
A revised edition

Hozo – Ontology Editor
(Distributed Development Version)

Operating Manual

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Industrial Research, Osaka University

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(Representative: Kazuhiko OHE, Faculty of Medicine, Tokyo University, Contributors: Riichiro MIZOGUCHI, Osaka University, et al.)

- FY2007 Commission for Promoting Development of Medical Information Systems

"Research and development of medical knowledge base databases for medical information systems"

(Representative: Kazuhiko OHE, Faculty of Medicine, Tokyo University, Contributors: Riichiro MIZOGUCHI, Osaka University, et al.)

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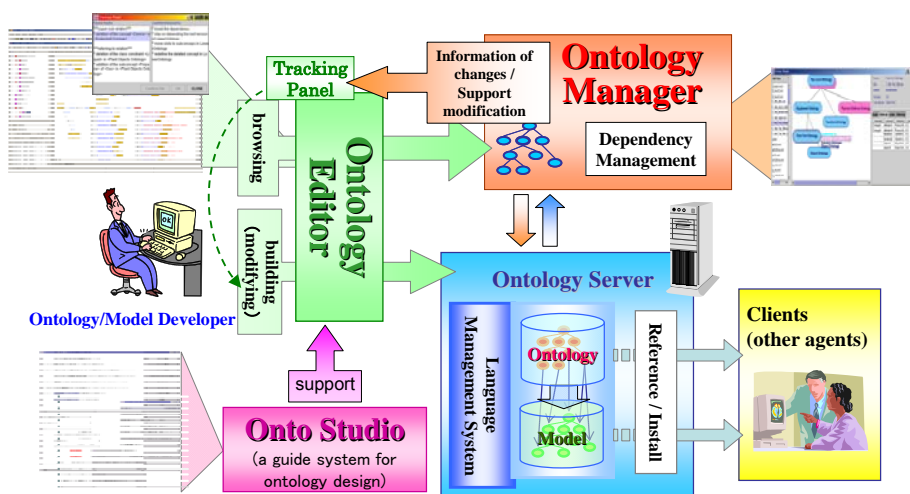
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2. Introduction

Hozo is a tool for building ontologies in a distributed environment. The following figure shows the block diagram of Hozo. It consists of three major components: Ontology editor, Ontology server and Ontology manager. Onto Studio is specialized to support ontology-building. Users build and use ontologies through the Ontology editor which has a friendly GUI. Ontology manager manages projects in which several ontologies are built collaboratively and in a distributed environment through the internet. It also manages versions of ontologies. Ontology server stores ontologies and instances and provides APIs for clients.

The main characteristics of Hozo are summarized as follows:

- Unlike OWL, its conceptual level is closer to that of human beings. OWL is a low level language which is good for an interlingua for ontology exchange. If one uses it as an ontology representation language directly, it would degrade user's understanding of ontology by restricting their idea to semantic-network/description-logics levels which are inappropriate and less expressive for understanding the content of the ontology.
- Its representation scheme is based on a frame structure
- It helps users build ontologies with Roles in a natural way supported by the advanced theory of Roles.
- It represents nested structures of slots. That is, any slot can have its own slots.
- Inheritance information is explicit and is always accessible. Two ways of inheritance: one from super classes through *is-a* link and the other from *class constraint*
- A user-friendly GUI is available
- Version management is available with a useful function for displaying changes.
- Ontology building in a distributed environment over internet is supported.
- APIs are available for accessing ontologies and instances.



3. System Overview

3.1. System Requirements (Recommended Environment)

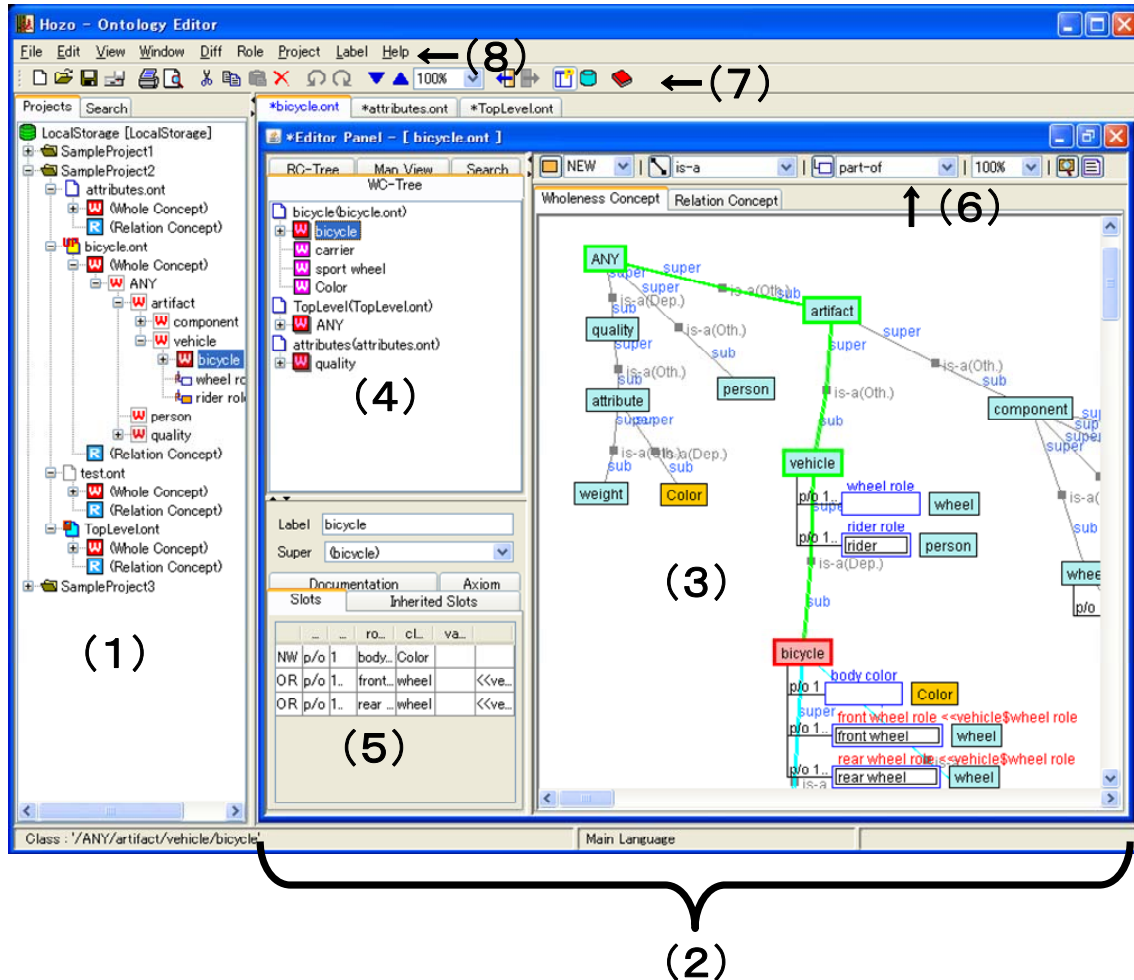
*Also confirmed to run under Mac OS X 10.4.x, and Windows XP, Vista, 7.

Machine	PC/AT compatible (DOS/V)
CPU	Intel Pentium III processor, 800MHz or higher
Memory	256MB or more RAM (512MB or more recommended)
Hard Disk Space	30MB or more available hard disk space.
Monitor Resolution	1024x768 (XGA) or higher
OS*	Windows 2000 or higher (Windows XP or higher recommended), Mac OS X 10.4 or higher
Java	JRE/JDK 1.5.0_10 or higher (1.6.0 or higher recommended)
Network	Not required if using on a local machine. When sharing within networks, clients and servers are connected via Ethernet using TCP/IP protocol.
Other, Supplementary Items	Communication via the Internet ¹ will utilize the Jakarta Slide project's WebDav client module as the WebDav communication module. URL: http://jakarta.apache.org/slide/

¹ Features for communication via the Internet will be released soon and become available in the next version.

3.2. Screen Layout

3.2.1. Ontology Editor Editing Screen



(1) Project Management Pane: allows user to display and manage a tree view of the project and ontologies within the project.

- [Project] Management View: allows user to display and operate projects and ontologies.
- [Search] View: allows user to search ontologies within the project.

(2) Editing Pane: allows user to switch between multiple ontologies with a tabbed display.

(3) Browsing Pane: displays ontologies graphically.

(4) Navigation Pane: provides an overview of the ontology.

- [WC (Wholeness Concept) Tree] View: provides a tree view of Wholeness Concept super and sub levels (is-a hierarchy).
- [Relational Tree] View: provides a tree view of Relational Concept super and sub levels (is-a hierarchy).

- [Concept Map] View: Provides a map view of the ontology's concept in its entirety.

- [Search] View: allows user to search the ontologies being edited.

(5) Definition Pane: allows user to display/edit the definitions of the concepts/classes in the ontology.

(6) Editing Tool Bar: a menu of buttons for editing ontologies.

(7) Operation Tool Bar: menu of buttons used for ontology operations.

(8) Menu Bar: drop-down menu for running various features.

3.3. Installation

3.3.1. Installation Instructions

- Decompress the archive you downloaded, and place the decompressed folder in a location of your choice on your machine.

[Note] This manual assumes the files are installed on c:\

[Note] To use this tool you must have a Java Runtime Environment.

Java Runtime Environment: Java 2 Platform, Standard Edition
(version 1.5.0_10 or higher recommended)

→Can be downloaded from the below site.

<http://java.sun.com/javase/downloads/>

* Select Java Runtime Environment (JRE), which contains only the runtime environment, or the Java SE Development Kit (JDK), which includes a development environment.

[Note] If the "lib" folder in the downloaded folder does not contain all of the following library files, please download the missing files from the below site.

<Download Site>

<http://jakarta.apache.org/slide/>

<Required Library Files>

- commons-httpclient.jar
- commons-logging.jar
- jakarta-slide-webdavlib-2.1.jar
- jdom-1.0.jar

3.3.2. Uninstall Instructions

- Delete the installed folder.

[Note] There is no uninstaller.

3.3.3. File Structure

This software is comprised of two programs: Hozo Ontology Editor ver.5 (OE5) and Model Editor ver.4 (ME4). The contents of the files and folders are as follows.

File / Folder Name	Description
oe5.jar	Ontology Editor executable file (jar file)
oe5.bat	AppleScript file for launching under Macintosh environments
me5.bat	Explanations of tools (text version)
data3	Settings file for Model Editor
LocalStorage	Settings file for Ontology Editor
ServerStorage	Ontology Editor manual (HTML file)
lib	Stores libraries required by tools
manual	Folder for managing server projects (contains samples)
hozo.properties	Folder for managing local projects (contains samples)
me4.properties	Folder for storing data. Also contains sample data
readme_jp.txt	Batch file for launching Model Editor
oe5.scpt	Batch file for launching Ontology Editor

3.4. Starting the Software

3.4.1. Starting the Ontology Editor

<Windows>

- Execute "oe5.bat", located in the tool folder.
[\[Note\] If you are unable to start the software, please check your Java Runtime Environment version. Please see chapter 5 for directions on checking your Runtime Environment version.](#)

<Mac OS X>

- In Macintosh environments (Mac OS X or higher), place the package folder on the desktop and use the AppleScript file to execute the program.

Alternatively, move to the decompressed folder (see 1.4.1.) in the terminal, and execute the following command:

```
> java -cp lib/commons-httpclient.jar:lib/commons-logging.jar:lib/jdom-1.0.jar:lib/Jakarta-slide-webdavlib-2.1.jar:oe5.jar hozo.oe.OntologyEditorHZ
```

[Attention] Do not insert line breaks when entering this command.

*If the Initial Setup Dialog is displayed in the center of the screen, you have succeeded in starting the program.

Various settings can be performed in the Initial Setup Dialog, and the program can be set to launch in the following usage modes.

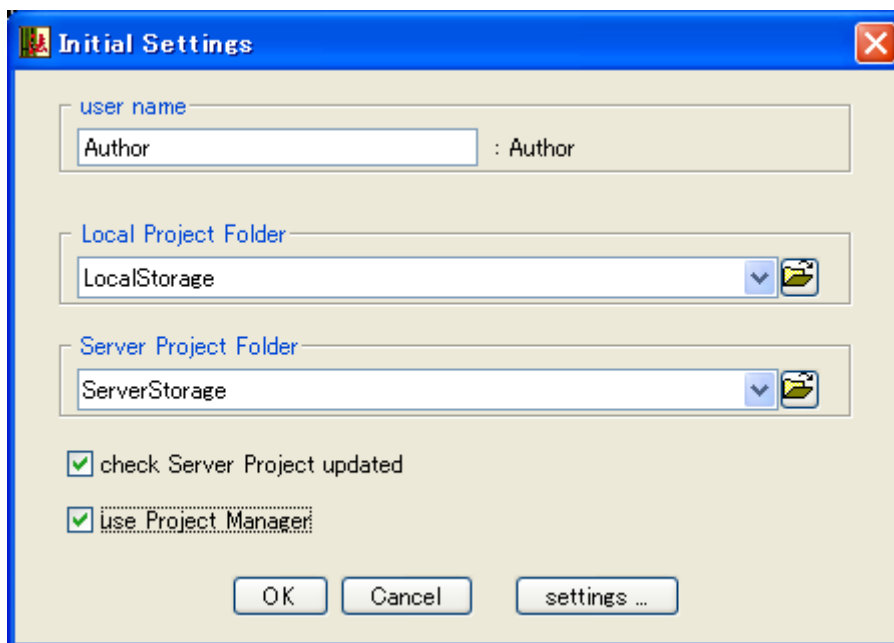


Figure 3-3. Initial Setup (Dialog)

- The initial setup dialog, shown in Fig. 3-3, will be displayed in the center of the window at startup. If this is the first time the program has been started, the default username will be "Author". Follow the dialog's instructions, and change the username to something other than "Author".

*As of now, usernames are not managed on the server; if identical usernames are used, they will be handled as the same user. Please take appropriate measures, such as using mail addresses for usernames, to assure that usernames are not duplicated among users.

[Attention] These characters cannot be used in usernames: \ / : * ? " < > | _

- Click OK to display the Ontology Editing screen.

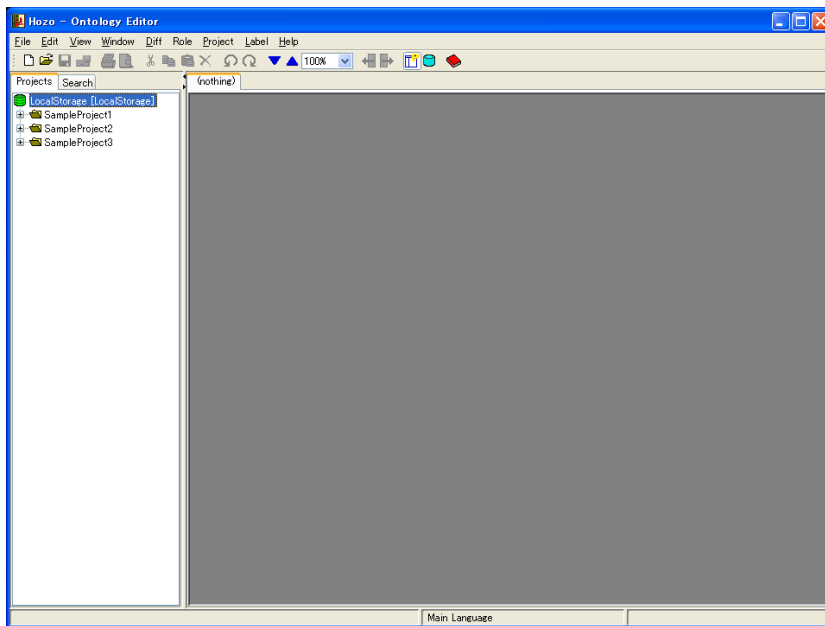
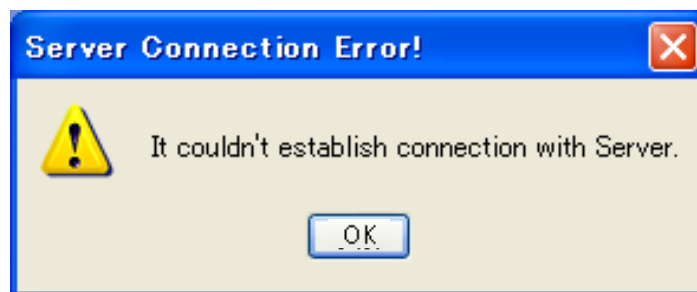


Figure 3-4. Ontology Editor Editing Screen

*The below error message will be displayed if no connection can be made with the server. If this happens, please try changing the project folder settings or network (WebDAV) settings (See chapter 4.3.6).



(1) Initial Setup Dialog

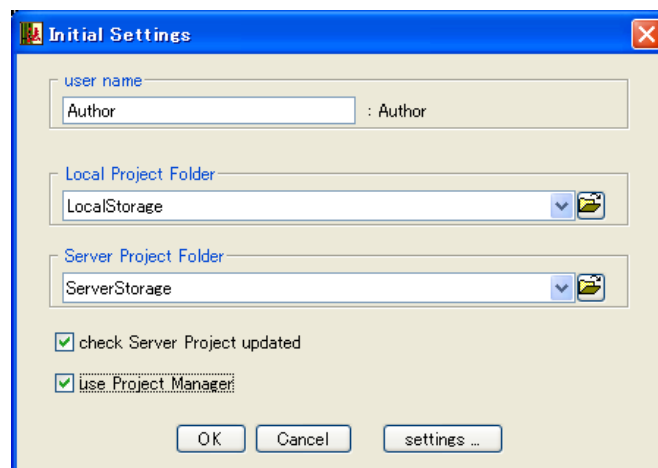


Figure 3-4. Initial Setup Dialog

- The below settings can be performed with the Initial Setup Dialog.

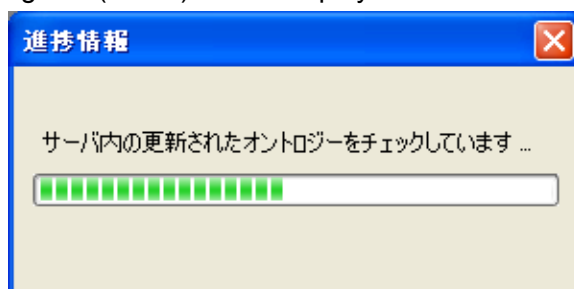
- ① Change username
- ② Change referent local project folder
- ③ Change referent server project folder
- ④ Enable/disable checking for server updates at startup
- ⑤ Select whether or not to use project management features
- ⑥ Network settings

[Reference] Please see chapter 4.3.6 Tool settings for instructions on performing the above settings.

(2) Checking for server updates

- In order to confirm if there are Ontology updates on the Ontology Server each time the Ontology Editor is started, check the "Connect to server to check for updates" box in the Initial Setup Dialog and click OK. The startup process will take several tens of seconds to several minutes. If the box is unchecked, Ontology Editor will not check for updates.

A progress dialog box (below) will be displayed when checking for updates.



(3) Starting without using project management features

(Use the same interface as the previous version of Ontology Editor)

- To start the Ontology Editor as in previous versions, without the Project Management Pane, uncheck the "Use project management features" box in the Initial Setup Dialog and click OK.

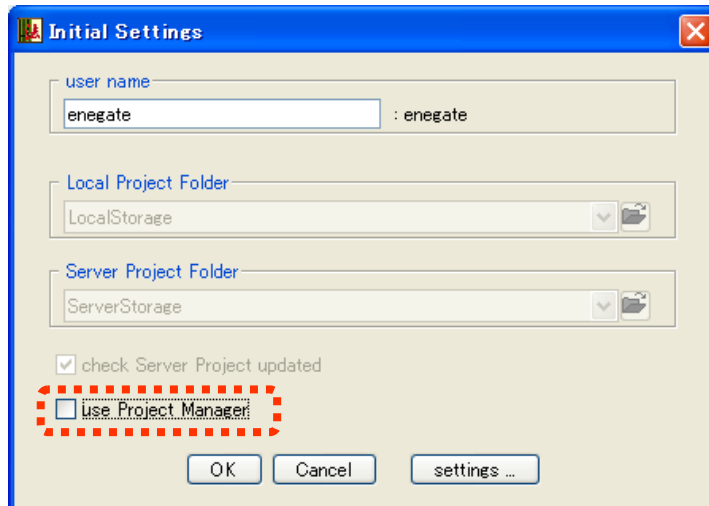


Figure 3-5. Initial Setup Dialog (disabled project management)

- You can edit the Ontology Editor without using project management features, as shown in the below editing screen image.

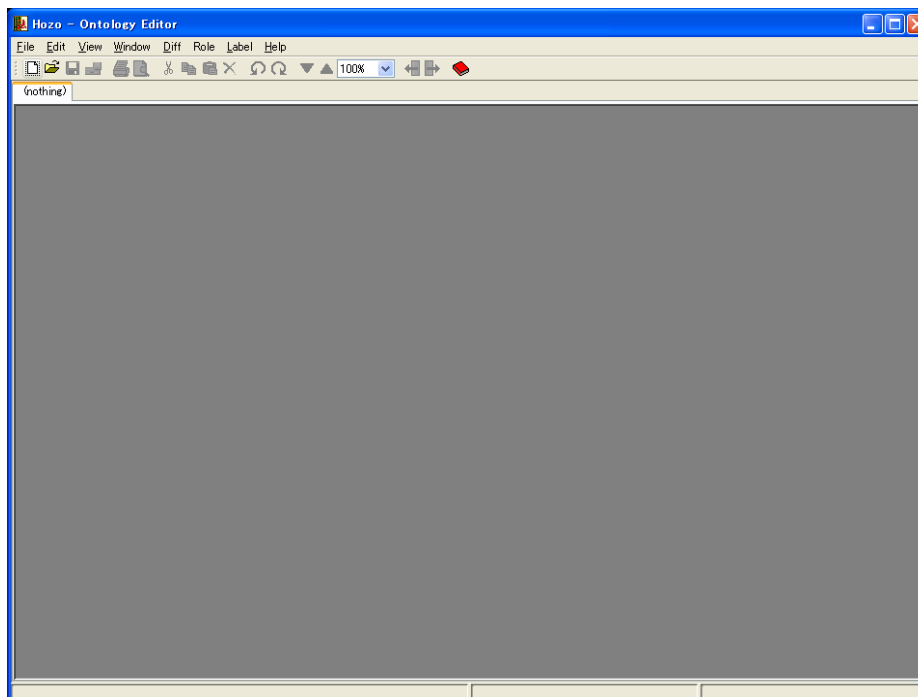


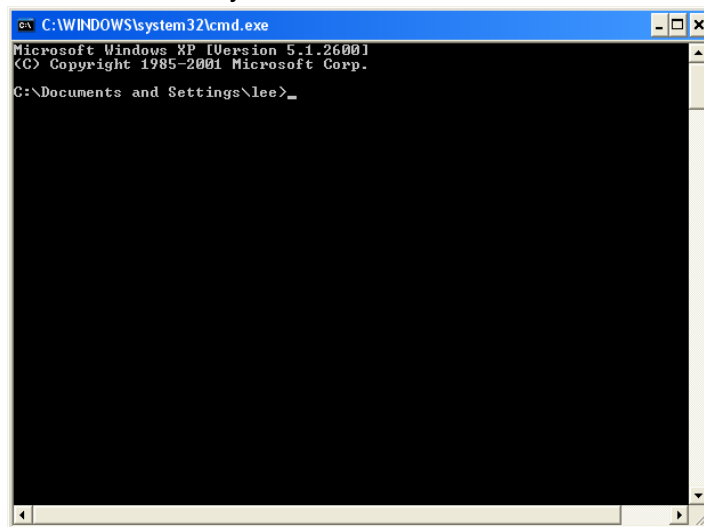
Figure 3-6. Editing screen without project management features

(4) Checking your Java Runtime Environment version

- With regards to start-up errors, if you are unable to start the software as described in chapter 1.5, please check your Java Runtime Environment version. Follow the below instructions.

<Windows>

- (1) Open a command prompt.
- (2) Type "java -version" (without quotes) and press enter to display the version of Java Runtime Environment currently installed.



- (3) If the installed version of Java is older than the one recommended (JRE/JDK 1.5.0_10 or higher), uninstall it and install a version of Java that will allow you to run the tools.

3.4.2. Closing the editor

- Select [File]-[Close] in the menu bar, or click the [x] on the upper right hand corner of the screen. The below dialog will be displayed. Click the [Yes] button to close the editor.

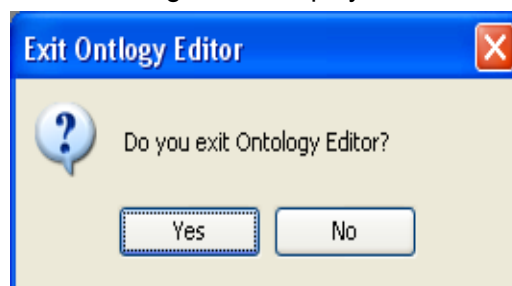


Figure 3-8. Dialog that appears when closing the Editor

4. Operation instructions

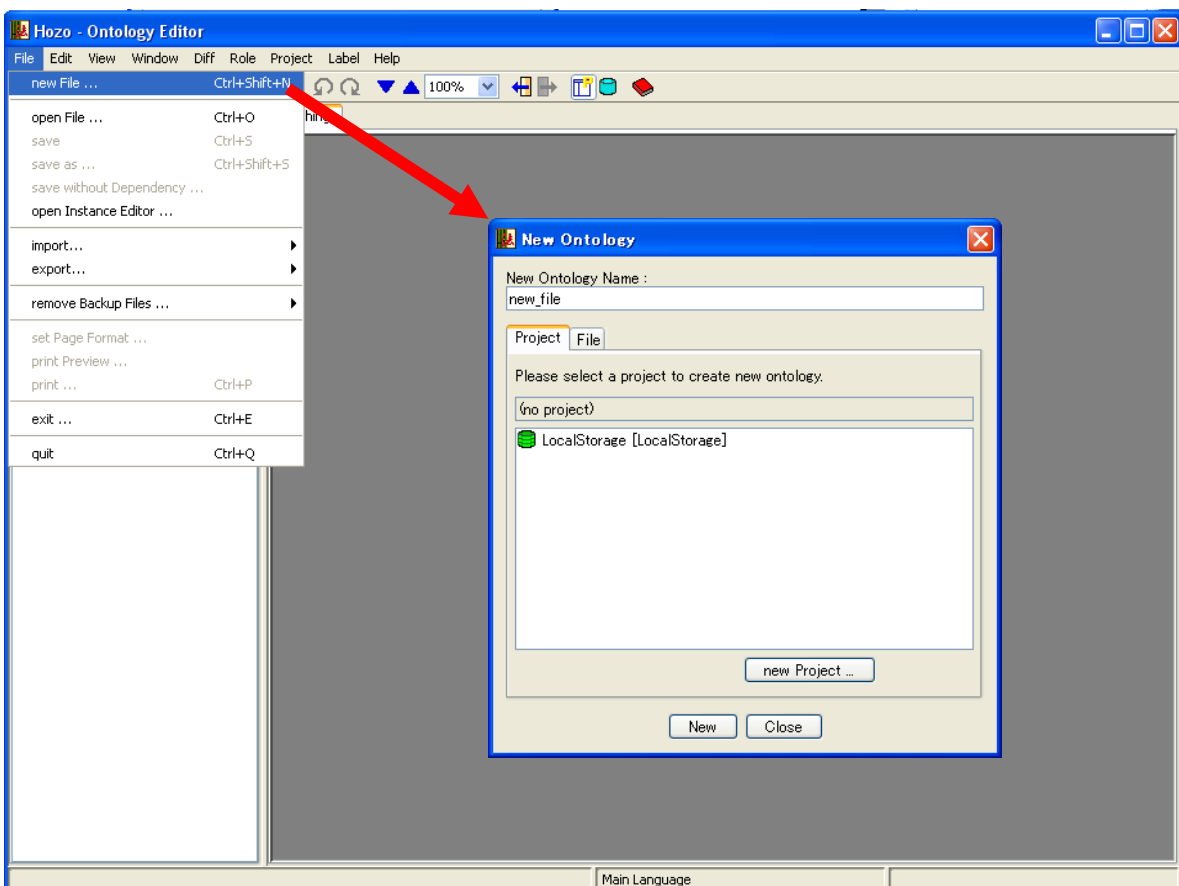
4.1. Editing Ontologies

This section will explain the basic editing functions of the Ontology Editor.

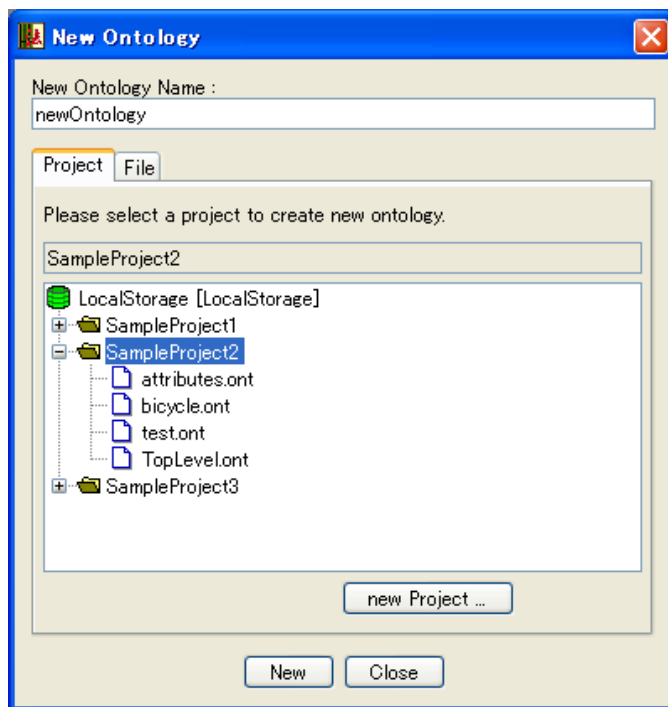
4.1.1. Creating a new ontology

(1) Creating a new ontology (project)

- Select [File]-[Create new...] in the menu bar. The "Create new Ontology" dialog will be displayed.

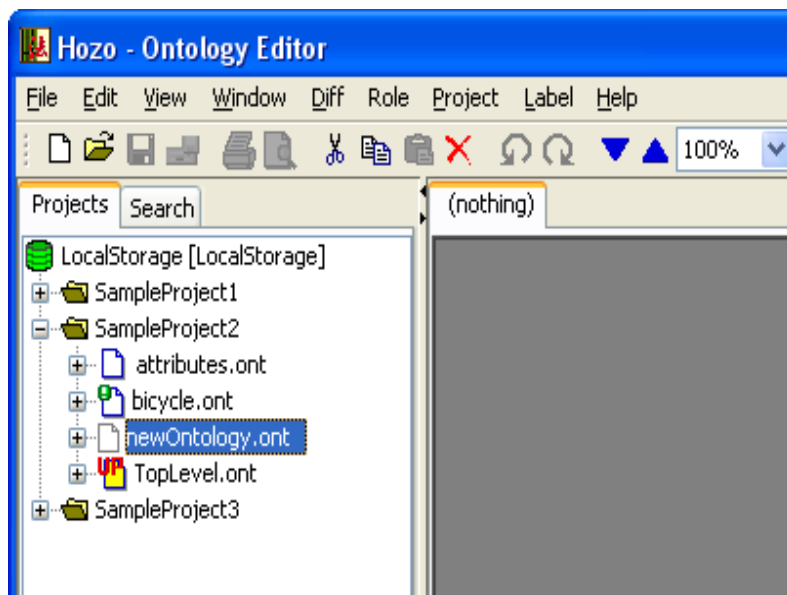


- Enter a name for the ontology file in the "New Ontology Name" text box.
- Next, select the project in which the new ontology will be created from the project folders in the [Project] tab.



- Click the [New] button on the bottom of the dialog to create the ontology file in the project.

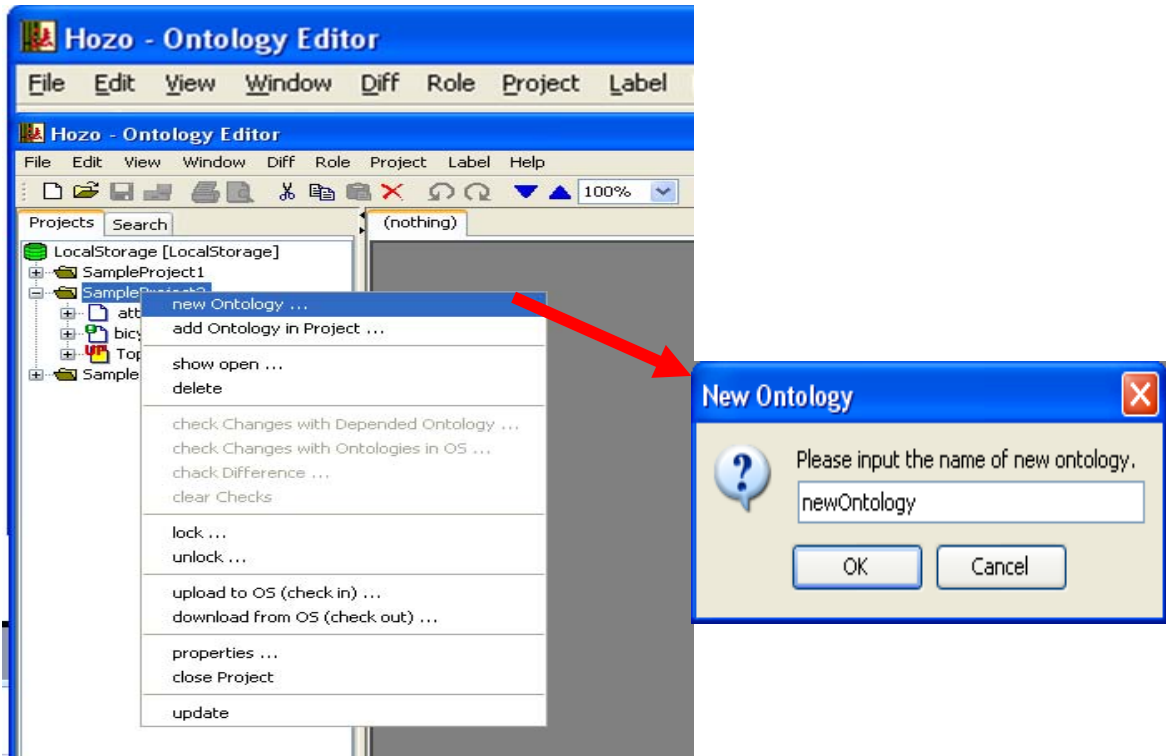
*When creating a project Ontology file, its file extension will be ".ont".



*New projects can be created by right clicking the Project Management Tree and selecting "Create new project..." from the right-click menu. (Refer to chapter 4.2.2 of this manual)

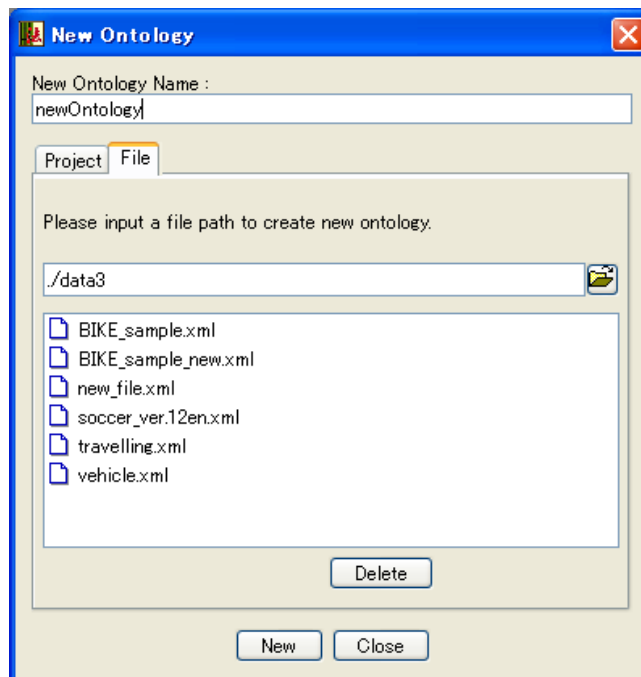
*The same operation can be performed by right clicking the project name on the Project

Management Tree and selecting [Create new...] from the right-click menu.



(2) Creating a new Ontology (file)

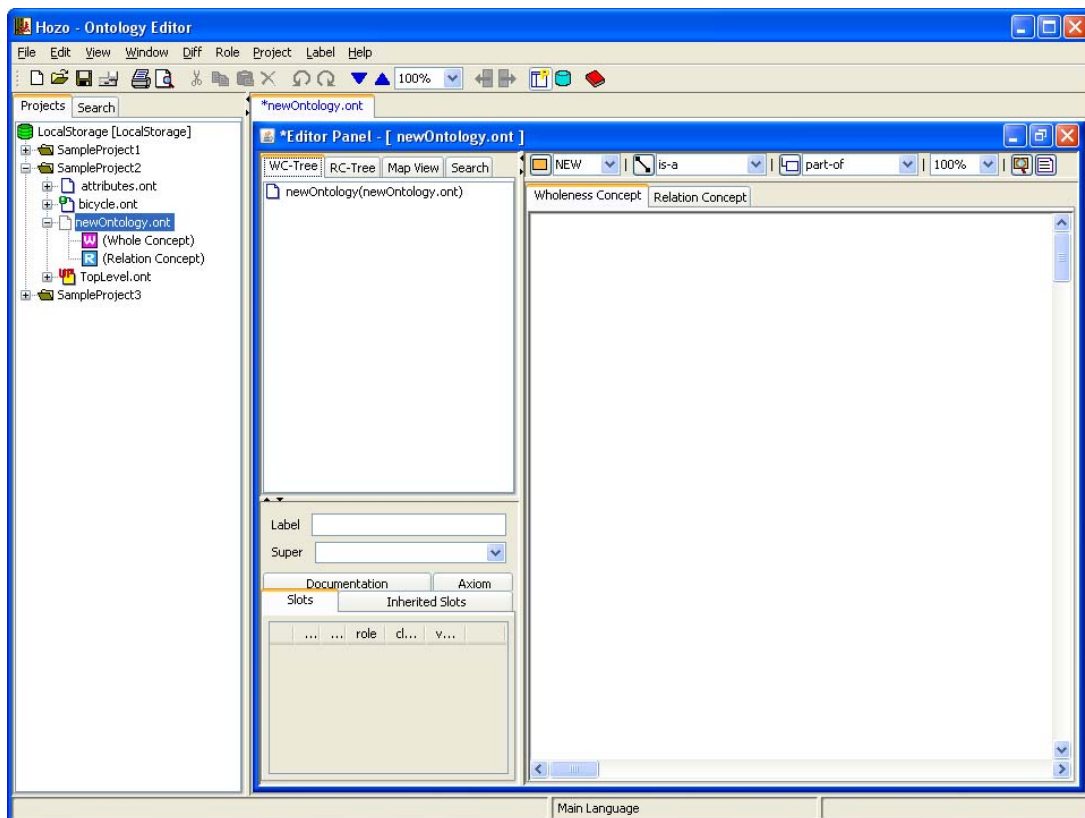
- Open the "Create New Ontology" dialog as in (1).
- Select the [File] tab to view the list displaying the default Ontology folder, and the existing Ontology files in that folder.



-
- Click the [New] button on the bottom of the dialog to create an Ontology file in the folder.

*When creating a single Ontology file, its file extension will be ".xml".

Single Ontology files are not managed by the project.



*Ontology files can be deleted by clicking the [Delete] button in the [File] tab of the "Create New Ontology" dialog. (Refer to chapter 4.2.2)

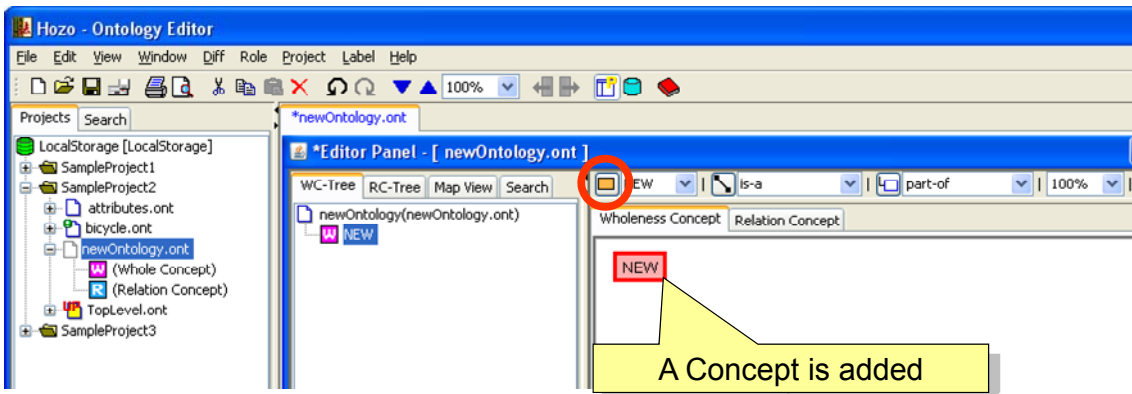
*Multiple files having the same filename cannot be created in the same folder or one project (an error message will be displayed).

4.1.2. Editing Ontologies

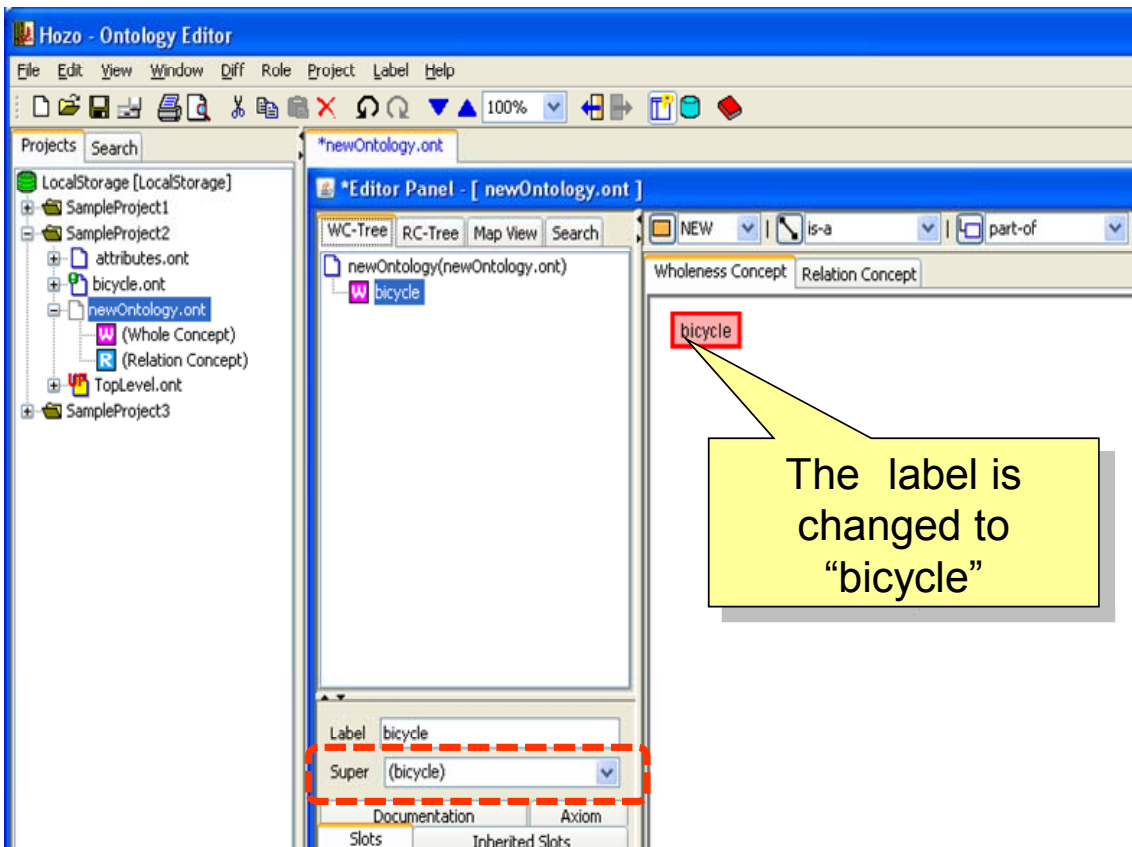
Clicking graphic objects (nodes, slots, links) on the browsing panel will select them, after which they can be edited.

(1) Adding a concept (concept class)

- Click the [NEW Concept] button on the Ontology Editing Tool Bar to add a node (i.e. concept) to the concepts displayed in the Browsing Pane.

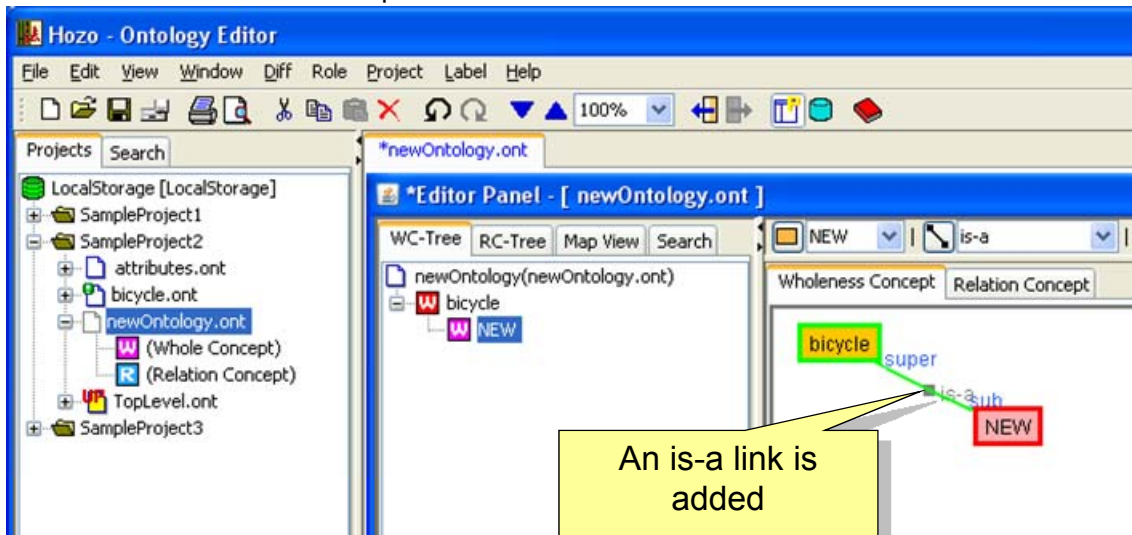


- To change the concept's label, edit the Label field displayed in the Definition Pane on the bottom left of the Editing Panel.

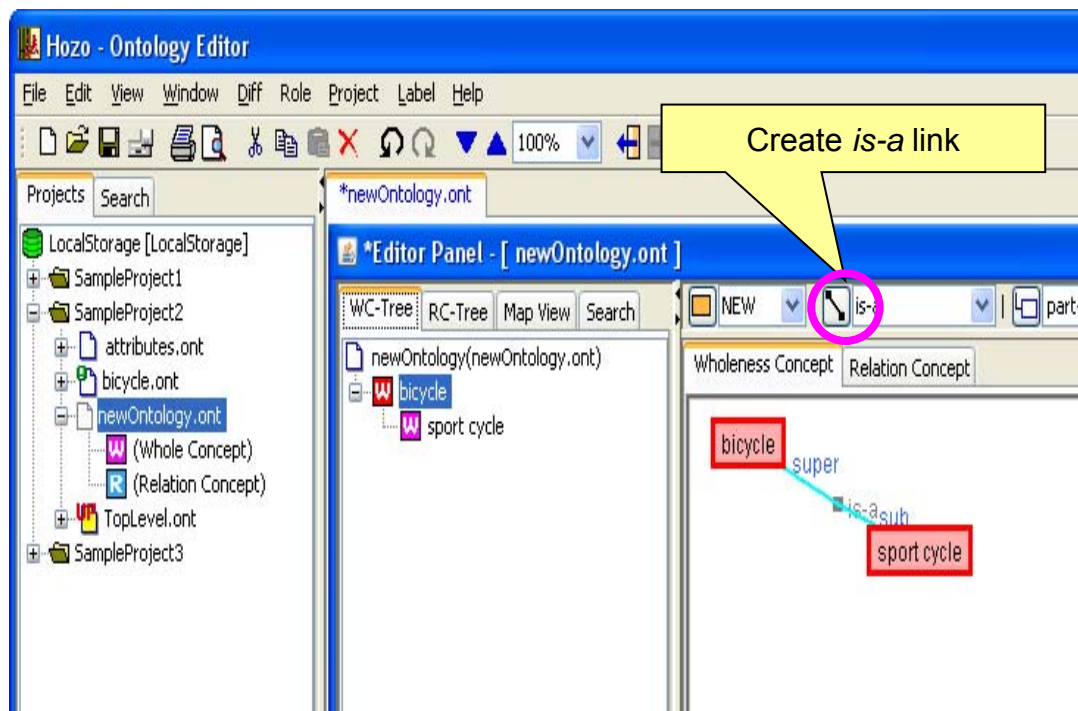


(2) Creating an is-a hierarchy (creating sub concepts)

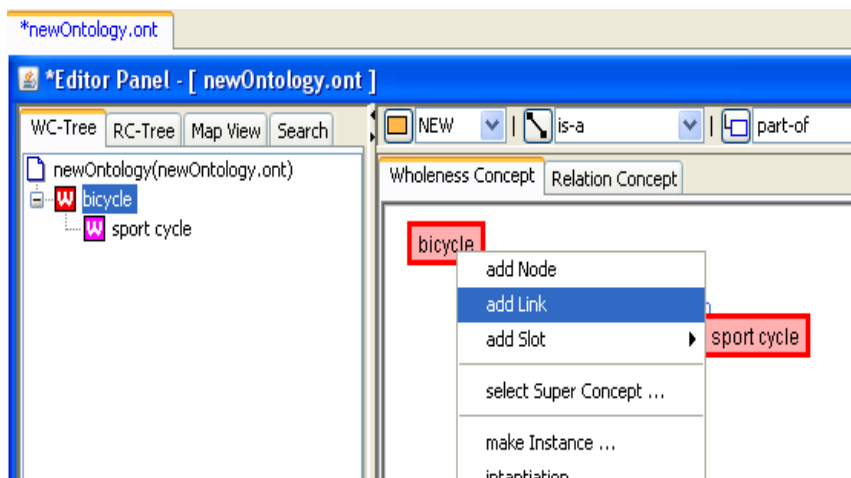
- If a concept is added as described above while an existing concept is selected, an is-a link will be added between it and the selected concept ("bicycle" in the below figure) to indicate an is-a relationship exists.



- To create is-a links between previously defined concepts, click the relevant concepts while holding the Shift key, clicking the super concept first and the sub concept second, then click the "Create Link" button.

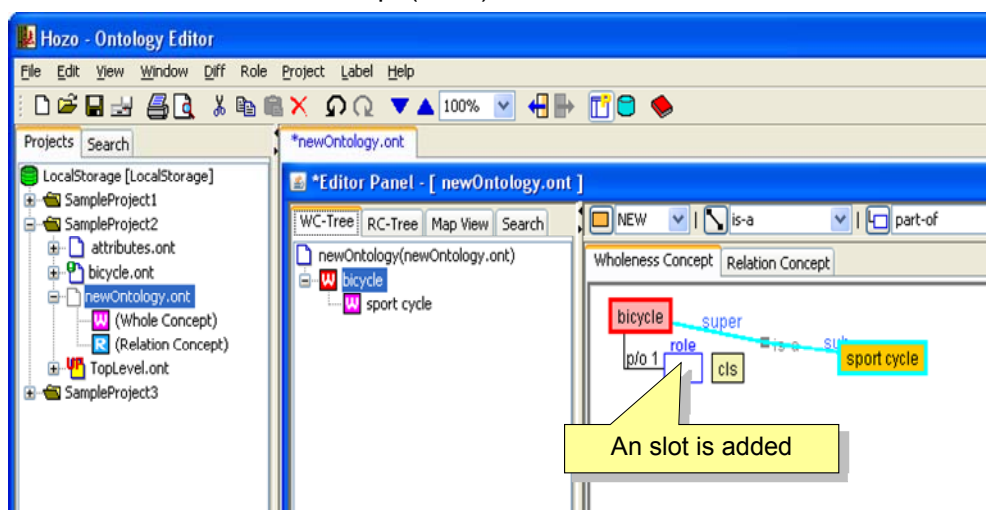


*The same operation can be performed from the right-click menu after selecting the concepts.



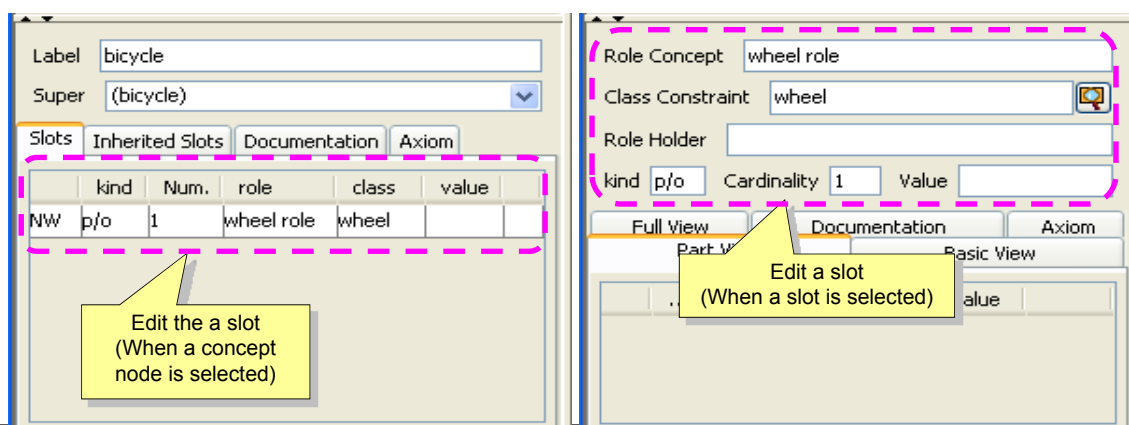
(3) Creating slots

- Select a concept (node) and click the [Add Slot] button on the Ontology Editing Tool Bar to add a slot to the selected concept (node).



*The same operation can be performed from the right-click menu after selecting the concept (node).

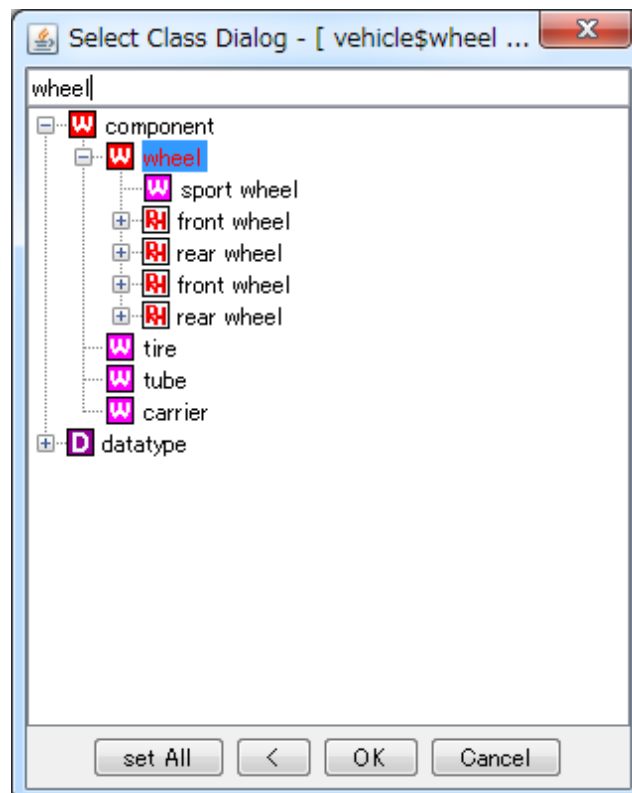
- To change the slot's definition, edit the Label field displayed in the Definition Pane on the bottom left of the editing panel.



