



Projektergebnis

Standardontologie für Wissensmanagement im SW-Engineering

Projektidentifikation:	WAVES – Wissensaustausch bei der verteilten Entwicklung von Software
Ergebnis ID:	E5
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1 Executive Summary

The WISE ontology is a domain ontology for knowledge management in software engineering. WISE stands for WAVES ontology for knowledge management in software engineering. The main development goals were:

- Usable for knowledge exchange within and across organisations
- Information integration between tools
- Information integration between people and organisations
- Better search abilities by exploiting e.g. sub- and super-concept hierarchies
- Small
- Understandable
- Comprehensible
- Extensible



Motivation

At a first glance, software engineering deals with software itself (e.g. source code or models), development activities, supporting tools such as an enterprise search engine, a number of projects, each engineers local desktop, issues to be resolved, personal notes and blogs and forums, where people seek for exchange on difficult or annoying problems. The WISE model on software engineering focuses on the transformation of rather vague ideas, over documents to executable artefacts. A typical process could have the following steps:

- An actor documents an idea
- The document is refined up to the point where it becomes executable
- The executable artifact is deployed and used
- Bugs or request for extends arise and are documented Seen in this way, software engineering deals with a variety of different documentation artefacts. Interestingly, the whole process can also be used in a kind of self-application, namely if the software engineers create new software engineering tools, or if they document the work processes themselves, or if they create an information system, which in turn helps them to manage another kind of information artifact better.

WISE is based on the analysis of a number of sources:

- The Software-OOP-Meta-model developed initially in the *KISSy/SISSy* project at FZI Karlsruhe. It models object-oriented software-artefacts, e.g. to compute quality metrics.
- The context model created by Empolis, loosely based on the TU Munich model for changes and activities. Context models are sued for intelligent support of software developers. A practical example for such support is the Mylyn project (<http://www.eclipse.org/mylyn/>). The empolis context model was delivered as a mind map with 255 activities based on the German V-model.
- Structured artefacts - The TeamWeaver search (WavesIS) processes a number of different entity types (i.e. not only files).
- Projects as modelled in DOAP (<http://usefulinc.com/ns/doap>) or Polarion (<http://polarion.org>) play an important role, to help organising the complexity of software engineering. The polarion database schema was used as the core of the WISE ontology. WISE adopted project and work item from the polarion XML schema.
- The semantic desktop project NEPOMUK (<http://nepomuk.semanticdesktop.org>) deals with interlinking a users desktop items. The NEPOMUK project developed a number of core desktop ontologies to represent e.g. contact entries, emails, or desktop files.
- Baetl is an ontology to model issues, i.e. bug reports and feature requests. Baetl was not ready for usage while the WISE ontology was developed.
- Online blackboards and blogs are modelled in SIOC, semantically interlinked online communities.

2 Core Ontology

The core of WISE consists of classes and properties modelling the relation between entities that represent processes, actors performing the processes, and artefacts being transformed in the processes. Fig. 1 depicts an overview of the ontology.

