar begin = DatatypeFactory.newInstance().
        newXMLGregorianCalendar("2000-01-01"^^xsd:date);
    XMLGregorianCalendar end = DatatypeFactory.newInstance().
        newXMLGregorianCalendar("2017-12-31"^^xsd:date);
    return new TextBuilder()
        ._titles_(asList(new PlainLiteral("European highway statistics - accident report", "en")))
        ._descriptions_(asList(new PlainLiteral("Accident analysis 2000 - 2017.", "en")))
        ._keywords_(asList(new PlainLiteral("report", "en"),
                              new PlainLiteral("highway", "en"),
                              new PlainLiteral("statistics", "en"),
                              new PlainLiteral("Europe", "en")))
        ._temporalCoverages_(asList(new IntervalBuilder()
                                      ._begin_(new InstantBuilder()._date_(begin).build())
                                      ._end_(new InstantBuilder()._date_(end).build())
                                      .build()))
        ._languages_(asList(Language.ENGLISH))
        ._representations_(asList(new TextRepresentationBuilder()
                                   ._mediaType_(IANAMediaType.APPLICATION_PDF)
                                   ._instances_(asList(createPdfArtifact())))
                              , new TextRepresentationBuilder()
                              ._mediaType_(IANAMediaType.APPLICATION_MSWORD)
                              ._instances_(asList(createDocArtifact())))
        .build();
}

Artifact createPdfArtifact() throws DatatypeConfigurationException {
    XMLGregorianCalendar pdfCreationDate = DatatypeFactory.newInstance().
        newXMLGregorianCalendar("2018-06-01"^^xsd:date);
    return new ArtifactBuilder().
        ._byteSize_(1923497)._fileName_("Highway_accident_statistics.pdf")
        ._creationDate_(pdfCreationDate).build();
}
```

Resource
Content Model

- Layered content model
  - Dedicated targets for referencing / download
  - Gradual refinement → evolutionary content modeling
  - Evt. annotation inheritance → no redundancy

![Diagram of Resource Content Model]

- Resource
  - arrangement and provision of related content
- Content
  - abstract, format-independent template
- Representation
  - concrete, format-dependent template
- Artifact
  - materialized, format-dependent instance

abstract → concrete
Resource

Content Description Patterns

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Representation</th>
<th>Description &amp; Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] Simple resource, single representation &amp; context (e.g., archive or a proprietary, domain-specific format)</td>
<td><img src="image1" alt="Diagram" /></td>
<td>Single representation/artifact - no need for disambiguation. Potential candidates: a) invariant resources with only one representation provided (e.g., the ideal one or only existing), b) resources of type-container, treated as a single artifact, e.g., an archive file, zip etc., comprising files that are not individually accessible (while they might be modeled as constituents of the container via the part relation of R51).</td>
</tr>
<tr>
<td>[2] Simple resource, homomorphic, semantically compatible, generated variants optimally distinguished by request time</td>
<td><img src="image2" alt="Diagram" /></td>
<td>Live resource, exposes a transient context snapshot that may change from one client request to another. PUB/SUB protocols are well suited to communicate (irregularly) changing, dynamic resources.</td>
</tr>
<tr>
<td>[3] Simple resource, semantically equivalent, heterogeneous content variants</td>
<td><img src="image3" alt="Diagram" /></td>
<td>Multiple representations, single artifact each - the artifacts are expected to be interchangeable, syntactical variants of the same content and thus semantically equivalent. Holistic likewise for containers, which context is optionally modeled as parts of R52.</td>
</tr>
<tr>
<td>[4] Simple resource, semantically equivalent, heterogeneous content variants</td>
<td><img src="image4" alt="Diagram" /></td>
<td>Simple resource exposing syntactical variants of a single content (e.g., by means of content negotiation on HTTP request). The pattern combines with [1] and [3].</td>
</tr>
<tr>
<td>[5] Collection resource, homomorphic, semantically compatible content variants distinguished by permutations of a defined set of dimensions (time, place, etc.)</td>
<td><img src="image5" alt="Diagram" /></td>
<td>Single representation, multiple artifacts each - the artifacts are expected to be homomorphic (identical per capita) and semantically compatible (uniform interpretation) permutations of one or a set of content dimensions. Examples are (time-based variable dimension: time), sensory values tabulated by a combination of a time and another sensory dimension, e.g., temperature and wind speed, with one setting the value ranges of the underlying dimensions, while each artifact indicates the individual permutation. This pattern is compatible with [3] and leads to generation of equivalent syntactical variants. Such an organizational structure should allow for slicing on arbitrary level by fixing all but one dimensional parameter (within a slice list) as in OLAP Cubes.</td>
</tr>
<tr>
<td>[6] Collection resources, related enumerated contents are distinguished by at least one fundamental dimension (language, method of measurement etc.)</td>
<td><img src="image6" alt="Diagram" /></td>
<td>Collection resources referencing logically contained / required or otherwise related contents. Being subordinated to a top-level resource these contents were not considered significant, self-contained etc., for an individual publishing as a standalone resource. The resource “container” model was felt appropriate supplying a clear boundary for the enumerated contents. Example: contents of a study performed at a particular locations.</td>
</tr>
<tr>
<td>[7] Collection of related resources.</td>
<td><img src="image7" alt="Diagram" /></td>
<td>Collection of resources referencing logically contained / required or otherwise related resources. Example: related studies performed at different locations, but following same methodology but which may have generated different types of contents.</td>
</tr>
<tr>
<td>[8] Republishing of content</td>
<td><img src="image8" alt="Diagram" /></td>
<td>Content republishing - individual content parts are re-published in a new resource providing e.g. a particular view on those contents.</td>
</tr>
</tbody>
</table>
Resource / Modeling Rationale
DCAT 1.0 Core model

Diagram:
- Catalog
- Dataset
- Distribution
- CatalogRecord

Relationships:
- Catalog to Dataset: * (many to many)
- Dataset to Distribution: * (many to many)
- Catalog to CatalogRecord: 0..1
DCAT 1.0 Distribution
Extension by Information Model

- instance
- mediaType
- representationStandard
- packaging
- compression

Value (inline)
- value
- base64Value

Artifact (external)
- byteSize
- fileName
- checkSum
- creationDate
- artifactParameterization
DCAT 1.0 Dataset
Extension by Information Model
Concern - Context

- Geometric model
- Named entity (country)