- Editing of the slot's definition can be performed when either the concept node or slot is selected. The below content can be edited.

- Role concept
- Class constraint
- Role holder
- Class (part-of, attribute-of)
- Quantity constraint (cardinality)
- Constraint value

*In regards to class constraints, the existing concept tree can be displayed, selected and edited by clicking the [Select Class Constraint] button on the right side of the text box when an existing concept is selected (text editing is also possible).

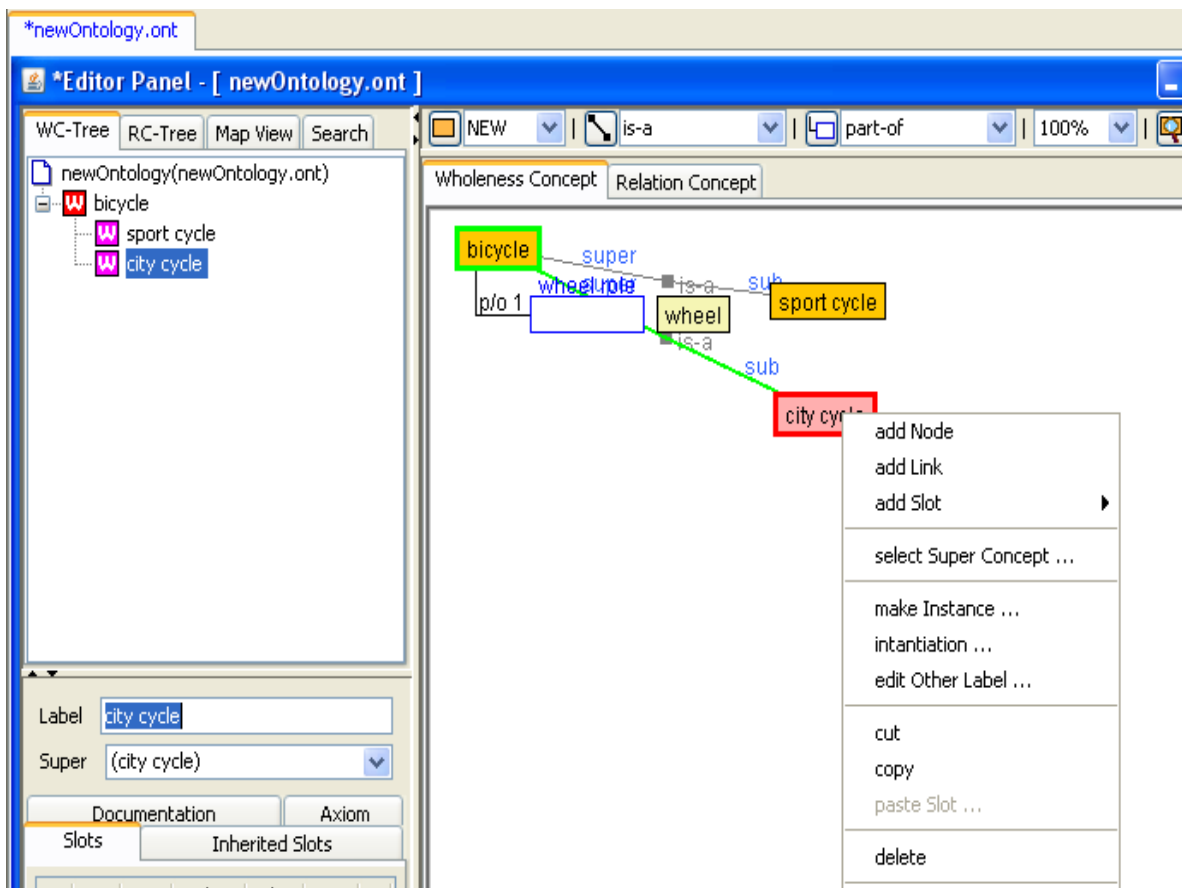


(4) Deleting objects

- Objects can be deleted by selecting concept nodes, slots, and relationships and selecting [Delete] from the right-click menu.

*The same operation can be performed with the [Delete] button on the Menu Bar, Ontology Operation Tool Bar/Editing Tool Bar.

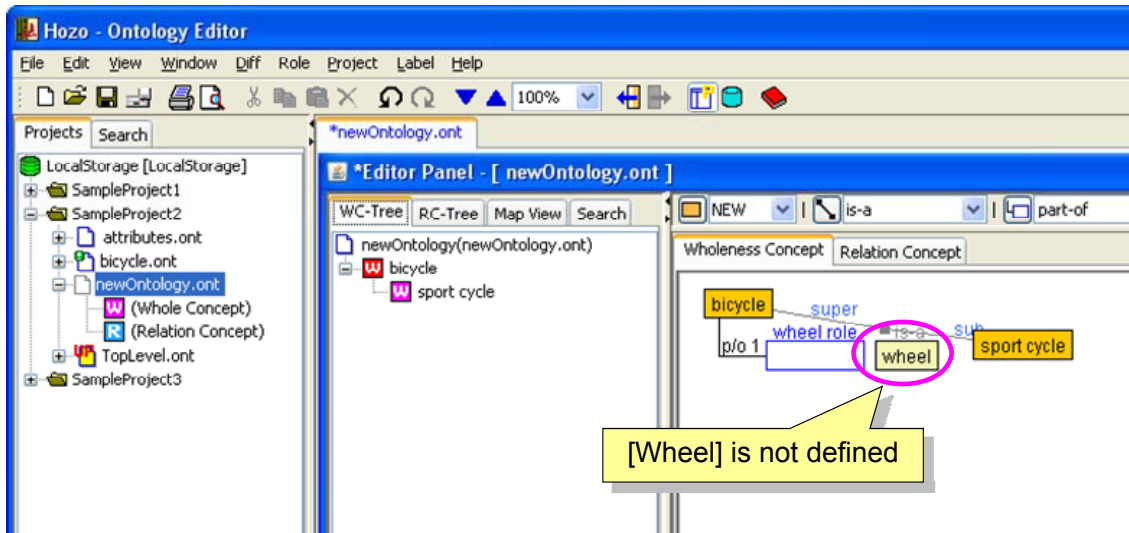
- Multiple objects can be selected then deleted by holding the Shift key while clicking.



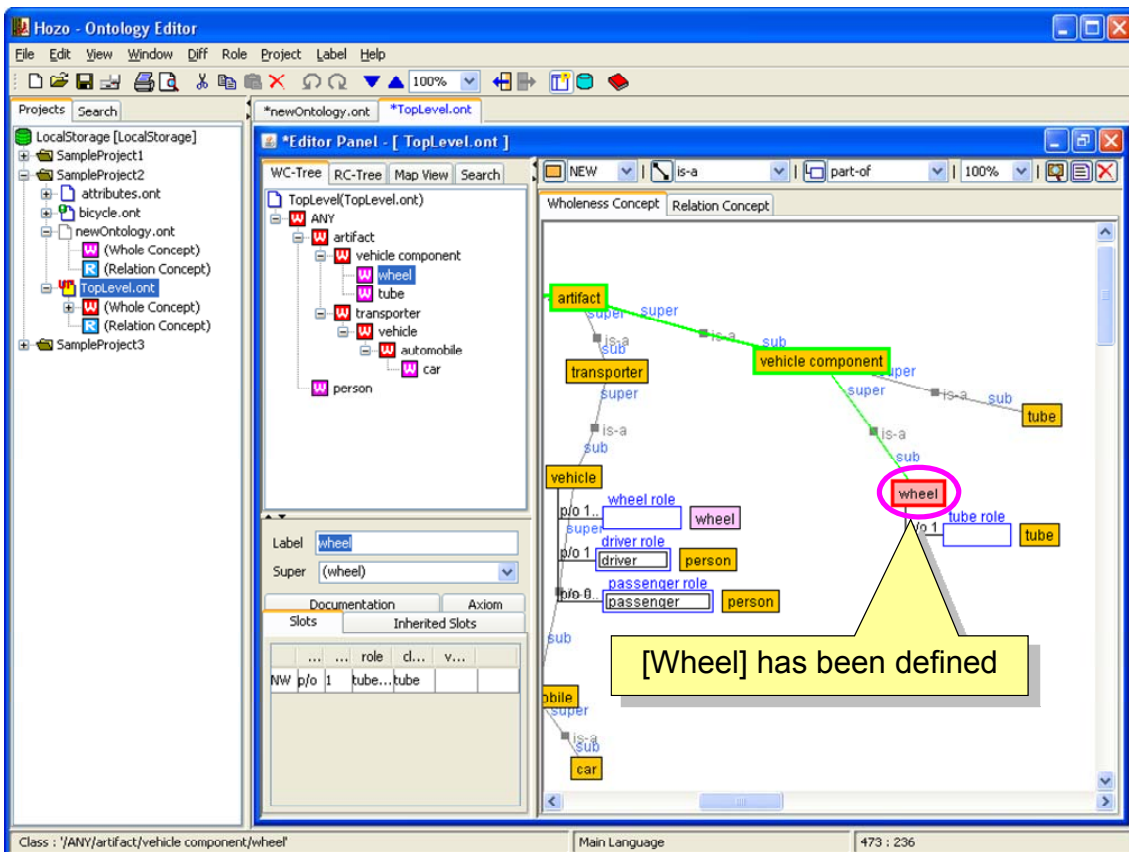
4.1.3. Creating Ontology dependency relationships

It is possible to reference concepts defined in other Ontologies in the project.

Ex.) Below, the concept "wheel" is undefined, but it is defined in another Ontology.

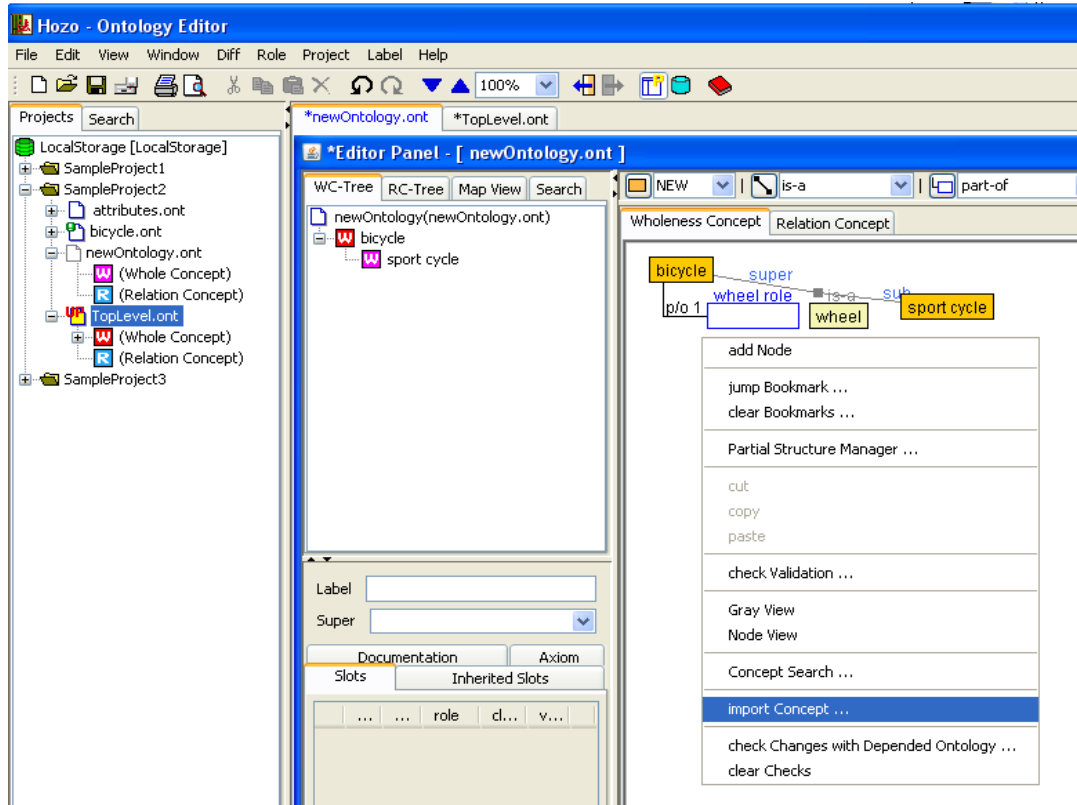


The concept "wheel" is defined in "TopLevel.ont".



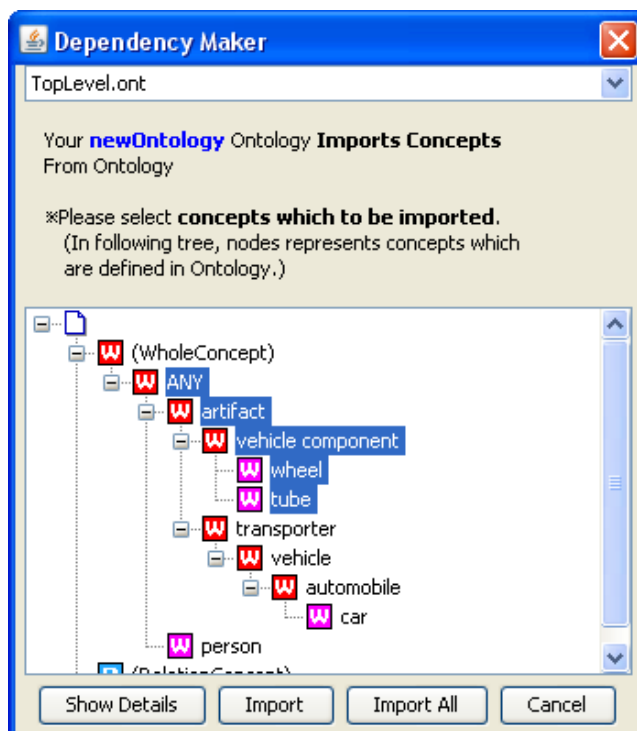
[Operating instructions]

- Without selecting anything, right-click in the Browsing Pane of the referencing Ontology (newOntology.ont) to display the right-click menu, and select "Import concept".



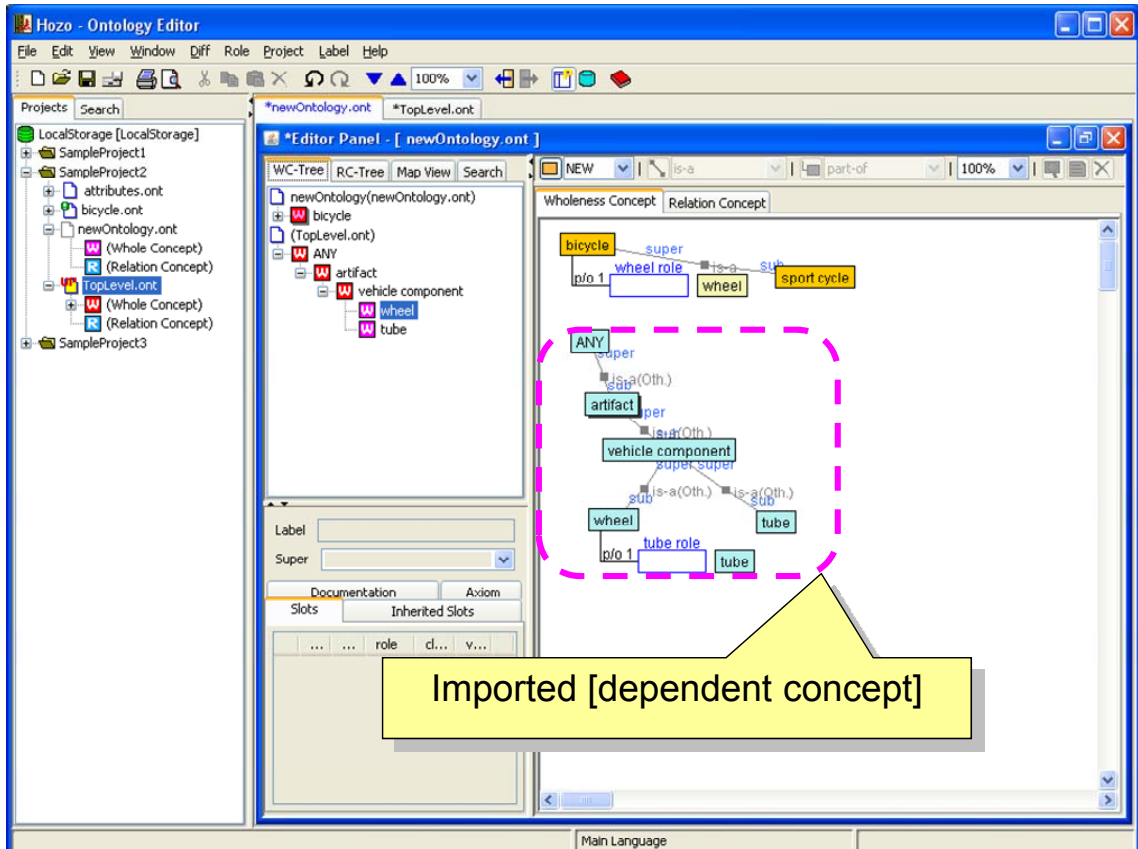
- The Import Concept Dialog will be displayed.

Select the Ontology to be referenced from the list, and select the concept to be imported.



*When a concept is selected to be imported, concepts necessary to that concept will be selected and imported at the same time.

- When the “Import” button on the bottom of the dialog is clicked, the selected concepts will be imported.



*After importing, the imported concepts will be in a selected state. The node arrangement will also be moved, so the user should manually rearrange it, or use the layout feature (select Menu Bar: [Display]-[Layout]).

[Attention] Unlike regular concepts, imported concepts will be displayed in light blue.

However, as they are references only, they cannot be edited in the referencing Ontology.

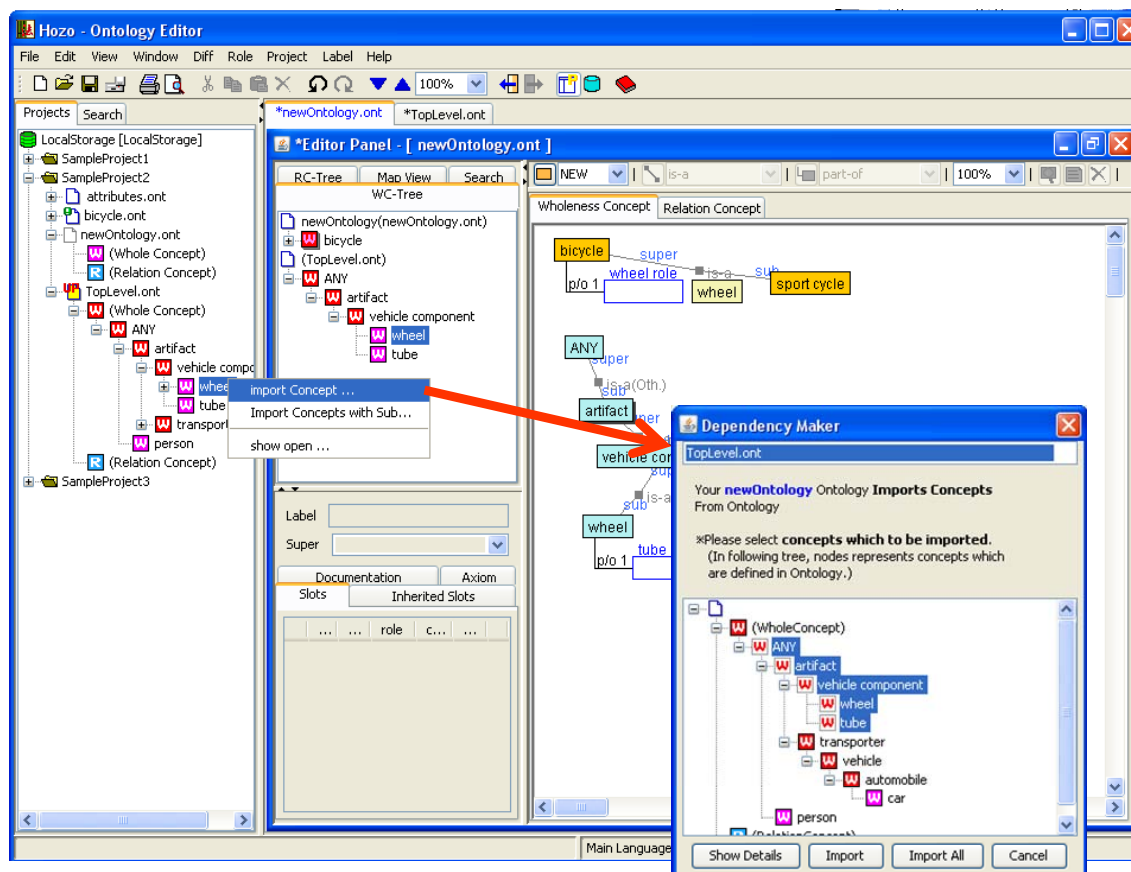
*Importing to the Ontology being edited can also be performed from the right-click menu by selecting the Ontology to be referenced in the Project Management Tree, and right-clicking it.

[Operating instructions]

- Open the Ontology that is importing (referencing) a concept in the Editing Panel. (Refer to chapter 4.1.5)
- Select the Ontology concept to be referenced in the Project Management Tree, bring up the right-click menu, and select "Import Concept".
- The Import Concept Dialog will be displayed.

Select the Ontology to be referenced from the list, and select the concept to be imported.

*Only the Ontologies to be imported will be displayed in the list.




4.1.4. Saving Ontologies

(1) Save

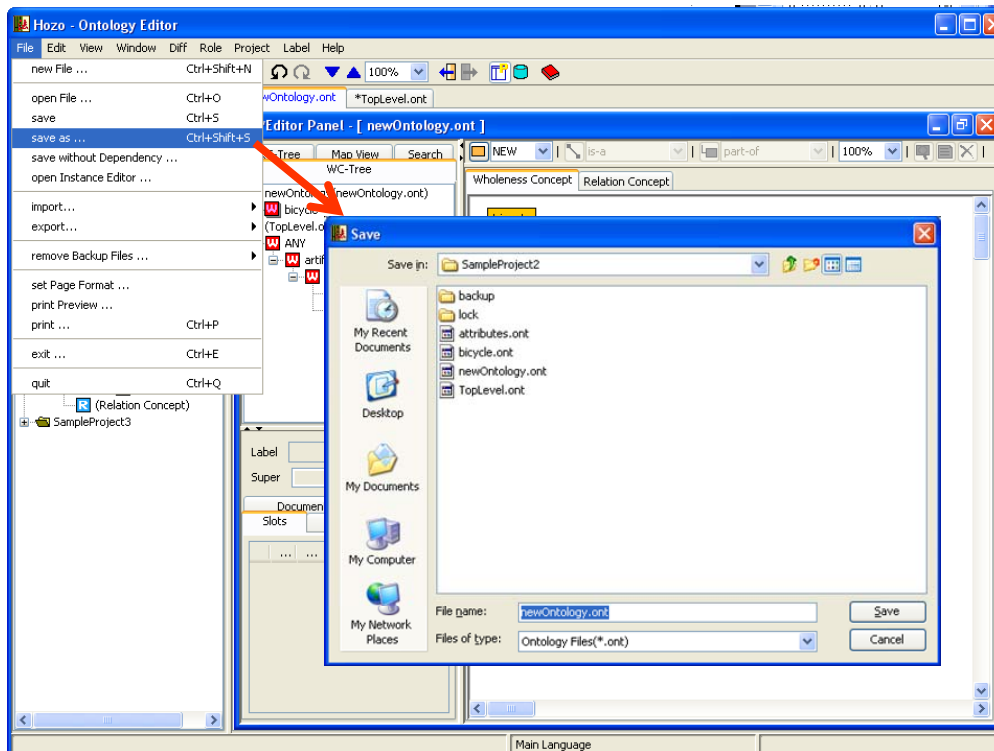
- To save, overwriting the existing file, select [File]-[Save] in the menu bar.

(No confirmation dialog will be displayed)

- When an Ontology file is saved, the icon in the Project Management Tree shows the local update status ().

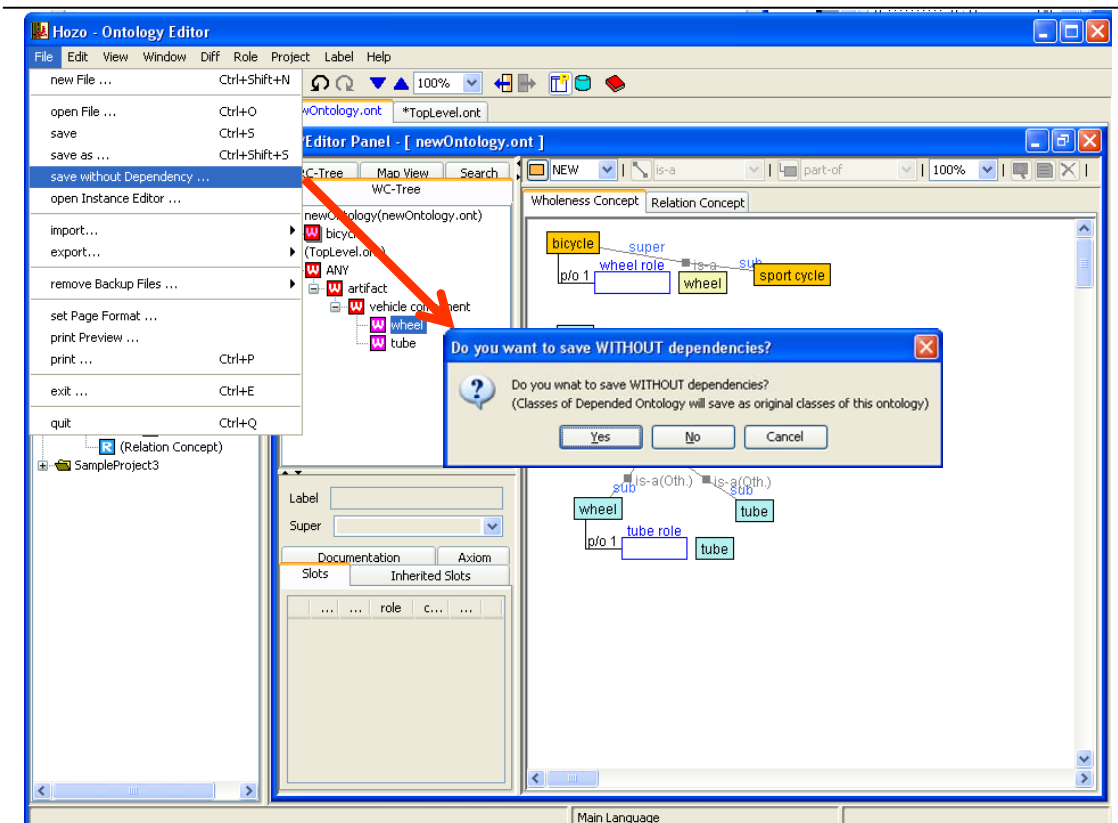
(2) Save as...

- When [File]-[Save as...] is selected in the menu bar, the file selection dialog is displayed.
- Enter a filename and click the [Open] button to save to a new Ontology file.

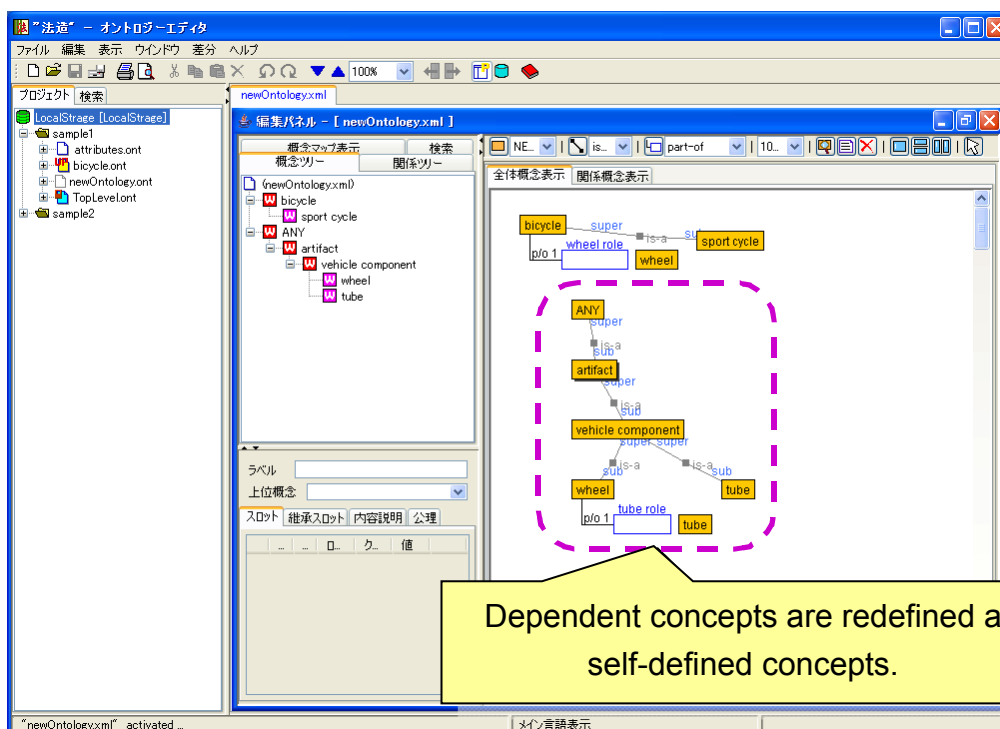


(3) Save without dependency relationships

- Select [File]-[Save without dependency relationships] in the menu bar and click [Yes] on the confirmation dialog; the file selection dialog is displayed as in (2).
- Enter a filename and click the [Open] button to save to a new Ontology file (file extension: .xml).



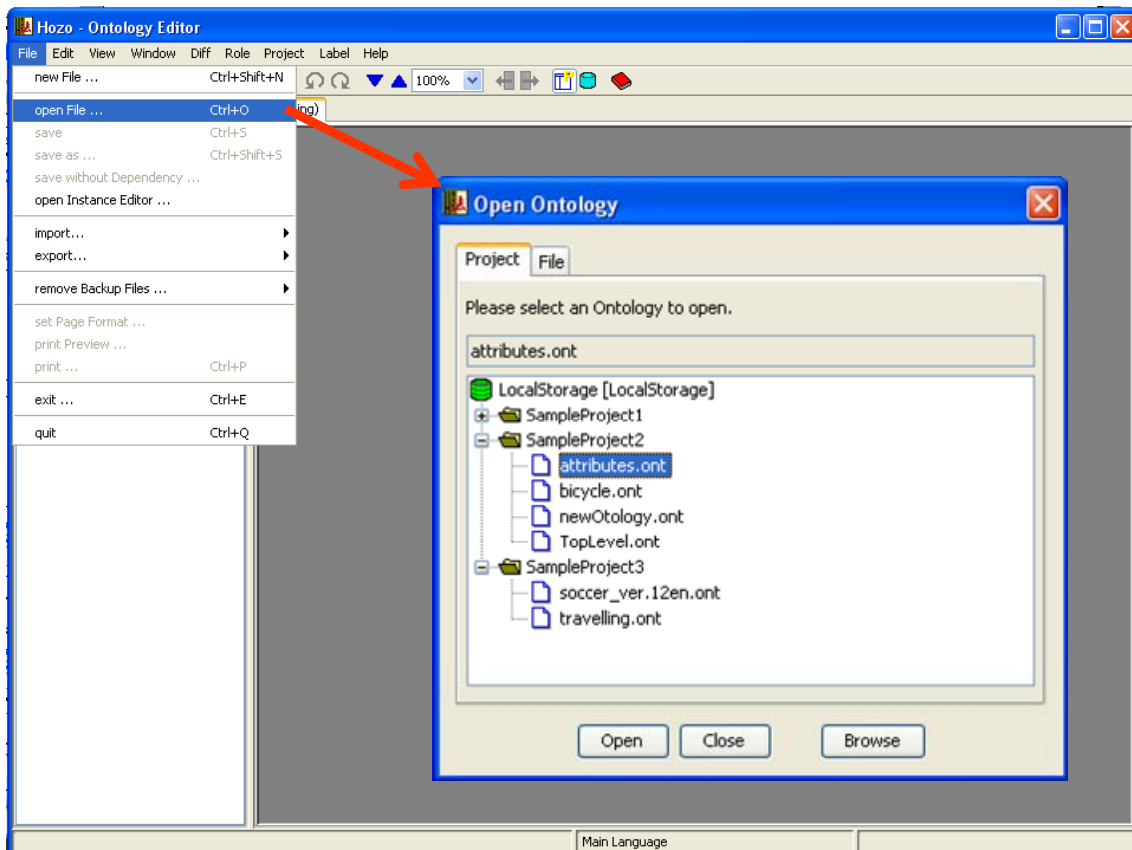
*Ontologies in the project will be saved as a single Ontology file. After saving, the Ontologies will be standalone Ontologies and Ontology files; moreover they will have no dependency relationships and be redefined as self-defined concepts.



4.1.5. Loading Ontologies

(1) Loading and exiting an Ontology (project)

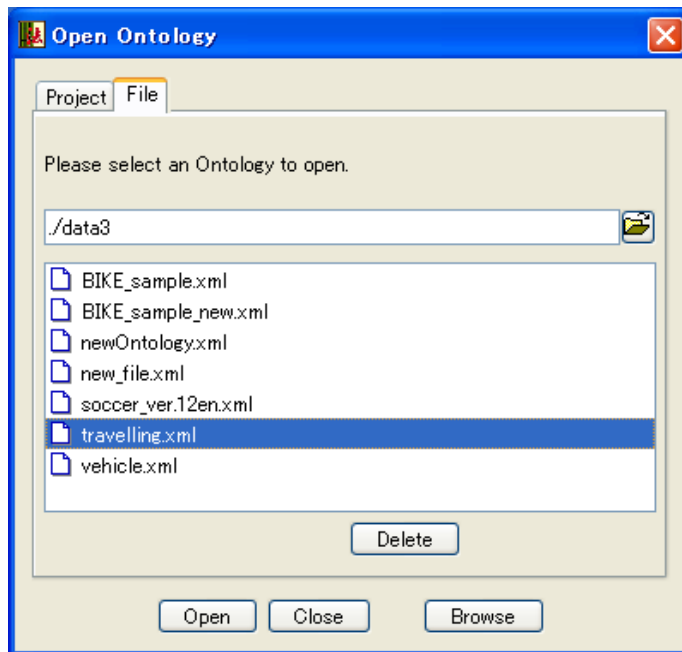
- Select [File]-[Open] in the menu bar to display the "Open Ontology" dialog.



- Select the Ontology to be displayed from the project folders on the [Project] tab.
- Click the [Open] button at the bottom of the dialog to open a new editing panel and display the Ontology.
- *The Ontology can be displayed in a separate window by clicking the [Browse] button at the bottom of the dialog (editing not possible).
- *Double click the Ontology file icon in the Project Management Tree, or select [Open] from the right click menu to perform the same operation.

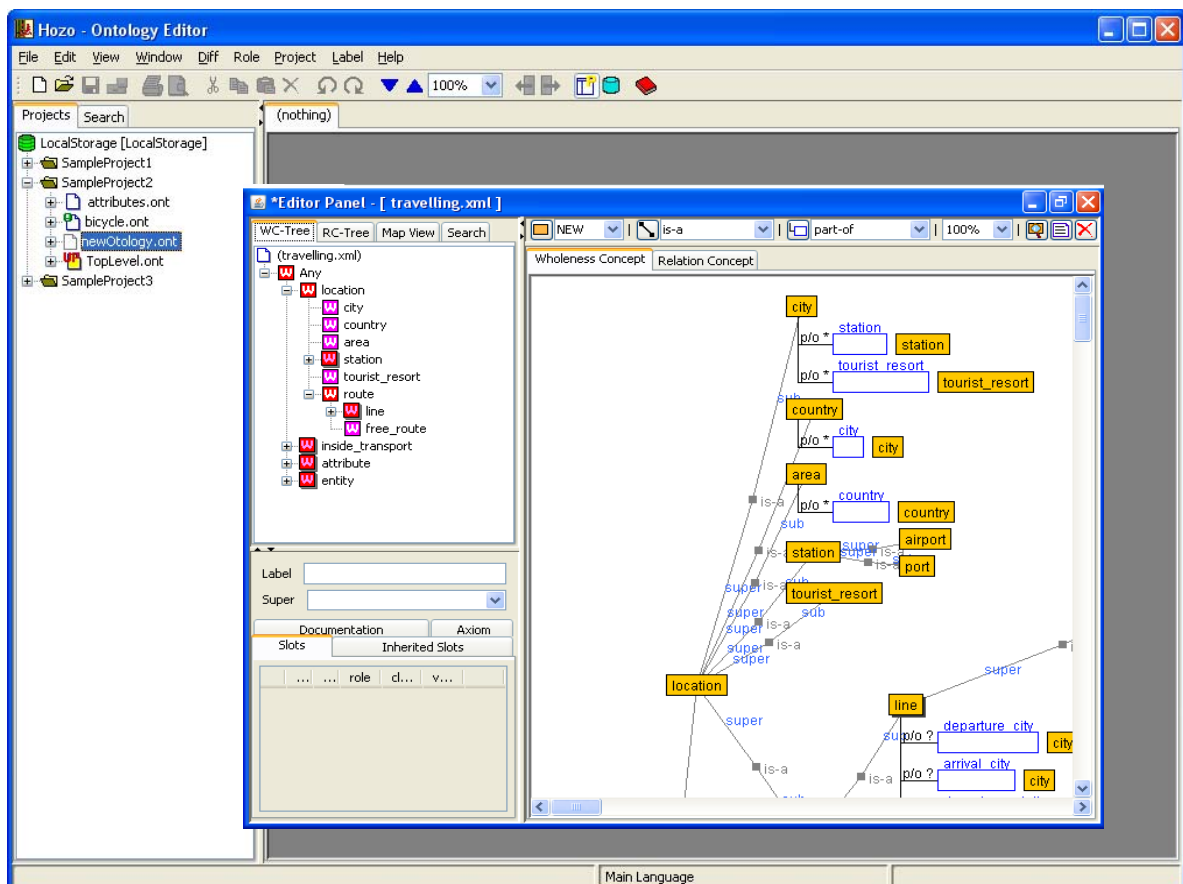
(2) Loading and exiting an Ontology (file)

- Open the "Open Ontology" dialog as in (1).
- Select the [File] tab to view the list displaying the default Ontology folder, and the existing Ontology files in that folder.



- Click the [Open] button at the bottom of the dialog to open a new editing panel and display the Ontology.

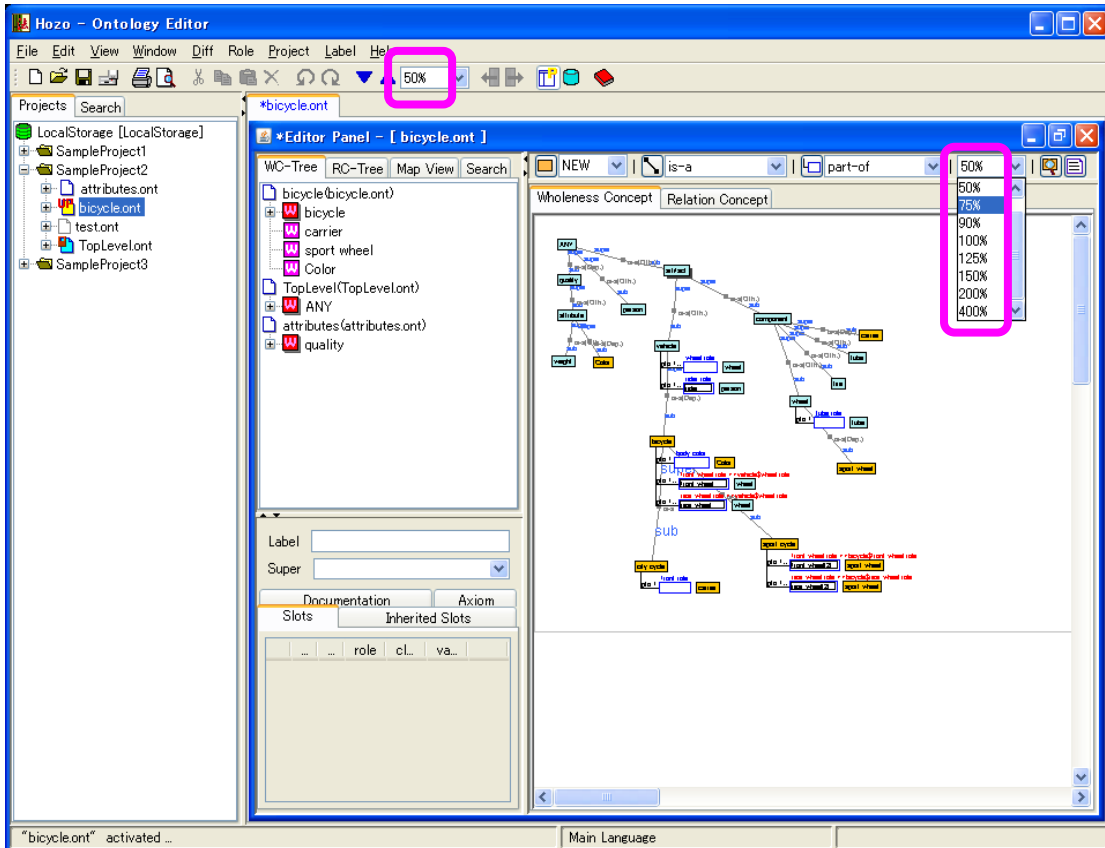
- *The Ontology can be displayed in a separate window by clicking the [Browse] button at the bottom of the dialog (editing not possible).



4.1.6. Other features

(1) Zoom in/out

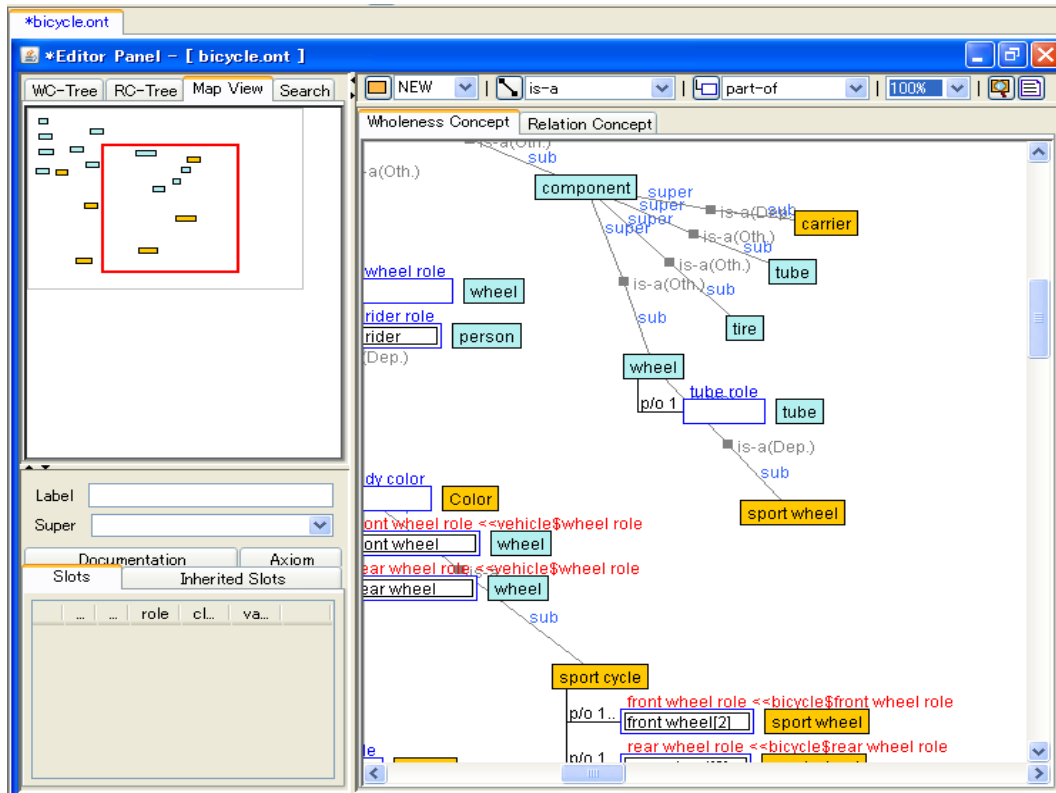
- The Browsing Pane magnification can be changed by selecting the magnification rate in the combo box on the Ontology Operation Tool Bar, or the Editing Tool Bar.



- *By clicking the [▲] [▼] buttons on the left side of the magnification list in the Ontology Operation Tool Bar, the next higher (or lower) magnification can be selected, zooming in or out on the pane.

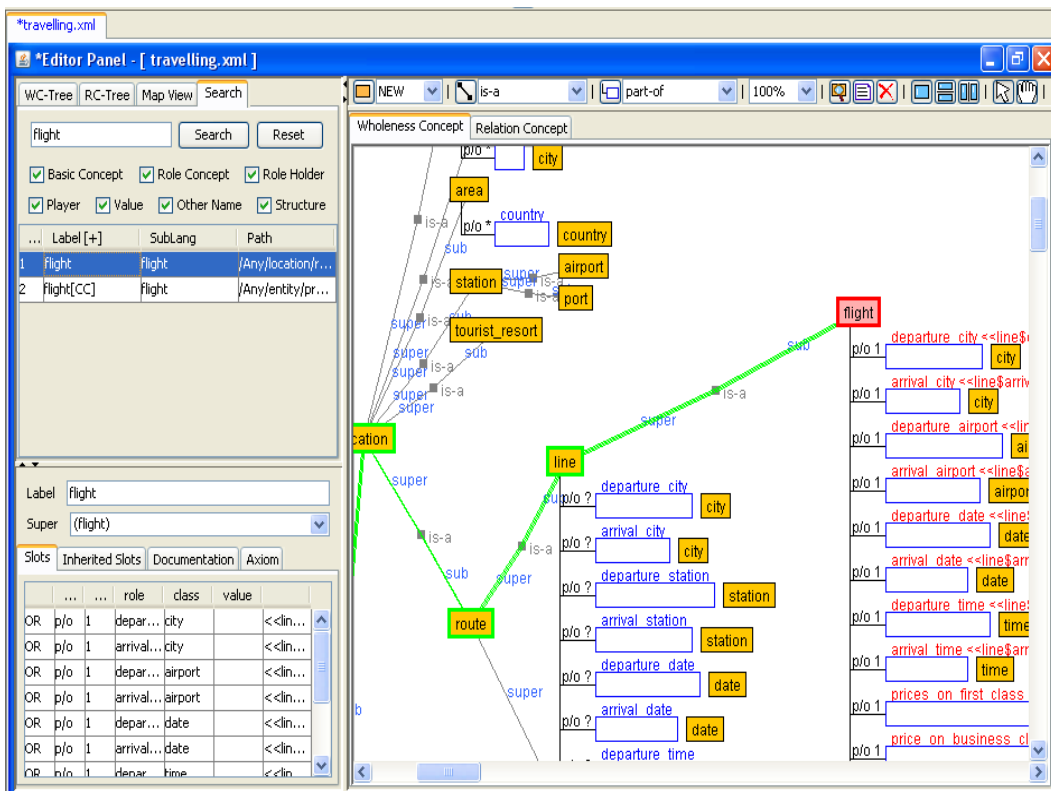
(2) Display concept map

- If the concept map display (Map) tab is selected in the Navigation Pane, a reduced view of the entire Ontology is shown, with a red frame indicating the area being displayed. If this frame is dragged, the area drew in the Browsing Pane will move correspondingly.
- Also, when toggling between Wholeness Concepts and Relational Concepts, the concept map view changes.



(3) Ontology search

- Displays the Search tab in the Navigation Pane. Enter text for the search criteria and click the [Search] button; search results will be displayed in a table on the lower part of the tab.



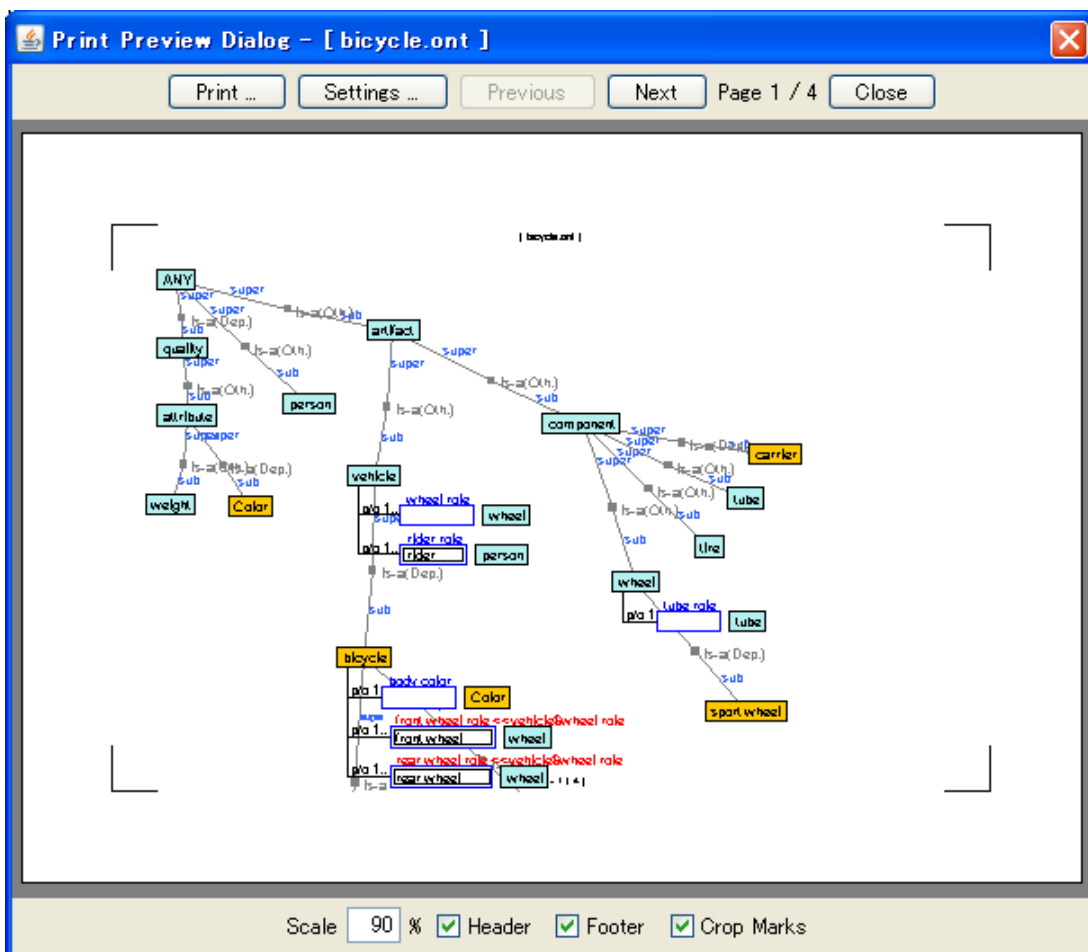
- Selecting a search result column will highlight the corresponding object.
- Objects that can be specified as search objectives are as follows.
 - ① Basic Concept, class
 - ② Role Concept, slot
 - ③ Role Holder
 - ④ Class constraint (Player)
 - ⑤ Value

[Attention] The scope of the search is the open Ontology (being edited) only.

[Reference] See 4.2 on project management features for more regarding searching Ontologies within a project.

(4) Printing

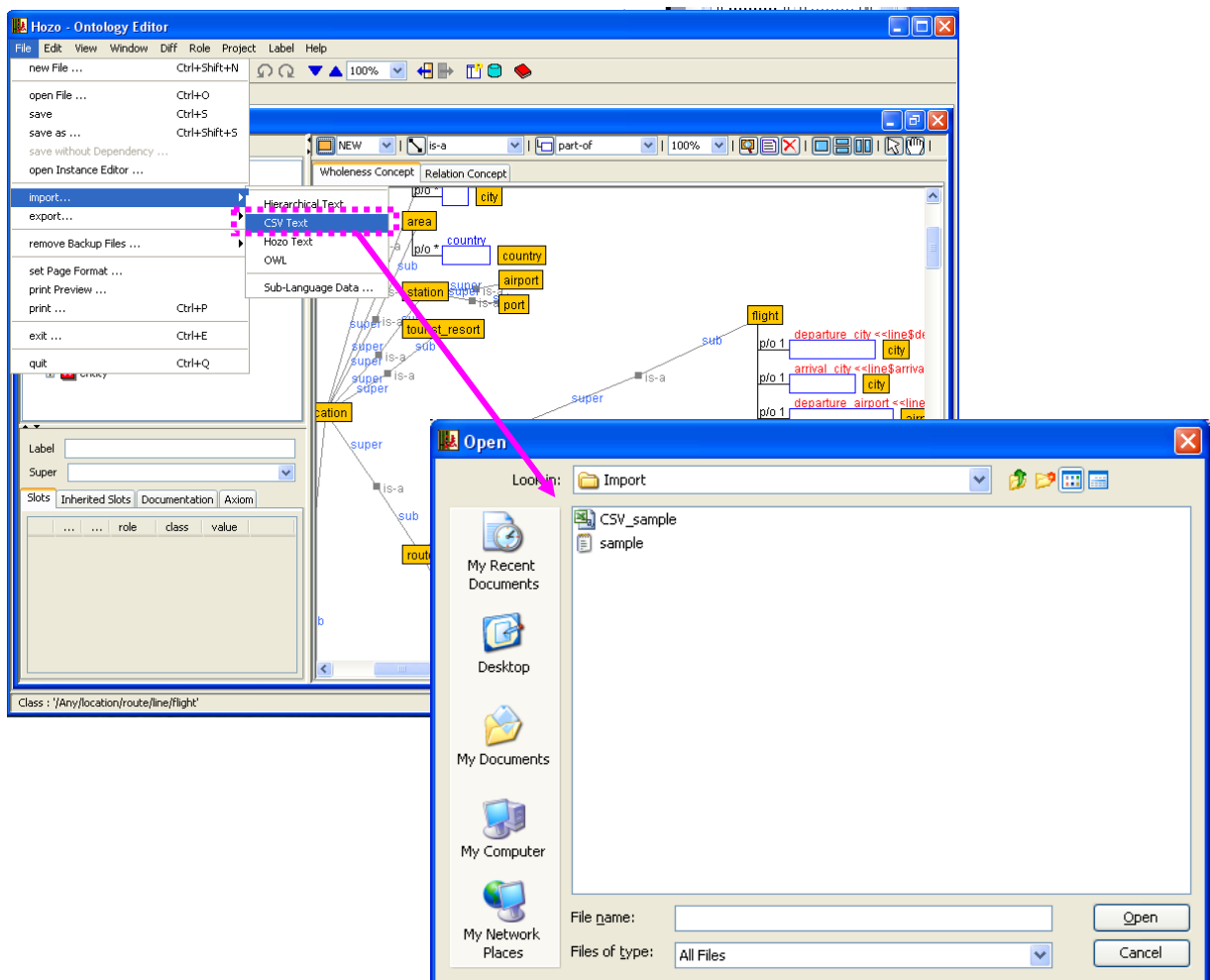
- Select [File]-[Print Preview...] in the menu bar, or click the [Print Preview...] button in the Ontology Operation Tool Bar, to open the print preview dialog.