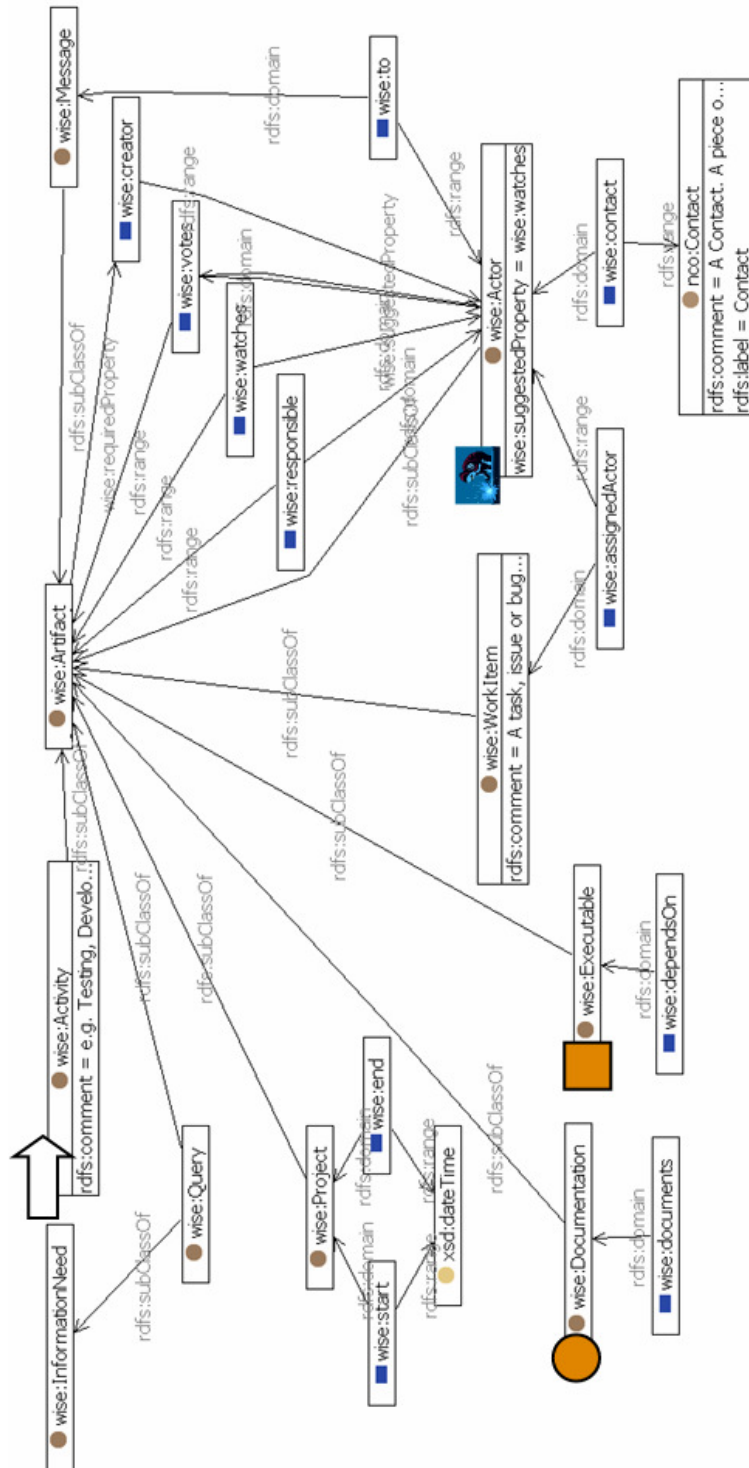


Fig. 1: Overview of the WISE ontology

2.1 Activity (Class)

An activity can be any kind of activity in software engineering, e.g.

- Testing,
- Developing,
- Deploying,
- Coding,
- Refactoring, or
- Documenting

The URI for this entity is '<http://www.fzi.de/2008/wise#Activity>'. The class *Activity* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>) and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

2.2 Artifact (Class)

Everything managed by the WISE ontology is an artifact. Even actors are artefacts. Actors in WISE do not represent real humans but rather actors in a process. The URI for this entity is '<http://www.fzi.de/2008/wise#Artifact>'. The class *Artifact* extends the classes *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *Assigned Actor* (<http://www.fzi.de/2008/wise#assignedActor>)
- *Contact* (<http://www.fzi.de/2008/wise#contact>)
- *Created* (<http://www.fzi.de/2008/wise#created>) **Note: This property is required. Instances of Artifact MUST define it.**
- *Creator* (<http://www.fzi.de/2008/wise#creator>) **Note: This property is required. Instances of Artifact MUST define it.**
- *Depends On* (<http://www.fzi.de/2008/wise#dependsOn>)
- *Documents* (<http://www.fzi.de/2008/wise#documents>)
- *Start* (<http://www.fzi.de/2008/wise#start>)
- *End* (<http://www.fzi.de/2008/wise#end>)
- *Previous Version* (<http://www.fzi.de/2008/wise#previousVersion>) This property is a suggested property. Instances of Artifact are encouraged to use it.
- *Responsible* (<http://www.fzi.de/2008/wise#responsible>)
- *To* (<http://www.fzi.de/2008/wise#to>)
- *Votes* (<http://www.fzi.de/2008/wise#votes>)
- *Watches* (<http://www.fzi.de/2008/wise#watches>)

- *Description*
(<http://www.semanticdesktop.org/ontologies/2007/08/15/nao#description>) This property is a suggested property. Instances of *Artifact* are encouraged to use it.
- *Has Tag*
(<http://www.semanticdesktop.org/ontologies/2007/08/15/nao#hasTag>) This property is a suggested property. Instances of *Artifact* are encouraged to use it.
- *Pref Label*
(<http://www.semanticdesktop.org/ontologies/2007/08/15/nao#prefLabel>) **Note: This property is required. Instances of *Artifact* MUST define it.**

