Tutorial
Using Semantic MediaWiki in Enterprise Architecture

Toine Schijvenaars (XL&Knowledge / ArchiXL)

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About us...

• ArchiXL
  – Independent Dutch Consultancy company
  – Specialised in Enterprise Architecture (EA)
  – Located in Amersfoort
  – Customers mainly from public sector
  – Started using SMW internally for EA repository

• XL&Knowledge (“Excellent knowledge”)
  – Knowledge management label for ArchiXL
  – Knowledge management world is much larger than only EA
  – SMW as knowledge management platform

• Toine Schijvenaars
  – Enterprise architect & managing partner at ArchiXL/XL&Knowledge
Agenda

1. Introduction to architectural knowledge (management)
2. Semantic wiki for architectural knowledge
3. Setting up and maintaining the architecture knowledge model
What is Enterprise Architecture

• Enterprise Architecture
  – A formal description of a *enterprise*, or a detailed plan of the *enterprise* at component level, to guide its implementation.
  – The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.
Why Enterprise Architecture?

- Architecture helps in optimising the service portfolio of an organisation, aligning IT supply to business demand
- Architecture contributes to a healthy project portfolio, ensuring that projects that contribute most to the long term vision will be realised
- Architecture improves the quality of individual solutions, simplifying their development and maintenance and prolonging their life time
The origin: Zachman framework

<table>
<thead>
<tr>
<th>abstractions perspectives</th>
<th>DATA</th>
<th>FUNCTION</th>
<th>NETWORK</th>
<th>PEOPLE</th>
<th>TIME</th>
<th>MOTIVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What</td>
<td>How</td>
<td>Where</td>
<td>Who</td>
<td>When</td>
<td>Why</td>
</tr>
<tr>
<td>SCOPE Planner</td>
<td>List of Things - Important to the Business</td>
<td>List of Processes - How the Business Performs</td>
<td>List of Locations - Where the Business Operates</td>
<td>List of Organizations - Important to the Business</td>
<td>List of Events - Significant to the Business</td>
<td>List of Business Goals and Strategies</td>
</tr>
<tr>
<td>contextual</td>
<td>Entity = Class of Business Thing</td>
<td>Function = Class of Business Process</td>
<td>Node = Major Business Location</td>
<td>People = Class of People and Major Organizations</td>
<td>Time = Major Business Event</td>
<td>Ends/Masters/Major Business Goal/Initial Success Factor</td>
</tr>
<tr>
<td>ENTERPRISE MODEL Owner</td>
<td>e.g., SemanticModel</td>
<td>e.g., Business Process Model</td>
<td>e.g., Logical Network</td>
<td>e.g., Work Flow Model</td>
<td>e.g., Master Schedule</td>
<td>e.g., Business Plan</td>
</tr>
<tr>
<td>SYSTEM MODEL Designer</td>
<td>e.g., Logical Data Model</td>
<td>e.g., Application Architecture</td>
<td>e.g., Distributed System Architecture</td>
<td>e.g., Human Interface Architecture</td>
<td>e.g., Processing Structure</td>
<td>e.g., Business Rule Model</td>
</tr>
<tr>
<td>logical</td>
<td>Entity = Data Entity, Rel = Data Relationship</td>
<td>Process = Application Function ID = User Interface</td>
<td>Node = IS Function, Line = Interface Characteristic</td>
<td>People = Role, Work = Deliverable</td>
<td>Time = System Event, Cycle = Processing Cycle</td>
<td>Ends = Structural Assertion, Means = Action</td>
</tr>
<tr>
<td>TECHNOLOGY CONSTRAINED MODEL Builder</td>
<td>e.g., Physical Data Model</td>
<td>e.g., System Design</td>
<td>e.g., Technical Architecture</td>
<td>e.g., Presentation Architecture</td>
<td>e.g., Control Structure</td>
<td>e.g., Rule Design</td>
</tr>
<tr>
<td>physical</td>
<td>Entity = Table/Segmentation, Rel = Key/Primary</td>
<td>Process = Computer Function ID = Data Element/Set</td>
<td>Node = Hardware/System Software, Line = Link Specifications</td>
<td>People = User, Work = Software/Device Format</td>
<td>Time = End Event, Cycle = Component Cycle</td>
<td>Ends = Condition, Means = Action</td>
</tr>
<tr>
<td>DETAILLED REPRESENTATIONS Subcontractor out-of-context</td>
<td>e.g., Data Definition</td>
<td>e.g., Program</td>
<td>e.g., Network Architecture</td>
<td>e.g., Security Architecture</td>
<td>e.g., Timing Definition</td>
<td>e.g., Rule Specification</td>
</tr>
<tr>
<td>FUNCTION ENTERPRISE</td>
<td>DATA Implementation</td>
<td>FUNCTION Implementation</td>
<td>NETWORK Implementation</td>
<td>ORGANIZATION Implementation</td>
<td>SCHEDULE Implementation</td>
<td>STRATEGY Implementation</td>
</tr>
</tbody>
</table>
The enterprise architect as knowledge worker

