



git4G

Quick Reference Guide V 1.0.2



DATA AHEAD **git4G** is an easy to use toolkit for NI LabVIEW that integrates Git- the well-known and free Source Control Management System into the development environment of LabVIEW. It provides all important source control managing functions and furthermore supports many popular Git hosting services like GitHub and GitLab

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Introducing git4G

git4G is an easy to use toolkit for NI LabVIEW that integrates Git - the well-known and free Source Control Management System -- into the development environment of LabVIEW. It provides all important source control managing functions and furthermore supports many popular Git hosting services like GitHub and GitLab.

git4G uses and manipulates the fundamental functionality of LabVIEW. Because of this DATA AHEAD cannot guarantee that the behaviour of LabVIEW has changed or that it still works after the installation of the toolkit. Consider to save your important data separately. In general, DATA AHEAD cannot be held liable for any loss of data that occurs while using git4G.

Safety



Git4G uses and manipulates the fundamental functionality of LabVIEW. Because of this reason, DATA AHEAD cannot guarantee that the behaviour of LabVIEW has changed or that it still works after the installation of the toolkit.

Minimum requirements

OS: Windows XP

LabVIEW: Version 2010

Git: Version 2.2 (Download-Link: <https://git-for-windows.github.io/>)

Installation

LabVIEW 2010 or newer is required to install **git4G**.

The installation of the toolkit requires the installation of Git (at least Version 2.2).

We recommend at least a basic knowledge about the functionality of Git.

Follow the link below to learn more about Git:

<https://git-scm.com/book/en/v1/Getting-Started>

1. Git Installation

Download and install the latest version of Git.

Link: <https://git-for-windows.github.io/>

For a more detailed installation description about different operating systems, please visit: <https://git-scm.com/book/en/v2>.

2. git4G Installation

The easiest way to install **git4G** is to use the National Instruments Tools Network or the JKI VI Package Manager. Search for "git4G" and select "Install & Upgrade Packages" to install the Toolkit to your LabVIEW installation.

git4G requires the JKI VI Package Manager 2014.0.0 or newer.

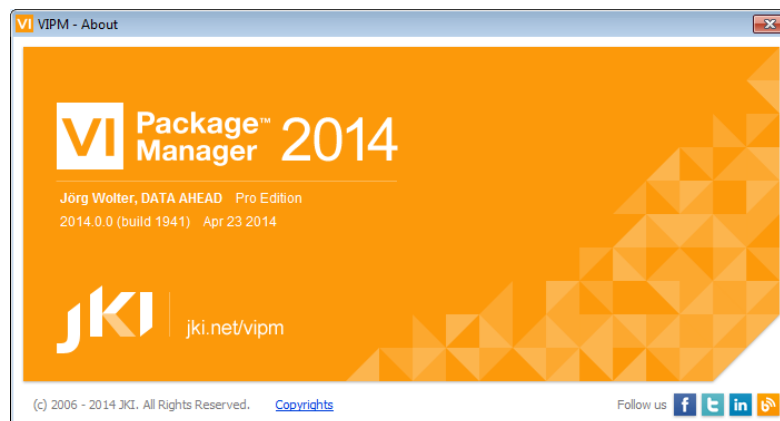


Figure 1: JKI Package Manager to find and install git4G

Following the installation the toolkit checks if there is a Git entry in the windows environment variables or if the git.exe is at the default location. If not the installation routine opens a dialog where the user needs to navigate to the git.exe or deactivate the tool. If the tool is deactivated, it can be reactivated after successful installation of Git ("Tools" -> "git4G" -> "Check Git And Activate Tool").

Note: This Deactivation and Activation does not affect the license.

In case LabVIEW does not restart automatically after the installation, you should do it manually to activate the tool.

Licensing

Developer license:

You need a developer license in order to use **git4G**. Upon purchasing a license from NI, you will receive an email titled "*Activation Information for your ni.com purchase: **git4G** - DATA AHEAD GMBH*" that contains your **License ID** and **Password** for the developer suite. With this information, you are able to activate **git4G**. The installation description is located in this document under "Activating".

The license is a single End-User PC License. With a single End-User PC License you may install and use one copy of the SOFTWARE PRODUCT on a single computer. In addition to the above, if you have bought a License for a number of concurrent users you may install the SOFTWARE PRODUCT on any number of computers at one single physical (geographical) location notified to Licensors provided it is used on no more computers than that number of licensed users at any one time.

You cannot deactivate the license and reactivate it on a second computer.

Activating

You can evaluate **git4G** for 30 days. After this period you have to activate the **git4G** add-on in LabVIEW. Upon purchasing a license from NI, you will receive an email titled "Activation Information for your ni.com purchase: **git4G** - DATA AHEAD GMBH" that contains your License ID and Password for the developer suite. In order to activate **git4G**, your target system needs to be connected to the Internet. If there is no Internet connectivity available on the target computer, you can also activate **git4G** through a web browser on a different computer (see step 3 – alternative option).

Step 1: Open LabVIEW. Select "Help" in the menu bar then the menu point "Activate Add-ons" to carry out the function.

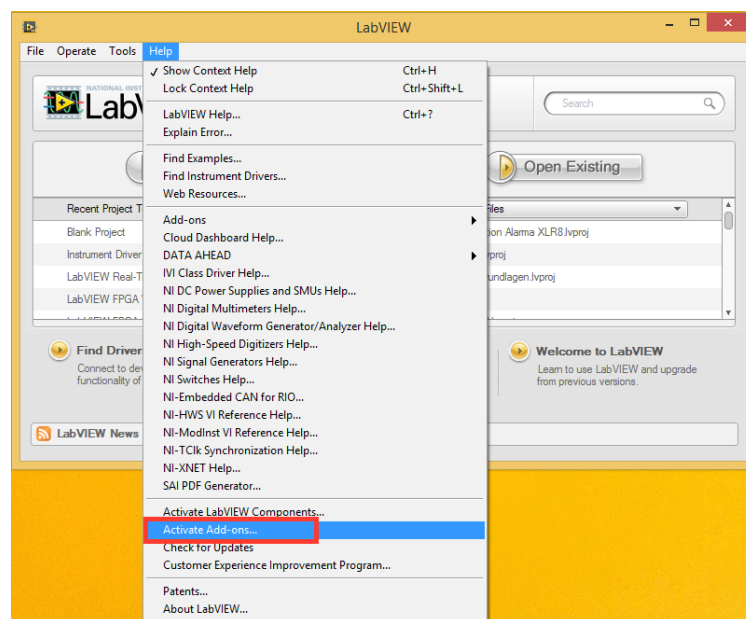


Figure 2: Activation Step 1

Step 2: The following pop-up window will appear and display your **git4G** installation and activation status. Select **git4G** “DATA AHEAD **git4G** x.x.x.xx” and click “next” or “Activate”.

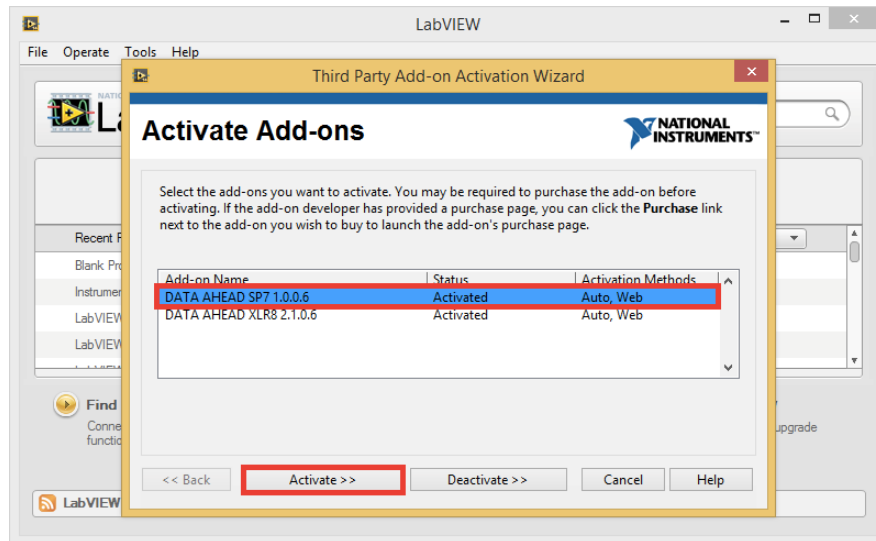


Figure 3: Activation Step 2

Step 3: Now select the method of activation. If the computer is connected to the Internet, select the first option. If you do not have Internet access, see the alternative option below. To proceed, click “Next”.

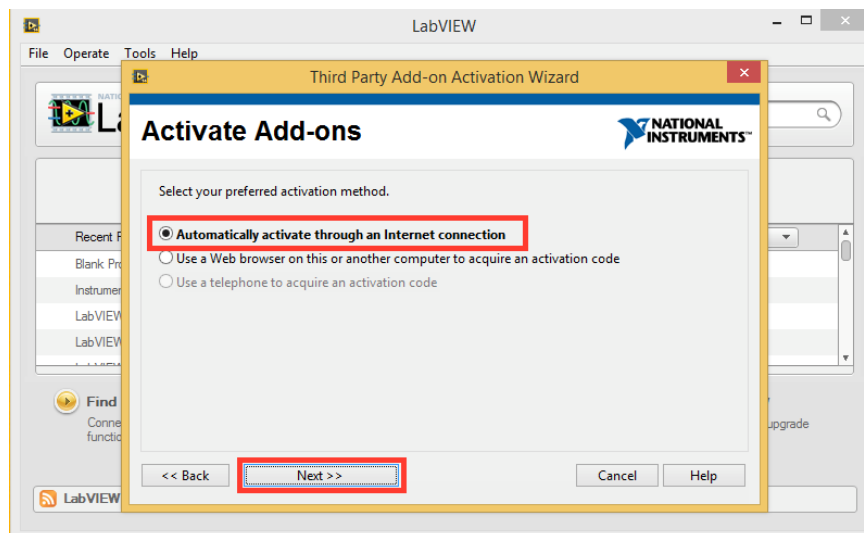


Figure 4: Activation Step 3

Step 4: To complete the activation, enter the provided License ID and Password that you received in the email from NI. Please mind capital letters.
After entering the License ID and Password, click “Activate”.

