

Natural

Natural Studio Extensions

Version 9.1.4

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This document applies to Natural Version 9.1.4 and all subsequent releases.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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Preface

This documentation describes the Natural Studio extensions which are delivered with Natural. It is organized under the following headings:

Object Compare	How to compare the contents of two different Natural sources.
Local Versioning	How to interact with a source control system.
Natural for Ajax Tools	How to use Natural for Ajax functionality directly from within Natural Studio.

1

About this Documentation

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Document Conventions

Convention	Description
Bold	Identifies elements on a screen.
Monospace font	Identifies service names and locations in the format <i>folder.subfolder.service</i> , APIs, Java classes, methods, properties.
<i>Italic</i>	Identifies: Variables for which you must supply values specific to your own situation or environment. New terms the first time they occur in the text. References to other documentation sources.
Monospace font	Identifies: Text you must type in. Messages displayed by the system. Program code.
{ }	Indicates a set of choices from which you must choose one. Type only the information inside the curly braces. Do not type the { } symbols.
	Separates two mutually exclusive choices in a syntax line. Type one of these choices. Do not type the symbol.
[]	Indicates one or more options. Type only the information inside the square brackets. Do not type the [] symbols.
...	Indicates that you can type multiple options of the same type. Type only the information. Do not type the ellipsis (...).

Online Information and Support

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You can find documentation on the Software AG Documentation website at <https://documentation.softwareag.com>.

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You can find product information on the Software AG Empower Product Support website at <https://empower.softwareag.com>.

To submit feature/enhancement requests, get information about product availability, and download products, go to [Products](#).

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If you have any questions, you can find a local or toll-free number for your country in our Global Support Contact Directory at https://empower.softwareag.com/public_directory.aspx and give us a call.

Software AG Tech Community

You can find documentation and other technical information on the Software AG Tech Community website at <https://techcommunity.softwareag.com>. You can:

- Access product documentation, if you have Tech Community credentials. If you do not, you will need to register and specify "Documentation" as an area of interest.
- Access articles, code samples, demos, and tutorials.
- Use the online discussion forums, moderated by Software AG professionals, to ask questions, discuss best practices, and learn how other customers are using Software AG technology.
- Link to external websites that discuss open standards and web technology.

Data Protection

Software AG products provide functionality with respect to processing of personal data according to the EU General Data Protection Regulation (GDPR). Where applicable, appropriate steps are documented in the respective administration documentation.

2 Object Compare

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Using Object Compare, you can compare the contents of two different Natural sources.

Supported object types are: program, dialog, class, subprogram, subroutine, text, local data area, parameter data area, global data area, help routine, copycode, function, and adapter.



Note: There is no extra Natural Security support for enabling/disabling the Object Compare plug-in. However, Object Compare uses the system command `LIST` to read a Natural source. The same Natural Security support that is provided for the `LIST` command also applies to Object Compare.

Before You Start

Before Object Compare can be used, you have to proceed as described in the following topics:

- [Prerequisites](#)
- [Activating Object Compare](#)

Prerequisites

Work file 30 is used. Therefore, the profile parameter `WORK` must be set to 30 or higher.

An external tool with a graphical user interface for comparing files must have been installed on the PC. An example of such a tool is ExamDiff. A line command compare tool such as *diff.exe* does not work.

Activating Object Compare

Object Compare has to be activated in the Plug-In Manager. For detailed information on the activation procedure, see *Plug-in Manager* in the documentation *Using Natural Studio*.

Elements of Object Compare

When Object Compare has been activated in the Plug-in Manager, additional elements are available in the Natural Studio window:

- [Context Menu](#)
- [Menu Command](#)
- [Toolbar](#)

- Options Dialog Box

Context Menu

When the current context (that is, the selected object) allows it, the context menu in the library workspace provides the following additional cascading menu: **Object Compare**. This cascading menu contains the following commands: **Write Left File** and **Write Right File**. See [Selecting the Objects to be Compared](#) for further information.

Menu Command

The **Tools > Development Tools** menu provides the following additional command: **Start Object Compare**. See [Starting Object Compare](#) for further information.

Toolbar

An additional toolbar is shown. The button in this toolbar represents the following menu command:

 **Start Object Compare**



Note: The display of this toolbar can be switched on and off by choosing **Customize** from the **Tools** menu.

Options Dialog Box

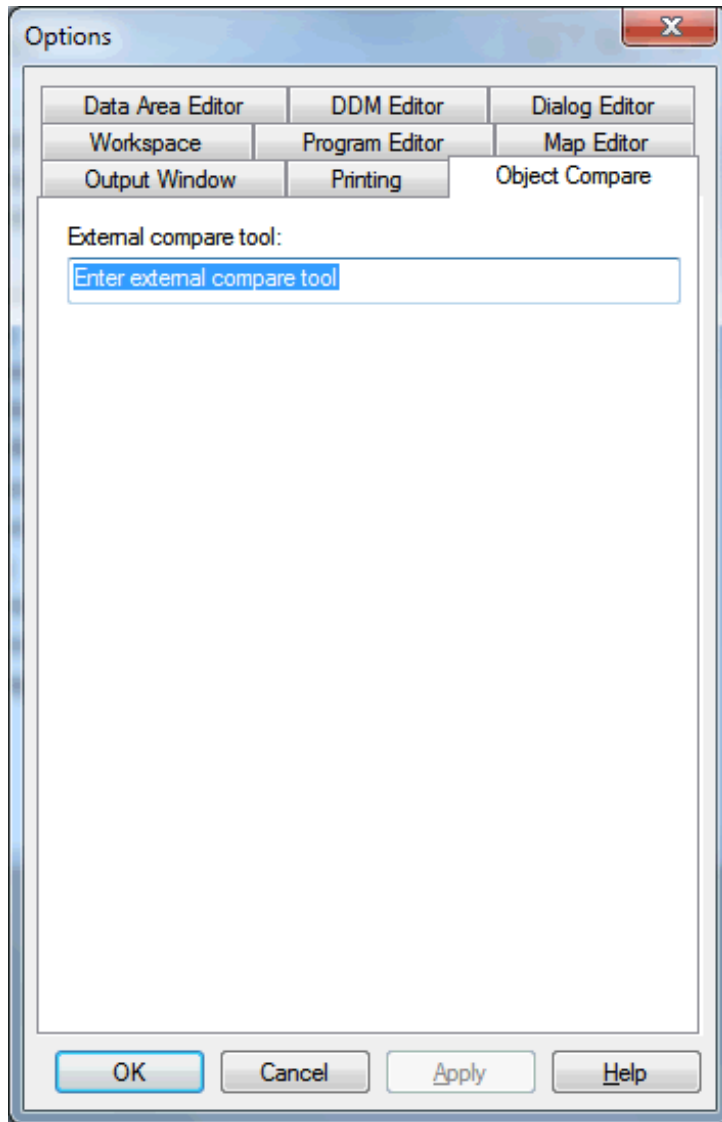
The **Options** dialog box contains an additional page labeled **Object Compare**. See [Setting the Options](#) for further information.

Setting the Options

When Object Compare has been activated, you first have to set the options for this Natural Studio extension.

➤ To set the options

- 1 From the **Tools** menu, choose **Options**.
The **Options** dialog box appears.
- 2 Select the **Object Compare** page in this dialog box.



- 3 Specify the following information:

External compare tool

The external tool (including path) that is to be used for comparing files.

- 4 Choose the **OK** button.

Selecting the Objects to be Compared

When you select the objects to be compared, copies of these Natural sources are temporarily stored in the subdirectories *left* and *right* of the temporary Natural directory which has been defined in the local configuration file. See *Installation Assignments* in the *Configuration Utility* documentation.

If a temporary Natural directory has not been defined in the local configuration file, the copies are stored in the directory defined by the Windows environment variable `TEMP` or, if `TEMP` is not defined, in the directory defined by the Windows environment variable `TMP`.

These copies are the input for the external tool.

➤ To select the objects

- 1 In the library workspace, select the first object to be compared.
- 2 Invoke the context menu and choose **Object Compare > Write Left File**.

The code for this object will be shown on the left side of the external tool.

- 3 In the library workspace, select the second object to be compared.
- 4 Invoke the context menu and choose **Object Compare > Write Right File**.

The code for this object will be shown on the right side of the external tool.

Starting Object Compare

When you start Object Compare, the external tool, which has been defined in the **Options** dialog box, is invoked with the left and right files you have defined last.

➤ To start Object Compare

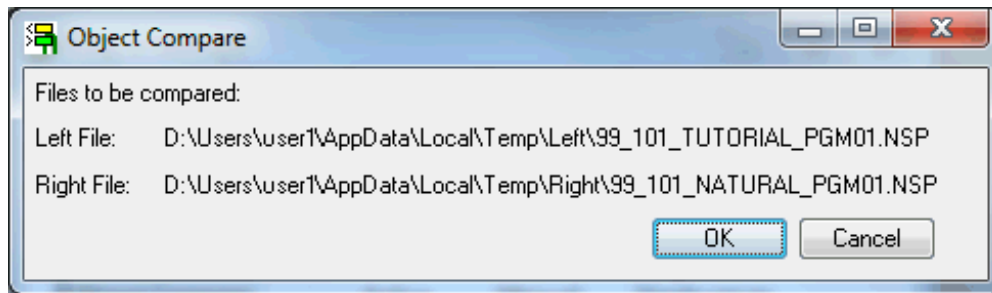
- 1 From the **Tools** menu, choose **Development Tools > Start Object Compare**.

Or:

When the Object Compare toolbar is shown, choose the following toolbar button.



The following dialog box appears. It shows the file names that are used in the temporary directories. The file names are composed of the following information: host and port (only shown when an object has been selected on a remote development server), database ID, file number, library name, name of the selected object and an extension which indicates the type of Natural object.



- 2 Choose the **OK** button to invoke the external tool.

3

Local Versioning

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Using Local Versioning, you can use the source control system Subversion (SVN) or Concurrent Versions System (CVS) from within your Natural environment.

To use this functionality, you must have the Subversion or CVS client part (*svn.exe* or *cvs.exe*) installed on your PC and you must have access to a Subversion or CVS repository server which has been installed locally or on a server. When you search the internet, you can find these Subversion or CVS components on several download sites.

Preliminary Remarks

The following topics are covered below:

- [Natural Security](#)
- [Supported Subversion and CVS Functions](#)
- [Name of the System Library SYSPLCVS](#)
- [Batch Mode](#)

Natural Security

Natural Security is partly supported. When a logon to a library is disallowed, this library will not be shown in the tree view and Local Versioning commands cannot be executed. However, when the **List**, **Open** or **Save** commands are disallowed for a Natural object in a library, it is still possible to read Natural objects and commit them to a repository as well as check out Natural objects from a repository and import (and maybe replace) them in Natural.

For accessing the Natural Development Server (NDV), Local Versioning uses Object Handler routines. Therefore, a utility profile for the Object Handler (*SYSOBJH*) must be defined in Natural Security in which **Load** and **Rep** are allowed. Furthermore, **Applies as default profile** must be set to "Y" to activate the utility profile.