• Knowledge work entails gathering, processing, creating, sharing and disseminating knowledge

• 3 phases:
  1. Information:
     • gathering relevant knowledge and data
  2. Use:
     • processing the gathered knowledge
     • creating new knowledge
  3. Result:
     • sharing and disseminating the result

(Mackenzie Owen, 2001)
Architectural knowledge is an *asset*

“The major problem with intellectual capital is that it has legs and walks home every day.”

*Rus & Lindvall*
Advantages of using a semantic wiki

• Open invitation for knowledge sharing
  – Everyone may contribute
  – “Who knows what”?

• Single entry point for architectural knowledge
  – Open platform
  – Integration with other tools possible

• Architecture in context
  – No a-priori constraints on the type of knowledge that can be captured

• Semi-structured
  – Supports structure and text

• Dynamic overviews / queries
  – Stakeholder-specific content
Agenda

1. Introduction to architectural knowledge (management)

2. Semantic wiki for architectural knowledge

3. Setting up and maintaining the architecture knowledge model
Semantic (Architecture) Wikis

- E-government
  - Reference architectures
  - Organisation-specific (enterprise) architectures
  - Master data management

- IT
  - ArchiXL IT reference architecture
  - Solution architecture
  - Information model

- But also
  - Issue management
  - Project management
  - Contract management
  - Service management
Background: ‘e-government’

- **Goals (for citizens and businesses):**
  - Reduce administrative burdens
  - Better service provision

- **Means (for government agencies):**
  - Work together
  - Align business processes
  - Use each other’s information

- **This has huge impact on the enterprise architecture of government agencies!**
  - Business processes
  - Information landscape
  - Technology
The NORA architecture family

- Establish processes and systems that ensure interoperability
- Increasing level of specificity (government → domain → organization)
- Main constituents:
  - Architecture principles
  - Architecture models
- Architecture is the fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution (ISO-IEC 42010)
- “Principles are general rules and guidelines, intended to be enduring and seldom amended, that inform and support the way in which an organization sets about fulfilling its mission.” (TOGAF)
Example architecture principles

• No wrong door:
  – Citizens and businesses can direct their questions to ‘the government’; government offices (re)direct to the appropriate service

• Single request, multiple use of data:
  – Once the government has obtained certain data from a citizen or business, no government agency may ask for the same data again.

• Transparent services:
  – Citizens and businesses are informed about the state of the requested service.
Principle (Wiki page)

Transparent case handling

GEMMA Core Principle

**Statement**
Our municipality has the ability to provide its customers through any channel with current status information on the progress of ongoing cases.

**Motivation**
Case-oriented work

**Implications (inferred)**
Stakeholders know about status changes, Confidential case information, Case filing

**Source**
GEMMA Thema’s en Kernprincipes v1.0 p.12

**ID**
K1.2

**Scope**
Generic

**Category:** Core principles
Example query answered by the wiki:
Case management motivation and implications
Case handling

Characteristic properties of case-oriented work are:

1. each customer request results in the definition of a case, which is integrally managed, monitored and implemented;
2. the customer and the municipality have knowledge of the current status of their ongoing cases;
3. municipal service processes are designed and standardized according to the same overall pattern;
4. a case is the combination of stakeholder(s), case information, documents, status, results and eventual decisions;
5. all information concerning a case is registered under a single identifier. (bron: KING)