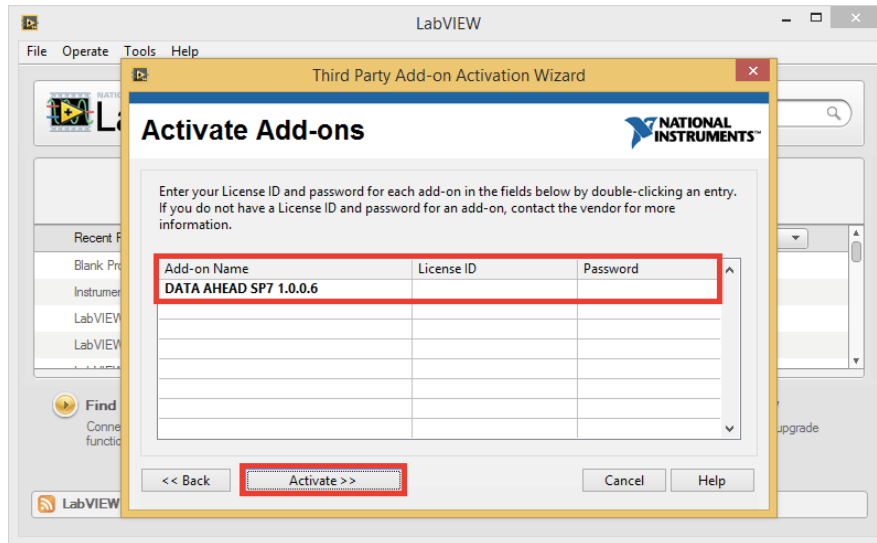


Figure 5: Activation Step 4

Step 3 (alternative): If no Internet connection is available, selecting the second option will direct you to the National Instruments activation website where you need to enter the user codes displayed in the dialog as well as your License ID and Password. This option allows you to activate the toolkit from another computer that is connected to the Internet.

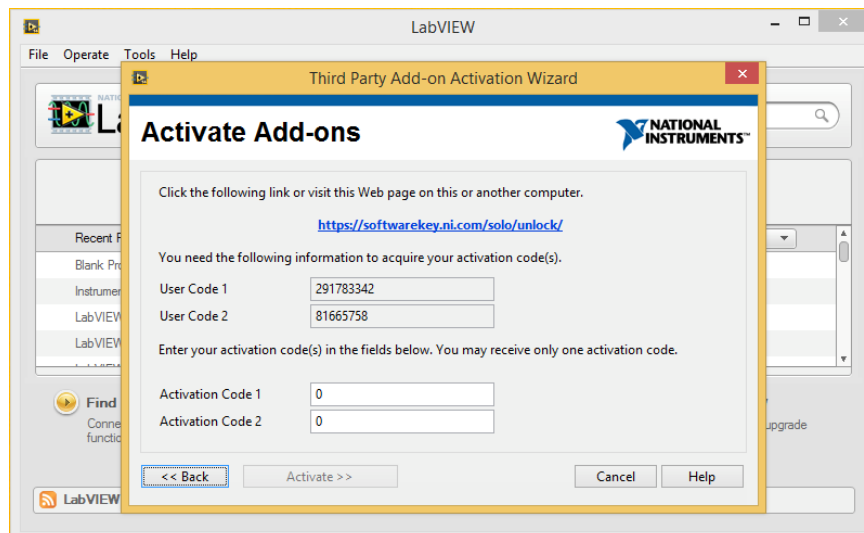
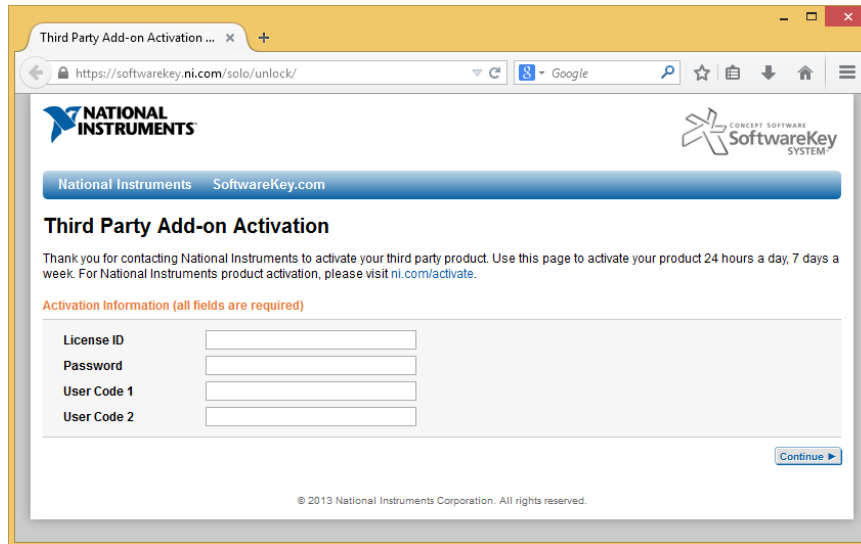


Figure 6: Activation Step 3, (alternative): activate through a web browser – LabVIEW dialog

Step 4 (alternative): Open the website <https://softwarekey.ni.com/solo/unlock/> on a computer with Internet connection. Enter the User Code 1 and User Code 2 on the website, as displayed in the dialog on the target computer. Enter License ID and Password from the activation email. Click "Continue". Now the User Code 1 and 2 will be generated. Afterwards you need to type in these two Codes in the dialog box of the Activation Wizard at Activation Code 1 and 2. Finish the dialog by clicking "Activate".



The screenshot shows a web browser window with the address bar displaying <https://softwarekey.ni.com/solo/unlock/>. The page features the National Instruments logo and the SoftwareKey SYSTEM logo. The main heading is "Third Party Add-on Activation". Below this, a message states: "Thank you for contacting National Instruments to activate your third party product. Use this page to activate your product 24 hours a day, 7 days a week. For National Instruments product activation, please visit ni.com/activate." The form is titled "Activation Information (all fields are required)" and contains four input fields: "License ID", "Password", "User Code 1", and "User Code 2". A "Continue" button is located at the bottom right of the form. The footer of the page reads "© 2013 National Instruments Corporation. All rights reserved."

Figure 7: Activation Step 4, (alternative): activate through a web browser – activation website

Getting Started

The **git4G** toolkit expands the toolbar by four buttons ("Git Menu", "Update", "Remote Update" and "Settings")

The "Tools" menu of the LabVIEW Project Explorer will be expanded by a **git4G** section. Here you can perform all the important Git functions to the repository corresponding to the open project, open the **git4G** settings the "Git Menu" or clone a repository

Furthermore, the toolkit adds **git4G** elements to the pop-up menus when right clicking on LabVIEW Project items. Which functions will be shown in the pop-up menu depends on the status of the repository and on which project item you click.

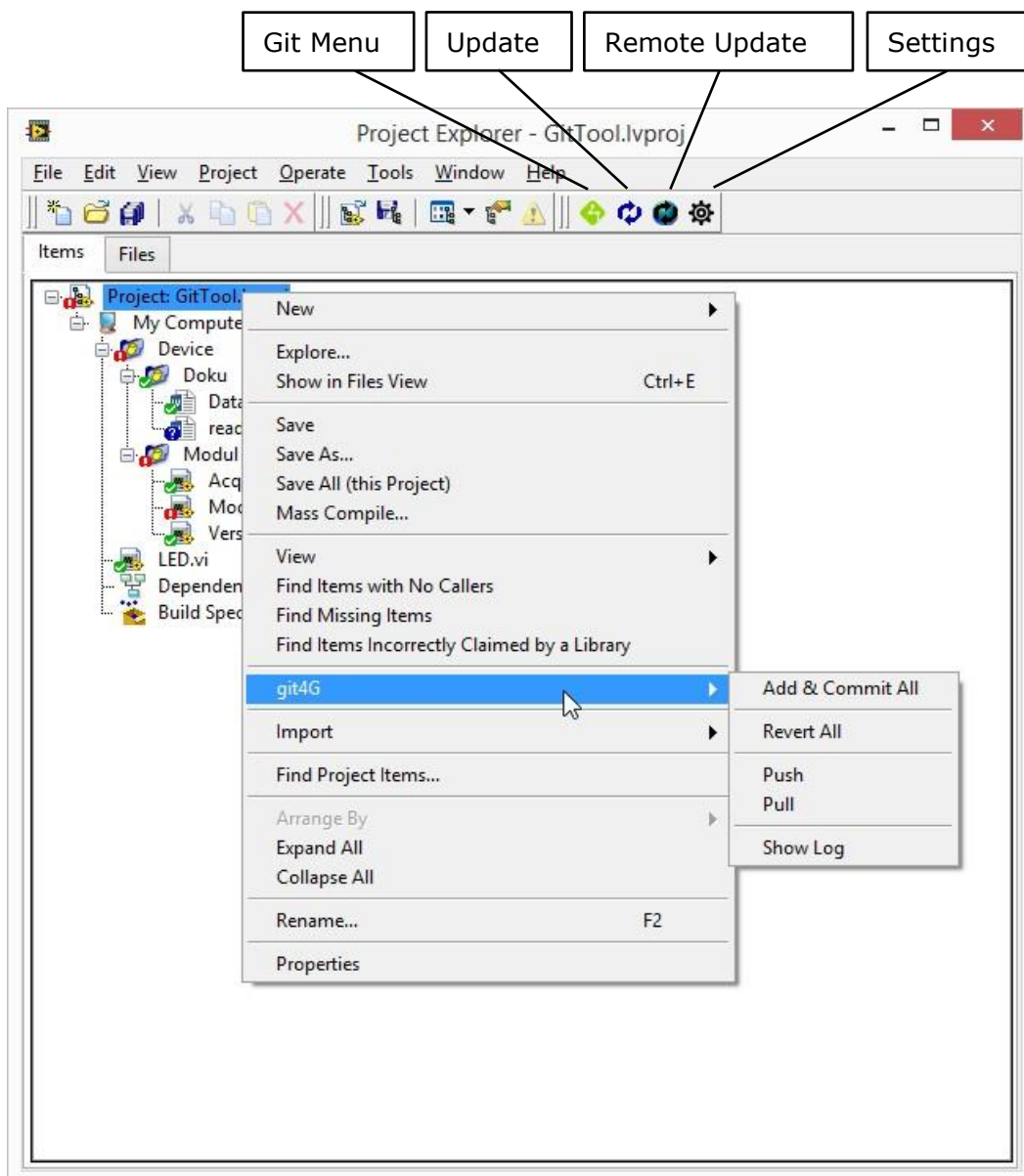


Figure 8: NI LabVIEW Project Explorer with git4G toolbar and pop-up menu

The **git4G** toolkit uses overlay icons to display the current source control management status of the files in the Project Explorer.