```
(ids:temporalCoverage [a ids:Interval ;
  ids:begin [ ids:date "2000-01-01"^^xsd:date ];
  ids:end [ ids:date "2017-12-31"^^xsd:date ] ] ;

(ids:subject highway:E31 ;
```
Concern - Concept

idsc_concept:trafficConceptScheme
  a skos:ConceptScheme ;
  dct:title "Collection of concepts referenced by content" ;
  skos:prefLabel "IDS concept scheme"@en;
  skos:definition "Main concept scheme of the IDS."@en.

idsc_concept:time
  a skos:Concept ;
  skos:inScheme idsc_concept:trafficConceptScheme; 
  skos:topConceptOf idsc_concept:trafficConceptScheme; 
  skos:prefLabel "time"@en; 
  skos:definition "top concept describing terms of time"@en.

idsc_concept:YEAR
  a ids:Concept ;
  skos:inScheme idsc_concept:trafficConceptScheme; 
  skos:broader idsc_concept:time; 
  skos:prefLabel "Orbital period of the Earth."@en . 

a ids:Data ;# String 
  ids:theme idsc_concept:HIGHWAY ;
  ids:representation [ 
    a ids:DataRepresentation ;
    ids:dataType xsd:string 
     "http://www.w3.org/2001/XMLSchema#string"^^xsd:anyURI ;
  ]
  ids:keyword "report", "highway", "statistics", "Europe" ;
Concern - Communication

Key concepts

- **Path (hierarchical name) in namespace of host**
- **Networked entity that implements a communication protocol and supports interactions at Endpoint paths. Defined by connector, if omitted defaults to „defaultHost“**
- **Metadata describing payload exchanged by interacting Connectors**
- **Conceptualization of the interchange of digital Artifacts as a set of uniform operations (interactions primitives)**
Communication Interaction Types

- **Legacy (non-IDS)**
  - Open data
  - Simple, reuses existing APIs
  - Restricted functionality
  - `ids:StaticEndpoint`
    - Artifact download per HTTP GET
    - No interface
  - `ids:InteractiveEndpoint`
    - Parameter based request
    - Requires an interaction Interface

- **Message-oriented (IDS)**
  - `MessageEndpoint`
  - Default message endpoints
    - `./data`
    - `./infrastructure`
Legacy Communication
Artifact Retrieval // Static Endpoint

Resource ids:endpoint [ 
a ids:StaticEndpoint ;
ids:endpointHost conn2:http_host ;
ids:endpointArtifact data1:report_doc ;
ids:path "/reports/Highway_accident_statistics.doc";
] ;

conn2:http_host
a ids:Host ;
..... ids:protocol idsc_prot:HTTP2;
ids:accessUrl "https://connector.gov.de"^^xsd:anyURI.
Legacy communication
Interactive content access