Infrastructure service

- **Name**: Case handling
- **Description**: Provide case-oriented support for processes, which means the case is central rather than the detailed process design
- **External information**: [http://www.kinggemeenten.nl/](http://www.kinggemeenten.nl/)

**IT reference architecture**

- **Specializes**: Process control
- **Is related to**: Processes are supported by process control
- **Is realized by**: Case management system

Categories: Infrastructure services | Application infrastructure
ArchiMate: Overview

Passive structure | Behaviour | Active structure

- Representation
  - Business object
  - Data object
  - Artifact

- Business service
  - Business process
  - Application service
  - Application function
  - Infrastructure service
  - System software

- Event
  - Business interaction
  - Business collaboration
  - Application interface
  - Infrastructure interface

- Business role
  - Business actor
  - Device
  - Network
ArchiMate extensions

**Motivation Extension**
- Stakeholder
- Assessment
- Driver
- Goal
- Requirement
- Constraint
- Principle

**Implementation and Migration Extension**
- Work package
- Deliverable
- Plateau
- Gap
An ArchiMate model

source: Lankhorst et al., ArchiMate Language Primer
Semantic architecture wiki: The end user’s perspective (the ‘reader’)

• Facts and relationships, such as
  – Model elements: ArchiMate attributes and relations
  – Architectural statements: motivation and implications; traceability

• Combined structured and unstructured information

• Dynamic overviews
  – Tables
  – Lists
  – Diagrams
  – Relation tables
  – Categories

• Interactive selections
  – Faceted search; dynamic drill-down
  – Semantic search (advanced)
Facts and relationships in GEMMA: Principles, motivation and implication
Facts and relationships in ROSA: Education Chain Processes as ArchiMate Wiki Pages
Case handling

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Is related to: Processes are supported by process control
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### Dynamic overviews

#### User interaction services

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content presentation</td>
<td>Disseminating content (including documents) to the user, in a user-friendly way to navigate through. Het ontsluiten van content (inclusief documenten) richting de gebruiker, die hier op een gebruikersvriendelijke wijze doorheen kan.</td>
</tr>
<tr>
<td>Electronic forms</td>
<td>Providing forms that can be filled out and submitted electronically.</td>
</tr>
</tbody>
</table>

#### User interaction logical components

<table>
<thead>
<tr>
<th>Realizes</th>
<th>Content presentation</th>
<th>Electronic forms</th>
<th>Multimedia</th>
<th>Presentation aggregation</th>
<th>Speech</th>
<th>Search</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document management system</td>
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<td>X</td>
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<td>Form generator</td>
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<tr>
<td>Media server</td>
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<tr>
<td>Media player</td>
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<tr>
<td>Portal server</td>
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<tr>
<td>Speech recognition software</td>
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<td>Web browser</td>
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<tr>
<td>Web content management system</td>
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<tr>
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(XL& Knowledge)
## User interaction services

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</tr>
<tr>
<td>Multimedia</td>
<td>Playing and editing audio and video.</td>
</tr>
<tr>
<td>Presentation aggregation</td>
<td>Compiling a user interface with smaller user interface elements, adapted to the role and preferences of the user (aka portal).</td>
</tr>
<tr>
<td>Speech</td>
<td>Recognizing and synthesizing (human) speech.</td>
</tr>
<tr>
<td>Search</td>
<td>Searching in all kinds of data, both structured and unstructured (such as web content, email and documents).</td>
</tr>
</tbody>
</table>
### Dynamic overview: relation table

#### User interaction logical components

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</tr>
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<td>Search engine</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>
Dynamic overview: graph

User interaction

- Specializes
  - Presentation aggregation
    - Realizes
      - Document management
      - Search
  - Electronic forms
    - Realizes
      - Multimedia
      - Speech
      - Content presentation
  - Web content management
    - Specializes
      - Form generator
      - Media player
      - Media server
      - Speech recognition software
      - Web browser
Interactive selections

View details

Archimate concepts
Select one or more of the following terms to reduce the number of results.