Supported Subversion and CVS Functions

Local Versioning does not cover all Subversion and CVS functions. Therefore, for some tasks it may be necessary to use the command line interface of a repository (*svn.exe* or *cvs.exe*) or free third-party software such as TortoiseSVN or TortoiseCVS.

Name of the System Library SYSPLCVS

Although the system library for Local Versioning is called `SYSPLCVS`, it contains the objects for both repositories, Subversion and CVS.

Batch Mode

The current version of Local Versioning is designed for online use. For accessing a repository in batch mode, use the Object Handler.

If you want to load Natural sources from a repository in batch mode, proceed as described below:

1. Check out a repository module with the structure of a system file (`FUSER`) into a local workspace.
2. Create a `FILEDIR.SAG` file for each library using the `FTOUCH` utility. To get the parameters for the `FTOUCH` utility (for example, structured mode), you can read the source header, if there is one. Or, if you have disabled the source header in the [options](#), you can use user-defined default values for each source that you have committed.

This makes a system file (`FUSER`) out of the workspace, which can either be used locally or processed further by Natural in batch mode.

If you want to bring the sources to a remote development environment (NDV), continue with the following steps.

3. Use the Object Handler to unload the system file (`FUSER`) in batch mode to a local file.
4. Map to a remote development environment in batch mode.
5. Use the direct commands to load the previously unloaded sources into the remote development environment.

For further information, see *Batch Processing in a Remote Environment* in the *Object Handler* part of the *Tools and Utilities* documentation.

Before You Start

Before Local Versioning can be used, you have to proceed as described in the following topics:

- [Prerequisites](#)

- [Activating Local Versioning](#)

Prerequisites

Using Natural Version 8.3 or above, a second Natural session for plug-ins will be started from *C:\Program Files (x86)\Common Files\Software AG\Natural\V1\bin*. It also uses a separate NATPARM parameter module. The FNAT (especially the libraries SYSPLCVS) and the FUSER are different in the Natural plug-in session and in your Natural session. See also the information on the Natural parameter file in the section *Plug-Ins under Natural Security* of the *Natural Security* documentation.

To be able to access the FUSER of the standard Natural installation with the Local Versioning plug-in, you need to define and set the FUSER of the standard Natural in the separate Local Versioning NATPARM parameter module. This can be achieved by starting the *natparm.exe* in the directory *C:\Program Files (x86)\Common Files\Software AG\Natural\V1\bin*.

To be able to use Local Versioning for an inactive system file of the standard Natural installation, the inactive system file needs to be set and defined in the separate Local Versioning NATPARM parameter module.

Local Versioning uses the Subversion or CVS command interface *svn.exe* or *cvs.exe* (exactly with this name) which must be installed on the PC running Local Versioning. Make sure that the command interface is accessible (for example, by adding *svn.exe* or *cvs.exe* including its path to the Windows environment variable %PATH%).

In the Windows registry, the command extensions for *cmd.exe* must be enabled. This is enabled by default.

You must have access to the repository of your source control system. This repository can be installed locally or on a server. The repository must be operational before you start using Local Versioning.

A Natural object should not be archived with its line numbers or line number references. Local Versioning removes the line numbers when a Natural object is copied to a workspace. Line numbers are removed so that sources in which just one line has been added or removed do not differ because only the line number is different. We recommend that you switch on line number suppression for a library which is used as a workspace; see *Suppressing Line Numbers in the Source Code* in the documentation *Using Natural Studio*. However, Local Versioning is also able to work with line numbers.

Local Versioning stores a Natural object in a repository using its file system name. When there are special characters in the name of a Natural object, its Natural name and file system name will be different. For Natural objects with special characters coming from a remote mainframe development server (NDV) to a workspace outside Natural, a file system name is not available. Local Versioning does not support such Natural objects. We strongly recommend that you do not use special characters in Natural names.

Special characters are the following:

■ On a Remote UNIX or OpenVMS Development Server

.

@
all lowercase characters (a through z)

■ On a Remote Mainframe Development Server

\$
%
+
/
@
§
all lowercase characters (a through z)

Activating Local Versioning

Local Versioning has to be activated in the Plug-In Manager. For detailed information on the activation procedure, see *Plug-in Manager* in the documentation *Using Natural Studio*.

Elements of Local Versioning

When Local Versioning has been activated in the Plug-in Manager, additional elements are available in the Natural Studio window:

- Menu Commands
- Toolbar
- Context Menu
- Options Dialog Box

Menu Commands

The **Object** menu provides the cascading menu **Local Versioning** with commands for processing an object. These commands can also be found in the [context menu](#) (see below). You can use the commands from the **Object** menu when a context menu is not available for a Natural object (for example, for resources and error messages).

The **Library** menu provides the cascading menu **Local Versioning** with commands for processing a library. These commands can also be found in the [context menu](#) (see below). You can use these commands, for example, to add a new library in your source control system. Alternatively, you can create a new library in Natural and perform commands on the empty library.

The **Tools > Development Tools** menu provides the cascading menu **Local Versioning** with the **Maintain Projects** command. It is used to define and maintain projects for Local Versioning.

Toolbar

An additional toolbar is shown. The button in this toolbar represents the following menu command:



Note: The display of this toolbar can be switched on and off by choosing **Customize** from the **Tools** menu.

Context Menu

When the current context (that is, the selected object) allows it, the context menu provides the following additional cascading menu: **Local Versioning**.



Note: Local Versioning commands can be applied to Natural resources and Natural error messages, although the context menu does not show the cascading menu **Local Versioning**. In these cases, use the **menu commands** instead.

Depending on the context, the cascading menu contains different commands.

Depending on the **project definition**, the status of the project folder or the setting of the **option Disable import, make branch, add library**, several of the commands in the cascading menu may be disabled.

System File Level

When a system file is currently selected (for example, the node for FUSER or FNAT), the following commands are available in the cascading menu:

Commands for Subversion	Commands for CVS
SVN Display Log	CVS Display Log
SVN Status System File	CVS Status System File
SVN Import Module into Repository	CVS Import Module into Repository
SVN Make Branch	CVS Make Branch/Tag
SVN Commit System File	CVS Commit System File
SVN Update System File	CVS Update System File
SVN Check Out and Import System File	CVS Check Out and Import System File
SVN Check Out System File	CVS Check Out System File
Import System File into Natural	Import System File into Natural

Library Level

When a library is currently selected, the following commands are available in the cascading menu:

Commands for Subversion	Commands for CVS
SVN Display Log	CVS Display Log
SVN Status Library	CVS Status Library
SVN Add and Commit Library	<i>No command available</i>
SVN Add Library	CVS Add Library
SVN Delete and Commit Library	CVS Remove and Commit Library
SVN Delete Library	CVS Remove Library
SVN Commit Library	CVS Commit Library
SVN Update Library	CVS Update Library
SVN Check Out and Import Library	CVS Check Out and Import Library
SVN Check Out Library	CVS Check Out Library
Import Library into Natural	Import Library into Natural

Natural Object Level

When a Natural object is currently selected, the following commands are available in the cascading menu:

Commands for Subversion	Commands for CVS
SVN Display Log	CVS Display Log
Copy and SVN Commit Object	Copy and CVS Commit Object
Copy to Project Folder	Copy to Project Folder
SVN Add and Commit Object	CVS Add and Commit Object
SVN Add Object	CVS Add Object
SVN Delete and Commit Object	CVS Remove and Commit Object
SVN Delete Object	CVS Remove Object
SVN Commit Object	CVS Commit Object
SVN Update Object	CVS Update Object
<i>No command available</i>	CVS Check Out and Import Object
<i>No command available</i>	CVS Check Out Object
Import Object into Natural	Import Object into Natural

The above commands correspond to the commands used by Subversion and CVS.

Options Dialog Box

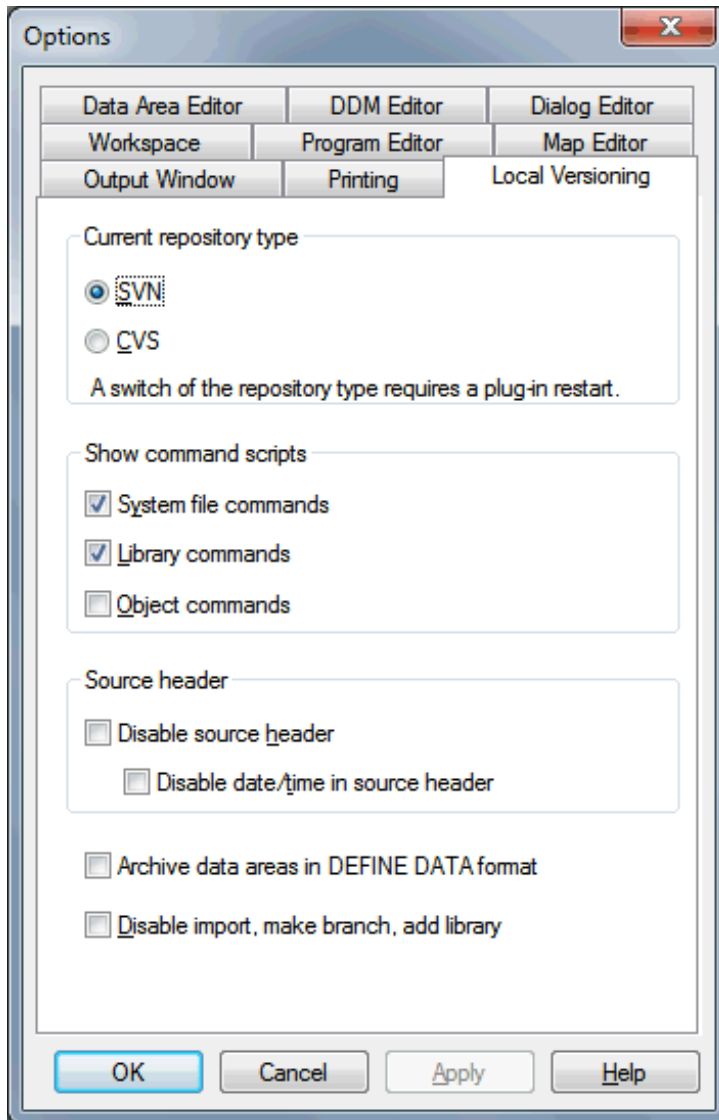
The **Options** dialog box contains an additional page labeled **Local Versioning**. See [Setting the Options](#) for further information.

Setting the Options

When Local Versioning has been activated, you can set the options for this Natural Studio extension.

➤ To set the options

- 1 From the **Tools** menu, choose **Options**.
The **Options** dialog box appears.
- 2 Select the **Local Versioning** page in this dialog box.



- 3 You can set the following options:

Current repository type

Choose the option button for the repository type (either **SVN** for Subversion or **CVS**) to which you want commit or from where you want to check out Natural object sources.