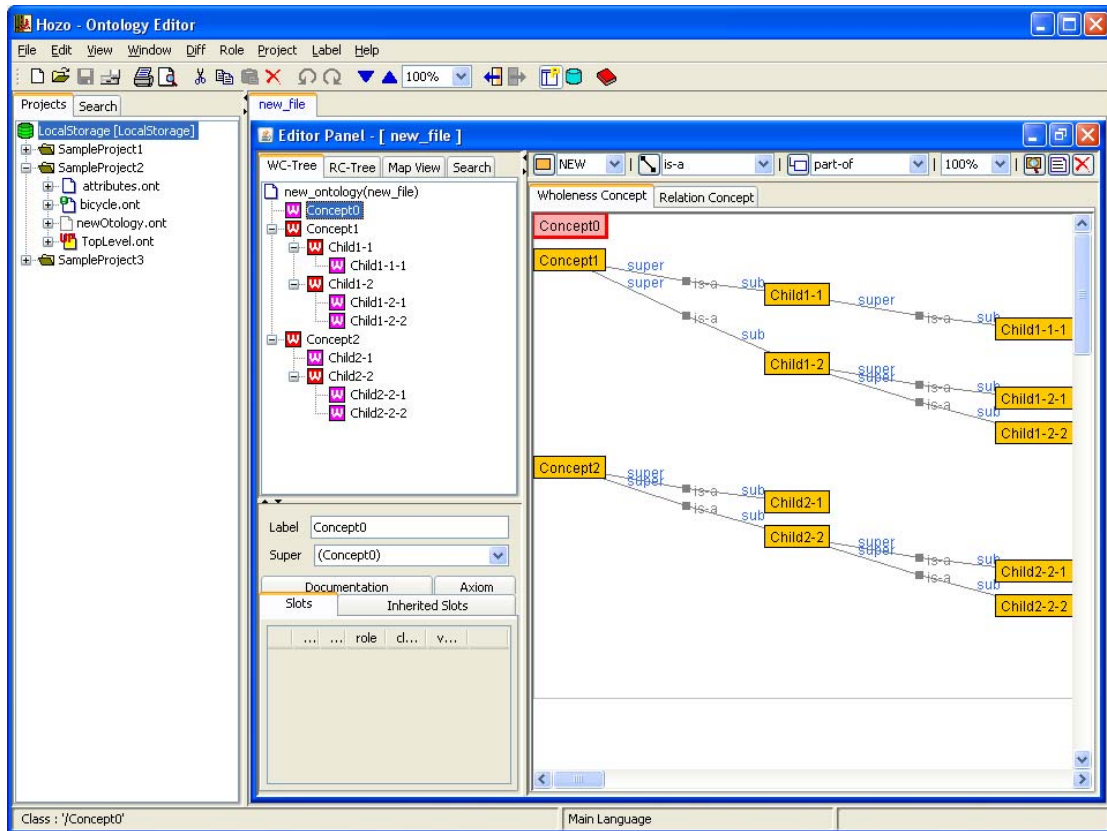
- These operations can be performed in the print preview dialog:
 - Confirmation of the printed image (use [Next] and [Prev] to navigate pages)
 - Set the magnification to be used when printing (Scale)
 - Enable/disable display of headers, footers and crop marks
 - Set printer paper size ([Settings] button)
- When the [Print] button on the upper part of the print preview dialog is clicked, the print dialog is displayed, and printing can be performed.

(5) Import

- An Ontology can be created automatically from an existing text file.
- Select [File]-[Import]-[Hierarchical Text] (CSV Text) in the menu bar to open the file selection dialog.



- Select a file and click the [Open] button to import it.



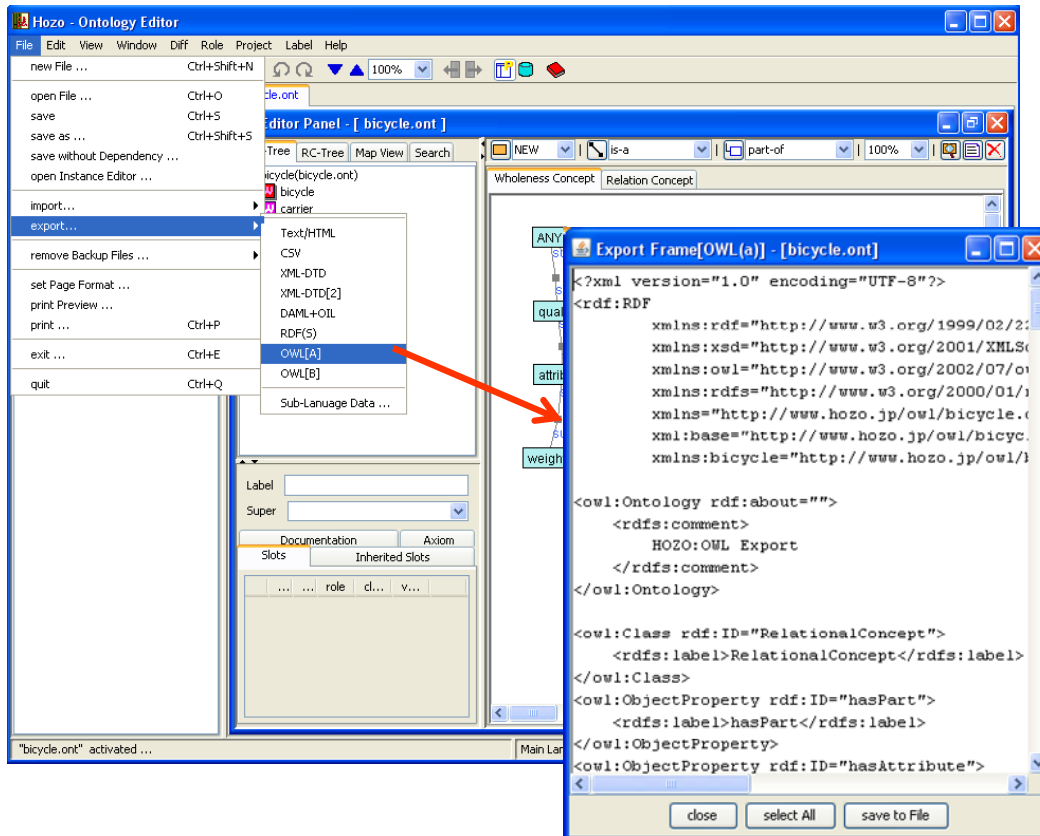
*The below formats are supported

- ① Hierarchical Text
- ② CSV Text
- ③ Hozo Text
- ④ OWL

Regarding description formats, please see the sample file in "(root folder)/data3/Import/".

(6) Export

- An Ontology file that is being edited can be output to a file with a different format.
- Select [File]-[Export]-[OWL] in the menu bar to open the file output window.



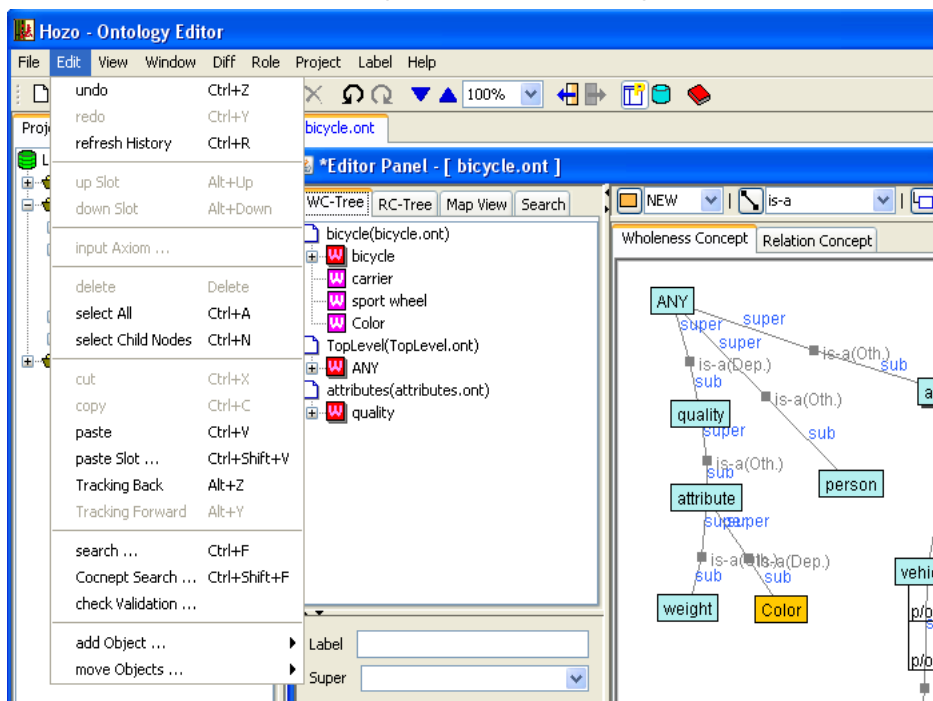
- Click the [Save File] button on the bottom of the output window to display the file selection dialog; choose a file and click the [Open] button to export the file.

*The below formats are supported

- Text / HTML
- XML-DTD
- DAML+OIL
- RDF(S)
- OWL

(7) Ontology editing operations

- Ontology editing operations can be found the menu bar ([Edit] menu), the Ontology Operations Tool Bar/Editing Tool Bar, and the right click menu of the Browsing Pane.



No	Menu item	Description	①	②	③	④
1	Undo	Performs the Undo operation	●	●		
2	Redo	Performs the Redo operation	●	●		
3	Refresh History	Clears the operation log	●			
4	Up slot	Raises slot by one position	●			●
5	Down slot	Lowers slot by one position	●			●
6	Input Axiom	<i>*This item is not used now.</i>	●		●	●
7	Delete	Deletes the selected graphic object	●	●	●	●
8	Select all	Selects all graphic objects on the Browsing Pane	●			
9	Select Child Nodes	Selects selected concept's sub concepts	●			
10	Cut	Cuts the selected graphic object	●	●		●
11	Copy	Copies the selected graphic object	●	●		●
12	Paste	Pastes the selected graphic object	●	●		●
13	Tracking back	Moves to the previous selected graphic object	●	●	●	
14	Tracking forward	Moves to the next selected graphic object	●	●	●	

Note) ①: Item located in Menu Bar

②: Item located in Ontology Operation Tool Bar

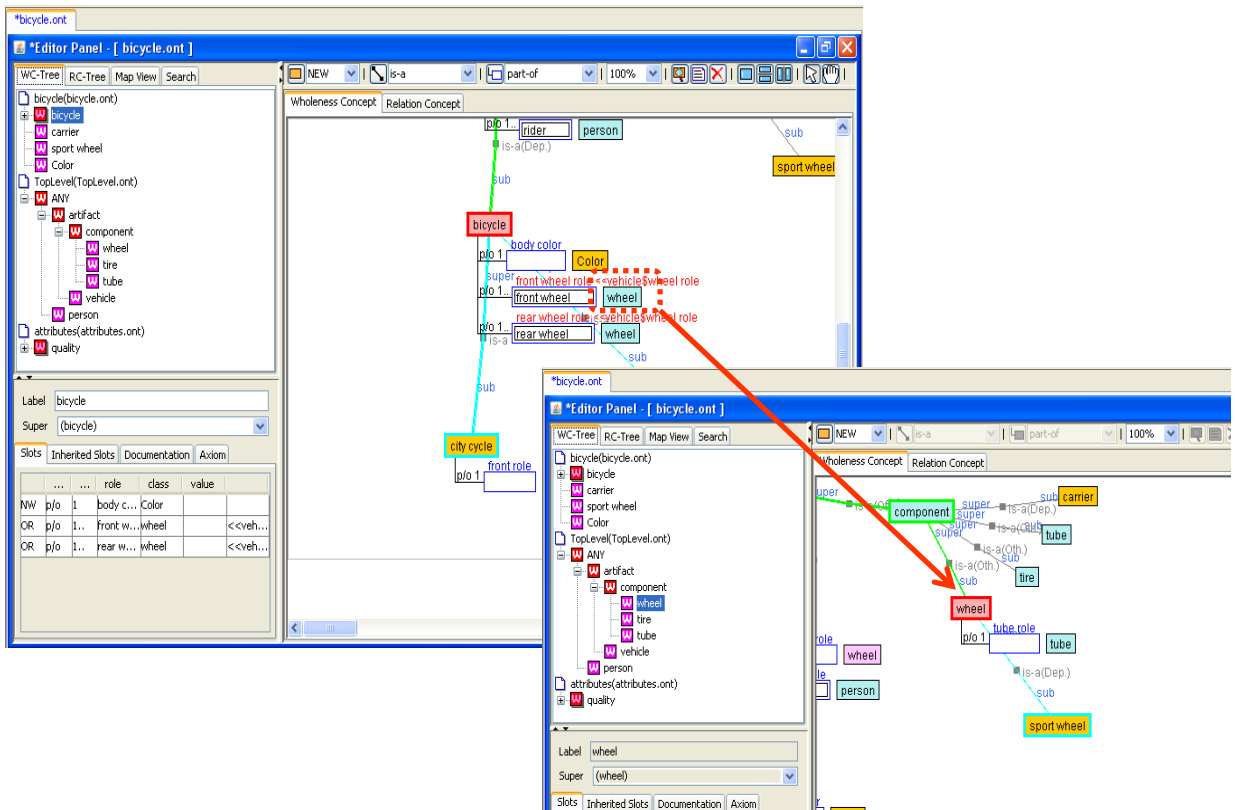
③: Item located in Ontology Editing Tool Bar

④: Item located in Browsing Pane right click menu

(8) Ontology selection operations

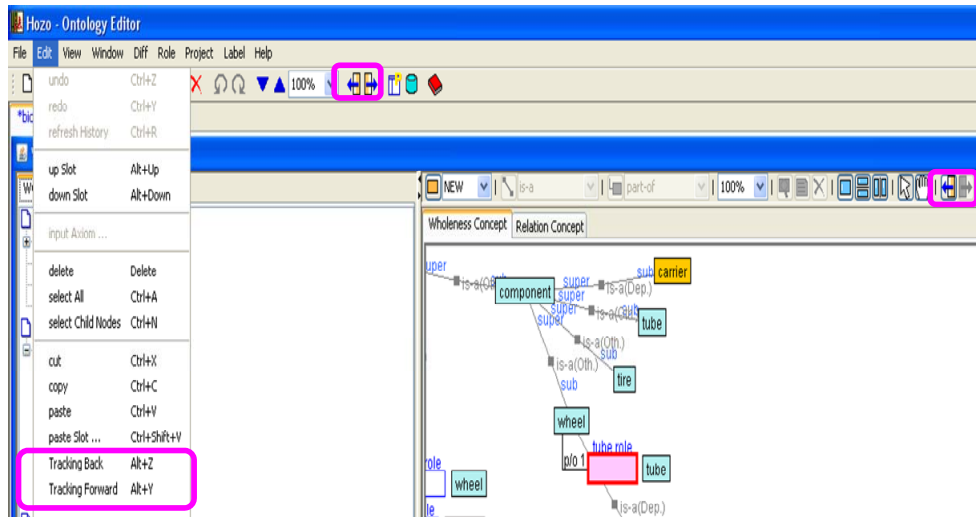
① Move to defined concept

- When the graphic object of a constrained concept is clicked on the Browsing Pane, its defining concept class is selected.



② Selection tracking

- This tool tracks (records) selection of graphic objects with respect to jump functions such as ①, and screen scrolling during editing.
- To move to the previous selected graphic object, use the selection tracking menu located in the Menu Bar, Operation Tool Bar or Editing Bar.



③ Scrolling the screen with the mouse

- Scrolling the screen with the mousewheel

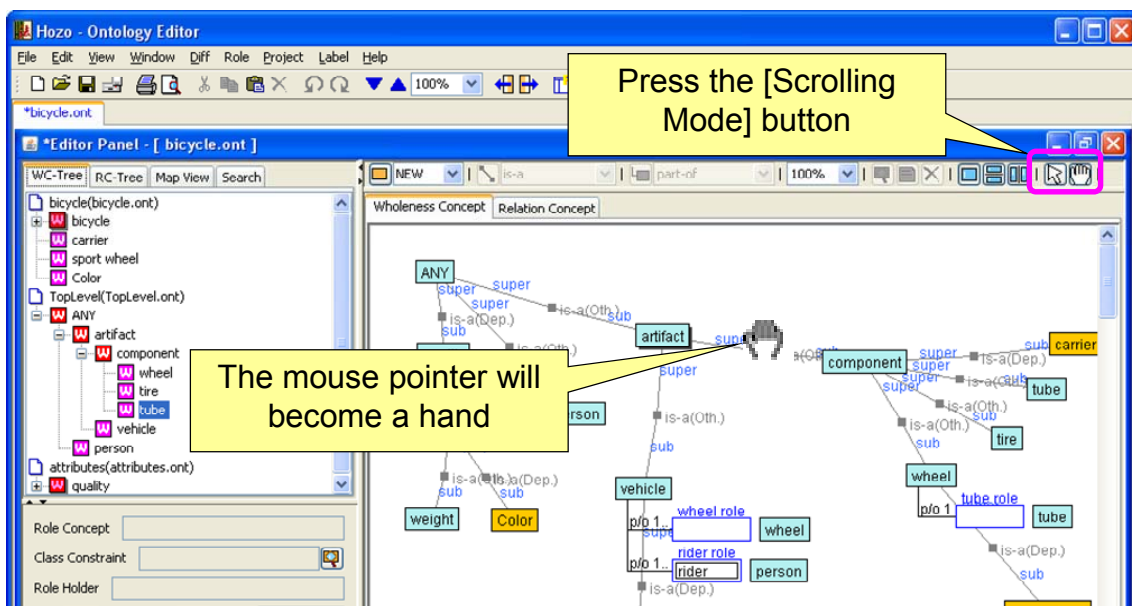
The mousewheel scrolls the screen up and down.

To scroll left and right with the mousewheel, hold the Ctrl key.

- Scrolling the screen by dragging the mouse

Press the [Scrolling Mode] button in the Operations Tool Bar; the mouse pointer will become a hand, and it will be possible to scroll the screen by dragging the mouse.

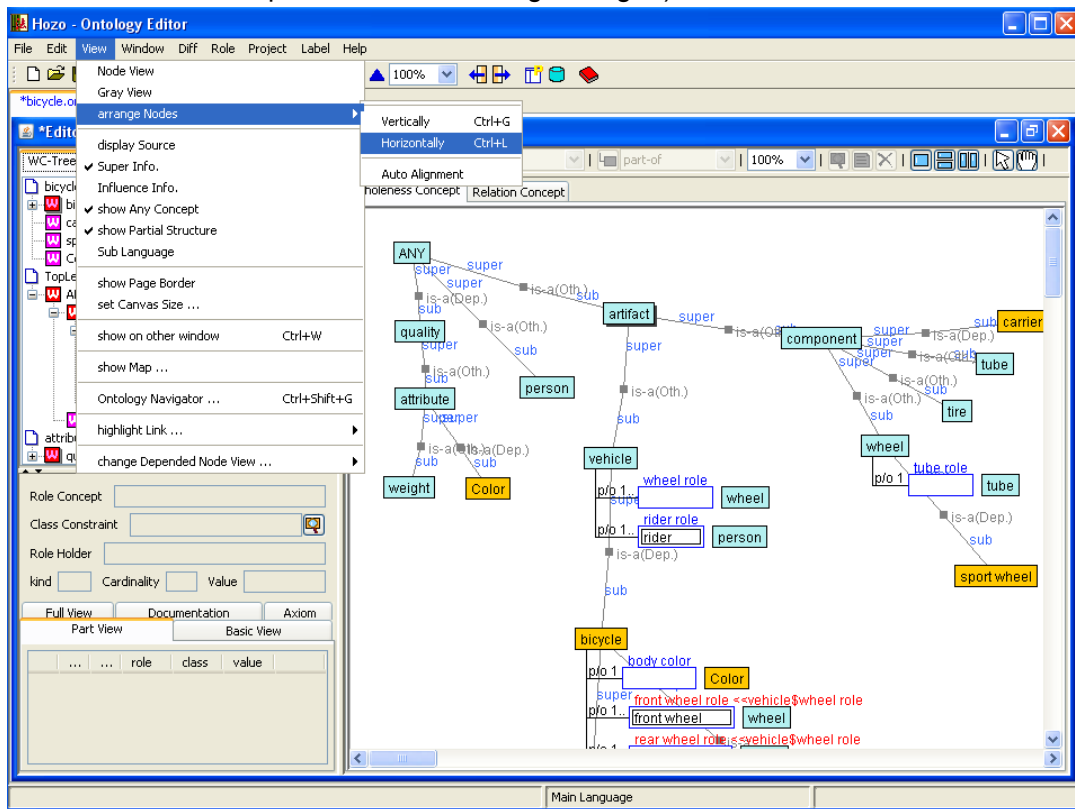
Press the [Selection Mode] button to return the mouse pointer to normal; it will now be possible to select objects.



(9) Ontology view

① Vertical/Horizontal layout

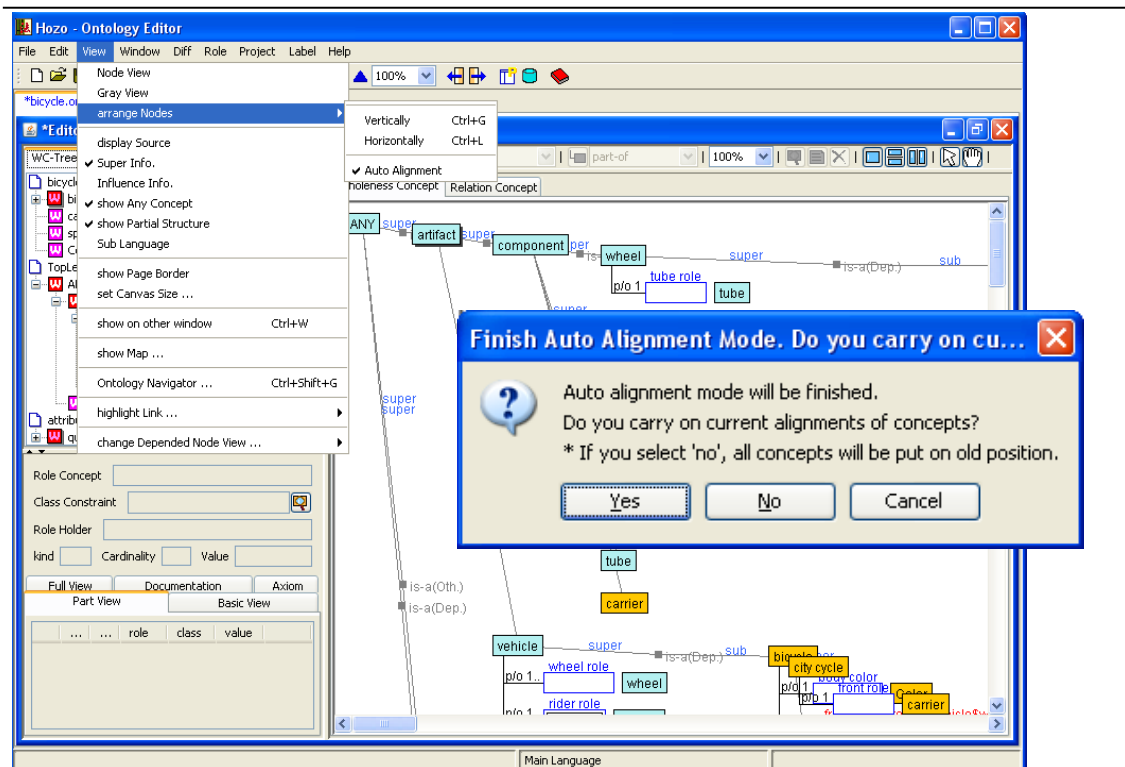
- Select a concept.
- Select [View]-[Layout]-[Vertical Layout] (or Horizontal Layout) in the Menu Bar to arrange the sub concepts of the selected concept in a pyramid. (The below figure shows the concept "artifact" after being arranged)



② Automatic layout

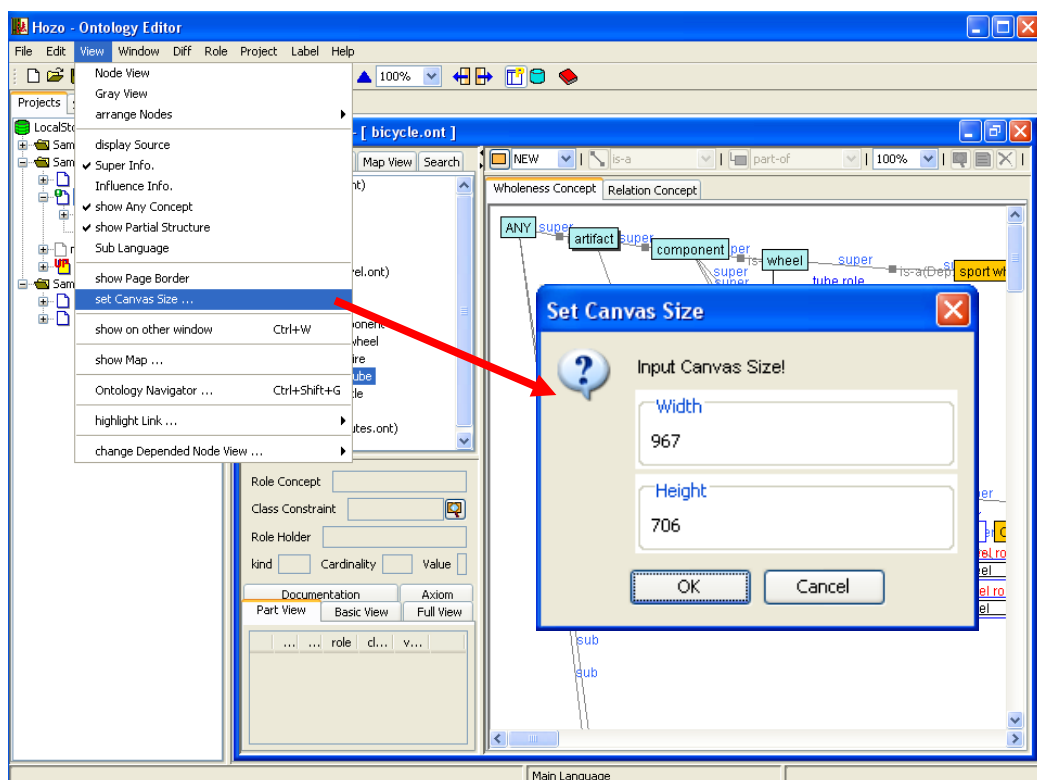
- Select [View]-[Layout]-[Automatic Layout] to switch to automatic layout mode.
- When automatic layout mode is ON, the root concept and its sub concepts are arranged evenly in the drawing area of the Browsing Pane from upper left to lower right.
- When automatic layout mode is switched from ON to OFF, the below confirmation dialog appears and the user can select whether or not to keep the layout.

*When automatic layout mode is enabled, the canvas size is also set automatically.



③ Canvas size setting

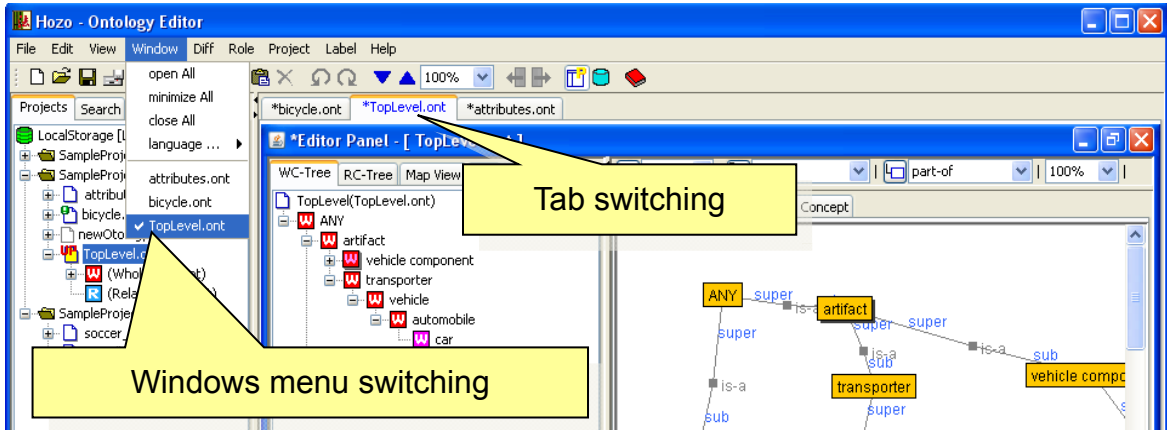
- Change the canvas size setting to alter the drawing size of the Browsing Pane when the Ontology grows too large.
- Select [View]-[Canvas Size Setting] from the Menu Bar to open the canvas size setting dialog; the canvas size setting can now be changed.



(10) Toggling windows

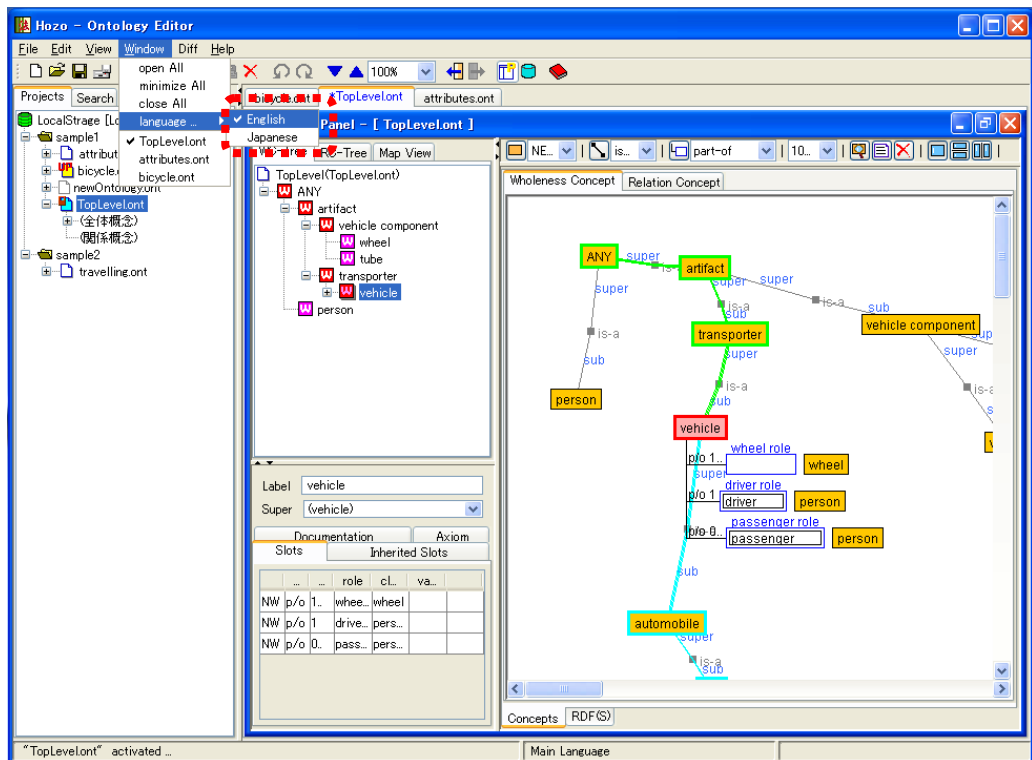
① Toggling windows (Editing Panel)

- Toggling windows is performed by selecting the Window Menu under [Window] in the Menu Bar, or with the tab in the upper part of the Editing Panel.



② Language settings

- The language specified for displaying the menus can be changed by selecting [Window]-[Language...] in the Menu Bar and setting the language submenu.



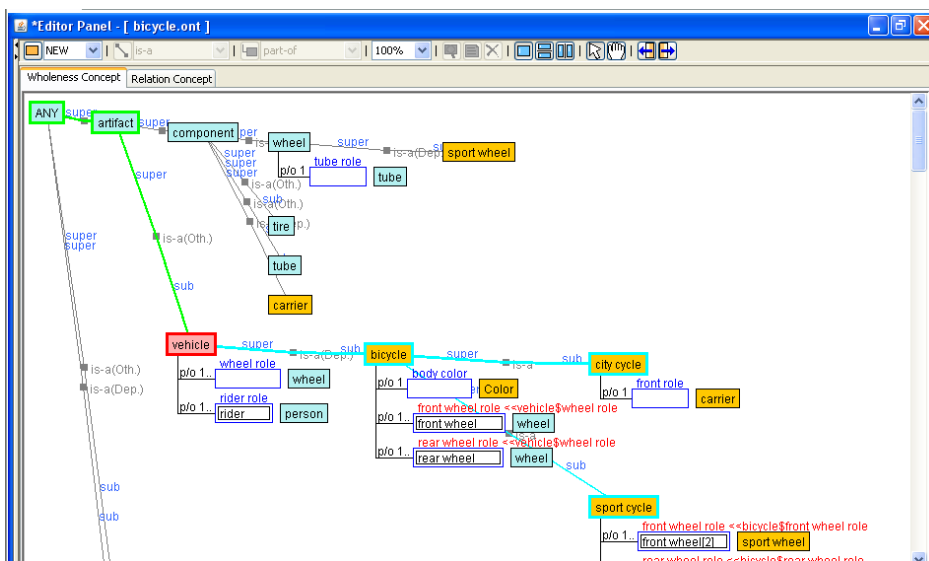
*At installation, only "English" and "Japanese" are available.

(11) Navigation support

- There are features that support navigation on the Browsing Pane for cases in which the user wants to move to a part that cannot be displayed there, for example when structuring large scale Ontologies.

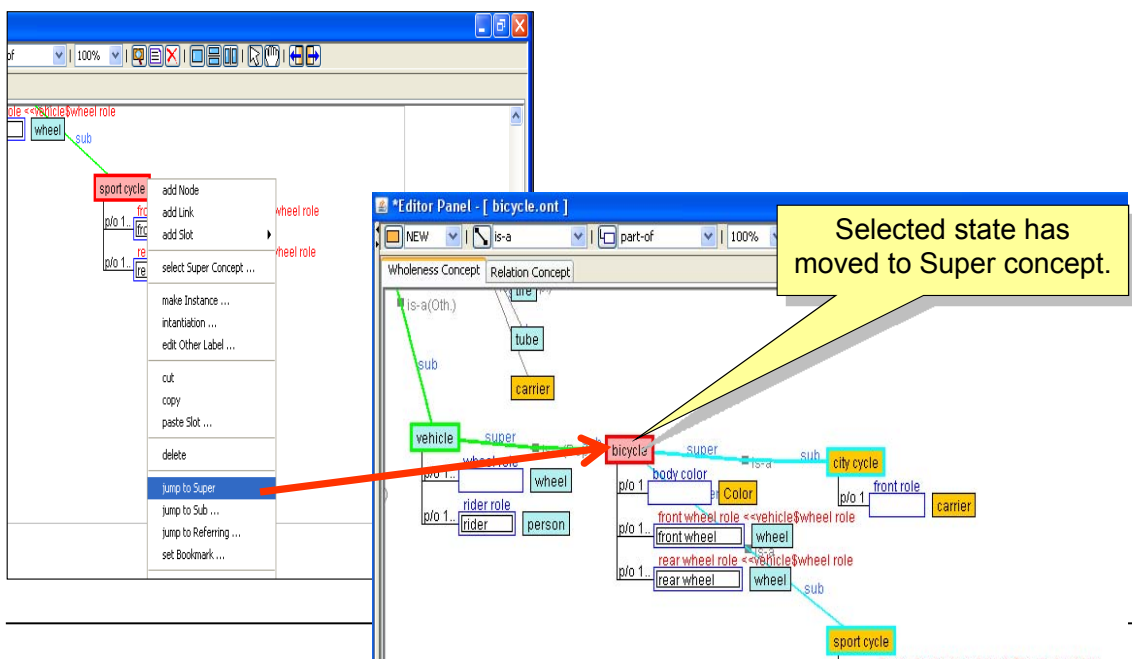
① Highlight display

- Highlights concepts that are in an *is-a* relationship (general-special relationship). When concept nodes and slots are selected, the super concept (*is-a* link) is highlighted in yellow-green, and the sub concept is highlighted in light blue.

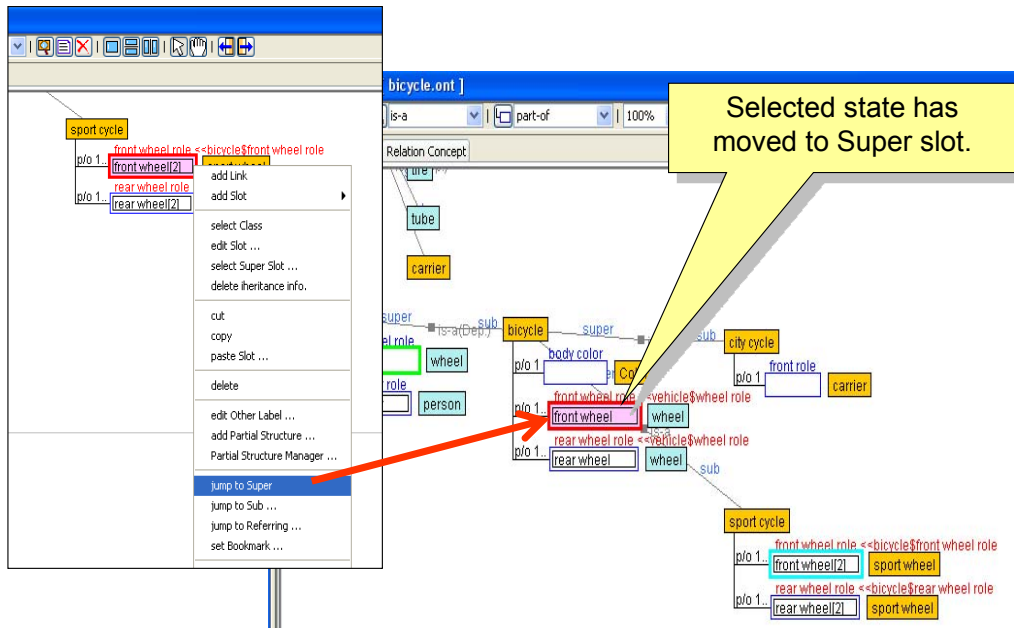


② Jumping to super concepts

- When a concept node is selected and [Jump to Super] is chosen from the right click menu, the screen will move to the position of the super concept node, and it will be selected.

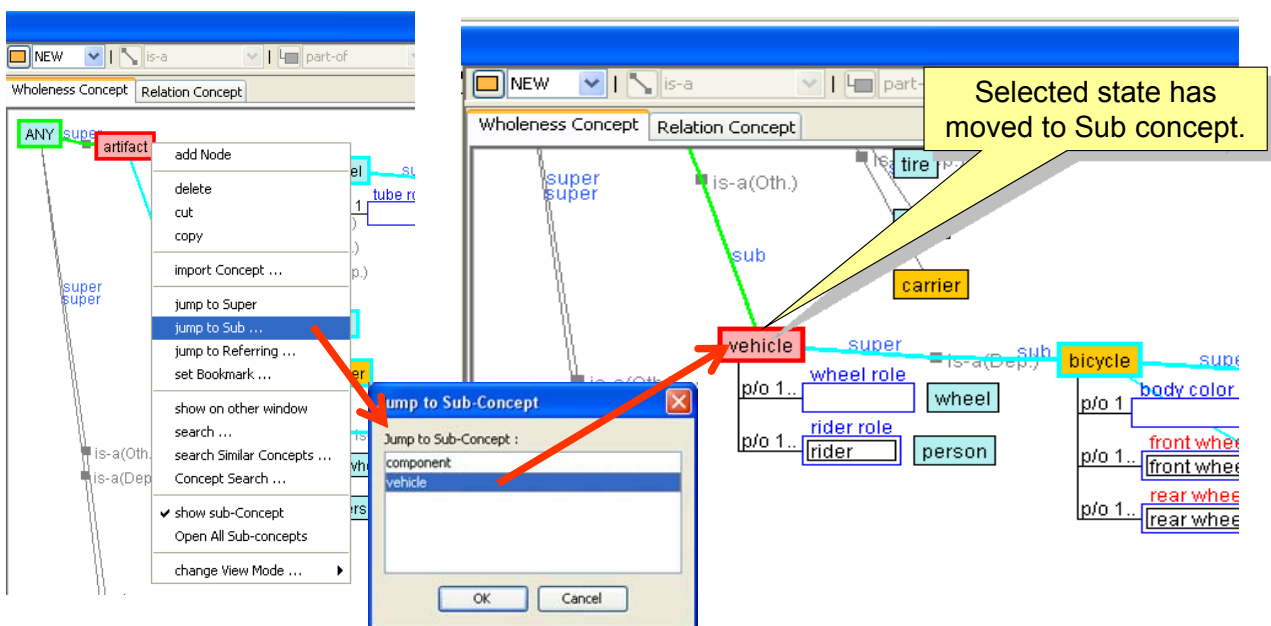


- When a slot is selected, the user can jump to the super slot by using the same operation as above.



③ Jumping to sub concepts

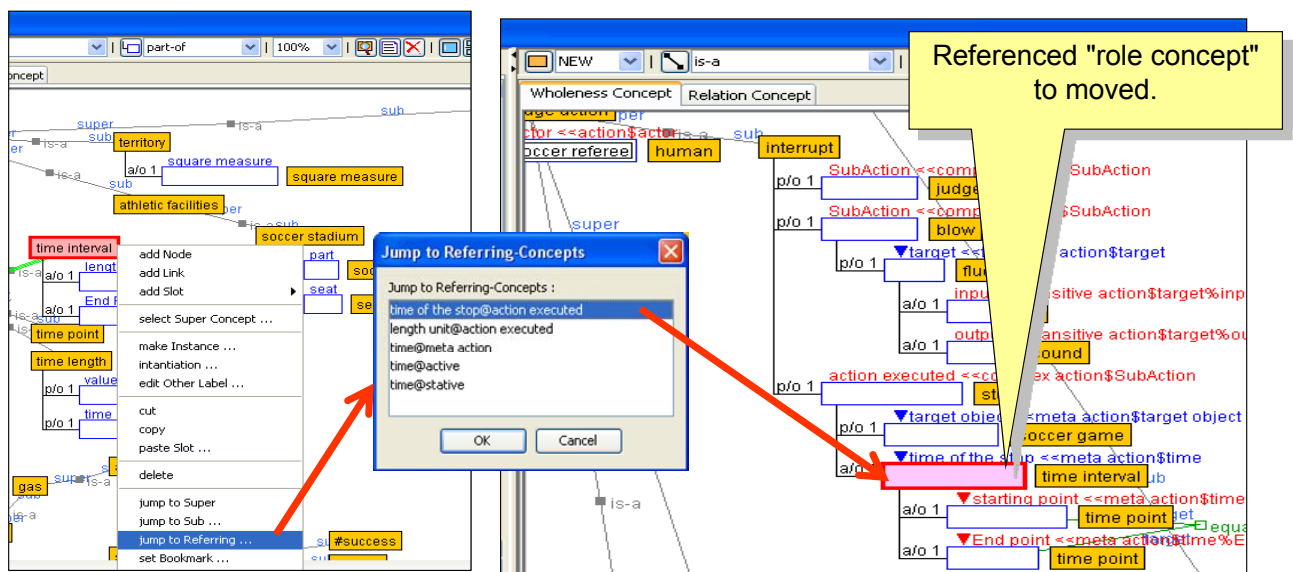
- When a concept node is selected and [Jump to Sub] is chosen from the right click menu, a dialog with a list of destination sub concepts will appear.
- When a destination is selected from the sub concept list and the [OK] button is clicked, the screen will move to the position of the sub concept node, and it will be selected.
- When a slot is selected, the user can jump to a sub slot by using the same operation as above.



④ Move to reference concept

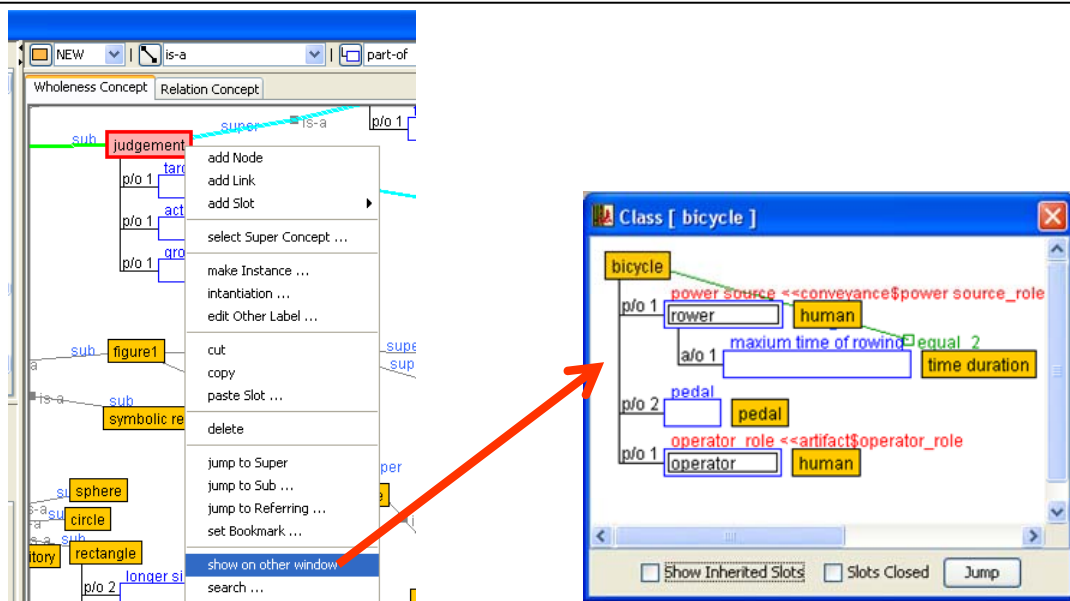
- It is possible to jump to role concepts (reference concepts) that are referencing as class constraints.
- When a concept node is selected and [Jump to Reference] is chosen from the right-click menu, a dialog with a list of reference concepts (reference slots) will appear.
- When a destination is selected from the reference concept list and the [OK] button is clicked, the screen will move to the position of the selected concept node, and it will be selected.
- When a slot is selected, the user can jump to the reference slot by using the same operation as above.

*Class referenced as Role Holder

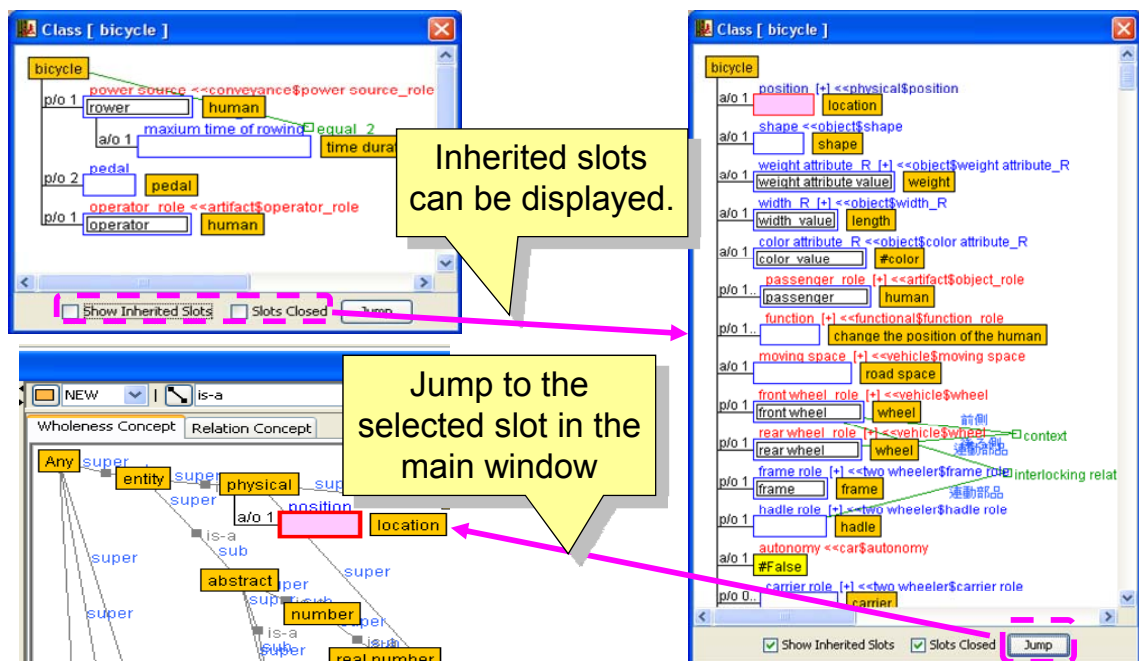


⑤ Display in separate window

- Various concept nodes can be displayed simultaneously in separate windows, allowing the user to simultaneously view and edit concept nodes that are in different locations.
- Select the concept node and choose [Display in Separate Window...] from the right click menu to display the selected concept class in a separate window.



- In the separate window display, inherited slots, other than slot information defined by the selected concept class, can be displayed.
- Check the [Display Inherited Slots] box in the bottom part of the separate window display dialog to display all slots, including inherited slots.



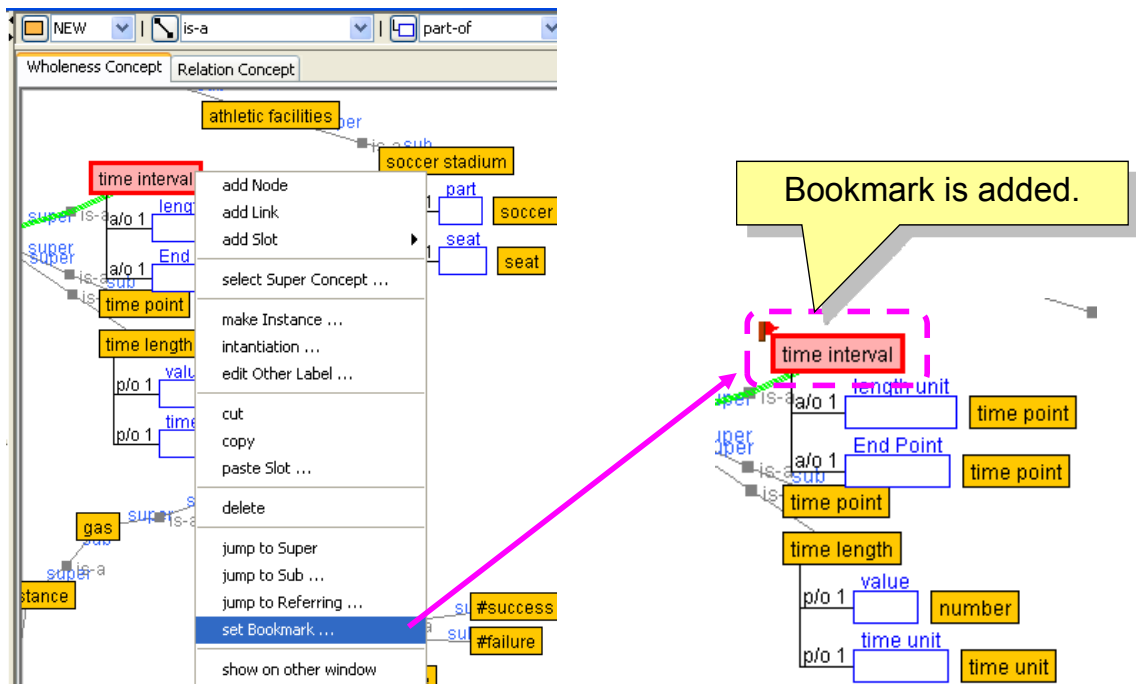
- Concept nodes and slot selection operations can be performed in the separate window display dialog, just as in the Browsing Pane.
- In order to confirm the selection status on the Browsing Pane, click the [Jump] button to move the screen to the position of the selected concept node (slot).

(12) Setting bookmarks

- This feature saves, in the form of a marker, a bookmark in the concept or slot being edited to aid in structuring large scale Ontologies.

① Setting bookmarks

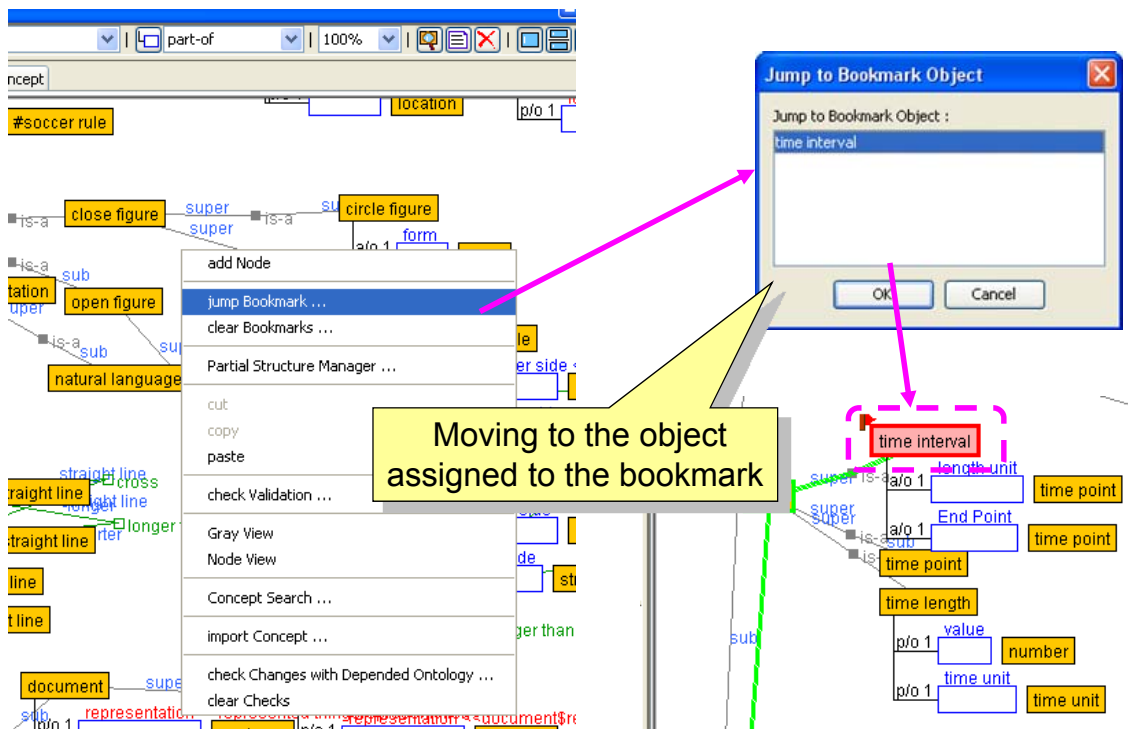
- A bookmark can be added to an object by selecting the concept node or slot, and choosing [Bookmark] from the right click menu.