Under the Category: Archimate active concepts (507) · Archimate behavior concepts (230) · Archimate passive concepts (66)

▼ IT reference architecture:
(There are no values for this)

▼ Supplier:
AMD (1) · ARAS Security (1) · AVD-ICT (1) · Adobe (1) · Aenova (1) · Apache (9) · ArcSight (1) · Ataccama (4) · Atlassian (2) · Avaya (1) · Axios Systems (1) · Axway (4) · nurse true (1) · Barracuda Networks (4) · Management Vision (1) · Benjamin Pierce (1) · Bentis (1) · Bentley (3) · Berkeley Bridge (1) · BiZZdesign (2) · Borland (1) · C3Group (1) · CECID (1) · CallScripter (1) · Cobecon (1) · Centric (23) · Checkpoint IC (1) · Chip PC (1) · Citrix (5) · Collibra (1) · DHV (1) · Esri (1) · Flamingo (1) · Free Software Foundation (2) · GISKit (2) · GeoTax (1) · Google (1) · GouwIT (1) · Grundmij (1) · HP (4) · IBM (21) · ICT (1) · ICTU (1) · IDS Scheer (2) · Impactive (1) · INFA (1) · Science (1) · Impact (1) · Interflex (1) · Iron Mountain (1) · JBoss (4) · JCC Software (1) · Kempen Hills (1) · Logius (1) · Loquendo (1) · Lumension (1) · Lumina (1) · MFAS (1) · Maxim (1) · Microsoft (16) · Nagios Enterprises (1) · Nedap (1) · Nedgraphics (4) · Novell (1) · Nuance (1) · OW2 (1) · OpenText (1) · Oracle (24) · Parallels (2) · Pentaho (1) · PinkRocca (8) · Plan Consult (1) · Planon (2) · pleso (1) · PostgreSQL (1) · Procura (1) · Progress (2) · Q-Matic (1) · Quark (1) · Quire (1) · Raet (1) · Red Hat (3) · Roxil IT Solutions (1) · SAP (6) · SAS (1) · SDU (1) · SIMgroup (2) · SOA Software (1) · Sendmail.org (1) · Softlution (1) · Soft Tack (1) · Solvsteens (1) · Sparx Systems (1) · Stratoch (2) · SugarCRM (1) · Symantec (1) · Synaxion Urbidata (1) · TIECO (1) · Talend (3) · The Kernel Group (1) · The Linux Foundation (1) · Tradelec (1) · Trinicom (1) · Unisys (1) · Unit 4 (1) · VMWare (5) · Vicrea (3) · Wayne Davidson (1) · Wikimedia Foundation (1) · XMind (1)

▼ Abstraction Level:
Physical (331) · Logical (191)
Semantic search

<table>
<thead>
<tr>
<th>Query</th>
<th>Additional data to display</th>
</tr>
</thead>
<tbody>
<tr>
<td>[[Category:System software]] [[Supplier: Microsoft]]</td>
<td>ASP.NET</td>
</tr>
<tr>
<td></td>
<td>Microsoft .NET</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microsoft Application Virtualization</td>
</tr>
<tr>
<td></td>
<td>Microsoft Hyper-V</td>
</tr>
<tr>
<td></td>
<td>Microsoft Internet Information Server</td>
</tr>
<tr>
<td></td>
<td>Microsoft MSMQ</td>
</tr>
<tr>
<td></td>
<td>Microsoft Remote Desktop Services</td>
</tr>
<tr>
<td></td>
<td>Microsoft Robocopy</td>
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<tr>
<td></td>
<td>Microsoft SQL Server</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Microsoft SyncToy</td>
</tr>
<tr>
<td></td>
<td>Microsoft Virtual Server</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows Virtual PC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other options</th>
<th>Specializes</th>
</tr>
</thead>
<tbody>
<tr>
<td>limit: 20</td>
<td>ASP.NET</td>
</tr>
<tr>
<td>The maximum number of results to return</td>
<td>Microsoft .NET</td>
</tr>
<tr>
<td>link:</td>
<td>Microsoft Application Virtualization</td>
</tr>
<tr>
<td>intro:</td>
<td>Microsoft Hyper-V</td>
</tr>
<tr>
<td>Show values as links</td>
<td>Microsoft Internet Information Server</td>
</tr>
<tr>
<td>default:</td>
<td>Microsoft MSMQ</td>
</tr>
<tr>
<td>The text to display if there are no query results</td>
<td>Microsoft Remote Desktop Services</td>
</tr>
</tbody>
</table>