2.3 Actor (Class)

Any kind of activity is performed by someone. This is modelled by an *Actor*. An actor is not necessarily a person, it could e.g. also be a team or sub-contractor. In this respect it corresponds more to the concept of *roles* in other ontologies. The URI for this entity is '<http://www.fzi.de/2008/wise#Actor>'. The class *Actor* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>) and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *Contact* (<http://www.fzi.de/2008/wise#contact>)
- *Responsible* (<http://www.fzi.de/2008/wise#responsible>)
- *Votes* (<http://www.fzi.de/2008/wise#votes>) This property is a suggested property. Instances of *Actor* are encouraged to use it.
- *Watches* (<http://www.fzi.de/2008/wise#watches>) This property is a suggested property. Instances of *Actor* are encouraged to use it.

2.4 Documentation (Class)

Documentation is any kind of artifact that is not executable. The URI for this entity is '<http://www.fzi.de/2008/wise#Documentation>'. The class *Documentation* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *Documents* (<http://www.fzi.de/2008/wise#documents>)

2.5 Executable (Class)

An executable entity can be executed on a suitable piece of environment. Examples for executables and their environments are:

- Java class file - Java Virtual Machine
- Windows Vista application - Windows Vista operating system
- BPEL model - BPEL engine

The URI for this entity is '<http://www.fzi.de/2008/wise#Executable>'. The class *Executable* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Executable*

(<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executable>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *Depends On* (<http://www.fzi.de/2008/wise#dependsOn>)

2.6 Tool (Class)

Tools are special kinds of executable artefacts: They help transforming other artefacts. The URI for this entity is '<http://www.fzi.de/2008/wise#Tool>'. The class *Tool* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Executable* (<http://www.fzi.de/2008/wise#Executable>), *Executable* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executable>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

2.7 Project (Class)

A project is a unit of work. Other ontologies might call this a *task* and differentiates it from *project*. WISE just has projects, to keep the ontology minimal. The URI for this entity is '<http://www.fzi.de/2008/wise#Project>'. The class *Project* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Project* (<http://usefulinc.com/ns/doap#Project>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *Start* (<http://www.fzi.de/2008/wise#start>)
- *End* (<http://www.fzi.de/2008/wise#end>)

2.8 Query (Class)

A query is a concrete way to express the more abstract information need. Queries can either be full-text queries, i.e. keywords, or more complex queries, up to e.g. structured SQL or SPARQL queries. The URI for this entity is '<http://www.fzi.de/2008/wise#Query>'. The class *Query* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Information Need* (<http://www.fzi.de/2008/wise#InformationNeed>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

2.9 Contact (Property)

The minimal required knowledge about an actor is a way to contact him. This property assigns each actor an [nco:Contact](#). The URI for this entity is '<http://www.fzi.de/2008/wise#contact>'. This property does not extend other properties.

2.10 Created (Property)

Records the creation time of an artifact. The URI for this entity is '<http://www.fzi.de/2008/wise#created>'. The property *Created* extends the properties *Created* (<http://www.semanticdesktop.org/ontologies/2007/08/15/nao#created>).

2.11 Creator (Property)

Records the original creator of the artifact. This is useful, if e.g. the purpose of the artifact is unclear to other actors. The URI for this entity is '<http://www.fzi.de/2008/wise#creator>'. The property *Creator* extends the properties

Creator

(<http://www.semanticdesktop.org/ontologies/2007/08/15/nao#creator>).

2.12 Depends On (Property)

The core of dependency management is to record in a formal way which other artefacts must be present in order to execute another executable. Typical artefacts to depend on would e.g. be a Java VM version, and a set of jar files. The URI for this entity is

'<http://www.fzi.de/2008/wise#dependsOn>'. This property does not extend other properties.

2.13 Documents (Property)

This property links the world of non-executable documentation with the executable artefacts. It is an n:m relation, since e.g. a handbook may well document several executable artefacts. The URI for this entity is '<http://www.fzi.de/2008/wise#documents>'. This property does not extend other properties.