Each time you switch the repository type, you have to restart (that is: deactivate and then activate) Local Versioning in the Plug-in Manager. For detailed information, see *Plug-in Manager* in the documentation *Using Natural Studio*.

Show command scripts

When the check boxes in this group box are selected, the window for the Windows command prompt appears each time a Subversion or CVS command is issued which is implemented in Local Versioning. You can then see whether the Subversion or CVS command was successful.

System file commands enables/disables the window on system file level, **Library commands** on library level and **Object commands** on Natural object level.

When the windows for the above commands have been disabled, you can use the different commands which are provided by Local Versioning for displaying the status. Or you can use a third-party tool such as TortoiseSVN or TortoiseCVS to check whether a command has been successful.

For getting started or for testing purposes, all levels may be enabled. Since there may be numerous windows on object level when many object are selected at once (for example, the objects of a whole library), it is advisable to switch off the object level. There will be a warning when the number of selected objects is bigger than 10.

The processing of the selected objects can be canceled by pressing ESC. However, when the options in this group box are selected and there are numerous command windows, Natural hardly gets control.

Exception: The command prompt window appears always when you issue the commands for displaying the [status of a library or system file](#), or when you choose the **Login** button in the dialog box containing the [project definition](#). This does not depend on the setting of these options.

Source header

Before a Natural source is copied to the workspace, Local Versioning adds a header to the source. The header contains the Natural name of the object, the source user ID, the mode, the code page, the source date and the source time. This information is used when a source object is imported back into Natural after a checkout from a repository.

When Local Versioning does not find a header in the source before importing it, default values are used. The default values are:

Header Type	Default Value
Mode	Structured.
Natural name of the object	Name of the file in the workspace/repository.
User ID	*USER
Code page	*CODEPAGE
Source date	*DATN
Source time	*TIMN

Since the source date and source time may change without any change of the source, source date and source time may be disabled, while the other header parameters remain. The following check boxes are available in this group box:

- **Disable source header**

When this check box is selected, the whole source header is disabled, including source date and source time.

■ **Disable date/time in source header**

When this check box is selected, there will be no source date and source time in the header. The other parameters depend on the setting of **Disable source header** check box.

Local Versioning is able to process Natural sources with a header from Natural for Eclipse.

Archive data areas in DEFINE DATA format

When this check box is selected, data areas are converted to the `DEFINE DATA` format before they are copied to the workspace and committed to a repository.

When this check box is not selected, data areas are archived in the Natural-internal format for data areas in the file system.

The `DEFINE DATA` format is readable. A data area in internal format does not need to be converted when you want it to bring it into Natural with the `FTOUCH` utility or the Natural import function.

Data areas containing views with fields marked as multiple fields or periodic groups (this is for documentation only and will not be considered when using the view) and which are converted to the `DEFINE DATA` format, lose the information about multiple fields or a periodic groups.

Disable import, make branch, add library

When this check box is selected, the following commands are disabled:

Commands for Subversion	Commands for CVS
SVN Import Module into Repository	CVS Import Module into Repository
SVN Make Branch	CVS Make Branch/Tag
SVN Add Library	CVS Add Library
SVN Add and Commit Library	<i>No command available</i>

- 4 Choose the **OK** button.

Maintaining Projects

The following topics are covered below:

- [Displaying the List of Projects](#)
- [Defining a New Project](#)
- [Deleting a Project](#)

Displaying the List of Projects

Before you can start using Local Versioning, you must define a project. Each project belongs to a specific system file and is identified by the environment, the database ID (DBID) and the file number (FNR).

A Natural system file is the development environment in which the sources of a project are created, changed and tested. Such a Natural system file is usually the `FUSER`, either in the local environment or on a remote development server. Since Local Versioning supports all types of Natural system files, it can also cope with `FNAT` or an inactive environment. An inactive environment is a file which is defined as a system file in the global configuration file of the Configuration Utility. It is accessible from the library workspace of Natural Studio. Sources cannot be modified in an inactive environment, but they can be copied to an inactive environment.

The workspace may be outside Natural, in an ordinary Windows folder, or it may also be a Natural system file. Using an inactive Natural for Windows system file for a repository workspace has the advantage that the user has a view on the repository workspace within the Natural library workspace. It is also possible to use an active system file (for example, an `FUSER`) for both, the place where a user holds the development sources and as a repository workspace. In this case, the user must take care when a source is meant to be in the `FUSER` and when it is in the repository workspace. Sources in an `FUSER` usually do not have a header; they may have line numbers and line number references. Sources in a workspace usually have a header, but no line numbers and no line number references.

Each workspace can refer to one Subversion or CVS repository only. A repository may refer to more than one workspace.

You may define more than one repository, including workspace, to one Natural system file. If so, a dialog box appears prompting you to select one or more repositories, including workspace, when you perform commands on Natural objects in such a system file.

You may also define more than one Natural system file to one repository, including workspace.

If you have set up a project with the **Maintain Projects** command which requires user attention so that Natural libraries or objects in a repository are not mixed up or overwritten, a warning appears. In such a case, you have to take care that you do not unintentionally overwrite objects, or unintentionally commit or check out objects to wrong libraries or system files.

➤ To display the list of projects

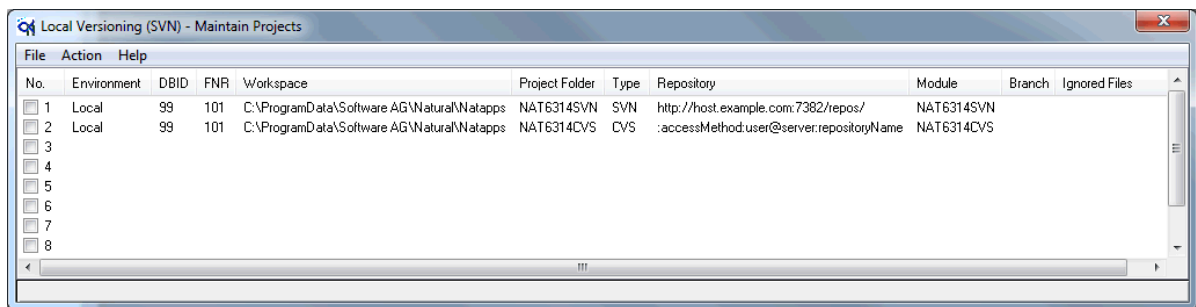
- From the **Tools** menu, choose **Development Tools > Local Versioning > Maintain Projects**.

Or:

When the Local Versioning toolbar is shown, choose the following toolbar button.



The following window, which contains the project list, appears. You can define up to 10 projects, which you can enable or disable using the check box in the first column. Initially, the project definitions are empty. The repository type which is currently used is indicated in the title bar. Example:



Note: The list of defined projects is stored as a resource (text document) in the system library `SYSPLCVS`. The name of this file is `lv_projects.txt`. Do not delete this file; otherwise you will lose all project definitions. During an installation of the plug-in and even during a new Natural installation, an old `lv_projects.txt` file is kept. If there is no `lv_projects.txt` file at plug-in activation, it will be created with default values.

Defining a New Project

To define a project you have to select one of the empty entries in the project list and then edit the project definition.

➤ To edit the project definition

- 1 Select the project and from the **Action** menu, choose **Maintain**.

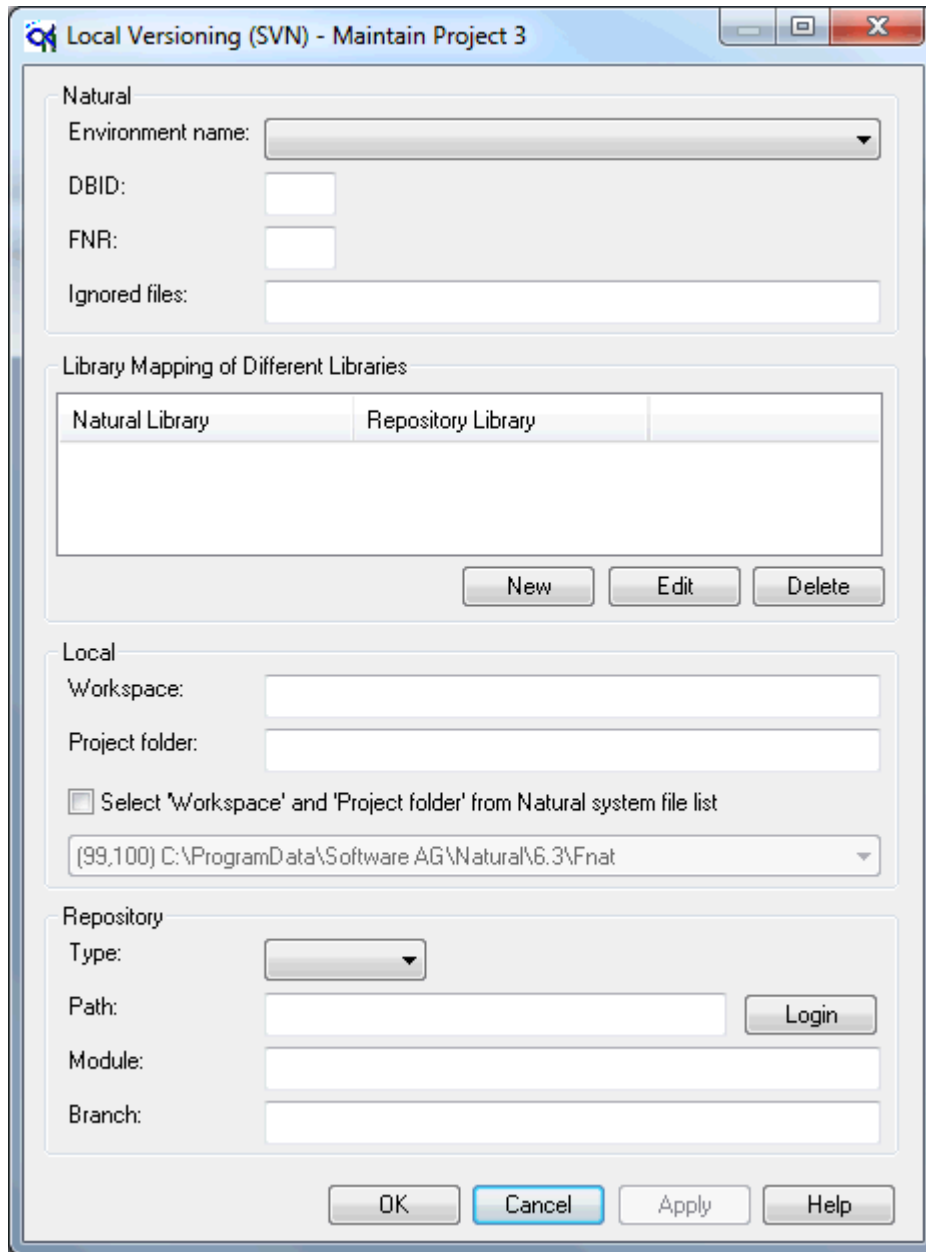
Or:

Select the project, invoke the context menu and choose **Maintain**.