X&L Knowledge
Semantic architecture wiki:
The architect’s perspective (the ‘contributor’)

- **Input forms**
  - Forms for meaningful codification of e.g. ArchiMate concepts and architecture principles
  - Automatic form assignment for ‘red links’ based on relations

- **Standard wiki markup for free text**

- **ImageMap editor**
  - Annotate images with links to wiki pages

- **Special forms, such as**
  - Import reference architecture knowledge
  - Project Start Architecture generator

- **Integration with other tools**
  - show and link model images from other tools in the wiki
  - batch import model definitions from other tools
**Input forms**

## Edit Statement: Case-oriented work

<table>
<thead>
<tr>
<th>Type:</th>
<th>GEMMA Core principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version:</td>
<td>1</td>
</tr>
<tr>
<td>Statement:</td>
<td>Our municipality treats all customer requests, except for requests for information, in a case-oriented way.</td>
</tr>
</tbody>
</table>

**Motivation:** Case and process-oriented work

**derived motivation:** no derived motivation

**Implication:**

**derived implications:** Transparent case handling, Connect, Case management

**Implication (text):**
Special forms

LctuPsas

Assess which of the following conditions are met:
- Does the project impact in organisation?
- Does the project affect a service?
- Does the project affect the business?
- Does the project have implications on people?
- Does the project have implications on processes?
- Does the project have implications on information?
- Does the project affect the information?
- Does the project have implications on documents?
- Does the project have implications on data?
- Does the project have implications on technical structures?

Key Terms
- Security
- Web technology
- Multimedia
- Together
- Documents
- Data
- Technical

Identify key questions and standards

GEMMA Import

- Zakenbeheer (3)
  - Procesondersteuning (2)
    - Ondersteuning alle benodigde procesondersteuning (5)
      - Procesondersteuning biedt mogelijkheid tot rollback (importeer)
      - Procesondersteuning houdt rekening met communicatiefouten tussen systemen (importeer)
      - Procesorkestratie impliceert koppelen van documentstromen aan processen (importeer)
      - Signalering van overschrijding behandelte mijen (importeer)
      - Voortgang van processen te volgen tot op processtap en klant op status (importeer)
    - Servicegerichte procesondersteuning (2)
      - Geautomatiseerde stappen van een proces worden geïmplementeerd via procesorkestratie (importeer)
    - Procesorkestratie kan taken uitbesteden aan andere organisaties (importeer)
  - Werktoewijzing (2)
    - Voorziening voor human workflow (3)
      - Een omgeving voor geautomatiseerde werktoewijzing (importeer)
      - Human workflow gekoppeld aan een generieke taak wordt vervangen door een generieke oplossing (importeer)
      - Human workflow gekoppeld aan sectorale taken koppelt status terug aan zaakregistratie (importeer)
    - Werktoewijzing op actiesniveau (2)
XL&Knowledge: WikiXL platform

- New label for our knowledge management advise en solutions
- Main platform: WikiXL (Semantic MediaWiki implementation)
Agenda

1. Introduction to architectural knowledge (management)
2. Semantic wiki for architectural knowledge
3. Setting up and maintaining the architecture knowledge model
Knowledge model of SSC Holland (based on real life case)

- Shared service centre
- Cutting costs by efficiency and sharing resources
- Four municipalities
- Shared infrastructure
- Shared application portfolio
- Separate business processes
Most important components of the knowledge model

- Templates
  - ‘Classes’

- Properties
  - Attributes and relationships

- Forms
  - For data entry and changes

- Categories
  - ‘Object types’
Do it yourselves!

- Step 1: Create your model
- Step 2: Query the model
Step 1 - Create the model:  
How to start?