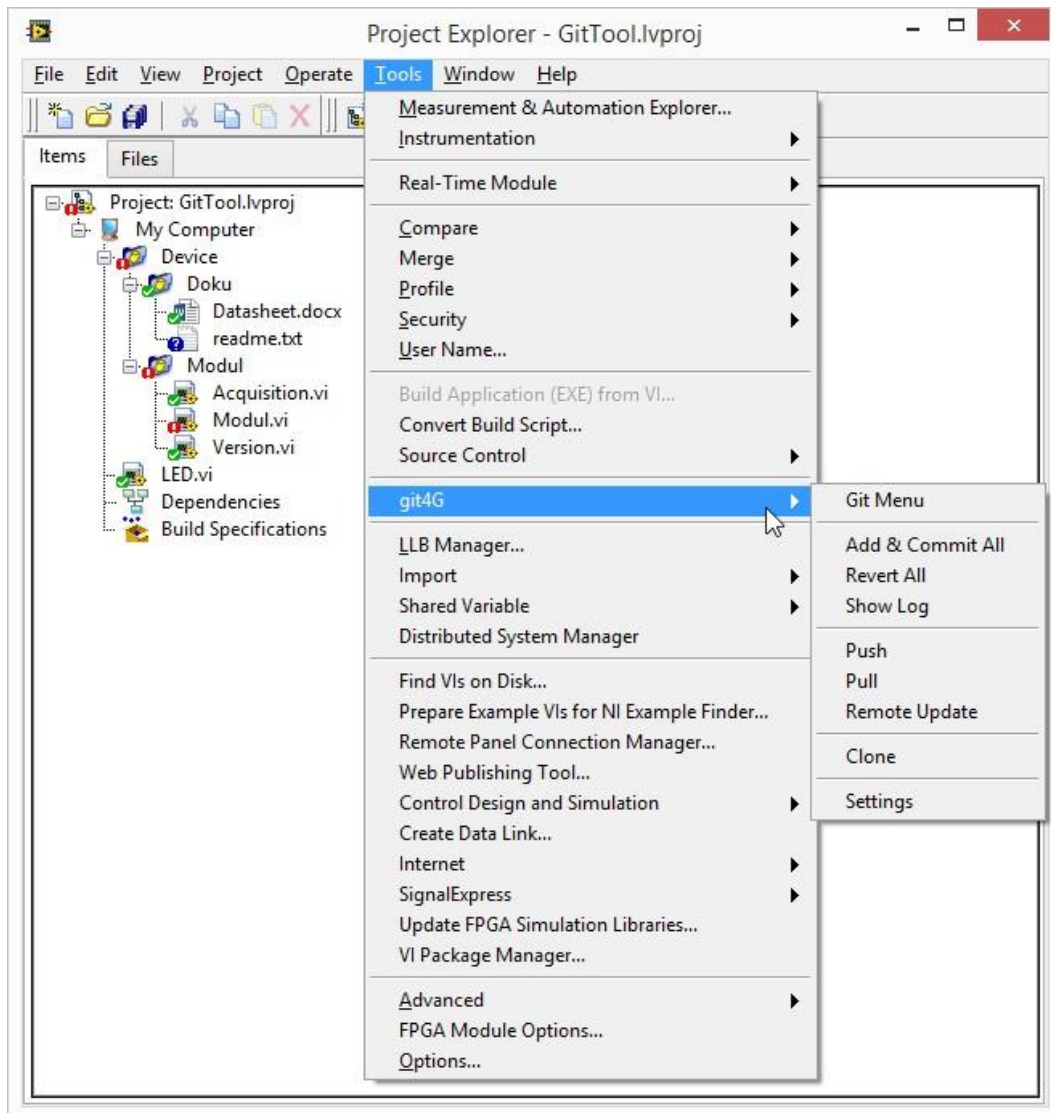


Figure 9: NI LabVIEW Project Explorer with git4G entries in "Tools" menu


To use the toolkit we recommend at least a basic knowledge about source control management using Git.

Follow the link below to learn more about Git:

<https://git-scm.com/book/en/v1/Getting-Started>

Use of git4G

git4G makes it easy to call all important Git functions directly from the NI LabVIEW Project Explorer. There are three different ways to call the functions:

- "git4G" submenu of the Project Explorer "Tools" menu
- "git4G" submenu of the context menu of LabVIEW Project Explorer items
- Git menu called by button  (Git Menu) in the toolbar (or "Tools" menu -> "git4G" -> "Git Menu")

Initialize source control to your project – creating a repository

To initialize Git source control to your LabVIEW project you need to create a Git-repository. Before doing this, the project file needs to be saved.

With **git4G** there are two ways to create a repository:

1. Open the Git menu and press "**Init**"

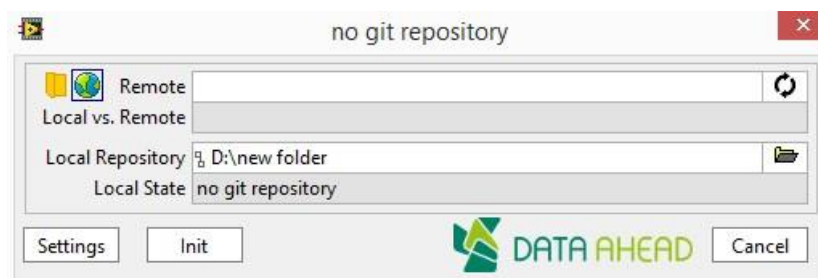


Figure 10: Creating a repository from Git Menu

2. Right-click on the project and select "git4G" -> "Create Repository"

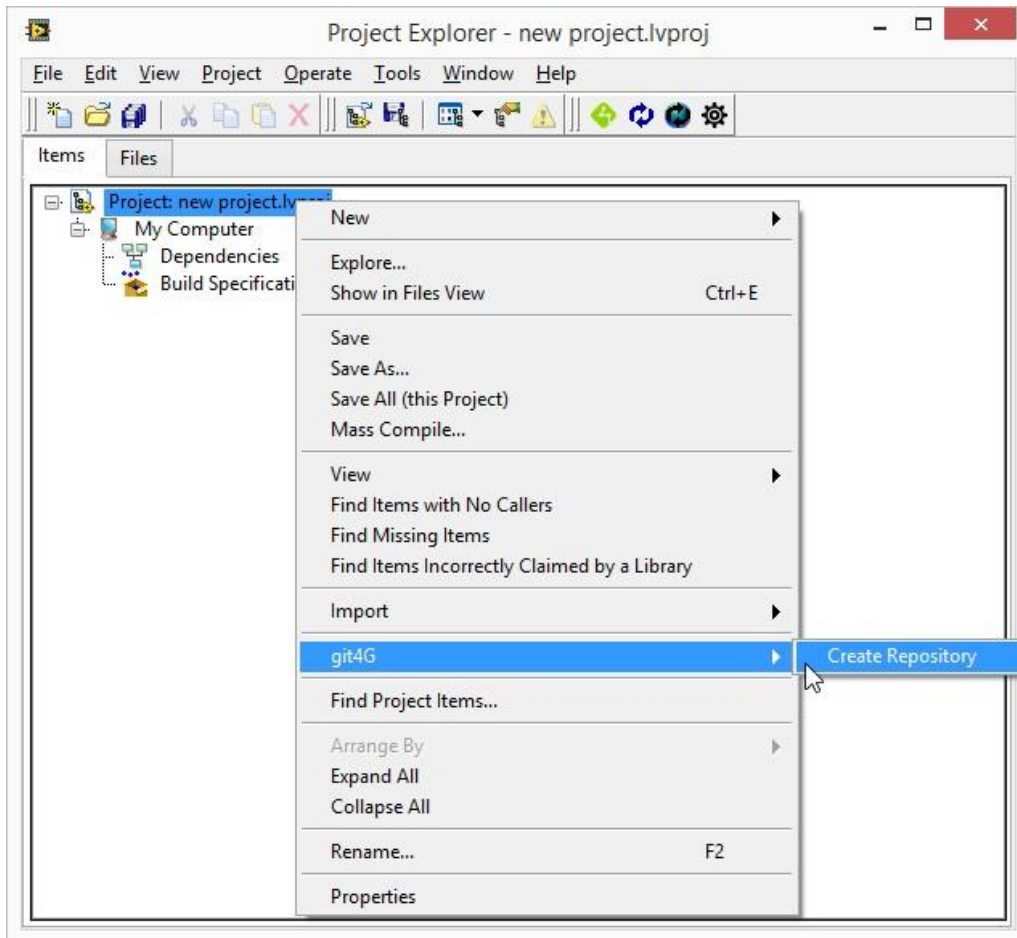


Figure 11: Creating a repository from Right-click pop-up menu

Second step is to browse to the path where you want to create the repository. By default, the "Create Repository Dialog" starts with the project-path.

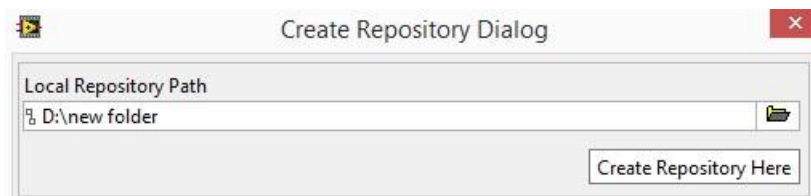


Figure 12: Browse to path where to create the repository

After pressing "**Create Repository Here**" the repository is created and at the same time a ".gitignore"-file will be copied to that location. The ".gitignore"-file contains the information, which files Git will ignore. **git4G** will automatically ignore all *.aliases-files.



Now your LabVIEW project is under Git source control. The status of the project items will be indicated in the NI LabVIEW Project Explorer. You can add and commit single/multiple/all files, take a look at the history of a single file or the whole project and restore old versions.

If you use a remote repository, add the remote address and you are ready to push and pull from or to the remote repository.

Use git4G with a remote repository

git4G can be used with all the main source control functions just with your local repository. But if you want to benefit from all the advantages, a source control like Git offers, you should consider adding a remote repository to your project - especially while working in a team on a project.

git4G supports two kinds of remote repositories:

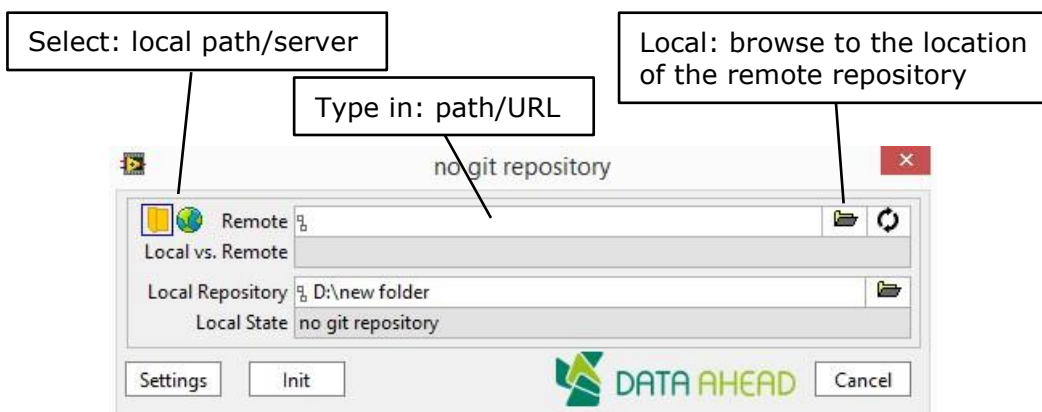
- On a server using SSH to push and pull (select )
- On your local file system (select )

Server


One advantage of choosing Git as your source control system is that there are many Git hosting services on the market. These services make it easy to create a remote repository. With **git4G** you can easily add the URL of this repository to your project and you are ready to push and pull to/from this remote repository.