2.14 Start (Property)

Each project may have a start date. The URI for this entity is

'<http://www.fzi.de/2008/wise#start>'. This property does not extend other properties.

2.15 End (Property)

Each project may have an end date. The URI for this entity is

'<http://www.fzi.de/2008/wise#end>'. This property does not extend other properties.

2.16 Previous Version (Property)

As a light-weight way of versioning, WISE offers the ability to link different artefacts by the *previous version* property. There is no built-in for version numbers. The URI for this entity is '<http://www.fzi.de/2008/wise#previousVersion>'. This property does not extend other properties.

2.17 Responsible (Property)

Giving each artifact a responsible actor allows others to find a contact point for further questions. This is a key point for successful knowledge management. The URI for this entity is '<http://www.fzi.de/2008/wise#responsible>'. This property does not extend other properties.

3 Extensions

3.1 Architecture (Class)

This class models a software or IT architecture. It is an example of a more specific kind of model. The URI for this entity is '<http://www.fzi.de/2008/wise#Architecture>'. The class *Architecture* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document*

(<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>),

Documentation (<http://www.fzi.de/2008/wise#Documentation>), *Model*

(<http://www.fzi.de/2008/wise#Model>), and *Resource*

(<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.2 Diagram (Class)

A diagram is a special kind of Documentation. Software engineers often use e.g. UML diagrams to communicate their ideas. The URI for this entity is

'<http://www.fzi.de/2008/wise#Diagram>'. The class *Diagram* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), *Documentation* (<http://www.fzi.de/2008/wise#Documentation>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.3 Information System (Class)

A typical kind of executable artifact is an information system, such as a travel booking system, an issue tracker or a source code versioning repository. The URI for this entity is

'<http://www.fzi.de/2008/wise#InformationSystem>'. The class *Information System* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Executable* (<http://www.fzi.de/2008/wise#Executable>), *Executable* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executable>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.4 Model (Class)

A model is an example of documentation. Some models may be executable (e.g. executable UML), but in general, models are not always executable. To model an executable model it should be an instance of *Executable*. The URI for this entity is

'<http://www.fzi.de/2008/wise#Model>'. The class *Model* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), *Documentation* (<http://www.fzi.de/2008/wise#Documentation>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.5 Note (Class)

A note is any kind of free-form documentation. The URI for this entity is

'<http://www.fzi.de/2008/wise#Note>'. The class *Note* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), *Documentation* (<http://www.fzi.de/2008/wise#Documentation>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.6 Runtime Environment (Class)

A runtime environment such as the Java Virtual Machine is itself an executable artifact. The URI for this entity is '<http://www.fzi.de/2008/wise#RuntimeEnvironment>'. The class *Runtime Environment* extends the classes *Artifact*

(<http://www.fzi.de/2008/wise#Artifact>), *Executable* (<http://www.fzi.de/2008/wise#Executable>), *Executable* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executable>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.7 Software Class (Class)

A class file, e.g. in Java, is a common example of an executable artifact. The URI for this entity is

'<http://www.fzi.de/2008/wise#SoftwareClass>'. The class *Software Class* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Executable* (<http://www.fzi.de/2008/wise#Executable>), *Executable*

(<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executable>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.8 Specification (Class)

A specification is another typical example for a kind of documentation used in software engineering. The URI for this entity is '<http://www.fzi.de/2008/wise#Specification>'. The class *Specification* extends the classes *Artifact*

(<http://www.fzi.de/2008/wise#Artifact>), *Document* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), *Documentation* (<http://www.fzi.de/2008/wise#Documentation>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.9 Test (Class)

Many software design methodologies use tests to verify other executable artefacts. A test in WISE is itself executable. The URI for this entity is

'<http://www.fzi.de/2008/wise#Test>'. The class *Test* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Executable* (<http://www.fzi.de/2008/wise#Executable>), *Executable* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executable>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.10 Test Result (Class)

Running a test produces a kind of result. This class models such automatically generated artefacts. The URI for this entity is '<http://www.fzi.de/2008/wise#TestResult>'. The class *Test Result* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document*

(<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), *Documentation* (<http://www.fzi.de/2008/wise#Documentation>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.11 Information Need (Class)

No ontology on knowledge management would be complete, if it would only model what is there. It is equally important to model the needs of people, i.e. what should be there. The URI for this entity is '<http://www.fzi.de/2008/wise#InformationNeed>'. The class *Information Need* extends the classes *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>).