- Bookmarks are set when the Ontology file is saved. They reappear when the file is loaded.

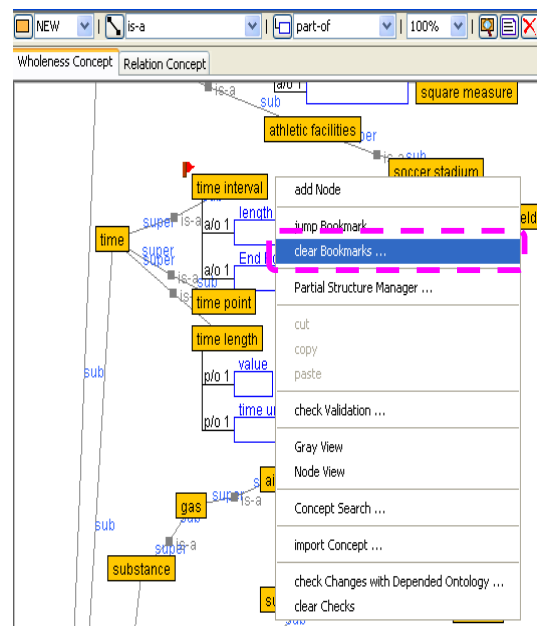
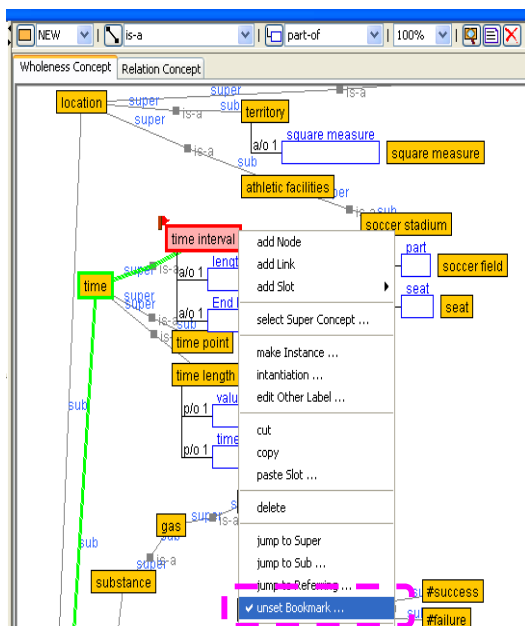
② Jumping to bookmarks

- Make sure that no objects, such as concept nodes and slots, are selected, and select [Jump to Bookmark] from the Browsing Pane right click menu to open the bookmark selection dialog.
- Select the desired bookmark from the list and click the [OK] button to move to the object assigned to the bookmark; the object will also be selected.



③ Removing bookmarks

- Select a bookmarked concept node or slot, and choose [Remove Bookmark] from the right click menu to remove the bookmark from the object.
- It is possible to remove all bookmarks from the Browsing Pane; make sure that no objects, such as concept nodes and slots, are selected, and select [Remove all Bookmarks] from the Browsing Pane right click menu.



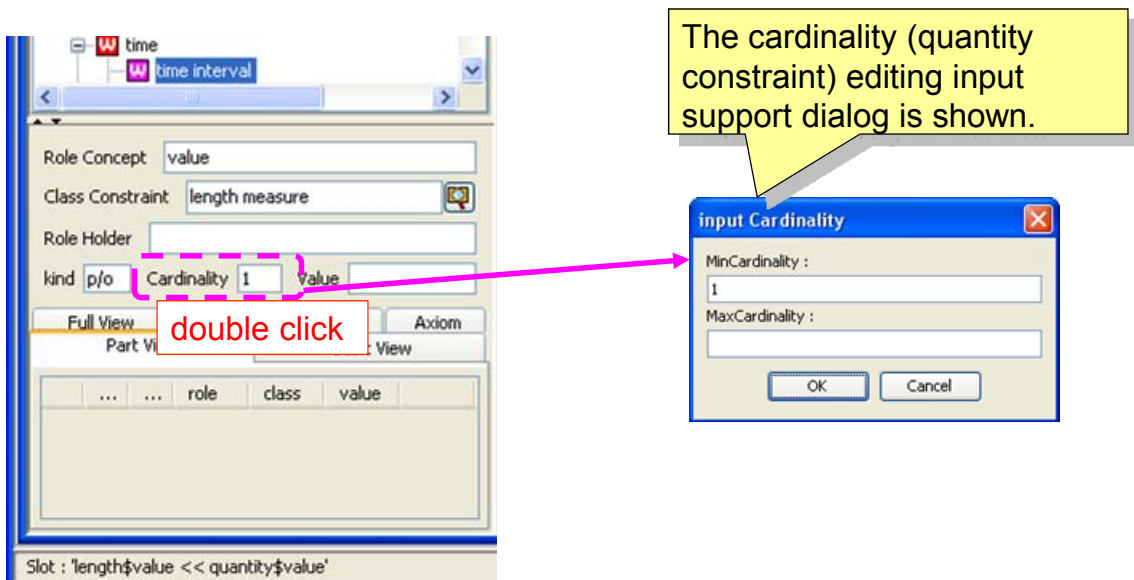
(13) Ontology editing support

- Here, aside from selective editing of class constraints when editing slots (4.1.2(3)), we will provide a guide to editing by the user as per the Ontology's rules when defining concepts and slots.

① Edit cardinality (quantity constraint)

- Cardinality (quantity constraint) input can be performed by directly entering a value into the quantity constraint text field in the Definition Pane, but there are input support features to ensure editing as per the Ontology's rules.
- Move the mouse pointer to the quantity constraint text field in the Definition Pane, and double click over the input field to open the cardinality (quantity constraint) editing input support dialog.
- Set the "Maximum Quantity" and "Minimum Quantity" and click the [OK] button to update the value of the quantity constraint text field in the Definition Pane.

**If no quantity is specified, the value will be blank.*



② Specializing slots

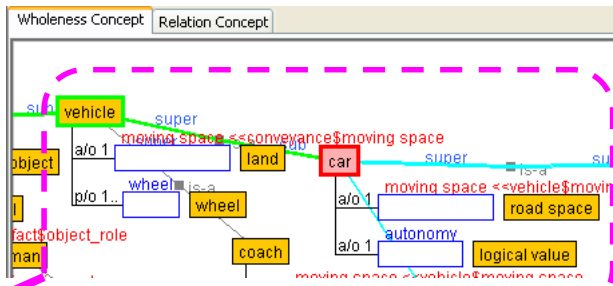
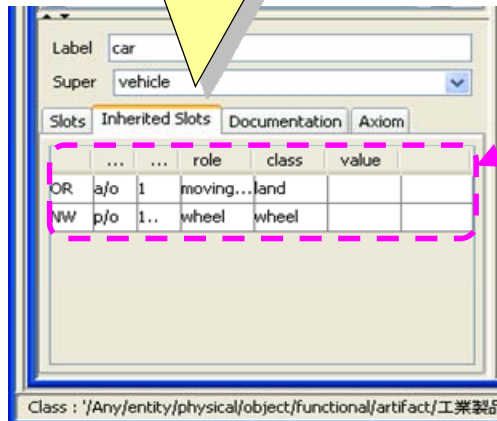
- If two concepts are in an *is-a* relationship (general-special relationship) property information (slot information) will be imported from the super concept and used to refine the definition (i.e. slot inheritance and specialization) .

<Display information on slots inherited from super concepts>

- Information on inherited slots can be viewed by selecting a super concept from the

[Super Concept] list in the Definition Pane. Inherited slots will be displayed on the [Inherited Slots] tab.

Information on slots inherited from "Vehicle" are displayed.



<Specialization of slots inherited from super concepts>

- Specialization of slot information inherited from super concepts that are in an *is-a* relationship within a sub concept can be performed by selecting the [Specialize] slot category of the toolbar, and clicking the [Add Slot] button to open a selection dialog displaying a list of importable slots.
- Click the slot to be specialized in the list on the dialog to import both the slot information and inheritance information to the sub concept.

*The [Imported Concepts/Slots List] dialog can also be displayed by selecting a mouse-right-clicking-menu.

selecting [Specialize]

List of concepts and slots to be im...

Select a slot to specialize :

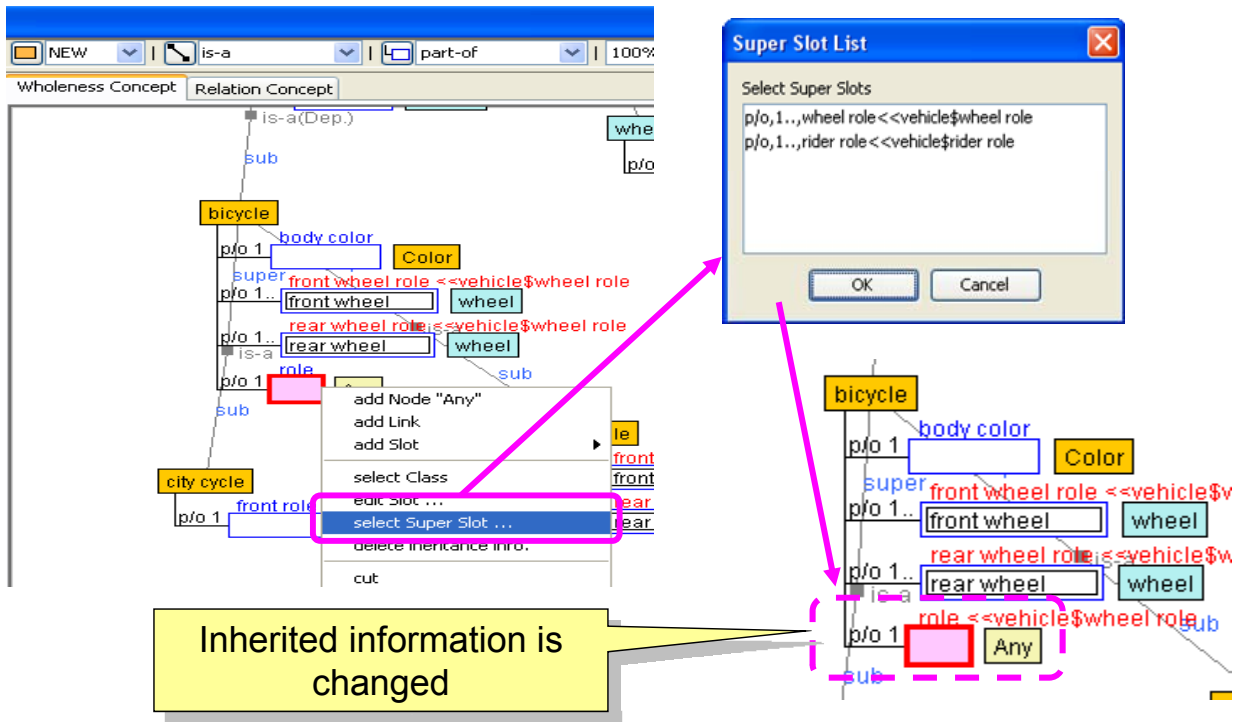
p/o,1,..,target<<rule about forbidden action

OK Cancel

"target" is added as a specialized slot.

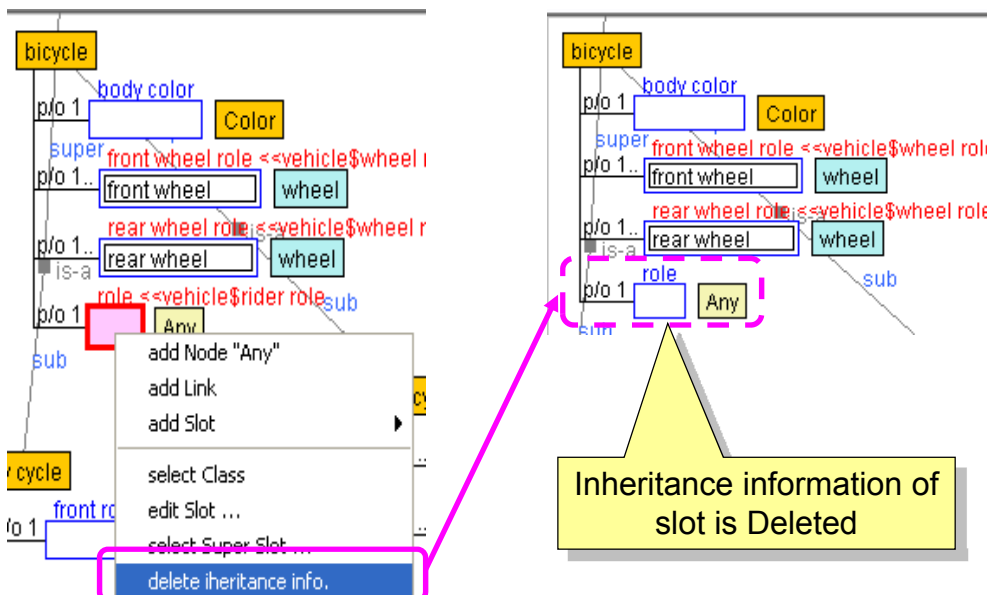
<Editing slot inheritance information>

- To import slot inheritance information only, select a slot, and choose [Select Super Slot] from the right click menu to open the [Super Slot Candidate List] selection dialog. Select a candidate from the list and click the [OK] button to change just the inheritance information.



<Deleting slot inheritance information>

- To delete slot inheritance information, select a slot, and choose [Delete Slot Inheritance Information] from the right click menu to delete inheritance information.



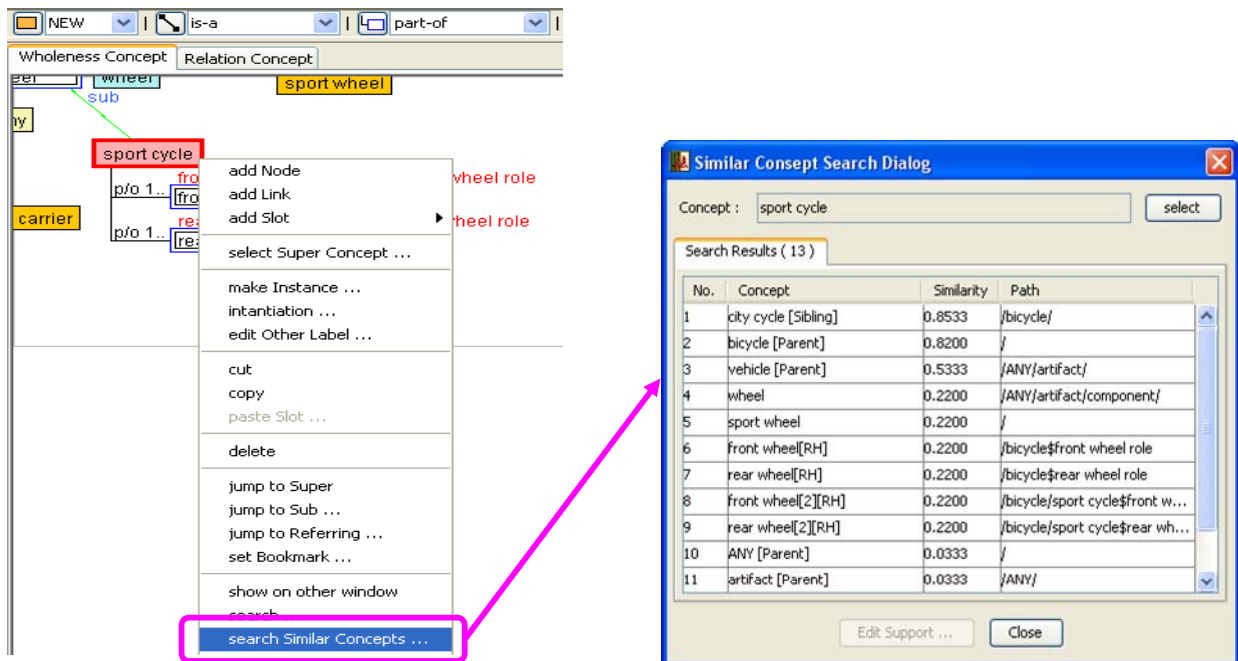
4.1.7. Using the Ontology Editor's extended features

(1) Search for similar concepts (Analogous Concept Search Feature)

When importing large amounts of data, the Analogous Concept Search Feature assists with conceptualization by comparing concepts with similar properties (i.e. slot structures), and generalizing those similar concepts.

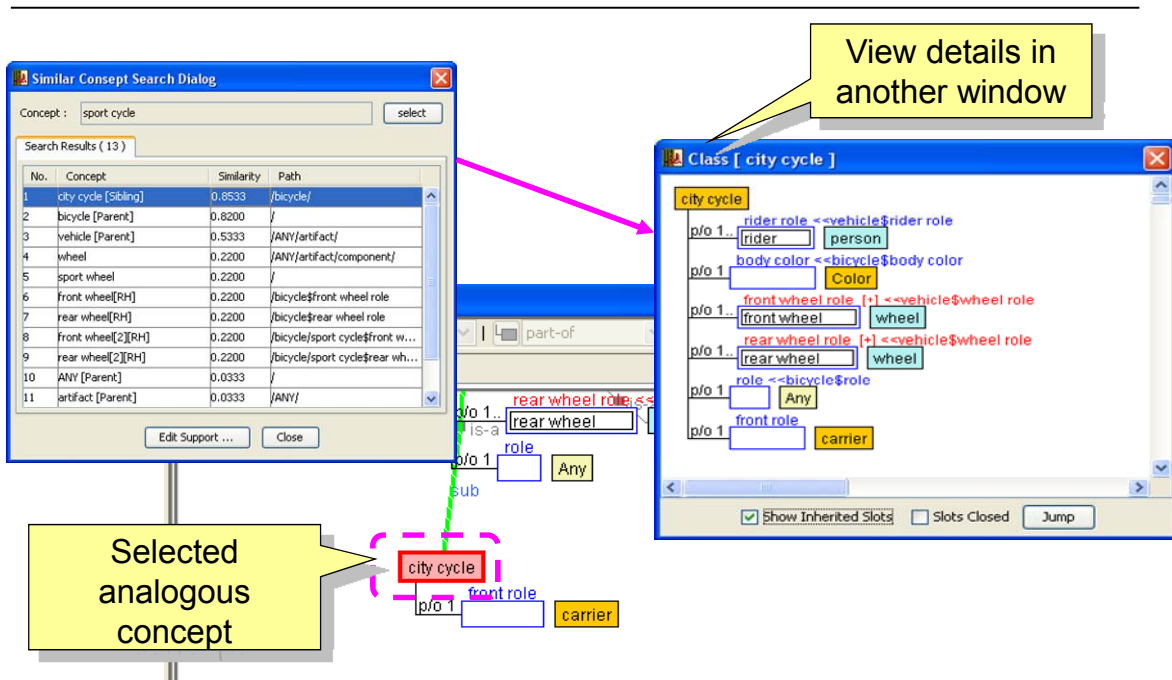
① Searching for analogous concepts

- Select the node of the concept class to search for, right click to open the pop-up menu, and choose [Analogous Concept Search] to open the analogous concept search dialog.



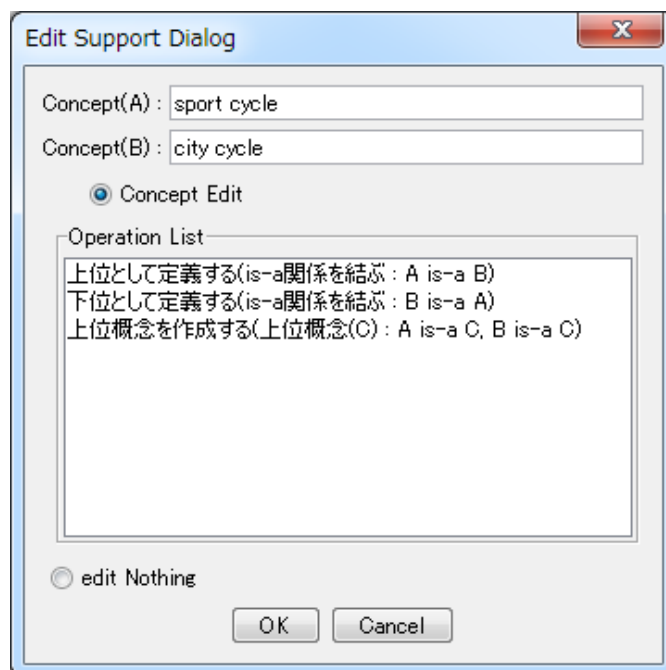
② Display Analogous Concepts

- Clicking an item in the Analogous Concept Search dialog list will select the chosen node from the list.
- Double click the selected node to open a separate window displaying all inherited slots and confirm matching slot details.



③ Editing analogous concepts

- Editing operations can be performed on the analogous concepts returned as search results.
- Select an item on the Analogous Concept Search dialog list, and click the [Editing Assistance] button on the bottom of the dialog to open the Editing Assistance dialog.
- Editing operations can be performed easily on analogous concepts by selecting a candidate displayed in the editing dialog, and clicking the [Edit] button.



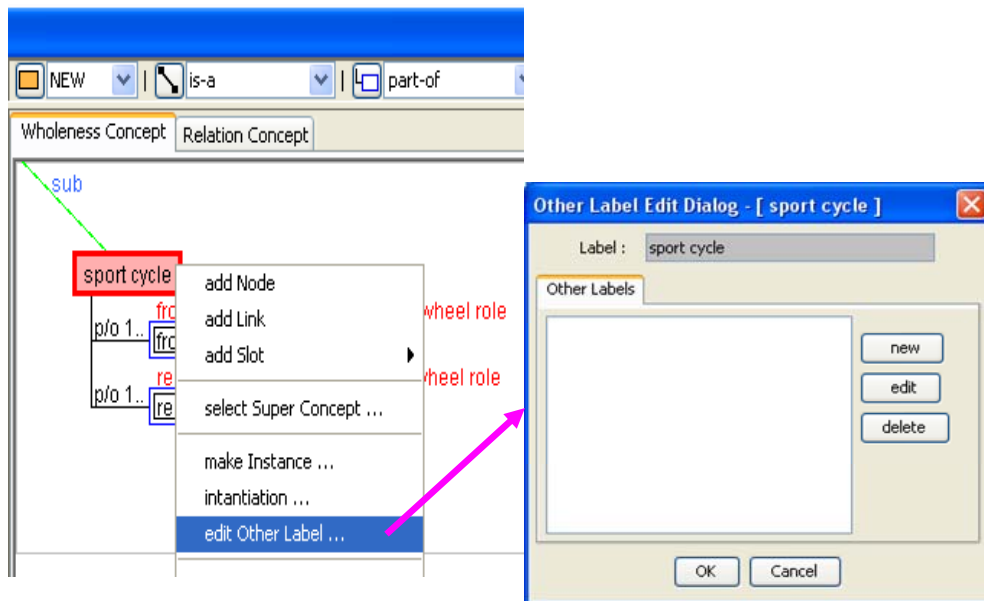
(2) Edit alias (Alias Management Features)

In some cases, users want to define a separate name (i.e. label) when defining a concept. In such cases, multiple labels can be defined for one concept.

① Alias Editing Feature

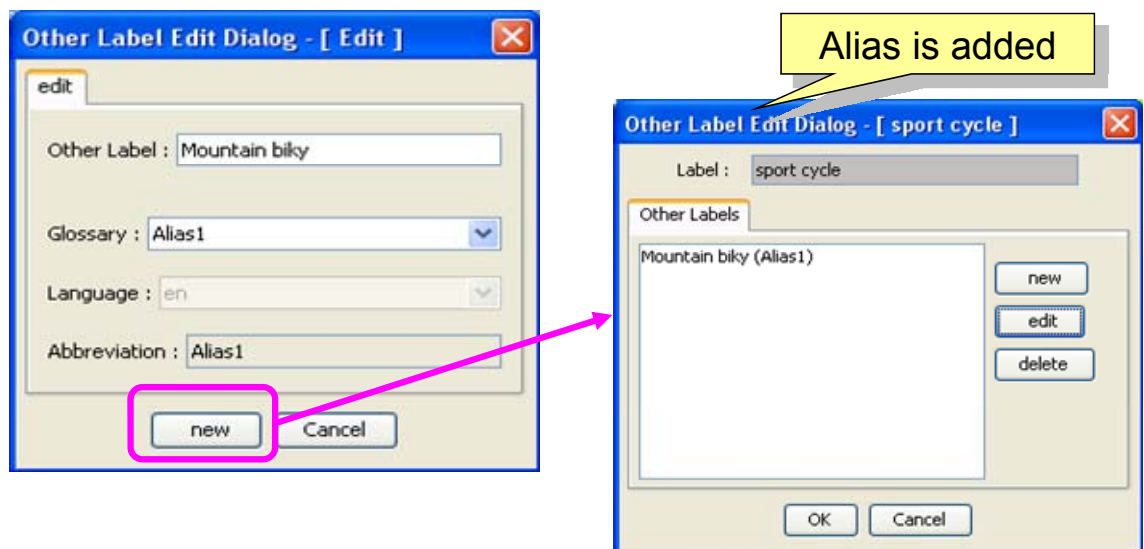
This feature allows multiple labels to be defined and edited for one concept.

- Select the concept node or slot, and choose [Edit Alias] from the right click menu to open the alias editing dialog.

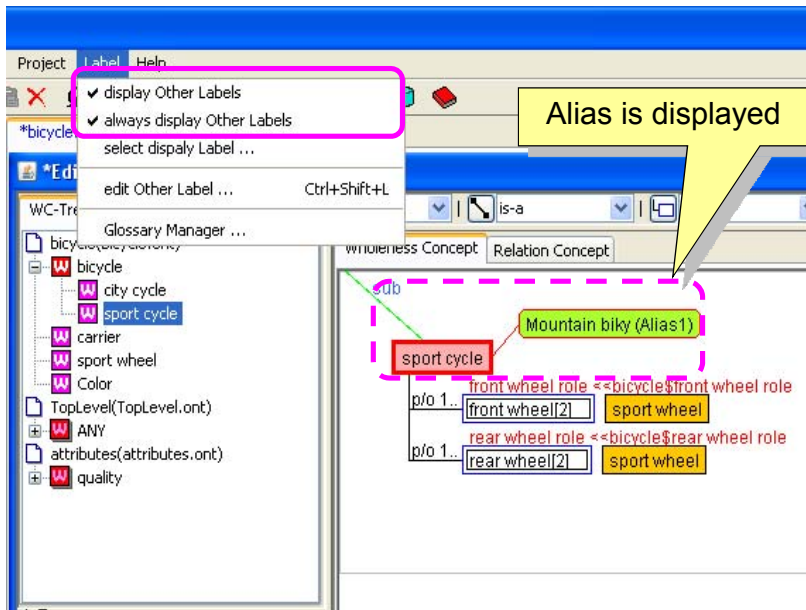


- Click the [New] button and edit the alias in the alias editing dialog, then click the [New] button to add the alias.

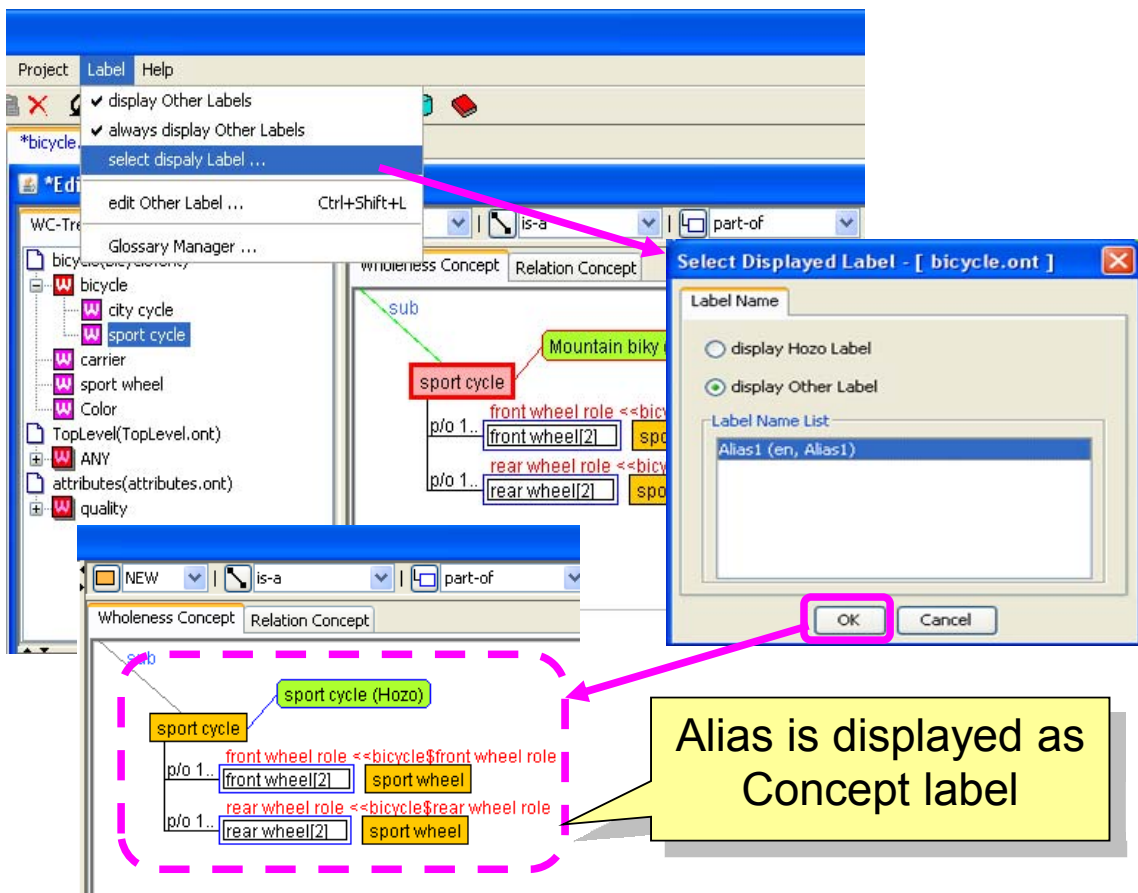
*To selectively view by term class, see "② Alias Management Features".



- Aliases can be displayed in the Browsing Pane by selecting [Alias Management]-[Display Alias] in the Menu Bar.



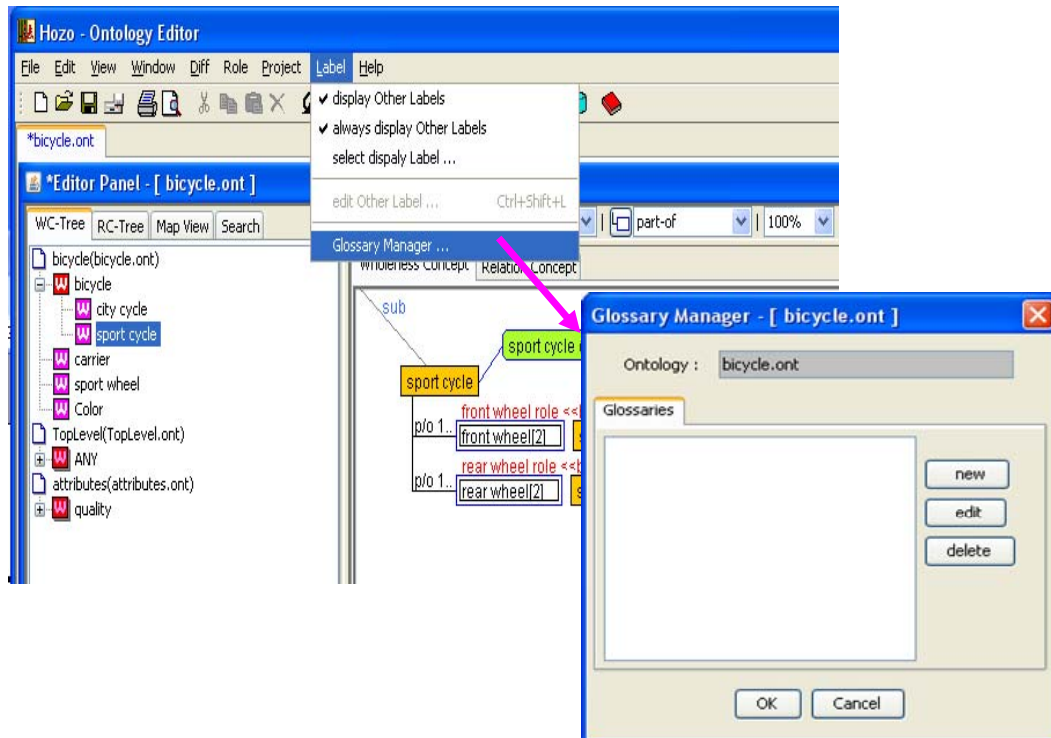
- Aliases can be displayed as concept labels by toggling alias classes in the Menu Bar, [Alias Management]-[Select Alias Display].



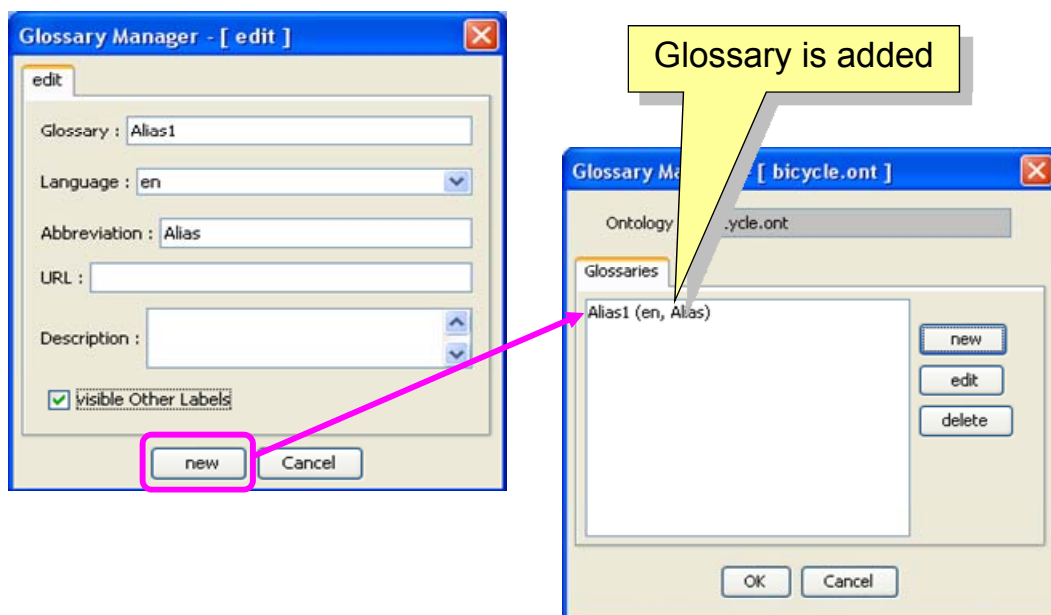
② Alias Management Features

Labels can be grouped by term class.

- Select [Alias Management]-[Manage Term Class] in the Menu Bar to open the term class management dialog.



- Click the [New] button and perform editing in the term class editing dialog, then click the [New] button to add the term class.

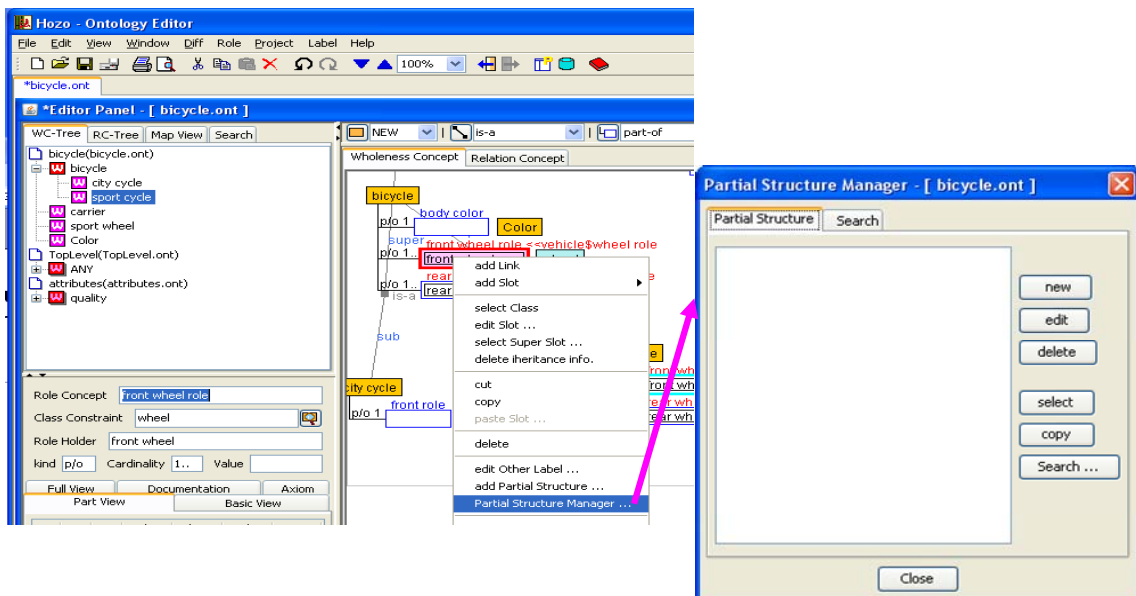


*Will not be displayed unless the "Display alias of this term class" box is checked.

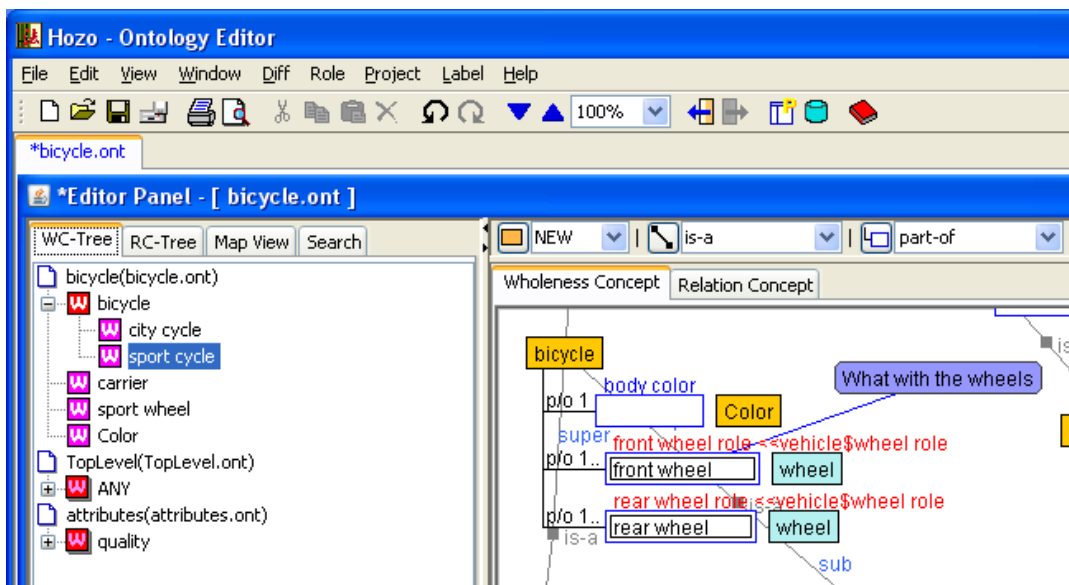
(3) Labeling component structures (Concept Component Structure Management Features)

Optional labels can be assigned to specific component structures within concept definitions.

- Select any slot in the concept class.
- Select [Register Component Structure] in the right click menu to open the concept component structure management dialog.



- Click the [New] button to display the concept component structure management dialog.
- Enter the necessary items, and click the [Register New] button to register the concept component structure.

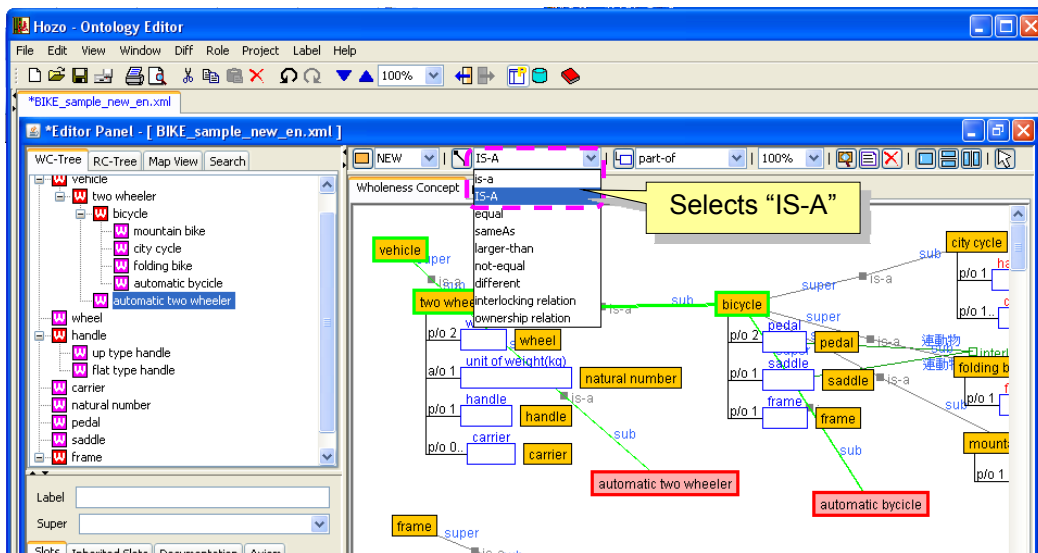


- In the concept component structure registration dialog, selecting an item in the concept component structure list will highlight the corresponding concept structure.

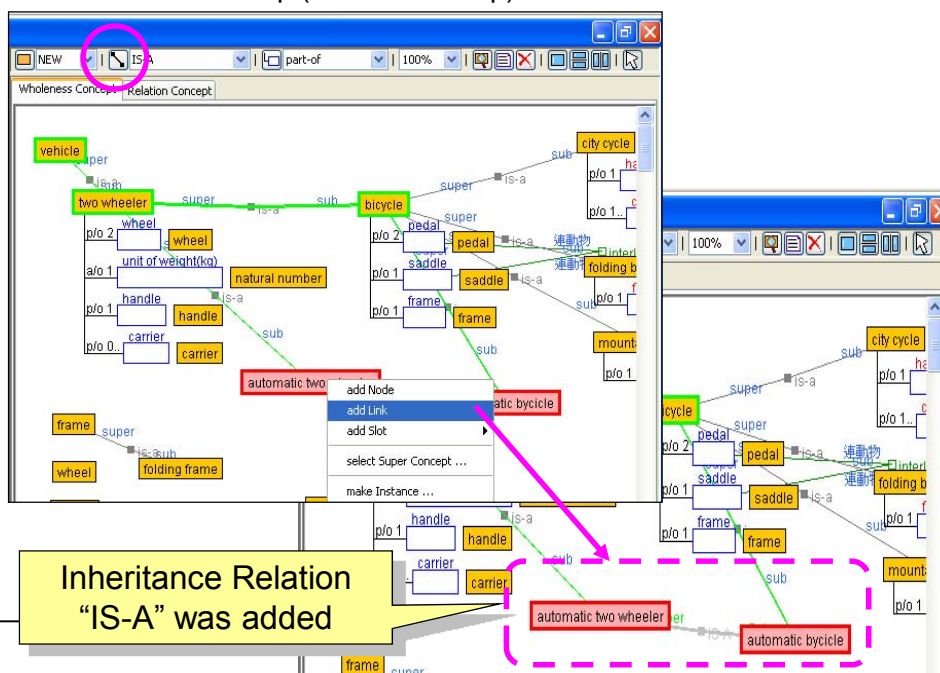
(4) Editing multiple inheritance (Multiple Inheritance Display and Editing Features)

It is possible to multiplex the super and sub relationships (inheritance relationships) of concepts (i.e. multiple inheritance), toggle the perspective (view) and edit them.

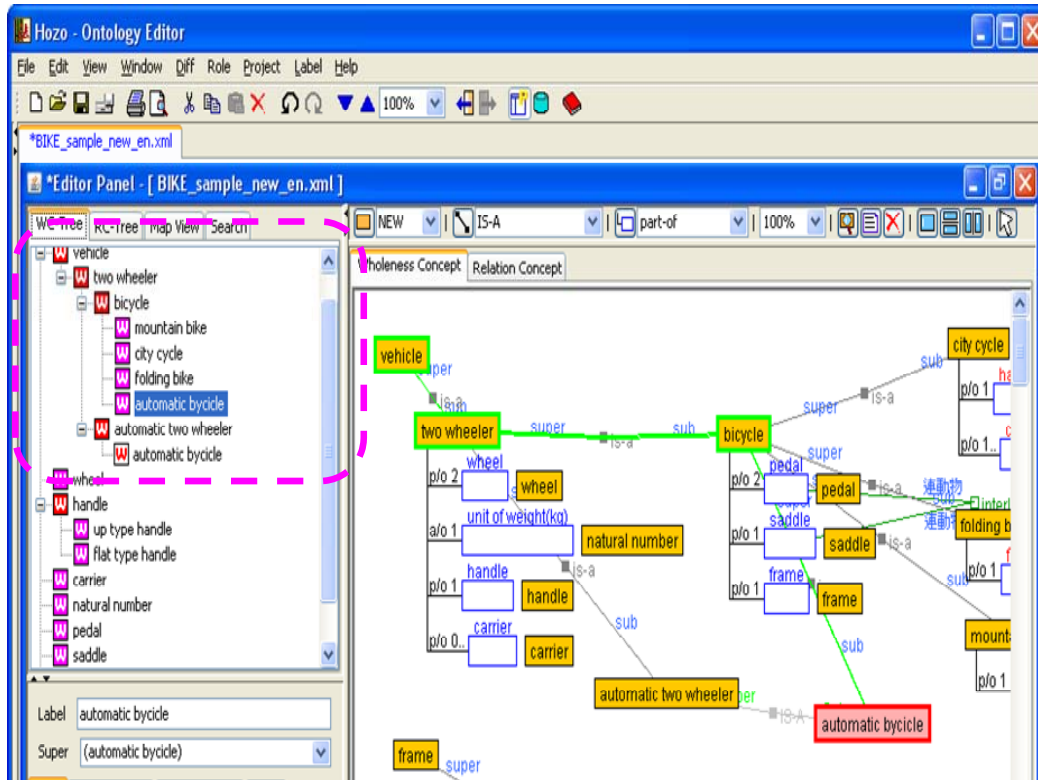
- For concepts that already have an inheritance relationship, the weak inheritance relationship (is-a relationship) link will be edited.
- Choose the concept to be multiplexed and select "IS-A" (capitalized) from the relationship class list in the Ontology Editing Tool Bar.



- As when editing an is-a relationship link, click the [Add Link] button in the Ontology Editing Tool Bar, or select [Add Link] from the right-click pop-up menu to add a weak inheritance relationship (is-a relationship) link.



- When a weak inheritance relationship (is-a relationship) link is added, it will be added to the is-a hierarchal tree on the Navigation Pane. The concept with the weak inheritance relationship will appear on the tree as a white icon.



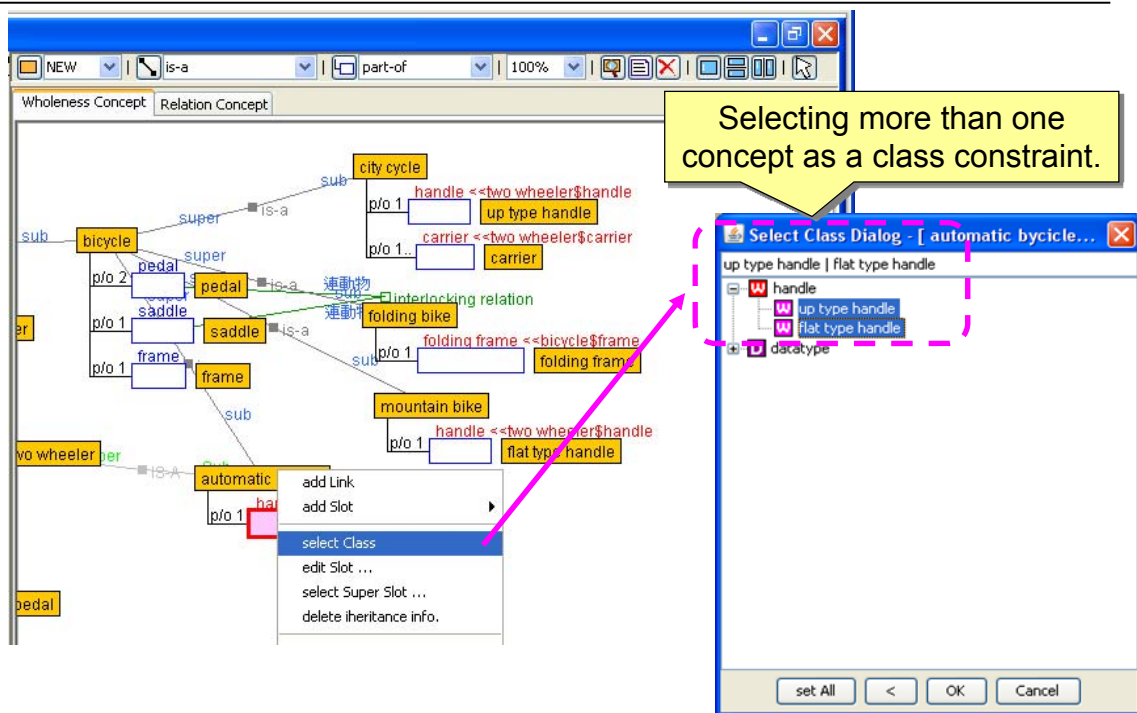
- It will be possible to view and edit slots with multiple inheritance when editing in the Definition Pane and slots.

***[Important]: With regards to weak inheritance relationships (is-a relationship), it is necessary to define any behavior that differs from is-a relationships based on the basic Ontology theories put forward by the Mizoguchi Laboratory. Please use with caution as it is possible that feature specifications will change with future theoretical development.**

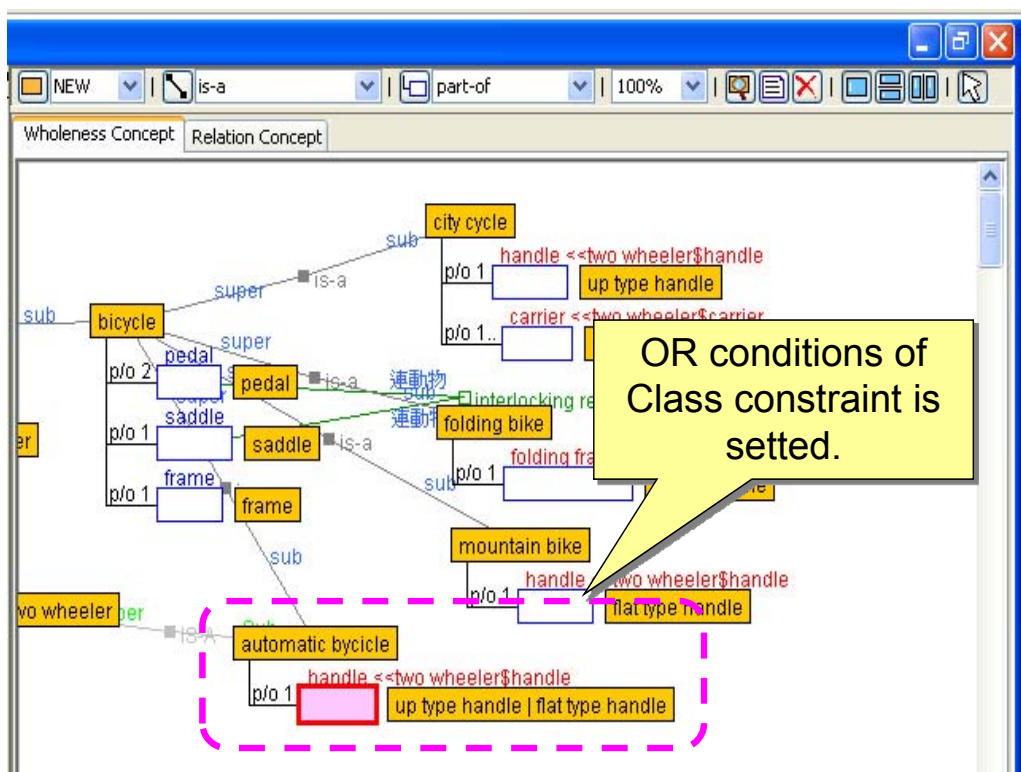
5) Setting an OR condition in a class constraint (using extended features for editing class constraints)

Editing support features make it possible to set multiple slot class constraints when defining concepts, and to use a combination condition (OR condition) between them.

- When editing with the class constraint selection dialog, it is possible to hold the Ctrl key (or Shift key) to select multiple concept classes assigned to class constraints.



- Click the [Select] button on the bottom of the dialog after making selections to set a class constraint OR condition.

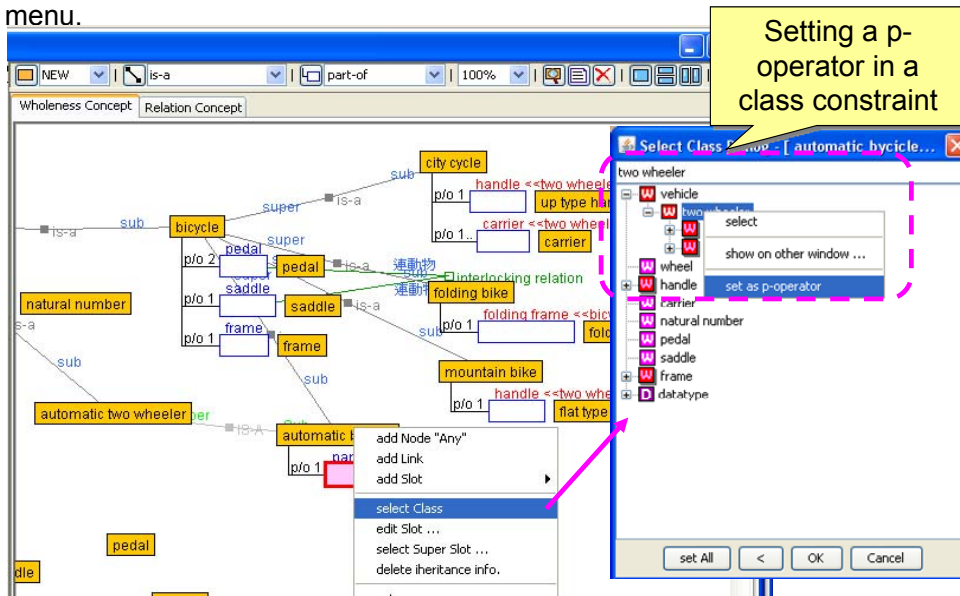


- *It is also possible to edit the text in the Definition Pane ("|": delimiter character).
- *Role Holders and Datatypes can also be specified as OR conditions.