Local file system

Another option is to have your remote repository on your local file system. Just browse to the location of the remote repository. If you have not created one yet, browse to the desired destination and **git4G** asks you to create a bare repository to push and pull to/from it.



Indication of the current state of the project items in NI LabVIEW Project Explorer

When opening a LabVIEW – project, **git4G** searches for a repository, which belongs to the project, and checks its state. Further on, the state will be checked periodically if “Periodic Status Check” box is checked (**git4G** Settings, page 25) or you can do that check manually by pressings the button  (Update) in the toolbar.

If a project has a corresponding repository, the elements in the Project Explorer get overlay icons to show their current state.

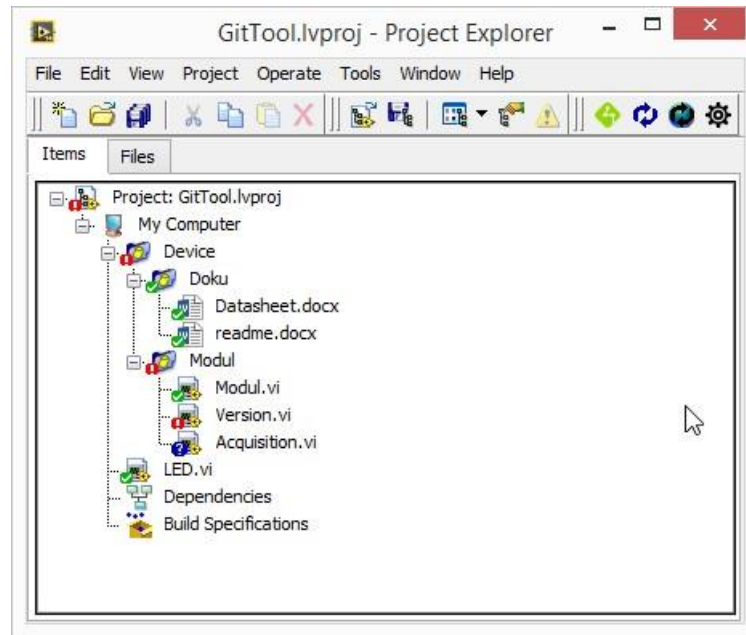


Figure 13: Current state of project items marked with overlay icons





Icon	File	Folder	Project
	Up to date	All files in folder are up to date	All files in the repository are up to date – the repository is "clean"
	File has been changed since last commit	One or more files in folder have been changed since last commit	One or more files in repository have been changed since last commit or are unknown to Git
	File unknown to Git	-	-
	There is a merge conflict with this file	One or more files inside folder have a merge conflict	One or more files in repository have a merge conflict
No icon	File will be ignored (see ".gitignore"-file)	-	-

Table 1: Overlay Icons

If you encounter performance issues using the periodic check (e.g. large project with a lot of files not "clean") it could be helpful to switch off the periodic check (-> Settings).

Git Menu

Opening the Git menu gives you an overview about the status of the repository and its containing files.

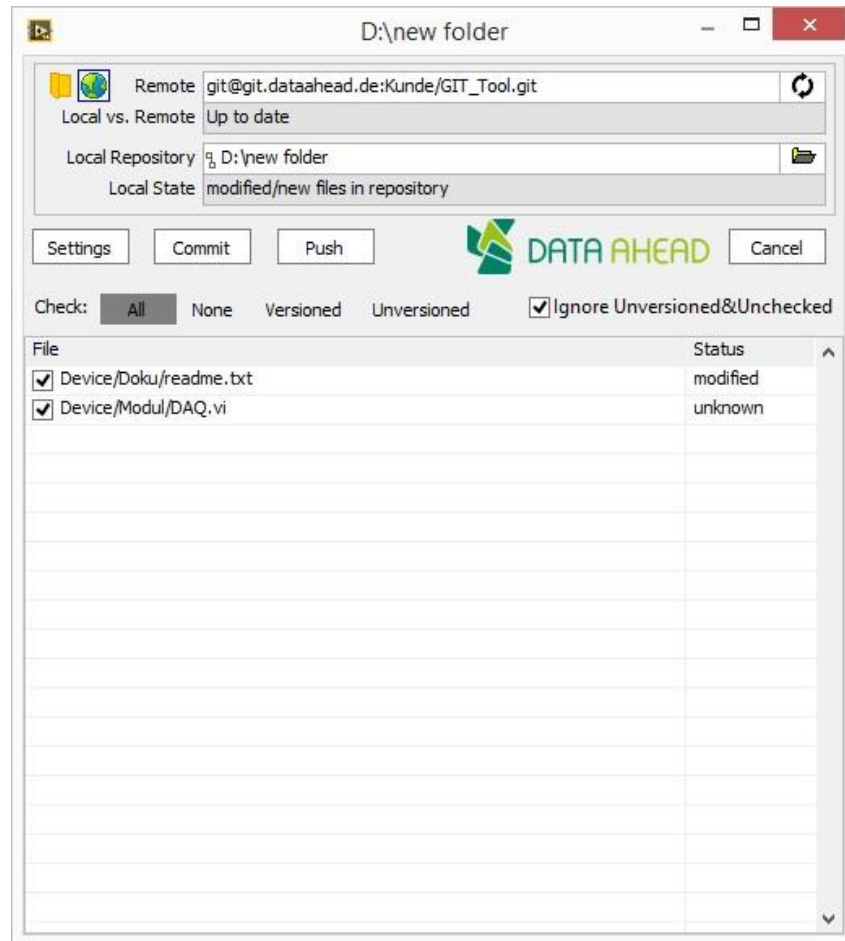




Figure 14: Git Menu

If a remote repository was configured for the project, the URL will be shown and, if there is connection to the server, a comparison between your local and the remote repository will be performed when opening the Git menu. The result will be displayed at "**Local vs. Remote**". Later on you can perform a comparison by pressing the  (Remote Update) button.

You can change to a different local repository using the  button and browsing to the path of the repository.

The **git4G** Git menu offers its functions depending on the status of the repository.

If there are files to add/commit the "**Commit**"-button will be shown.

If the path doesn't belong to a Git repository the "**Init**"-button gives you the option to create a repository.

If a remote repository was configured and your local repository is "behind" the remote the "**Pull**" button will be shown. If your local repository is "ahead" the remote the "**Push**" button will be shown.

Note: if your local repository is "ahead" and "behind" you first need to pull before you can push.

If there are files in the repository not identical to the last commit, a list with all these files will be shown on the bottom of the window. Each file gets a checkbox that allows you to choose whether the file should be committed or not. To check/uncheck multiple files at once you can use the buttons **"All"**, **"None"**, **"Versioned"** and **"Unversioned"**.

If you check **"Ignore Unversioned&Unchecked"** all "unknown" files in the list that are unchecked will automatically be ignored by Git after committing.

A right-click on items in the list gives you the option to perform certain functions to these elements or open the Log window for the file.

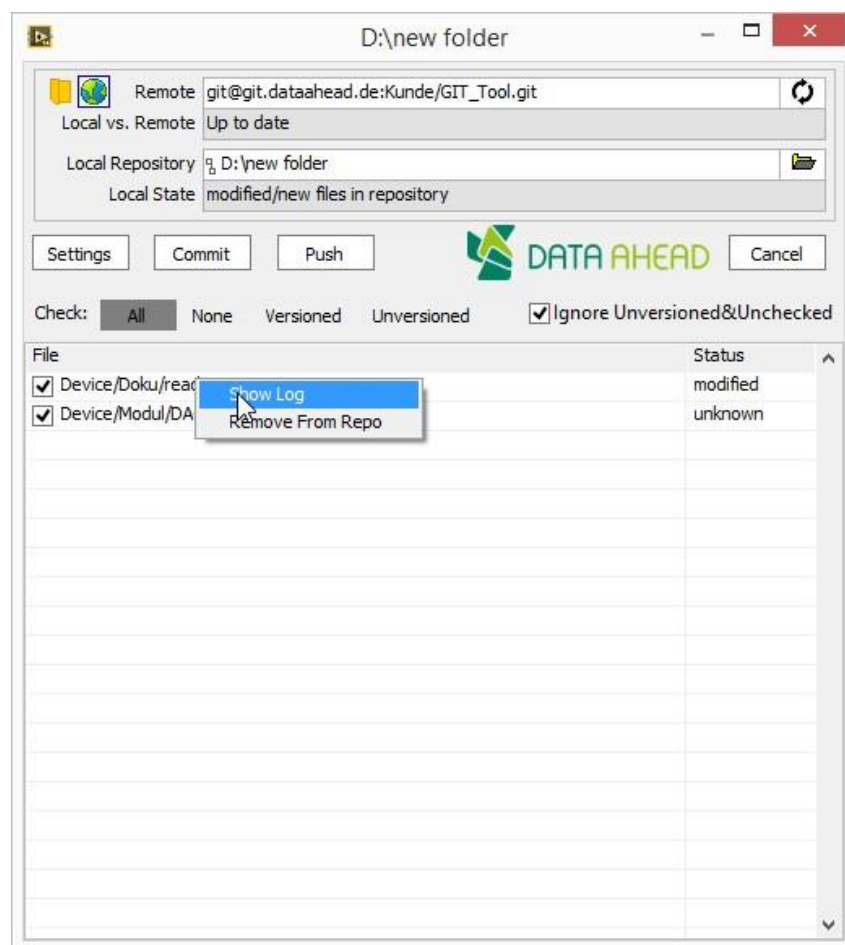


Figure 15: Git Menu with context menu for selected item

Tools Menu

git4G extends the LabVIEW Tools Menu by a **git4G** submenu with the following functions:

- **Git Menu:** Open the Git menu
- **Add & Commit All:** All files get committed. Files that are not yet part of the repository will be added before automatically.
- **Push:** Pushes from the local to the remote repository.
- **Pull:** Pulls from the remote to the local repository
- **Revert All:** Reverts all files on disk to the state of the last commit.
- **Remote Update:** Compares the lokal repository vs. the remote repository.
- **Clone:** Creates a local copy of a repository
- **Show log:** Shows the history of the project in the Log window.
- **Settings:** Open the **git4G** settings menu (page 25)