Or:

Double-click the project.

The following dialog box appears:



The dialog box is titled "Local Versioning (SVN) - Maintain Project 3". It is divided into three main sections: "Natural", "Library Mapping of Different Libraries", and "Local".

Natural Section:

- Environment name: A drop-down menu.
- DBID: A text input field.
- FNR: A text input field.
- Ignored files: A text input field.

Library Mapping of Different Libraries Section:

Natural Library	Repository Library

Buttons: New, Edit, Delete

Local Section:

- Workspace: A text input field.
- Project folder: A text input field.
- ☐ Select 'Workspace' and 'Project folder' from Natural system file list
- A path selection dropdown showing "(99,100) C:\ProgramData\Software AG\Natural\6.3\Fnat".

Repository Section:

- Type: A drop-down menu.
- Path: A text input field with a "Login" button to its right.
- Module: A text input field.
- Branch: A text input field.

Buttons: OK, Cancel, Apply, Help

- 2 Specify the following information:

Environment name

From the drop-down list box, select the environment (local or any remote development server) of the Natural system file from where you want to bring Natural sources into your source control system.

DBID

The database ID of the Natural system file from where you want to bring Natural sources into your source control system.

FNR

The file number of the Natural system file from where you want to bring Natural sources into your source control system.

Ignored files

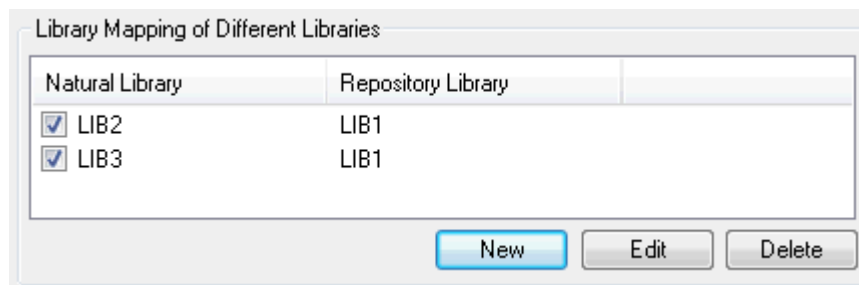
Optional. You can specify the Natural sources which are to be ignored - even if they are selected. The ignored Natural sources are not handled by Local Versioning.

A Natural source name and the input in this field are case-sensitive. There may be lowercase characters in the name of a Natural object when an ampersand (&) in the name is replaced by the language code. In most cases, however, a Natural source name is in uppercase characters.

The character which is used to separate the source names is a semicolon (;). It is not allowed to specify file extensions. Wildcards are also not allowed.

Library Mapping of Different Libraries

Optional. Use the **New** button to specify a Natural library and map it to another library in your source control system if you want to change the library for committing and checking out of objects. A library mapping can be enabled or disabled. Example:

**Workspace**

The path to a local working folder in which Natural objects are held before they are copied to your source control system. The workspace usually parallels a Natural system file such as FNAT or FUSER (for example, outside Natural or in an inactive Natural environment). However, it may also be in an active system file (for example, FUSER). For example:

```
c:\natural\cvs
```

UNC paths (such as \\nat\cvs) are not supported since *cmd.exe* does not support UNC paths.



Note: For performance reasons, you may define a workspace outside of Natural. Since no interaction with Natural is necessary, working with a workspace outside of Natural is faster.

Project folder

A subfolder within the workspace.

It is recommended that you define a separate subfolder for every module and every branch in your source control system.

**Notes:**

1. Using an inactive system file as the workspace/project folder has the advantage that the workspace is visible within the Natural environment.
2. When the workspace is a Natural system file, the repository creates folders for Subversion or CVS status information (with the names *.svn* or *CVS*) in the Natural system file. When you use CVS, you may run into problems with a library called *CVS* in your *FUSER*. If you have a library with this name, CVS will put administration files into the *CVS* folder. When you delete a whole Natural library, the files or folders unknown to Natural (such as *.svn* or *CVS*) are not deleted.
3. When Natural sources are copied to the project folder using the command **SVN Add Object**, **CVS Add Object** or **Copy to Project Folder**, the line numbers are removed from the sources (this is done so that sources where just one line has been added or removed do not differ because only the line number is different); line number references are resolved by a symbolic label. When you have defined your *FUSER* as the project folder, you also have to perform these commands in order to remove the line numbers.
4. When you check out a Natural source from Subversion or CVS directly to an *FUSER* and this source does not yet exist on this *FUSER*, you will not see this source in Natural. This is because the file *FILEDIR.SAG* will not be updated. You need to import the source into Natural.
5. Missing workspace/project folder directories will be created with the first use.

Type

The repository type may either be **SVN** (for Subversion) or **CVS**.

Path

The full connection string to your source control system.

■ Subversion

For Subversion this string may be entered in one of the following formats (depending on the Subversion configuration):

```
file://d:...
```

```
svn://...
```

```
http://...
```

For example:

```
http://natsvn/repos/proj1/dev/vers/fuser100
```



Note: For Subversion, the path is only used for the commands which check out and import into the repository. Other Subversion commands use the path specification in the *.svn* directories.

■ CVS

For CVS this string must be entered in the following format:

```
:protocol:user-name@server-name:repository-folder
```

For example:

```
:pserver:natural@cvs.myserver.com:/cvsroot/Repositories/DevSources
```



Tip: Copy the string directly from your source control system and paste it in this text box.

Login

When you choose this button, the command prompt window appears and you are prompted to enter your repository password. This corresponds to the `svn info` or `cvs login` command which is used to confirm your password and to store it for later use in your home directory.

Module

The name of the Subversion or CVS module that you want to use or create.

Branch

Optional.

For Subversion, the name of a new directory which is to contain a branch of the main version.

For CVS, the name of the branch on which you want to work or that you want to create.

If you do not specify a branch, the main branch is used.

- 3 Choose the **OK** button.

Deleting a Project

You can delete any project which is currently defined in the **Maintain Projects** window.

➤ To delete a project

- Select the project and from the **Action** menu, choose **Delete**.

Or:

Select the project, invoke the context menu and choose **Delete**.

All information which has previously been specified in the project definition is deleted.

Alternatively, you can delete a project in the file *lv_projects.txt* which is stored as a resource (text document) in the system library `SYSPLCVS`.

First Steps with Local Versioning

This section contains a brief tutorial which shows how to interact with a source control system. It applies to both Subversion and CVS.

The following topics are provided:

- [Prerequisites for this Tutorial](#)
- [Setting Up a New Project in Your Source Control System](#)
- [Making a Branch for a Project in Your Source Control System](#)
- [Working on the Main Branch](#)
- [Working on a Different Branch](#)

Prerequisites for this Tutorial

Project Definition

This tutorial assumes that the values below have been specified in the [project definition](#).

For Subversion:

Local Versioning (SVN) - Maintain Project 1

Natural

Environment name: Local

DBID: 30

FNR: 30

Ignored files:

Library Mapping of Different Libraries

Natural Library	Repository Library
-----------------	--------------------

New Edit Delete

Local

Workspace: C:\natural\natapps\SVN

Project folder: LV-MyFolder

☐ Select 'Workspace' and 'Project folder' from Natural system file list

(30,31) C:\natural\natapps\SVN\LV-MyFolder

Repository

Type: SVN

Path: http://natsvn/repos/demo Login

Module: LV-MyModule

Branch:

OK Cancel Apply Help

For CVS:

Local Versioning (SVN) - Maintain Project 1

Natural

Environment name: Local

DBID: 30

FNR: 30

Ignored files:

Library Mapping of Different Libraries

Natural Library	Repository Library
-----------------	--------------------

New Edit Delete

Local

Workspace: C:\natural\natapps\CVS

Project folder: LV-MyFolder

☐ Select 'Workspace' and 'Project folder' from Natural system file list

(30,31) C:\natural\natapps\SVN\LV-MyFolder

Repository

Type: CVS

Path: :pserver:uid1@natcvs/qatest1 Login

Module: LV-MyModule

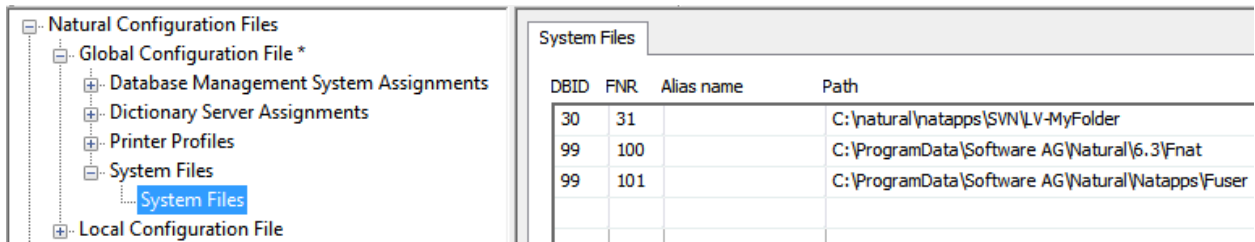
Branch:

OK Cancel Apply Help

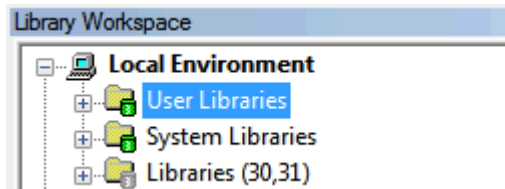
Make sure to specify the correct values for your Natural environment (environment name, DBID and FNR) and repository (repository type and path). For the workspace, project folder and module name, use the above values. Leave the remaining text boxes blank.

Workspace Definition

Use the Configuration Utility to define the workspace as an inactive environment (in the example below, DBID 30 and FNR 31 point to the project folder *C:\natural\natapps\SVN\LV-MyFolder* in the workspace for Subversion).