3.12 Message (Class)

Any kind of artifact that is communicated to other actors is considered a message in WISE. The URI for this entity is '<http://www.fzi.de/2008/wise#Message>'. The class *Message* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Message* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Message>), and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *To* (<http://www.fzi.de/2008/wise#to>)

3.13 Test Specification (Class)

As an example of a special kind of specification, the *test specification* specifies the expected behaviour of a test. The corresponding test might not exist. The URI for this entity is '<http://www.fzi.de/2008/wise#TestSpecification>'. The class *Test Specification*

extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>), *Document* (<http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Document>), *Documentation* (<http://www.fzi.de/2008/wise#Documentation>), *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>), and *Specification* (<http://www.fzi.de/2008/wise#Specification>).

3.14 Work Item (Class)

A work item is e.g. a task, issue, bug report or other unit kind of work unit that someone should do. The URI for this entity is '<http://www.fzi.de/2008/wise#WorkItem>'. The class *Work Item* extends the classes *Artifact* (<http://www.fzi.de/2008/wise#Artifact>) and *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *Assigned Actor* (<http://www.fzi.de/2008/wise#assignedActor>) This property is a suggested property. Instances of *Work Item* are encouraged to use it.

3.15 Message (Class)

The URI for this entity is

'<http://www.semanticdesktop.org/ontologies/2007/03/22/nmo#Message>'. The class *Message* extends the classes *Resource* (<http://www.w3.org/2000/01/rdf-schema#Resource>). Properties, which belong to this class are:

- *To* (<http://www.fzi.de/2008/wise#to>)

3.16 Assigned Actor (Property)

The actor which should do the task represented by the work item. The URI for this entity is '<http://www.fzi.de/2008/wise#assignedActor>'. This property does not extend other properties.

3.17 To (Property)

Similar to an Email's to-field, this property assigns a message its recipients. The URI for this entity is '<http://www.fzi.de/2008/wise#to>'. This property does not extend other properties.

3.18 Votes (Property)

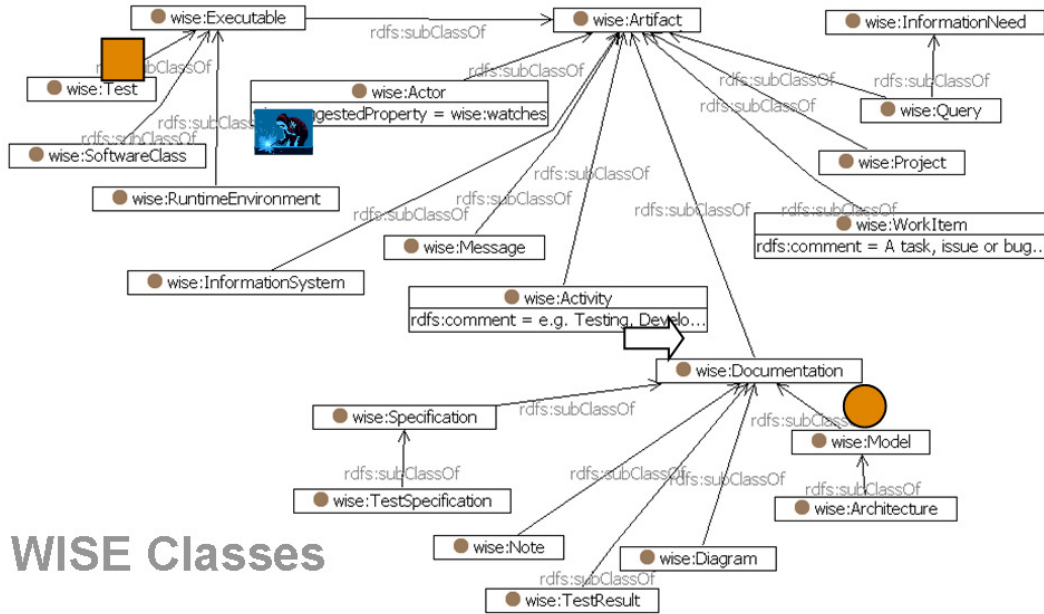
This property allows actors to express in a simple way their interest in an artifact. An example is voting for issues, which means the actor has an interest in a quick solution for the problem mentioned in the issue. The URI for this entity is '<http://www.fzi.de/2008/wise#votes>'. This property does not extend other properties.