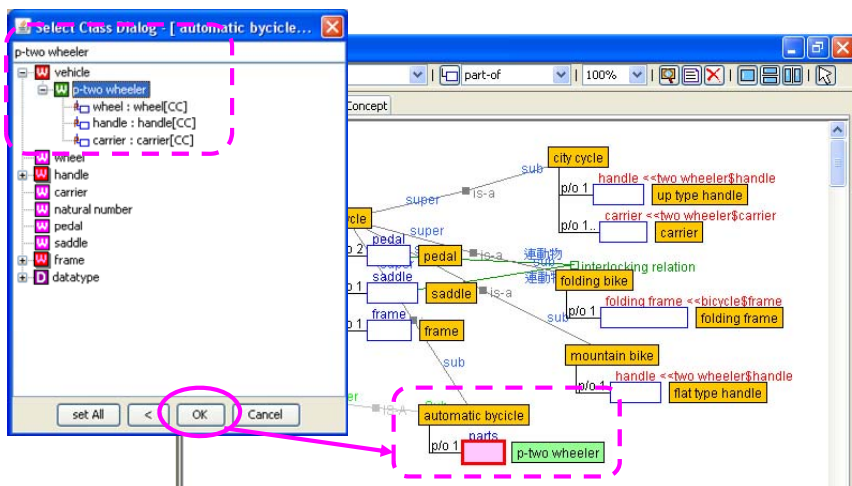
6) Setting a p-operator in a class constraint (p-operator Editing Feature)

*The "p-operator" is an expanded setting for slot class constraints. By setting a p-operator for a given concept within a class constraint, the concept (class) to which it was set, or that instance of a component concept, can be retrieved as that slot's value.

- When editing with the class constraint selection dialog, select the concept class node, then toggle the selection display by choosing [Assign as p-operator] in the right click menu.

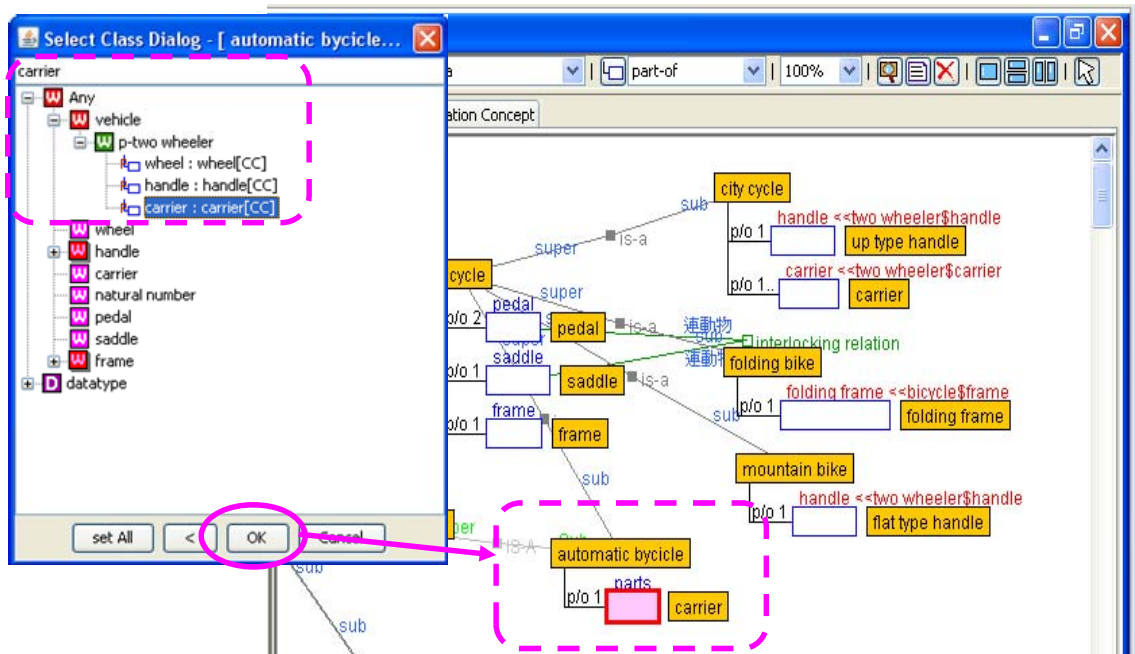


- The tree icon assigned as a p-operator will turn green, and it will become possible to specify p-operators. Click the [OK] button on the bottom of the dialog to set the p-operator as a class constraint.



*It is also possible to edit the text in the Definition Pane (add the prefix "p-"). If the corresponding concept class is undefined, it will be displayed in light green in the Browsing Pane.

- Details of component concepts will be displayed underneath concepts assigned p-operators in the p-operator assignment view. If a component concept is selected and set, it will be set as a class constraint.

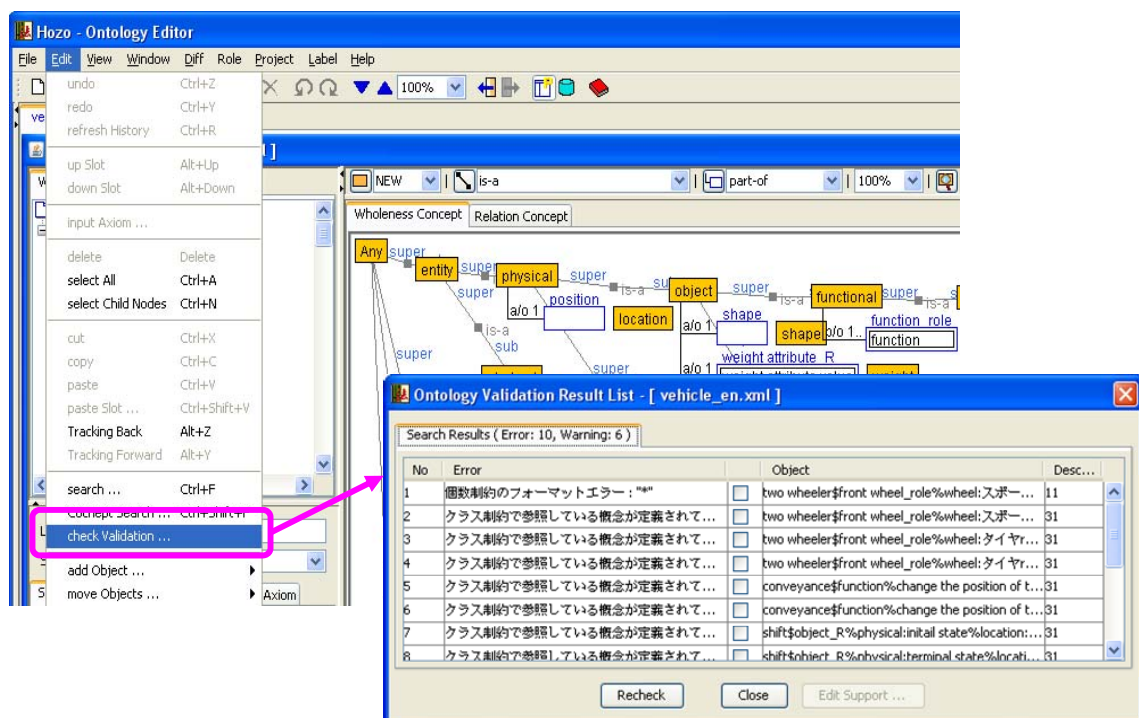


(7) Validating Ontologies (Ontology Consistency Check Feature)

- The Ontology Consistency Check feature utilizes the Hozo inference structure to verify whether or not the Ontology being edited is structured according to the rules.
- Details of the Ontology consistency check are as follows.
 - Duplicate labels (Basic Concept, Role Holder)
 - Cardinality (quantity constraint) format
 - Cardinality (quantity constraint) consistency check
 - Slot inheritance consistency check
 - Inheritance from super slot
 - Inheritance from class constraint
 - Class constraint consistency check
 - Presence/absence of class constraint concept
 - Check consistency between super slot and class constraint concept etc.

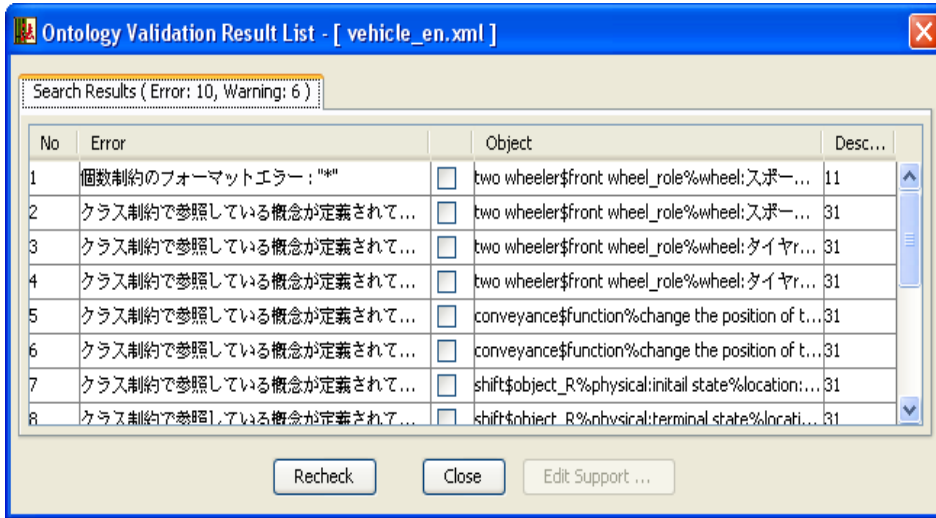
① Checking Ontology consistency

- Select [Edit (E)]-[Consistency Check] from the Menu Bar to validate the Ontology being edited; after validation the results will be displayed in a list.



*The same operation can be performed by making sure no object is selected, then choosing "Consistency Check" in the right-click menu.

*Explanation of the "Ontology Consistency Check Results List" dialog



[Check Again] button: Check Ontology consistency again.

[Close] button: Close dialog screen.

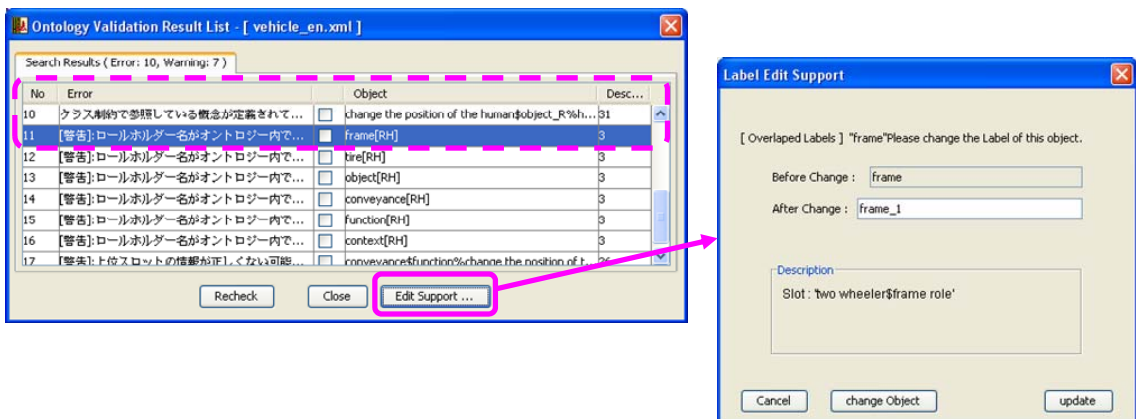
[Editing Support] button: Perform editing operations on error items (explained later).

② Correcting errors

- Hozo provides the features support editing in order to remove errors.
- Chose an error item on the Ontology consistency check results list and click the [Editing Support] button to open a dialog that provides editing support according to each error contents. Editing support for each error is explained below.

<Case-1>Duplicate Label Error

- Clicking the [Editing Support] button for a duplicate label error will open the label editing support dialog.

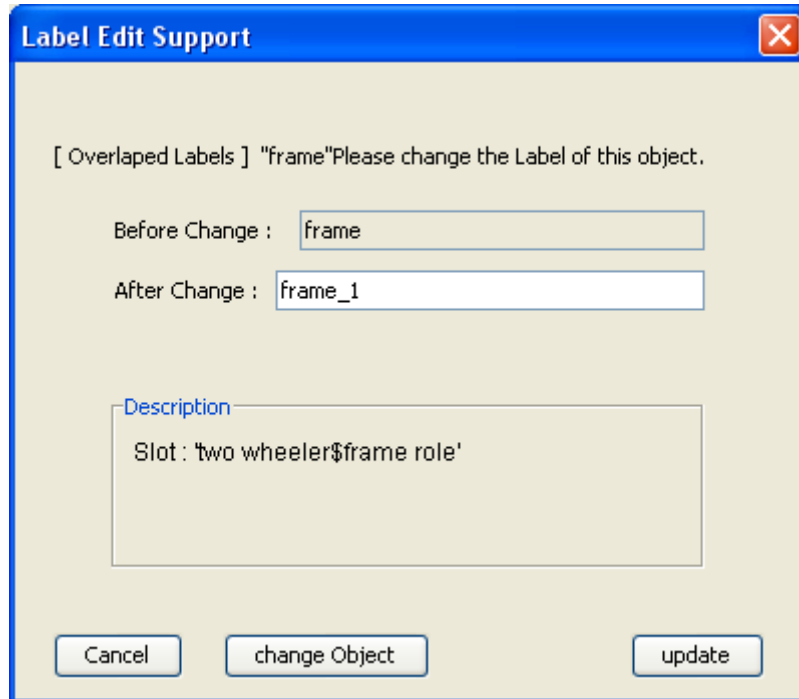


- Follow the editing support dialog directions to edit duplicate labels.

[Update] button: Updates the label.

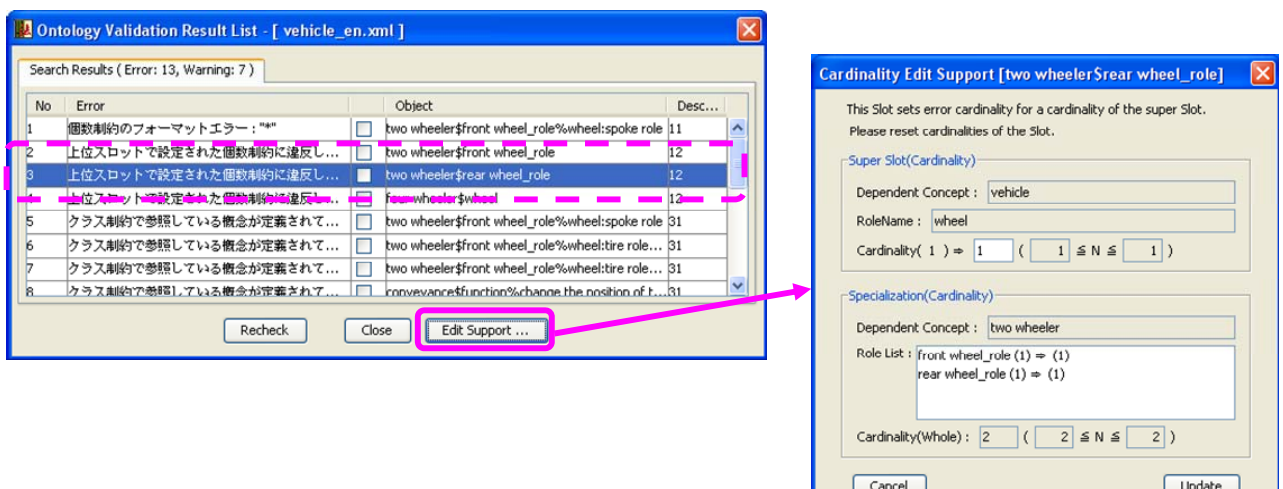
[Change Object] button: Changes the object whose label is being edited.

[Cancel] button: Closes the dialog without performing any editing operations.



<Case-2> Cardinality (quantity constraint) Error

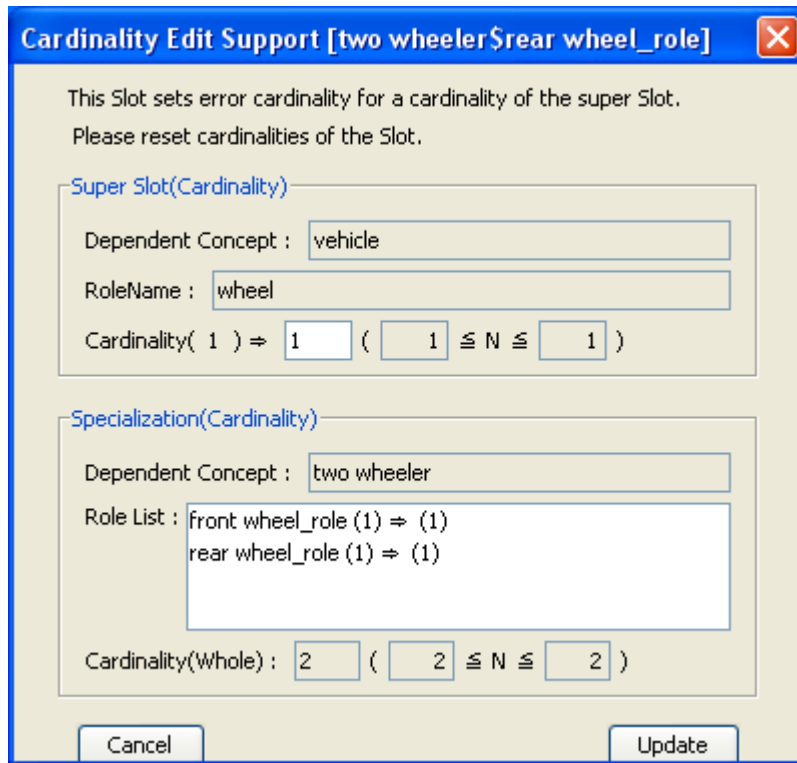
- Clicking the [Editing Support] button for a cardinality (quantity constraint) error will open the cardinality editing support dialog.



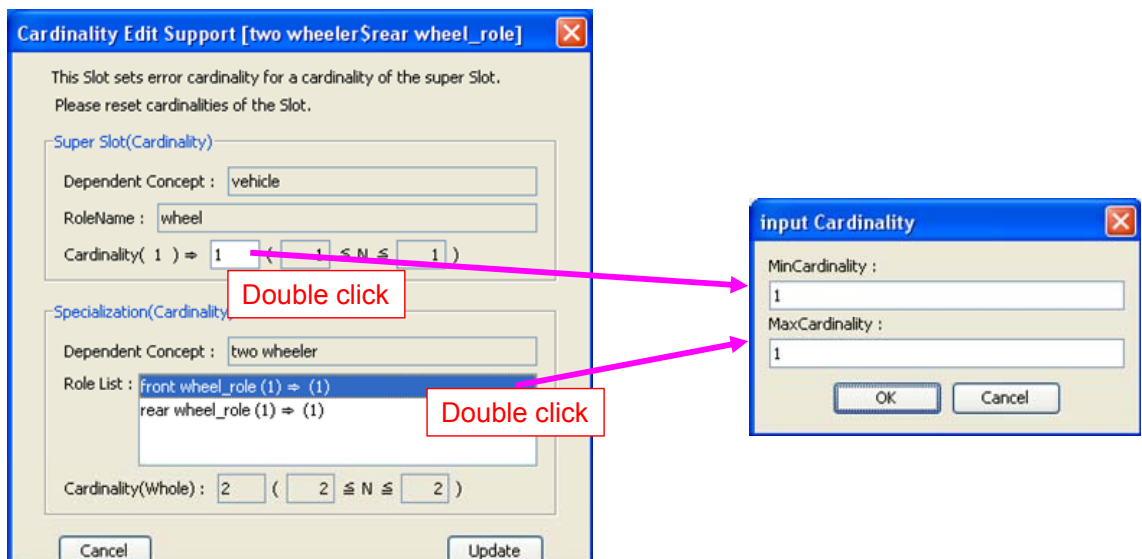
- Follow the editing support dialog directions to edit cardinality definitions in super slots and specialized slots.

[Update] button: Updates cardinality definitions.

[Cancel] button: Closes the dialog without performing any editing operations.

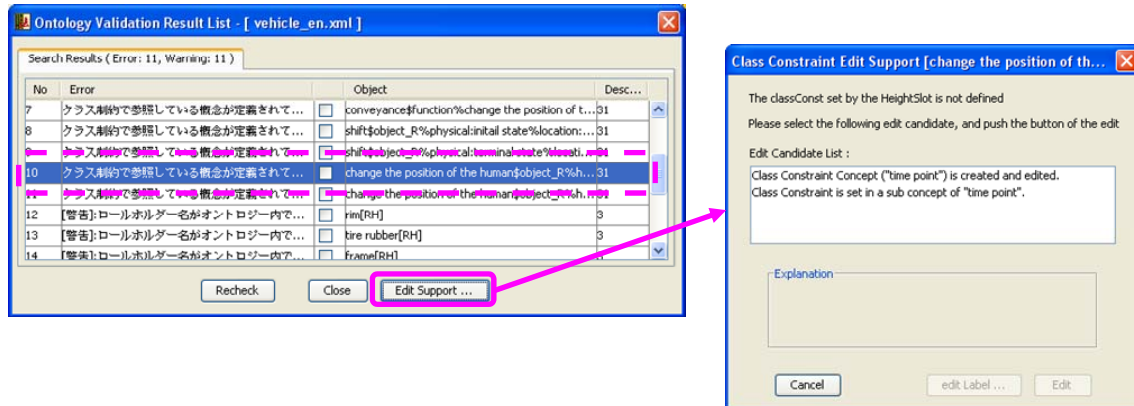


*Double clicking on super slot settings and specialized slot role list items will open the cardinality editing dialog, allowing editing operations to be performed.

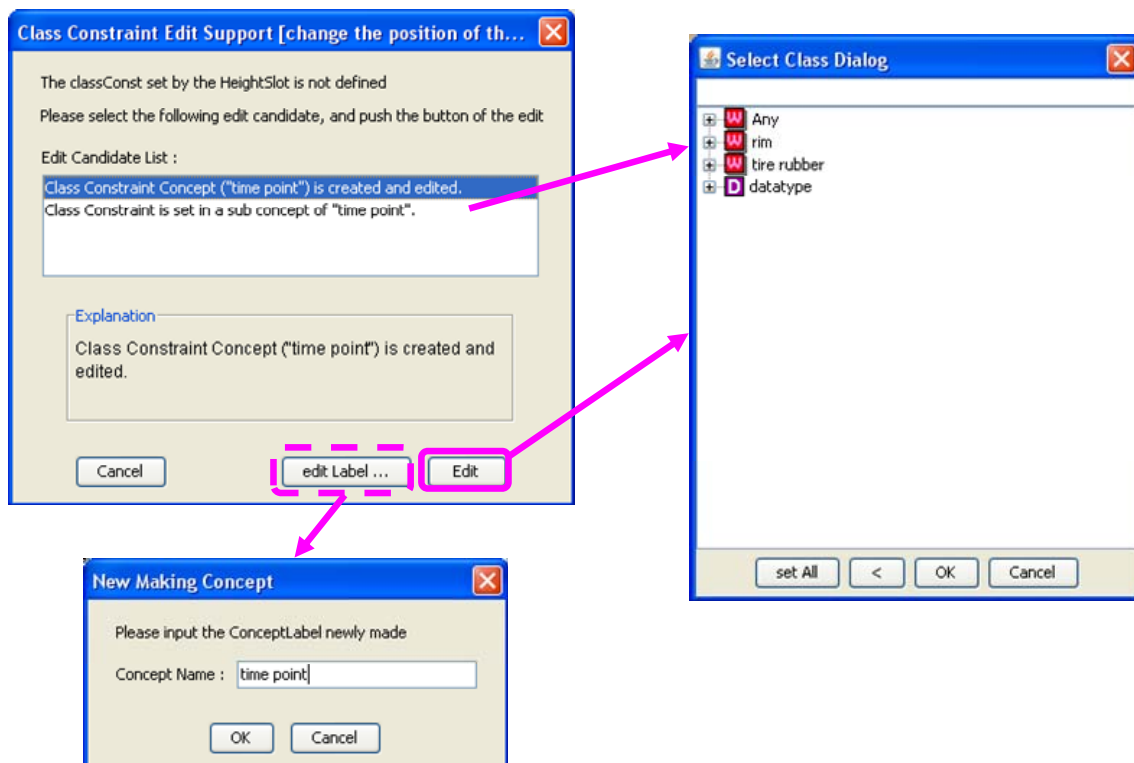


<Case-3> Slot Class Constraint Error

- Clicking the [Editing Support] button for a slot class constraint error will open the class constraint editing support dialog.



- Follow the editing support dialog directions to perform class constraint creation and selective editing operations.



[Perform Edit] button: Implements class constraint editing operations.

[Edit Label] button: the concept label can be edited.

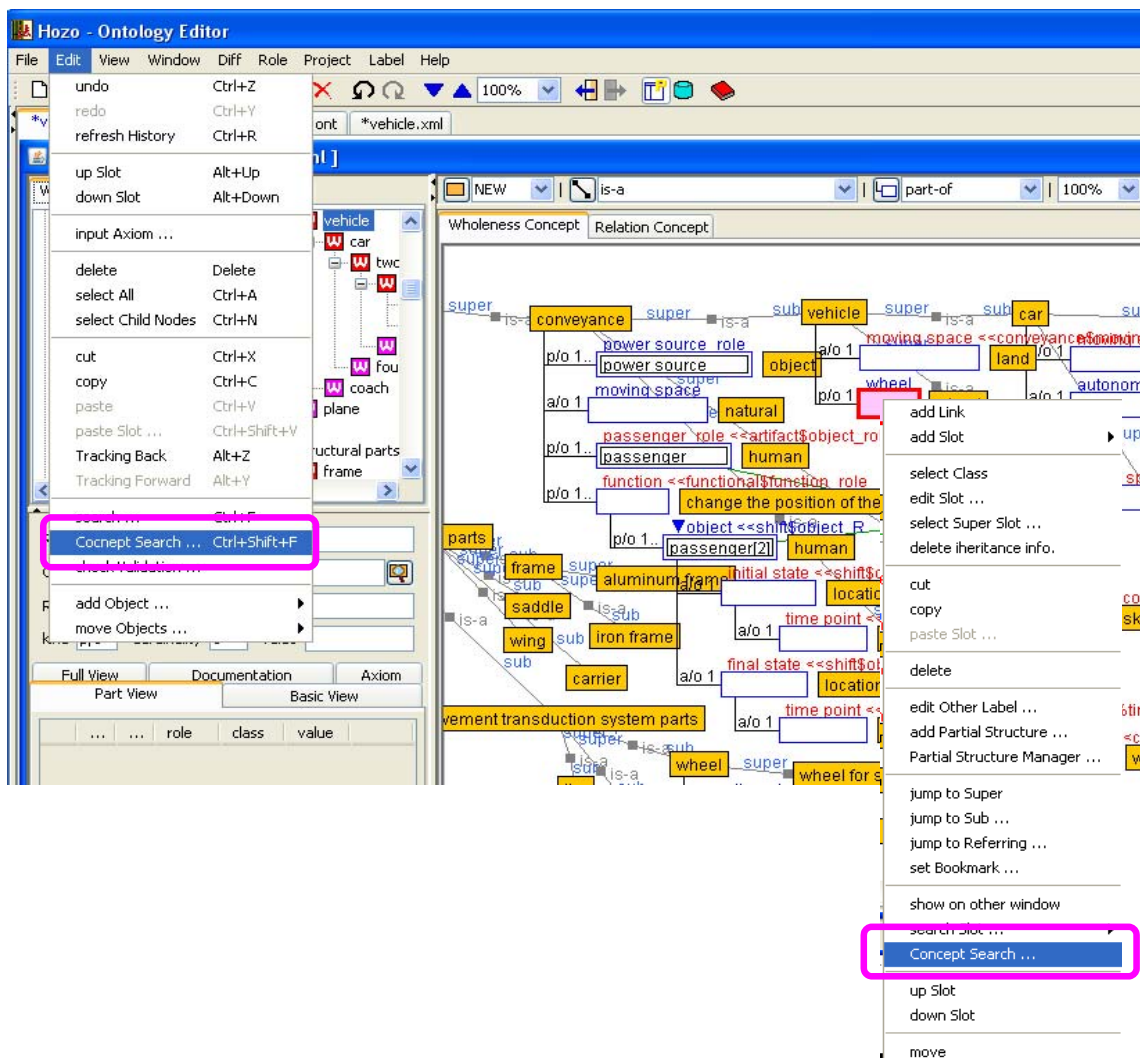
[Cancel] button: Closes the dialog without performing any editing operations.

(8) Performing searches using slot information (Advanced Concept Search Feature)

- Searches using slot information (role concept, class constraint) can be performed with the Advanced Concept Search Feature.

① Assigning search conditions

- When assigning conditions from an existing concept structure, select the slot to be used as the search condition, and chose [Advanced Concept Search] from the right-click menu.
- When assigning arbitrary search conditions, select [Edit (E)]-[Advanced Concept Search] from the main menu.

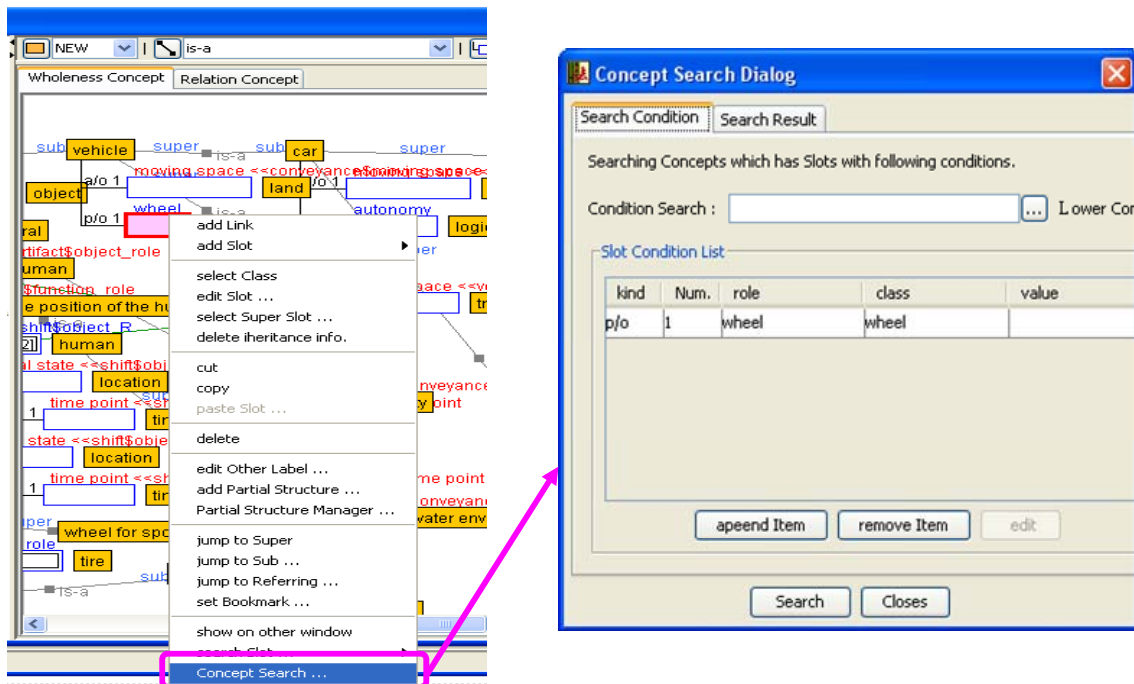


② Editing search conditions

- Performing menu selection will open the Advanced Concept Search dialog.
- Edit slot information.
 - Search Conditions: Puts constraints on output concepts.
 - Slot Condition Field: Input slot information to use as a search condition.

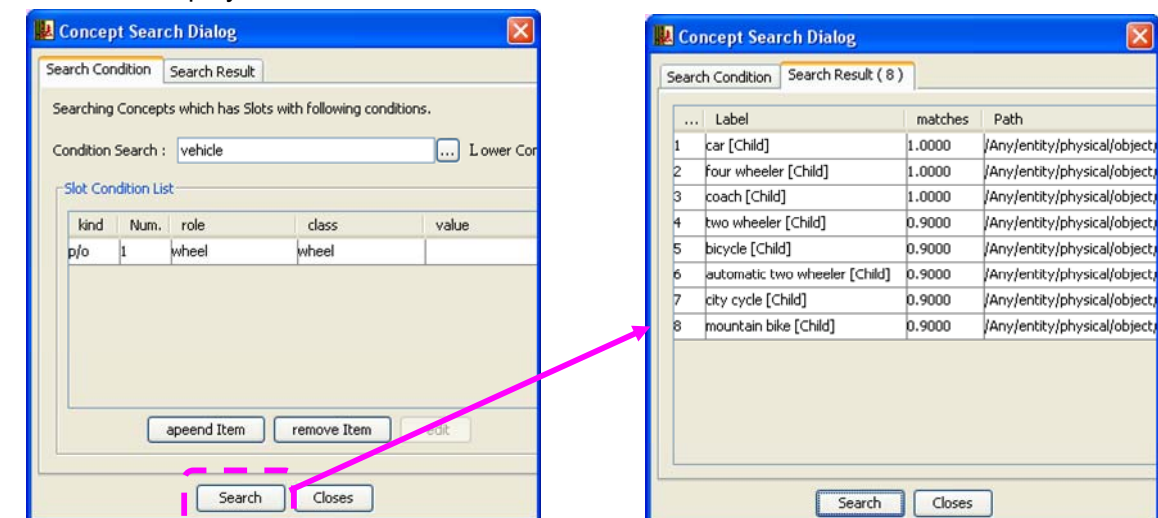
*It is possible to add/remove slot conditions.

*If this field is left blank, the search condition will be all values (arbitrary).



③ Performing advanced searches

- After assigning search conditions, click the [Perform Search] button on the bottom of the dialog to perform the advanced search; the view will toggle to the [Search Results] tab to display search results.



④ Viewing search results

- Search results are displayed in order by relevance.

Note) Concepts annotated with a (*) are dependent concepts of the Specified slots.

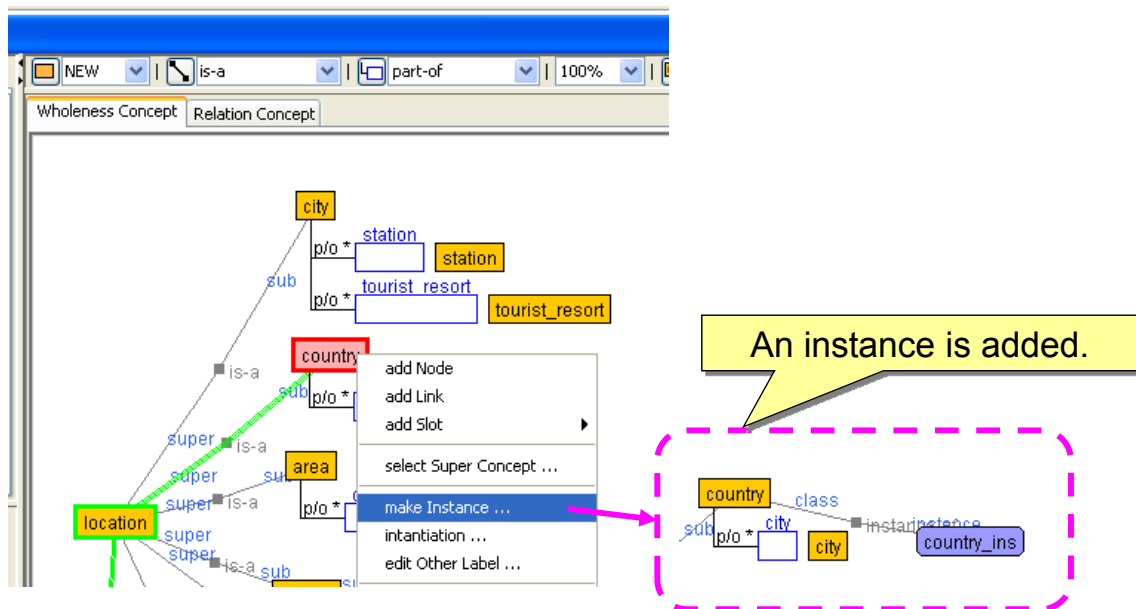
- When an item on the search results list is selected, the corresponding concept node (or slot, if a Role Holder) will be selected. Slots matching the search conditions will also be selected.

(9) Editing Instances (Simple Instance Editing Feature)

Instances required for Ontology structuring, such as instances used as constraint values within Ontology definitions, can be created with the Ontology Editor.

① Creating an Instance

- Select the concept node or slot, and choose [Create Instance] from the right click menu to open the editor (in the Browsing Pane) and create an instance node.
- It is not possible, however, to create sub nodes of an instance, or create instances without a super concept node.



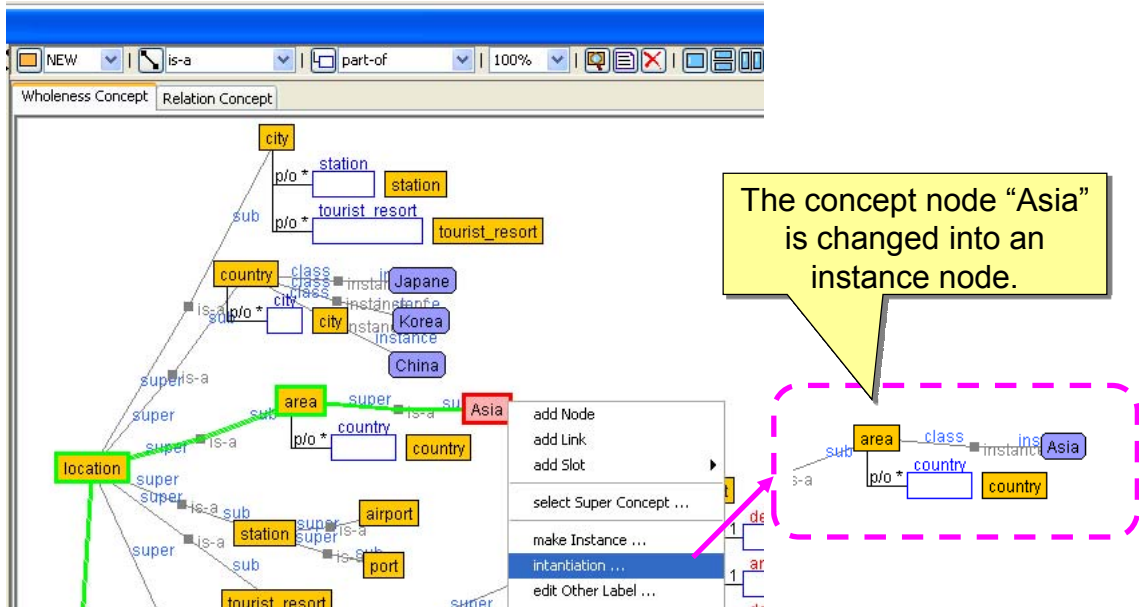
② Viewing and editing instances

- Instance nodes can be viewed/edited just as concept nodes.

The screenshot displays the Editor Panel for 'travelling.xml'. On the left, the WC-Tree shows a hierarchy of concepts: Any, location, city, country, area, station, airport, port, tourist_resort, route, line, free_route, inside_transport, attribute, and entity. The 'Japan' instance is highlighted under 'country'. A yellow callout bubble points to 'Japan' with the text 'An instance shown on the is-a tree'. On the right, the is-a tree diagram shows 'location' as a base concept with several subclasses: 'city', 'country', 'area', 'station', and 'tourist_resort'. 'Japan' is shown as an instance of 'country'. A yellow callout bubble points to the 'Japan' node in the tree with the text 'Editing the definition of instance on definition pane'. Below the tree, the definition pane is open, showing the 'Label' field with 'Japane' and the 'Super' field with '(Japane)'. The 'Slots' tab is active, showing a table with columns for 'role', 'class', and 'value'.

③ Instantiating an existing concept

- It is possible to instantiate an existing concept node.
- Select the concept node, and choose [Instantiate] from the right click menu to change the concept node into an instance node.
- However, instantiation can only be performed when the node has no sub concepts.



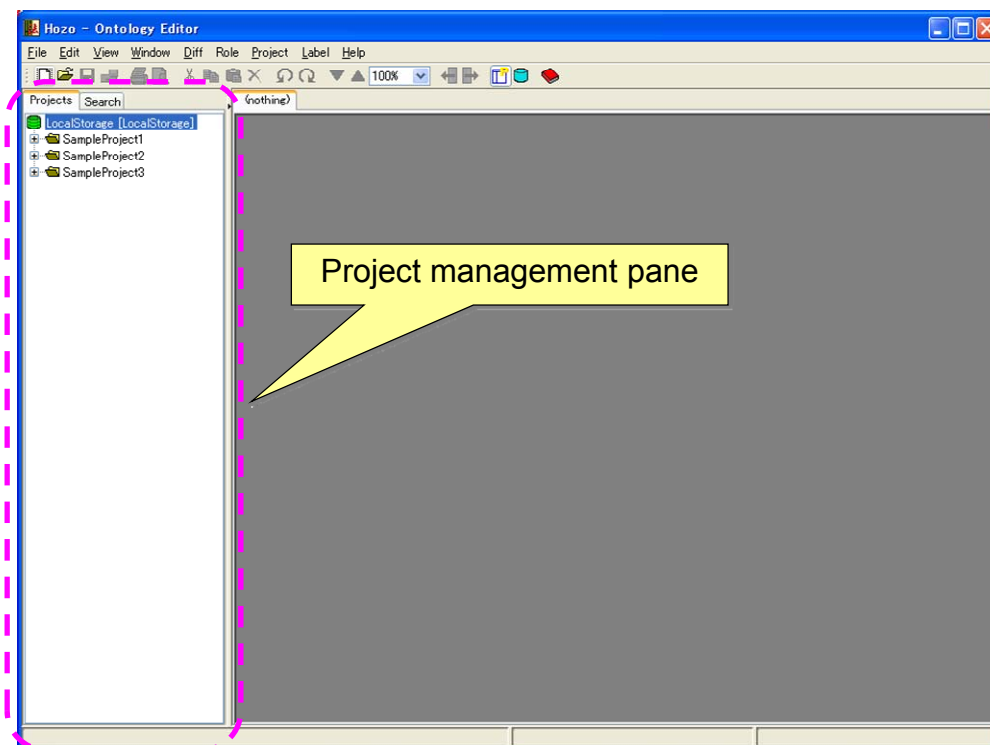
*The same operation can be used to change from an instance to a concept node.

4.2. Managing projects

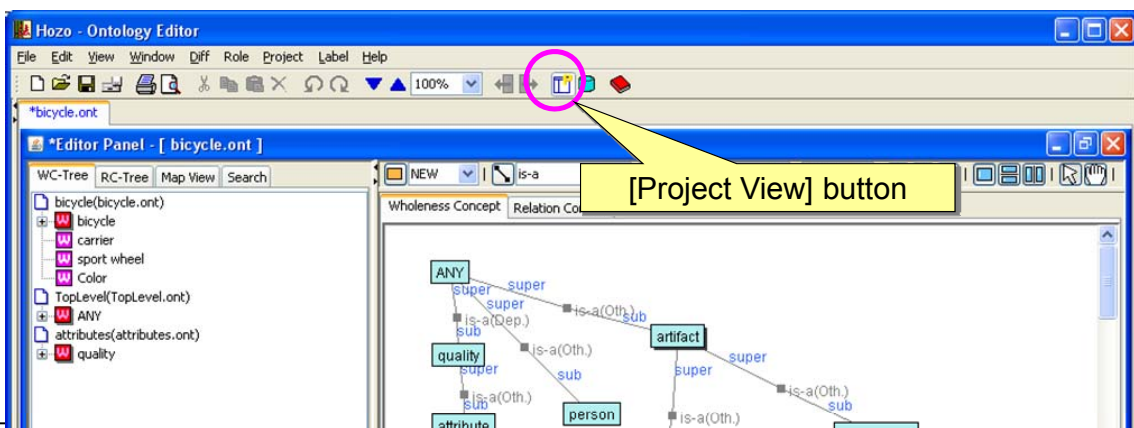
The Project Management Features allow an Ontology to be divided into multiple component Ontologies to facilitate the structuring of large scale Ontologies and collaborative work by multiple developers.

4.2.1. Viewing project management

- If the "Use project management features" box is checked in the Initial Setup Dialog, the Project Management Pane will be displayed on the left side of the screen when the Ontology Editor is started. Most project management operations can be performed in the Project Management Pane.



- Clicking the [Project View] button in the Ontology Operations Toolbar toggles the Project Management Pane view.



(Reference) About the Project Management Tree view

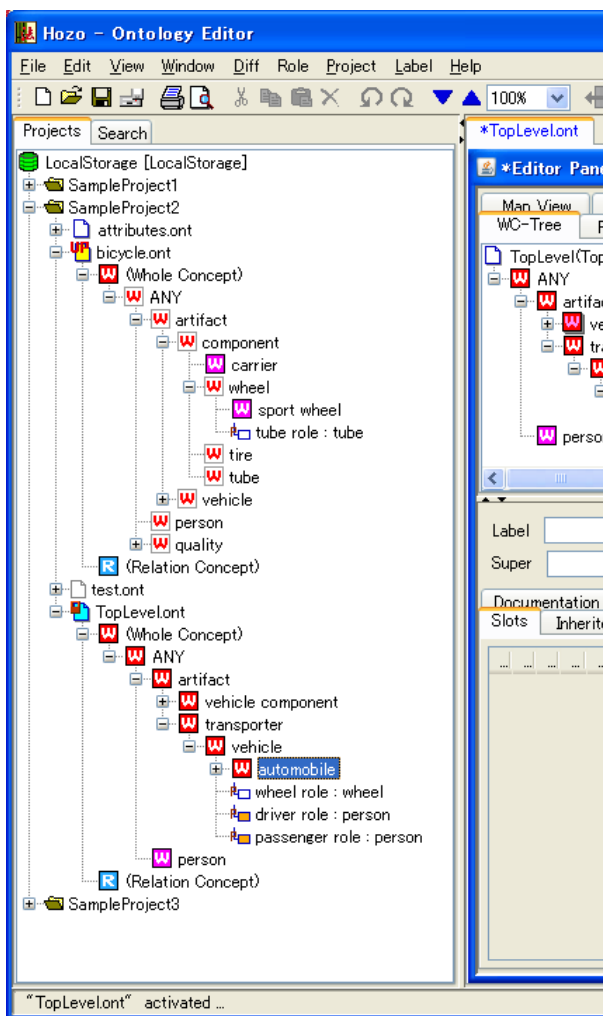
• The Project Management Tree displays and operates the following managed entities in Hozo (local directory) in a tree hierarchy:

"Project" (folder) in Hozo

"Ontology" in Project

"Concept" in Ontology

"Slot" in Concept



• Project Management Tree icon view

:Root folder

:Project folder

:Local project folder

:Ontology file

:Ontology updated on server

:Ontology updated on server

(Locked)

:(Locked Ontology)

:Ontology with unlock key

:Locally updated Ontology

:Locally updated Ontology

(with unlock key)

:Locally updated Ontology

(Locked)

:Local Ontology (no shadow)

:Wholeness Concept

:Relational Concept

:Imported Concept

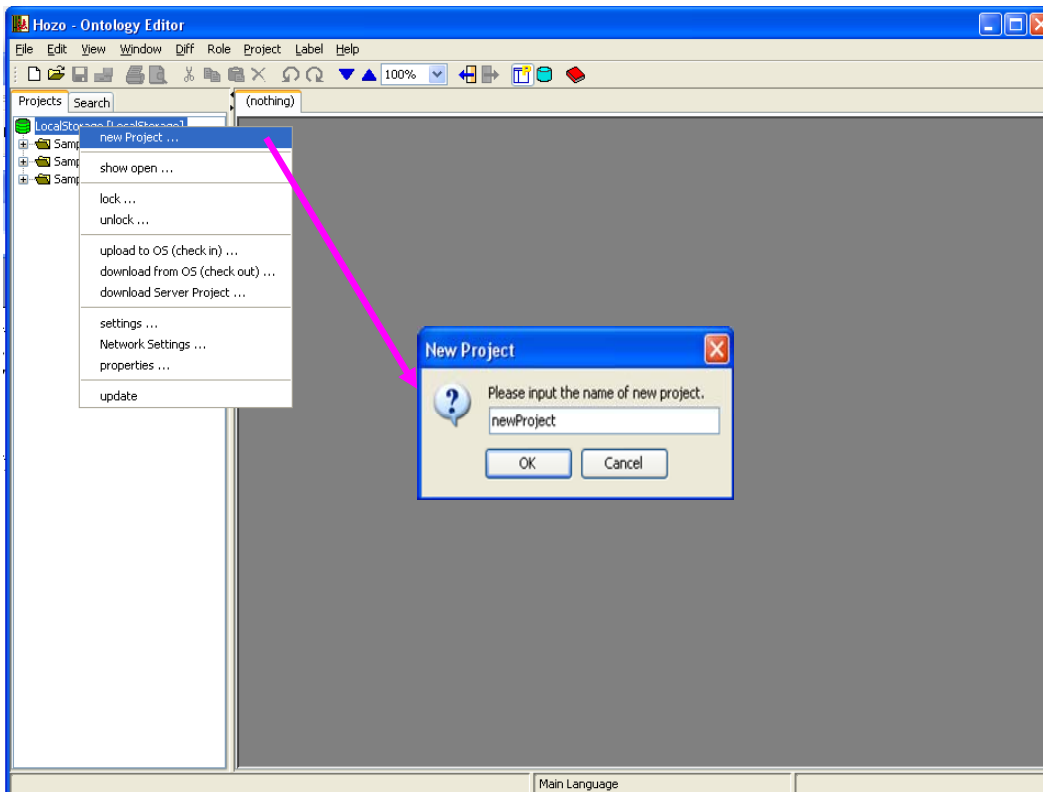
:Slot (part-of)

:Slot (attribute-of)

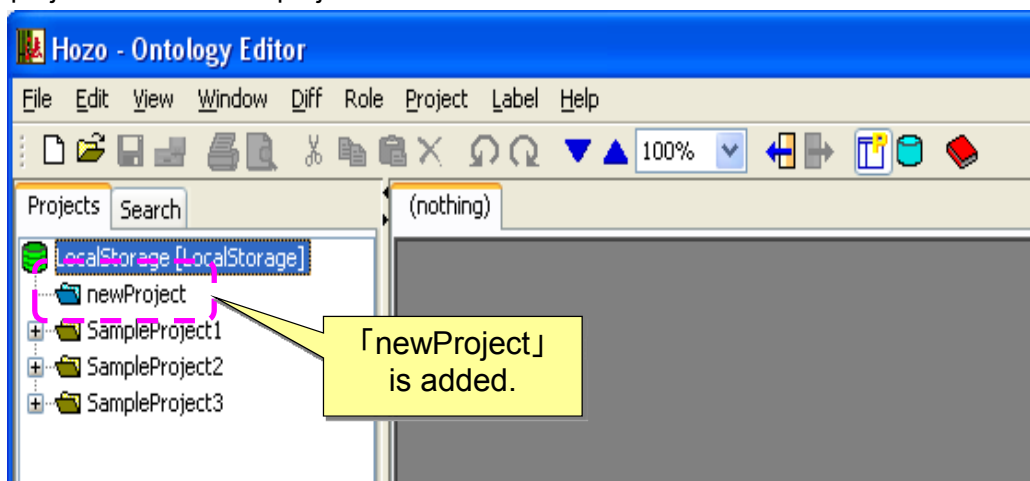
:Inherited slot (overwritten slot)

4.2.2. Creating a New Project

Select and right-click on the root folder icon in the Project Management Tree then select [New Project] from the right-click menu to open the "New Project Creation" dialog.



- Enter a name for the new project and click the [OK] button to add the new project. The project will be a local project and have a blue icon.

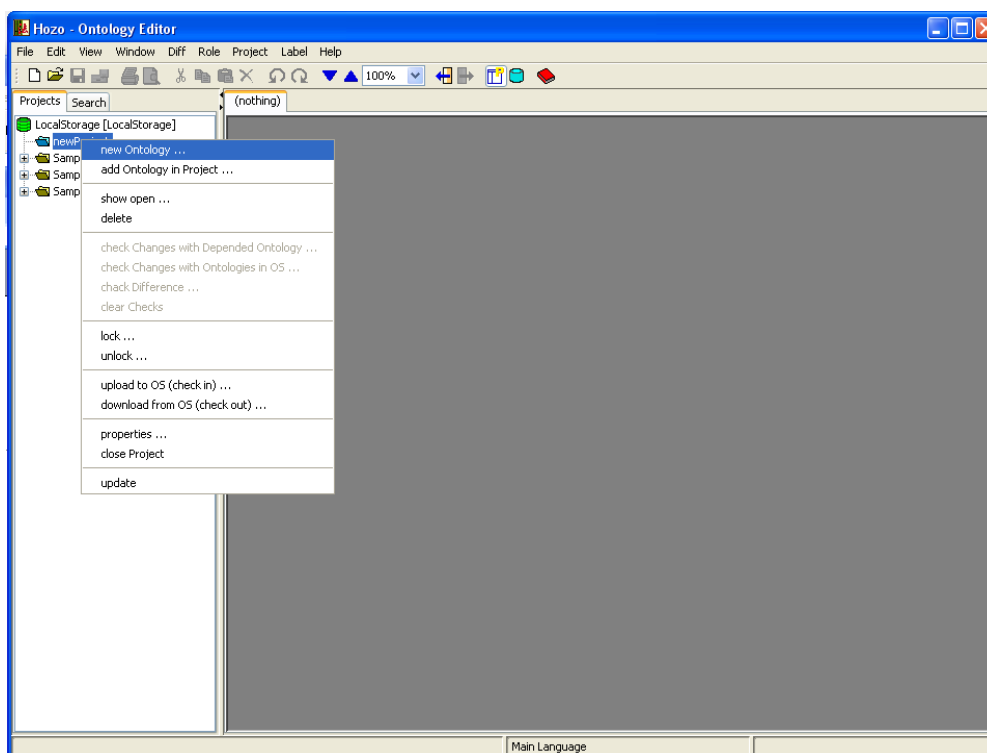


[Attention] Multiple projects having the same filename cannot be created in the editor (local directory); an error message will be displayed.

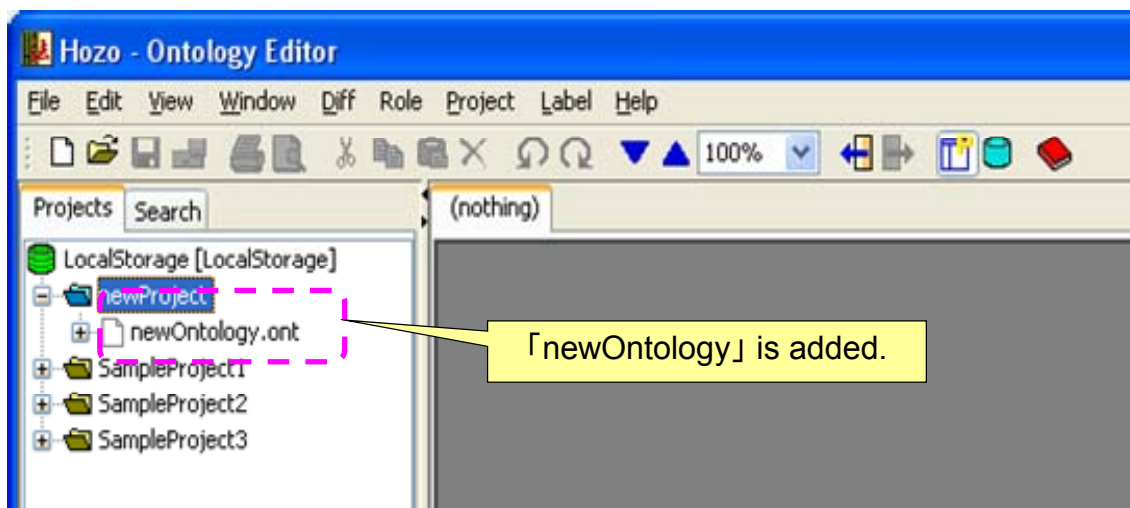
4.2.3. Operating the Project

(1) Adding a new Ontology

- Select and right-click on the Project Management Tree root or project folder icon then select [New Ontology] from the right-click menu to open the "New Ontology Creation" dialog.