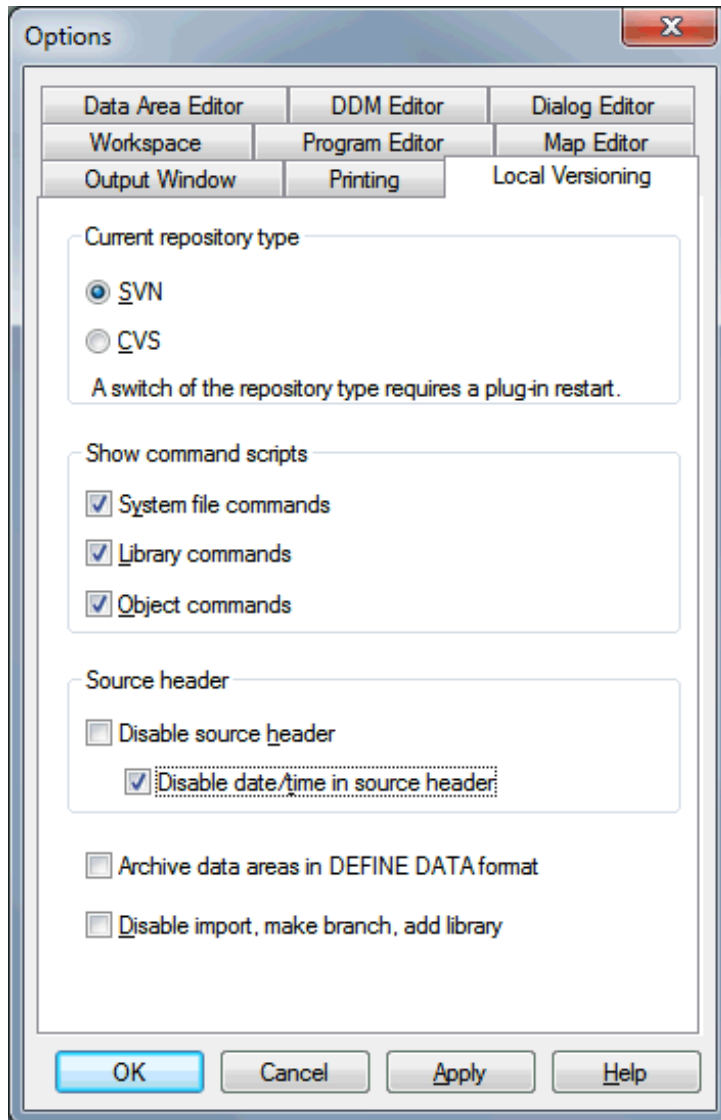
The inactive environment will then appear in Natural Studio's library workspace.



Options

This tutorial assumes that the **options** below have been enabled.

For Subversion:



For CVS: Use the same options, but specify **CVS** as the repository type.

Library and Objects

This tutorial assumes that a library with the name `LV-TEST` exists and that this library contains a program named `PGM1` and a subprogram named `SUBPGM1`.

Setting Up a New Project in Your Source Control System

With this exercise, you will now learn how to set up a new project in a new module and how to add and commit an entire Natural library to your source control system.



Note: The descriptions in this tutorial apply when you are working with the logical view of your library workspace.

➤ To set up a new project in your source control system

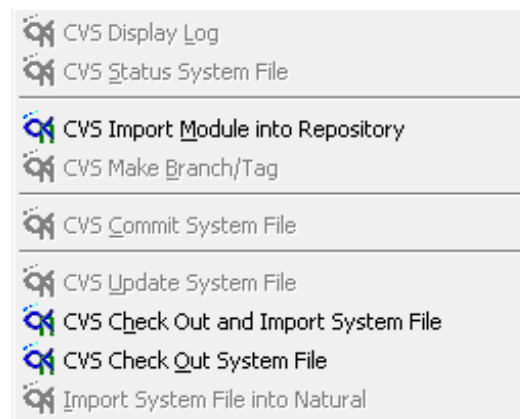
- 1 Select the node for the system file (for example, "User Libraries") in which your Natural sources reside.
- 2 Invoke the context menu for the selected node and display the commands in the cascading menu **Local Versioning**.

The commands below are shown.

For Subversion:



For CVS:



Since a branch has not been specified in the project definition, the command for making a branch/tag is disabled.

Since a workspace under Subversion or CVS version control does not yet exist, further commands are also disabled.



Note: When none of the above commands is enabled, the selected system file and your specification in the project definition do not match.

- 3 To set up a new project in a new module, choose the command **SVN Import Module into Repository** or **CVS Import Module into Repository** from the context menu.

A dialog box appears, prompting for a log message for the import command. Do not change the preset log message.

- 4 Choose the **OK** button to proceed.

Since the options in the **Show command scripts** group box have been enabled, the command prompt window appears, showing the commands that have been executed by your source control system and the result of the execution.

- 5 Press ENTER to proceed.

When you check your repository now (for example, by invoking ViewCVS in your browser which works for both CVS and Subversion), you can see that the module *LV-MyModule* has been created in the repository that has been specified in the project definition.

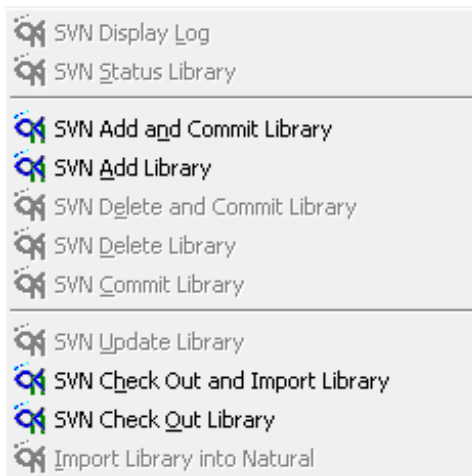
When you check your local workspace (for example, using the Windows Explorer), you can see that the folder *LV-MyFolder* has been created. It includes a folder with the name *.svn* or *CVS*. This folder has been created by an implicit checkout of the new module *LV-MyModule*.

Now that the project has been set up for a system file, it is possible to add libraries to your source control system.

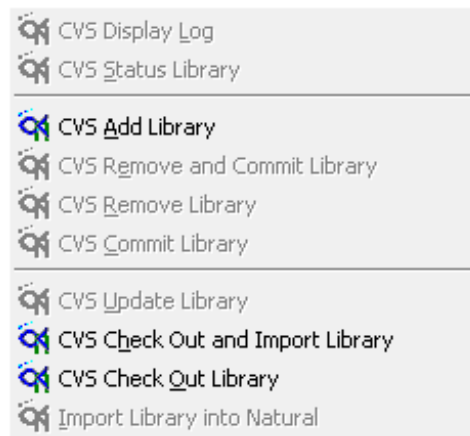
- 6 Select the node for a library (this tutorial assumes that the name of this folder is *LV-TEST*), invoke the context menu and display the commands in the cascading menu **Local Versioning**.

The commands below are shown.

For Subversion:



For CVS:



Since the selected library is not yet under version control in the workspace (no object has been added and objects have not been checked out), only the commands for adding a library and for checking out a library are enabled. All other commands in this context menu are disabled.

- 7 To add the selected library to your source control system, choose the command **SVN Add Library** or **CVS Add Library** from the context menu.

Subversion: Then choose the command **SVN Commit Library** to commit the library.



Note: When the command prompt window with the executed commands is shown, proceed as described above. The corresponding instructions will no longer be given in this tutorial.

In Natural Studio's library workspace, you can now see that the library `LV-TEST` has also been created in the inactive system file (30, 31) which you have previously defined as the workspace.



When you check your repository now (for example, by invoking ViewCVS in your browser which works for both CVS and Subversion), you can see that the folder `LV-TEST` (which corresponds to the Natural library with the same name) has been created in the module `LV-MyModule`.

When you check your local project folder `LV-MyFolder` (for example, using the Windows Explorer), you can see that the folder `LV-TEST` has been created.

Since the directories which correspond to a Natural library have been created, all commands in the context menu for this library are now enabled.

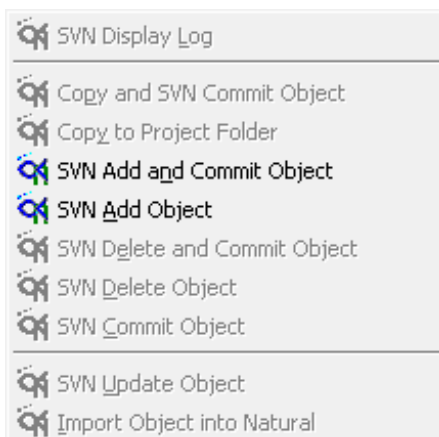


Note: CVS only: Unlike objects, you need not commit directories to CVS. Directories are created in CVS without a commit.

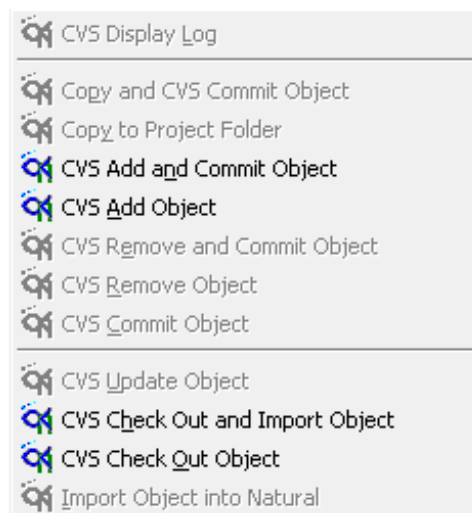
- 8 Select the node for an object in the library (this tutorial assumes that the name of this object is `PGM1`), invoke the context menu and display the commands in the cascading menu **Local Versioning**.

The commands below are shown.

For Subversion:



For CVS:



Since the selected object has not yet been added to your source control system (is not under version control), only the commands for adding an object and checking out an object from CVS are enabled.

**Notes:**

1. The command **CVS Check Out Object** can only return an object when the object is already stored in your source control system. If the object `PGM1` were already stored in your source control system (in `LV-MyModule\LV-TEST\SRC\`) you could read it with this command.
2. Using Subversion, it is only possible to check out an entire library in order to ensure the integrity of an application.

- 9 Choose the command **SVN Add Object** or **CVS Add Object** from the context menu.

The subfolder `SRC` is automatically created and committed to your source control system since it does not yet exist.

The object is copied to your project folder (`PGM1` is now shown in the inactive environment) and, at the same time, it is prepared to be copied to your source control system.

When you check the `SRC` folder in your local project folder (for example, using the Windows Explorer), you can see that the file `PGM1.NSP` has been created. This corresponds to the object `PGM1.NSP` in the file system (in a remote development environment, this applies only to UNIX and OpenVMS platforms, not to mainframe platforms where objects are stored in Adabas).

Natural objects which have been added to the local project folder no longer contain line numbers. When you look at your workspace in the inactive environment, you can see a green symbol on the library folder. This is the symbol for line number suppression.



When you check your repository now (for example, by invoking ViewCVS in your browser which works for both CVS and Subversion), the added object is not yet visible in the `SRC` folder and a version has not yet been created for this object. In order to see the added object in your source control system, you have to commit it. This is explained later in this tutorial.

- 10 Select the node for the library `LV-TEST`, invoke the context menu and choose the command **Local Versioning > SVN Status Library** or **Local Versioning > CVS Status Library**.

The command prompt window appears, indicating that the object `PGM1` has been added locally.

Example for Subversion:

```
A SRC\PGM1.NSP
```

Example for CVS:

```
cvs status: Examining .
cvs status: Examining SRC
File: PGM1.NSP          Status: Locally Added
```

- 11 Press ENTER to proceed.
- 12 Select another Natural object in the library LV-TEST (this tutorial assumes that you add a subprogram with the name SUBPGM1) and from the context menu choose the command **Local Versioning > SVN Add Object** or **Local Versioning > CVS Add Object** to copy another Natural module to your project folder and thus add it to your source control system.

Make a small change in the program PGM1 using the program editor and save this change. Then select PGM1, invoke the context menu and choose the command **Local Versioning > Copy to Project Folder**. This copies the program from the system file to the project folder. You can use this command since you have already added the program to your source control system.