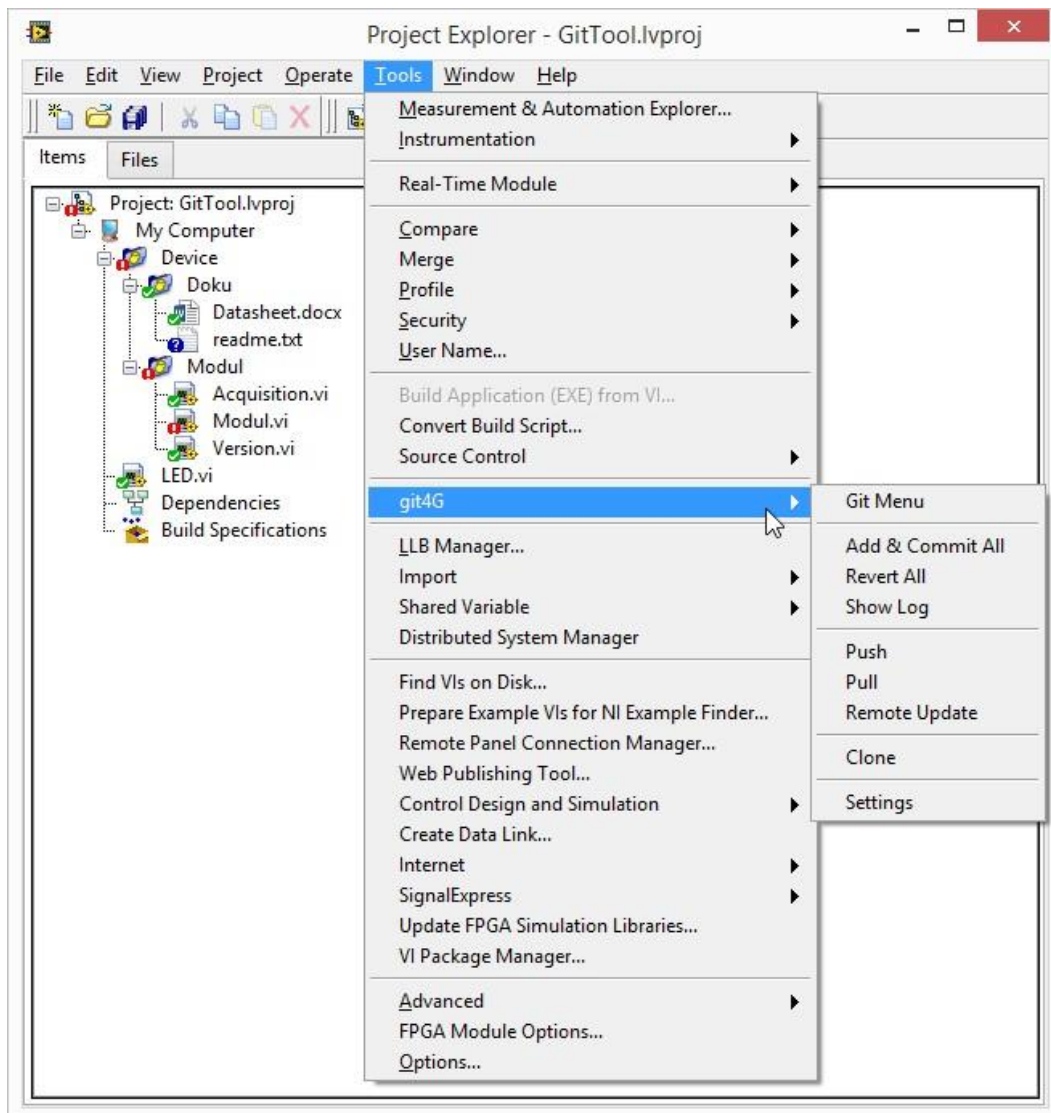


Figure 16: Tools Menu

Context Menu (Project Explorer Item)

git4G extends the context menu in the project explorer with Git functions. This context menu shows you the Git functions corresponding to the repository status/ current file status.

Project functionality:

- **Add & Commit All:** All unknown files will be added to the repository. Afterwards all changes will be committed.
- **Revert All:** Resets all modified files in the project to the state of the last commit.
- **Push:** Pushes from the local to the remote repository.
- **Pull:** Pulls from the remote to the local repository.
- **Show Log:** Shows the history of the project in the Log window.
- **Checkout All Ours/Theirs:** This allows you to switch between your version of the project files with a merge conflict and the version that was modified from a different location.

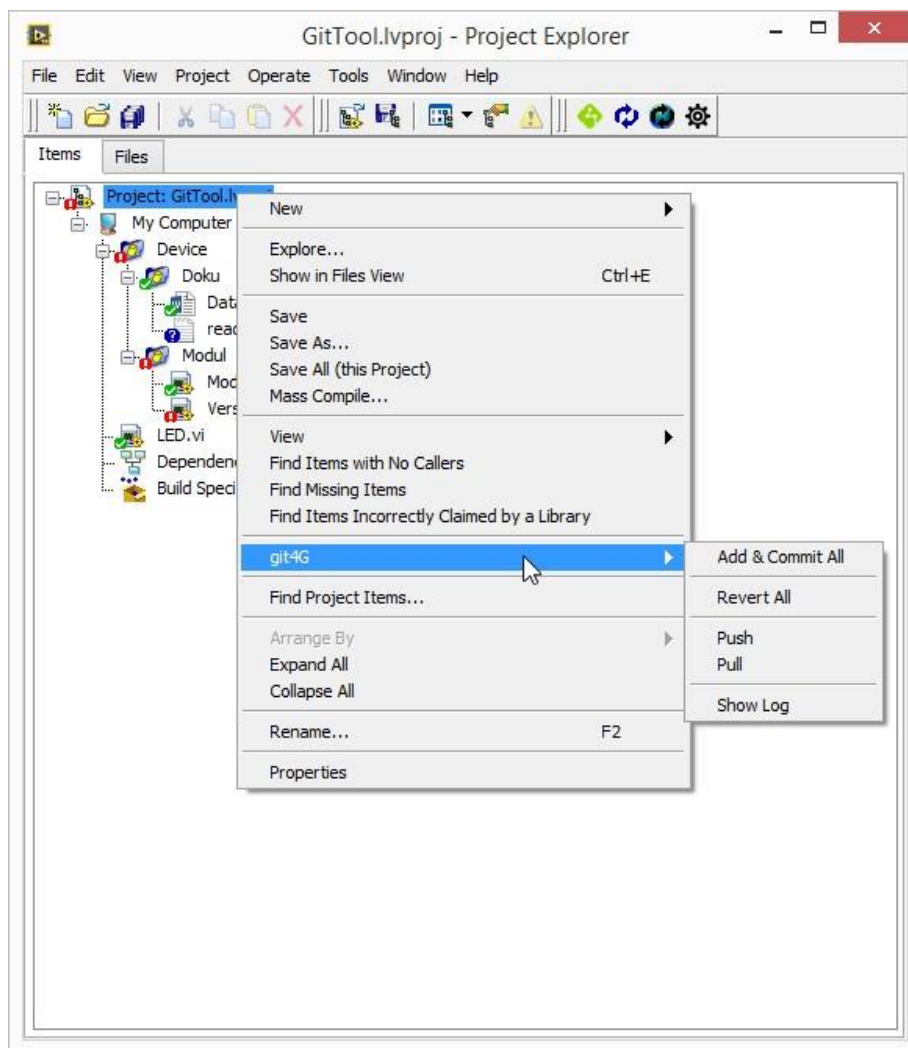


Figure 17: Project Pop-up Menu

Folder functionality:

- **Add All Items in Folder:** Adds all files in the selected folder to the local repository.
- **Commit All items in Folder:** Commits all files in the folder.
- **Revert All items in Folder:** Resets all files in the selected folder to the last commit.
- **Ignore Folder:** Ignores the whole folder with all files included.

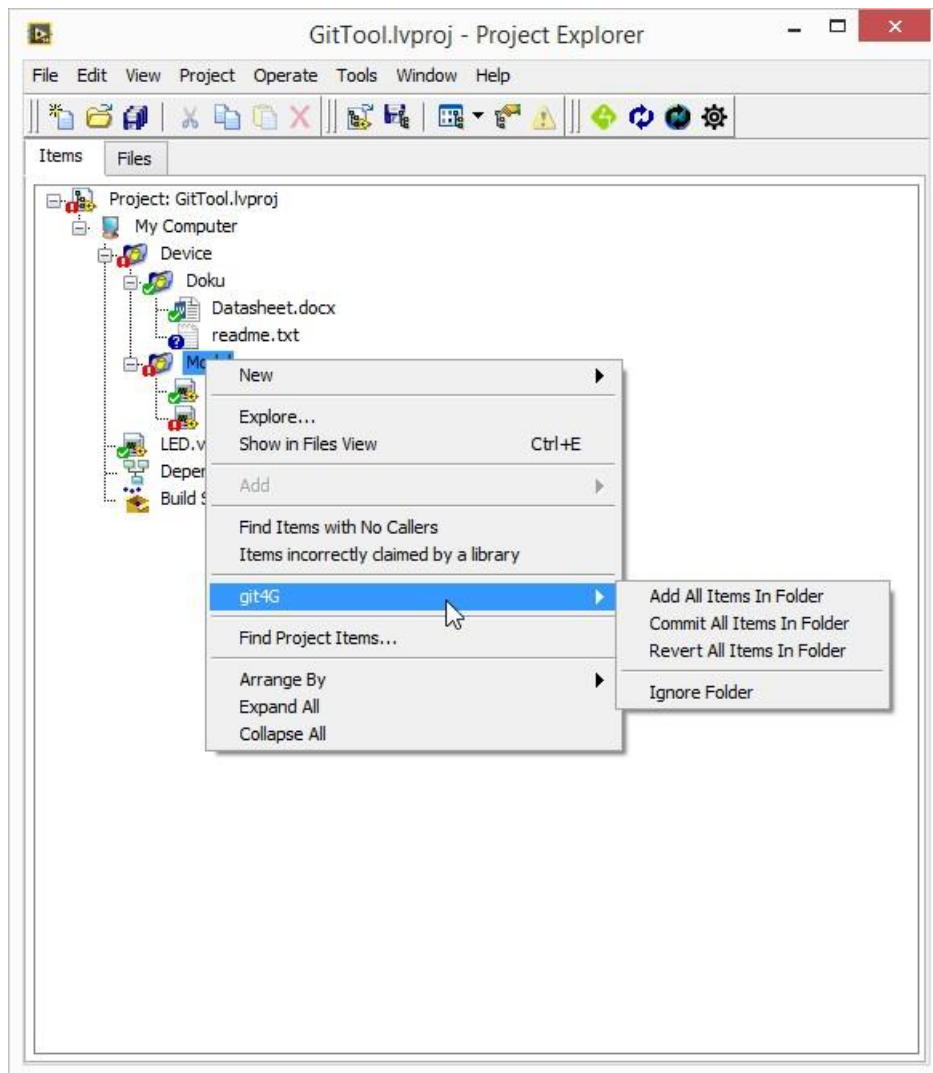


Figure 18: Folder Pop-up Menu

Single file functionality:

