8th International Conference on Applied Informatics
Eger, Hungary, January 27–30, 2010.

Web ontology for software package management

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Abstract

The term software package refers to a single archive file that contains computer software to be installed. Modern Linux distributions and Unix-like operating systems consist of hundreds or thousands of software packages. The handling of software packages on these systems is carried out by a package management system.

A package management system typically uses a specific software package format and provides a wide range of functionality, such as automatic package updates and handling dependencies amongst software packages automatically.

Not only operating systems can benefit from software packages, even application software may use them to add new functionality. An example is the open source R statistical computing environment that has its own software package format and package management system.

Software packages usually contain metadata, such as the full name, version number, description and license of the contained software, and the list of dependencies. Embedding metadata is file format specific.

In this paper the author presents an OWL web ontology that defines classes and properties to represent software package metadata in RDF. As part of this work a collection of software tools is provided that supports various software package formats and extracts metadata as RDF triples, providing a rich source of information for semantic web applications.

As demonstrated, this framework can be used to publish the full metadata content of a software package repository as linked data, thus allowing repositories to become part of the Semantic Web. The framework is also intended to serve as a foundation for a unified software package dependency analyzer tool, and maybe for a unified package management tool that can support arbitrary package formats.

Keywords: software package, metadata, package management system, dependency, semantic web, web ontology, RDF, linked data

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