Note: As an alternative, you can also use the command **Local Versioning > SVN Add Object** or **Local Versioning > CVS Add Object**. In this case, the addition to your source control system is ignored, but the object is copied to the project folder.

You will now commit all added objects to your source control system in one step.

- 13 Select the node for the library LV-TEST, invoke the context menu and choose the command **Local Versioning > SVN Commit Library** or **Local Versioning > CVS Commit Library**.



Note: You can also commit each object separately to your source control system using the command **SVN Commit Object** or **CVS Commit Object**. Or if you want to add and commit an object in one step, use the command **SVN Add and Commit Object** or **CVS Add and Commit Object**. In this case, you can enter a different commit log message for each single object.

A dialog box appears in which you can enter a log message. A string including the current date and time, and your user ID is automatically provided.

- 14 Choose the **OK** button to proceed.

Since the options in the **Show command scripts** group box have been enabled, the command prompt window appears, showing the commands that have been executed by your source control system and the result of the execution.

Example for Subversion:

```
C:\natural\natapps\SVN\LV-MyFolder>svn update LV-TEST
At revision 651.
C:\natural\natapps\SVN\LV-MyFolder>svn commit -m "Commit_date:2007-06-25_time:15:31:56_uid:USER1" LV-TEST
Adding LV-TEST\SRC\PGM1.NSP
Adding LV-TEST\SRC\SUBPGM1.NSN
Transmitting file data ..
Committed revision 652.
```

Example for CVS:

```
cvs update: Updating LV-TEST
cvs update: Updating LV-TEST/SRC
A LV-TEST/SRC/PGM1.NSP
A LV-TEST/SRC/SUBPGM1.NSN

cvs commit: Examining LV-TEST
cvs commit: Examining LV-TEST/SRC
/qatest1/Fuser200/LV-TEST/SRC/PGM1.NSP,v <-- LV-TEST/SRC/PGM1.NSP
initial revision: 1.1
/qatest1/Fuser200/LV-TEST/SRC/SUBPGM1.NSN,v <-- LV-TEST/SRC/SUBPGM1.NSN
initial revision: 1.1
```

To synchronize the *LV-TEST* library tree with the repository, a Subversion or CVS `update` command is issued before the Subversion or CVS `commit` command.

In CVS, you can see that *PGM1.NSP* and *SUBPGM1.NSN* have been committed, each with the version 1.1. In Subversion, you can see that *PGM1.NSP* and *SUBPGM1.NSN* have been committed under a new revision; in the above example, this is the revision 652. The objects are now resident in your source control system.

When you check your repository now (for example, by invoking ViewCVS in your browser which works for both CVS and Subversion), you can see that these objects are contained in the folder *LV-MyModule/LV-TEST/SRC*.

Making a Branch for a Project in Your Source Control System

Now that the first version of your project is ready and has been committed to the module *LV-MyModule*, you will make a branch from this module and call it "Beta1". This branch will always show you which objects of which revision are included in the first version of your project. In case you need to make changes later to the first version of your project (for example, if somebody reports a bug in this version), you use the Beta1 branch. In the meantime, you may continue developing the second version of your project on the main branch.

In CVS, a branch is created with the CVS command `tag`. In Subversion, a branch is created with the Subversion command `copy`. Before you can create a branch, you first have to enter a name for this branch (Beta1) in the project definition.

➤ To make a branch

- 1 Invoke the dialog box for the **project definition** that you have used for the previous exercise and enter the name "Beta1" in the **Branch** text box. Leave all other entries unchanged.
- 2 In the Natural library workspace, select the node for the system file, invoke the context menu and from the cascading menu **Local Versioning**, choose the command **SVN Make Branch** or **CVS Make Branch/Tag**.



Note: Since a branch has been specified in the project definition, the command is now enabled.

Since the options in the **Show command scripts** group box have been enabled, you can see that all objects in the module *LV-MyModule* are tagged with "Beta1".

Example for Subversion:

```
C:\natural\natapps\SVN\LV-MyFolder>svn copy http://natsvn/repos/user1/LV-MyModule
http://natsvn/repos/user1/Beta1/ -m "make branch"

Committed revision 653.
Press any key to continue . . .
```

Example for CVS:

```
$ cvs -d :pserver:natsvn:/qatest1 tag -b Beta1
cvs tag: Tagging
cvs tag: Tagging LV-TEST
cvs tag: Tagging LV-TEST/SRC
T LV-TEST/SRC/PGM1.NSP
T LV-TEST/SRC/SUBPGM1.NSN
```



Note: In the next exercise, you will continue to work on the main branch (not on the Beta1 branch). In order to work with the Beta1 branch, you have to check it out in a separate step. In this case, you should also specify a different project folder for the Beta1 branch so that you do not mix up the main branch with another branch. This will be explained later in this tutorial.

Working on the Main Branch

Now that you have created the branch Beta1, you will continue to work with the project on the main branch. To do so, you have to remove the branch Beta1 from the project definition.

Since you did not delete or change the project folder for the main version, you do not need to check out the main version. The objects are already there. You just have to make sure that the project folder entered in the project definition equals the local project folder. Furthermore, you have to make sure that the Natural objects in the Natural environment and the Natural objects in the project folder are still the same. If this is not the case after a checkout, you have to import the modules using the **Import Library into Natural** command of Local Versioning.

➤ To continue work on the main branch

- 1 Invoke the dialog box for the **project definition** that you have used for the previous exercise and remove the name "Beta1" from the **Branch** text box. Leave all other entries unchanged.
- 2 To make sure, that you have the latest version of your project in your FUSER, select the library LV-TEST, invoke the context menu and choose the command **Local Versioning > SVN Check Out and Import Library** or **Local Versioning > CVS Check Out and Import Library**.

For each Natural source which already exists you will be asked whether you want to replace the object.

- 3 To replace the objects, choose the **Yes** button for both objects.
- 4 To continue development of your project, apply a small change to your program PGM1 and then save or stow it.
- 5 To put this change into your source control system, select the object PGM1, invoke the context menu and choose the command **Local Versioning > Copy to Project Folder**.
- 6 To check the status of your project folder, select the library LV-TEST, invoke the context menu and choose the command **Local Versioning > SVN Status Library** or **Local Versioning > CVS Status Library**.

When you use Subversion, you will see that SRC\PGM1.NSP is marked with "M" (modified). SUBPGM1 is not listed since it is up to date.

When you use CVS, you will see that the status of PGM1 is "Locally Modified" whereas SUBPGM1 has the status "Up-to-date".

This is the expected status: since you have last committed the library to your source control system, you have changed PGM1 but you did not change SUBPGM1.

Now that you have completed all required changes, you can commit them.

- 7 Select the node for the library LV-TEST, invoke the context menu and choose the command **Local Versioning > SVN Commit Library** or **Local Versioning > CVS Commit Library**.

A dialog box appears in which you can enter a log message.

- 8 Choose the **OK** button to proceed.

In Subversion, a new revision is created. In this example, this is the revision 654. This revision contains the changed PGM1 and the old SUBPGM1. This is the new version of your project. It is different from the Beta1 branch which has the revision 653.

In CVS, a new version of PGM1 is created, that is version 1.2. Now you have a new version of your project which is different from the version tagged with "Beta1". In fact, only PGM1 is different. SUBPGM1 belongs to the branch Beta1 and to the main branch.

Working on a Different Branch

Suppose you have shipped the version Beta1 to a customer and the customer reports a bug that you want to fix. You know that the customer works with the branch Beta1. Since you need the sources from this branch, you have to change the project definition again. In this case, you have to specify a new project folder, in addition to the branch name. It is important that you specify a new project folder so that you do not mix up the main branch with the Beta1 branch.

➤ To work on the branch Beta1

- 1 Invoke the dialog box for the **project definition** that you have used for the previous exercise and proceed as follows:
 - For Subversion, replace the repository module "LV-MyModule" in the **Module** text box with the name "Beta1".
 - For CVS, specify the name "Beta1" in the **Branch** text box.
 - For Subversion and CVS, specify the name "LV-MyFolder-Beta1" in the **Project folder** text box.
 - 2 Use the Configuration Utility to define the workspace as an additional inactive environment (for example, DBID 30, FNR 32 pointing to the project folder *C:\natural\natapps\SVN\LV-MyFolder-Beta1* in the workspace for Subversion).
- The new inactive environment appears in Natural Studio's library workspace.
- 3 To ensure that you do not have obsolete Natural objects in the library LV-TEST, delete this library on your FUSER.
 - 4 Select the node for the system file, invoke the context menu and choose the command **Local Versioning > SVN Check Out and Import System File** or **Local Versioning > CVS Check Out and Import System File**.

Subversion: The objects in the repository module *Beta1* (created equally and in parallel to the module *LV-MyModule*) are checked out: PGM1 and SUBPGM1 from revision 653 are read into the

project folder *LV-MyFolder-Beta1* and are imported into library *LV-TEST* on your *FUSER*. Note that in this example the latest version of *PGM1* and *SUBPGM1* in the main branch of the project is revision 654.

CVS: The objects in the *Beta1* branch are checked out: *PGM1* (revision 1.1) and *SUBPGM1* (revision 1.1) are read into the project folder *LV-MyFolder-Beta1* and imported into the library *LV-TEST* on your *FUSER*. Note that the latest version of *PGM1* in the main branch of the project is revision 1.2.

In your Natural environment, library *LV-TEST* is created on the *FUSER* and on the inactive environment pointing to the workspace. *SUBPGM1* is the same in the main branch and in the *Beta1* branch. *PGM1* is different, since there has been a source change after *Beta1*.

- 5 Apply your changes to *PGM1* (that is: fix the bug).
- 6 To put your changes into your source control system, select the object *PGM1*, invoke the context menu and choose the command **Local Versioning > Copy to Project Folder**.

The changed program *PGM1* is copied to the folder *LV-MyFolder-Beta1*. This is the folder that you have previously specified for the *Beta1* branch.

- 7 To check the status of your project folder, select the library *LV-TEST*, invoke the context menu and choose the command **Local Versioning > SVN Status Library** or **Local Versioning > CVS Status Library**.

When you use Subversion, you will see that the status of *PGM1* is "M" (modified). *SUBPGM1* is not listed since it has not changed.

When you use CVS, you will see that the status of *PGM1* is "Locally Modified". The status of *SUBPGM1* is "Up-to-date".

You have now completed all required changes for the *Beta1* branch and you will now commit them.

- 8 Select the node for the library *LV-TEST*, invoke the context menu and choose the command **Local Versioning > CVS Commit Library** or **Local Versioning > SVN Commit Library**.

A dialog box appears in which you can enter a log message.

- 9 Choose the **OK** button to proceed.

Since the **Library commands** option (in the **Show command scripts** group box) has been enabled, you can see what happens in your repository.

Subversion creates a new revision (655 in this example) which contains the new version of *PGM1* and the version of *SUBPGM1*. When you display the Subversion information with ViewCVS (which also works for Subversion), you can find the *Beta1* version in the *Beta1* module of the repository.