- **Add:** Adds the selected file to the local repository.
- **Ignore:** Adds the selected file to the .gitignore file.
- **Ignore Data Type:** Ignores all files of this data type in the entire repository.
- **Commit:** Commits the selected file.
- **Revert:** Resets the selected file to the state of the last commit.
- **Show Log:** Shows the history of the file in the Log window.
- **Checkout Ours:** in case of a merge conflict: switch to your version of the (see Merge Conflict, page 24).
- **Checkout Theirs:** switch to the version of the file that was modified from a different copy of the repository
- **Resolve Conflict:** Resolves the merge conflict by using the selected file version

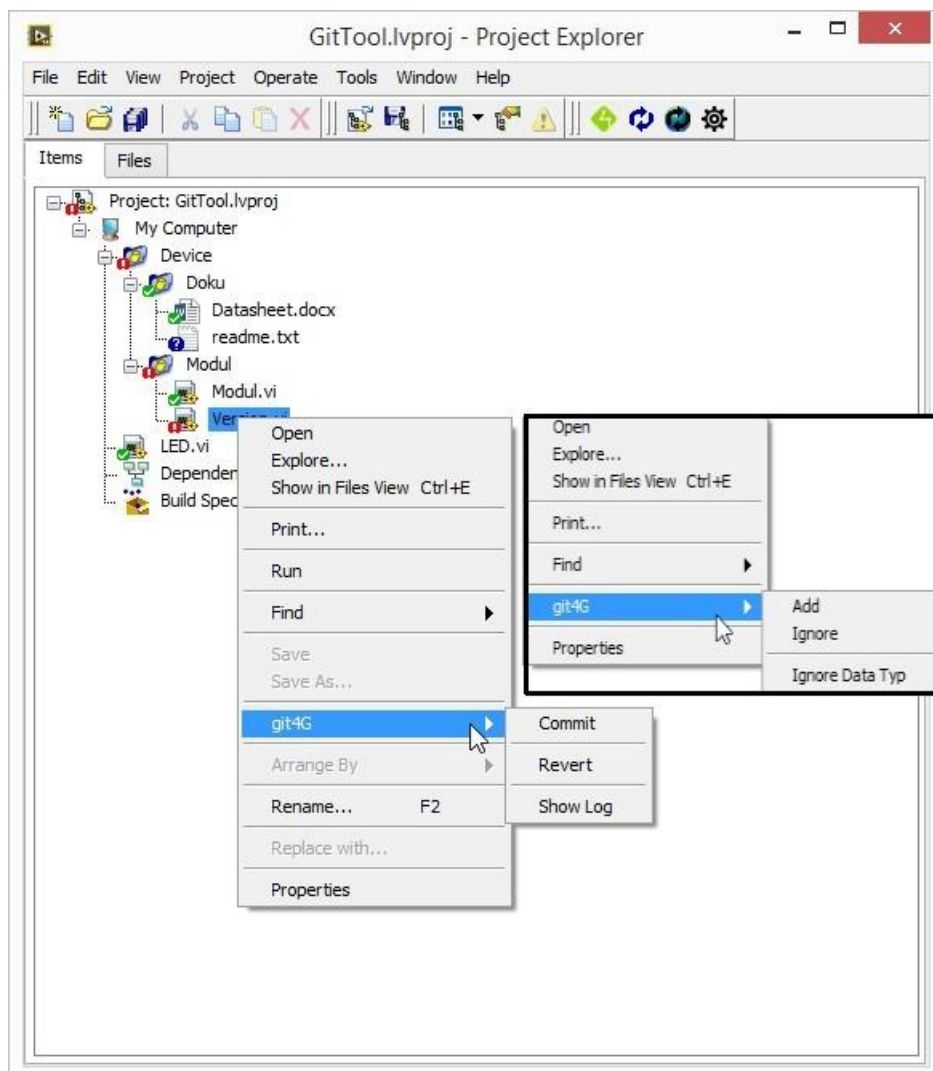


Figure 19: File Pop-up Menu

Tagging

git4G gives you the option to tag specific points in the project history as being important.

You can add a tag at the time of the commit:

Before every commit, the "Commit Message" window will open. Checking the "Tag" box and typing the desired tag into the field right next to the box, will add this tag to the commit.

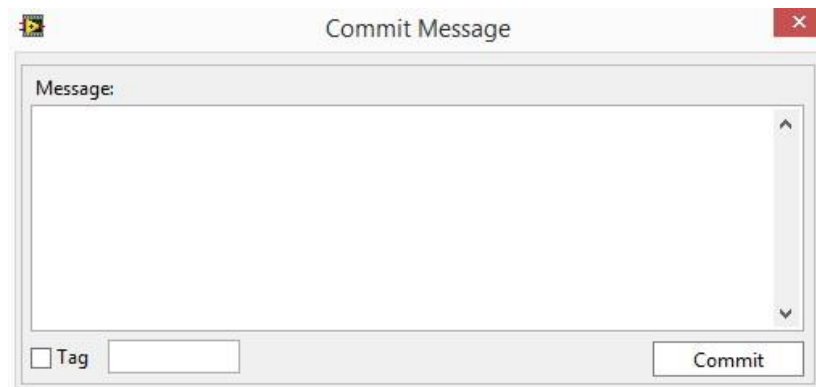


Figure 20: Commit Message

In the "Log Window" it is possible to add tags to commits in the past (see Log Window, page 22)

Clone

With **git4G** you can create a local copy of a repository using "Clone". Go to "Tools" -> "git4G" -> "Clone"

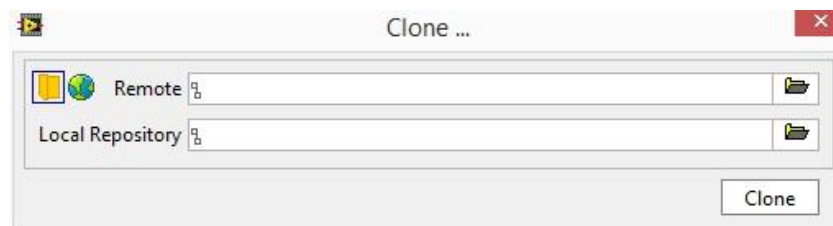


Figure 21: Clone dialog

Type in a remote URL, choose a local folder ("Local Repository") and press the "Clone" button.

Log Window

With **git4G** it is possible to view the history of all commits for the whole project or for a single file.

There are two ways to open the Log Window for **project**:

- LabVIEW Tools menu -> git4G -> Show Log
- In Project Explorer right-click on the project -> git4G -> Show Log

In the top list, you can see the history of all commits. Select a commit to display the whole commit message (field below) and the details for all the files that have been changed (list on the bottom).

A right-click on the commit gives the option to save a zip-archive of the project in the state of that specific commit. It is also possible to add tags to specific commits.

A right-click on a file in the list on the bottom allows you to save a copy of that file in the state of the selected commit.

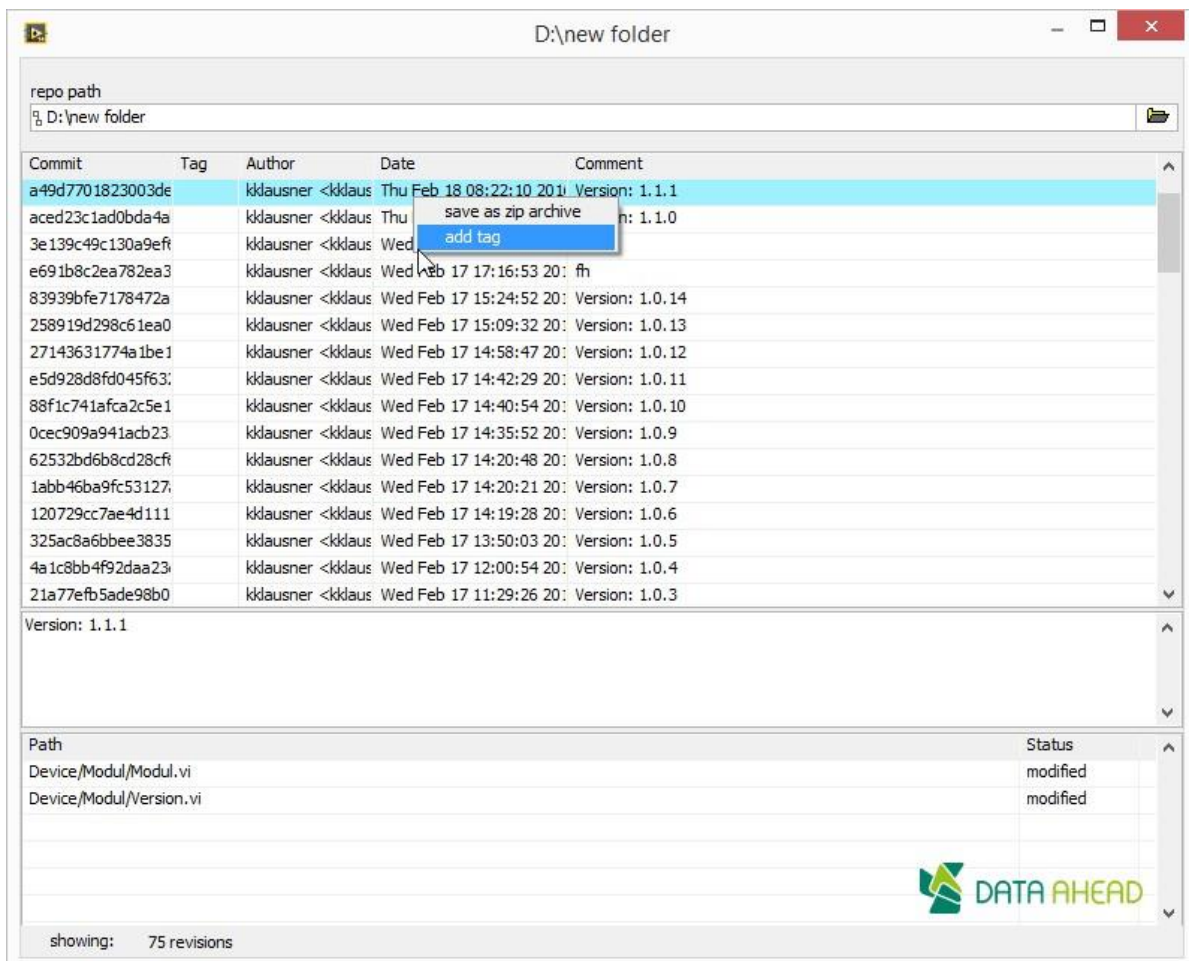


Figure 22: Log window for a project

If you want to open the Log window for a single file, you can right-click the file in the Project Explorer and select git4G -> Show Log or right-click on a file in the file list of the Git Menu.

Select a specific commit to see details.