• We'll divide the group people into 6 groups of nine people. 
• The model is composed of 9 element types. 
• Every group is divided in 3 subgroups (1A, 1B, 1C, 2A, 2B, 2C etc..) who implement 3 element types/categories each.
• Every category, form and template has it's own category prefix: Gr1_, Gr2_ etc... E.g. Category:Gr1_Nodes
• Every property has it's own category prefix: Gr1a_, Gr2a_ etc... E.g. Category:Gr1a_description
Log in

- Go to: https://test.wikixl.nl/wiki/smwcon2
- Enter the username / password (from the handout)
Step 1 - Create the model:
Choose the right categories

- Each Category page contains the definition, properties and relations of the ArchiMate element we want to use.
- Look in the hand out for your category
Step 1 - Create the model:
Example: Nodes

Category: Gr1 Nodes

A node is defined as a computational resource upon which artifacts may be stored or distributed.

Sample data for data entry Nodes

<table>
<thead>
<tr>
<th>Properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Type</td>
</tr>
<tr>
<td>Description</td>
<td>Text</td>
</tr>
<tr>
<td>External information</td>
<td>URL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Target</td>
</tr>
<tr>
<td>Realizes</td>
<td>Application services</td>
</tr>
<tr>
<td>Realizes</td>
<td>Principles</td>
</tr>
<tr>
<td>Encompasses</td>
<td>Nodes</td>
</tr>
</tbody>
</table>
Step 1 - Create the model:
Edit Schema
Step 1 - Create the model: Generate schema

![Diagram of a node with properties and relations]

### Category: Gr1 Nodes

A node is defined as a computational resource upon which artifacts may be stored or deployed.

**Sample data for data entry Nodes**

<table>
<thead>
<tr>
<th>Properties</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Text</td>
</tr>
<tr>
<td>External information</td>
<td>URL</td>
</tr>
</tbody>
</table>

**Relations**

<table>
<thead>
<tr>
<th>Name</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realizes</td>
<td>Application services</td>
</tr>
<tr>
<td>Realizes</td>
<td>Principles</td>
</tr>
<tr>
<td>Encompasses</td>
<td>Nodes</td>
</tr>
</tbody>
</table>

*Page schema [Expand]*
Step 1 - Create the model:
Generate pages
Step 1 - Create the model: Start the data entry

- Go to the created form, e.g.
  - Form: Gr1_Node
Step 1 - Create the model:
Spoiler alert!

- Use **unique** names for forms, templates and properties, e.g.
  - Form: gr1_node
  - Template: gr1_node
  - Attribute: gr1a_description
Step 2 - Query the model: How to start?

- Go to: https://test.wikixl.nl/wiki/smwcon2
- Login with the same username password
- Try to make queries according to the assignment on the page:
  - Use Special:Ask to formulate the query
Step 2 - Query the model: Use Special:Ask
Step 2 - Query the model:
Example: Ask query

Semantic search

Query

[[Category:Nodes]]

Additional data to display
(add one property name per line)

Description
Realizes

[Add sorting condition]

Format as: Broad table (default)

Other options

limit: The maximum number of results to return

sort: Property to sort the query by

order: [ ] descending [ ] asc
[ ] ascending [ ] rand [ ] random
Order of the query sort

offset: The offset of the first result

headers: [ ] show [ ]
Display the headers/property names

mainlabel: The label to give to the main page name

link: all
Show values as links

searchlabel: Text for continuing the search (default is « ... further results»)

intro: The text to display before the query results, if there are any

class: sortable wikitble smrttable
An additional CSS class to set for the table
### Step 2 - Query the model:

**Example: Results**

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Description</th>
<th>Realizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application server</td>
<td>Ondersteunt het uitvoeren van softwarecomponenten op een transactionele, veilige en schaalbare wijze.</td>
<td>Transaction management</td>
</tr>
<tr>
<td>Application virtualisation platform</td>
<td>Ondersteunt het virtualiseren van applicaties</td>
<td>Application virtualisation</td>
</tr>
<tr>
<td>B2B Gateway</td>
<td>Ondersteunt bericht-gedreven integratie met externe partijen.</td>
<td>Partner integration</td>
</tr>
<tr>
<td>Backup software</td>
<td>Software die het maken en beheren van backups ondersteunt</td>
<td>Backup</td>
</tr>
<tr>
<td>Copier</td>
<td>Een apparaat dat een document kan vermenigvuldigen.</td>
<td>Reproduction</td>
</tr>
<tr>
<td>Cordless phone</td>
<td>Een telefoon die gebruik maakt van een draadloos netwerk op één lokatie.</td>
<td>Phone</td>
</tr>
<tr>
<td>Database management system</td>
<td>Ondersteunt het beheren van gestructureerde gegevens.</td>
<td>Database</td>
</tr>
<tr>
<td>Desktop virtualisation platform</td>
<td>Ondersteunt het gebruik van een desktop die zich op een server bevindt.</td>
<td>Desktop virtualization</td>
</tr>
<tr>
<td>Direct-attached storage</td>
<td>Een apparaat dat gegevens kan opslaan en die direct is aangesloten op de computer.</td>
<td>Local storage</td>
</tr>
<tr>
<td>Directory server</td>
<td>Een hierarchisch opslagmechanisme van gebruikersgegevens.</td>
<td>Directory</td>
</tr>
<tr>
<td>Fax</td>
<td>Een apparaat dat in staat is om een document in te scanen en te versturen alsook te ontvangen en af te drukken over een telefoonlijn.</td>
<td>Reproduction</td>
</tr>
<tr>
<td>Firewall</td>
<td>Filtert netwerkcommunicatie om bedreigingen tegen te gaan.</td>
<td>Zone security</td>
</tr>
<tr>
<td>HTTP server</td>
<td>Omgeving die content ontsluit naar eindgebruiker.</td>
<td>Content retrieval</td>
</tr>
<tr>
<td>Hardware load balancer</td>
<td>Een system dat werk verdeelt over verschillende systemen.</td>
<td>Network load balancing</td>
</tr>
<tr>
<td>Host access tool</td>
<td>Ondersteunt het ontsluiten van host (mainframe) toepassingen.</td>
<td>Data scraping</td>
</tr>
<tr>
<td>Hub</td>
<td>Een apparaat dat netwerken kan verbinden op OSI laag 1.</td>
<td>Network routing</td>
</tr>
<tr>
<td>Hypervisor</td>
<td>Ondersteunt het uitvoeren van meerdere besturingssystemen op een fysieke machine.</td>
<td>Machine virtualization</td>
</tr>
<tr>
<td>Interactive voice response system</td>
<td>Een system dat het telefonisch geven van opdrachten ondersteunt.</td>
<td>Call</td>
</tr>
<tr>
<td>Intrusion detection system</td>
<td>Een system dat controleert of er geen kwaadaardige activiteit op het netwerk of andere systemen plaats vindt.</td>
<td>Intrusion detection and prevention</td>
</tr>
<tr>
<td>Intrusion prevention system</td>
<td>Een system dat controleert of er geen kwaadaardige activiteit op het netwerk of andere systemen plaats vindt en dit zodanig blokkeert.</td>
<td>Intrusion detection and prevention</td>
</tr>
</tbody>
</table>
Step 2 - Query the model:
Example: Query statement

Semantic search

```sql
{{#ask: [[Category:Nodes]]
|?Description
|?Realises
|?format-broadtable
|?headers-show
|link=all
|class-sortable wikitables
|offset=
|limit=
}}
```
Do it yourselves!

- Query assignments
  - Q1: A unnumbered list of all application services and their description
  - Q2: A table of all nodes and the infrastructures they realize
  - Q3: Count the total number of nodes
  - Q4: A table with Nodes which realize an Infrastructure service called *Central storage*
  - Q5: A graph of the logical application component *CAD system* and its relations with physical applications and application services
  - Q6: Which ArchiMate elements are realized by the principle *All software should be virtualized*
  - Q7: Which ArchiMate elements are NOT realized by the principle *All software should be virtualized*
Wrap up

• What we’ve seen today
  – Introduction to architectural knowledge management
  – Semantic wiki for architectural knowledge
  – Setting up and maintaining the architecture knowledge model

• Questions? Remarks? Want to share your thoughts?
  • Right here, right now...
  • ... or contact me:

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