```
data3:endpoint
  a ids:InteractiveEndpoint;
  ids:endpointHost conn2:http_host ;
  ids:path "/content/{highway}/{year?}/{month?}" ;
  ids:endpointOperationBinding [ 
    a ids:OperationBinding ;
    ids:boundOperation data3:query_highway_operation ;
    ids:apiDefinition data3:api_definition_resource ;
  ] .
```
Communication Interface Model

data3:
  a ids:Resource ;
  ids:title "Interactive European highway portal"@en ;
  ids:resourceInterface [ 
    a ids:Interface ;
    ids:title "Query interface for highway statistics" ;
    ids:operation data3:query_highway_operation ;
  ] ;

data3:query_highway_operation
  a ids:QueryOperation ;
  ids:pattern idsc_mep:IN_OUT ;
  ids:name "Get statistics by highway" ;
  ids:mandatoryInput data3:highway_param ;
  ids:input data3:year_param, data3:month_param ;
  ids:output data3:highway_statistics .

data3:year_param a ids:Parameter ;
  ids:name "year" ;
  ids:parameterContent [ 
    a ids:Data ;
    ids:theme idsc_concept:YEAR ;
    ids:representation [ a ids:DataRepresentation ;
      ids:dataType
      "http://www.w3.org/2001/XMLSchema#gYear"^^xsd:anyURI ;
Communication Message Taxonomy

+ InvokeOperationMessage
  OperationResultMessage

Message

Request Message
  - Contract Request Message
  - Artifact Request Message

Response Message
  - Contract Agreement Message
  - Contract Rejection Message

Notification Message
  - Artifact Response Message
  - Contract Offer Message
Communication
Message-oriented Interactions // Contract negotiation

Authorized Connection Established

Consumer (IDS Connector)  Provider (IDS Connector)  Provider-internal Contract Service

- Reference to base contract C
- Suggested contract C' as payload

1a. ContractRequestMessage
1b. RequestInProcessMessage

2a. contract acceptable?
2b. acceptance verification result

Alternative Contract C''

3. ContractOfferMessage

Agreed contract C'' as payload

4a. ContractAgreementMessage
4b. ContractAgreementMessage
Concern - Commodity Contracts
**Commodity Usage Policy Language**

- **Specification Level Policies (SLP)**
  - declarative contracts (natural language or machine-readable)

- **Implementation Level Policies (ILP)**
  - machine-interpretable and enforceable (technology-dependent)

**Policy mapping**

(left to right) Coverage:
- high
- low

Enforcement:
- manual
- automated
Commodity Pricing

![Commodity Pricing Diagram](image-url)
Concern - Community of Trust
Participants

part3:
a ids:Participant ;
ids:title "Supercargo GmbH"@en;
ids:description "International logistics company"@en ;
ids:corporateEmailAddress "info@supercargo.de" ;
ids:corporateHomepage "http://www.supercargo.de"^^xsd:anyURI ;
ids:primarySite [ a ids:Site ;
  ids:siteAddress "Supercargo Gmbh, Musterstraße 5, Köln, Deutschland" ;
] ;
ids:participantCertification [ a ids:ParticipantCertification ;
  ids:certificationLevelidsc_cert:PARTICIPANT_CENTRAL_LEVEL_MANAGEMENT_SYSTEM; 
  ids:lastValidDate "2020-12-31"^^xsd:date 
]
# Subsidiaries
Concern – Community of Trust
Infrastructure

incl. DAPS.
Community of Trust Connector

broker1:
  a ids:Broker;
  ids:title "Logistics registry" ;
  ids:description "Description of an example Trusted Connector maintained by PART1" ;
  ids:maintainer part1: ; # Participant - service provider PART1
  ids:curator part1: ; # Content manager
  ids:physicalLocation <http://sws.geonames.org/3247450/> ; # Datacenter located in Bonn
  ids:outboundModelVersion "1.0.0" ;

  # Network hosts maintained by the Connector
  ids:host conn2:http_host;

  # Security and trust features
  ids:authInfo conn2:auth_info ;
  ids:securityProfile ids:Level2SecurityProfile ;
  ids:componentCertification conn2:certification ;

  # Catalog of mediated resources
  ids:catalog 
      a ids:Catalog;
      ids:offer conn2:data1, conn2:data2, conn2:data3 ;
  ].

conn2:http_host
  a ids:Host ;
  ids:protocol idsc_prot:HTTP2;
  ids:accessUrl "https://connector.aastat.gov.de"^^xsd:anyURI ; description?
Concern - Community of Trust
Certification

Certification Level → Certification → Evaluation Authority

Participant Certification → Certification
Component Certification → Certification
Information Model in Use
Model Usage Example
Connector Registration at Broker