Right-click on a commit gives you the option to save a copy of that file in the state of that specific commit

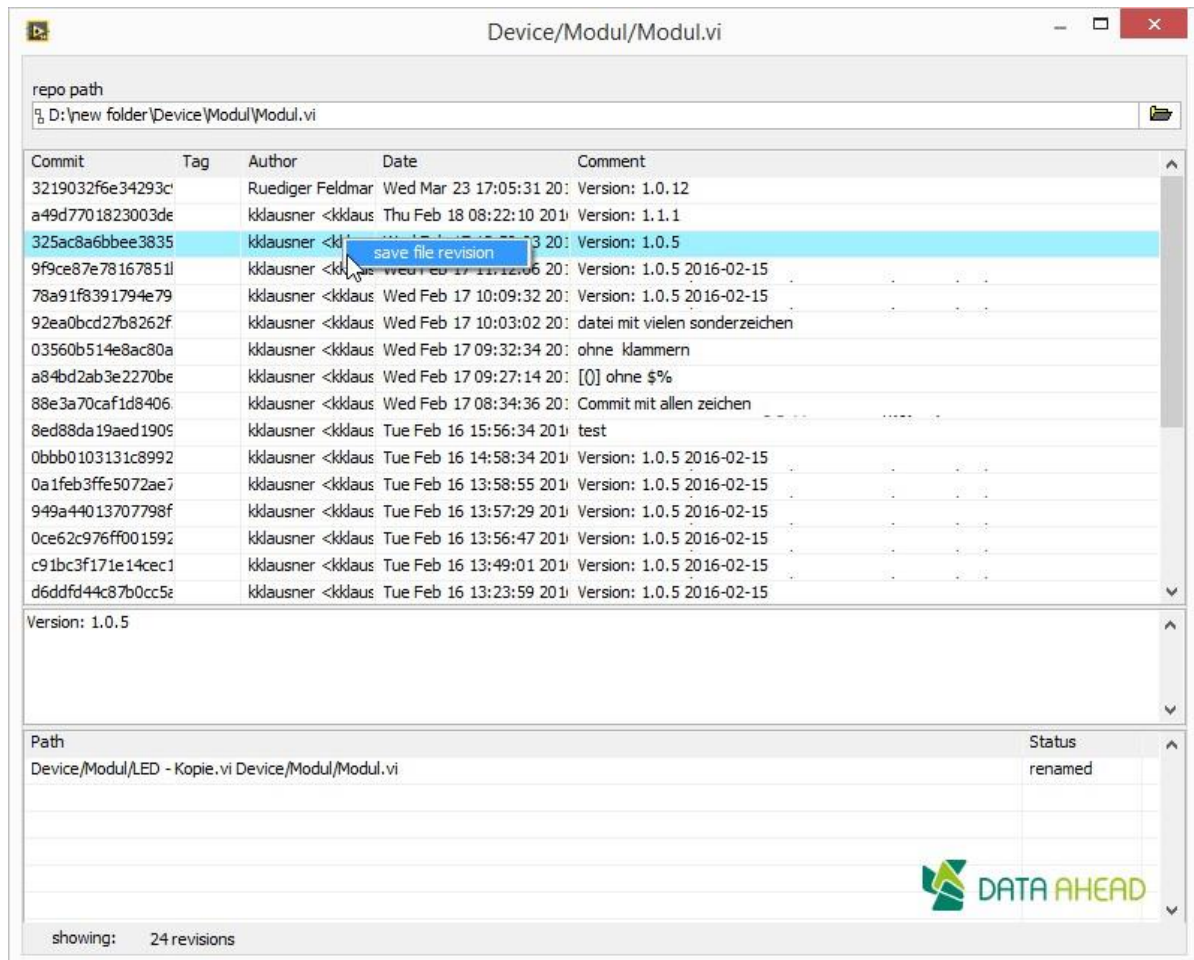


Figure 23: Log window for a file

Merge Conflict

If one (or more files) was modified at different local copies of a repository a merge conflict occurs. Git tries to merge text files but is not able to merge binary files. The user needs to decide, which version of a binary file to keep with or merge the files manually.

If a merge conflict occurs **git4G** marks the file, the folder (if file is located in an auto-populating folder) and the project with the yellow overlay icons (Table 1: Overlay Icons, page 14). Additionally the context menus for files in the file list of the Git menu and the **git4G** context menu for files in LabVIEW Project Explorer are getting entries to allow you to switch between the versions of a file and to resolve the conflict. The context menu of the project itself gets the entries to apply these functions for the whole repository.

Swichting between the file versions:

- **Checkout Ours:** Copies the file version to the project, which was modified from your local repository.
- **Checkout Theirs:** Copies the file version to the project, which was modified from another copy of the repository.

Resolving the conflict:

- **Resolve Conflict:** If you want to keep the version of the file, which was recently selected, choose this option.

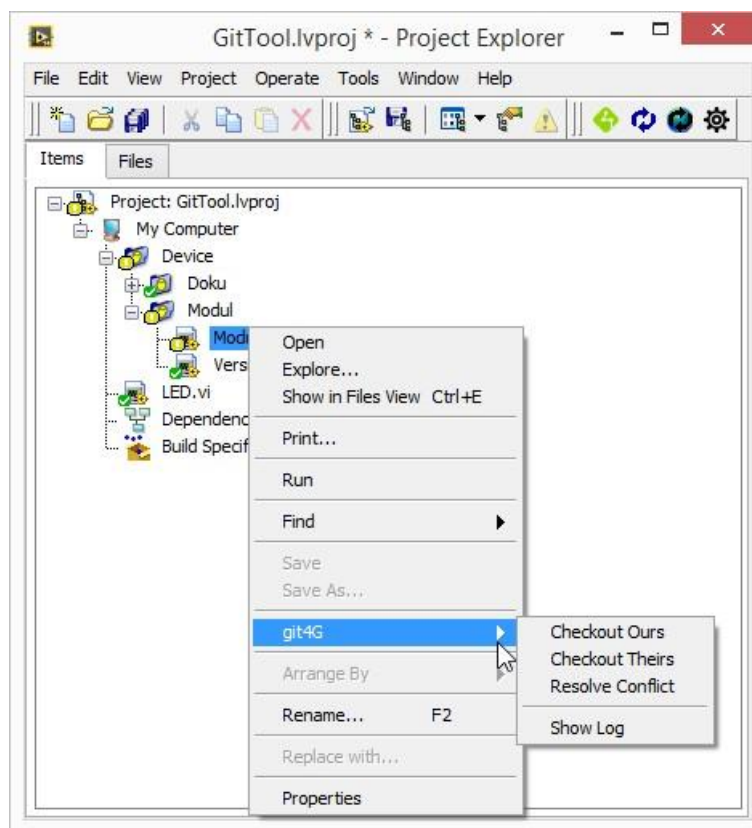



Figure 24: Context menu for a file with a merge conflict

Settings

There are three ways to open the settings menu:

-  button in the git4G toolbar
- Settings button in the Git menu
- LabVIEW Tools menu -> git4G -> Settings

The settings menu has a **git4G** and **Git** section:

git4G: here it is possible to switch on/off the “Periodic Status Check” and modify the update time. This could be helpful if you encounter performance issues. Especially for huge repositories with many new or modified files, the Git status check could cause performing issues.

The current installed version of **git4G** is shown.

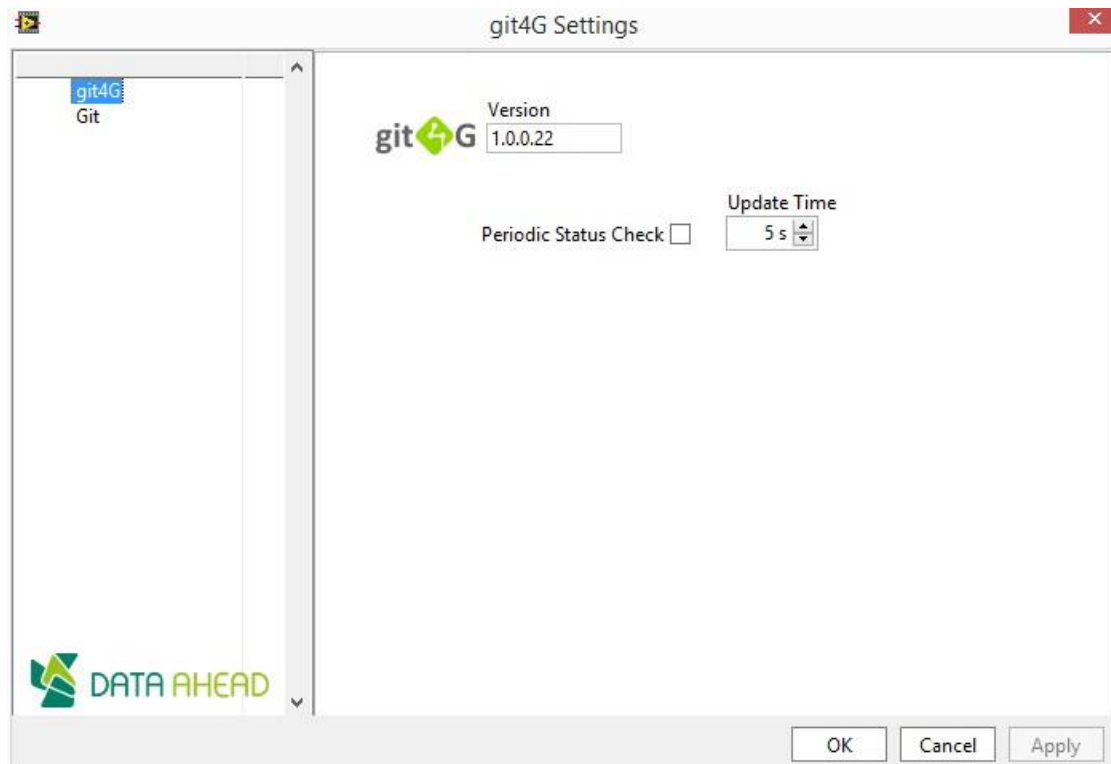


Figure 25: git4G Settings

Git: Here it is possible to modify the global Git settings "Auto Convert CrLf" (we recommend unchecked), "User Name" and "User Email". The current installed version of Git will be shown.

If the settings menu was called from a project that is already under Git control, pressing the button "Open .gitignore" opens the belonging .gitignore file with the standard editor. This allows you to modify the file manually and e.g. remove entries in that file.