- Enter a name for the new Ontology and click the [OK] button to add the new Ontology.

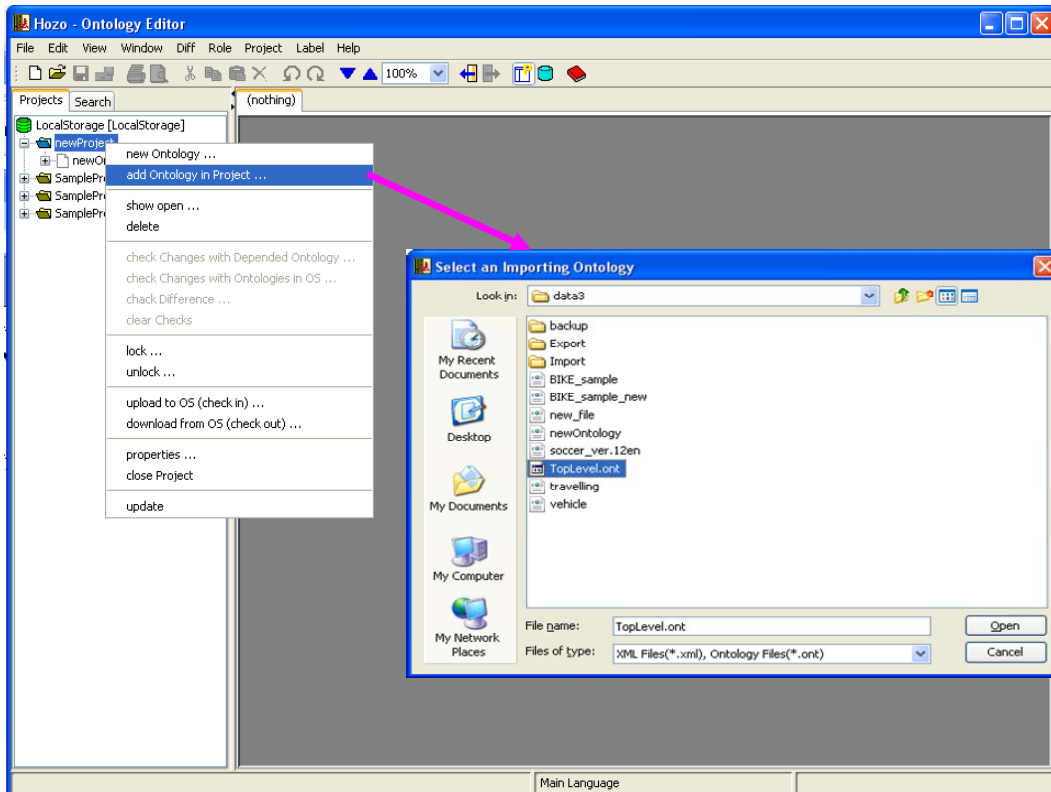


[Attention] Multiple Ontologies having the same filename cannot be created in the project (an error message will be displayed).

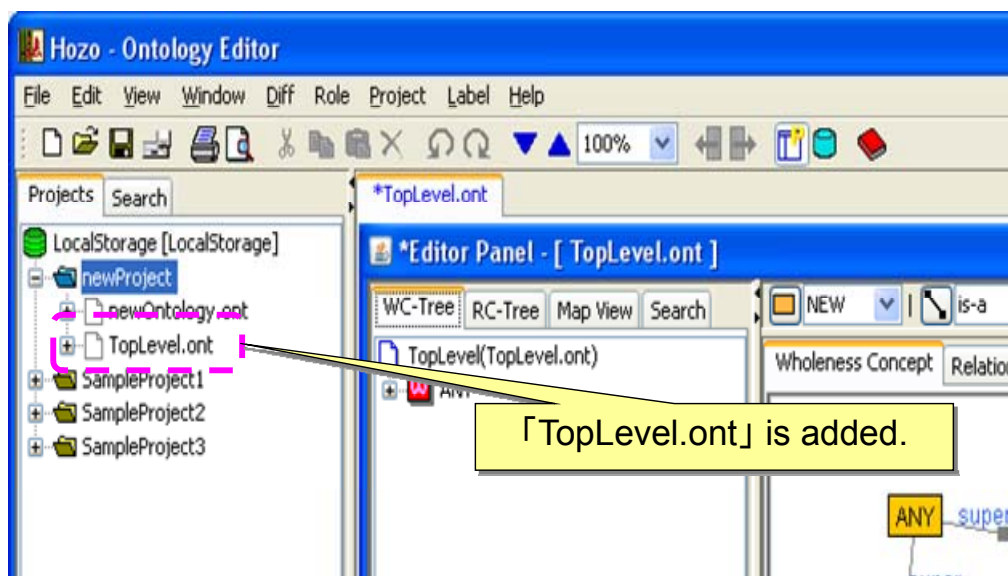
(2) Adding an existing Ontology

*Allows importing of standalone Ontology files (.xml) and Ontology files created in other projects (.ont).

- Select and right-click on the Project Management Tree root or project folder icon then select [Add Existing Ontology] from the right-click menu to open the file selection dialog.



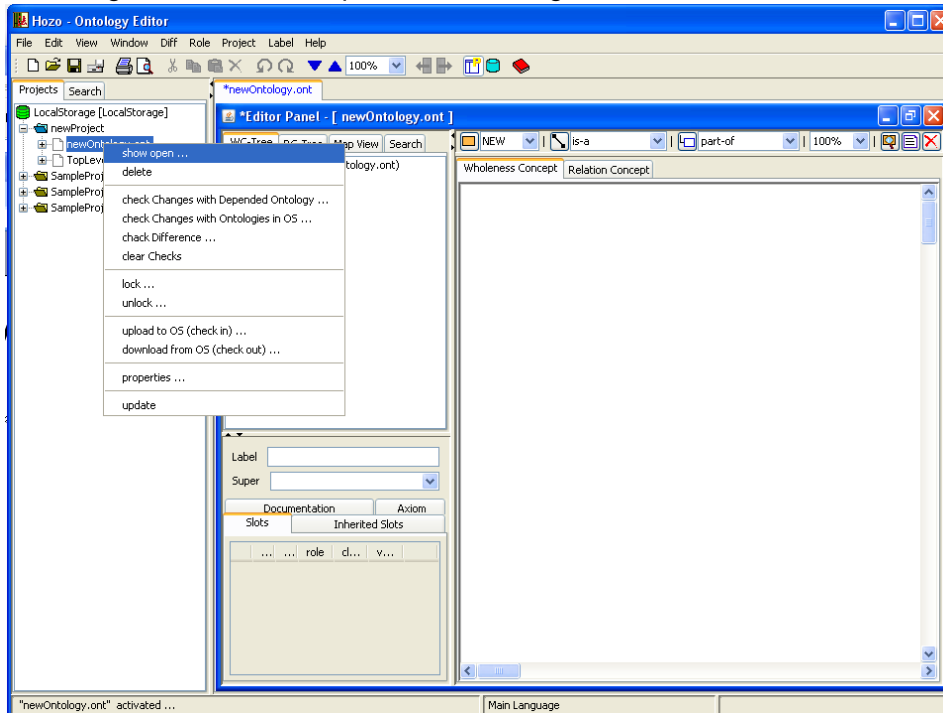
- Enter a name for the new Ontology and click the [OK] button to add (import) the existing Ontology.



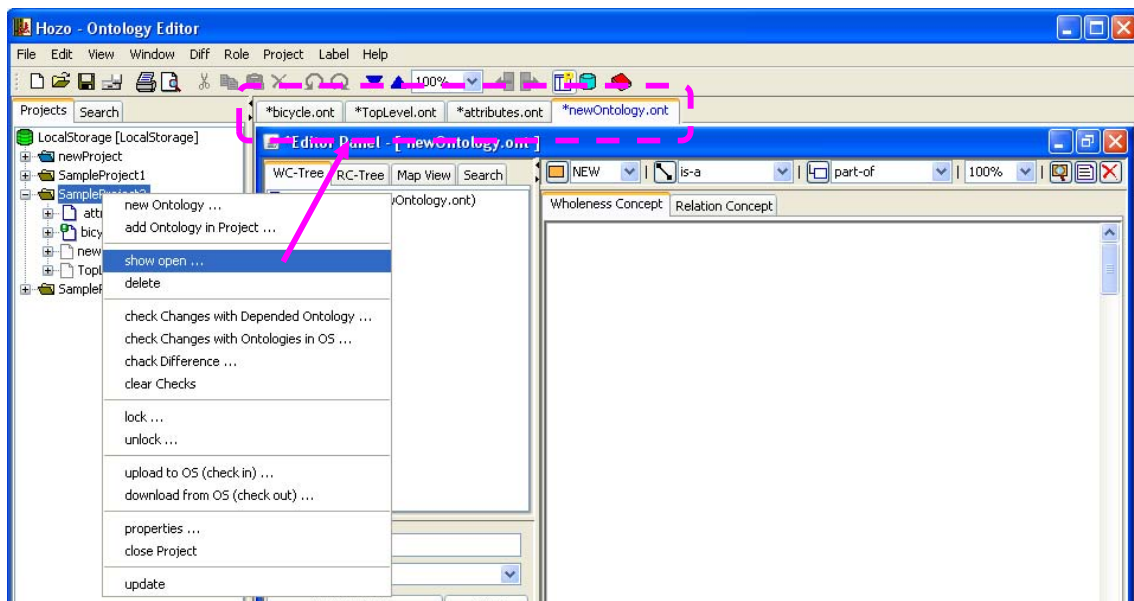
- * The designated Ontology file will automatically be copied to the project as a new Ontology file (its file extension will be changed to .ont).
(This will have no effect on the existing Ontology file.)

(3) Viewing Ontologies

- Double click the Ontology file icon in the Project Management Tree, or select [Open] from the right-click menu to open a new Editing Panel in the window.

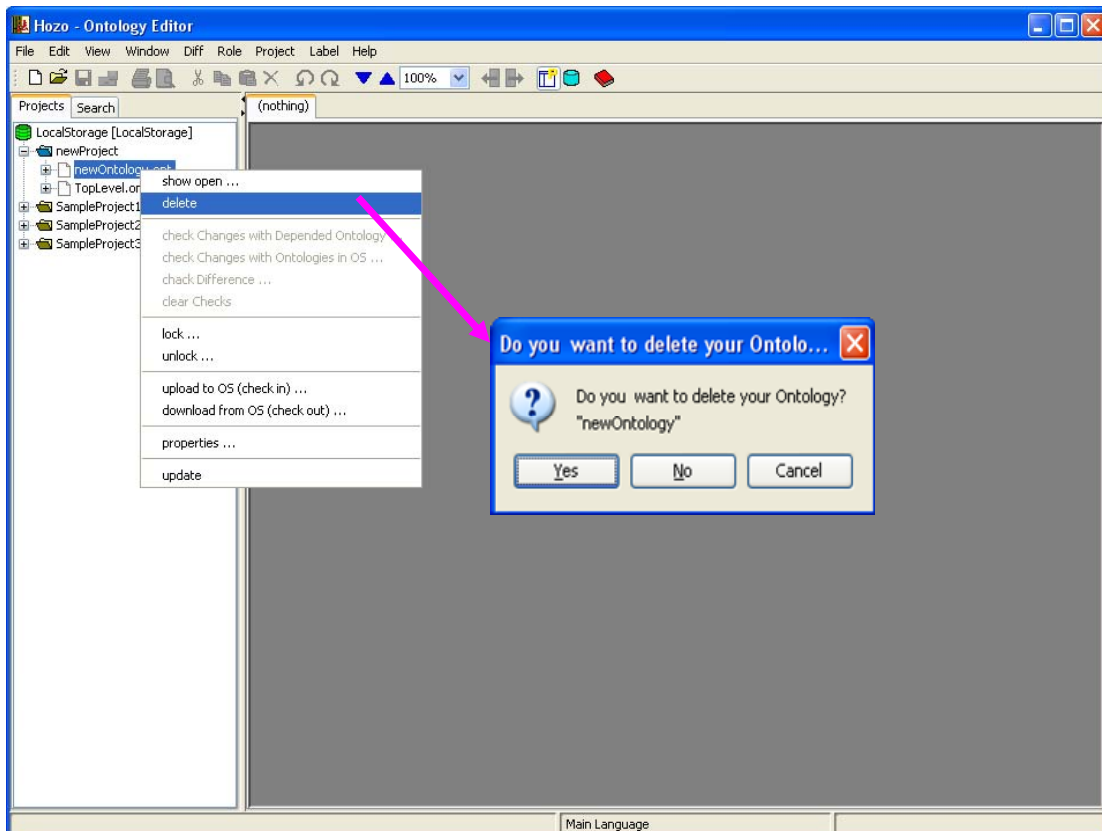


- *Right clicking the project folder icon in the Project Management Tree and selecting [Open] from the right-click menu will display all Ontology files in that project in the Editing Panels.

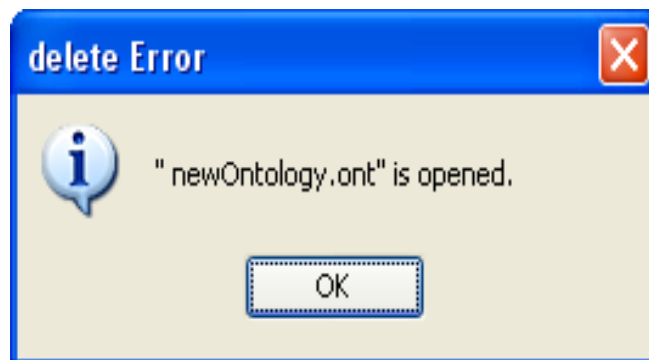


(4) Deleting Ontologies

- Right-click on the Ontology file icon in the Project Management Tree and select [Delete] in the right-click menu to open the deletion confirmation dialog.
- Click the [Yes] button on the bottom of the dialog to delete the selected Ontology file from the project.

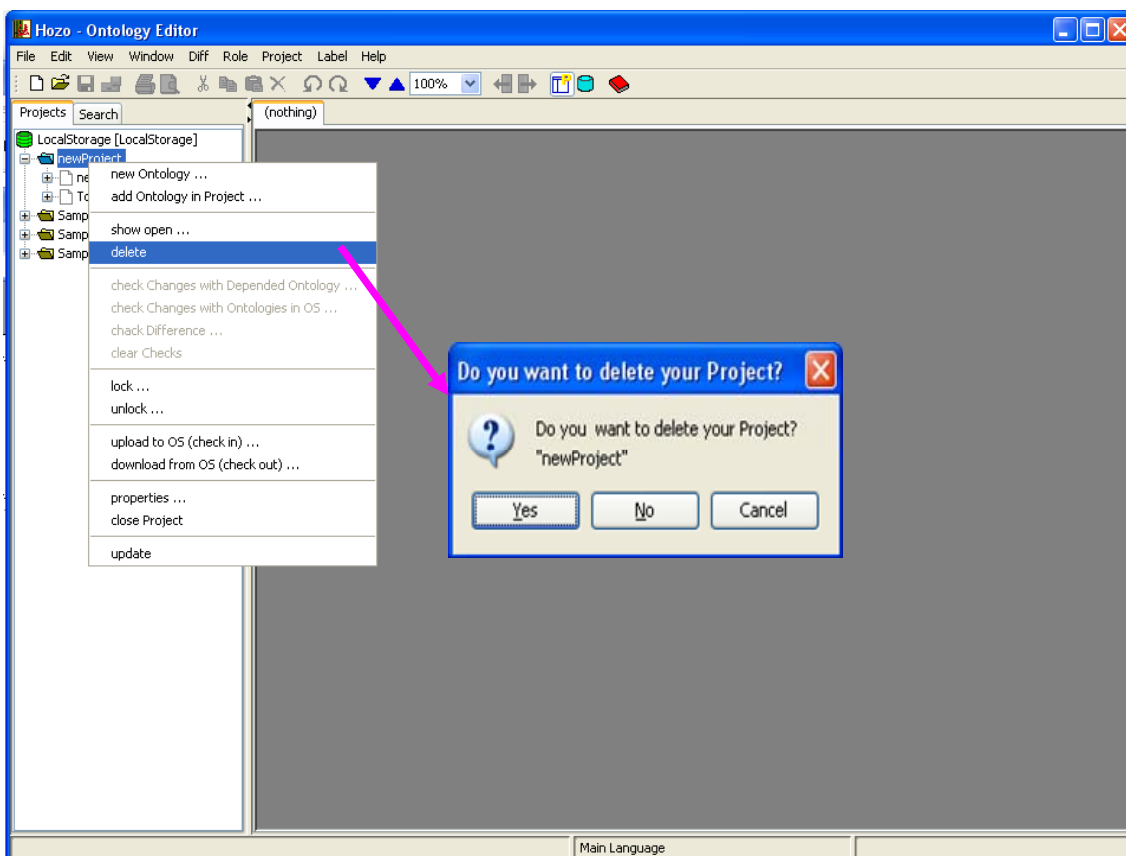


*It is not possible to delete Ontologies when their files are open (Ontologies that are being edited). Close the editing panel before proceeding.



(5) Deleting projects

- Right-click on the project folder icon in the Project Management Tree and select [Delete] in the right-click menu to open the deletion confirmation dialog.
- Click the [Yes] button on the bottom of the dialog to delete the project folder.



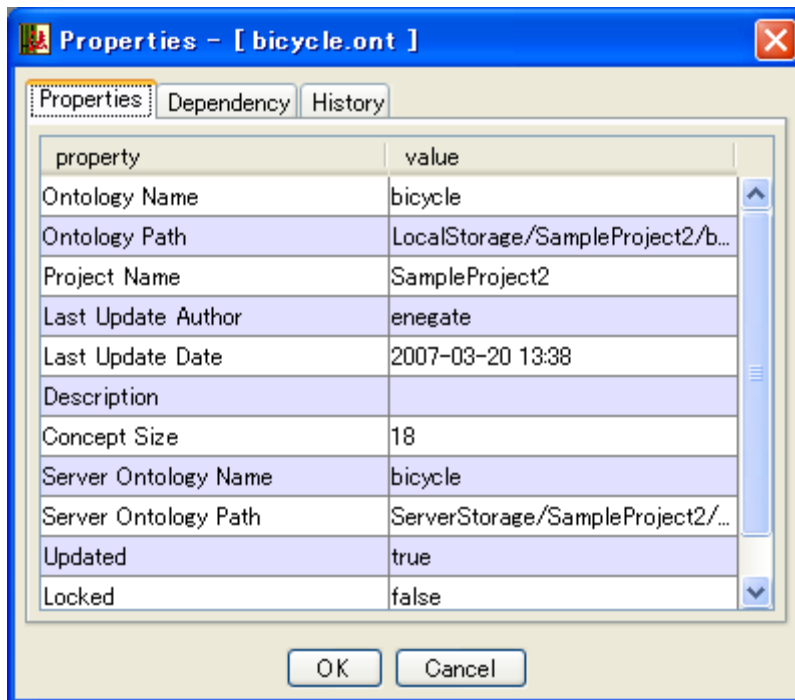
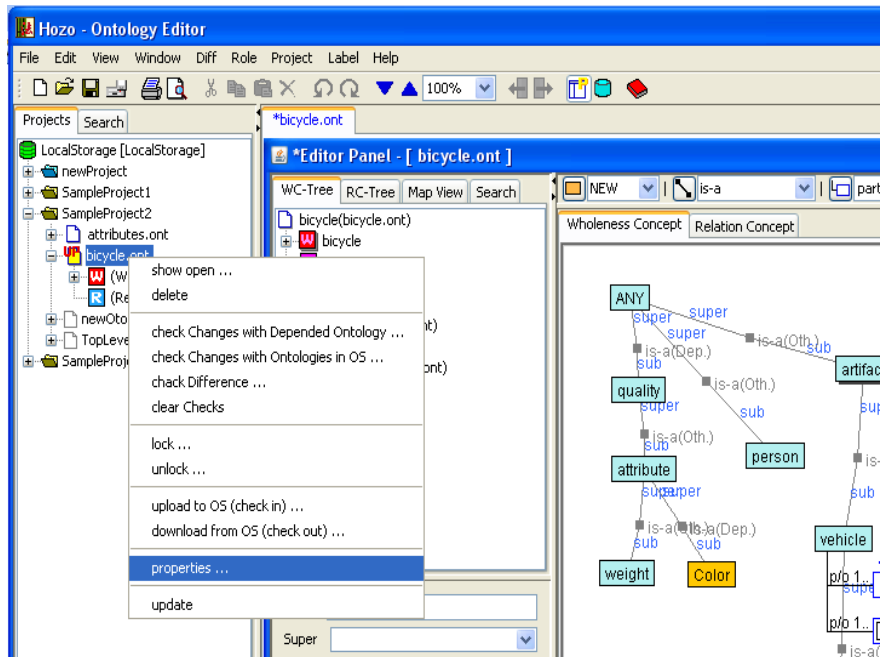
*It is not possible to delete projects that have open Ontology files (Ontologies that are being edited). Close the editing panel before proceeding.

*When a project is deleted, the Ontologies in that project are also deleted.

4.2.4. Other Features

(1) Viewing properties

- Right-click on the Ontology file icon in the Project Management Tree and select [Properties] in the right-click menu to open the properties dialog.



(Reference) Items shown in the Ontology properties dialog

① "Properties" tab

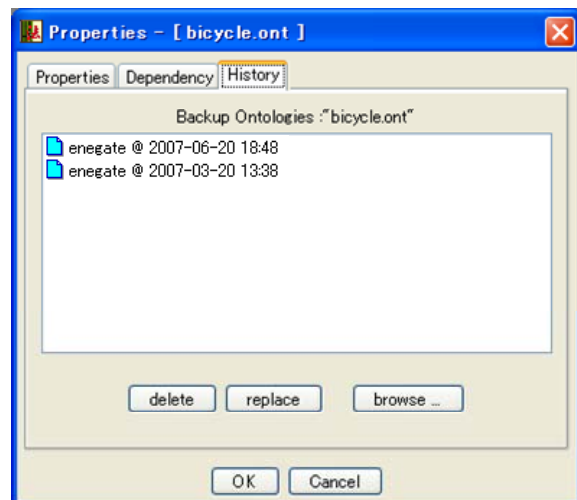
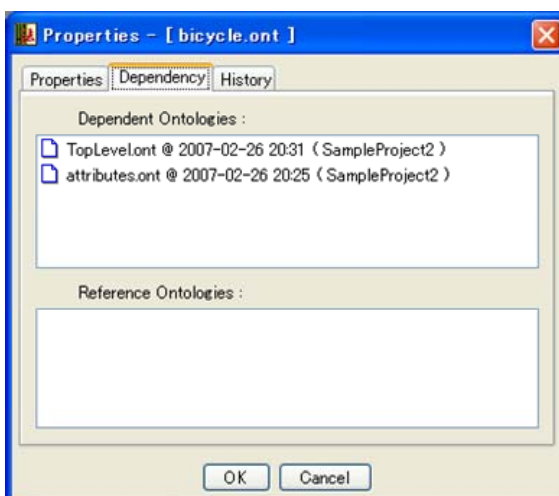
- Ontology name: the Ontology's name (i.e. filename)
- Ontology path: path of the Ontology file
- Project name: name of the affiliated project
- Last updated by: name of last user to update the Ontology file
- Last update date: date when the Ontology file was last updated
- Explanation: Explanation of Ontology files
- Concept class number: number of concepts stored in the Ontology file
- Server Ontology name: name of Ontology on the server
- Server Ontology path: path of the Ontology file on the server
- Server update: indicates whether the Ontology file on the server is updating
- Locked: indicates whether the Ontology file on the server is locked
- With key: indicates whether or not the unlock key is possessed

② "Dependency Relationship" tab

- Depended Ontology: list of depending (referencing) Ontologies
- Referenced Ontology: list of Ontologies being depended (referenced)

③ "History" tab

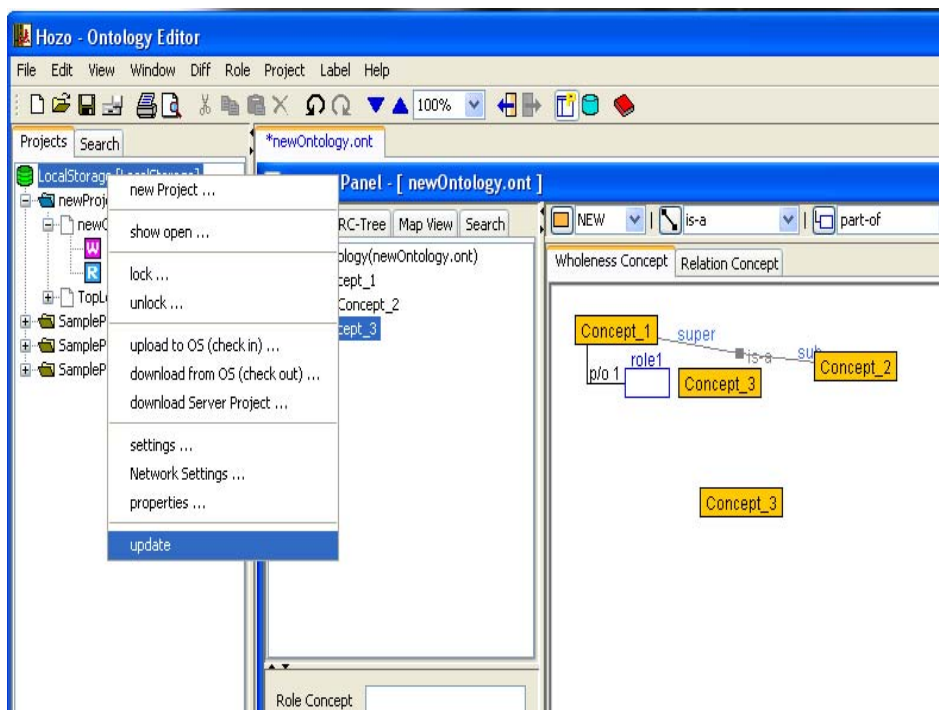
- Backup Ontology: list of Ontologies backed up during updates
 - [Delete] button: delete backup files selected from list
 - [Replace] button: replace selected file with latest Ontology file
 - [Browse] button: display selected file's Ontology in a separate window



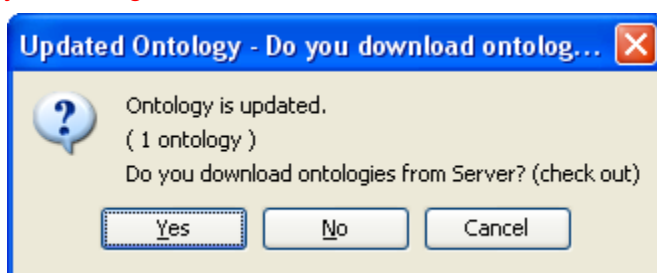
(2) Updating the Project Management Tree

*Project Management Features are applicable to saved Ontology files To apply updates made to Ontologies it is necessary to update the Project Management Tree.

- Right-click on the root folder (project folder) icon in the Project Management Tree and select [Update with Latest Information] to update the Project Management Tree.



*Checks whether the server-side Ontology files are up to date when updating the Project Management Tree.

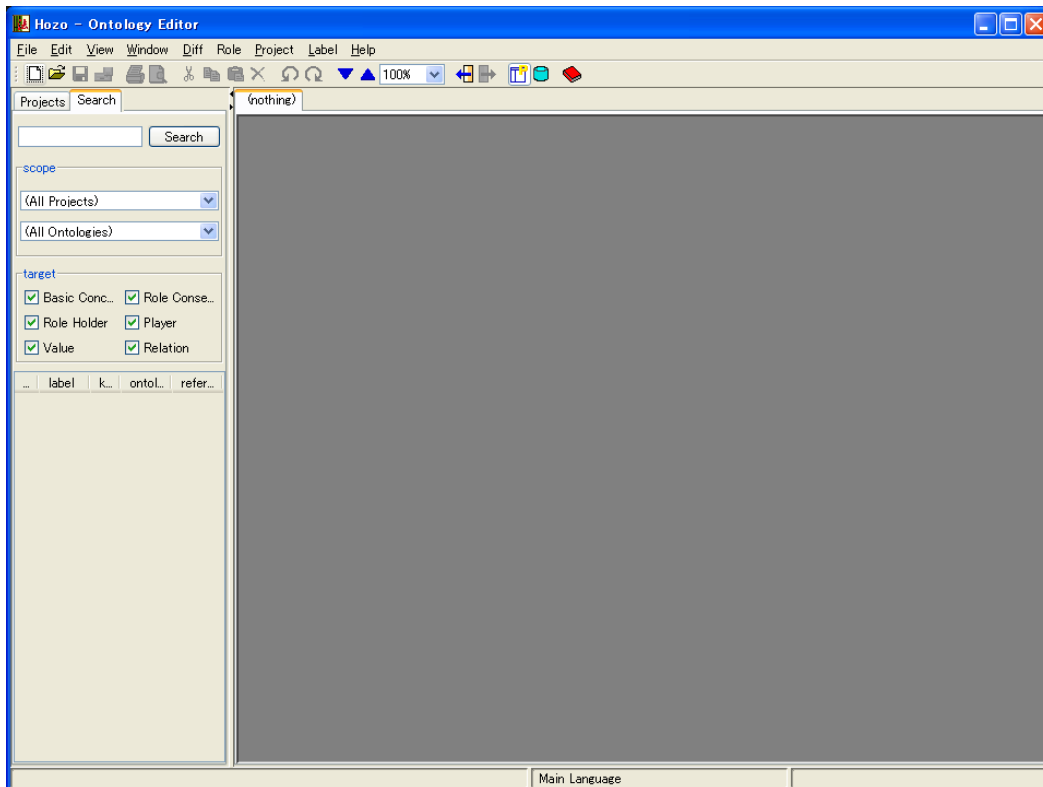


It is possible to confirm whether or not the server-side Ontology files are up to date by clicking the [Yes] button on the above screen.

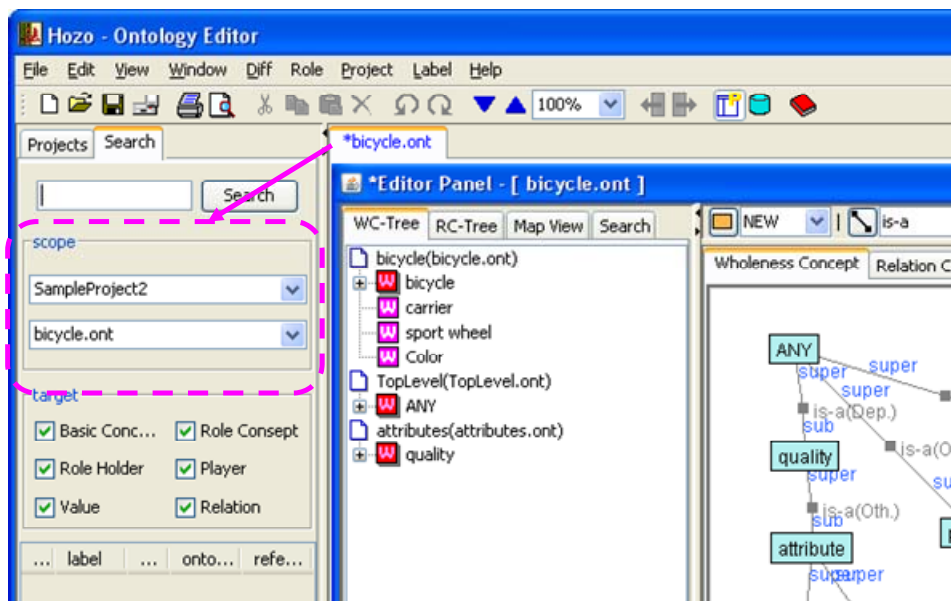
(3) Searching within a project

*Searching Ontologies within a project is performed using the Project Search Feature found in the "Search" tab of the Project Management Pane.

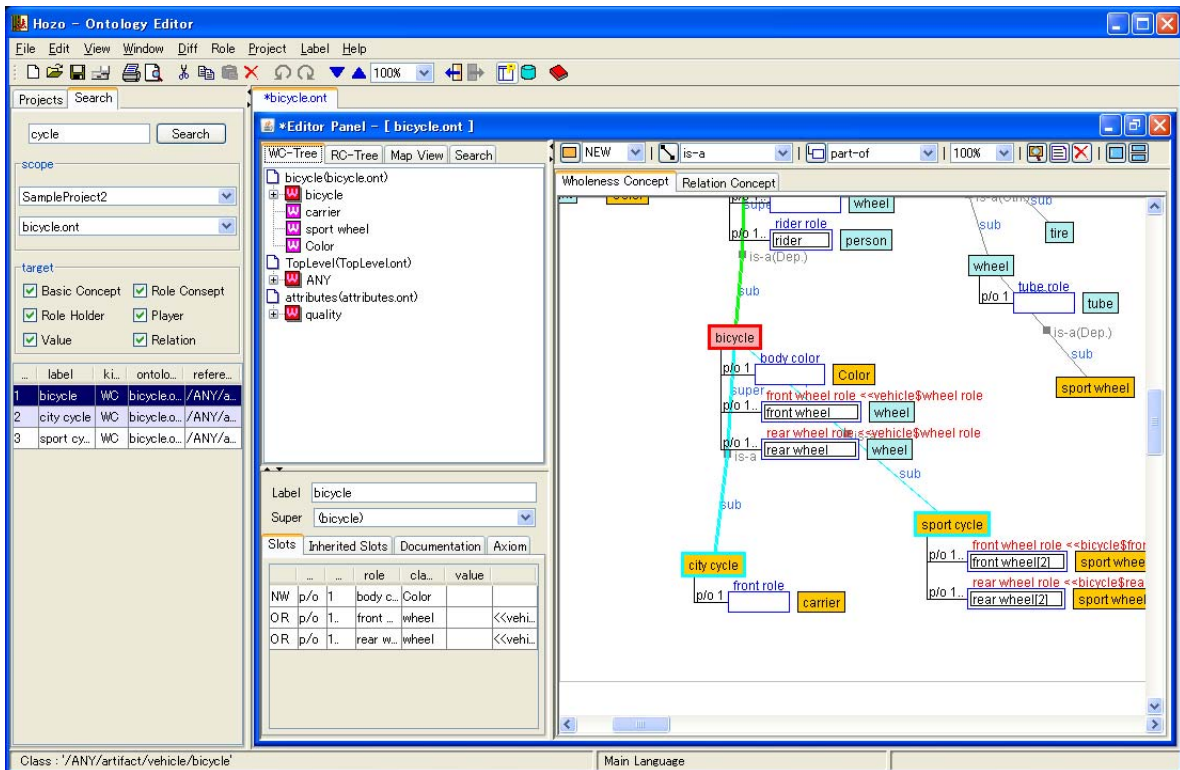
- Select "Search" tab of the Project Management Pane on the left side of the screen to open the "Project Search Panel".



*If the "Project Search Panel" is opened while editing an Ontology, the scope of the search will be that Ontology file.



- Assign search conditions in the upper part of the "Project Search Panel" and click the [Search] button to display search results in a table.



*Items specified in search conditions

① Search text

- Search text: enter a character string to search
- [Search] button: performs search
- [Reset] button: clears search conditions and results

② Search scope

- Project list: designate projects to search
- Ontology list: designate Ontologies to search

*Note) No Ontology list will be displayed if no project is designated

③ Search target: if checked, will be targeted by the search

- Basic Concept (class)
- Role Concept (slot)
- Role Holder
- Class Constraint
- Constraint Value
- Relationship

- Select and double click an item on the search result table on the bottom of the panel to select the corresponding Ontology object.

[Attention] There may be discrepancies when searching Ontologies that are currently being edited because the project search feature searches the saved Ontologies. Before searching, always save the file being edited, and update the Project Management Tree. When searching within Ontologies that are currently open (being edited), use the search feature in the Navigation Pane.

*Explanation of search table view

No	label	kind	ontology	reference
1	bicycle	WC	bicycle.ont	/ANY/artifact...
2	city cycle	WC	bicycle.ont	/ANY/artifact...
3	sport cycle	WC	bicycle.ont	/ANY/artifact...

Class : '/ANY/artifact/vehicle/bicycle'

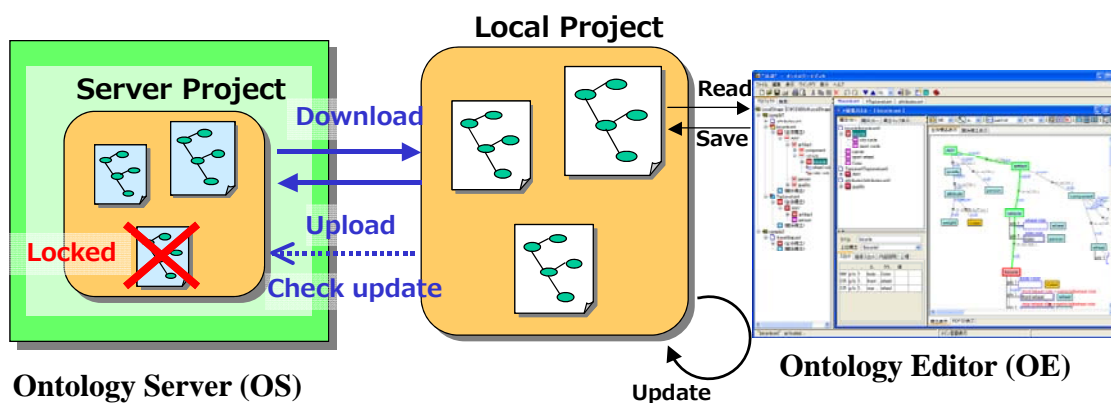
- No: item number
- Label: Ontology or slot label
- Class: shows Ontology class
 - WC**: Wholeness Concept
 - RC**: Relational Concept
 - SL**: slot (role concept)
 - RH**: Role Holder
 - RR**: Relational Concept relationship
 - C**: other concepts
 - R**: Other Relationships
 - (concept)+ 's'**: species concept
 - "ref." + (concept)**: reference
- Ontology: shows affiliated Ontologies
- Reference: shows path of concept hierarchy within Ontology
- (Status Bar): shows number of search results

*Click the header of the search results table to sort that header's column by ascending (or reverse) order.

4.3. Sharing Ontologies (distributed management)

In order to share Ontologies among multiple users, it is necessary to upload the locally created Ontology file. Furthermore, features are necessary to restrict (lock) changes to the uploaded file during editing, and to check the update information of other Ontology files. The below features will be explained in this chapter.

- Uploading Ontologies (4.3.1)
- Downloading Ontologies (4.3.2)
- Locking Ontologies (4.3.3)
- Checking Ontologies for updates (4.3.4)
- Managing server projects (4.3.5)



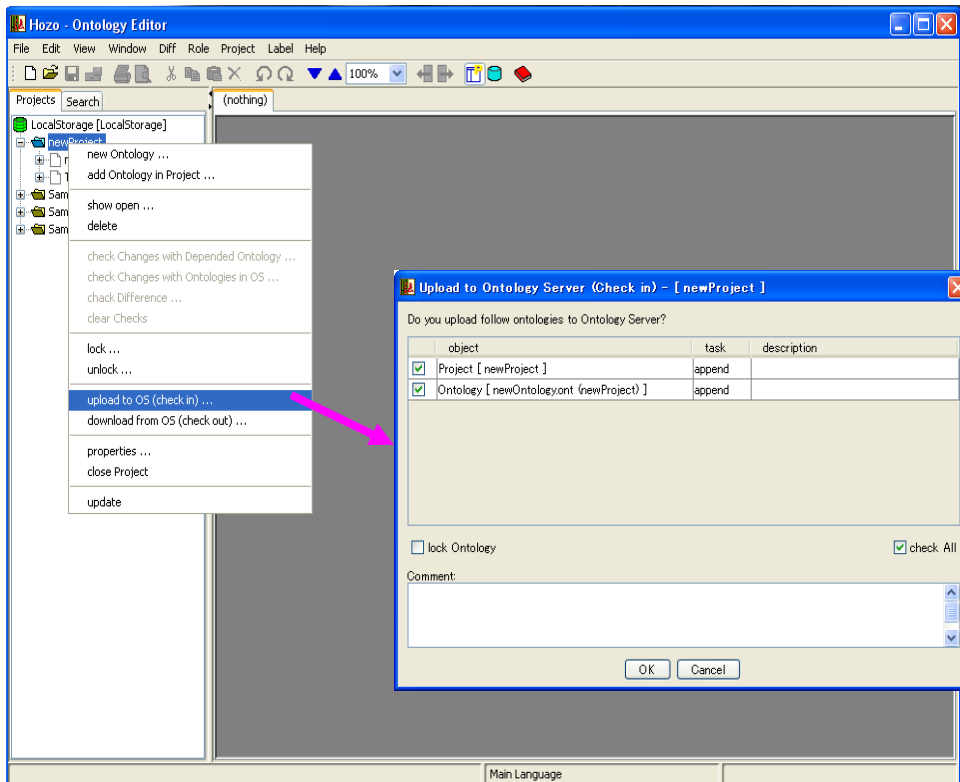
4.3.1. Uploading Ontologies

*In order to share Ontologies among multiple users, it is necessary to upload the locally created Ontology file to the Ontology server so that other users can reference it.

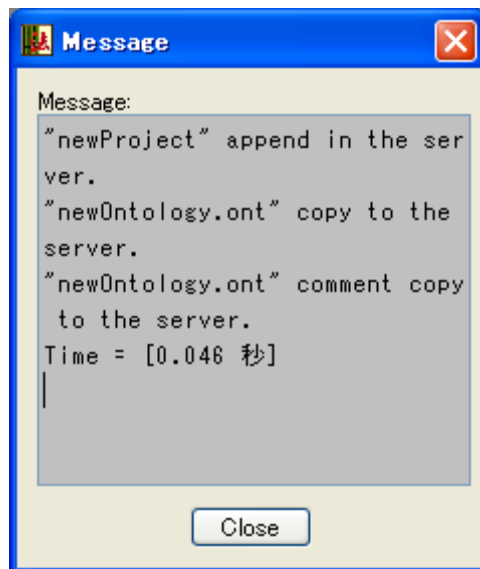
(1) Uploading local projects

- Right-click on the Project Management Tree project folder or Ontology file icon, and select [Upload to server (check in)] to open the Check-in Dialog in the center of the screen.

* If the corresponding project does not exist on the server, the project will be added (appended) on the server. If the project (or Ontology) already exists on the server, an update will be performed.

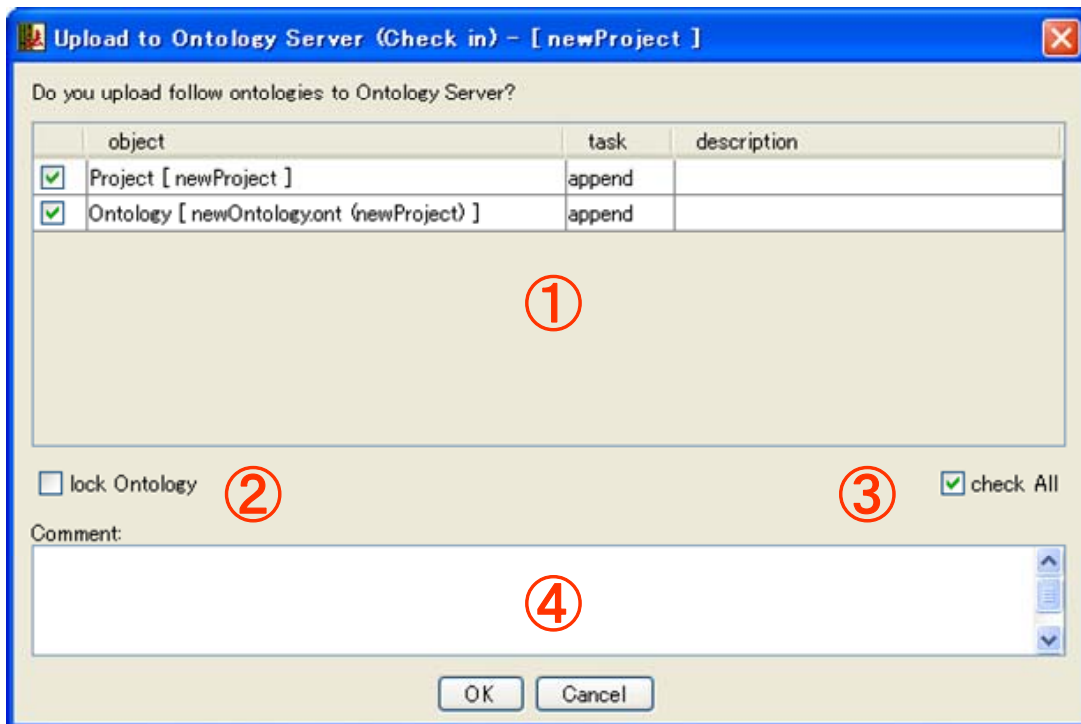


- Confirm the content to be uploaded, and click the [OK] button to upload the project folder (Ontology file) to the server; a confirmation message will be displayed.



*Standalone Ontology files are uploaded using the right-click menu of the Ontology file icon.

*Explanation of the Check-in Dialog



① Project task/table (center of screen):

- Displays list of items to be handled during check-in. If the check box at the head of the list is unchecked, it will be excluded from the target and will not be uploaded.
- When handling is not possible, for example the existing project file is locked (unchangeable) etc., the list color will change and it will automatically be excluded from handling.
- Handling details
 - "**append**": adds folders or files.
 - "**update**": updates folders or files.
 - "**delete**": deletes folders or files.

② Ontology lock (check box):

- If checked, Ontology will be locked on update (server updates not possible).
- If unchecked, Ontology will be unlocked on update (server updates possible).

③ Check all (check box):

- If checked, all items on the task list will be checked.
- If unchecked, all items on the task list will be unchecked.

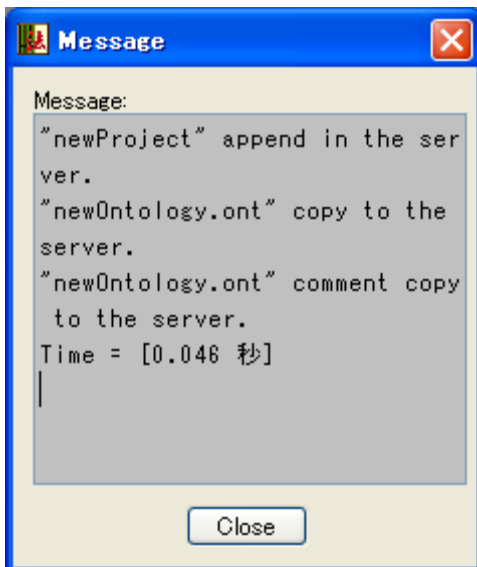
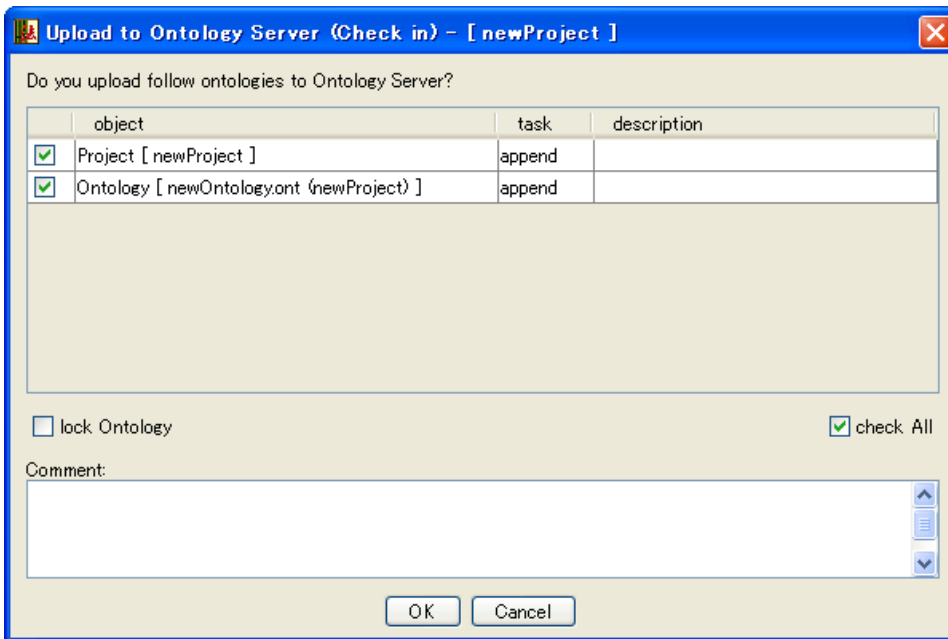
④ Comment (text field);

- Adds comments to the update file.

(2) Update server project

*Performs check-in, as in (1), to update an updated project or Ontology to the server project (Ontology).

As in (1), right-click on the updated project's (Ontology's) Project Management Tree project folder or Ontology file icon, and select [Upload to server (check in)] to open the Check in Dialog in the center of the screen.

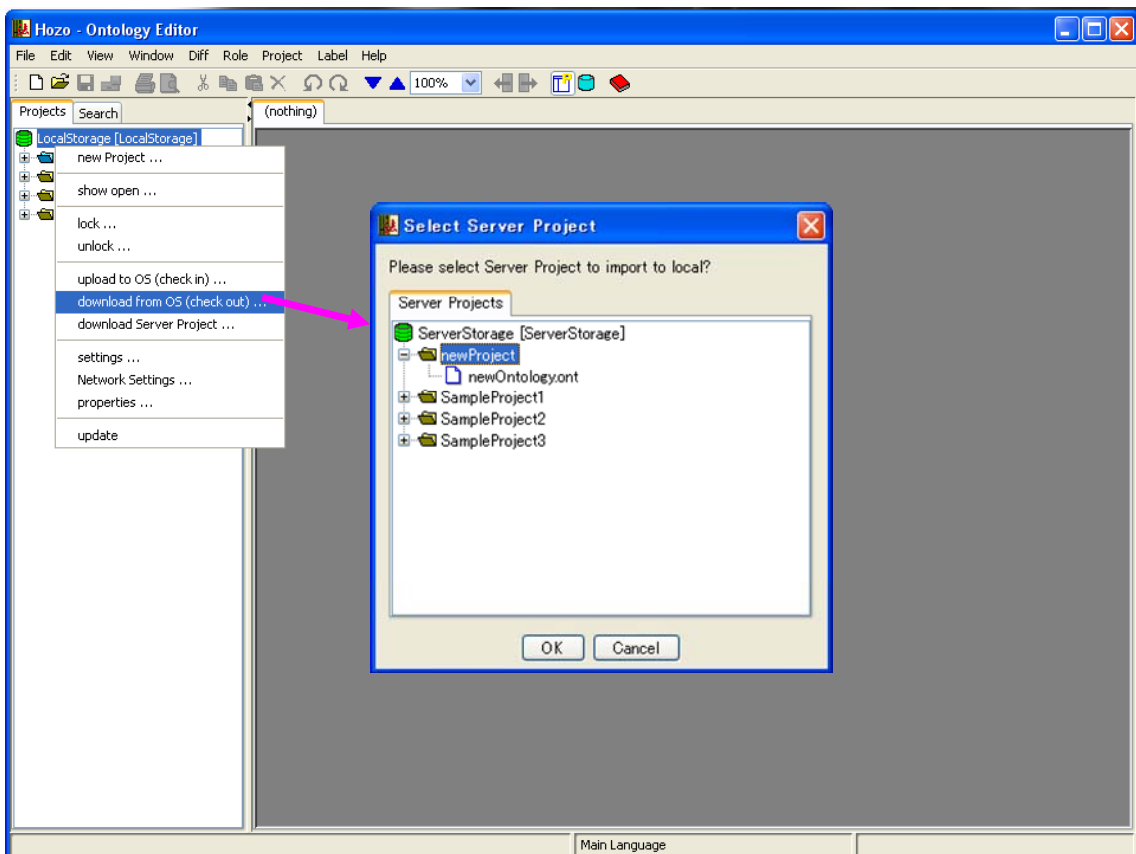


4.3.2. Downloading Ontology

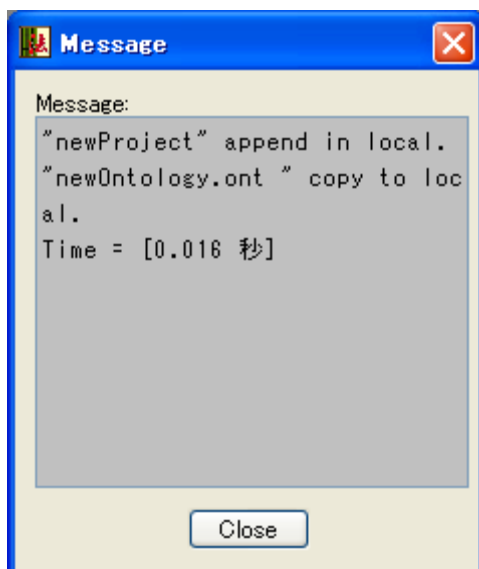
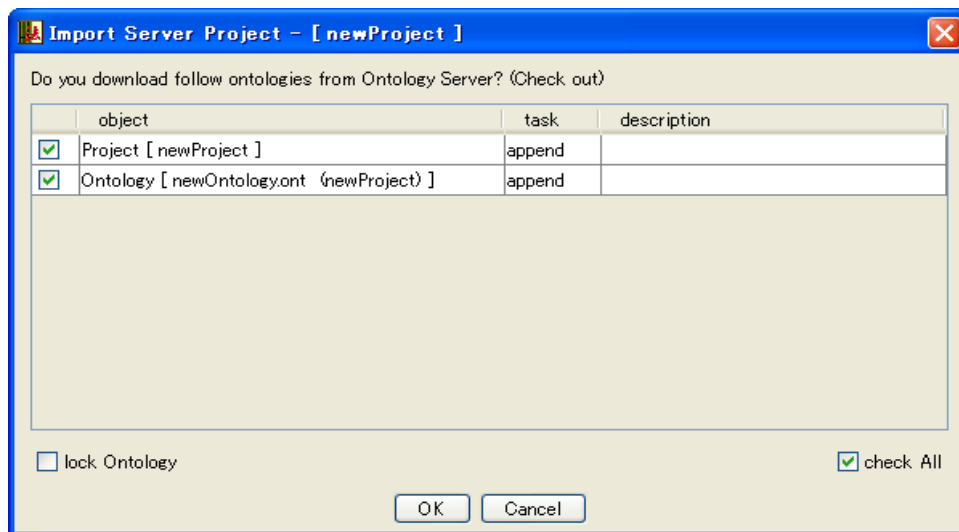
- *Downloads a server-side project (Ontology) previously uploaded to the Ontology server in order to import it into a local project.
- *This operation is used when collaborating with other users over a LAN. When using this feature, please use an installation of Hozo that is in a different location (PC) from the one used to upload the project.**

(1) Downloading Server Projects

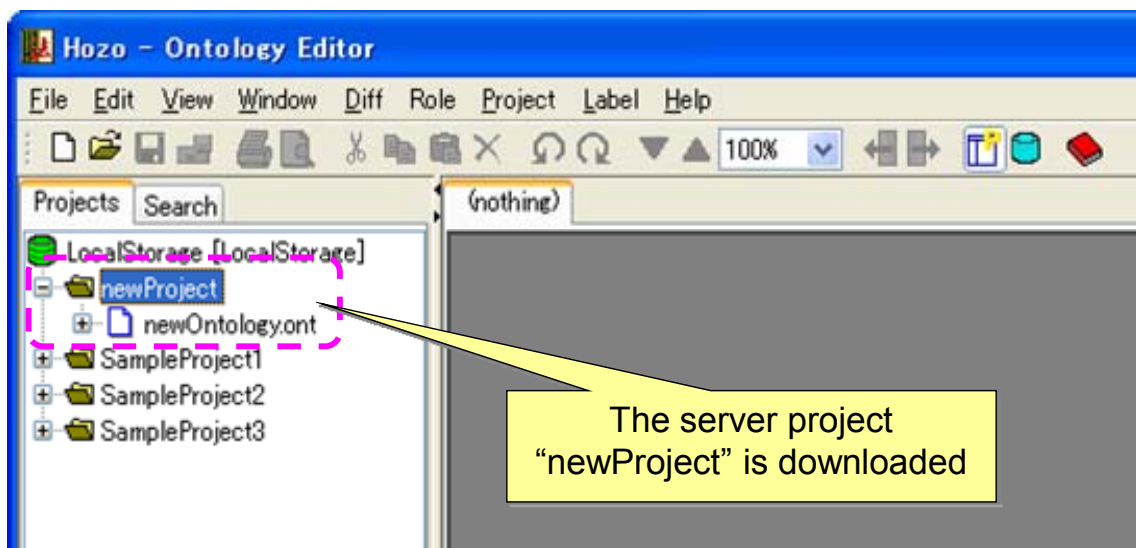
- Right-click on the Root folder icon in the Project Management Tree and select [Download Server Project] to open the server project selection dialog.