```
--msgpart
Content-Type: application/json; charset=utf-8
Content-Disposition: form-data; name="header"

{
  "@type" : "ids:ConnectorAvailableMessage",
  "id" : "http://industrialdataspace.org/connectorAvailableMessage/34d761cf-5ca4-4a77-a7f4-b14d8f75636a",
  "issued" : "2018-10-25T11:37:08.245Z",
  "modelVersion" : "1.0.1-SNAPSHOT",
  "issuerConnector" : "https://companyA.com/connector/59a68243-dd96-4c8d-88a9-0f0e03e13b1b"
}

--msgpart
Content-Type: application/json
Content-Disposition: form-data; name="payload"

{
  "@type" : "ids:BaseConnector",
  "id" : "https://companyA.com/connector/59a68243-dd96-4c8d-88a9-0f0e03e13b1b",
  "defaultHost" : {
    "@type" : "ids:Host",
    "id" : "http://industrialdataspace.org/host/73171c77-10d1-4e12-b04e-f696c467897e",
    "protocol" : "https://w3id.org/idsa/code/protocol/HTTP",
    "accessUrl" : "http://companyA.com/ids/connector"
  },
  "catalog" : {
    "@type" : "ids:Catalog",
    "id" : "http://industrialdataspace.org/catalog/04b84cdf-b28c-4d22-b936-ee899900294a",
    "offers" : [ {
      "@type" : "ids:Resource",
      "id" : "http://industrialdataspace.org/resource/2e8ceebd-43f8-41c9-8225-a763fe83931a",
      "titles" : [ { "@value" : "Quarterly Business Report" ...
```
Ontology Governance Process
GitHub Source Repository
Top-level Structure

- **Code lists**
  - Value sets: standards, units, categories etc.

- **Reference examples**
  - Documented model instances (aligned with RAM)

- **Utility annotations**
  - Annotations on validity rules, concept status etc.

- **Focused submodels**
  - Module per concern / competence

- **Custom model representations**
  - Visualisation, glossary etc.

https://github.com/IndustrialDataSpace/InformationModel/
Community Feedback
Issue Life-cycle

Source: https://github.com/IndustrialDataSpace/InformationModel/labels
Governance Process
Team

- WG Architecture / Sub-working Group 4 “Information Model”
  - Fraunhofer (FIT, IAIS, ISST)
  - eccenca, Schaeffler, Boehringer Ingelheim, Signal Cruncher
Processes
Contribution and release

Modifying issue (bug, enhancement)

Monthly sprints

- Analysis, proposal and (re)implementation
- Evaluation, discussion approval or rejection

Information Model
Version <N>
DEVELOP branch

Information Model
Version <N+1>
DEVELOP branch

Releases twice a year (09 / 03)

Release plan

- Integration, consolidation testing and upgrade process
- Evaluation, discussion Release approval or rejection

Information Model
Version <N>
MASTER branch

Information Model
Version <N+1>
MASTER branch

Presentation at WG1 Architecture meetings
Summary
Extended C-Hexagon
Thank you!

Q & A