3.19 Watches (Property)

The actor requests notifications if the artifact changes. E.g. is a new version of the artifact is created. The URI for this entity is '<http://www.fzi.de/2008/wise#watches>'. This property does not extend other properties.

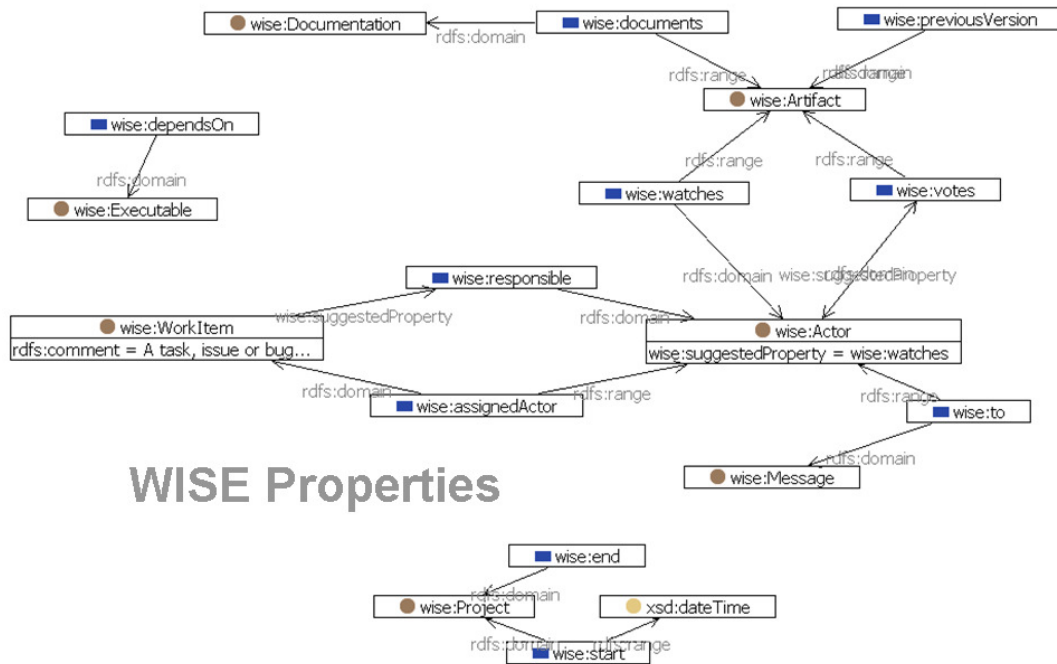
4 Summary

Fig. 2 visualises the interrelation of the WISE classes. Fig. 3 shows a similar visualisation for the property hierarchy.



WISE Classes

Fig. 2: WISE classes



WISE Properties

Fig. 3 WISE properties

5 Axioms

In this section we list the axioms of the ontology.

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:nrl="http://www.semanticdesktop.org/ontologies/2007/08/15/nrl#"
  xmlns:nfo="http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns:doap="http://usefulinc.com/ns/doap#"
  xmlns:nmo="http://www.semanticdesktop.org/ontologies/2007/03/22/nmo/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:nao="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#"
  xmlns:lo="http://xam.de/2008/09/literate-ontology#"
  xmlns:nco="http://www.semanticdesktop.org/ontologies/2007/03/22/nco#"
  xmlns:nie="http://www.semanticdesktop.org/ontologies/2007/01/19/nie#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:wise="http://www.fzi.de/2008/wise#">

  <rdf:Description rdf:about="http://www.fzi.de/2008/wise#">
    <rdf:type rdf:resource="http://www.w3.org/2002/07/owl#Ontology"/>
    <owl:imports
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nmo/" />
      <owl:imports
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#" />
        <owl:imports
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nrl#" />
          <owl:imports rdf:resource="http://purl.org/dc/elements/1.1/" />
            <owl:imports
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#" />
              <owl:imports
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nco#" />
                <owl:imports
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/01/19/nie#" />
                  <owl:imports rdf:resource="http://www.w3.org/2003/01/geo/wgs84_pos" />
                    <owl:imports rdf:resource="http://usefulinc.com/ns/doap#" />
                      <owl:versionInfo>Created with text editor</owl:versionInfo>
                      <nao:hasDefaultNamespaceAbbreviation>wise</nao:hasDefaultNamespaceAbbreviation>
                    </rdf:Description>

