

Natural

AceWiki is a semantic wiki that is easily understandable by everybody. The wiki articles are written in ACE (Attempto Controlled English) that is a **controlled natural language**.



ACE supports a **wide range of natural language constructs**:

- Proper names, nouns, verbs, *of*-constructs, ...
- Singular and plural noun phrases
- Relative phrases
- Anaphoric references
- Existential and universal quantifiers
- Negation

... and much more. Some examples:

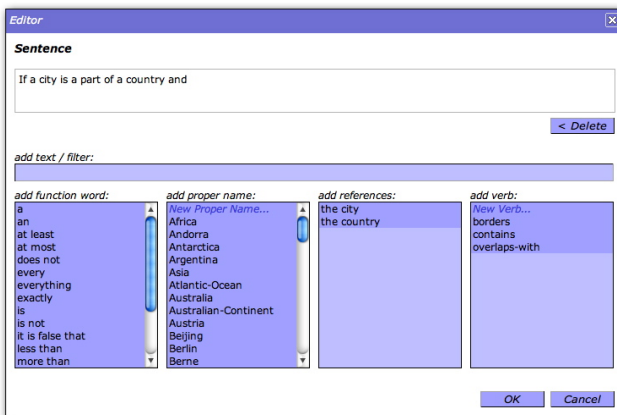
- ▶ Every country controls every city of the country.
- ▶ Italy is a country that is a part of Europe.
- ▶ Switzerland borders exactly 5 countries.
- ▶ Switzerland does not border a sea.

AceWiki

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Easy to Use

AceWiki is not only easy to read and understand, but also easy to modify and extend. Users do not need to understand the details of ACE. A **predictive editor** helps them word-by-word to create sentences that comply with the ACE syntax:



We performed a small-scale **user experiment** to test the usability of AceWiki. The participants were asked to add general knowledge to AceWiki:

- 20 participants (no background in logic and ontologies)
- No instructions how to use the interface
- They spent on average 47 minutes on AceWiki
- They created in total 186 sentences
 - 80% were correct and sensible
 - 61% were complex (using negation or implication)

Expressive

ACE is a **formal language** that is translatable into **logic** and other languages, for example OWL. Some examples of **OWL-compliant sentences**:

- ▶ Every country that borders no sea is a landlocked-country.
- ▶ If something X borders something Y then Y borders X.
- ▶ Antarctica contains no country.
- ▶ There are exactly 7 continents.

ACE is more expressive than OWL. You can express complex statements (e.g. rules) that are **beyond OWL**:

- ▶ No country borders every country.
- ▶ If Liechtenstein is a country then Andorra is a country.
- ▶ If a country contains an area and does not control the area then the country is an unstable-country.

ACE supports also **questions** which are used in AceWiki to state queries:

- ▶ Which continents contain more than 10 countries?
- ▶ Zurich is a part of what?
- ▶ Which cities overlap-with more than 1 continent?
- ▶ Switzerland borders which country that borders Spain?

Thus, ACE is an **all-in-one language**.

ALL-IN-ONE

- ✓ Ontology Language
- ✓ Rule Language
- ✓ Query Language

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Reasoning

AceWiki integrates the **OWL reasoner Pellet** that considers all OWL-compliant sentences of the wiki. It ensures that the ontology is **always consistent**:

- ▶ Every country is a part of exactly 1 continent.
- ▶ Every country that borders Switzerland is a part of Europe.
- ▶ Germany borders Switzerland.
- ▶ Germany is a part of Asia.

The reasoner infers **class memberships** and presents them in ACE:

- ▶ Switzerland is an area.
- ▶ Switzerland is a country.
- ▶ Switzerland is a landlocked-country.
- ▶ Switzerland is an object.

Also **class hierarchies** are inferred and presented in ACE:

Upward

- ▶ Every country is an area.
- ▶ Every country is an object.

Downward

- ▶ Every baltic-state is a country.
- ▶ Every landlocked-country is a country.

Furthermore, AceWiki supports **inline-queries** that are answered by the reasoner:

- ▶ Which cities are a part of Switzerland?
 - Berne
 - Geneva
 - Lucerne
 - Zurich