- Select the project file to be downloaded and click the [OK] button on the bottom of the dialog to bring up the project import confirmation dialog.
- Confirm the content to be downloaded, and click the [OK] button to download the project folder (Ontology file) from the server. A confirmation message will be displayed.



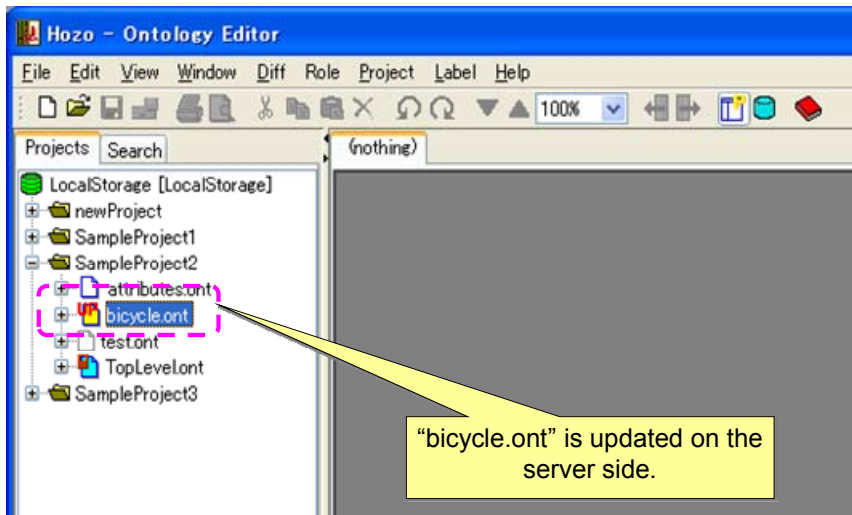
- Refresh the Project Management Tree to display the downloaded project and enable local browsing/editing.



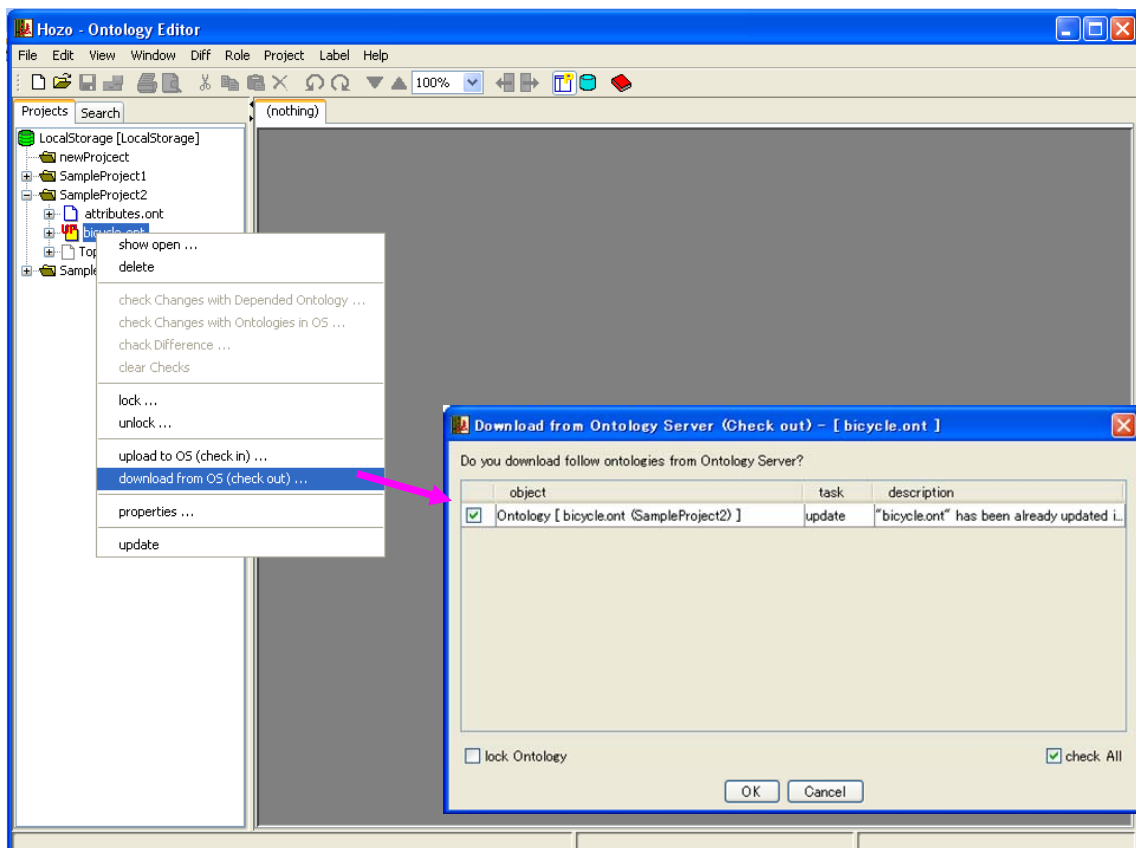
(2) Update local project (check-out)

*Check-out a server-side project (Ontology) in order to update a previously imported local project (Ontology).

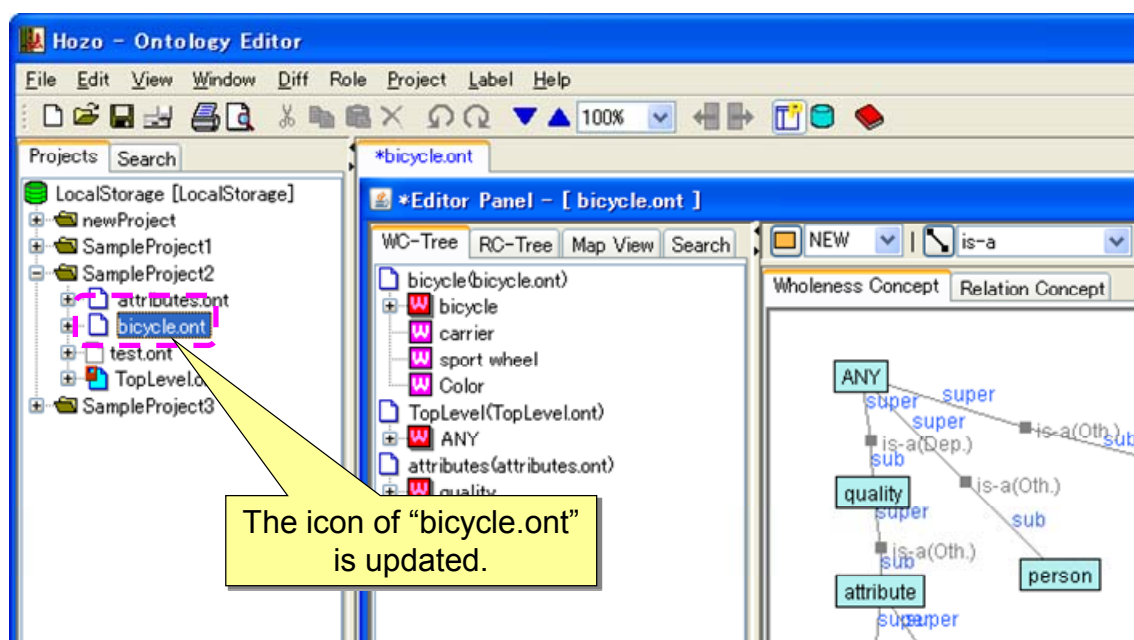
- When an Ontology is updated on the server-side, the Ontology file icon indicates that it was updated.



- Right-click on the Ontology file (project folder) icon in the Project Management Tree and select [Download Server Project] to open the server project selection dialog.



- Confirm the content to be downloaded, and click the [OK] button to download the project folder (Ontology file) from the server to local; a confirmation message will be displayed.
- Refresh the Project Management Tree to display the downloaded and updated Ontology and enable local browsing/editing.



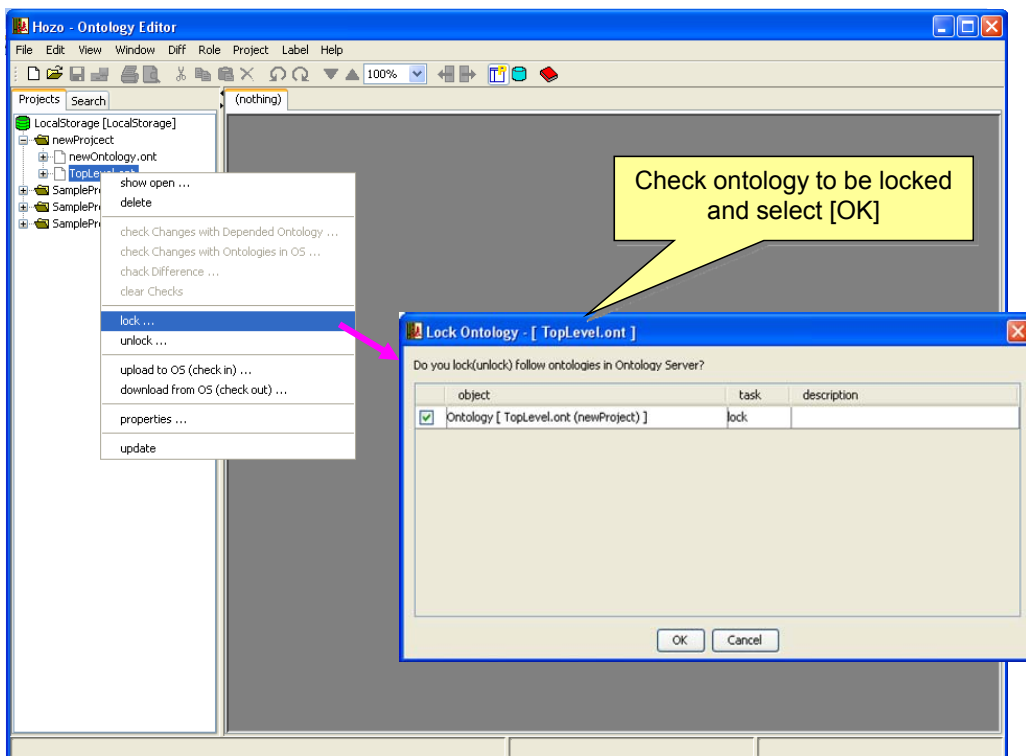
*Project Management Tree updates occur when downloads/uploads, locking and Hozo startup occur. If the icon display is not updated, update the Project Management Tree from the right-click menu of root folder.

4.3.3. Locking Ontologies

*Restricts (locks) uploaded Ontology files from updating on the server during local editing of the Ontology, etc. .

(1) Locking Ontologies

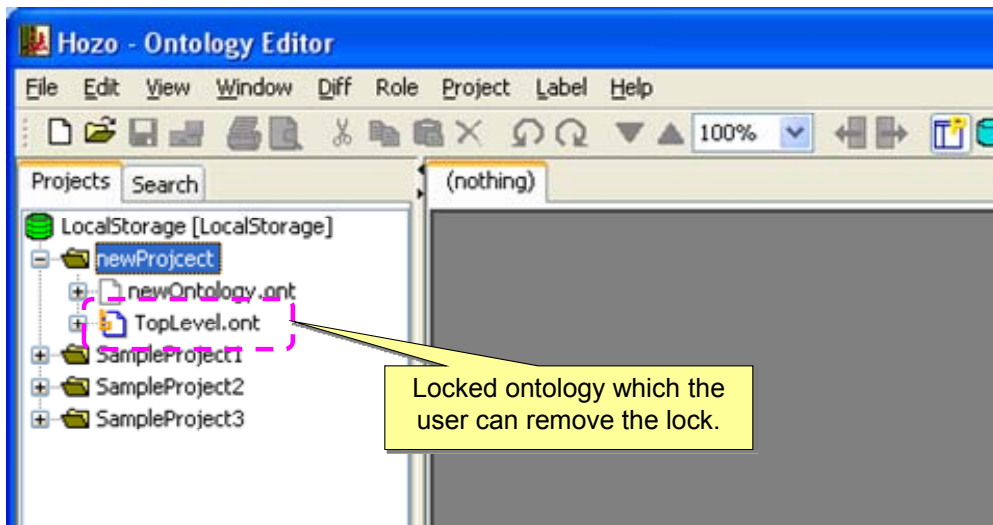
- Right-click on the project folder or Ontology file icon in the Project Management Tree, and select [Lock] to open the lock confirmation dialog in the middle of the screen.



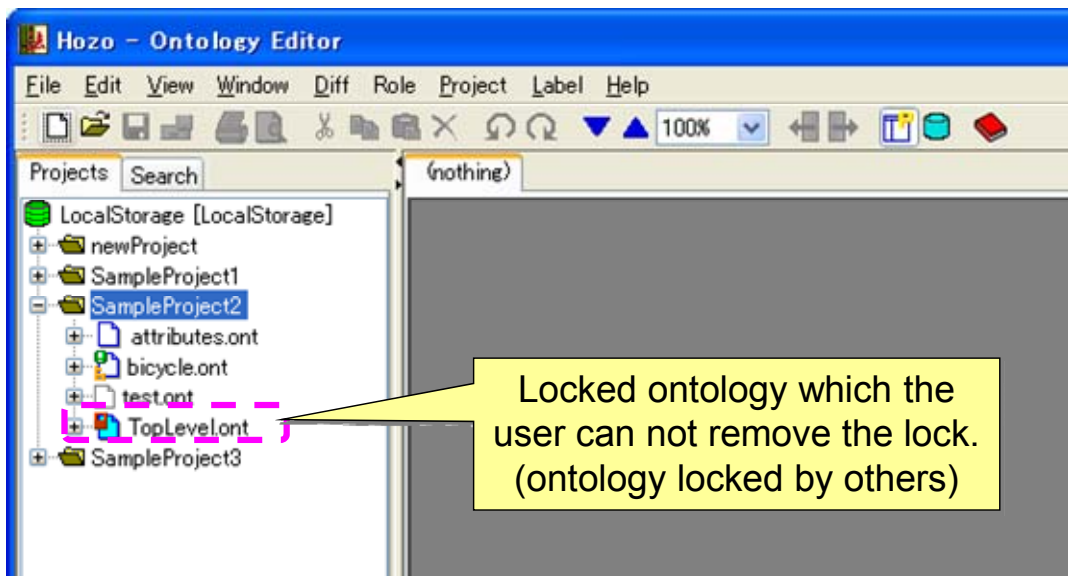
- Confirm the Ontology to be locked, and click the [OK] button to lock the Ontology file; a confirmation message will be displayed.



- Refresh the Project Management Tree to display the locked Ontology and prevent other users from updating the Ontology on the server.



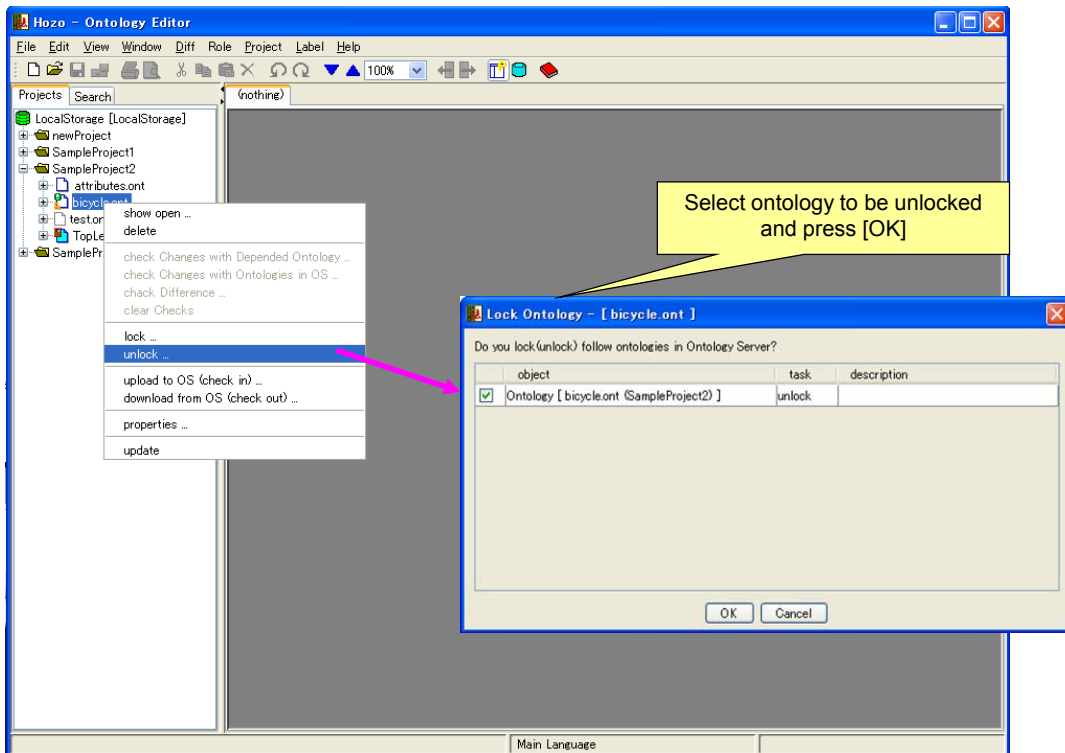
*In the above situation, other users' editors will display an icon indicating that the lock cannot be removed, as shown below.



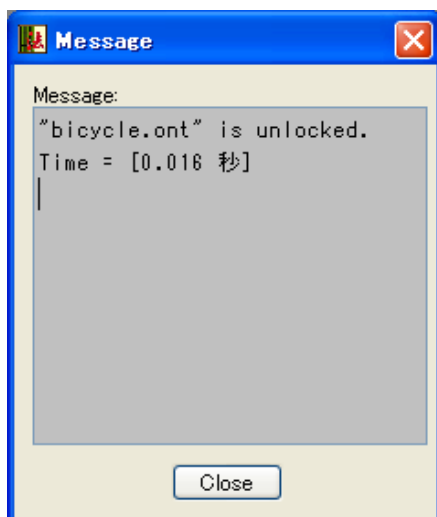
*Check the "Lock Ontology" check box when downloading an Ontology to lock it at the same time it is downloaded.

(2) Unlocking Ontologies

- Right-click on the project folder or Ontology file icon in the Project Management Tree, and select [Unlock] to open the unlock confirmation dialog in the middle of the screen.



- Confirm the Ontology to be unlocked, and click the [OK] button to unlock the Ontology file; a confirmation message will be displayed.



[Attention] Unlocking cannot be performed if the unlock key is incorrect.

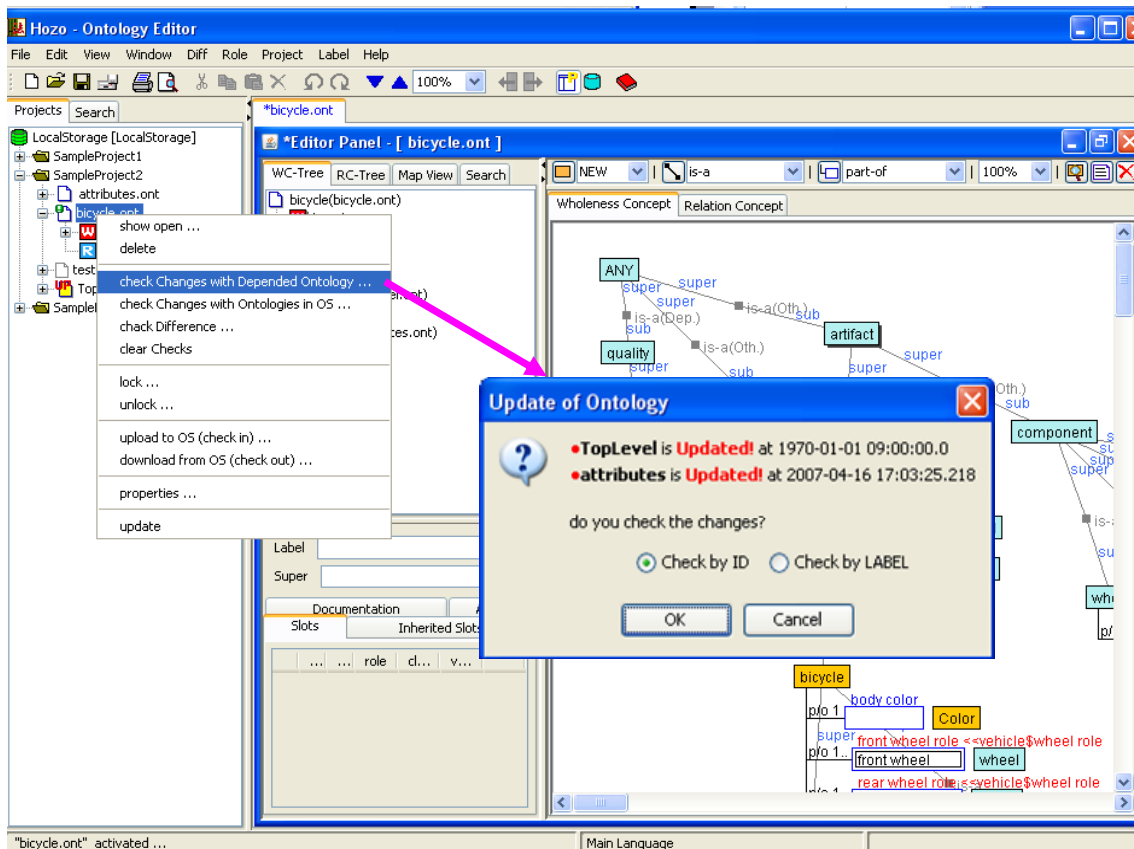
*In order to view lock information or deliberately remove a lock, it is necessary to use the Ontology Management Tools (see "4.3.5. (5) Displaying lock information").

4.3.4. Checking Ontology changes

*Checks changed items by checking against Ontologies that are in dependency relations and comparing with previous versions of Ontologies with respect to the updated Ontologies.

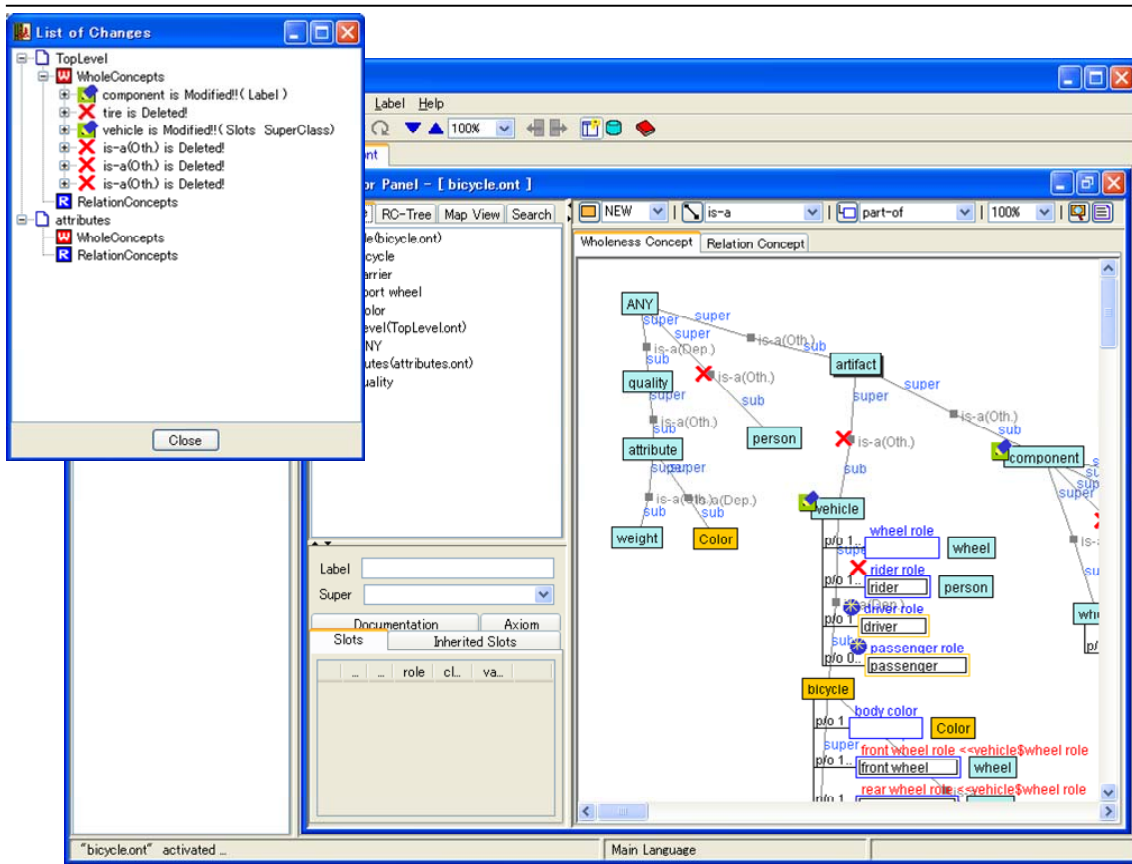
(1) Checking changes in depended Ontologies

- Open the Ontology in the Editing Panel.
- Right-click on the Ontology file icon in the Project Management Tree and select [Check for Changes in Depended Ontologies] in the right-click menu to open the update confirmation dialog in the center of the screen.

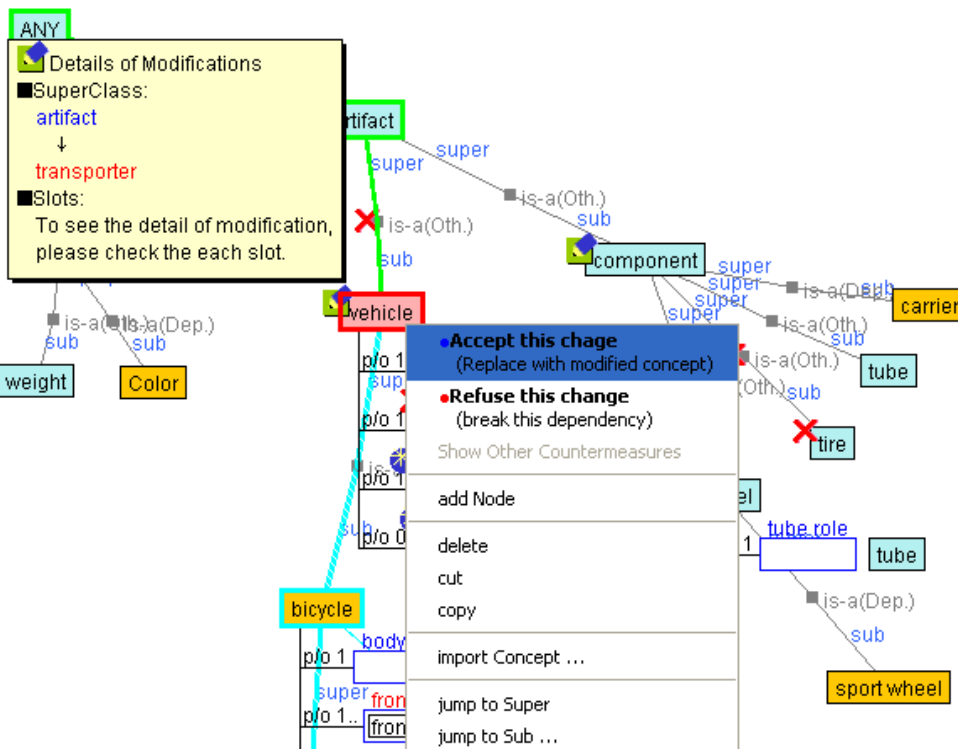


- Click the [OK] button after confirming the updated contents to display a changes checklist dialog and view an Ontology change log in the Editing Panel.

*Select the "Check by ID" option on the bottom of the update confirmation dialog to compare changes in each object by ID. Or, select "Check by LABEL" to compare changes in each object by name (Label).

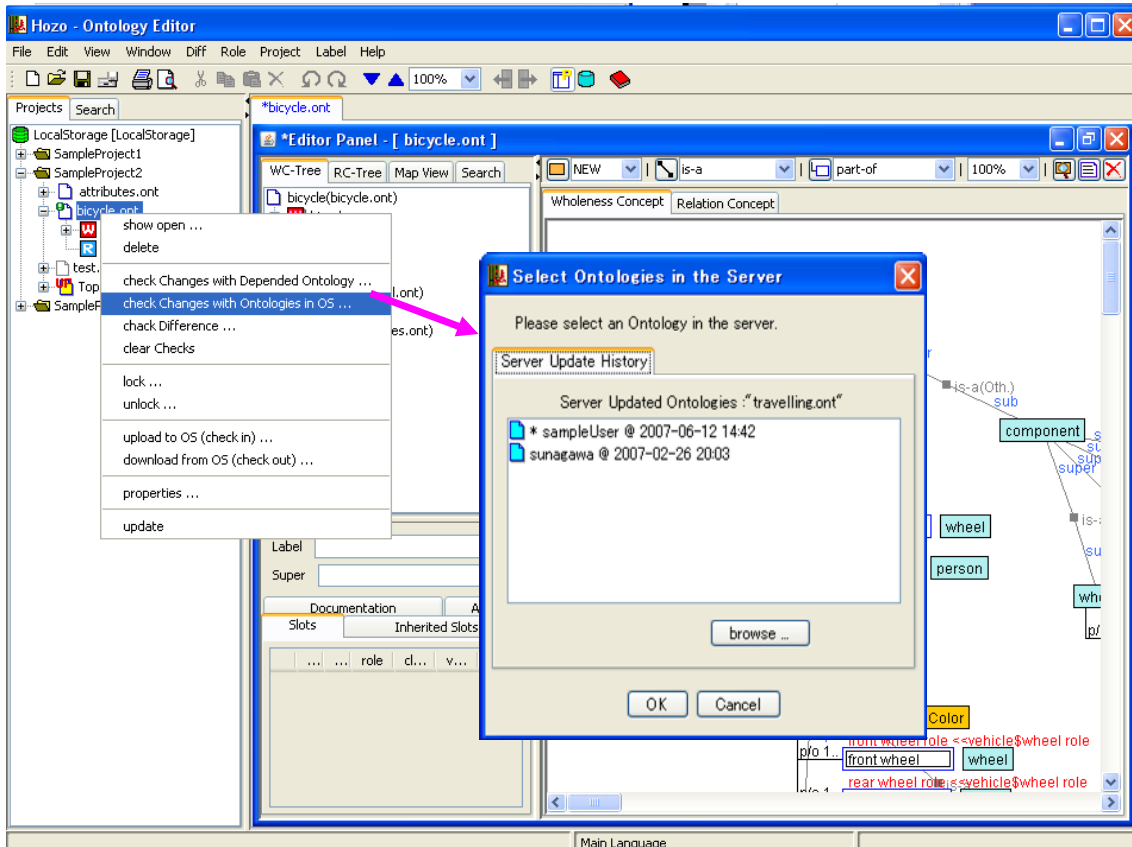


- Selecting an item on the changes checklist will select and highlight the changed items. Right click a changed object to open the "Accept this change", "Refuse this change" menu, allowing actions to be selected for each change.



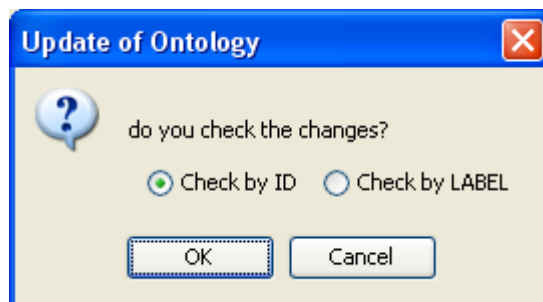
(2) Checking changes with Ontologies on the server

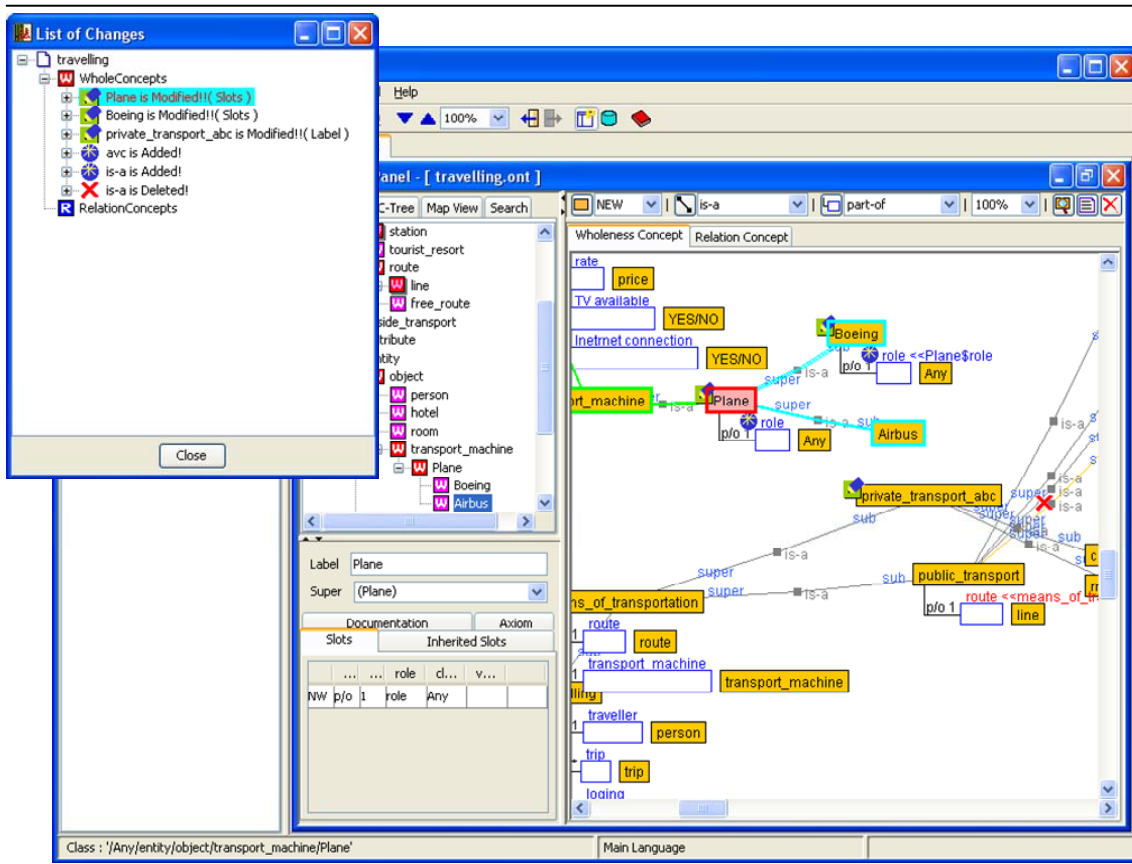
- Open the Ontology in the Editing Panel.
- Right-click on the Ontology file icon in the Project Management Tree and select [Check for Changes in Ontologies on the Server] in the right-click menu to open the server Ontology selection dialog in the center of the screen.



- Select the server-side Ontology that will be compared for changes and click [OK] button to open the check method confirmation dialog; the changes checklist dialog will be displayed as in (1) and a change log will be displayed in the Editing Panel.

[Note] If there is a "*" in front of the title, it is the latest version on the server.

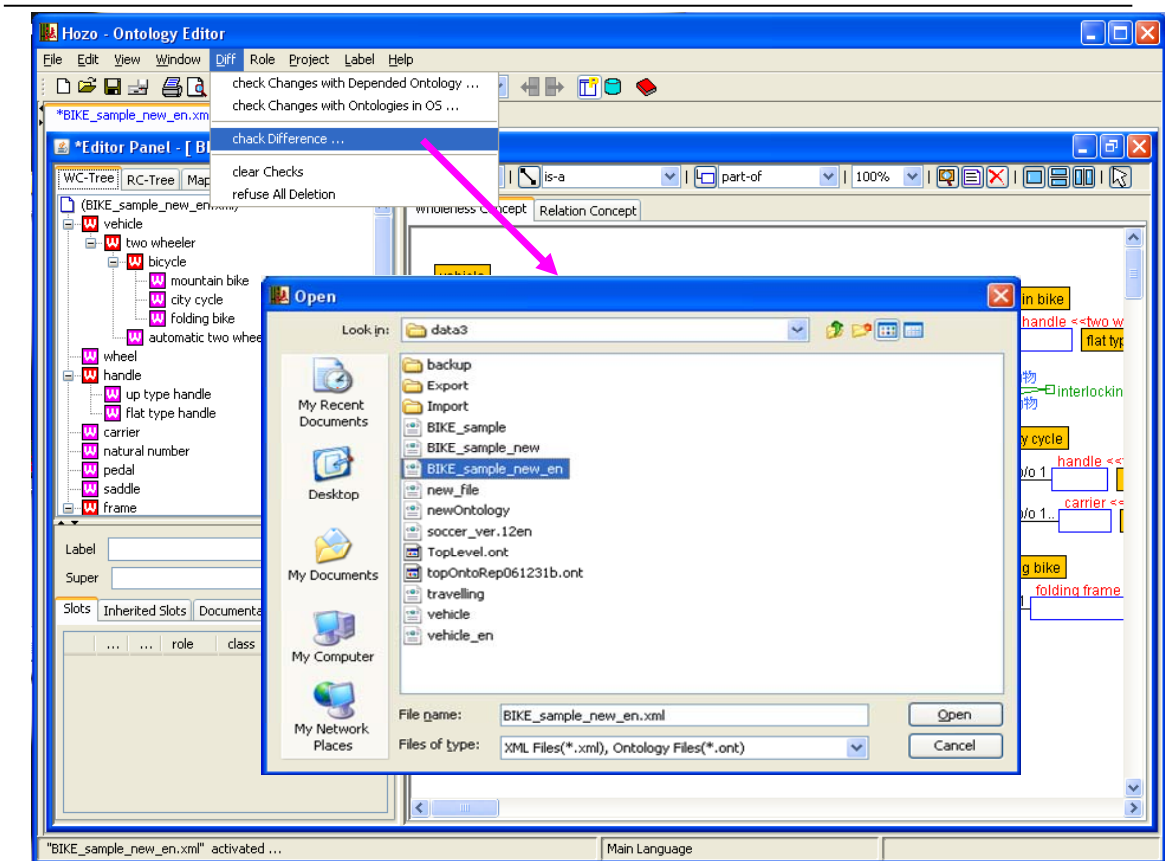




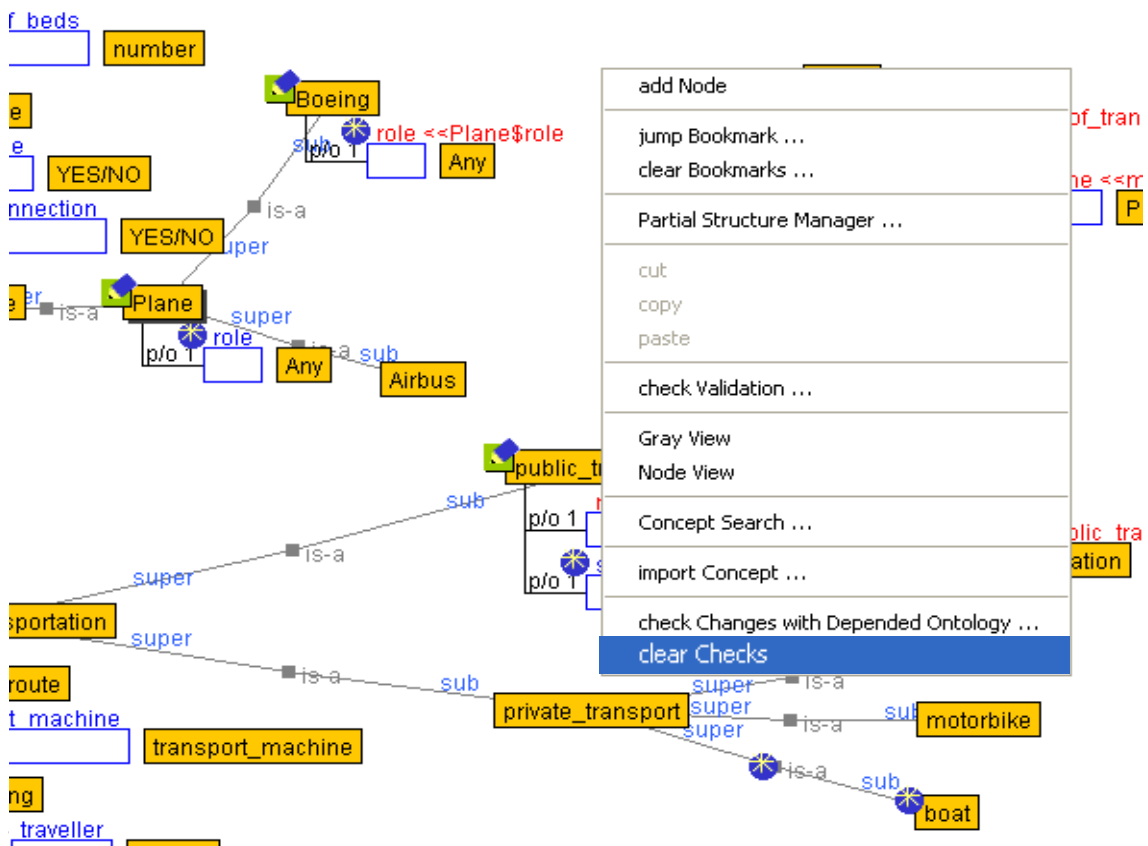
(3) Checking for changes in any Ontology

*Aside from Ontologies managed by the project, standalone Ontologies can also be checked for changes.

- Put any Ontology in edit mode.
- From the menu bar, select [Diff.]-[Check for differences with any file...].
- Select the Ontology file that will be the comparison target in the file selection dialog.
- Select a file in the file selection dialog and click [Open] to open the options dialog. Choose comparison options, and click the [OK] button.
- A list of changes will be displayed in the dialog.
- Changed items are indicated by changed icons on the Browsing Pane allowing changes to be confirmed visually.
- Selecting an item on the changes list will highlight the changed area.



- Select [Clear Change Log] in the right-click menu on the Browsing Pane of the Editing Panel to close the change log view and return to the normal Ontology view.

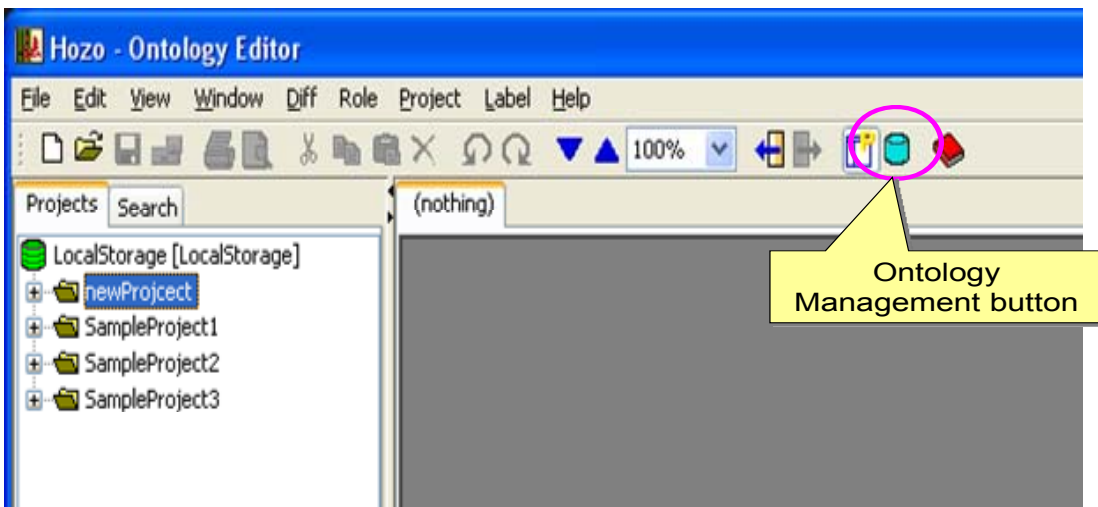


4.3.5. Server Ontology management features

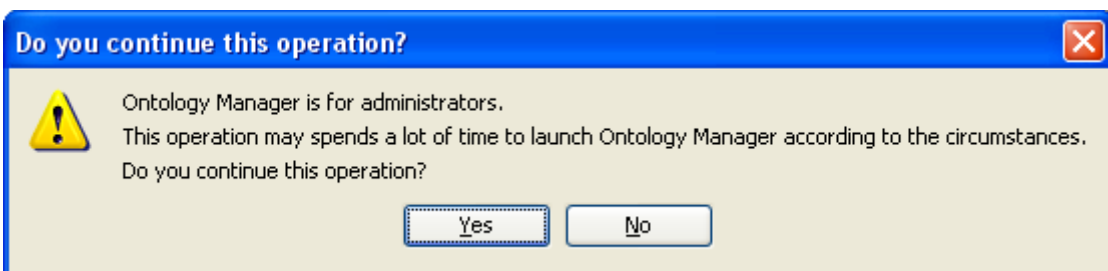
*Ontology management features, utilizing the Ontology management window, for server administrators will be explained here.

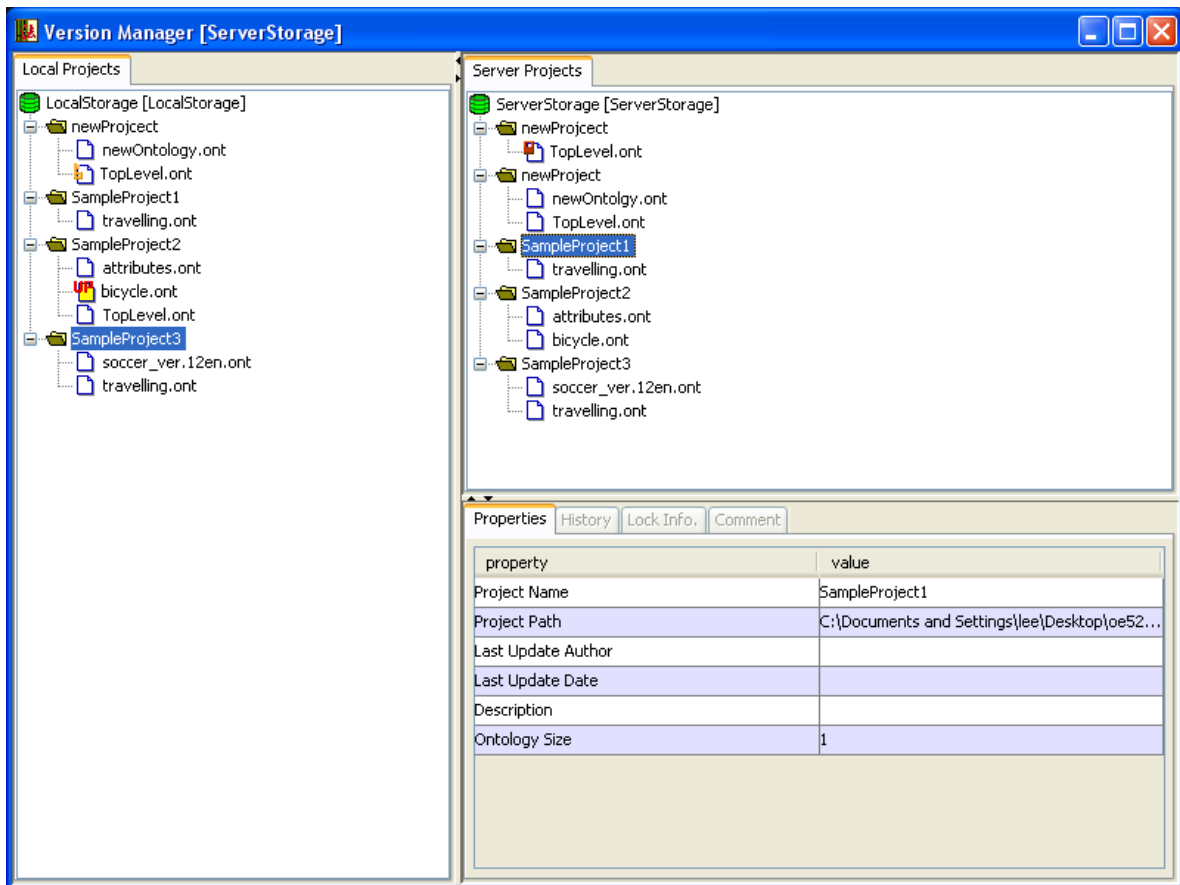
(1) Viewing Ontology management

- Click the [Ontology Management] button in the Ontology Operation Tool Bar to view the confirmation message.



- Click the [Yes] button in the below confirmation message dialog to open the Ontology management window. Click the [No] button to return to the original editing window without viewing Ontology management.





*In addition to the local project management features described in 4.2, the Ontology management window can perform the following operations.

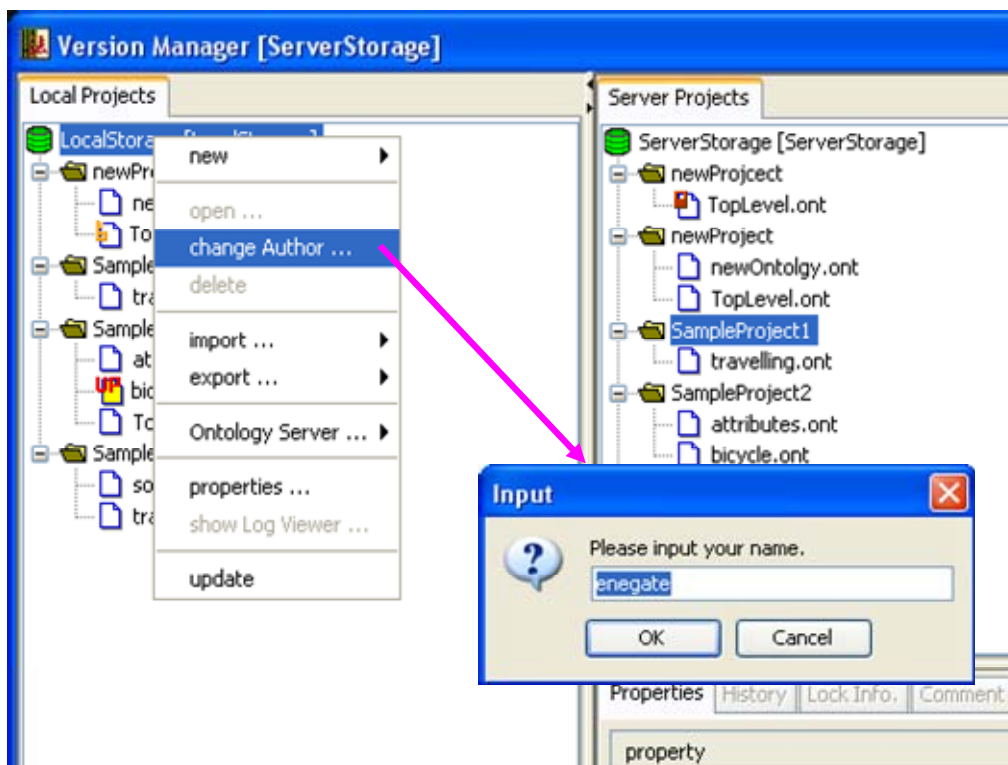
- Changing usernames →(2)
- Creating server projects →(3)
- Creating server Ontologies →(4)
- Viewing lock information →(5)
- Viewing comments →(6)

*When opening the Ontology management window, it may take several minutes for the window to display depending on network conditions. If it takes longer than a few minutes, check the network settings (4.3.6(2)) and try to reopen the window.

(2) Changing usernames

*Allows changing of the username entered the first time Hozo was run.

- Right click the local Project Management Tree and select [Change Username] to open the Change Username dialog.

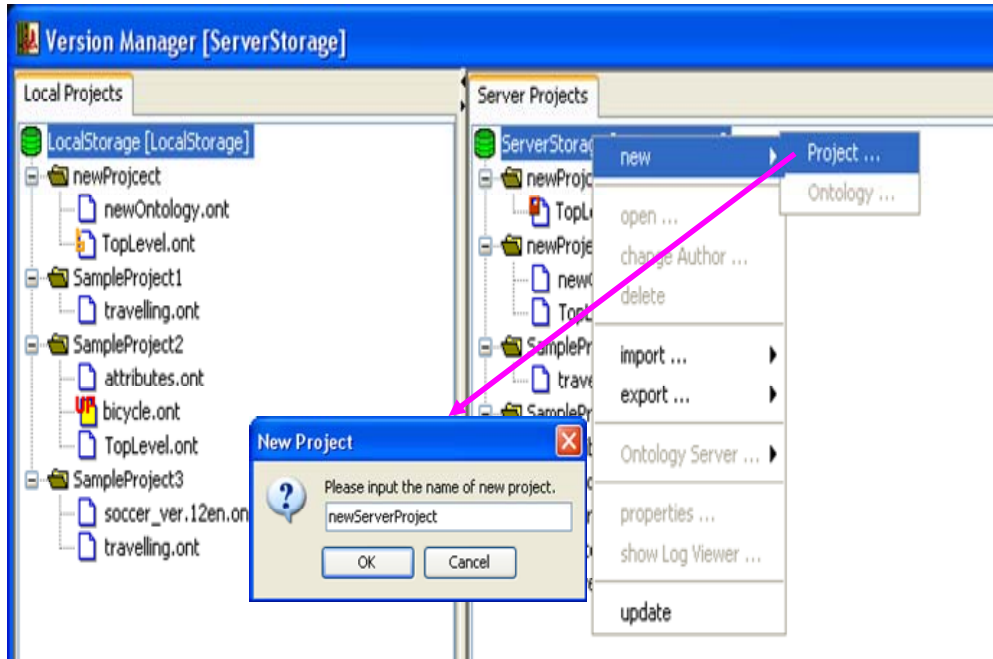


- Click the [Yes] button after changing the username.