  <rdf:Description rdf:about="http://www.fzi.de/2008/wise#secCore">
    <rdfs:label>Core</rdfs:label>
  </rdf:Description>

  <rdf:Description rdf:about="http://www.fzi.de/2008/wise#Activity">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
    <rdfs:isDefinedBy rdf:resource="http://www.fzi.de/2008/wise#" />
  </rdf:Description>

  <rdf:Description rdf:about="http://www.fzi.de/2008/wise#Artifact">
```

```

    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-
schema#Resource"/>
    <lo:requiredProperty
rdf:resource="http://www.fzi.de/2008/wise#created"/>
    <lo:requiredProperty
rdf:resource="http://www.fzi.de/2008/wise#creator"/>
    <lo:requiredProperty
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#prefLab
el"/>
    <lo:suggestedProperty
rdf:resource="http://www.fzi.de/2008/wise#previousVersion"/>
    <lo:suggestedProperty
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#descrip
tion"/>
    <lo:suggestedProperty
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#hasTag"
/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Actor">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
    <lo:suggestedProperty rdf:resource="http://www.fzi.de/2008/wise#votes"/>
    <lo:suggestedProperty
rdf:resource="http://www.fzi.de/2008/wise#watches"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Documentation">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Documen
t"/>
    <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Executable">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nfo#Executa
ble"/>
    <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Tool">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#secExt">
    <rdfs:label>Extensions</rdfs:label>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Architecture">
    <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Model"/>

```

```

</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Diagram">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#InformationNeed">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#InformationSystem">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Message">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
  <rdfs:subClassOf
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nmo#Message
"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Model">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Note">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Project">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
  <rdfs:subClassOf rdf:resource="http://usefulinc.com/ns/doap#Project"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Query">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#InformationNeed"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#RuntimeEnvironment">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
</rdf:Description>

```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#SoftwareClass">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Specification">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#Test">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#TestResult">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#TestSpecification">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf
rdf:resource="http://www.fzi.de/2008/wise#Specification"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#WorkItem">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:subClassOf rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
  <lo:suggestedProperty
rdf:resource="http://www.fzi.de/2008/wise#assignedActor"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#assignedActor">
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
  <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#WorkItem"/>
  <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#contact">
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
  <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
  <rdfs:range
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nco#Contact
"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://www.fzi.de/2008/wise#created">
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
```



```

    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
    <rdfs:range rdf:resource="http://www.w3.org/2001/XMLSchema#dateTime"/>
    <rdfs:subPropertyOf
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#created
"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#creator">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
    <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
    <rdfs:subPropertyOf
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/08/15/nao#creator
"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#dependsOn">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
    <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Executable"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#documents">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
    <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#start">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Project"/>
    <rdfs:range rdf:resource="http://www.w3.org/2001/XMLSchema#dateTime"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#end">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Project"/>
    <rdfs:range rdf:resource="http://www.w3.org/2001/XMLSchema#dateTime"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#previousVersion">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
    <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

```

```

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#responsible">
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>

```

```

    <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
    <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#to">
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
  <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Message"/>
  <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#votes">
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
  <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
  <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#watches">
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property"/>
  <rdfs:domain rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
  <rdfs:range rdf:resource="http://www.fzi.de/2008/wise#Artifact"/>
</rdf:Description>

<rdf:Description rdf:about="http://xam.de/2008/09/literate-ontology#example">
  <rdf:type rdf:resource="http://xam.de/2008/09/literate-
ontology#Section"/>
  <rdfs:label>Example</rdfs:label>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#_Max">
  <rdf:type rdf:resource="http://www.fzi.de/2008/wise#Actor"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#_Presentation">
  <rdf:type rdf:resource="http://www.fzi.de/2008/wise#Documentation"/>
  <wise:created
rdf:datatype="http://www.w3.org/2001/XMLSchema#dateTime">2008-07-
28T22:11:35.471+01:00</wise:created>
  <wise:creator rdf:resource="http://www.fzi.de/2008/wise#_Max"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.fzi.de/2008/wise#EmailAddress_1">
  <rdf:type
rdf:resource="http://www.semanticdesktop.org/ontologies/2007/03/22/nco#EmailAd
dress"/>
</rdf:Description>

</rdf:RDF>

```