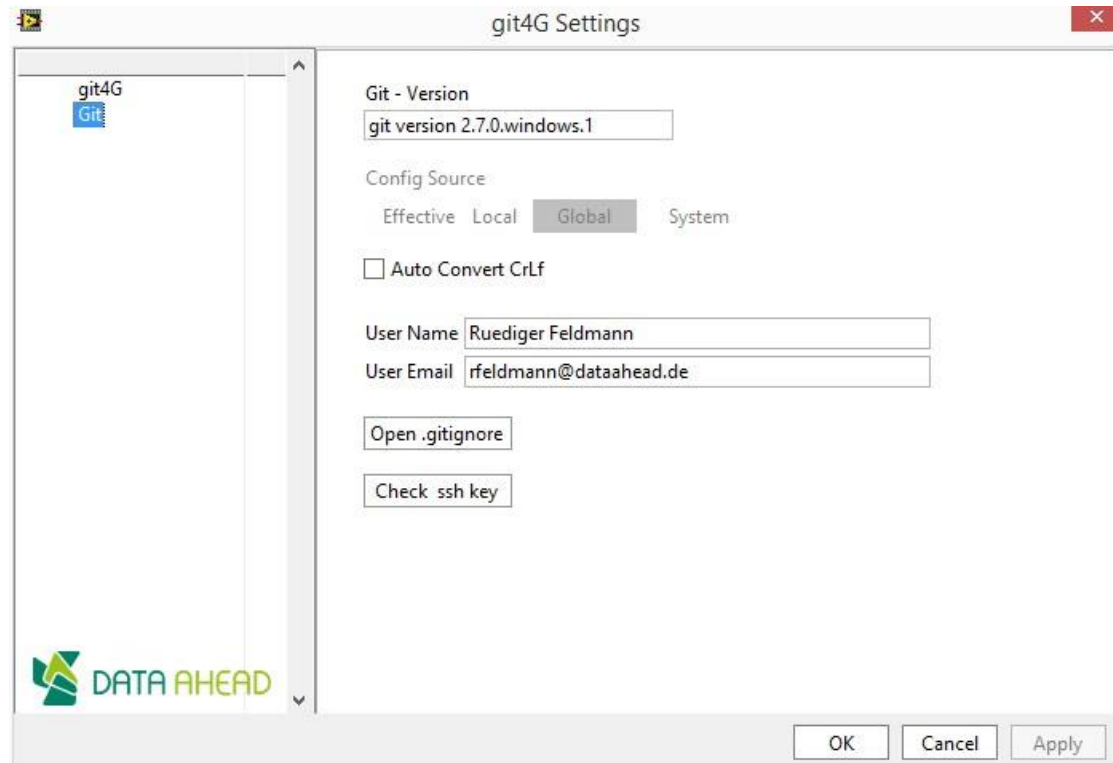


Figure 26: Git Settings

Additionally you can check the SSH key (if using **git4G** with remote repositories on a server).

Check SSH key

To use **git4G** with a server (e.g. hosting service like GitHub or GitLab) a SSH key pair is needed to pull and push to/from the server. For authentication, the public key needs to be copied to the server.

By default **git4G** uses the a SSH key (id_rsa) inside the standard SSH key folder (\.ssh). If you want to create a new key pair, if you want to use a different key or if you want to copy the key to the clipboard to save it at the server press the "Check ssh key" button in the settings window. This button opens a window where the public key of the available SSH key pairs will be shown. If no key was previously selected **git4G** starts with the standard folder for SSH keys. If you want to search a different folder press the button "Browse to ssh key". If you want to select a different key use "Select ssh key".

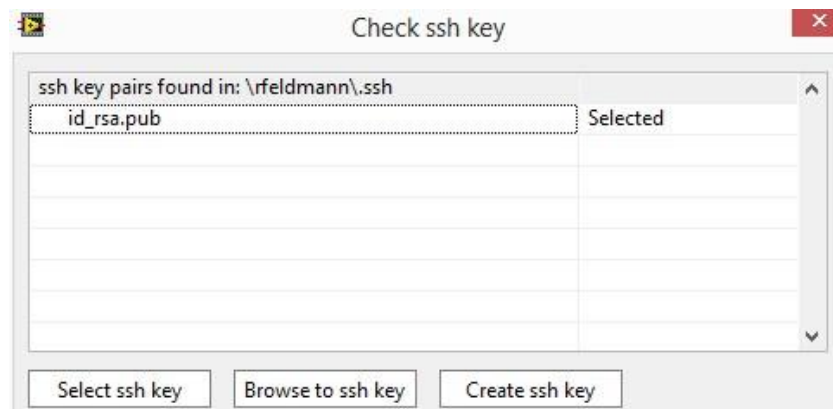


Figure 27: List shows available SSH keys

If you want to create a new SSH key pair press "Create ssh key" and follow the dialog:

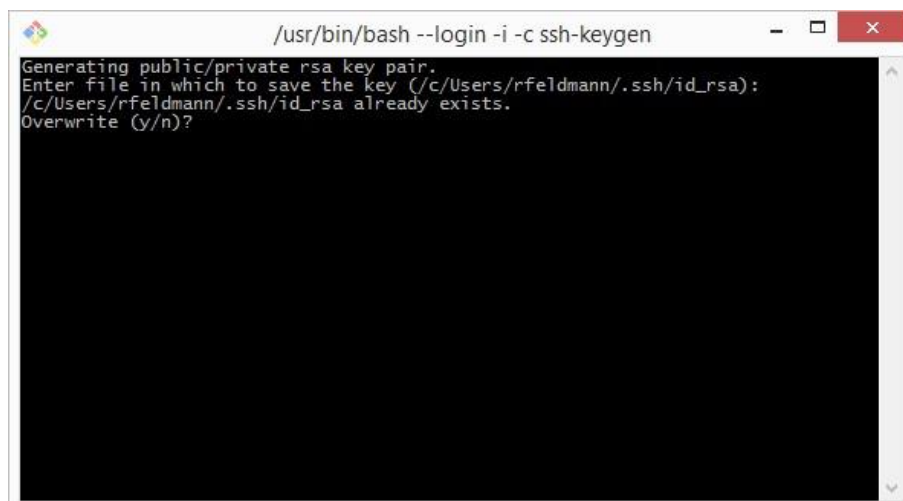


Figure 28: Dialog to create a new SSH key pair

Note: If you don't want to use a password with your SSH key just press the Return button when asking for a password. When using with a password every time the SSH agent starts you need to type in the password.

To show the content of the public SSH key and to get the option to copy the content to the clipboard double click on the SSH key in the list:

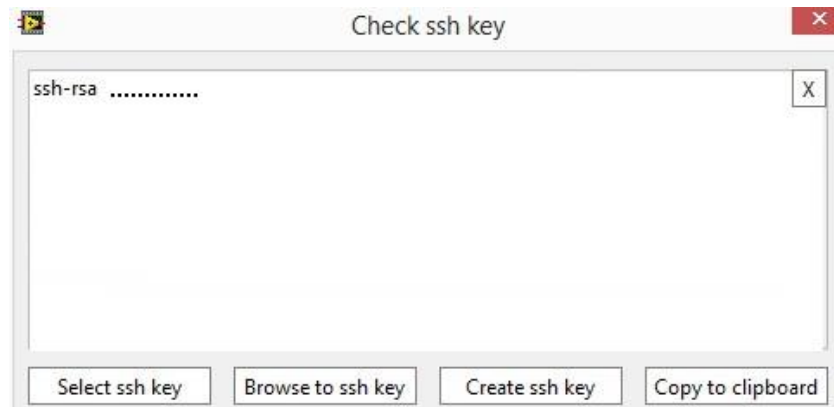


Figure 29: Content of the key (here substituted with) and the option to copy the string to the clipboard

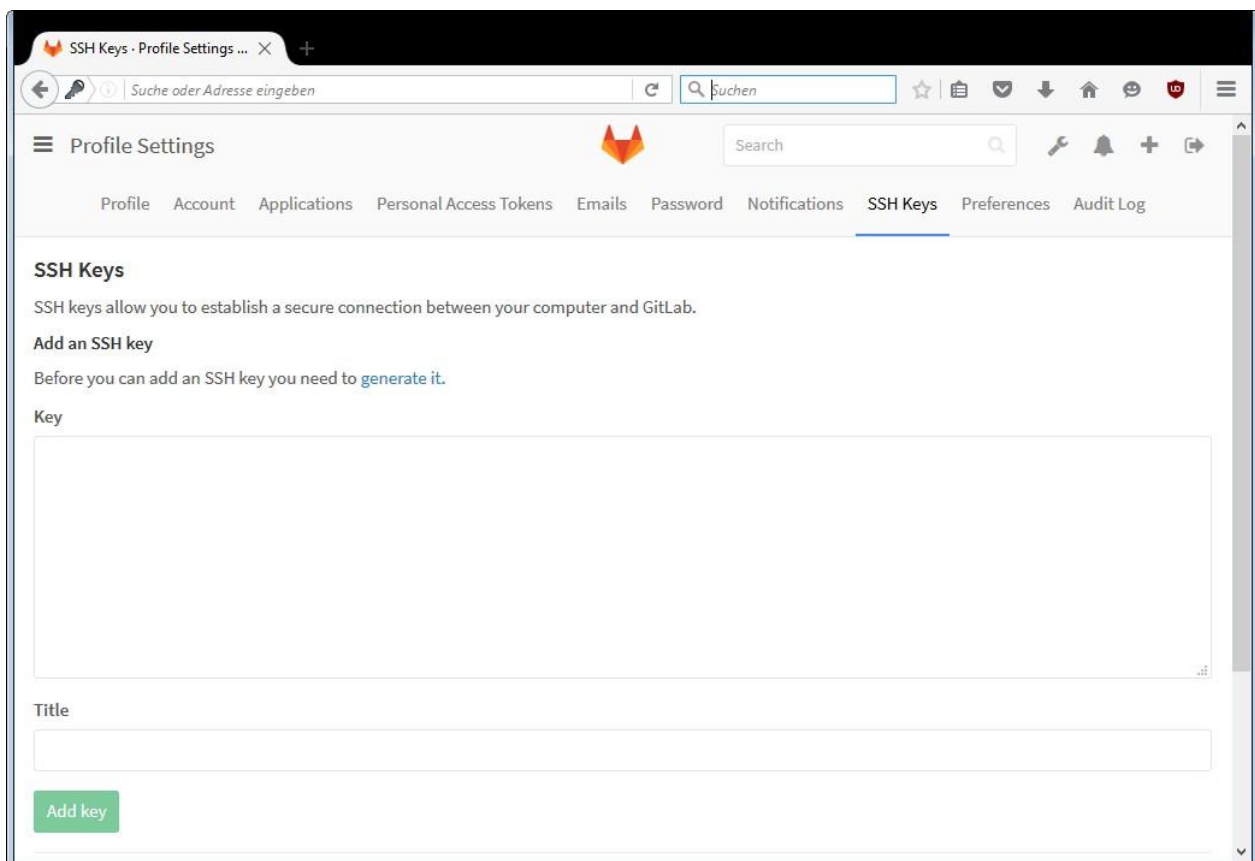


Figure 30: Example GitLab: Add the SSH key from clipboard in your Profile Settings

Support and Feedback

Please contact us at info@dataahead.de

For latest news and support on our toolkits, go to:

<https://decibel.ni.com/content/groups/data-ahead-toolkit-support>

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