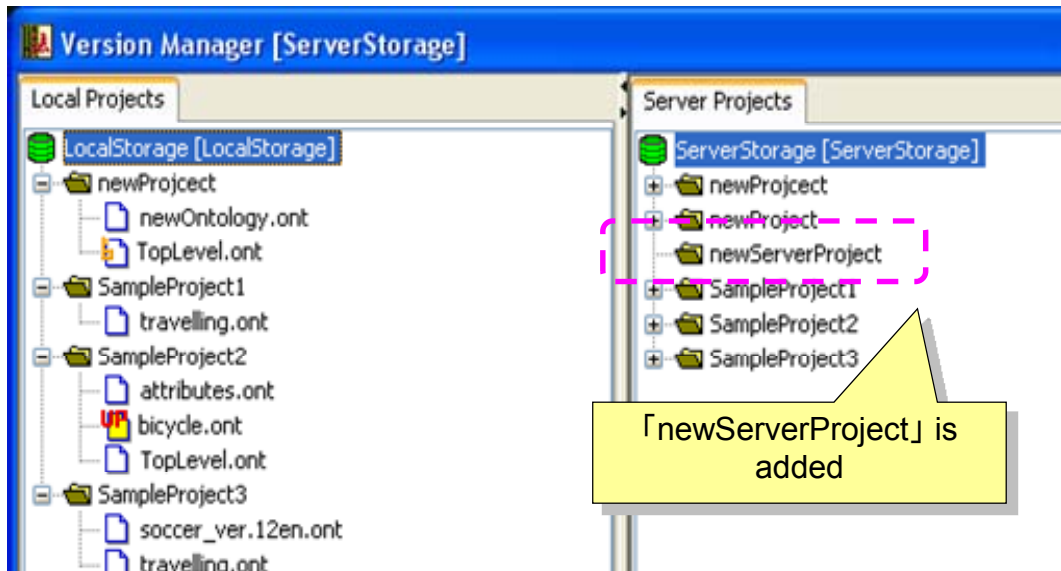
(3) Creating server projects

① Creating a new server project

- Right-click on the server Project Management Tree then select [New]-[Project] from the right-click menu to open the "New Project Creation" dialog.



- Enter a name for the new project and click the [OK] button to add the new project to the server.



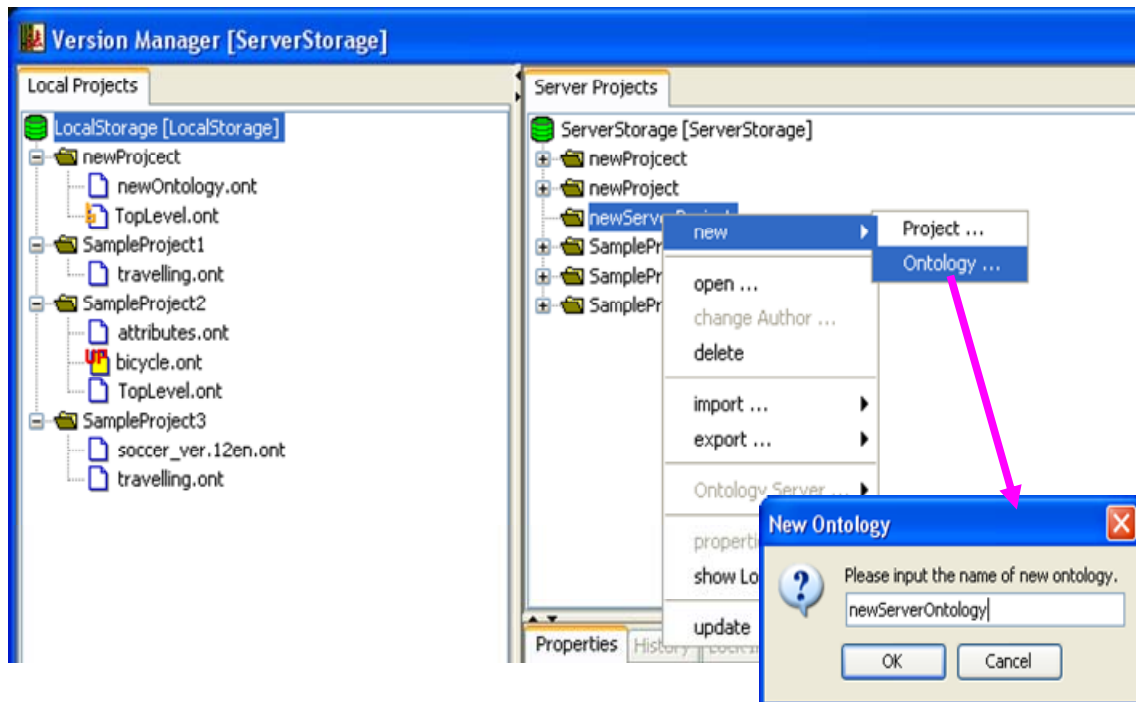
② Deleting server projects

- Right-click on the project folder icon in the server Project Management Tree and select [Delete] in the right-click menu to open the deletion confirmation dialog. Click the [Yes] button to delete the project from the server.

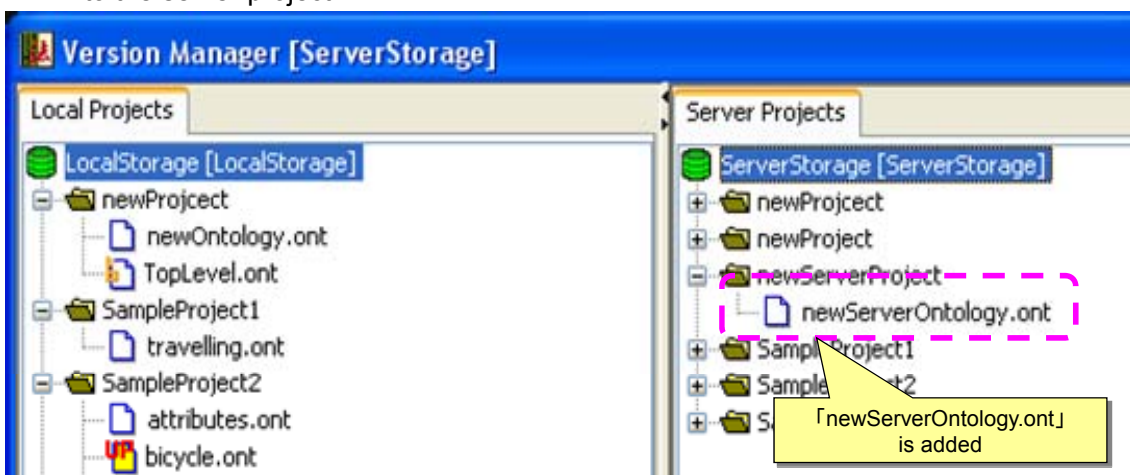
(4) Creating server Ontologies

① Creating a new server Ontology

- Right-click on the server Project Management Tree project folder, then select [New]-[Ontology] from the right-click menu to open the "New Ontology Creation" dialog.



- Enter a name for the new Ontology and click the [OK] button to add the new Ontology to the server project.



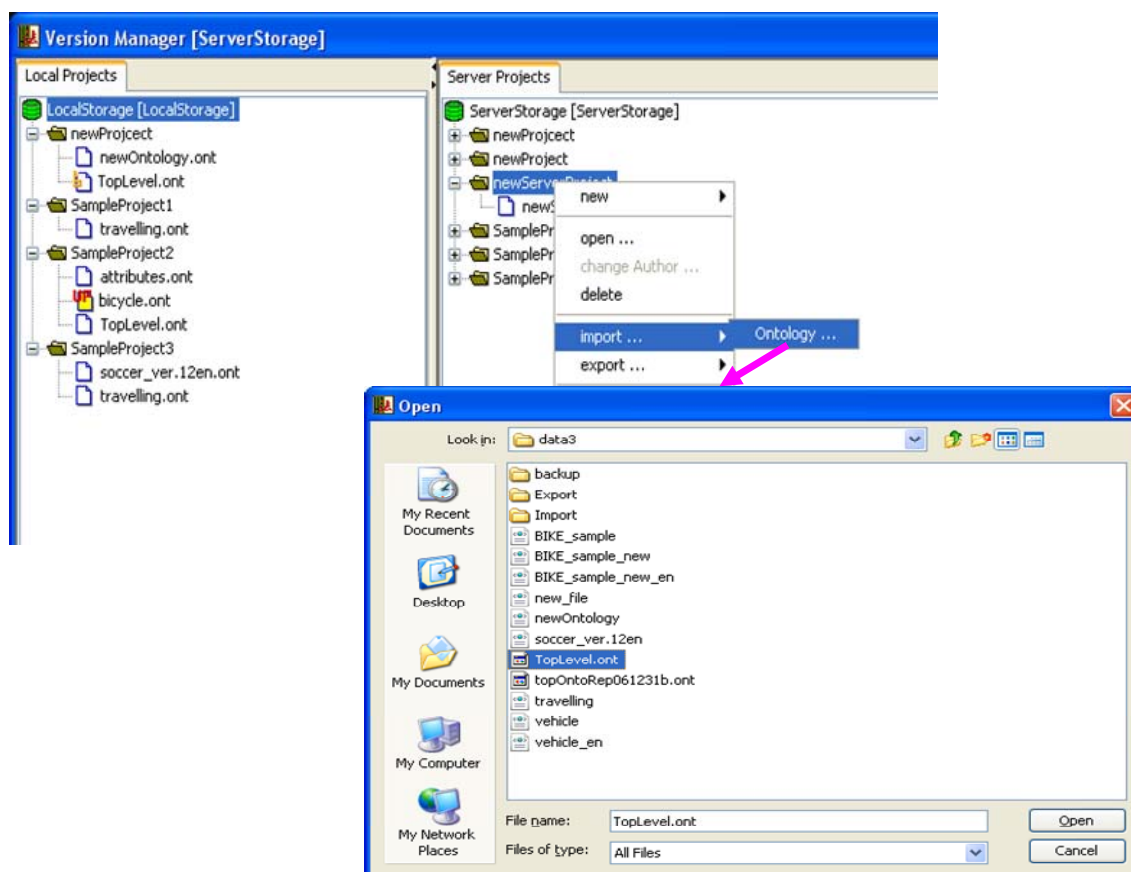
② Deleting a server Ontology

- Right-click on the Ontology file in the server Project Management Tree and select [Delete] in the right-click menu to open the deletion confirmation dialog. Click the

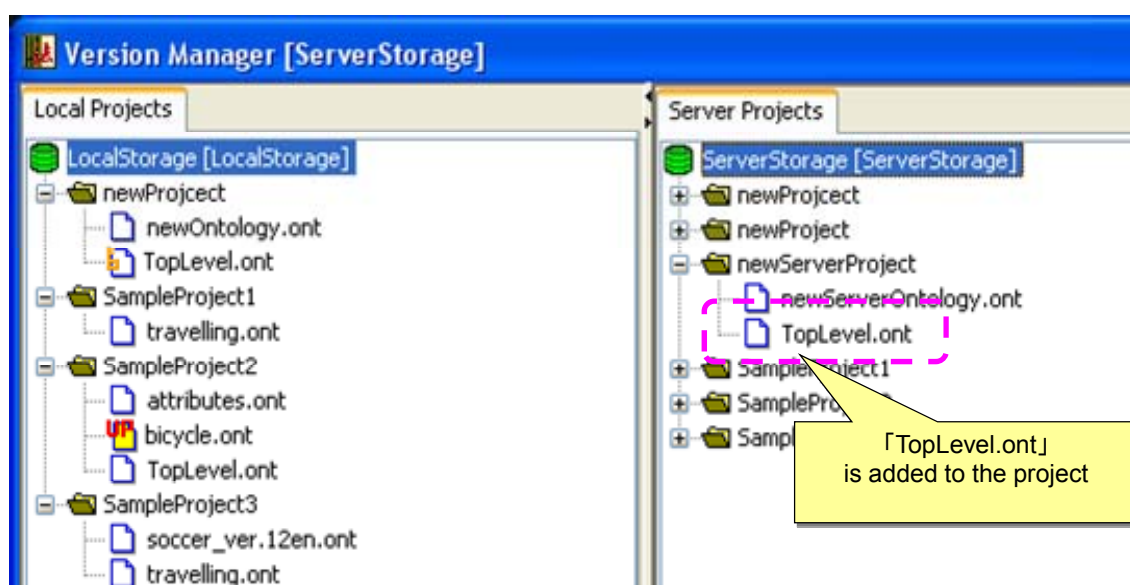
[Yes] button to delete the Ontology from the server project.

③ Importing a server Ontology

- Right-click on the server Project Management Tree project folder then select [Import]-[Ontology] from the right-click menu to open the file selection dialog.



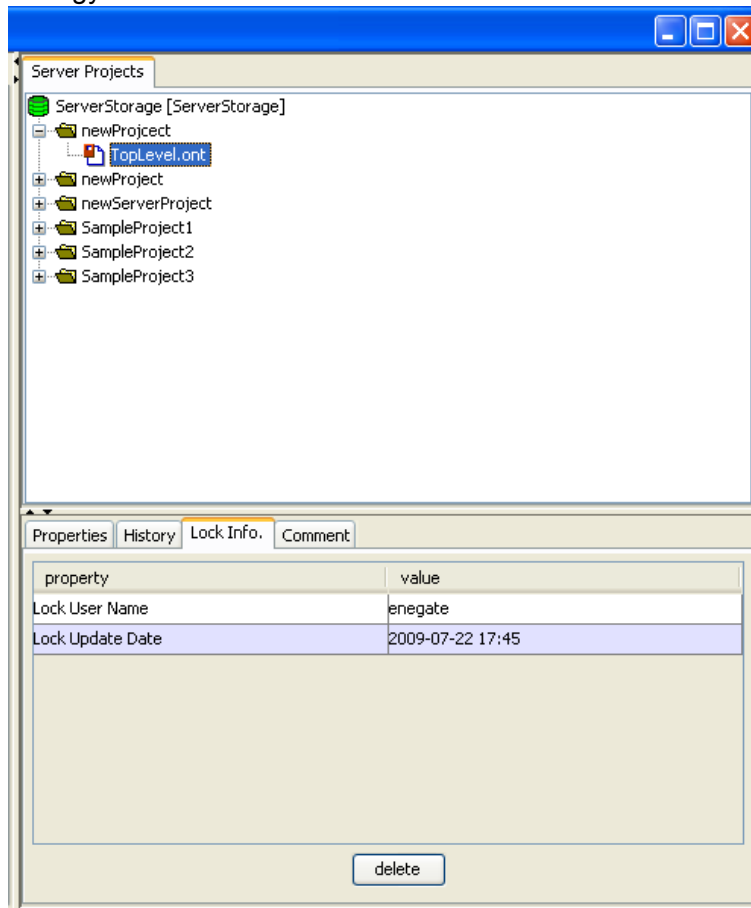
- Select an Ontology file to import and click the [Open] button to import it into the server project.



(5) Viewing lock information

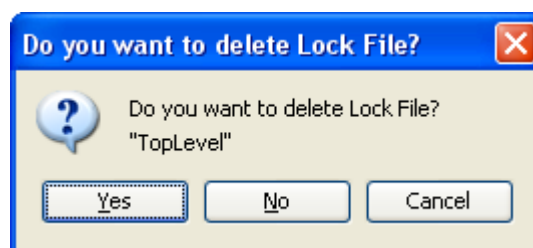
① Viewing lock information

- Select the Ontology file icon in the server Project Management Tree and click on the [Lock Information] tab in the property view pane on the right bottom of the window to view Ontology lock information.



② Delete lock information

- Click the [Delete] button at the bottom of the lock information panel in the property view pane to open the deletion confirmation dialog and click the [Yes] button to remove the lock.

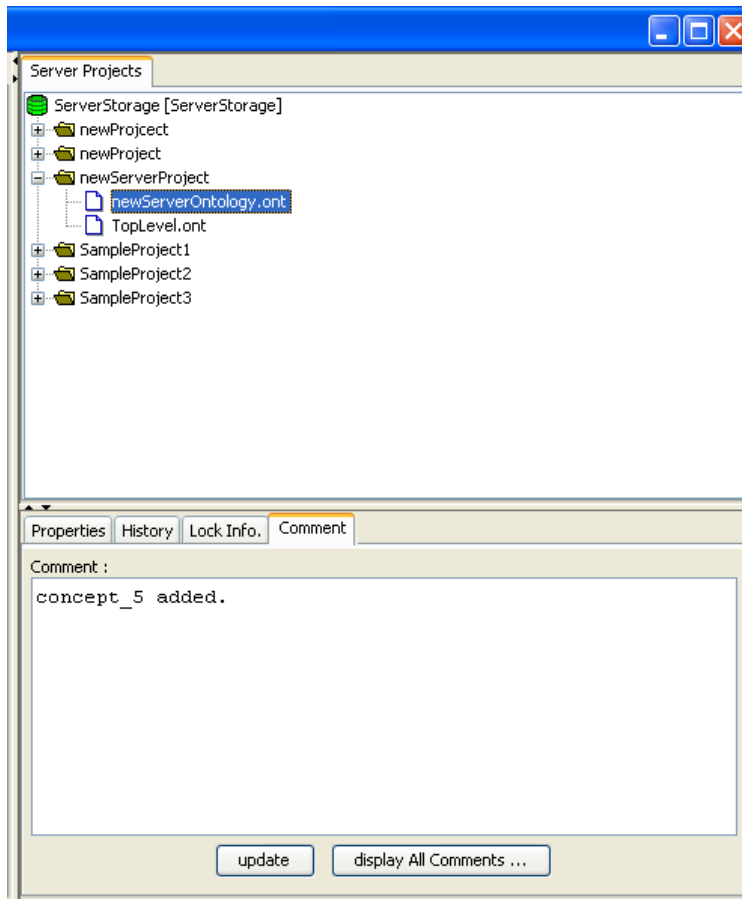


[Attention] This feature will force lock removal, but this action will cause problems when multiple users are collaboratively working on Ontologies. Take necessary precautions when using this feature.

(6) Displaying comments

① Displaying comments

- Select the Ontology file icon in the server Project Management Tree and click on the [Comment] tab in the property view pane at the right bottom of the window to view Ontology comments that were added when the Ontology was uploaded (check-in).

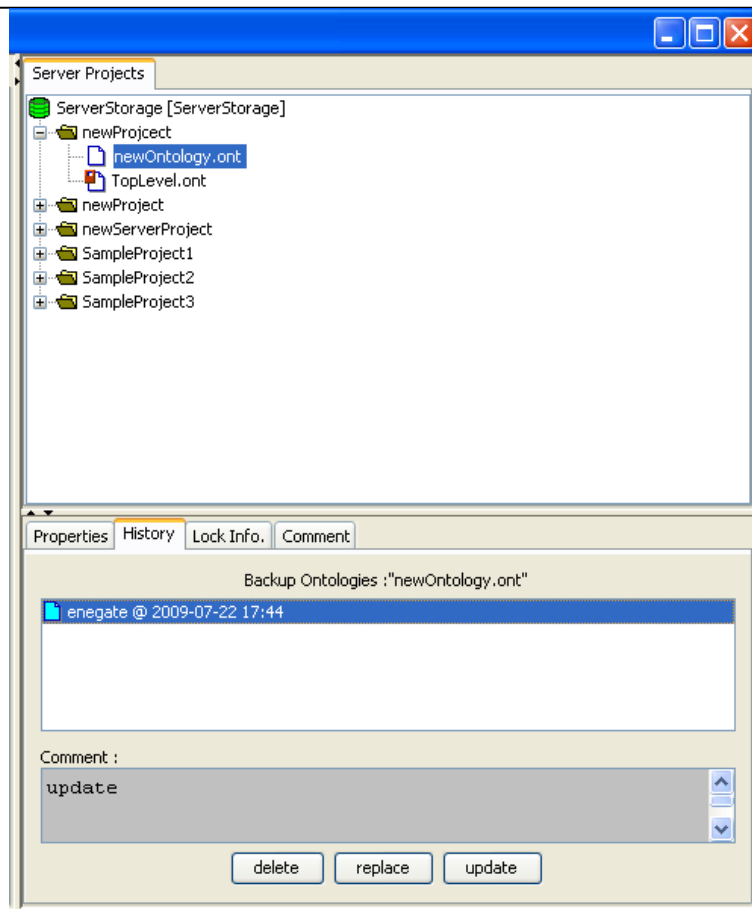


② Edit comments

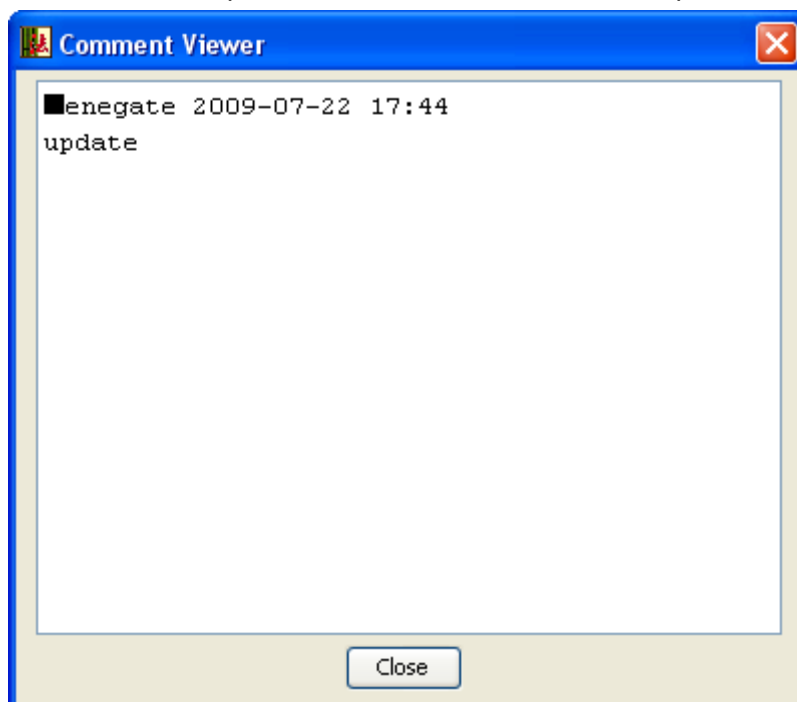
- The text area in the comment view panel of the property view pane can be edited. Click the [Update] button underneath it to update comments.

③ View update log

- Select the Ontology file icon in the server Project Management Tree and click on the [Update Log] tab in the property view pane at the right bottom of the window to view a list of Ontology files that have been backed up during updates.
- Select a backup Ontology file to view comments made during past backups in the comment field at the bottom.



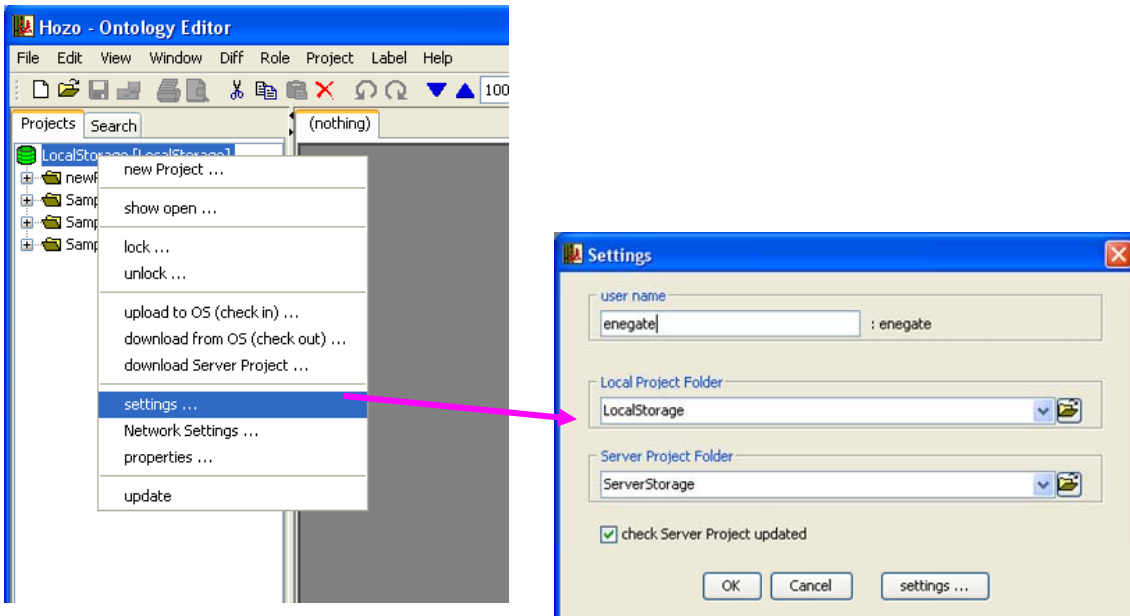
*Click the [View All Comments] button underneath comment view panel of the property view pane to view a list of past comments; comments can be updated.



4.3.6. Tool settings

(1) Project folder settings

- To change the project's root folder path, select and right-click on the root node in the Project Management Tree then select [Settings] from the right-click menu to open the project folder path "Settings" dialog.



- After making changes, click the [OK] button to change the username, and/or local and server folder path.
 - *Check the "Connect to server to check for updates" box and click the [OK] button to check for Ontology updates on the server at the same time the path change is made.
- When changing networks to connect to an external server, click the [Network Settings] button on the bottom of the dialog. Network settings will be explained in the next section.

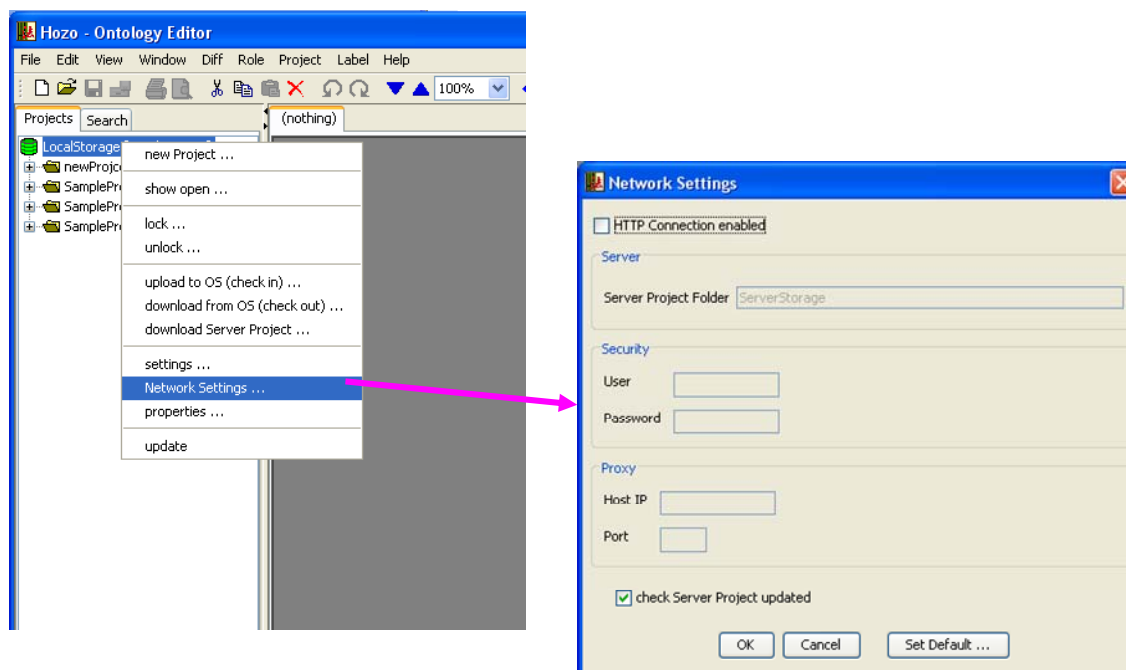
(Reference) It is necessary to change the parameters in the "hozo.properties" settings file to change the default path setting of the project folder.

- Local project folder path (approximately line 83 of the file)
 - # Project management settings
 - ProjectRoot=LocalStorage
- Server project folder path (approximately line 60 of the file)
 - #Ontology server address
 - ServerLocation=ServerStorage

(2) Setting up the network (WebDAV)

*In order for users to use this system on a network environment, it is necessary to change the network (WebDAV) settings to work with the environment being used.

- Select and right-click on the root node in the Project Management Tree, then select [Network Settings] from the right-click menu to open the "Network Settings" dialog.



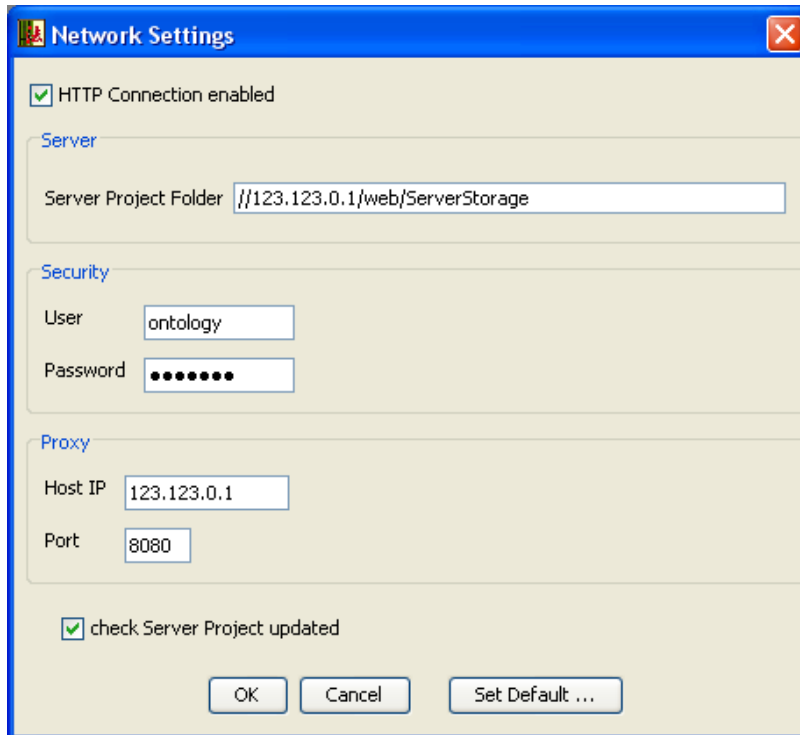
- After making changes, click the [OK] button to change the network (WebDAV) settings.

*Explanation of the network settings

① "Enable/disable HTTP Communication": Determines whether or not the application's internal WebDAV module is enabled. Used especially when accessing Web servers that utilize specific security settings.

*By default, this is unchecked (disabled), but it can still be used because operating systems from Windows XP and higher versions come standard with WebDAV support.

*None of the settings can be edited when disabled; settings will become available when enabled.



- ② "Server project folder": Path of the server project folder.
- ③ "Security (User Authentication)": Specifies a username and password when Ontology server user authentication (Basic Authentication) is set.
- ④ "Proxy": Specifies the proxy address and port number when connecting to the Ontology server via a proxy.
- ⑤ "Connect to server to check for updates": Checks for Ontology updates when connecting to the server to make setting changes.
- ⑥ [Restore Defaults] button: Replaces settings with default parameter information from the "hozo.properties" setting file.

(3) About Usage Modes

The Hozo-Ontology Editor (Distributed Development Edition) can be toggled between three modes, depending on the intended use.

A) Non-distributed Mode (Chapter 2)

*Uncheck "Use Project Management Feature".

This will start the software in the traditional Ontology Editor interface, without using distributed development features.

B) Local PC Distributed Mode (Chapter 3)

*Check "Use Project Management Feature", and select a folder on your computer to use as a server project folder.

A project management folder is set on the local PC (not shared with other users), allowing dependency and version management for multiple Ontologies to be performed while constructing Ontologies.

C) Local Network Distributed Mode (Chapter 4)²

*Check "Use Project Management Feature", select a shared **folder on the LAN** as a server project folder.

Create/share a project management folder on a server in your local network environment; Ontologies are shared between multiple users while being structured.

Methods for setting each mode at launch will be explained below.

[Explanation of annotations used in this document]

[Note] (blue): indicates information that is supplementary to the explanation.

[Operation Example](green): indicates an example operation that uses a sample file.

[Attention] (red): describes things which should be given care during operation.

[Reference] (purple): indicates a reference found in another document (or chapter).

² An Internet distributed mode will be released soon.

A) Non-distributed Mode (uses traditional Ontology Editor interface)

In this mode, editing can be performed using the traditional Ontology Editor interface. Furthermore, allows new features "Advanced Search" and "Differential Comparison" to be used.

Making Settings during Startup

(How to Select Options in the Initial Setup Dialog)

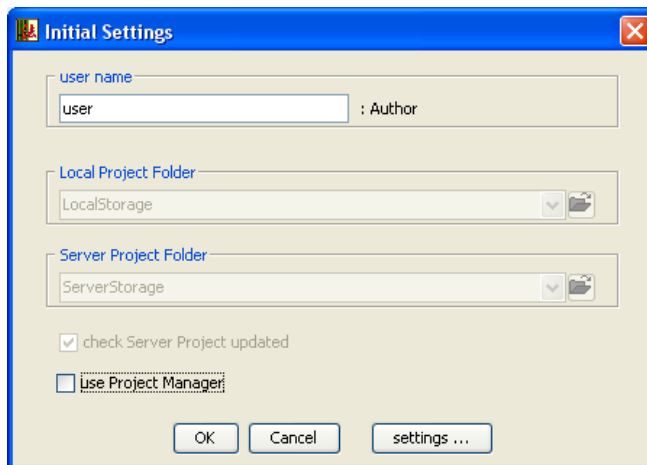
(1) Enter a username (any half-width alphanumeric characters).

[Note] You cannot start the program without entering a username.

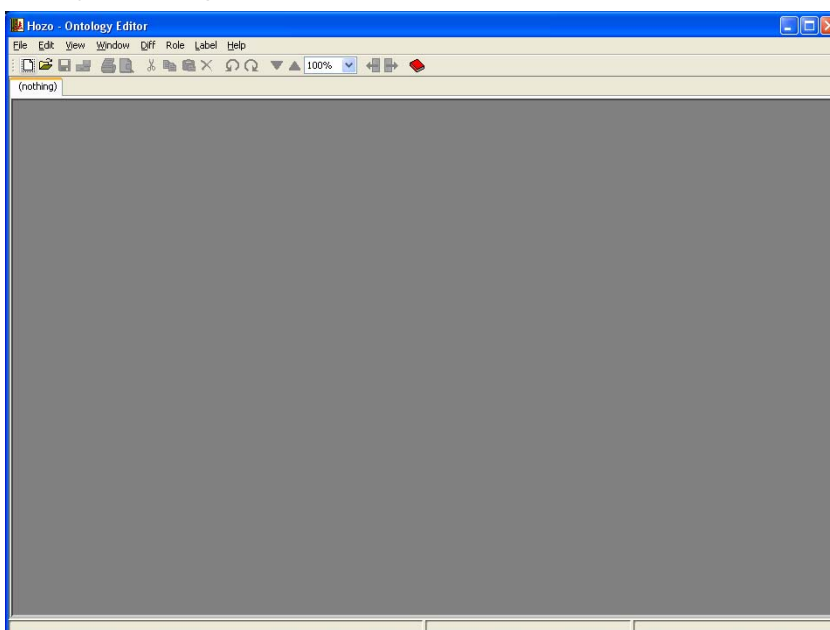
These characters cannot be used in usernames: "\ / : * ? " < > | _".

(2) Uncheck the "Use Project Management Feature" box.

[Note] All fields other than username will be disabled.



(3) Click the [OK] button to display the Ontology Editing screen in Non-distributed Mode (with no Project Management Pane).



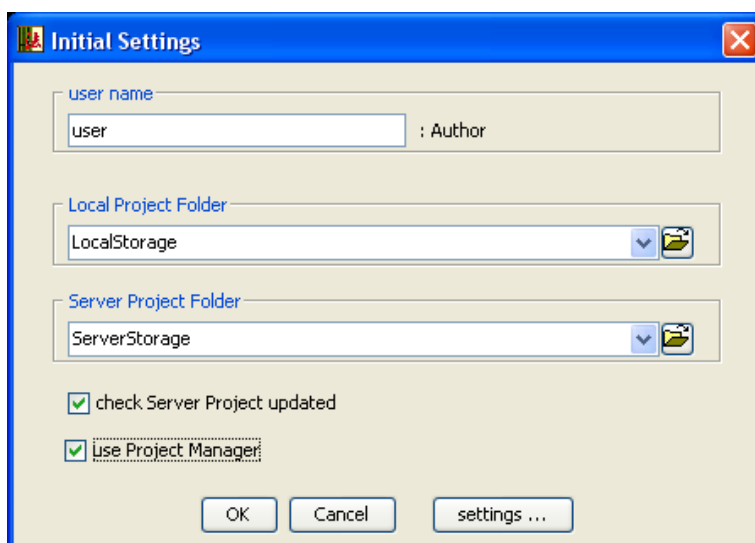
B). Local PC Distributed Mode (Managing Dependencies in Multiple Ontologies)

In this mode, the project is managed on a local PC. As long as a project management folder is designated, dependencies and versions can be managed for multiple Ontologies.

Making Settings during Startup

(How to Select Options in the Initial Setup Dialog)

- (1) Enter a username (any half-width alphanumeric characters).
- (2) Check the "Use Project Management Feature" box.



- (3) Designate a name in the "Local Projects Folder" box for the folder that will be used to manage local projects³.

[Note] Default is "**LocalStorage**" (you should use this setting in most cases).

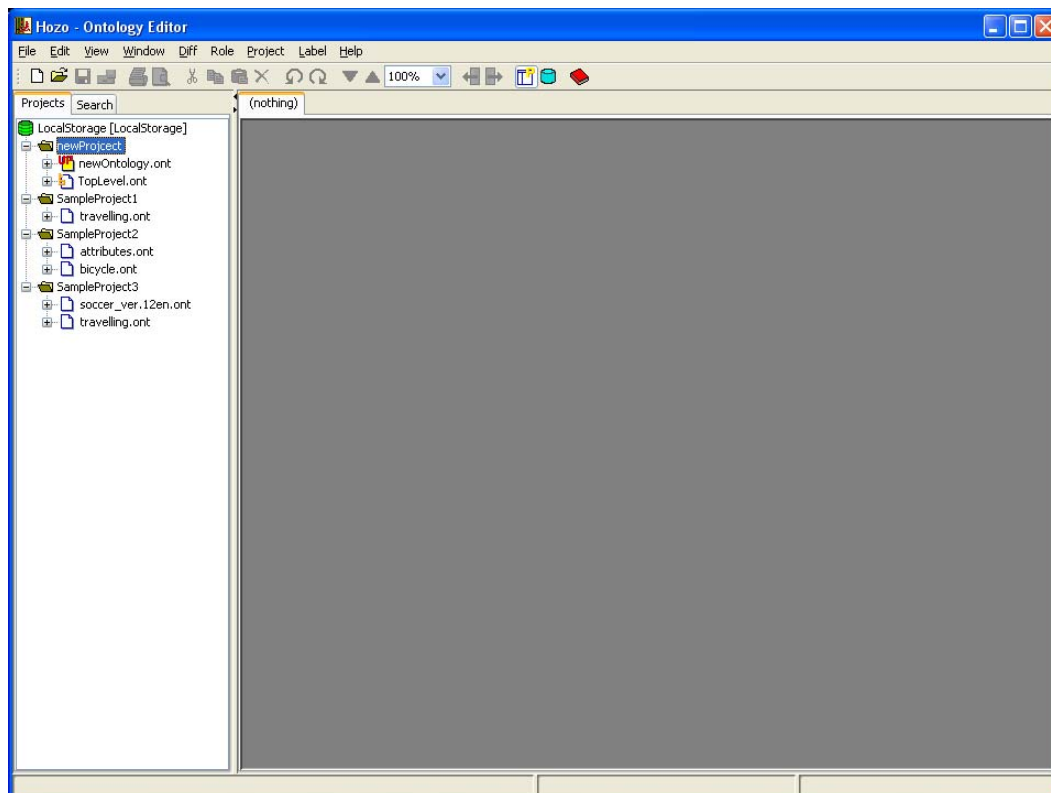
- (4) Designate a name in the "Server Projects Folder" box for the folder where server projects will be saved.

[Note] Default is "**ServerStorage**" (you should use this setting in most cases).




- (5) Click the [OK] button to start the Ontology editor in Local Distributed Mode (with the Project Management Pane displayed).

[Note] If you check the "Connect and check server for updates" box, the server project will be checked for updates. If this box is unchecked, the server will not be checked for updates (it will be possible to check for updates once the program is started).

³ Designate the relative or absolute path for the Hozo installation folder. You can also click on the directory button next to the text box to select the folder.



About the Project Management Screen

- If the Ontology Editor is started in Distributed Mode, the "Project Management Tree" will be displayed on the left side of the screen.
- The Project Management Tree is composed of:
 -  Root Node: the local project folder.
 -  Project Node: a unit that manages multiple Ontologies (project).
 -  Ontology Node: constructed from Ontologies that are managed by that project.

These icons may change due to updates.

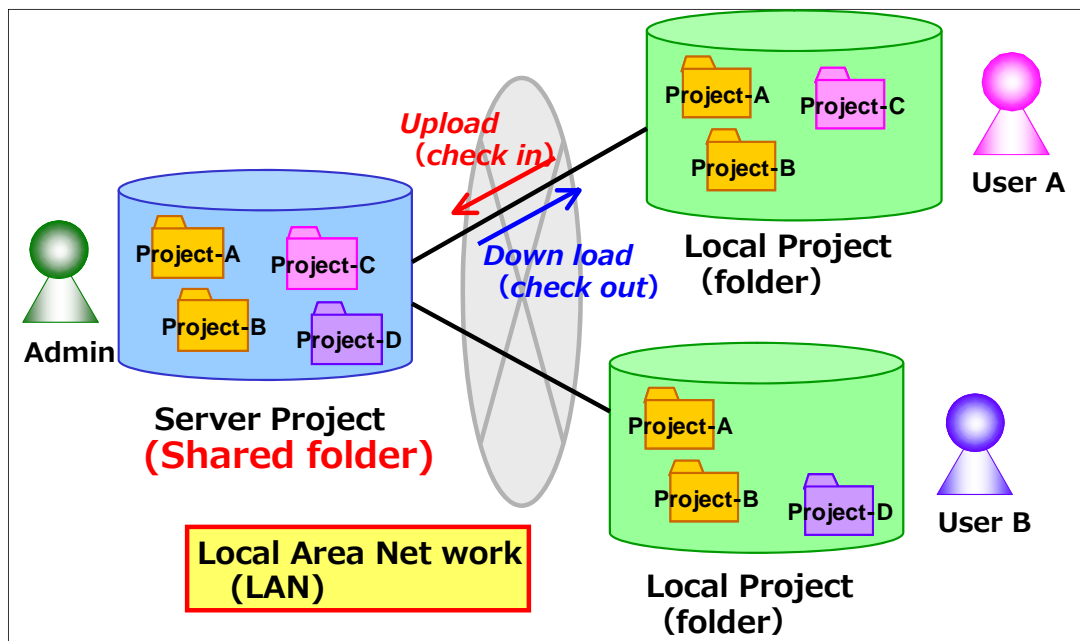
[Reference] See Appendix B for an explanation of the icons.

[Reference] For details see chapter 4.2. "Managing Projects", in the Operating Manual.

- Ontologies can be opened for editing by double clicking on the Ontology Node.

C). Network Distributed Mode (Sharing Ontologies over a LAN)

Projects and Ontologies can be shared with multiple users over a LAN by setting the server project folder to **a shared folder on the local network (LAN)**.



Creating a Shared Folder

*In order to share Ontologies over a LAN, it is necessary to create in advance a folder to be used as the server project folder that can be shared on the LAN.

Create a sharable folder on the local network to be used the folder for sharing Ontologies among multiple users. (Normally, it is recommended you create the shared folder on a server etc. on the LAN.)

[Operation Example] Hereafter, examples will assume a folder called "share" has been created on "win_server", a server computer on the LAN.

- (1) In Windows2000/XP, right-click the folder you wish to share and select [Sharing and Security...] to display the properties dialog.
- (2) On the [Sharing] tab, check the boxes labeled [Share this folder on the network], and [Allow network users to change files] under [Sharing and Security on the network].

[Note] The above steps for creating shared folders may differ depending on your OS version etc. Please see your OS help documentation etc. for details.

[Note] File sharing and access permission may not be possible depending on your network environment. If this is the case,

please inquire with your network administrator.

Making Settings during Startup

(How to Select Options in the Initial Setup Dialog)

(1) Check the "Use Project Management Feature" box.

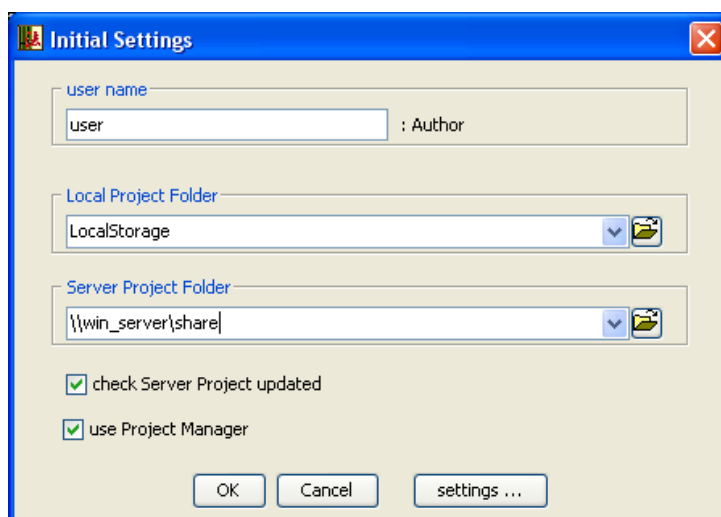
[Note] If you check the "Connect and check server for updates" box, the server project will be checked for updates. If this box is unchecked, the server will not be checked for updates (it will be possible to check for updates once the program is started).

(2) Specify the local project folder.

[Note] Default is "**LocalStorage**" (you should use this setting in most cases).

(3) Specify the server project folder.

[Operation Example] Select the shared folder on the LAN created in 4.1.



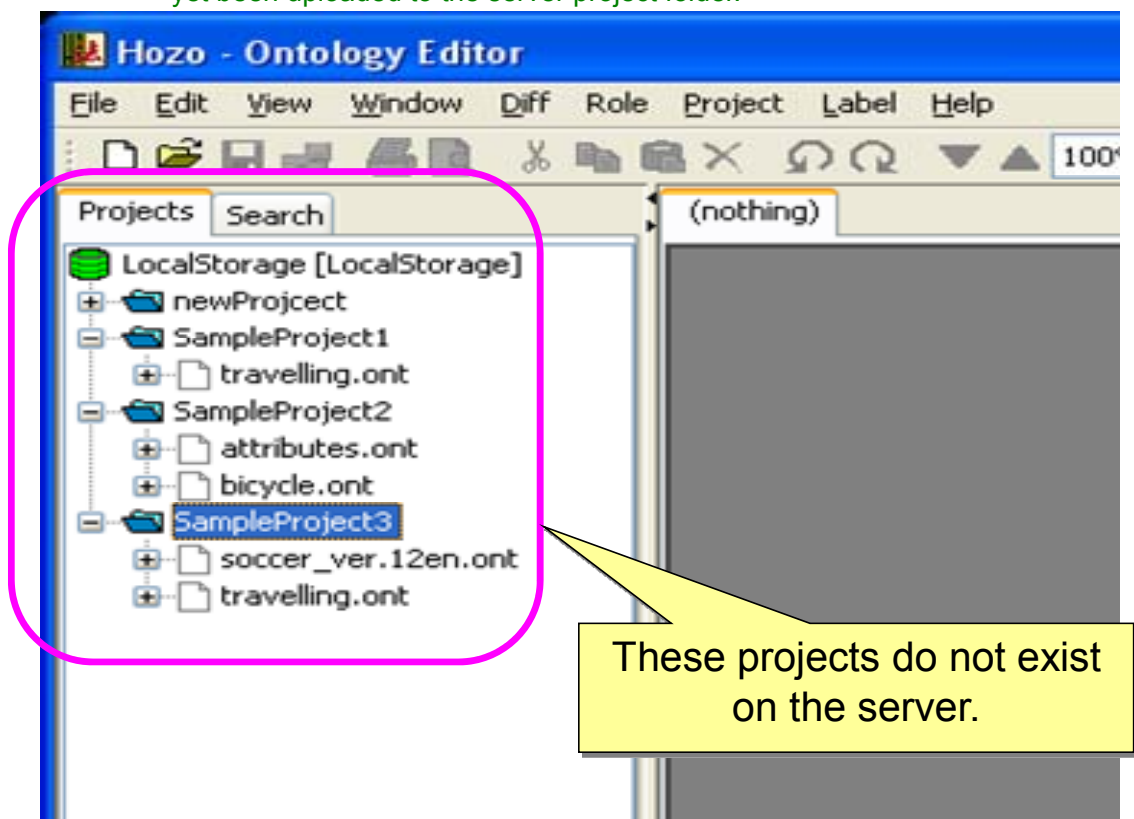
[How to Specify the Server Project Folder]

- To specify the server project folder on Windows network, use
"//(computer name)/(folder name or path)" (Note: "http:" not needed)
or
"\\(computer name)\(folder name or path)".
Example: "///192.168.1.5/webdav/ServerStorage"
- You can also click on the directory button next to the text box to select the folder.
In the directory dialog, select "My Network" and specify the folder.

[Operation Example] To specify the folder from the previous example, you would use
"\\win_server\share".

(4) Click [OK] to start the Ontology editor.

[Operation Example] The project folder icons are blue because the project files have not yet been uploaded to the server project folder.



5. Explanation of the menus

(1) Menu Bar

• File menu

New	create a new project/Ontology
Open	used to open Editing Panels and load files
Save	save the data being edited to file
Save as...	save the data being edited in a new file under a different name
Save without dependency relationships	save data being edited with dependency relationships removed
Start Model Editor	launch the Model Editor
Import	import a Hierarchical Text/CSV Text file
Export	export data being edited
Backup File	delete backup file made at save
Page Settings	set printer settings
Print Preview	display a print preview on the screen
Print	print the Ontology being edited
Quit	quit the system
Force Quit	system forced quit (data being edited not saved)

• Edit menu

Undo	undo editing
Redo	redo editing
Clear Editing Log	clear the editing history
Raise Slot by One	raise selected slot by one position in the view
Lower Slot by One	lower slot by one position in the view
Edit Principle	edit principles in selected node or slot
Delete	delete the selected graphic object
Select All	select all graphic objects on the browsing panel
Select Sub Concepts	select the selected node's sub concepts
Cut	cut the selected graphic object
Copy	copy the selected graphic object

Paste	paste a graphic object that was cut
Selection Tracking Back	move to the previous selected graphic object
Selection Tracking Forward	move to the next selected graphic object

• **View menu**

View Concepts Only	display only concepts (nodes) on the browsing panel
B&W Display	display browsing panel in black and white (for monochrome printing)
Layout	automatically arranges the selected node and its sub concept nodes in either a vertical or horizontal layout
Source View	view the Ontology Editor source code in a separate window
View Super Concept	display inherited slots' super concepts on the browsing panel (super concepts displayed when checked)
Display Page Frame	display a frame indicating the printer paper size on the browsing panel
Specify Canvas Size	set the canvas size of the browsing panel
Change Dependent Node Display	set the imported concept display mode

• **Window menu**

View All	open all Editing Panels
Minimize All	minimize all Editing Panels
Close All	close all Editing Panels
Language	toggle Editing Panel language between English and Japanese

• **Diff. menu**

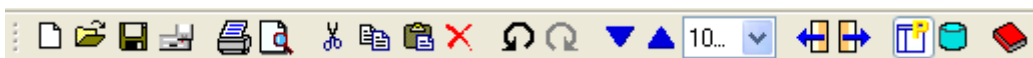
Check for Changes in Depended Ontologies	confirm whether or not imported concepts in the Ontology being edited have been changed
Check for Changes in Ontologies on the Server	confirm whether or not the Ontology being edited has been updated from the corresponding Ontology on the server (i.e. the previous version)
Check for differences with any	check for differences between the Ontology being edited















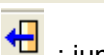





file...	and an existing Ontology file
Clear Change Log	clear the change history in the Diff. display

• **Help menu**

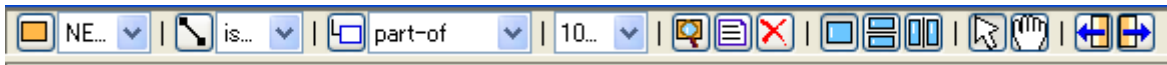
View Help	open help
Quick Reference	open the Quick Reference
Operating Manual	open the Operating Manual
Version Information	display version information

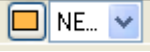
(2) Operation Tool Bar

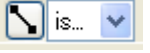


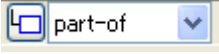
-  : create a new project/Ontology
-  : open Editing Panels and load files
-  : save the data being edited to file
-  : save the data being edited in a new file under a different name
-  : print the Ontology being edited
-  : display a print preview on the screen
-  : cut the selected graphic object
-  : copy the selected graphic object
-  : paste a graphic object that was cut
-  : deletes the selected graphic object
-  : undo editing
-  : redo editing
-  : decrease magnification on Browsing Pane (zoom out)
-  : increases magnification on Browsing Pane (zoom in)
-  : display Browsing Pane magnification (selectable list)
-  : jump to the previous selected graphic object
-  : jump to the next selected graphic object
-  : show/hide Project Management Pane
-  : display Ontology management window
-  : view help

(3) Editing Tool Bar





 : concept class create button and concept selection list


 : relational link create button and relational link selection list


 : slot create button and slot selection list


 : display Browsing Pane magnification (selectable list)


 : select constraint concept


 : select principle


 : toggle screen mode (single screen view)


 : toggle screen mode (vertical split screen view)

 : toggle screen mode (horizontal split screen view)

 : toggle to selection mode

 : toggle to jump mode

 : jump to the previous selected graphic object

 : jump to the next selected graphic object

(4) Shortcut keys

There are shortcut keys for the operation menu and editing menu.

New	Ctrl+ O
Save	Ctrl+ S
Print	Ctrl+P
Quit	Ctrl+E
Force Quit	Ctrl+Q
Undo	Ctrl+Z
Redo	Ctrl+Y
Raise Slot by One	Alt+Up
Lower Slot by One	Alt+Down
Delete	Delete
Select All	Ctrl+A
Select Sub Concepts	Ctrl+N
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Vertical Layout	Ctrl+G
Horizontal Layout	Ctrl+H
Selection Tracking Back	Alt+Z
Selection Tracking Forward	Alt+Y

(5) Mouse menu

The mouse menu will be displayed when right clicking on selected objects in the Navigation Pane, Browsing Pane, or the Project Management Pane in the Editing Panel.

6. Contact Information

- Hozo website: <http://www.hozo.jp/>
- E-mail for Hozo support: hozo@ei.sanken.osaka-u.ac.jp
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http://www.ei.sanken.osaka-u.ac.jp/~kozaki/index_en.html