CVS creates a new version of PGM1 which has the revision 1.1.2.1. Remember that this program has the revision 1.2 on the main branch. When you display the CVS information with ViewCVS, you can see that CVS has started a branch from revision 1.1.

Your latest version in the branch Beta1 is now stored in your source control system. You have now completed this tutorial.

Working with Local Versioning

This section explains all commands which are available with Local Versioning. The following topics are available:

- [Setting Up a New Project](#)
- [Putting Libraries into Your Source Control System](#)
- [Putting Objects into Your Source Control System](#)
- [Copying and Committing Objects to the Project Folder](#)
- [Getting Existing Objects from Your Source Control System](#)
- [Importing into Natural](#)
- [Synchronizing Your Project Folder with the Repository](#)
- [Deleting Objects from Your Source Control System](#)
- [Displaying the Status of a Library or System File](#)
- [Displaying the Log](#)
- [Making a Branch](#)



Note: When you issue a command which is implemented by Local Versioning, all selected Natural objects are processed. When you select more than one object (for example in a list view window for a program node), the Local Versioning commands are applied to all of these objects. When the **options** in the **Show command scripts** group box have been enabled, a separate command prompt window appears for each selected object.

Setting Up a New Project

When you want to set up a new project in a new module, you use the command **SVN Import Module into Repository** or **CVS Import Module into Repository**. This command uses the following information:

- The repository as specified in the project definition is accessed in your source control system.
- A module with the name as specified in the project definition is created in the repository.
- The workspace folder and the project subfolder are created as specified in the project definition.

When you want to start a new project, it is important that the project folder is empty. If the project folder exists already and if it contains modules, these modules will be added to your source control system (known as “vendor branch” in the Subversion or CVS documentation).



Note: If you want to get an existing project from your source control system, use the command **SVN Check Out System File** or **CVS Check Out System File** and the command **Import System File into Natural**. You can also perform the above two steps with a single command: **SVN Check Out and Import System File** or **CVS Check Out and Import System File**. See [Getting Existing Objects from Your Source Control System](#) and [Importing into Natural](#) for further information.

➤ **To set up a new project**

- 1 Select the node for the system file which contains the sources that you want to store in your source control system.
- 2 Invoke the context menu and choose **Local Versioning > SVN Import Module into Repository** or **Local Versioning > CVS Import Module into Repository**.



Note: The usage of this command can be disabled in the [options](#).

Putting Libraries into Your Source Control System

When you add a library to CVS, it is immediately visible in CVS. Unlike objects, you need not commit libraries. CVS directories for the Natural libraries are created in CVS without a commit.

Unlike CVS and like objects in CVS and Subversion, a library must be added and committed before it is visible in Subversion.

➤ **To add a library**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Add Library** or **Local Versioning > CVS Add Library**.
- 3 Subversion only: Invoke the context menu and choose **Local Versioning > SVN Commit Library**.

➤ **To add and commit a library (Subversion only)**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Add and Commit Library**.



Note: The command for adding a library can be disabled in the [options](#).

Putting Objects into Your Source Control System

To put objects into your source control system, you first have to add the object and then you have to commit the added object. It is also possible to add and commit an object in one step, to commit the contents of an entire library, or to commit a system file with several libraries.

When you add an object to your source control system, it is copied to your project folder.



Tip: When you switch to the file view in the library workspace and open the **Src** (source) node for a library so that a list view window is shown, you can add all objects of this library in one step. You can also commit several objects at a time with a single **SVN Commit Object** or **CVS Commit Object** command, which enables you to store a different commit comment for each object in the commit log message (a separate dialog box is shown for each selected object). When you do not need a different commit comment for each object, use the **SVN Commit Library** or **CVS Commit Library** command to commit several objects with one command.

➤ To add an object

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > SVN Add Object** or **Local Versioning > CVS Add Object**.

➤ To commit an object

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > SVN Commit Object** or **Local Versioning > CVS Commit Object**.

A dialog box appears in which you can enter a log message. If available, a string including the date and time when the object has been saved last and the ID of the user who saved the object is automatically provided. Save data is not available for resources and error messages.

- 3 Choose the **OK** button.

➤ To add and commit an object in one step

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > SVN Add and Commit Object** or **Local Versioning > CVS Add and Commit Object**.

A dialog box appears in which you can enter a log message. If available, a string including the date and time when the object has been saved last and the ID of the user who saved the object is automatically provided. Save data is not available for resources and error messages.

- 3 Choose the **OK** button.

➤ **To commit the contents of an entire library**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Commit Library** or **Local Versioning > CVS Commit Library**.



Note: The above commands perform a Subversion or CVS `update` command before committing the library.

A dialog box appears in which you can enter a log message. A string including the current date and time, and your user ID is automatically provided.

- 3 Choose the **OK** button.

➤ **To commit the contents of an entire system file**

- 1 Select the node for the system file.
- 2 Invoke the context menu and choose **Local Versioning > SVN Commit System File** or **Local Versioning > CVS Commit System File**.



Note: The above commands perform a Subversion or CVS `update` command before committing the system file.

A dialog box appears in which you can enter a log message. A string including the current date and time, and your user ID is automatically provided.

- 3 Choose the **OK** button.

Copying and Committing Objects to the Project Folder

When an object has already been copied to the project folder for the first time (using the command **SVN Add Object** or **CVS Add Object**), you can use the command **Copy to Project Folder** to copy to the project folder any changes you have applied to the object in the meantime.



Note: Alternatively, you can use the command **SVN Add Object** or **CVS Add Object**.

➤ **To copy an object to the project folder**

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > Copy to Project Folder**.



Note: When the object has not yet been added to the project folder, you will be asked whether you want to add the object.

➤ **To copy and commit an object to the project folder**

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > Copy and SVN Commit Object** or **Local Versioning > Copy and CVS Commit Object**.

Getting Existing Objects from Your Source Control System

When you want to get an existing project from your source control system, you can check out the entire system file. It is also possible to check out only a library. Using CVS, it is possible to check out a single object. Subversion does not support to check out a single object.

When you check out a library and the corresponding project folder in the workspace does not yet exist, the project folder is created. In this case, however, the project folder is not under version control and some commands which require that the project folder is under version control (such as **SVN Commit System File** or **CVS Commit System File**, or **SVN Display Log** or **CVS Display Log**) cannot be performed. When you use CVS, the same applies for the check out of an object where its library does not exist or where its library is not under version control.

When you check out objects, the files will be copied from your source control system into the project folder of your local workspace.

➤ **To check out a system file**

- 1 Select the node for the system file.
- 2 Invoke the context menu and choose **Local Versioning > SVN Check Out System File** or **Local Versioning > CVS Check Out System File**.

➤ **To check out a library**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Check Out Library** or **Local Versioning > CVS Check Out Library**.

➤ **To check out an object (CVS only)**

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > CVS Check Out Object**.

Importing into Natural

When you have checked out objects from a repository and you want to work with them in Natural (usually in the `FUSER`), you have to import the objects into Natural. You can do this either with one command which combines check out and import, or you can use one of the import commands after you have checked out the objects to a project folder in a workspace.

➤ To check out and import a system file in one step

- 1 Select the node for the system file.
- 2 Invoke the context menu and choose **Local Versioning > SVN Check Out and Import System File** or **Local Versioning > CVS Check Out and Import System File**.

➤ To import a system file

- 1 Select the node for the system file. This system file must be checked out.
- 2 Invoke the context menu and choose **Local Versioning > SVN Import System File into Natural** or **Local Versioning > CVS Import System File into Natural**.

➤ To check out and import a library in one step

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Check Out and Import Library** or **Local Versioning > CVS Check Out and Import Library**.

➤ To import a library

- 1 Select the node for the library. This library must be checked out.
- 2 Invoke the context menu and choose **Local Versioning > SVN Import Library into Natural** or **Local Versioning > CVS Import Library into Natural**.

➤ To check out and import an object in one step (CVS only)

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > CVS Check Out and Import Object**.

➤ To import an object

- 1 Select the node for the object. This object must be checked out.
- 2 Invoke the context menu and choose **Local Versioning > SVN Import Object into Natural** or **Local Versioning > CVS Import Object into Natural**.

Synchronizing Your Project Folder with the Repository

When you work on a project in a team, another developer may have changed a source on which you are also working. The update command brings changes from the repository into your working copy.

➤ To update a system file

- 1 Select the node for the system file. This system file must be under version control.
- 2 Invoke the context menu and choose **Local Versioning > SVN Update System File** or **Local Versioning > CVS Update System File**.

➤ To update a library

- 1 Select the node for the library. This library must be under version control.
- 2 Invoke the context menu and choose **Local Versioning > SVN Update Library** or **Local Versioning > CVS Update Library**.

➤ To update an object

- 1 Select the node for the object. This object must be under version control.
- 2 Invoke the context menu and choose **Local Versioning > SVN Update Object** or **Local Versioning > CVS Update Object**.

Deleting Objects from Your Source Control System

To delete objects from your source control system, you first have to delete the objects and then you have to commit the deleted objects. It is also possible to delete and commit objects in one step, or to delete the contents of an entire library (either with the library itself or without the library).



Caution: The deletion is done as a forced deletion. Modified objects and objects not under version control are also deleted.

You are always asked to confirm the deletion. Objects and libraries are only deleted from the workspace, not from the Natural development environment.

However, if your Natural development environment (usually the `FUSER`) and the workspace are identical, the objects are also deleted from your Natural development environment. In this case, you may delete and commit an object or library with one command, since a library or object disappears after the deletion. Or you commit the deletion using the next higher node (that is, use the system file node to commit a library, or use the library node to delete an object).

➤ **To delete an object**

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > SVN Delete Object** or **Local Versioning > CVS Remove Object**.
- 3 To commit the deleted object, invoke the context menu and choose **Local Versioning > SVN Commit Object** or **Local Versioning > CVS Commit Object**.

➤ **To delete and commit an object in one step**

- 1 Select the node for the object.
- 2 Invoke the context menu and choose **Local Versioning > SVN Delete and Commit Object** or **Local Versioning > CVS Remove and Commit Object**.

➤ **To delete a library**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Delete Library** or **Local Versioning > CVS Remove Library**.
- 3 To commit the deleted library, invoke the context menu and choose **Local Versioning > SVN Commit Library** or **Local Versioning > CVS Commit Library**.

➤ **To delete and commit a library in one step**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Delete and Commit Library** or **Local Versioning > CVS Remove and Commit Library**.

Displaying the Status of a Library or System File

When you display the status of a library or system file in the project folder, you can check whether an object has been modified.

When an object has been modified in Subversion, it is marked with "M". When an object has been modified in CVS, its status is "Locally Modified". The latest changes have not yet been committed to your source control system.

When the status of an object is not listed (Subversion) or is "Up-to-date" (CVS), it has not been changed since it has last been committed.



Note: For a description of any other status, see the Subversion or CVS documentation.

➤ **To check the status of a library**

- 1 Select the node for the library.
- 2 Invoke the context menu and choose **Local Versioning > SVN Status Library** or **Local Versioning > CVS Status Library**.

➤ **To check the status of a system file**

- 1 Select the node for the system file.
- 2 Invoke the context menu and choose **Local Versioning > SVN Status System File** or **Local Versioning > CVS Status System File**.

Displaying the Log

You can print out history information for files, that is, the commit log messages.

➤ **To display the log**

- 1 Select the node for a system file, library or object.
- 2 Invoke the context menu and choose **Local Versioning > SVN Display Log** or **Local Versioning > CVS Display Log**.

Making a Branch

You can only make a branch when a branch name has been specified in the [project definition](#).

Subversion: When you make the branch, all objects in the specified module are copied to another module when the module name is the branch name.

CVS: When you make the branch, all objects in the specified module are tagged with the branch name that you have specified in the project definition.



Note: If you want to work with the new branch, check it out in a separate step. It is recommended that you use a different project folder for each branch.

➤ **To make a branch**

- 1 Select the node for the system file.
- 2 Invoke the context menu and choose **Local Versioning > SVN Make Branch** or **Local Versioning > CVS Make Branch/Tag**.



Note: The usage of this command can be disabled in the [options](#).

Subversion only: a dialog box appears.



Note: A dialog box does not appear for CVS since the version is only tagged and not copied to a new module. In addition, the `switch` command is not available in CVS.

- 3 Specify a new module name (branch) in the dialog box.

In addition, you can select the **Switch current workspace to new module** check box. Keep in mind that one workspace can serve only one repository, since the repository address is kept in the `.svn` status folder. When you switch to the new module, your workspace is updated with a new repository address.

- 4 Choose the **OK** button.

Processing Log

Local Versioning writes a log file which is stored as a resource (text document) in the system library `SYSPLCVS`. The name of this file is `lv_log.log`. This log file may contain information on the processed steps or, in some cases, error information.

You can use this log file if for some reason Local Versioning stops during the processing of several objects. In the log file, you can see which object was processed last.

Command Scripts

The Local Versioning commands in the context menu (such as **SVN Commit Library** or **CVS Commit Library**) are controlled via Windows command scripts. These command scripts are stored as resources in the system library `SYSPLCVS`.

4 Natural for Ajax Tools

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When Natural for Ajax is installed, you can work with Natural for Ajax Tools which allows you to use the Natural for Ajax functionality directly from within Natural Studio. Using Natural for Ajax Tools, you can design web pages for rich internet applications, import adapters for these pages into a Natural library, generate programs that display these pages and test these programs in an internal browser.

For application modernization, it is possible to extract information from Natural maps. The resulting files can then be used by another tool which converts the output to Natural for Ajax page layouts.

For further information, see the Natural for Ajax documentation which is available separately. The most up-to-date Natural for Ajax documentation is always available at <http://documentation.softwareag.com/> (Empower login required).

Before You Start

Before Natural for Ajax Tools can be used, you have to proceed as described in the following topics:

- [Prerequisites](#)
- [Activating Natural for Ajax Tools](#)

Prerequisites

When you activate a plug-in, Natural Studio starts a second Natural session using the parameter file NATPARM. If your Natural session uses a parameter file other than NATPARM, you must be aware of the fact that the FNAT (especially the libraries SYSPLNJX and SYSLIBS) and other Natural parameters (such as the WORK parameter) may be different in the Natural plug-in session (which uses NATPARM) and in your Natural session (which uses another parameter file). This may lead to unpredictable errors. Therefore, it is recommended that you also use the parameter file NATPARM for your Natural session. See also the information on the Natural parameter file in the section *Plug-Ins under Natural Security* of the *Natural Security* documentation.

Activating Natural for Ajax Tools

Natural for Ajax Tools has to be activated in the Plug-In Manager. For detailed information on the activation procedure, see *Plug-in Manager* in the documentation *Using Natural Studio*.

Elements of Natural for Ajax Tools

When Natural for Ajax Tools has been activated in the Plug-in Manager, additional elements are available in the Natural Studio window:

- [Toolbar](#)
- [Context Menu](#)

Toolbar

An additional toolbar is shown. The buttons in this toolbar represent the following menu commands:

-  [Import Adapters](#)
-  [Create Main Program](#)
-  [Show URL](#)
-  [Execute in Browser](#)
-  [Open Application Designer](#)

 **Note:** The display of this toolbar can be switched on and off by choosing **Customize** from the **Tools** menu.

Context Menu

When the current context (that is, the selected object) allows it, the context menu provides the following additional cascading menu: **Natural for Ajax**. Depending on the context, the cascading menu contains different commands:

Library Level

When a library is currently selected, the following commands are available in the cascading menu:

- [Import Adapters](#)
- [Open Application Designer](#)

Natural Object Level

When a program is currently selected, the following commands are available in the cascading menu:

- [Show URL](#)
- [Execute in Browser](#)

When an adapter is currently selected, the following command is available in the cascading menu:

- **Create Main Program**

When a map is currently selected, the following command is available in the cascading menu:

- **Extract Map**

Configuring the Servers

In order to develop Natural for Ajax applications, a Natural Development Server (NDV, optional), an application server with Natural for Ajax and a Web I/O Interface server (NWO) are required.

When Natural for Ajax Tools has been activated in the Plug-in Manager, you first have to configure the relationship between the Natural development servers and the corresponding application servers and Web I/O Interface servers. This is done in the configuration file *ConfigNJXPLG.dat* that resides as a resource in the library `SYSPLNJX`.

Each entry in the configuration data consists of:

- Natural Development Server host name.
- Natural Development Server port number (optional).
- Application server host name.
- Application server port number.
- Application server path name.
- Web I/O Interface server host name.
- Web I/O Interface server port number.

See the contents of the file *ConfigNJXPLG.dat* for additional information.

This file already contains the configuration that is necessary for working in the local environment. After you have defined a configuration line for a new remote development environment, you must make sure that the file *sessions.xml* on the corresponding application server (see *Managing the Configuration File for the Session* in the *Natural Web I/O Interface* documentation) contains a session definition with the same name.

Example:

Your *ConfigNJXPLG.dat* file contains the following line:

```
MYNDV,2700,MYAPPS,8080,\\MYAPPS\JB0SS\#LIB\nat,MYNWO,2900
```

In this case, the *sessions.xml* file of the application server running on "MYAPPS:8080" must contain the following session definition:

```
<sessions>
  <session id="MYNDV">
    <natural_program>script-name</natural_program>
    <user id="" pwd="" />
  </session>
</sessions>
```

Optionally, you can specify a user ID and password. This is useful with the **Execute in Browser** command. Then you do not have to enter a user ID and password every time you start a Natural for Ajax program in Natural Studio.

Configuring Libraries and Projects

In general, a Natural for Ajax project consists of one or more Natural libraries with Natural objects that implement the server part, and one or more Application Designer projects that implement the user interface part.

The current version of Natural for Ajax Tools assumes that a Natural for Ajax project consists of one Natural library and one Application Designer project, where the name of the Application Designer project is identical to the name of the Natural library translated to lowercase letters.

Opening the Application Designer Development Workplace

Using the Application Designer, you design the web pages for your rich internet applications. You can open the Application Designer development workplace directly from Natural Studio.

➤ To open the Application Designer development workplace

- 1 Select the Natural library which belongs to your Application Designer project.
- 2 Invoke the context menu and choose **Natural for Ajax > Open Application Designer**.

Or:

When the Natural for Ajax Tools toolbar is shown, choose the following toolbar button.



The Application Designer development workplace is invoked in a browser window. Now you can create an Application Designer project for your web pages, create pages, edit existing pages and create Natural adapters for pages.



Important: Name your Application Designer project like the corresponding Natural library (translated to lowercase letters).

For further information, see *Developing the User Interface* in the Natural for Ajax documentation.

Importing the Generated Adapters

A Natural adapter is generated when you save the layout for your Natural page in the Application Designer. You can import the generated adapters from the application server environment into the Natural library with the same name.

➤ To import the generated adapters

- 1 Select the library into which you want to import the generated adapters.
- 2 Invoke the context menu and choose **Natural for Ajax > Import Adapters**.

Or:

When the Natural for Ajax Tools toolbar is shown, choose the following toolbar button.



The generated adapters from the equally named Application Designer project are imported into the selected library.

When an adapter already exists in the library, you are asked whether you want to replace it.

Generating the Main Program from an Adapter

From an adapter, you can generate the Natural main program that calls the adapter and displays the page.

➤ To generate the main program from an adapter

- 1 Select the adapter.

- 2 Invoke the context menu and choose **Natural for Ajax > Create Main Program**.

Or:

When the Natural for Ajax Tools toolbar is shown, choose the following toolbar button.



The program is generated. Its source code is shown in a program editor window.

- 3 Stow the program with a name of your choice.

For further information (for example, how to handle page events), see *Developing the Application Code* in the Natural for Ajax documentation.

Executing the Main Program in the Browser

You can execute the Natural main program which has been generated from an adapter. A browser window is then invoked in Natural Studio and you can test your program.

> To execute the main program

- 1 Select the main program.
- 2 Invoke the context menu and choose **Natural for Ajax > Execute in Browser**.

Or:

When the Natural for Ajax Tools toolbar is shown, choose the following toolbar button.



The program is executed in a browser window.

Displaying the URL of a Natural Program or of the Application Designer Development Workplace

If you want to start a Natural program or the Application Designer development workplace outside of Natural Studio, you can display the URL that is required for starting it.

➤ **To display the URL of a program**

- 1 Select the program.
- 2 Invoke the context menu and choose **Natural for Ajax > Show URL**.

Or:

When the Natural for Ajax Tools toolbar is shown, choose the following toolbar button.



A dialog box appears, containing the URL for the program.

Using copy-and-paste, you can enter this URL in a browser which is supported by Application Designer (for example, Internet Explorer or Mozilla Firefox). Thus, you can execute your program directly in the browser (that is, not in the internal browser which is used in Natural Studio).

➤ **To display the URL of the Application Designer development workplace**

- 1 Select any object except for a program, or select a library or system file.
- 2 Choose the following toolbar button from the Natural for Ajax Tools toolbar.



A dialog box appears, containing the URL for the Application Designer development workplace.

Using copy-and-paste, you can enter this URL in a browser which is supported by Application Designer (for example, Internet Explorer or Mozilla Firefox). Thus, you can invoke the Application Designer development workplace directly in the browser (that is, not in the internal browser which is used in Natural Studio).

Using the Map Extractor

The Map Extractor is used in the process of converting a map-based application to a Natural for Ajax application. It creates map extract files which are intended as input for the Map Converter. For detailed information, see *Application Modernization* in the Natural for Ajax documentation.

➤ **To use the Map Extractor**

- 1 Select one or more Natural maps.

- 2 Invoke the context menu and choose **Natural for Ajax > Extract Map**.

The map extract files are created. The location of these files is shown in a dialog box.

